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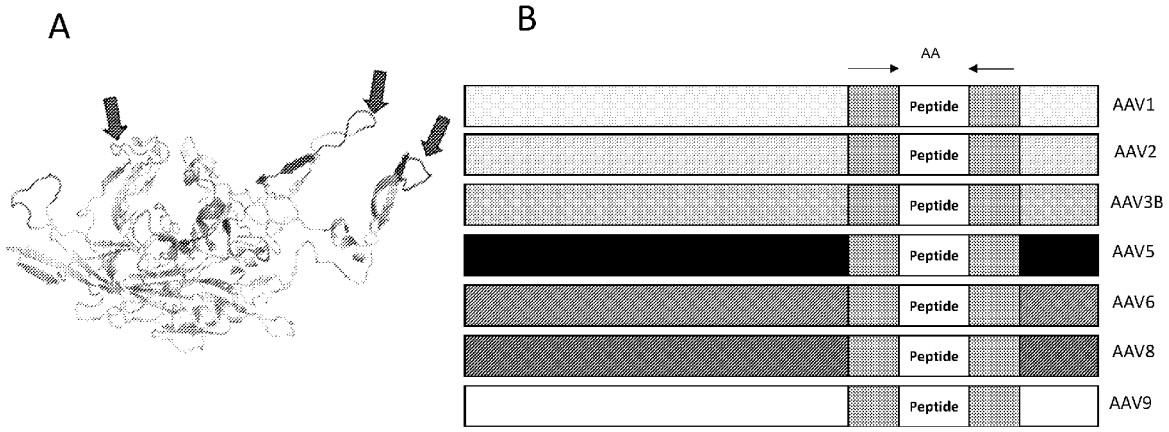
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(54) Title: ENGINEERING AAV

FIG. 1



(57) Abstract: The present disclosure provides methods and compositions to develop AAV capsids with a desired characteristic compared to a natural AAV serotype. These capsids are useful, for example, for the delivery of genome engineering molecules and gene therapy molecules for the treatment of a subject in need thereof.

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ENGINEERING AAV

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of and priority from United States Provisional Applications 62/839,421, filed April 26, 2019; 62/915,386, filed October 15, 2019 and 62/939,094, filed November 22, 2019. Each of the foregoing applications is incorporated by reference herein in its entirety.

SEQUENCE LISTING

[0002] The instant application contains a Sequence Listing which has been submitted electronically in ASCII format and is hereby incorporated by reference in its entirety. Said ASCII copy, created on April 17, 2020, is named 000222-0002-WO1_SL.txt and is 70,821 bytes in size.

TECHNICAL FIELD

[0003] The present disclosure is in the fields of delivery of molecules associated with genome engineering and gene therapy.

BACKGROUND

[0004] Artificial nucleases, such as engineered zinc finger nucleases (ZFN), transcription-activator like effector nucleases (TALENs), the CRISPR/Cas system with an engineered crRNA/tracrRNA ('single guide RNA'), also referred to as RNA guided nucleases, and/or nucleases based on the Argonaute system are revolutionizing the fields of medicine, biotechnology and agriculture. These molecular tools are allowing the genetic manipulation (*e.g.* editing) of genomes in organisms to a level never-before possible. In addition, gene therapy (delivery of a transgene to a cell in the body that is maintained extra-chromosomally and expresses a product encoded by the transgene) is being studied in the clinic to deliver such needed proteins as clotting factors and proteins to treat ocular disorders. The promise of these revolutionary technologies is dependent on efficient delivery of the nuclease systems and/or transgenes to the appropriate tissue in the body.

[0005] Adeno-associated virus (AAV) is a promising *in vitro* and *in vivo* gene delivery vector for delivering nuclease systems described above as well as the vectors associated with gene therapy. There are several naturally occurring ("wild-type")

serotypes and over 100 known variants of AAV, each of which differs in amino acid sequence, particularly within the hypervariable regions of the capsid proteins, and thus in their gene delivery properties. AAV has not been associated with any human disease, making recombinant AAV attractive for clinical applications. AAV also displays several additional favorable characteristics including an absence of pathogenicity, low immunogenicity, and stable episomal transgene expression. However, the use of AAV also has some issues including promiscuous viral tropism, limited ability to circumvent biological barriers, and the high prevalence of pre-existing neutralizing antibodies against AAV capsid proteins in human subjects that potentially limit their efficacy. Thus, improvements in AAV design are needed to fully exploit these new systems.

SUMMARY

[0006] The present disclosure provides methods and compositions to develop AAV capsids with a desired characteristic compared to a natural AAV serotype. These capsids are useful, for example, for the delivery of genome engineering molecules and gene therapy molecules for the treatment of a subject in need thereof. In some embodiments, the capsids are used to deliver a payload to a desired tissue, cell or organelle.

[0007] In a first aspect, the present disclosure provides a method of identifying an AAV capsid variant with a desired characteristic compared to a natural AAV serotype, comprising: (i) contacting a cell, cell line, or tissue with a library of AAV variants, wherein each member of the library comprises: a) a nucleic acid encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and one or more of: b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a); c) a nucleic acid encoding a localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein; (ii) allowing the AAV variants in said library to transduce the cell, cell line, or tissue; (iii) recovering from the cell, cell line, or tissue the AAV variant; and (iv) identifying the AAV capsid variant with the desired characteristic.

[0008] In some embodiments, each member of the library used in the methods disclosed herein comprises a) a nucleic acid encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein and b) one or more silent mutations in the nucleic acid sequence

flanking the peptide insertion site in the AAV variant capsid protein. In some embodiments, each member of the library used in the methods disclosed herein comprises a) a nucleic acid encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein, and c) a nucleic acid encoding a localization signal. In some embodiments, each member of the library used in the methods disclosed herein comprises a) a nucleic acid encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein, c) a nucleic acid encoding a localization signal, and d) a nucleic acid comprising a barcode. In some embodiments, each member of the library used in the methods disclosed herein comprises a) a nucleic acid encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein, c) a nucleic acid encoding a localization signal, d) a nucleic acid comprising a barcode, and e) a nucleic acid encoding a reporter protein.

[0009] In some embodiments, each member of the library used in the methods disclosed herein comprises a) a nucleic acid encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and c) a nucleic acid encoding a localization signal. In some embodiments, each member of the library used in the methods disclosed herein comprises a) a nucleic acid encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, c) a nucleic acid encoding a localization signal, and d) a nucleic acid comprising a barcode. In some embodiments, each member of the library used in the methods disclosed herein comprises a) a nucleic acid encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, c) a nucleic acid encoding a localization signal, and e) a nucleic acid encoding a reporter protein. In some embodiments, each member of the library used in the methods disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop

of the variant capsid protein, c) a nucleic acid encoding a localization signal, d) a nucleic acid comprising a barcode, and e) a nucleic acid encoding a reporter protein.

[0010] In some embodiments, each member of the library used in the methods disclosed herein comprises a) a nucleic acid encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and d) a nucleic acid comprising a barcode. In some embodiments, each member of the library used in the methods disclosed herein comprises a) a nucleic acid encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and e) a nucleic acid encoding a reporter protein. In some embodiments, each member of the library used in the methods disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and e) a nucleic acid encoding a reporter protein.

[0011] In a second aspect, the present disclosure provides a method of identifying an AAV capsid variant with a desired characteristic compared to a natural AAV serotype, comprising: (i) contacting a cell, cell line, or tissue with a library of AAV variants, wherein each member of the library comprises: a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and one or more of: b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a), wherein the one or more silent mutations are in the nucleic acid sequence flanking the peptide insertion site; c) a nucleic acid encoding a localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein; (ii) allowing the AAV variants in said library to transduce the cell, cell line, or tissue; (iii) recovering from the cell, cell line, or tissue the AAV variant; and (iv) identifying the AAV capsid variant with the desired characteristic.

[0012] In some embodiments, each member of the library used in the methods disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a), wherein the one or more silent mutations are in the nucleic acid sequence flanking the peptide insertion site. In some embodiments, each member of the library used in the methods disclosed herein comprises a) an AAV variant capsid protein

comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a), wherein the one or more silent mutations are in the nucleic acid sequence flanking the peptide insertion site, and c) a nucleic acid encoding a localization signal. In some embodiments, each member of the library used in the methods disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a), wherein the one or more silent mutations are in the nucleic acid sequence flanking the peptide insertion site, c) a nucleic acid encoding a localization signal, and d) a nucleic acid comprising a barcode. In some embodiments, each member of the library used in the methods disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a), wherein the one or more silent mutations are in the nucleic acid sequence flanking the peptide insertion site, c) a nucleic acid encoding a localization signal, d) a nucleic acid comprising a barcode, and e) a nucleic acid encoding a reporter protein.

[0013] In some embodiments, each member of the library used in the methods disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and c) a nucleic acid encoding a localization signal. In some embodiments, each member of the library used in the methods disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, c) a nucleic acid encoding a localization signal, and d) a nucleic acid comprising a barcode. In some embodiments, each member of the library used in the methods disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, c) a nucleic acid encoding a localization signal, and e) a nucleic acid encoding a reporter protein. In some embodiments, each member of the library used in the methods disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, c) a nucleic acid encoding a localization signal, d) a nucleic acid comprising a barcode, and e) a nucleic acid encoding a reporter protein.

[0014] In some embodiments, each member of the library used in the methods disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and d) a nucleic acid comprising a barcode. In some embodiments, each member of the library used in the methods disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, d) a nucleic acid comprising a barcode, and e) a nucleic acid encoding a reporter protein. In some embodiments, each member of the library used in the methods disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and e) a nucleic acid encoding a reporter protein.

[0015] In some embodiments, the nucleic acid encoding an AAV variant capsid protein, and the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are located in separate nucleic acid molecules. In other embodiments, the nucleic acid encoding an AAV variant capsid protein, the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are located in one nucleic acid molecule. In some embodiments, the nucleic acid encoding an AAV variant capsid protein, and the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are linked to each other in any order. In some embodiments, each member of the library comprises: a 5'ITR sequence, the nucleic acid comprising a barcode, the nucleic acid encoding a reporter protein, the nucleic acid encoding an AAV variant capsid protein, and a 3'ITR sequence, in that order.

[0016] In some embodiments, the library of AAV variants used in the methods disclosed herein comprises AAV variant capsid proteins derived from two or more AAV serotypes. In some embodiments, the AAV serotype is selected from one or more of: AAV1, AAV2, AAV3B, AAV5, AAV6, AAV8, AAV9, AAV3, AAV4, AAV7, AAV11, AAVrh10, AAVrh39, and AAVrh74.

[0017] In some embodiments, the nucleic acid encoding the reporter protein and the nucleic acid encoding the AAV variant capsid are under the control of separate promoters. In some embodiments, the nucleic acid encoding the reporter protein and the nucleic acid encoding the AAV variant capsid are each independently operatively linked to a promoter.

[0018] In some embodiments, the desired characteristic of the AAV capsid variant identified by the methods disclosed herein is enhanced cell or tissue tropism.

[0019] In a third aspect, the disclosure provides a method of identifying an AAV capsid variant with a desired characteristic compared to a natural AAV serotype, comprising: (i) inserting a plurality of nucleic acids encoding peptides, into a population of nucleic acids encoding a hypervariable and/or surface-exposed loop of an AAV capsid protein to create a library of nucleic acids encoding AAV variant capsid proteins; (ii) linking each nucleic acid encoding an AAV variant capsid protein in said library to one or more of: (a) a nucleic acid comprising a barcode, (b) a nucleic acid encoding a reporter protein, and (c) a nucleic acid encoding a localization signal; (iii) manufacturing a library of AAV variants in producer cells by providing adenovirus helper and AAV rep functions *in trans*; (iv) purifying the library of AAV variants; (v) contacting a cell, cell line, or tissue with the library of AAV variants; (vi) recovering the AAV variants from the target cell, cell line, or tissue; and (vii) identifying the AAV capsid variant with the desired characteristic.

[0020] In some embodiments, each nucleic acid encoding an AAV variant capsid protein in said library used in the methods disclosed herein is linked to (a) a nucleic acid comprising a barcode. In some embodiments, each nucleic acid encoding an AAV variant capsid protein in said library used in the methods disclosed herein is linked to (a) a nucleic acid comprising a barcode, and (b) a nucleic acid encoding a reporter protein. In some embodiments, each nucleic acid encoding an AAV variant capsid protein in said library used in the methods disclosed herein is linked to (a) a nucleic acid comprising a barcode, and (c) a nucleic acid encoding a localization signal. In some embodiments, each nucleic acid encoding an AAV variant capsid protein in said library used in the methods disclosed herein is linked to (a) a nucleic acid comprising a barcode, (b) a nucleic acid encoding a reporter protein, and (c) a nucleic acid encoding a localization signal. In some embodiments, each nucleic acid encoding an AAV variant capsid protein in said library used in the methods disclosed herein is linked to (a) a nucleic acid comprising a barcode, and (d) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site. In some embodiments, each nucleic acid encoding an AAV variant capsid protein in said library used in the methods disclosed herein is linked to (a) a nucleic acid comprising a barcode, (b) a nucleic acid encoding a reporter protein, and (d) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site. In some embodiments, each nucleic acid

encoding an AAV variant capsid protein in said library used in the methods disclosed herein is linked to (a) a nucleic acid comprising a barcode, (b) a nucleic acid encoding a reporter protein, (c) a nucleic acid encoding a localization signal and (d) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site.

[0021] In some embodiments, each nucleic acid encoding an AAV variant capsid protein in said library used in the methods disclosed herein is linked to (b) a nucleic acid encoding a reporter protein. In some embodiments, each nucleic acid encoding an AAV variant capsid protein in said library used in the methods disclosed herein is linked to (b) a nucleic acid encoding a reporter protein, and (c) a nucleic acid encoding a localization signal. In some embodiments, each nucleic acid encoding an AAV variant capsid protein in said library used in the methods disclosed herein is linked to (c) a nucleic acid encoding a localization signal. In some embodiments, each nucleic acid encoding a AAV variant capsid protein further comprises one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site. In some embodiments, each nucleic acid encoding an AAV variant capsid protein in said library used in the methods disclosed herein is linked to (b) a nucleic acid encoding a reporter protein, and (d) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site. In some embodiments, each nucleic acid encoding an AAV variant capsid protein in said library used in the methods disclosed herein is linked to (c) a nucleic acid encoding a localization signal and (d) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site. In some embodiments, each nucleic acid encoding an AAV variant capsid protein in said library used in the methods disclosed herein is linked to (d) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site.

[0022] In some embodiments, step (iv) further comprises combining libraries of variant AAVs based on two or more AAV serotypes to generate a single pool. In some embodiments, the population of nucleic acid sequences encoding a hypervariable and/or surface-exposed loop of an AAV capsid protein used in the methods disclosed herein comprises sequences derived from two or more AAV serotypes. In some embodiments, the AAV serotype is selected from one or more of: AAV1, AAV2, AAV3B, AAV5, AAV6, AAV8, AAV9, AAV3, AAV4, AAV7, AAV11, AAVrh10, AAVrh39, and AAVrh74.

[0023] In some embodiments, the adenovirus helper functions used in the methods disclosed herein comprise one or more of E2A, E4, VA, E1A, and E1B. In some

embodiments, the AAV rep function comprises rep78, rep 68, rep 52 and rep40 genes. In some embodiments the start codon of the rep78 and/or rep68 gene used in the methods disclosed herein is modified from ACG to ATG. In some embodiments, the producer cells used in the methods disclosed herein are HEK293 cells.

[0024] In some embodiments, the nucleic acid encoding an AAV variant capsid protein, the nucleic acid comprising a barcode, the nucleic acid encoding a reporter protein, and/or a nucleic acid encoding a localization signal used in the methods disclosed herein are linked to each other in any order. In some embodiments, each member of the library comprises: a 5'ITR sequence, the nucleic acid comprising a barcode, the nucleic acid encoding a reporter protein, the nucleic acid encoding an AAV variant capsid protein, and a 3'ITR sequence, in that order.

[0025] In some embodiments, the nucleic acid encoding a reporter protein and the nucleic acid encoding the AAV variant capsid used in the methods disclosed herein are under the control of separate promoters. In some embodiments, the nucleic acid encoding a reporter protein and the nuclei acid encoding the AAV variant capsid used in the methods disclosed herein are each independently operatively linked to a promoter.

[0026] In some embodiments, the desired characteristic of the AAV capsid variant is enhanced cell or tissue tropism.

[0027] In some embodiments of the methods disclosed herein, the AAV capsid variant with the desired characteristic is identified through sequencing of the associated barcode. In some embodiments of the methods disclosed herein, the AAV capsid variant with the desired characteristic is identified through sequencing of the associated one or more barcode. In some embodiments, a first barcode operatively linked to a promoter identifies barcoded transcripts in a target cell population, for example neurons or hepatocytes, because the promoter is only expressed in a specific cell population. In some embodiments, a second barcode identifies expression in all cell types, because it is operatively linked to a promoter which drives ubiquitous expression.

[0028] In some embodiments of the methods disclosed herein, the AAV capsid variant with the desired characteristic is identified by purification and sequencing of the AAV genome.

[0029] In some embodiments of the methods disclosed herein, the cell or tissue includes but is not limited to a cell or tissue from the CNS, heart, lung, trachea, esophagus, muscle, bone, cartilage, stomach, pancreas, intestine, liver, bladder, kidney,

ureter, urethra, uterus, fallopian tube, ovary, testes, prostate, eye, blood, lymph, or oral mucosa.

[0030] In some embodiments of the methods disclosed herein, the cell includes, but is not limited to, neurons, glial cells, astrocytes, oligodendroglia, microglia, Schwann cells, ependymal cells, hepatocytes, stellate fat storing cells, Kupffer cells, liver endothelial cells, epithelial cells, cardiomyocytes, smooth muscle cells, T-cells, B cells, hematopoietic stem cells, and embryonic stem cells.

[0031] In some embodiments of the methods disclosed herein, one or more of (i) the nucleic acid encoding a localization signal; (ii) the nucleic acid comprising a barcode; and (iii) the nucleic acid encoding a reporter protein are provided in *trans* with respect to the nucleic acid encoding the AAV variant capsid protein comprising the inserted peptide. In some embodiments of the methods disclosed herein, i) the nucleic acid encoding a localization signal; (ii) the nucleic acid comprising a barcode; and (iii) the nucleic acid encoding a reporter protein are all provided in *trans* with respect to the nucleic acid encoding the AAV variant capsid protein comprising the inserted peptide. In some embodiments of the methods disclosed herein, one or more of (i) the nucleic acid encoding a localization signal; (ii) the nucleic acid comprising a barcode; and (iii) the nucleic acid encoding a reporter protein are provided in *cis* with respect to the nucleic acid encoding the AAV variant capsid protein comprising the inserted peptide. In some embodiments of the methods disclosed herein, i) the nucleic acid encoding a localization signal; (ii) the nucleic acid comprising a barcode; and (iii) the nucleic acid encoding a reporter protein are all provided in *cis* with respect to the nucleic acid encoding the AAV variant capsid protein comprising the inserted peptide. .

[0032] In a fourth aspect, the present disclosure provides a library of AAV variants, wherein each member of said library comprises: a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and one or more of: b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a); c) a nucleic acid encoding a localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein.

[0033] In some embodiments, each member of the library disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein and b) one or more silent mutations in the nucleic acid sequence flanking the

peptide insertion site in the AAV variant capsid protein. In some embodiments, each member of the library disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein, and c) a nucleic acid encoding a localization signal. In some embodiments, each member of the library disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein, c) a nucleic acid encoding a localization signal, and d) a nucleic acid comprising a barcode. In some embodiments, each member of the library disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein, c) a nucleic acid encoding a localization signal, d) a nucleic acid comprising a barcode, and e) a nucleic acid encoding a reporter protein.

[0034] In some embodiments, each member of the library disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and c) a nucleic acid encoding a localization signal. In some embodiments, each member of the library disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, c) a nucleic acid encoding a localization signal, and d) a nucleic acid comprising a barcode. In some embodiments, each member of the library disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, c) a nucleic acid encoding a localization signal, and e) a nucleic acid encoding a reporter protein. In some embodiments, each member of the library disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, c) a nucleic acid encoding a localization signal, d) a nucleic acid comprising a barcode, and e) a nucleic acid encoding a reporter protein.

[0035] In some embodiments, each member of the library disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and d) a nucleic acid comprising a barcode. In some embodiments, each member of the library disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, d) a nucleic acid comprising a barcode, and e) a nucleic acid encoding a reporter protein. In some embodiments, each member of the library disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and e) a nucleic acid encoding a reporter protein.

[0036] In a fifth aspect, the present disclosure provides a library of AAV variants, wherein each member of said library comprises: a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and one or more of: b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a), wherein the one or more silent mutations are in the nucleic acid sequence flanking the peptide insertion site; c) a nucleic acid encoding a localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein.

[0037] In some embodiments, each member of the library disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a), wherein the one or more silent mutations are in the nucleic acid sequence flanking the peptide insertion site. In some embodiments, each member of the library disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a), wherein the one or more silent mutations are in the nucleic acid sequence flanking the peptide insertion site, and c) a nucleic acid encoding a localization signal. In some embodiments, each member of the library disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and b) one or more silent mutations in the

nucleic acid encoding the AAV variant capsid protein of a), wherein the one or more silent mutations are in the nucleic acid sequence flanking the peptide insertion site, c) a nucleic acid encoding a localization signal, and d) a nucleic acid comprising a barcode. In some embodiments, each member of the library disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a), wherein the one or more silent mutations are in the nucleic acid sequence flanking the peptide insertion site, c) a nucleic acid encoding a localization signal, d) a nucleic acid comprising a barcode, and e) a nucleic acid encoding a reporter protein.

[0038] In some embodiments, each member of the library disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and c) a nucleic acid encoding a localization signal. In some embodiments, each member of the library disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, c) a nucleic acid encoding a localization signal, and d) a nucleic acid comprising a barcode. In some embodiments, each member of the library disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, c) a nucleic acid encoding a localization signal, and e) a nucleic acid encoding a reporter protein. In some embodiments, each member of the library disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, c) a nucleic acid encoding a localization signal, d) a nucleic acid comprising a barcode, and e) a nucleic acid encoding a reporter protein.

[0039] In some embodiments, each member of the library disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and d) a nucleic acid comprising a barcode. In some embodiments, each member of the library disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, d) a nucleic acid comprising a barcode, and e) a nucleic acid encoding a reporter protein. In some embodiments, each member of the library disclosed herein comprises a) an AAV

variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and e) a nucleic acid encoding a reporter protein.

[0040] In some embodiments, the nucleic acid encoding an AAV variant capsid protein, and the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are located in separate nucleic acid molecules. In other embodiments, the nucleic acid encoding an AAV variant capsid protein, the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are located in one nucleic acid molecule. In some embodiments, the nucleic acid encoding an AAV variant capsid protein, and the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are linked to each other in any order. In some embodiments, each member of the library disclosed herein comprises: a 5'ITR sequence, the nucleic acid comprising a barcode, the nucleic acid encoding a reporter protein, the nucleic acid encoding an AAV variant capsid protein, and a 3'ITR sequence, in that order.

[0041] In some embodiments, the library of AAV variants disclosed herein comprises AAV variant capsid proteins derived from two or more AAV serotypes. In some embodiments, the AAV serotype is selected from one or more of: AAV1, AAV2, AAV3B, AAV5, AAV6, AAV8, AAV9, AAV3, AAV4, AAV7, AAV11, AAVrh10, AAVrh39, and AAVrh74.

[0042] In some embodiments, the nucleic acid encoding the reporter protein and the nucleic acid encoding the AAV variant capsid are under the control of separate promoters. In some embodiments, the nucleic acid encoding the reporter protein and the nucleic acid encoding the AAV variant capsid are each independently operatively linked to a promoter.

[0043] In a sixth aspect, the present disclosure provides an AAV variant comprising: a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and one or more of: b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a); c) a nucleic acid encoding a localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein.

[0044] In some embodiments, an AAV variant disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein and b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein. In some embodiments, an AAV variant disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein, and c) a nucleic acid encoding a localization signal. In some embodiments, an AAV variant disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein, c) a nucleic acid encoding a localization signal, and d) a nucleic acid comprising a barcode. In some embodiments, an AAV variant disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein, c) a nucleic acid encoding a localization signal, d) a nucleic acid comprising a barcode, and e) a nucleic acid encoding a reporter protein.

[0045] In some embodiments, an AAV variant disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and c) a nucleic acid encoding a localization signal. In some embodiments, an AAV variant disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, c) a nucleic acid encoding a localization signal, and d) a nucleic acid comprising a barcode. In some embodiments, an AAV variant disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, c) a nucleic acid encoding a localization signal, and e) a nucleic acid encoding a reporter protein. In some embodiments, an AAV variant disclosed herein comprises a) a nucleic acid sequence encoding an AAV

variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, c) a nucleic acid encoding a localization signal, d) a nucleic acid comprising a barcode, and e) a nucleic acid encoding a reporter protein.

[0046] In some embodiments, an AAV variant disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and d) a nucleic acid comprising a barcode. In some embodiments, an AAV variant disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, d) a nucleic acid comprising a barcode, and e) a nucleic acid encoding a reporter protein. In some embodiments, an AAV variant disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and e) a nucleic acid encoding a reporter protein.

[0047] In a seventh aspect, the present disclosure provides an AAV variant comprising: a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and one or more of: b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a) in the nucleic acid sequence flanking the peptide insertion site; c) a nucleic acid encoding a localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein.

[0048] In some embodiments, an AAV variant disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a), wherein the one or more silent mutations are in the nucleic acid sequence flanking the peptide insertion site. In some embodiments, an AAV variant disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a), wherein the one or more silent mutations are in the nucleic acid sequence flanking the peptide insertion site, and c) a nucleic acid encoding a localization signal. In some embodiments, an AAV variant disclosed herein comprises a) an AAV variant capsid protein comprising a peptide

inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a), wherein the one or more silent mutations are in the nucleic acid sequence flanking the peptide insertion site, c) a nucleic acid encoding a localization signal, and d) a nucleic acid comprising a barcode. In some embodiments, an AAV variant disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a), wherein the one or more silent mutations are in the nucleic acid sequence flanking the peptide insertion site, c) a nucleic acid encoding a localization signal, d) a nucleic acid comprising a barcode, and e) a nucleic acid encoding a reporter protein.

[0049] In some embodiments, an AAV variant disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and c) a nucleic acid encoding a localization signal. In some embodiments, an AAV variant disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, c) a nucleic acid encoding a localization signal, and d) a nucleic acid comprising a barcode. In some embodiments, an AAV variant disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, c) a nucleic acid encoding a localization signal, and e) a nucleic acid encoding a reporter protein. In some embodiments, an AAV variant disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, c) a nucleic acid encoding a localization signal, d) a nucleic acid comprising a barcode, and e) a nucleic acid encoding a reporter protein.

[0050] In some embodiments, an AAV variant disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and d) a nucleic acid comprising a barcode. In some embodiments, an AAV variant disclosed herein comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, d) a nucleic acid comprising a barcode, and e) a nucleic acid encoding a reporter protein. In some embodiments, an AAV variant disclosed herein comprises a) an AAV variant capsid protein comprising a peptide

inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and e) a nucleic acid encoding a reporter protein.

[0051] In some embodiments, the nucleic acid encoding an AAV variant capsid protein, and the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are located in separate nucleic acid molecules. In other embodiments, the nucleic acid encoding an AAV variant capsid protein, the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are located in one nucleic acid molecule. In some embodiments, the nucleic acid encoding an AAV variant capsid protein, and the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are linked to each other in any order. In some embodiments, an AAV variant comprises: a 5'ITR sequence, the nucleic acid comprising a barcode, the nucleic acid encoding a reporter protein, the nucleic acid encoding an AAV variant capsid protein, and a 3'ITR sequence, in that order.

[0052] In some embodiments, an AAV variant disclosed herein is derived from the group consisting of: AAV1, AAV2, AAV3B, AAV5, AAV6, AAV8, AAV9, AAV3, AAV4, AAV7, AAV11, AAVrh10, AAVrh39, and AAVrh74.

[0053] In some embodiments, the nucleic acid encoding the reporter protein and the nucleic acid encoding the AAV variant capsid are under the control of separate promoters. In some embodiments, the nucleic acid encoding the reporter protein and the nucleic acid encoding the AAV variant capsid are each independently operatively linked to a promoter.

[0054] In an eighth aspect, the present disclosure provides a nucleic acid molecule comprising a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and one or more of: b) a nucleic acid sequence encoding a variant capsid protein comprising one or more silent mutations in the nucleotide sequence flanking the peptide insertion site in the hypervariable and/or surface-exposed loop of the variant capsid protein; c) a nucleic acid sequence encoding a localization signal; d) a nucleic acid sequence comprising a barcode; and e) a nucleic acid sequence encoding a reporter protein.

[0055] In some embodiments, a nucleic acid disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted

into a hypervariable and/or surface-exposed loop of the variant capsid protein and b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein. In some embodiments, a nucleic acid disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein, and c) a nucleic acid encoding a localization signal. In some embodiments, a nucleic acid disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein, c) a nucleic acid encoding a localization signal, and d) a nucleic acid comprising a barcode. In some embodiments, a nucleic acid disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein, c) a nucleic acid encoding a localization signal, d) a nucleic acid comprising a barcode, and e) a nucleic acid encoding a reporter protein.

[0056] In some embodiments, a nucleic acid disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and c) a nucleic acid encoding a localization signal. In some embodiments, a nucleic acid disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, c) a nucleic acid encoding a localization signal, and d) a nucleic acid comprising a barcode. In some embodiments, a nucleic acid disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, c) a nucleic acid encoding a localization signal, and e) a nucleic acid encoding a reporter protein. In some embodiments, a nucleic acid disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the

variant capsid protein, c) a nucleic acid encoding a localization signal, d) a nucleic acid comprising a barcode, and e) a nucleic acid encoding a reporter protein.

[0057] In some embodiments, a nucleic acid disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and d) a nucleic acid comprising a barcode. In some embodiments, a nucleic acid disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, d) a nucleic acid comprising a barcode, and e) a nucleic acid encoding a reporter protein. In some embodiments, a nucleic acid disclosed herein comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein, and e) a nucleic acid encoding a reporter protein.

[0058] In some embodiments of a method, library, AAV variant, or nucleic acid disclosed herein, the peptide inserted into a variant capsid protein has a length of 4-15 amino acids. In some embodiments, the peptide has a length of 6-15 amino acids. In some embodiments, the peptide has a length of 7, 10, or 15 amino acids. In some embodiments, the peptide has a length of 7 amino acids. In some embodiments, the inserted peptide comprises at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO: 1-32. In some embodiments, the inserted peptide comprises at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO: 68-110. In some embodiments, the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 1-32. In some embodiments, the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 68-110.

[0059] In some embodiments, the peptide is inserted into the VR-I, VR-II, VR-III, VR-IV, VR-V, VR-VI, VR-VII, VR-VIII or VR-IX region of the capsid protein. In some embodiments, the peptide is inserted into the VR-I of the capsid protein. In some embodiments, the peptide is inserted into the VR-IV of the capsid protein. In some embodiments, the peptide is inserted into the VR-VIII of the capsid protein. In some embodiments, the peptide is inserted into the capsid protein VP1, VP2, or VP3. It is well recognized that VP2 and VP3 proteins are truncated forms of VP1 protein.

[0060] In some embodiments, the peptide is inserted at a location between amino acid residues 450 and 600 of the capsid protein. In some embodiments, (i) the AAV serotype is AAV1 and the peptide is inserted at amino acid position 590 of the capsid protein,

(ii) the AAV serotype is AAV6 and the peptide is inserted at amino acid position 454 or 590 of the capsid protein, (iii) the AAV serotype is AAV2 and the peptide is inserted at amino acid position 588 of the capsid protein, (iv) the AAV serotype is AAV3B and the peptide is inserted at amino acid position 589 of the capsid protein, (v) the AAV serotype is AAV5 and the peptide is inserted at amino acid position 578 of the capsid protein, (vi) the AAV serotype is AAV8 and the peptide is inserted at amino acid position 591 of the capsid protein, or (vii) the AAV serotype is AAV9 and the peptide is inserted at amino acid position 266, 455, or 589 of the capsid protein, wherein the positions correspond to the numbering of VP1 in the AAV serotype.

[0061] In some embodiments of a method, library, AAV variant, or nucleic acid disclosed herein, the nucleic acid encoding an AAV variant capsid protein is under the control of the p40 promoter. In some embodiments of a method, library, AAV variant, or nucleic acid disclosed herein, the nucleic acid encoding an AAV variant capsid protein is operatively linked to the p40 promoter.

[0062] In some embodiments of a method, library, AAV variant, or nucleic acid disclosed herein, the nucleic acid encoding the reporter protein the encodes a fluorescent protein. In some embodiments, the reporter protein is selected from the group consisting of: EGFP, mCherry, mClover3, mRuby3, mApple, iRFP, tdTomato, mVenus, YFP, RFP, firefly luciferase, and nanoluciferase.

[0063] In some embodiments, the nucleic acid encoding a reporter protein is under the control of a cell type and/or tissue specific promoter. In some embodiments, the nucleic acid encoding a reporter protein is operatively linked to a cell type and/or tissue specific promoter. In some embodiments, the nucleic acid encoding a reporter protein is operatively linked to a cell-type specific RNA polymerase II promoter (e.g. transthyretin or hSynapsin1). In some embodiments, the cell type and/or tissue specific promoter is selected from the group consisting of: human synapsin promoter (hSyn1), transthyretin promoter (TTR), cytokeratin 18, cytokeratin 19, unc-45 myosin chaperon B (unc45b) promoter, cardiac troponin T (cTnT) promoter, glial fibrillary acidic protein (GFAP) promoter, myelin basic protein (MBP) promoter, and methyl CpG-binding protein *2 (*Mecp2) promoter. In some embodiments, the cell type and/or tissue specific promoter is the hSyn1 promoter. In some embodiments, the cell type and/or tissue specific promoter is the TTR promoter.

[0064] In some embodiments of a method, library, AAV variant, or nucleic acid disclosed herein, the reporter protein is fused to the localization signal. In some

embodiments, the localization signal is fused N-terminally, C-terminally or both N-terminally and C-terminally to the reporter protein. In some embodiments, the localization signal is a nuclear localization signal (NLS), a nuclear envelope binding domain or a histone binding domain. In some embodiments, the NLS is the SV40 NLS. In some embodiments, the nuclear envelope binding domain is a KASH domain. In some embodiments, the histone binding domain is H2B.

[0065] In some embodiments of a method, library, AAV variant, or nucleic acid disclosed herein, the barcode is 5-18 nucleotides long.

[0066] In some embodiments of a method, library, AAV variant, or nucleic acid disclosed herein, the nucleic acid comprising the barcode comprises a sequence selected from any one of sequences SEQ ID NO: 111-154 or 155-198. In some embodiments, the nucleic acid comprising the barcode comprises a sequence selected from any one of sequences SEQ ID NO: 111-154. In some embodiments, the nucleic acid comprising the barcode comprises a sequence selected from any one of sequences SEQ ID NO: 155-198. In some embodiments of a method, library, AAV variant, or nucleic acid disclosed herein, the nucleic acid comprising the barcode is selected from any one of sequences SEQ ID NO: 111-154 or 155-198. In some embodiments, the nucleic acid comprising the barcode is selected from any one of sequences SEQ ID NO: 111-154. In some embodiments, the nucleic acid comprising the barcode is selected from any one of sequences SEQ ID NO: 155-198.

[0067] In some embodiments of a method, library of AAV variants, AAV variant, or nucleic acid disclosed herein, each member of the library comprises a first nucleic acid comprising a first barcode and a second nucleic acid comprising a second barcode. In some embodiments, the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode are different. In some embodiments, the first nucleic acid comprising the first barcode comprises a sequence selected from any one of sequences SEQ ID NO: 111-154 or is selected from any one of sequences SEQ ID NO: 111-154. In some embodiments of the method, library of AAV variants, AAV variant, or nucleic acid disclosed herein, the second nucleic acid comprising the second barcode comprises a sequence selected from any one of sequences SEQ ID NO: 155-198 or is selected from any one of sequences SEQ ID NO: 155-198. In some embodiments, the first nucleic acid comprising the first barcode comprises a sequence selected from any one of sequences SEQ ID NO: 111-154 or is selected from any one of sequences SEQ ID NO: 111-154 and the second nucleic acid comprising the second

barcode comprises a sequence selected from any one of sequences SEQ ID NO: 155-198 or is selected from any one of sequences SEQ ID NO: 155-198. In some embodiments, each of the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode is independently operatively linked to a promoter. In some embodiments, said promoter is different for each of the first barcode and the second barcode. In some embodiments, each of the first nucleic acid comprising the first barcode and the second nucleic acid are independently controlled under a different promoter. In some embodiments, the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the second nucleic acid comprising the second barcode is each independently an RNA Pol II promoter (e.g., human synapsin promoter (hSyn1), transthyretin promoter (TTR), cytokeratin 18, cytokeratin 19, unc-45 myosin chaperon B (unc45b) promoter, cardiac troponin T (cTnT) promoter, glial fibrillary acidic protein (GFAP) promoter, myelin basic protein (MBP) promoter, or methyl CpG-binding protein *2 (*Mecp2) promoter). In some embodiments, the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the second nucleic acid comprising the second barcode is each independently an RNA Pol III promoter (e.g., U6 promoter, H1 promoter or 7SK promoter). In some embodiments, the promoter operatively linked to the first nucleic acid comprising the first barcode is an RNA Pol II promoter and the promoter operatively linked to the second nucleic acid comprising the second barcode is an RNA Pol III promoter. In some embodiments, the nucleic acid comprising the barcode further comprises a reporter gene, a nuclear localization signal and a polyadenylation signal.

[0068] In some embodiments, of a method, library, AAV variant, or nucleic acid disclosed herein, each inserted peptide coding sequence is synthesized with multiple different nucleic acid sequences, all encoding the same peptide. Each nucleic acid sequence is linked to a unique bar code such that performance (*e.g.* enrichment) of an inserted peptide can be verified when two or more variants are identified with the same inserted peptide sequence but wherein different nucleic acid sequences encode that inserted peptide.

[0069] In some embodiments, of a method, library, AAV variant or nucleic acid disclosed herein, one or more of (i) the nucleic acid encoding a localization signal; (i) the nucleic acid comprising a barcode; and (iii) the nucleic acid encoding a reporter protein are provided in *trans* with respect to the nucleic acid encoding the AAV variant

capsid protein comprising the inserted peptide. In some embodiments of a method, library, AAV variant or nucleic acid disclosed herein, (i) the nucleic acid encoding a localization signal, (ii) the nucleic acid comprising a barcode; and (iii) the nucleic acid encoding a reporter protein are all provided in *trans* with respect to the nucleic acid encoding the AAV variant capsid protein comprising the inserted peptide. In some embodiments of a method, library, AAV variant or nucleic acid disclosed herein, one or more of (i) the nucleic acid encoding a localization signal; (ii) the nucleic acid comprising a barcode; and (iii) the nucleic acid encoding a reporter protein are provided in *cis* with respect to the nucleic acid encoding the AAV variant capsid protein comprising the inserted peptide. In some embodiments of a method, library, AAV variant or nucleic acid disclosed herein, (i) the nucleic acid encoding a localization signal; (ii) the nucleic acid comprising a barcode; and (iii) the nucleic acid encoding a reporter protein are all provided in *cis* with respect to the nucleic acid encoding the AAV variant capsid protein comprising the inserted peptide.

[0070] In a ninth aspect, an AAV variant disclosed herein is used to deliver a transgene to a target cell or tissue. In some embodiments, the transgene is useful in gene therapy. In some embodiments, the transgene is useful in genome editing.

[0071] In a tenth aspect, the present disclosure provides an AAV vector comprising a nucleic acid encoding a peptide that comprises at least 4 contiguous amino acids of an amino acid sequence set forth in SEQ ID Nos. 1-32 or 68-110. In some embodiments, the AAV vector comprises a nucleic acid encoding a peptide that comprises at least 4 contiguous amino acids of an amino acid sequence set forth in SEQ ID Nos. 1-32. In other embodiments, the AAV vector comprises a nucleic acid encoding a peptide that comprises at least 4 contiguous amino acids of an amino acid sequence set forth in SEQ ID Nos. 68-110. In some embodiments, the nucleic acid encodes an amino acid sequence of any one of SEQ ID Nos. 1-32 or SEQ ID Nos. 68-110. In some embodiments, the nucleic acid encodes the amino acid sequence is any one of SEQ ID Nos. 1-32. In some embodiments, the nucleic acid encodes the amino acid sequence of any one of SEQ ID Nos. 68-110. In some embodiments, the inserted amino acid sequence is a part of a capsid protein. In some embodiments, the capsid protein is VP1, VP2, or VP3. In some embodiments, the amino acid sequence is inserted at a location between amino acid residues 450 and 600 of the capsid protein. In some embodiments, amino acid sequence is inserted at (i) amino acid position 590 of an AAV1 capsid protein, (ii) amino acid position 454 or 590 of an AAV6 capsid

protein, (iii) amino acid position 588 of an AAV2 capsid protein, (iv) amino acid position 589 of an AAV3B capsid protein, (v) amino acid position 578 of an AAV5 capsid protein, (vi) amino acid position 591 of the an AAV8 capsid protein, or (vi) amino acid position 266, 455, or 589 of an AAV9 capsid protein, wherein the positions correspond to the numbering of VP1 in the AAV serotype.

[0072] In an eleventh aspect, the present disclosure provides a pharmaceutical composition comprising an AAV vector disclosed herein and a pharmaceutically acceptable carrier.

[0073] In a twelfth aspect, the present disclosure provides a peptide comprising an amino acid sequence set forth in any one of SEQ ID Nos. 1-32 or 68-110. In some embodiments, the peptide comprises an amino acid sequence set forth in any one of SEQ ID Nos. 1-32. In some embodiments, the peptide comprises an amino acid sequence set forth in any one of SEQ ID Nos. 68-110. In some embodiments, the peptide is any of the sequences set forth in SEQ ID Nos. 1-32. In some embodiments, the peptide is any of the sequences set forth in SEQ ID Nos. 68-110. In some embodiments, the peptide is part of an AAV vector. In some embodiments, the peptide is part of a capsid protein of the AAV vector.

[0074] In a thirteenth aspect, the present disclosure provides a capsid protein comprising a peptide comprising at least 4 contiguous amino acids of an amino acid sequence set forth in SEQ ID Nos. 1-32 or 68-110. In some embodiments, the capsid protein comprises an inserted peptide comprising at least 4 contiguous amino acids of an amino acid sequence set forth in SEQ ID Nos. 1-32. In some embodiments, the capsid protein comprises the amino acid sequence set forth in any one of SEQ ID Nos. 1-32. In some embodiments, the capsid protein comprises an inserted peptide comprising at least 4 contiguous amino acids of an amino acid sequence set forth in SEQ ID Nos. 68-110. In some embodiments, the capsid protein comprises the amino acid sequence set forth in any one of SEQ ID Nos. 68-110.

[0075] In a fourteenth aspect, the present disclosure provides a nucleic acid sequence encoding the peptides or capsid proteins disclosed herein.

[0076] In a fifteenth aspect, the present disclosure provides a method of delivering a nucleic acid to a target cell or tissue of a subject, comprising: administering a composition comprising an AAV vector comprising the nucleic acid, and wherein the AAV vector further comprises a capsid protein comprising an inserted peptide comprising at least 4 contiguous amino acids of an amino acid sequence set forth in

SEQ ID Nos. 1-32 or 68-110. In some embodiments, the capsid protein comprises an inserted peptide comprising at least 4 contiguous amino acids of an amino acid sequence set forth in SEQ ID Nos. 1-32. In other embodiments, the capsid protein comprises an inserted peptide comprising at least 4 contiguous amino acids of an amino acid sequence set forth in SEQ ID Nos. 68-110. In some embodiments, the capsid protein comprises an amino acid sequence set forth in any one of SEQ ID Nos. 1-32. In other embodiments, the capsid protein comprises an amino acid sequence set forth in any one of SEQ ID Nos. 68-110.

[0077] In some embodiments, the target cell or tissue includes, but is not limited to, a cell or tissue from the CNS, heart, lung, trachea, esophagus, muscle, bone, cartilage, stomach, pancreas, intestine, liver, bladder, kidney, ureter, urethra, uterus, fallopian tube, ovary, testes, prostate, eye, blood, lymph, or oral mucosa. In some embodiments, the target cell or tissue includes, but is not limited to CNS, heart, lung, trachea, esophagus, muscle, bone, cartilage, stomach, pancreas, intestine, liver, bladder, kidney, ureter, urethra, uterus, fallopian tube, ovary, testes, prostate, eye, blood, lymph, or oral mucosa. In some embodiments, the target cell or tissue is CNS cell or tissue. In other embodiments, the target cell or tissue is liver cell or tissue.

[0078] In some embodiments, the target cell includes, but is not limited to, neurons, glial cells, astrocytes, oligodendroglia, microglia, Schwann cells, ependymal cells, hepatocytes, stellate fat storing cells, Kupffer cells, liver endothelial cells, epithelial cells, cardiomyocytes, smooth muscle cells, T-cells, B cells, hematopoietic stem cells, and embryonic stem cells.

[0079] In some embodiments, the target cell or tissue is from liver.

[0080] In some embodiments, the target cell or tissue is from CNS.

[0081] These and other aspects will be readily apparent to the skilled artisan in light of the disclosure as a whole.

BRIEF DESCRIPTION OF THE DRAWINGS

[0082] The patent or application file contains at least one drawing executed in color. Copies of this patent or patent application publication with color drawing(s) will be provided by the Office upon request and payment of the necessary fee.

[0083] **Fig. 1** depicts information relating to the assembly of the capsid libraries. Panel A is an illustration of an AAV capsid protein where arrows indicate the exposed loops into which the peptides are inserted. Panel 1B is a diagram of the AAV serotype

backbones that the peptides were inserted into. Silent mutations were made in the regions surrounding the peptide insertion sites (shown as grey boxes adjacent to the inserted peptide region, "peptide") to enable the use of the same universal Next-Generation Sequencing (NGS) primers to amplify the diversified region and quantify variant performance in a head to head comparison. A single insertion region is depicted (VR-VIII) as a representative example, but the same strategy is generalizable to other capsid regions targeted for diversification.

[0084] **Fig. 2** illustrates an example of the method used to generate capsid libraries with high diversity. Panel A shows the fragments used to build the capsid encoding genes, where two fragments, left and right, were joined by Gibson assembly of two PCR amplification products and a pre-digested plasmid backbone. Panel B is a blow up of a primer pair (Reverse: SEQ ID NO: 204 and Forward: SEQ ID NO: 205) used to join the two fragments by Gibson assembly and also depicts the diversified sequence included in the RF Fwd primer, where X can be between 12 and 45 nucleotides in length.

[0085] **Fig. 3A and Fig. 3B** are drawings of the various library constructs that contain the variant capsid library in *cis* with an expression cassette, both flanked by viral ITRs for encapsidation of the viral genome. Panel A is a construct where the variant capsid gene "Cap" is regulated by the p40 promoter and the transcript is terminated by a polyadenylation signal sequence ("polyA"). The construct also comprises an EGFP reporter gene regulated by the CMV promoter where the EGFP is linked to an SV40 nuclear localization sequence ("SV40 NLS") on its N-terminus. The construct also comprises a bovine growth hormone polyA signal sequence BGH and the 5' and 3' ITR sequences. Panel B is similar to that in Panel A except in that it has an mCherry reporter. Panel C shows the same design for the variant capsid gene, and further comprises an EGFP reporter gene regulated by the CMV promoter wherein the EGFP gene is fused to a KASH nuclear envelope binding domain ("KASH"). Panel D shows a construct similar to Panel C except that an mCherry reporter is used. Panel E shows a construct with the same variant capsid expression construct but has a synapsin promoter ("hSyn1") driving expression of an EGFP reporter fused to a histone 2B DNA binding domain ("H2B") on its 3' end. The construct also comprises an SV40 polyadenylation signal sequence. Panels F and G are similar to Panel E except that Panel F uses an mClover3 reporter and Panel G uses an mRuby3 reporter.

[0086] **Fig. 4A and Fig. 4B** illustrate the steps for Method 1 for bioinformatically linking each variant capsid sequence with a randomly generated or specified barcode. In step 1, a short piece of DNA is synthesized comprising a randomly generated or specified barcode and a randomly generated or specified capsid variant region, as well as two regions used for Gibson assembly. Step 2 comprises amplification of capsid sequence 3' of the diversified region. Step 3 is the Gibson assembly reaction where the 5'ITR and SV40 polyadenylation sequences are fused to the barcode on the 5' end, and the second Gibson assembly region is fused to the 3' end of the capsid gene and the polyA signal for the capsid gene and the 3'ITR. Step 4 comprises performing ILLUMINA® sequencing across the barcode and the variant capsid sequences. Step 5 comprises digestion with the BsaI restriction enzyme. Step 6 is a PCR amplification step where the H2B, EGFP, hSyn1 and p40 promoters, and the 5' end of the capsid gene are prepared. Alternatively, the fragment comprising the H2B, EGFP, hSyn1, p40 promoter, and 5' end of the capsid gene may be pre-assembled in a donor plasmid, digested with BsaI, and gel purified. Step 7 is the final golden gate cloning step to create the final construct.

[0087] **Fig. 4C and Fig. 4D** illustrate an alternate approach to Method 1 for bioinformatically linking each variant capsid sequence with a randomly generated barcode. In step 1 two DNA fragments are synthesized. Fragment A comprises Gibson assembly region #1, a BsaI site, the variable capsid region, and a region homologous to the capsid gene that is used as a PCR primer. Fragment B comprises Gibson assembly region #2, a random barcode, a BsaI site, and Gibson assembly region #1. Next, a PCR procedure is performed where the 3' sequence of capsid gene is amplified using fragment A synthesized in step 1 as a PCR primer. Next, an intermediate AAV construct is generated by Gibson assembly where the construct comprises in a 5' to 3' order the 5' ITR, the SV40 poly A signal, the barcode, the two restriction endonuclease sites, the variant capsid sequences, the 3' region of the capsid protein, the polyA sequence for the capsid expression construct and the 3' ITR (step 3). Step 4 comprises performing ILLUMINA® sequencing across the barcode and the variant capsid sequences. Step 5 comprises digestion with the BsaI restriction enzyme. Step 6 is a PCR amplification step where the H2B, EGFP, hSyn1 and p40 promoters, and the 5' end of the capsid gene are prepared. Alternatively, the fragment comprising the H2B, EGFP, hSyn1, p40 promoter, and 5' end of the capsid gene may be pre-assembled in a donor

plasmid, digested with BsaI, and gel purified. Step 7 is the final golden gate cloning step to create the final construct.

[0088] **Fig. 5** illustrates the steps for Method 2 for bioinformatically linking each mutated capsid sequence with a randomly generated barcode. First, two sets of ILLUMINA® sequencing primers are used to separately sequence the random barcode and mutated capsid sequence with high fidelity. Next, OXFORD NANOPORE® sequencing is performed to sequence the entire construct. The Nanopore sequencing is less accurate than ILLUMINA® sequencing, but can be used to link the two ILLUMINA® sequences to one molecule via bioinformatic analysis.

[0089] **Fig. 6** is a plot of the AAV variants isolated from primary mouse cortical neurons following transduction with the AAV variant libraries. The Y axis indicates the log2 fold change in variant frequency after selection and recovery from transduced cells as compared with the variant frequency in administered library prior to transduction. The data demonstrates that the AAV serotypes tended to cluster with variants based on AAV1 being the most enriched in the primary mouse neurons as compared with variants based on insertions into other AAV serotypes.

[0090] **Fig. 7A and Fig. 7B** are plots of either the AAV1 variants (Fig. 7A) or the AAV2 variants (Fig. 7B). In Fig. 7A, wild type AAV1, lacking any inserted peptide in the capsid sequence, is labeled. The data demonstrates that many of the inserted peptide sequences caused an enrichment of the variants as compared to the wild type AAV1. In Fig. 7B, wild type AAV2, lacking any inserted peptide in the capsid sequence, is labeled. The data demonstrates that many of the inserted peptide sequences caused an enrichment of the variants in nuclei as compared to the wild type AAV2.

[0091] **Fig. 8** depicts two plots showing the enriched AAV variants as assayed by either reverse transcription of the RNA isolated from the target cells and amplification of the barcodes (plot on left side) or by isolation of nuclei from the treated cells and sequencing of the inserted nucleotides encoding the peptides inserted into the capsid gene (plot on right side). The data demonstrates that very similar results were obtained by both analysis methods. Left and right plots each disclose SEQ ID NOS: 199-203, respectively, in order of appearance (top to bottom in each panel).

[0092] **Fig. 9** shows micrographs of HEK293 cells transduced with the different reporter gene constructs. Panel A shows HEK293 cells transduced with AAV variants comprising the EGFP reporter alone, while Panel B shows the results when HEK293 cells are transduced with constructs comprising the SV40 nuclear localization sequence

(NLS) fused to the EGFP gene, causing accumulation of the reporter in the nucleus. Panel C shows the results of HEK293 cells transduced with the AAV construct comprising the KASH-linked EGFP sequence and Panel D shows HEK293 cells transduced with the AAV construct comprising the mCherry reporter. Panel E shows the results when the AAV construct comprised the mCherry fused to the SV40 NLS, and Panel F shows the results when mCherry is fused to KASH.

[0093] **Fig. 10A and Fig. 10B** are immunohistochemistry micrographs from mouse brain tissues depicting nuclear localized neuronal reporter expression (cortex, hippocampus, thalamus) of the AAV variant library comprising the EGFP-H2B fusion (Panels A and B) following injection. Panel C shows mouse brain tissue depicting nuclear localized neuronal reporter expression (cortex, hippocampus, thalamus) of the AAV variant library comprising the mClover3-H2B fusion following injection. Panels D and E show mouse brain tissue depicting nuclear envelope localized neuronal reporter expression (cortex, hippocampus, thalamus) of the AAV variant library comprising the EGFP-KASH fusion following injection. Panel F shows mouse brain tissue depicting nuclear localized neuronal reporter expression (cortex, hippocampus, thalamus) of the AAV variant library comprising the mRuby3-H2B fusion following injection. Images in Panel F are native fluorescence in fixed brain sections.

[0094] **Fig. 11** depicts FACS analysis of nuclei isolated from neuronal tissue in mice treated with AAV variants comprising the EGFP-H2B reporter. In mice injected with formulation buffer alone (Formulation) examined brain tissues did not exhibit any EGFP fluorescence (depicted in graph is the cortex tissue). In comparison, for nuclei isolated from mice treated with the AAV variants, reporter signaling could be detected in the thoracic spinal cord (7.68% of total events), the thalamus (16.53% of total events) and the cortex (6.54% of total events).

[0095] **Fig. 12** depicts FACS analysis of nuclei isolated from mice treated with AAV variants comprising the mClover3 reporter construct or the EGFP-KASH reporter. With both types of AAV variants, reporter signal was seen in the thalamus for mClover3 (14.72% of total events) and in the cortex for EGFP-KASH (4.88%).

[0096] **Fig. 13** depicts FACS analysis of nuclei isolated from mice treated with AAV variants comprising the mRuby3 reporter construct where reporter signal was detected in the cortex as shown (7.62% of total events).

[0097] **Fig. 14** depicts FACS analysis of nuclei isolated from non-CNS tissues when the reporter gene is driven by the hSyn1 promoter (neuron specific). Panel A shows

the comparison in signal from liver tissue in mice treated with AAV variants comprising the EGFP-H2B construct in comparison with formulation buffer, while Panel B shows the same comparison in cardiac tissue. No off-target expression from the hSyn1 promoter was observed.

[0098] **Fig. 15A, Fig. 15B and Fig. 15C** depict a series of graphs supporting a clear dose response of EGFP reporter signal when the AAV variant library comprising the EGFP-H2B construct driven by the liver-specific TTR promoter are introduced into HepG2 cells *in vitro* at different doses ($3x10^3$ (Panel B); $1x10^4$ (Panel C); $3x10^4$ (Panel D); $1x10^5$ (Panel E); $3x10^5$ (Panel F) and $1x10^6$ (Panel G) compared to mock (Panel A)).

[0099] **Fig. 16** depicts the reporter signal detected in NHP (Non-Human Primate) nuclei isolated from liver tissue following injection of the animals with the AAV variant library (Panel A). Panel B shows immunohistochemical analysis of the liver tissue and demonstrates that nuclear localized reporter signal (brown staining of nuclei) is detected in the liver in both the male and female NHP.

[00100] **Fig. 17A and Fig. 17B** show the distribution of the top 2500 fold enriched AAV variants according to which parent serotype the peptide insertion was made in. Data were obtained from sorting and sequencing. EGFP positive nuclei isolated from HepG2 (Panel A) and primary human hepatocytes *in vitro* (Panel B) in comparison with mouse (Panel C) and NHP liver tissue *in vivo* (Panel D). As can be seen in the figure, there are significant differences in the parent serotypes of AAV variants that are successful when challenged with different selective pressures.

[00101] **Fig. 18** shows a sampling of highly enriched AAV variants and the sequences of peptides inserted ("Peptide", SEQ ID NOs 1 to 32) identified from the second round of screening from NHP liver tissue. As can be seen, the variants are based on insertions into AAV1, AAV2, AAV3B, AAV9, AAV6 and AAV5 serotypes, where the peptide sequences were inserted into the following amino acid positions in each serotype indicated: AAV1 (590), AAV2 (588), AAV3B (589), AAV5 (578), AAV6 (454), AAV8 (591), AAV9 (589). The data shows the enrichment of the individual variants through a second screening round as measured by analysis of AAV library derived barcoded mRNA transcripts isolated from liver tissue ("Round 2 mRNA), viral genomic DNA sequenced from nuclei isolated on the basis of EGFP-H2B reporter signal using FACS ("Round 2 nuclei"), viral genomic DNA sequenced from total liver genomic DNA in round 2 ("Round 2 Total gDNA"), and viral genomic DNA sequenced

from total liver genomic DNA in round 1 ("Round 1 Total gDNA"). Also shown is the relative yield of the AAV variant when produced by transient transfection into HEK293 cells. The degree of enrichment of the individual variant when isolated from the tissue as compared to its percentage in the library prior to injection is indicated by the size of the circle. For example, the AAV3B serotype variant with the inserted peptide sequence QGALAQV (SEQ ID NO: 8) has a log2 fold enrichment of 6.1 in mRNA barcode frequency when isolated from the NHP tissue as compared with the starting library. The darkness of the color of the circles also relates to the scale shown in the bottom right showing the relative variability in performance across multiple animals and tissue punches for a particular variant.

[00102] **Fig. 19** is a bubble plot of the AAV library variants recovered after infection of Neuro2A cells. The log2 fold change represents the change in variant frequency after infection and recovery of transcripts expressed in transduced Neuro2A cells as compared with the variant frequency in the administered library. The performance of wild type serotypes is indicated as well as that for variants 1-43 (SEQ ID NO: 68-110) listed in Figs. 29A-D.

[00103] **Fig. 20** is a bubble plot of the AAV library variants recovered after infection of primary mouse cortical neurons. The log2 fold change represents the change in variant frequency after infection and recovery of transcripts expressed in transduced neurons as compared with the variant frequency in the administered library. The performance of wild type serotypes is indicated as well as that of variants 1-43 (SEQ ID NO: 68-110) listed in Fig. 29A-D.

[00104] **Fig. 21** is a bubble plot of the AAV library variants recovered after infection of iCell human neurons derived from human induced pluripotent stem cells. The log2 fold change represents the change in variant frequency after infection and recovery of transcripts expressed in transduced neurons as compared with the variant frequency in the administered library. The performance of wild type serotypes is indicated as well as that of variants 1-43 (SEQ ID NO: 68-110) listed in Fig. 29A-D.

[00105] **Fig. 22** is a bubble plot of the AAV library variants recovered from C57BL/6J mouse CNS tissues after intracerebroventricular administration of the AAV variant library. Tissue regions included in the analysis were striatum, hippocampus, cerebellum, thalamus, hypothalamus, midbrain, brain stem, motor cortex, somatosensory cortex, rest of cortex, cervical spinal cord, thoracic spinal cord, and lumbar spinal cord. The log2 fold change represents the change in variant frequency

after infection and recovery of transcripts expressed in transduced neurons as compared with the variant frequency in the administered library. The performance of wild type serotypes is indicated as well as that of variants 1-43 (SEQ ID NO: 68-110) listed in Fig. 29A-D.

[00106] **Fig. 23** is a bubble plot of the AAV library variants recovered from non-human primate CNS tissues after intrathecal administration of the AAV variant library. Tissue regions included in this analysis were hippocampus, entorhinal cortex, temporal cortex, frontal cortex, and parietal cortex. The log2 fold change represents the change in variant frequency after infection and recovery of viral genomic DNA from tissue as compared with the variant frequency in the administered library. The performance of wild type serotypes is indicated as well as that of variants 1-43 (SEQ ID NO: 68-110) listed in Fig. 29A-D.

[00107] **Fig. 24** is a bubble plot of the AAV library variants recovered from non-human primate CNS tissues after intrathecal administration of the AAV variant library. Tissue regions included in this analysis were pons, medulla, cerebellum, and motor cortex. The log2 fold change represents the change in variant frequency after infection and recovery of viral genomic DNA from tissue as compared with the variant frequency in the administered library. The performance of wild type serotypes is indicated as well as that of variants 1-43 (SEQ ID NO: 68-110) listed in Fig. 29A-D.

[00108] **Fig. 25** is a bubble plot of the AAV library variants recovered from non-human primate spinal cord after intrathecal administration of the AAV variant library. The log2 fold change represents the change in variant frequency after infection and recovery of viral genomic DNA from tissue as compared with the variant frequency in the administered library. The performance of wild type serotypes is indicated as well as that of variants 1-43 (SEQ ID NO: 68-110) listed in Fig. 29A-D.

[00109] **Fig. 26** is a bubble plot of the AAV library variants recovered from non-human primate CNS tissues after intrathecal administration of the AAV variant library. Tissue regions included in this analysis were hippocampus, entorhinal cortex, temporal cortex, frontal cortex, and parietal cortex. The log2 fold change represents the change in variant frequency after infection and recovery of transcripts expressed in transduced neurons as compared with the variant frequency in the administered library. The performance of wild type serotypes is indicated as well as that of variants 1-43 (SEQ ID NO: 68-110) listed in Fig. 29A-D.

[00110] **Fig. 27** is a bubble plot of the AAV library variants recovered from non-human primate CNS tissues after intrathecal administration of the AAV variant library. Tissue regions included in this analysis were pons, medulla, cerebellum, substantia nigra, and motor cortex. The log2 fold change represents the change in variant frequency after infection and recovery of transcripts expressed in transduced neurons as compared with the variant frequency in the administered library. The performance of wild type serotypes is indicated as well as that of variants 1-43 (SEQ ID NO: 68-110) listed in Fig. 29.

[00111] **Fig. 28** is a bubble plot of the AAV library variants recovered from non-human primate spinal cord after intrathecal administration of the AAV variant library. The log2 fold change represents the change in variant frequency after infection and recovery of transcripts expressed in transduced neurons as compared with the variant frequency in the administered library. The performance of wild type serotypes is indicated as well as that of variants 1-43 (SEQ ID NO: 68-110) listed in Fig. 29.

[00112] **Fig. 29A, Fig. 29B, Fig. 29C and Fig. 29D** show highly enriched AAV variants and the sequences of peptides inserted ("Peptide", SEQ ID NOs 68-110) identified from the second round of screening from NHP CNS tissue. The variants are based on insertions into AAV1, AAV2, AAV3B, and AAV9 serotypes, where the peptide sequences were inserted into the following amino acid positions in each serotype indicated: AAV1 (590), AAV2 (588), AAV3B (589), AAV9 (589). The number to the left of each variant (1 through 43 (SEQ ID NO: 68-110)) corresponds to the numbers used for plotting in Figs. 19 through 28. The data shows the enrichment of the individual variants through a second screening round in multiple cell lines or species as measured by quantification of AAV library barcoded mRNA transcripts or vector genomic DNA isolated from cells or CNS tissues. The degree of enrichment of each individual variant when isolated from the cells or tissue as compared to its percentage in the library prior to injection is indicated by the size of the circle. The darkness of the color of the circles also relates to the scale shown in the bottom right of Fig. 29D showing the relative variability in performance across multiple replicates, animals and/or tissue punches for a particular variant.

[00113] **Fig. 30** is a schematic of the vector genome cassette employed for pooled evaluation of barcoded AAV variants. The cassette contains an RNA polymerase II promoter to quantify expression of barcoded transcripts in a target cell population, for example neurons or hepatocytes. In addition, there is an RNA polymerase III promoter

(e.g. hU6) which drives ubiquitous expression in all cell types. The combination of these promoters enables ranking of AAV variant transduction in both an individual targeted cell type and bulk tissue.

[00114] **Fig. 31** shows the results of a pooled evaluation of a subset of the AAV variants in Figs. 29A-D (variants 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 16, 18, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 49). Control serotypes include wild-type AAV9, PHP.B, and AAV2_HSPGKO. The barcoded AAV variants were evaluated *in vitro* in Neuro2A cells (ATCC CCL-131), primary mouse cortical neurons (Gibco), and iCell human neurons derived from human induced pluripotent stem cells. The AAV expression cassette described in Fig. 30 was employed for the pooled evaluation and the distinct barcode quantifications from the pol II neuron-specific hSyn1 promoter and the pol III hU6 ubiquitous promoter were labeled. The values in the heat maps represent the percentage of NGS reads derived from each AAV variant and are rounded to the nearest tenth of a percent. These results were normalized by the frequency of each AAV variant in the pool that was used for infection. The parental serotype of each AAV variant is colored according to the accompanying figure legend.

[00115] **Fig. 32** shows the evaluation of the barcoded AAV variants (variants 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 16, 18, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 49) and control serotypes wild-type AAV9, PHP.B, and AAV2_HSPGKO *in vitro* in iCell human astrocytes and endothelial cells derived from human induced pluripotent stem cells. The vector genome expression cassette described in Fig. 30 was employed for the pooled evaluation, data are presented for the pol III hU6 ubiquitous promoter, hSyn1 barcode measurements were not performed because the promoter has minimal activity in non-neuronal cell types. The values in the heat maps represent the percentage of NGS reads derived from each AAV variant and are rounded to the nearest tenth of a percent. These results were normalized by the frequency of each AAV variant in the pool that was used for infection. The parental serotype of each AAV variant is colored according to the accompanying figure legend.

[00116] **Fig. 33** shows the evaluation of the barcoded AAV variants (variants 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 16, 18, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 49) and control serotypes wild-type AAV9, PHP.B, and AAV2_HSPGKO *in vivo* after unilateral intracerebroventricular administration in C57BL/6J mice. Data are aggregated according to the following CNS regions:

brainstem (brainstem, midbrain), cerebellum, cortex (motor cortex, sensory cortex, rest of cortex), deep brain regions (hippocampus, hypothalamus, striatum, thalamus) and spinal cord (cervical, thoracic, and lumbar). The AAV expression cassette described in Fig. 30 was employed for the pooled evaluation and the distinct barcode quantifications from the pol II neuron-specific hSyn1 promoter and the pol III hU6 ubiquitous promoter are labeled. The values in the heat maps represent the percentage of NGS reads derived from each AAV variant and are rounded to the nearest tenth of a percent. These results were normalized by the frequency of each AAV variant in the pool that was administered. The parental serotype of each AAV variant is colored according to the accompanying figure legend.

[00117] **Fig. 34** shows the evaluation of the barcoded AAV variants (variants 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 16, 18, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 49) and control serotypes wild-type AAV9, PHP.B, and AAV2_HSPGKO *in vivo* after unilateral intracerebroventricular administration in Sprague-Dawley rats. Data are aggregated according to the following CNS regions: brainstem (brainstem, midbrain), cerebellum, cortex (motor cortex, sensory cortex, rest of cortex), deep brain regions (hippocampus, hypothalamus, striatum, thalamus) and spinal cord (cervical, thoracic, and lumbar). The AAV expression cassette described in Fig. 30 was employed for the pooled evaluation and the distinct barcode quantifications from the pol II neuron-specific hSyn1 promoter and the pol III hU6 ubiquitous promoter are labeled. The values in the heat maps represent the percentage of NGS reads derived from each AAV variant and are rounded to the nearest tenth of a percent. These results were normalized by the frequency of each AAV variant in the pool that was administered. The parental serotype of each AAV variant is colored according to the accompanying figure legend.

[00118] **Fig. 35** shows the evaluation of the barcoded AAV variants (variants 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 16, 18, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 49) and control serotypes wild-type AAV9, PHP.B, and AAV2_HSPGKO *in vivo* after intrathecal administration in non-human primates (cynomolgus macaques). Data shown are from analysis of total RNA isolated from NHP tissues. The data are aggregated according to the following CNS regions: brainstem (medulla, midbrain, pons, substantia nigra), cerebellum (cerebellum, cerebellar vermis), cortex (entorhinal cortex, frontal cortex, fronto-orbital gyrus,

fusiform gyrus, lateral orbital gyrus, medial orbital gyrus, motor cortex, parahippocampal gyrus, parietal cortex, parietal-visual cortex, posterior cingulate gyrus, sensory cortex, somatosensory cortex, temporal cortex, visual cortex), deep brain regions (amygdala, caudate nucleus, hippocampus, hypothalamus, putamen, thalamus) and spinal cord (cervical, thoracic, and lumbar). The AAV expression cassette described in Fig. 30 was employed for the pooled evaluation and the distinct barcode quantifications from the pol II neuron-specific hSyn1 promoter and the pol III hU6 ubiquitous promoter are labeled. The values in the heat maps represent the percentage of NGS reads derived from each AAV variant and are rounded to the nearest tenth of a percent. These results were normalized by the frequency of each AAV variant in the pool that was administered. The parental serotype of each AAV variant is colored according to the accompanying figure legend.

[00119] **Fig. 36** shows the evaluation of the barcoded AAV variants and control serotypes wild-type AAV9, PHP.B, and AAV2_HSPGKO *in vivo* after intrathecal administration in non-human primates (cynomolgus macaques). Data shown are from analysis of genomic DNA isolated from NHP tissues. The data are aggregated according to the following CNS regions: brainstem (medulla, pons, substantia nigra), cerebellum, cortex (entorhinal cortex, frontal cortex, motor cortex, parietal cortex, somatosensory cortex, temporal cortex), deep brain regions (caudate nucleus, hippocampus, hypothalamus, putamen, thalamus) and spinal cord (cervical, thoracic, and lumbar). The AAV expression cassette described in Fig. 30 was employed for the pooled evaluation and the distinct barcode quantifications from the pol II neuron-specific hSyn1 promoter and the pol III hU6 ubiquitous promoter are labeled. The values in the heat maps represent the percentage of NGS reads derived from each AAV variant and are rounded to the nearest tenth of a percent. These results were normalized by the frequency of each AAV variant in the pool that was administered. The parental serotype of each AAV variant is colored according to the accompanying figure legend.

[00120] **Fig. 37** shows the evaluation of the barcoded AAV variants and control serotypes wild-type AAV9, PHP.B, and AAV2_HSPGKO *in vivo* after intrathecal administration in non-human primates (cynomolgus macaques). Data shown are from analysis of total RNA isolated from NHP tissues. The data are aggregated according to the following CNS regions: brainstem (medulla, midbrain, pons, substantia nigra), cerebellum (cerebellum, cerebellar vermis), and cortex (entorhinal cortex, frontal cortex, fronto-orbital gyrus, fusiform gyrus, lateral orbital gyrus, medial orbital gyrus,

motor cortex, parahippocampal gyrus, parietal cortex, parietal-visual cortex, posterior cingulate gyrus, sensory cortex, somatosensory cortex, temporal cortex, visual cortex). The plotted results show the fold increase in the normalized percentage of reads for each serotype compared to wild-type AAV9.

[00121] **Fig. 38** shows the evaluation of the barcoded AAV variants and control serotypes wild-type AAV9, PHP.B, and AAV2_HSPGKO *in vivo* after intrathecal administration in non-human primates (cynomolgus macaques). Data shown are from analysis of total RNA isolated from NHP tissues. The data are aggregated according to the following CNS regions: deep brain regions (amygdala, caudate nucleus, hippocampus, hypothalamus, putamen, thalamus) and spinal cord (cervical, thoracic, and lumbar). The plotted results show the fold increase in the normalized percentage of reads for each serotype compared to wild-type AAV9.

[00122] **Fig. 39** shows the evaluation of the barcoded AAV variants and control serotypes wild-type AAV9, PHP.B, and AAV2_HSPGKO *in vivo* after intrathecal administration in non-human primates (cynomolgus macaques). Data shown are from analysis of genomic DNA isolated from NHP tissues. The data are aggregated according to the following CNS regions: brainstem (medulla, pons, substantia nigra), cerebellum, and cortex (entorhinal cortex, frontal cortex, motor cortex, parietal cortex, somatosensory cortex, temporal cortex). The plotted results show the fold increase in the normalized percentage of reads for each serotype compared to wild-type AAV9.

[00123] **Fig. 40** shows the evaluation of the barcoded AAV variants and control serotypes wild-type AAV9, PHP.B, and AAV2_HSPGKO *in vivo* after intrathecal administration in non-human primates (cynomolgus macaques). Data shown are from analysis of genomic DNA isolated from NHP tissues. The data are aggregated according to the following CNS regions: deep brain regions (caudate nucleus, hippocampus, hypothalamus, putamen, thalamus) and spinal cord (cervical, thoracic, and lumbar). The plotted results show the fold increase in the normalized percentage of reads for each serotype compared to wild-type AAV9.

[00124] **Fig. 41** shows a summary of serotype performance across different species. Data presented are for the hSyn1 barcode RNA analysis and serotypes are ordered according to performance in the non-human primate CNS.

[00125] **Fig. 42** shows a summary of serotype performance across different species. Data presented are for the hU6 barcode RNA analysis and serotypes are ordered according to performance in the non-human primate CNS.

DETAILED DESCRIPTION

[00126] The present disclosure provides methods and compositions to develop AAV capsids with a desired characteristic compared to a natural AAV serotype. These capsids are useful, for example, for the delivery of genome engineering molecules and gene therapy molecules to a target cell, cell line, or tissue (*e.g., in vitro* or *in vivo)* for the treatment of a subject in need thereof.

[00127] Many tissues are highly heterogeneous and contain biological barriers that limit adeno-associated virus (AAV) transduction. A functional selection strategy enables selection of AAV variants from a library that are capable of transducing specific cell types within a tissue. Moreover, the selective pressure is designed to identify variants that excel in mediating post-entry steps and driving transgene expression. In order to establish a functional selection strategy that is applicable to all species and tissues, several modifications were introduced in the AAV viral genome. Herein we describe methods for the generation of AAV variant libraries and methods of functional selection of variants capable of transducing desired tissues, cells and/or organelles. These methods are applicable to the development of AAV variants suitable for all species, cell types and target organelles.

General

[00128] Practice of the methods, as well as preparation and use of the compositions disclosed herein employ, unless otherwise indicated, conventional techniques in molecular biology, biochemistry, chromatin structure and analysis, computational chemistry, cell culture, recombinant DNA and related fields as are within the skill of the art. These techniques are fully explained in the literature. *See*, for example, Sambrook *et al.* MOLECULAR CLONING: A LABORATORY MANUAL, Second edition, Cold Spring Harbor Laboratory Press, 1989 and Third edition, 2001; Ausubel *et al.*, CURRENT PROTOCOLS IN MOLECULAR BIOLOGY, John Wiley & Sons, New York, 1987 and periodic updates; the series METHODS IN ENZYMOLOGY, Academic Press, San Diego; Wolffe, CHROMATIN STRUCTURE AND FUNCTION, Third edition, Academic Press, San Diego, 1998; METHODS IN ENZYMOLOGY, Vol. 304, "Chromatin" (P.M. Wassarman and A. P. Wolffe, eds.), Academic Press, San Diego, 1999; and METHODS IN MOLECULAR BIOLOGY, Vol. 119, "Chromatin Protocols" (P.B. Becker, ed.) Humana Press, Totowa, 1999.

Definitions

[00129] The term "herein" means the entire application.

[00130] Unless otherwise defined herein, scientific and technical terms used in this application shall have the meanings that are commonly understood by those of ordinary skill in the art to which this invention belongs. Generally, nomenclature used in connection with the compounds, composition and methods described herein, are those well-known and commonly used in the art.

[00131] It should be understood that any of the embodiments described herein, including those described under different aspects of the disclosure and different parts of the specification (including embodiments described only in the Examples) can be combined with one or more other embodiments of the invention, unless explicitly disclaimed or improper. Combination of embodiments are not limited to those specific combinations claimed via the multiple dependent claims.

[00132] All of the above, and any other publications, patents and published patent applications referred to in this application are specifically incorporated by reference herein. In case of conflict, the present specification, including its specific definitions, will control.

[00133] Throughout this specification, the word "comprise" or variations such as "comprises" or "comprising" will be understood to imply the inclusion of a stated integer (or components) or group of integers (or components), but not the exclusion of any other integer (or components) or group of integers (or components).

[00134] Throughout the specification, where compositions are described as having, including, or comprising (or variations thereof), specific components, it is contemplated that compositions also may consist essentially of, or consist of, the recited components. Similarly, where methods or processes are described as having, including, or comprising specific process steps, the processes also may consist essentially of, or consist of, the recited processing steps. Further, it should be understood that the order of steps or order for performing certain actions is immaterial so long as the compositions and methods described herein remains operable. Moreover, two or more steps or actions can be conducted simultaneously.

[00135] The term "including" is used to mean "including but not limited to." "Including" and "including but not limited to" are used interchangeably.

[00136] As used herein, "about" or "approximately" means within an acceptable error range for the particular value as determined by one of ordinary skill in the art, which will depend in part on how the value is measured or determined, *i.e.*, the limitations of the measurement system.

[00137] The use of the terms "a" and "an" and "the" and similar referents in the context of describing the elements (especially in the context of the following claims) are to be construed to cover both the singular and the plural, unless otherwise indicated herein or clearly contradicted by context.

[00138] The term "or" as used herein should be understood to mean "and/or," unless the context clearly indicates otherwise.

[00139] Recitation of ranges of values herein are merely intended to serve as a shorthand method of referring individually to each separate value falling within the range, unless otherwise indicated herein, and each separate value is incorporated into the specification as if it were individually recited herein. All methods described herein can be performed in any suitable order unless otherwise indicated herein or otherwise clearly contradicted by context. The use of any and all examples, or exemplary language (e.g., "such as") provided herein, is intended merely to better illuminate the embodiments and does not pose a limitation on the scope of the claims unless otherwise stated. No language in the specification should be construed as indicating any non-claimed element as essential.

[00140] The terms "nucleic acid," "polynucleotide," and "oligonucleotide" are used interchangeably and refer to a deoxyribonucleotide or ribonucleotide polymer, in linear or circular conformation, and in either single- or double-stranded form. For the purposes of the present disclosure, these terms are not to be construed as limiting with respect to the length of a polymer. The terms can encompass known analogues of natural nucleotides, as well as nucleotides that are modified in the base, sugar and/or phosphate moieties (*e.g.*, phosphorothioate backbones). In general, an analogue of a particular nucleotide has the same base-pairing specificity; *i.e.*, an analogue of A will base-pair with T.

[00141] The terms "polypeptide," "peptide" and "protein" are used interchangeably to refer to a polymer of amino acid residues. The term also applies to amino acid polymers in which one or more amino acids are chemical analogues or modified derivatives of a corresponding naturally-occurring amino acids.

[00142] "Binding" refers to a sequence-specific, non-covalent interaction between macromolecules (*e.g.*, between a protein and a nucleic acid). Not all components of a binding interaction need be sequence-specific (*e.g.*, contacts with phosphate residues in a DNA backbone), as long as the interaction as a whole is sequence-specific. Such interactions are generally characterized by a dissociation constant (K_d) of 10^{-6} M^{-1} or

lower. "Affinity" refers to the strength of binding: increased binding affinity being correlated with a lower K_d. "Non-specific binding" refers to, non-covalent interactions that occur between any molecule of interest (*e.g.* an engineered nuclease) and a macromolecule (*e.g.* DNA) that are not dependent on-target sequence.

[00143] A "binding protein" is a protein that is able to bind non-covalently to another molecule. A binding protein can bind to, for example, a DNA molecule (a DNA-binding protein), an RNA molecule (an RNA-binding protein) and/or a protein molecule (a protein-binding protein). In the case of a protein-binding protein, it can bind to itself (to form homodimers, homotrimers, *etc.*) and/or it can bind to one or more molecules of a different protein or proteins. A binding protein can have more than one type of binding activity. For example, zinc finger proteins have DNA-binding, RNA-binding and protein-binding activity. In the case of an RNA-guided nuclease system, the RNA guide is heterologous to the nuclease component (Cas9 or Cfp1) and both may be engineered.

[00144] A "DNA binding molecule" is a molecule that can bind to DNA. Such DNA binding molecule can be a polypeptide, a domain of a protein, a domain within a larger protein or a polynucleotide. In some embodiments, the polynucleotide is DNA, while in other embodiments, the polynucleotide is RNA. In some embodiments, the DNA binding molecule is a protein domain of a nuclease (*e.g.* the *Fok*I domain), while in other embodiments, the DNA binding molecule is a guide RNA component of an RNA-guided nuclease (*e.g.* Cas9 or Cpf1).

[00145] A "DNA binding protein" (or binding domain) is a protein, or a domain within a larger protein, that binds DNA in a sequence-specific manner, for example through one or more zinc fingers or through interaction with one or more RVDs in a zinc finger protein or TALE, respectively. The term zinc finger DNA binding protein is often abbreviated as zinc finger protein or ZFP.

[00146] A "zinc finger DNA binding protein" (or binding domain) is a protein, or a domain within a larger protein, that binds DNA in a sequence-specific manner through one or more zinc fingers, which are regions of amino acid sequence within the binding domain whose structure is stabilized through coordination of a zinc ion. The term zinc finger DNA binding protein is often abbreviated as zinc finger protein or ZFP.

[00147] A "TALE DNA binding domain" or "TALE" is a polypeptide comprising one or more TALE repeat domains/units. The repeat domains are involved in binding of the TALE to its cognate target DNA sequence. A single "repeat unit" (also referred to

as a "repeat") is typically 33-35 amino acids in length and exhibits at least some sequence homology with other TALE repeat sequences within a naturally occurring TALE protein. *See, e.g.,* U.S. Patent No. 8,586,526, incorporated by reference herein in its entirety.

[00148] "TtAgo" is a prokaryotic Argonaute protein thought to be involved in gene silencing. TtAgo is derived from the bacteria *Thermus thermophilus*. See, *e.g.* Swarts, *et al., ibid*; G. Sheng, *et al.* (2013) *Proc. Natl. Acad. Sci.* U.S.A. 111, 652). A "TtAgo system" is all the components required including e.g. guide DNAs for cleavage by a TtAgo enzyme.

[00149] "Cleavage" refers to the breakage of the covalent backbone of a DNA molecule. Cleavage can be initiated by a variety of methods including, but not limited to, enzymatic or chemical hydrolysis of a phosphodiester bond. Both single-stranded cleavage and double-stranded cleavage are possible, and double-stranded cleavage can occur as a result of two distinct single-stranded cleavage events. DNA cleavage can result in the production of either blunt ends or staggered ends. In certain embodiments, fusion polypeptides are used for targeted double-stranded DNA cleavage.

[00150] The term "editing" as used herein refers to a process wherein a nucleotide base is modified such that point mutations are introduced into a DNA strand. Introduction of the point mutation in the DNA will necessarily reproduce the change in any mRNA that is transcribed from the edited DNA. Adenine and cytidine deaminases remove an amino group from their respective nucleotide targets, converting them into inosine and uridine respectively. During DNA repair or replication, inosine is recognized as guanine and uridine is recognized as thymine by polymerase enzymes, resulting in conversion of an A:T base pair into a G:C base pair, or C:G base pair into a T:A base pair in the double stranded DNA that has been edited.

[00151] The term "sequence" refers to a nucleotide sequence of any length, which can be DNA or RNA; can be linear, circular or branched and can be either single-stranded or double stranded. The term "transgene" refers to a nucleotide sequence that is inserted into a genome. A transgene can be of any length, for example between 2 and 100,000,000 nucleotides in length (or any integer value therebetween or thereabove), between about 100 and 100,000 nucleotides in length (or any integer therebetween), between about 2000 and 20,000 nucleotides in length (or any value therebetween) or between about 5 and 15 kb (or any value therebetween).

[00152] A "chromosome," is a chromatin complex comprising all or a portion of the genome of a cell. The genome of a cell is often characterized by its karyotype, which is the collection of all the chromosomes that comprise the genome of the cell. The genome of a cell can comprise one or more chromosomes.

[00153] An "episome" is a replicating nucleic acid, nucleoprotein complex or other structure comprising a nucleic acid that is not part of the chromosomal karyotype of a cell. Examples of episomes include plasmids, minicircles and certain viral genomes. The liver specific constructs described herein may be episomally maintained or, alternatively, may be stably integrated into the cell.

[00154] An "exogenous" molecule is a molecule that is not normally present in a cell, but can be introduced into a cell by one or more genetic, biochemical or other methods. "Normal presence in the cell" is determined with respect to the particular developmental stage and environmental conditions of the cell. Thus, for example, a molecule that is present only during embryonic development of muscle is an exogenous molecule with respect to an adult muscle cell. Similarly, a molecule induced by heat shock is an exogenous molecule with respect to a non-heat-shocked cell. An exogenous molecule can comprise, for example, a functioning version of a malfunctioning endogenous molecule or a malfunctioning version of a normally-functioning endogenous molecule.

[00155] An exogenous molecule can be, among other things, a small molecule, such as is generated by a combinatorial chemistry process, or a macromolecule such as a protein, nucleic acid, carbohydrate, lipid, glycoprotein, lipoprotein, polysaccharide, any modified derivative of the above molecules, or any complex comprising one or more of the above molecules. Nucleic acids include DNA and RNA, can be single- or double-stranded; can be linear, branched or circular; and can be of any length. Nucleic acids include those capable of forming duplexes, as well as triplex-forming nucleic acids. See, for example, U.S. Patent Nos. 5,176,996 and 5,422,251. Proteins include, but are not limited to, DNA-binding proteins, transcription factors, chromatin remodeling factors, methylated DNA binding proteins, polymerases, methylases, demethylases, acetylases, deacetylases, kinases, phosphatases, ligases, deubiquitinases, integrases, recombinases, ligases, topoisomerases, gyrases and helicases.

[00156] An exogenous molecule can be the same type of molecule as an endogenous molecule, e.g., an exogenous protein or nucleic acid. For example, an exogenous nucleic acid can comprise an infecting viral genome, a plasmid or episome introduced

into a cell, or a chromosome that is not normally present in the cell. Methods for the introduction of exogenous molecules into cells are known to those of skill in the art and include, but are not limited to, lipid-mediated transfer (i.e., liposomes, including neutral and cationic lipids), electroporation, direct injection, cell fusion, particle bombardment, calcium phosphate co-precipitation, DEAE-dextran-mediated transfer and viral vector-mediated transfer. An exogenous molecule can also be the same type of molecule as an endogenous molecule but derived from a different species than the cell is derived from. For example, a human nucleic acid sequence may be introduced into a cell line originally derived from a mouse or hamster.

[00157] By contrast, an "endogenous" molecule is one that is normally present in a particular cell at a particular developmental stage under particular environmental conditions. For example, an endogenous nucleic acid can comprise a chromosome, the genome of a mitochondrion, chloroplast or other organelle, or a naturally-occurring episomal nucleic acid. Additional endogenous molecules can include proteins, for example, transcription factors and enzymes.

[00158] As used herein, the term "product of an exogenous nucleic acid" includes both polynucleotide and polypeptide products, for example, transcription products (polynucleotides such as RNA) and translation products (polypeptides).

[00159] The term "heterologous" means derived from a genotypically distinct entity from that of the rest of the entity to which it is being compared. For example, a polynucleotide introduced by genetic engineering techniques into a plasmid or vector derived from a different species is a heterologous polynucleotide. A promoter removed from its native coding sequence and operatively linked to a coding sequence with which it is not naturally found linked is a heterologous promoter. Thus, for example, an rAAV that includes a heterologous nucleic acid sequence encoding a heterologous gene product is an rAAV that includes a polynucleotide not normally included in a naturally-occurring, wild-type AAV, and the encoded heterologous gene product is a gene product not normally encoded by a naturally-occurring, wild type AAV.

[00160] The terms "fusion," "fused" molecule or variations thereof refer to is a molecule in which two or more subunit molecules are linked, preferably covalently. The subunit molecules can be the same chemical type of molecule, or can be different chemical types of molecules. Examples of fusion molecules include, but are not limited to, fusion proteins (for example, a fusion between a protein DNA-binding domain and a cleavage domain), fusions between a polynucleotide DNA-binding domain (*e.g.*,

sgRNA) operatively associated with a cleavage domain, and fusion nucleic acids (for example, a nucleic acid encoding the fusion protein).

[00161] Expression of a fusion protein in a cell can result from delivery of the fusion protein to the cell or by delivery of a polynucleotide encoding the fusion protein to a cell, wherein the polynucleotide is transcribed, and the transcript is translated, to generate the fusion protein. Trans-splicing, polypeptide cleavage and polypeptide ligation can also be involved in expression of a protein in a cell. Methods for polynucleotide and polypeptide delivery to cells are presented elsewhere in this disclosure.

[00162] A "gene," for the purposes of the present disclosure, includes a DNA region encoding a gene product (see infra), as well as all DNA regions which regulate the production of the gene product, whether or not such regulatory sequences are adjacent to coding and/or transcribed sequences. Accordingly, a gene includes, but is not necessarily limited to, promoter sequences, terminators, translational regulatory sequences such as ribosome binding sites and internal ribosome entry sites, enhancers, silencers, insulators, boundary elements, replication origins, matrix attachment sites and locus control regions.

[00163] "Gene expression" refers to the conversion of the information contained in a gene, into a gene product. A gene product can be the direct transcriptional product of a gene (e.g., mRNA, tRNA, rRNA, antisense RNA, ribozyme, structural RNA or any other type of RNA) or a protein produced by translation of an mRNA. Gene products also include RNAs which are modified, by processes such as capping, polyadenylation, methylation, and editing, and proteins modified by, for example, methylation, acetylation, phosphorylation, ubiquitination, ADP-ribosylation, myristoylation, and glycosylation.

[00164] "Modulation" of gene expression refers to a change in the activity of a gene. Modulation of expression can include, but is not limited to, gene activation and gene repression. Genome editing (e.g., cleavage, alteration, inactivation, random mutation) can be used to modulate expression. Gene inactivation refers to any reduction in gene expression as compared to a cell that does not include a ZFP, TALE or CRISPR/Cas system as described herein. Thus, gene inactivation may be partial or complete.

[00165] A "region of interest" is any region of cellular chromatin, such as, for example, a gene or a non-coding sequence within or adjacent to a gene, in which it is desirable to bind an exogenous molecule. Binding can be for the purposes of targeted

DNA cleavage and/or targeted recombination. A region of interest can be present in a chromosome, an episome, an organellar genome (e.g., mitochondrial, chloroplast), or an infecting viral genome, for example. A region of interest can be within the coding region of a gene, within transcribed non-coding regions such as, for example, leader sequences, trailer sequences or introns, or within non-transcribed regions, either upstream or downstream of the coding region. A region of interest can be as small as a single nucleotide pair or up to 2,000 nucleotide pairs in length, or any integral value of nucleotide pairs.

[00166] A "reporter gene" or "reporter sequence" refers to any sequence that produces a protein product (a "reporter protein") that is easily measured, in an assay. The assay may be, but is not necessarily, routine. Suitable reporter genes include, but are not limited to, sequences encoding proteins that mediate antibiotic resistance (*e.g.*, ampicillin resistance, neomycin resistance, G418 resistance, puromycin resistance), sequences encoding colored or fluorescent or luminescent proteins (*e.g.*, green fluorescent protein, enhanced green fluorescent protein, red fluorescent protein, luciferase), and proteins which mediate enhanced cell growth and/or gene amplification (*e.g.*, dihydrofolate reductase). Epitope tags include, for example, one or more copies of FLAG, His, myc, Tap, HA or any detectable amino acid sequence. "Expression tags" include sequences that encode reporters that may be operably linked to a desired gene sequence in order to monitor expression of the gene of interest.

[00167] "Eukaryotic" cells include, but are not limited to, fungal cells (such as yeast), plant cells, animal cells, mammalian cells and human cells (e.g., T-cells), including stem cells (pluripotent and multipotent).

[00168] The term "barcode", as used herein, refers to a unique oligonucleotide sequence (e.g., 5, 6, 7, 8, 9, 10, 12, 15, 20, 25, 30, 50, 75, 100 nucleotides) having a particular sequence, that is used as a means of identifying a nucleic acid sequence in which it is incorporated. The barcode is used as a means of distinguishing or identifying individual members (e.g., variants) in a library.

[00169] The terms "operative linkage" and "operatively linked" (or "operably linked") are used interchangeably with reference to a juxtaposition of two or more components (such as sequence elements), in which the components are arranged such that both components function normally and allow the possibility that at least one of the components can mediate a function that is exerted upon at least one of the other components. By way of illustration, a transcriptional regulatory sequence, such as a

promoter, is operatively linked to a coding sequence if the transcriptional regulatory sequence controls the level of transcription of the coding sequence in response to the presence or absence of one or more transcriptional regulatory factors. A transcriptional regulatory sequence is generally operatively linked in cis with a coding sequence, but need not be directly adjacent to it. For example, an enhancer is a transcriptional regulatory sequence that is operatively linked to a coding sequence, even though they are not contiguous.

[00170] A "functional fragment" of a protein, polypeptide or nucleic acid is a protein, polypeptide or nucleic acid whose sequence is not identical to the full-length protein, polypeptide or nucleic acid, yet retains the same function as the full-length protein, polypeptide or nucleic acid. A functional fragment can possess more, fewer, or the same number of residues as the corresponding native molecule, and/or can contain one or more amino acid or nucleotide substitutions. Methods for determining the function of a nucleic acid or protein (e.g., coding function, ability to hybridize to another nucleic acid, enzymatic activity assays) are well-known in the art.

[00171] A polynucleotide "vector" or "construct" is capable of transferring gene sequences to target cells. Typically, "vector construct," "expression vector," "expression construct," "expression cassette," and "gene transfer vector," mean any nucleic acid construct capable of directing the expression of a gene of interest and which can transfer gene sequences to target cells. Thus, the term includes cloning, and expression vehicles, as well as integrating vectors.

[00172] The terms "subject" and "patient" are used interchangeably and refer to mammals including, but not limited to, human patients and non-human primates, as well as experimental animals such as rabbits, dogs, cats, rats, mice, and other animals. Accordingly, the term "subject" or "patient" as used herein means any mammalian patient or subject to which the expression cassettes of the invention can be administered. Subjects of the present invention include those with a disorder.

[00173] The terms "treating" and "treatment" as used herein refer to reduction in severity and/or frequency of symptoms, elimination of symptoms and/or underlying cause, prevention of the occurrence of symptoms and/or their underlying cause, and improvement or remediation of damage. Cancer, monogenic diseases and graft versus host disease are non-limiting examples of conditions that may be treated using the compositions and methods described herein.

[00174] The term "effective amount" as used herein is an amount sufficient to effect beneficial or desired clinical results. An effective amount can be administered in one or more administrations. For purposes of this disclosure, an effective amount of a compound (*e.g.*, an infectious rAAV virion) is an amount that is sufficient to palliate, ameliorate, stabilize, reverse, prevent, slow or delay the progression of (and/or symptoms associated with) a particular disease state (*e.g.*, a muscle disease). Accordingly, an effective amount of an infectious rAAV virion is an amount of the infectious rAAV virion that is able to effectively deliver a heterologous nucleic acid to a target cell (or target cells) of the individual. Effective amounts may be determined preclinically by, *e.g.*, detecting in the cell or tissue the gene product (RNA, protein) that is encoded by the heterologous nucleic acid sequence using techniques that are well understood in the art, *e.g.* RT-PCR, western blotting, ELISA, fluorescence or other reporter readouts, and the like. Effective amounts may be determined clinically by, *e.g.* detecting a change in the onset or progression of disease using methods known in the art, *e.g.* 6-minute walk test, left ventricular ejection fraction, hand-held dynamometry, Vignos Scale and the like as described herein and as known in the art.

[00175] “Chromatin” is the nucleoprotein structure comprising the cellular genome. Cellular chromatin comprises nucleic acid, primarily DNA, and protein, including histones and non-histone chromosomal proteins. The majority of eukaryotic cellular chromatin exists in the form of nucleosomes, wherein a nucleosome core comprises approximately 150 base pairs of DNA associated with an octamer comprising two each of histones H2A, H2B, H3 and H4; and linker DNA (of variable length depending on the organism) extends between nucleosome cores. A molecule of histone H1 is generally associated with the linker DNA. For the purposes of the present disclosure, the term “chromatin” is meant to encompass all types of cellular nucleoprotein, both prokaryotic and eukaryotic. Cellular chromatin includes both chromosomal and episomal chromatin.

[00176] The term “virus genome” refers to a nucleic acid sequence that is flanked by cis acting nucleic acid sequences that mediate the packaging of the nucleic acid into a viral capsid. For AAVs and parvoviruses, for example it is known that the “inverted terminal repeats” (ITRs) that are located at the 5′ and 3′ end of the viral genome have this function and that the ITRs can mediate the packaging of heterologous, for example, non-wild type virus genomes, into a viral capsid.

[00177] The term "element" refers to a separate or distinct part of something, for example, a nucleic acid sequence with a separate function within a longer nucleic acid sequence. The term "regulatory element" and "expression control element" are used interchangeably herein and refer to nucleic acid molecules that can influence the expression of an operably linked coding sequence in a particular host organism. These terms are used broadly to and cover all elements that promote or regulate transcription, including promoters, core elements required for basic interaction of RNA polymerase and transcription factors, upstream elements, enhancers, and response elements (see, e.g., Lewin, "Genes V" (Oxford University Press, Oxford) pages 847-873). Exemplary regulatory elements in prokaryotes include promoters, operator sequences and a ribosome binding sites. Regulatory elements that are used in eukaryotic cells can include, without limitation, transcriptional and translational control sequences, such as promoters, enhancers, splicing signals, polyadenylation signals, terminators, protein degradation signals, internal ribosome-entry element (IRES), 2A sequences, and the like, that provide for and/or regulate expression of a coding sequence and/or production of an encoded polypeptide in a host cell.

[00178] As used herein, the term "variant" refers to a polynucleotide or polypeptide having a sequence substantially similar to a reference polynucleotide or polypeptide. In the case of a polynucleotide, a variant can have deletions, substitutions, additions of one or more nucleotides at the 5′ end, 3′ end, and/or one or more internal sites in comparison to the reference polynucleotide. Similarities and/or differences in sequences between a variant and the reference polynucleotide can be detected using conventional techniques known in the art, for example polymerase chain reaction (PCR) and hybridization techniques. Variant polynucleotides also include synthetically derived polynucleotides, such as those generated, for example, by using site-directed mutagenesis. Generally, a variant of a polynucleotide, including, but not limited to, a DNA, can have at least about 50%, about 55%, about 60%, about 65%, about 70%, about 75%, about 80%, about 85%, about 90%, about 91%, about 92%, about 93%, about 94%, about 95%, about 96%, about 97%, about 98%, about 99% or more sequence identity to the reference polynucleotide as determined by sequence alignment programs known by skilled artisans. In the case of a polypeptide, a variant can have deletions, substitutions, additions of one or more amino acids in comparison to the reference polypeptide. Similarities and/or differences in sequences between a variant and the reference polypeptide can be detected using conventional techniques known in

the art, for example Western blot. Generally, a variant of a polypeptide, can have at least about 60%, about 65%, about 70%, about 75%, about 80%, about 85%, about 90%, about 91%, about 92%, about 93%, about 94%, about 95%, about 96%, about 97%, about 98%, about 99% or more sequence identity to the reference polypeptide as determined by sequence alignment programs known by skilled artisans. In some instances, the term "variant" may also be used to describe an AAV comprising a variant capsid sequence.

[00179] The term "AAV" or "adeno-associated virus" refers to a Dependoparvovirus within the Parvoviridae genus of viruses. For example, the AAV can be an AAV derived from a naturally occurring "wild-type" virus, an AAV derived from a rAAV genome packaged into a capsid derived from capsid proteins encoded by a naturally occurring cap gene and/or a rAAV genome packaged into a capsid derived from capsid proteins encoded by a non-natural capsid cap gene. For the purposes of the disclosure herein, the term "AAV" is an abbreviation for adeno-associated virus, including, without limitation, the virus itself and derivatives thereof. Except where otherwise indicated, the term refers to all subtypes or serotypes and both replication-competent and recombinant forms. The term "AAV" includes, without limitation, AAV type 1 (AAV-1 or AAVl), AAV type 2 (AAV-2 or AAV2), AAV type 3A (AAV-3A or AAV3A), AAV type 3B (AAV-3B or AAV3B), AAV type 4 (AAV-4 or AAV4), AAV type 5 (AAV-5 or AAV5), AAV type 6 (AAV-6 or AAV6), AAV type 7 (AAV-7 or AAV7), AAV type 8 (AAV-8 or AAV8), AAV type 9 (AAV-9 or AAV9), AAV type 10 (AAV- 10 or AAV10 or AAVrhlO), avian AAV, bovine AAV, canine AAV, caprine AAV, equine AAV, primate AAV, non-primate AAV, and ovine AAV. "Primate AAV" refers to AAV that infect primates, "non-primate AAV" refers to AAV that infect non-primate mammals, "bovine AAV" refers to AAV that infect bovine mammals, etc.

[00180] The genomic sequences of various serotypes of AAV, as well as the sequences of the native terminal repeats (TRs), Rep proteins, and capsid subunits are known in the art. Such sequences may be found in the literature or in public databases such as GenBank. See, e.g., GenBank Accession Numbers NC_002077.1 (AAVl), AF063497.1 (AAVl), NC 001401.2 (AAV2), AF043303.1 (AAV2), J01901.1 (AAV2), U48704.1 (AAV3A), NC_001729.1 (AAV3A), AF028705.1 (AAV3B), NC_001829.1 (AAV4), U89790.1 (AAV4), NC_006152.1 (AA5), AF085716.1 (AAV-5), AF028704.1 (AAV6), NC_006260.1 (AAV7), AF513851.1 (AAV7), AF513852.1 (AAV8) NC 006261.1 (AAV-8), AY530579.1 (AAV9), AAT46337 (AAV10) and AAO88208

(AAVrhlO); the disclosures of which are incorporated by reference herein for teaching AAV nucleic acid and amino acid sequences. See also, *e.g.*, Srivistava *et al.* (1983) *J. Virology* 45 :555; Morini *et al.* (1998) *J. Virology* 71 :6823; Chiorini *et al.* (1999) J. *Virology* 73 : 1309; Bantel-Schaal *et al.* (1999) *J. Virology* 73:939; Xiao *et al.* (1999) *J. Virology* 73 :3994; Muramatsu *et al.* (1996) *Virology* 221 :208; Shade *et al.* (1986) *J. Virol.* 58:921; Gao *et al.* (2002) *Proc. Nat. Acad. Sci. USA* 99: 11854; Moris *et al.* (2004) *Virology* 33 :375-383; international patent publications WO 00/28061, WO 99/61601, WO 98/11244; and U.S. Pat. No. 6,156,303.

[00181] The term "rAAV" refers to a "recombinant AAV". In some embodiments, a recombinant AAV has an AAV genome in which part or all of the rep and cap genes have been replaced with heterologous sequences. If an AAV virion comprises a heterologous polynucleotide (i.e. a polynucleotide other than a wild-type AAV genome, *e.g.*, a transgene to be delivered to a target cell, a nuclease system, an RNAi agent or CRISPR agent to be delivered to a target cell, etc.), it is typically referred to as a "recombinant AAV (rAAV) virion" or an "rAAV viral particle." In general, the heterologous polynucleotide is flanked by at least one, and generally by two, AAV inverted terminal repeat sequences (ITRs).

[00182] The term "cap gene" or "capsid gene" refers to the nucleic acid sequences that encode capsid proteins that form, or contribute to the formation of, the capsid, or protein shell, of the virus. In the case of AAV, the capsid protein may be VP1, VP2, or VP3. For other parvoviruses, the names and numbers of the capsid proteins can differ.

[00183] The term "rep gene" refers to the nucleic acid sequences that encode the non-structural proteins (rep78, rep68, rep52 and rep40) required for the replication and production of virus.

[00184] The term "packaging" refers to a series of intracellular events that result in the assembly and encapsidation of an AAV particle. AAV "rep" and "cap" genes refer to polynucleotide sequences encoding replication and encapsidation proteins of adeno-associated virus. AAV rep and cap are referred to herein as AAV "packaging genes."

[00185] The term "helper virus" for AAV refers to a virus that allows AAV (e.g. wild-type AAV) to be replicated and packaged by a mammalian cell. A variety of such helper viruses for AAV are known in the art, including adenoviruses, herpesviruses and poxviruses such as vaccinia. The adenoviruses encompass a number of different subgroups, although Adenovirus type 5 of subgroup C is most commonly used. Numerous adenoviruses of human, non-human mammalian and avian origin are known

and available from depositories such as the ATCC. Viruses of the herpes family include, for example, herpes simplex viruses (HSV) and Epstein-Barr viruses (EBV), as well as cytomegaloviruses (CMV) and pseudorabies viruses (PRV); which are also available from depositories such as ATCC.

[00186] The term "helper virus function(s)" refers to function(s) encoded in a helper virus genome which allow AAV replication and packaging (in conjunction with other requirements for replication and packaging described herein). As described herein, "helper virus function" may be provided in a number of ways, including by providing helper virus or providing, for example, polynucleotide sequences encoding the requisite function(s) to a producer cell in trans. For example, a plasmid or other expression vector comprising nucleotide sequences encoding one or more adenoviral proteins is transfected into a producer cell along with an rAAV vector.

[00187] The term "infectious" virus or viral particle is one that comprises a competently assembled viral capsid and is capable of delivering a polynucleotide component into a cell for which the viral species is tropic. The term does not necessarily imply any replication capacity of the virus. Assays for counting infectious viral particles are described elsewhere in this disclosure and in the art. Viral infectivity can be expressed as the ratio of infectious viral particles to total viral particles. Methods of determining the ratio of infectious viral particle to total viral particle are known in the art. See, *e.g.*, Grainger *et al.* (2005) *Mol. Ther.* 11: S337 (describing a TCID50 infectious titer assay); and Zolotukhin *et al.* (1999) *Gene Ther.* 6:973.

[00188] The term "tropism" as used herein refers to the preferential targeting by a virus (*e.g.*, an AAV) of cells of a particular host species or of particular cell types within a host species. For example, a virus that can infect cells of the heart, lung, liver, and muscle has a broader (*i.e.*, increased) tropism relative to a virus that can infect only lung and muscle cells. Tropism can also include the dependence of a virus on particular types of cell surface molecules of the host. For example, some viruses can infect only cells with surface glycosaminoglycans, while other viruses can infect only cells with sialic acid (such dependencies can be tested using various cells lines deficient in particular classes of molecules as potential host cells for viral infection). In some cases, the tropism of a virus describes the virus's relative preferences. For example, a first virus may be able to infect all cell types but is much more successful in infecting those cells with surface glycosaminoglycans. A second virus can be considered to have a similar (or identical) tropism as the first virus if the second virus also prefers the same

characteristics (*e.g.*, the second virus is also more successful in infecting those cells with surface glycosaminoglycans), even if the absolute transduction efficiencies are not similar. For example, the second virus might be more efficient than the first virus at infecting every given cell type tested, but if the relative preferences are similar (or identical), the second virus can still be considered to have a similar (or identical) tropism as the first virus. In some embodiments, the tropism of a virion comprising a subject variant AAV capsid protein is not altered relative to a naturally occurring virion. In some embodiments, the tropism of a virion comprising a subject variant AAV capsid protein is expanded (i.e., broadened) relative to a naturally occurring virion. In some embodiments, the tropism of a virion comprising a subject variant AAV capsid protein is reduced relative to a naturally occurring virion.

[00189] The term "replication-competent" virus (*e.g.* a replication-competent AAV) refers to a phenotypically wild-type virus that is infectious, and is also capable of being replicated in an infected cell (*i.e.* in the presence of a helper virus or helper virus functions). In the case of AAV, replication competence generally requires the presence of functional AAV packaging genes. In general, rAAV vectors as described herein are replication-incompetent in mammalian cells (especially in human cells) by virtue of the lack of one or more AAV packaging genes. Typically, such rAAV vectors lack any AAV packaging gene sequences in order to minimize the possibility that replication competent AAV are generated by recombination between AAV packaging genes and an incoming rAAV vector. In many embodiments, rAAV vector preparations as described herein are those which contain few if any replication competent AAV (rcAAV, also referred to as RCA) (*e.g.,* less than about 1 rcAAV per 10^2 rAAV particles, less than about 1 rcAAV per 10^4 rAAV particles, less than about 1 rcAAV per 10 rAAV particles, less than about 1 rcAAV per 10^{12} rAAV particles, or no rcAAV).

[00190] A “library” may be in the form of a multiplicity of linear nucleic acids, plasmids, viral particles or viral vectors, etc. A library will include at least two nucleic acids, plasmids, viral particles, viral vectors, etc.

Libraries of AAV Variants

[00191] In one aspect, the subject matter disclosed herein relates to the development of libraries encoding AAV capsid proteins with a desired characteristic compared to a natural AAV serotype. Thus, described herein are libraries of AAV variants used to develop AAV capsids with a desired characteristic compared to a natural AAV serotype. In some embodiments, the desired characteristic is enhanced cell or tissue

tropism as compared to the natural AAV serotype. In some embodiments, the desired characteristic is the evasion of a pre-existing host antibody response. In some embodiments, the desired characteristic is reduced immunogenicity so as to not provoke a host response.

[00192] In some embodiments, each member of a library of the disclosure comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and one or more of: b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a); c) a nucleic acid encoding a localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein.

[00193] In some embodiments, each member of a library of the disclosure comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and two or more of: b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a); c) a nucleic acid encoding a localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein.

[00194] In some embodiments, each member of a library of the disclosure comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and three or more of: b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a); c) a nucleic acid encoding a localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein.

[00195] In some embodiments, each member of a library of the disclosure comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a); c) a nucleic acid encoding a localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein.

[00196] In some embodiments, each member of a library of the disclosure comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable

and/or surface-exposed loop of the variant capsid protein; and one or more of: b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a) in the nucleic acid sequence flanking the peptide insertion site; c) a nucleic acid encoding a localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein.

[00197] In some embodiments, each member of a library of the disclosure comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and two or more of: b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a) in the nucleic acid sequence flanking the peptide insertion site; c) a nucleic acid encoding a localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein.

[00198] In some embodiments, each member of a library of the disclosure comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and three or more of: b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a) in the nucleic acid sequence flanking the peptide insertion site; c) a nucleic acid encoding a localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein.

[00199] In some embodiments, each member of a library of the disclosure comprises a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a) in the nucleic acid sequence flanking the peptide insertion site; c) a nucleic acid encoding a localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein.

[00200] In some embodiments, each member of the library comprises a nucleic acid encoding a localization signal. In some embodiments, each member of the library comprises a nucleic acid encoding a localization signal. In some embodiments, each member of the library comprises a nucleic acid comprising a barcode. In some embodiments, each member of the library comprises a nucleic acid comprising two or more barcodes. In some embodiments, each member of the library comprises a nucleic acid encoding a reporter protein.

[00201] In any of the above embodiments, the nucleic acid encoding an AAV variant capsid protein, the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are present on separate nucleic acid molecules. In some embodiments, the nucleic acid encoding an AAV variant capsid protein, the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are present on a single nucleic acid molecule. In some embodiments, the nucleic acid encoding an AAV variant capsid protein, and the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are linked to each other in any order. In some embodiments, each member of the library comprises a 5'ITR sequence, the nucleic acid comprising a barcode, the nucleic acid encoding a reporter protein, the nucleic acid encoding an AAV variant capsid protein, and a 3'ITR sequence, in that order.

[00202] In some embodiments, the AAV variant capsid proteins are derived from AAV1, AAV2, AAV3B, AAV5, AAV6, AAV8 and AAV9. In some embodiments, the AAV variant capsid proteins are derived from less well characterized AAV serotypes, including but not limited to AAV3, AAV4, AAV7, AAV11, AAVrh10, AAVrh39, and AAVrh74. In some embodiments, a library of AAV variants comprises AAV variant capsid proteins derived from a single AAV serotype. In some embodiments, a library of AAV variants comprises AAV variant capsid proteins derived from 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, or more AAV serotypes. In some embodiments, the AAV variant capsid proteins derived from 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, or more AAV serotypes are combined once individual serotype libraries are developed. In some embodiments, combinatorial libraries are generated by modifying nucleic acids encoding AAV capsid proteins from 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, or more serotypes in the same pool.

[00203] In some embodiments, mutations (e.g., insertions, deletions and/or substitutions) are introduced into a DNA sequence encoding an exposed loop in the capsid protein. In some embodiments, a peptide is inserted into exposed loops (e.g. hypervariable regions) in the AAV capsid. In some embodiments, the peptide comprises 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 or more amino acids. In some embodiments, the HI loop is targeted (mutated) while in others, the DE loop is targeted (mutated). In some embodiments, mutations (e.g., insertions, deletions and/or substitutions) are made in both loops. In further embodiments, mutations (e.g., insertions, deletions and/or

substitutions) are introduced into the VR region of a surface loop, including into VR-I, VR-II, VR-III, VR-IV, VR-V, VR-VI, VR-VII, VR-VIII and or VR-IX. In yet other embodiments, mutations (e.g., insertions, deletions and/or substitutions) are made in VR-I, VR-VIII and or VR-IV. In some embodiments, the mutations (e.g., insertions, deletions and/or substitutions) are introduced into the AAV capsid proteins VP1, VP2 or VP3, or in two of the capsid proteins in any combination, or in all three. In some embodiments, the mutations are introduced into VP1. In some embodiments, the mutations are introduced into VP2. In some embodiments, the mutations are introduced into VP3. In some embodiments, the mutations are introduced into VP1 and VP2. In some embodiments, the mutations are introduced into VP1 and VP3. In some embodiments, the mutations are introduced into VP2 and VP3. In some embodiments, the mutations are introduced into VP1, VP2, and VP3. In some embodiments, a single mutation (e.g., an insertion, a deletion and/or a substitution) is introduced at a single site in a gene encoding a capsid protein, while in other embodiments, more than 1, 2, 3, 4, 5, 6, 7, 10, 20, 30, 40, 50, 100 or more (including any number between 1 and 100 or more) mutations (e.g., insertions, deletions and/or substitutions) are introduced in a gene encoding a capsid protein.

[00204] In some exemplary embodiments, a peptide is introduced into the variable regions VR-I, VR-IV, or VR-VIII of the capsid protein. In some embodiments, the peptide is introduced at a location between positions 450 and 600 of the capsid protein. In some embodiments, the peptide is introduced at position 590 if the capsid protein corresponds to AAV1. In some embodiments, the peptide is introduced into position 454 or 590 if an AAV6 capsid is being modified. In some embodiments, the peptide introduced at position 588 if an AAV2 capsid is being modified. In some embodiments, the peptide is introduced into position 589 if an AAV3B capsid is used. In some embodiments, the peptide is introduced into position 578 if an AAV5 capsid is used. In some embodiments, the peptide is introduced into position 591 if an AAV8 capsid is used. In some embodiments the peptide is introduced into position 266, 455, and/or 589 if an AAV9 capsid is used. It is understood that other sites in the capsid proteins may be selected for insertion.

[00205] In some embodiments of the AAV libraries disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO:1-32 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype. In some embodiments of the AAV libraries disclosed herein, a peptide comprising the amino acid sequence of

any one of SEQ ID NO:68-110 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype. In some embodiments of the AAV libraries disclosed herein, the peptide inserted at position 590 of the capsid protein of an AAV1 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 68 to SEQ ID NO: 75. In some embodiments of the AAV libraries disclosed herein, the peptide inserted at position 590 of the capsid protein of an AAV1 serotype comprises the amino acid sequence SEQ ID NO: 71. In some embodiments of the AAV libraries disclosed herein, the peptide inserted at position 590 of the capsid protein of an AAV1 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 1, SEQ ID NO: 2 and SEQ ID NO: 3.

[00206] In some embodiments of the AAV libraries disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO:1-32 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype. In some embodiments of the AAV libraries disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO:68-110 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype. In some embodiments of the AAV libraries disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO:1-32 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype. In some embodiments of the AAV libraries disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO:68-110 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype. In some embodiments of the AAV libraries disclosed here, the peptide inserted at position 454 of the capsid protein of an AAV6 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 19 to SEQ ID NO: 27. In some embodiments of the AAV libraries disclosed here, the peptide inserted at position 590 of the capsid protein of an AAV6 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 19 to SEQ ID NO: 27.

[00207] In some embodiments of the AAV libraries disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO:1-32 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype. In some embodiments of the AAV libraries disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO:68-110 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype. In some embodiments of the AAV libraries disclosed here, the peptide inserted at position 588 of the capsid protein of an AAV2 serotype

comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 90 to SEQ ID NO: 110. In some embodiments of the AAV libraries disclosed here, the peptide inserted at position 588 of the capsid protein of an AAV2 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 95, SEQ ID NO: 94, SEQ ID NO: 96, SEQ ID NO: 101, SEQ ID NO: 103, SEQ ID NO: 106, SEQ ID NO: 91 and SEQ ID NO: 102. . In some embodiments of the AAV libraries disclosed here, the peptide inserted at position 588 of the capsid protein of an AAV2 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 4-7.

[00208] In some embodiments of the AAV libraries disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO:1-32 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype. In some embodiments of the AAV libraries disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO:68-110 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype. In some embodiments of the AAV libraries disclosed here, the peptide inserted at position 589 of the capsid protein of an AAV3B serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 76- 85. In some embodiments of the AAV libraries disclosed here, the peptide inserted at position 589 of the capsid protein of an AAV3B serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 77, SEQ ID NO: 79, SEQ ID NO: 76 and SEQ ID NO: 83. In some embodiments of the AAV libraries disclosed here, the peptide inserted at position 589 of the capsid protein of an AAV3B serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 8 to SEQ ID NO: 11.

[00209] In some embodiments of the AAV libraries disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO:1-32 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype. In some embodiments of the AAV libraries disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO:68-110 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype. In some embodiments of the AAV libraries disclosed here, the peptide inserted at position 578 of the capsid protein of an AAV5 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 28 to SEQ ID NO: 32.

[00210] In some embodiments of the AAV libraries disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO:1-32 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype. In some embodiments of the AAV libraries disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO:68-110 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype.

[00211] In some embodiments of the AAV libraries disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO:1-32 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype. In some embodiments of the AAV libraries disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO:68-110 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype. In some embodiments of the AAV libraries disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO:1-32 is inserted at amino acid position 455 of the capsid protein of an AAV9 serotype. In some embodiments of the AAV libraries disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO:68-110 is inserted at amino acid position 455 of the capsid protein of an AAV9 serotype. In some embodiments of the AAV libraries disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO:1-32 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype. In some embodiments of the AAV libraries disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO:68-110 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype. In some embodiments of the AAV libraries disclosed here, the peptide inserted at position 266 of the capsid protein of an AAV9 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 12 to SEQ ID NO: 18. In some embodiments of the AAV libraries disclosed here, the peptide inserted at position 266 of the capsid protein of an AAV9 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 86 to SEQ ID NO: 89. In some embodiments of the AAV libraries disclosed here, the peptide inserted at position 266 of the capsid protein of an AAV9 serotype comprises an amino acid sequence of SEQ ID NO: 89. In some embodiments of the AAV libraries disclosed here, the peptide inserted at position 455 of the capsid protein of an AAV9 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 12 to SEQ ID NO: 18. In some embodiments of the AAV libraries disclosed here, the peptide

inserted at position 455 of the capsid protein of an AAV9 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 86 to SEQ ID NO: 89. In some embodiments of the AAV libraries disclosed here, the peptide inserted at position 455 of the capsid protein of an AAV9 serotype comprises an amino acid sequence of SEQ ID NO: 89. In some embodiments of the AAV libraries disclosed here, the peptide inserted at position 455 of the capsid protein of an AAV9 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 12 to SEQ ID NO: 18. In some embodiments of the AAV libraries disclosed here, the peptide inserted at position 589 of the capsid protein of an AAV9 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 86 to SEQ ID NO: 89. In some embodiments of the AAV libraries disclosed here, the peptide inserted at position 589 of the capsid protein of an AAV9 serotype comprises an amino acid sequence of SEQ ID NO: 89.

[00212] In some embodiments, the inserted peptide is 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 or more amino acids long. In some embodiments, the peptide is 7 amino acids long. In some embodiments, the peptide is 10 amino acids long. In some embodiments, the peptide is 15 amino acids long. In some embodiments, the peptides are introduced during amplification of the fragment of the capsid gene that is 3' of the insertion site by PCR. Thus, in some embodiments, the capsid gene is diversified using PCR. In some embodiments, the introduced sequences are introduced during amplification of the fragment of the capsid gene that is 3' of the insertion site.

[00213] In some embodiments, silent mutations are introduced into regions of the capsid gene flanking the region into which the peptides are introduced so that all capsid serotype genes have the same nucleotide sequence in these flanking regions. The flanking region may include 10 or more, 20 or more, 30 or more, 40 or more, 50 or more, 100 or more, 150 or more, or 200 or more nucleotides on either side of the peptide insertion site. In this way the same primer sequences can be used for PCR amplification and next-generation sequencing (NGS) for all serotype libraries. This allows for faster screening of libraries based on 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, or more serotypes. In some embodiments, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 or more silent mutations are introduced to bring the flanking sequences into alignment with two common sequences (one at the 5' end of the diversified region and one at the 3' end of the diversified region). In some embodiments, the silent mutations are introduced at one or more of position 571, 612, and 617 if the capsid protein corresponds to AAV1.

In some embodiments, the silent mutations are introduced at one or more of position 568, 569, 572, 573, 574, 610, 611, 613, 615, 616, and 617 if the capsid protein corresponds to AAV2. In some embodiments, the silent mutations are introduced at one or more of position 569, 570, 571, 573, 574, 575, 612, 614, 615, and 616 if the capsid protein corresponds to AAV3B. In some embodiments, the silent mutations are introduced at one or more of position 573, 575, 576, 577, 614, and 619 if the capsid protein corresponds to AAV8. In some embodiments, the silent mutations are introduced at one or more of position 571, 572, 573, 574, 575, 611, 612, 615, 616, and 617 if the capsid protein corresponds to AAV9. It is understood that other sites in the capsid proteins may be selected for insertion.

[00214] In some embodiments, the payload or genome of each AAV variant in a library further comprises a reporter gene. In some embodiments, the protein encoded by the reporter is fluorescent. Exemplary, non-limiting reporter genes include EGFP, mCherry, mClover3 and mRuby3. Other exemplary non-limiting reporter genes include mApple, iRFP, tdTomato, mVenus, YFP, RFP, firefly luciferase, and nanoluciferase.

[00215] In some embodiments, the capsid gene and the reporter gene are under the control of separate promoters. In some embodiments, the capsid gene and the reporter gene are each independently operatively linked to a promoter.

[00216] In some embodiments, the reporter gene is controlled by a cell type and/or tissue specific promoter. In some embodiments, the reporter gene is operatively linked to a cell type and/or tissue specific promoter. In some embodiments, the reporter gene is operatively linked to a cell-type specific RNA polymerase II promoter. Exemplary cell type and/or tissue specific promoters include the human synapsin promoter (hSyn1), only expressed in neurons, or the transthyretin promoter (TTR), expressed in hepatocytes. Other non-limiting cell type and/or tissue specific promoters for use in the methods and compositions of the invention include cytokeratin 18 and 19 (epithelial cell specific, Zheng and Baum (2008) *Methods Mol Biol* 434:205-219), unc45b or unc-45 myosin chaperon B (muscle specific, Rudeck *et al* (2016) *Genesis* 54(8):431-8), cardiac troponin T (cTnT) (cardiomyocyte specific, Ma *et al* (2004) *Am J Physiol Cell Physiol* 286(3):556-64), glial fibrillary acidic protein (GFAP) (astrocyte specific, Lee *et al* (2008) *Glia* 56(5):481-93), myelin basic protein (MBP) (oligodendrocyte specific, Wei *et al* (2003) *Gene* 313:161-7), methyl CpG-binding protein *2* (Mecp2) (neuron specific, Adachi *et al* (2005) *Hum Mol Genetics* 14(23):3709-22), and other brain or

eye specific rAAV-compatible MiniPromoters (Leeuw *et al* (2016) *Molecular Brain* 9(1):52).

[00217] In some embodiments, the payload or genome of each AAV variant in a library further comprise a nucleic acid encoding a localization signal. In some embodiments, the reporter gene is fused to the nucleic acid encoding a localization signal. In some embodiments, the reporter genes are fused to domains to increase movement of the reporter into organelles. In some embodiments, the reporter genes are fused to domains to increase movement of the reporter into the nucleus. In some embodiments, the reporter genes are fused to a nucleic acid encoding a nuclear localization signal (NLS) (for example the SV40 large T-antigen nuclear localization signal). Non-limiting examples of NLSs include an NLS sequence derived from: the NLS of the SV40 virus large T-antigen; the NLS from nucleoplasmin; a c-myc NLS; the hRNPA1 M9 NLS; the IBB domain from importin-alpha; the myoma T protein NLS; human p53 NLS; mouse c-ab1 IV NLS; influenza virus NS1 NLS; Hepatitis virus delta antigen NLS; the mouse Mx1 protein NLS; the human poly(ADP-ribose) polymerase NLS; and steroid hormone receptors (human) glucocorticoid NLS. Other NLSs are known in the art. In some embodiments, the reporter proteins are fused to a protein that localizes to the nuclear envelope (for example KASH domains). In some embodiments, the reporter proteins are fused to a histone binding domain (for example histone 2B binding domain, H2B). Other non-limiting histones include those in the H1, H2A, H3, and H4 families. It is understood that both N and C terminal fusions to a reporter gene support nuclear localization. In some embodiments, the reporter protein is fused to more than one localization signal. In some embodiments, the multiple localization signals are in tandem. In some embodiments, the reporter protein is fused to one or more localization signals at its N-terminus and one or more localization signals at its C-terminus.

[00218] In some embodiments, a nucleic acid comprising a barcode is added to the payload or genome of each AAV variant in a library. In some embodiments, the barcode is bioinformatically linked to the peptide introduced into the variant capsid protein. In some embodiments, the DNA sequences comprising the variant DNA sequences encoding the inserted peptide are synthesized to further comprise a random or specified barcode. The barcode may comprise 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18 or more nucleotides. In some embodiments, the nucleic acid comprising a barcode is selected from any one of sequences SEQ ID NO: 111-154 or 155-198. In

some embodiments, the nucleic acid comprising a barcode is selected from SEQ ID NO: 111-154. In some embodiments, the nucleic acid comprising a barcode is selected from SEQ ID NO: 155-198. I n some embodiments, the nucleic acid comprising the barcode comprises a sequence selected from any one of sequences SEQ ID NO: 111-154. In some embodiments, the nucleic acid comprising the barcode comprises a sequence selected from any one of sequences SEQ ID NO: 155-198. The synthesized DNA may also comprise restriction sites and or nucleic acid sequences used for molecular cloning by Gibson assembly. In some embodiments an intron is included in the expression cassette to confirm that sequenced transcripts are derived from mRNA and not vector genomic DNA. In further embodiments, the AAV payload or genome is assembled via Gibson assembly where the 3' end of the capsid gene is linked to the random or specified insertion sequences at the insertion site, and the barcode is linked to a polyA sequence and 5'ITR. In some embodiments, ILLUMINA® sequencing (or any other sequencing technique) is performed across the barcode and the inserted variable region in the capsid gene to bioinformatically link the two random sequences. In further embodiments, the reporter construct, reporter-specific promoter, capsid-specific promoter and 5' end of the capsid gene are assembled to create the final payload construct. In some embodiments, the expression cassette relative to the *cap* gene is in the sense orientation.

[00219] In some embodiments, each member of the library comprises a nucleic acid comprising more than one barcode sequences. In some embodiments, each member of the library comprises two or more nucleic acids each comprising a barcode sequence. In some embodiments, each member of the library comprises a first nucleic acid comprising a first barcode and a second nucleic acid comprising a second barcode. In some embodiments, the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode are different. In some embodiments, the first nucleic acid comprising the first barcode sequence comprises a sequence selected from any one of sequences SEQ ID NO: 111-154. In some embodiments, the first barcode sequence is selected from any one of sequences SEQ ID NO: 111-154. In some embodiments, the second nucleic acid comprising the second barcode sequence comprises a sequence selected from any one of sequences SEQ ID NO: 155-198. In some embodiments, the second nucleic acid comprising the second barcode sequence is selected from any one of sequences SEQ ID NO: 155-198. In some embodiments, each of the first nucleic acid comprising the first barcode and the second nucleic acid

comprising the second barcode is independently operatively linked to a promoter. In some embodiments, the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the second nucleic acid comprising the second barcode is each independently an RNA Pol II promoter. In some embodiments, the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the second nucleic acid comprising the second barcode is each independently an RNA Pol III promoter (e.g., a promoter selected from the group of U6 promoter, H1 promoter and 7SK promoter). In some embodiments, the promoter operatively linked to the first nucleic acid comprising the first barcode is operatively linked to an RNA Pol II promoter and the promoter operatively linked to the second nucleic acid comprising the second barcode is an RNA Pol III promoter (e.g., a promoter selected from the group of human synapsin promoter (hSyn1), transthyretin promoter (TTR), cytokeratin 18, cytokeratin 19, unc-45 myosin chaperon B (unc45b) promoter, cardiac troponin T (cTnT) promoter, glial fibrillary acidic protein (GFAP) promoter, myelin basic protein (MBP) promoter, and methyl CpG-binding protein *2* (Mecp2) promoter.

[00220] In some embodiments, a short piece of DNA is synthesized comprising a randomly generated or specified barcode and a randomly generated or specified capsid variant region, as well as two regions used for Gibson assembly. Next, capsid sequence 3' of the diversified region are amplified. In further embodiments, a Gibson assembly reaction where the 5'ITR and polyadenylation sequences are fused to the barcode on the 5' end, and a second Gibson assembly region is fused to the 3' end of the capsid gene and the polyA signal for the capsid gene and the 3'ITR are performed. In further embodiments, ILLUMINA® sequencing is performed across the barcode and the variant capsid sequences. In further embodiments, digestion with a restriction enzyme is carried out. In further embodiments, a PCR amplification step where the reporter, localization signal, promoter(s), and the 5' end of the capsid gene are prepared. Alternatively, the fragment comprising the reporter, the localization signal, the promoter(s), and 5' end of the capsid gene may be pre-assembled in a donor plasmid, digested with BsaI, and gel purified. In further embodiments, golden gate cloning step is performed to create the final construct.

[00221] In some embodiments, two DNA fragments are synthesized. Fragment A comprises Gibson assembly region #1, a restriction enzyme site, the variable capsid

region, and a region homologous to the capsid gene that is used as a PCR primer. Fragment B comprises Gibson assembly region #2, a random barcode, a restriction enzyme site, and Gibson assembly region #1. Next, a PCR procedure is performed where the 3' sequence of capsid gene is amplified using fragment A synthesized in step 1 as a PCR primer. In further embodiments, an intermediate AAV construct is generated by Gibson assembly where the construct comprises in a 5' to 3' order the 5' ITR, the SV40 poly A signal, the barcode, the two restriction endonuclease sites, the variant capsid sequences, the 3' region of the capsid protein, the polyA sequence for the capsid expression construct and the 3' ITR. In further embodiments, ILLUMINA® sequencing is performed across the barcode and the variant capsid sequences. In further embodiments, digestion with a restriction enzyme is carried out. In further embodiments, a PCR amplification step where the reporter, localization signal, promoter(s), and the 5' end of the capsid gene are prepared is performed. Alternatively, the fragment comprising the reporter, localization signal, promoter(s), and 5' end of the capsid gene may be pre-assembled in a donor plasmid, digested with BsaI, and gel purified. In further embodiments, a golden gate cloning step is performed to create the final construct.

[00222] In some embodiments, each inserted peptide may be encoded by multiple nucleic acid molecules, each having a different sequence (due to codon degeneracy). Each nucleic acid sequence is linked to a unique bar code such that performance (*e.g.* enrichment) of an inserted peptide can be verified when two or more variants are identified having the same inserted peptide sequence, but wherein the inserted peptides are encoded by different nucleic acid sequences.

[00223] In some embodiments, the barcode is linked to the reporter gene, the polyA sequence and the 5'ITR through standard cloning techniques. In further embodiments, the variant sequences encoding the peptide are inserted into the capsid gene through standard techniques, and then specific promoter(s) are added, and the 5'end of the capsid gene is added. ILLUMINA® sequencing (or any other highly reliable sequencing technique) is then performed in two separate reactions where the barcode and the inserted nucleotide sequences are sequenced. Finally, OXFORD NANOPORE® sequencing (or any other long read sequencing technique, for example PACBIO®SMRT sequencing) is performed such that the long-read length sequence comprises both the barcode and inserted nucleotide sequences.

[00224] In some embodiments, a 'look up' table is created linking each barcode to each nucleotide sequence that has been inserted into the capsid gene.

[00225] A library of the disclosure may comprise 10^2, 10^3, 10^4, 10^5, 10^6, 10^7, or 10^8 or more unique AAV variants. In some embodiments, a library may comprise 10^2-10^3, 10^3-10^4, 10^4-10^5, 10^5-10^6, 10^6-10^7, or 10^7-10^8 unique AAV variants.

[00226] Any of the foregoing libraries of AAV variants may be used in the methods disclosed herein.

Methods of Identifying AAV Capsid Variants

[00227] The present disclosure provides methods and compositions to develop AAV capsids with a desired characteristic compared to a natural AAV serotype. These capsids are useful, for example, for the delivery of genome engineering molecules and gene therapy molecules to a target cell, cell line, or tissue (*e.g., in vitro* or *in vivo)* for the treatment of a subject in need thereof. In some embodiments, the capsids are used to deliver a payload to a desired tissue, cell or organelle.

[00228] In another aspect, disclosed herein are methods for directed evolution of AAV capsid proteins and identification of an AAV capsid variant with a desired characteristic compared to a natural AAV serotype.

[00229] In some embodiments, the method of identifying an AAV capsid variant with a desired characteristic compared to a natural AAV serotype comprises: (i) contacting a cell, cell line, or tissue in vitro or in vivo with any one of the libraries of AAV variants disclosed herein, (ii) allowing the AAV variants in said library to transduce the cell, cell line, or tissue; (iii) recovering from the cell, cell line, or tissue the AAV variant; and (iv) identifying the AAV capsid variant with the desired characteristic.

[00230] In some embodiments, the method of identifying an AAV capsid variant with a desired characteristic compared to a natural AAV serotype, comprises: (i) inserting a plurality of nucleic acids encoding peptides, into a population of nucleic acids encoding a hypervariable and/or surface-exposed loop of an AAV capsid protein to create a library of nucleic acids encoding AAV variant capsid proteins; (ii) linking each nucleic acid encoding an AAV variant capsid protein in said library to one or more of: (a) a nucleic acid comprising a barcode, (b) a nucleic acid encoding a reporter protein, and (c) a nucleic acid encoding a localization signal, to form a payload construct; (iii) manufacturing a library of AAV variants in producer cells by providing adenovirus helper and AAV rep functions in trans; (iv) purifying the library of AAV variants; (v) contacting a cell, cell line, or tissue in vitro or in vivo with the library of AAV variants;

(vi) recovering the AAV variants from the target cell, cell line, or tissue; and (vii) identifying the AAV capsid variant with the desired characteristic.

[00231] In some embodiments, the method of identifying an AAV capsid variant with a desired characteristic compared to a natural AAV serotype, comprises: (i) inserting a plurality of nucleic acids encoding peptides, into a population of nucleic acids encoding a hypervariable and/or surface-exposed loop of an AAV capsid protein to create a library of nucleic acids encoding AAV variant capsid proteins; (ii) linking each nucleic acid encoding an AAV variant capsid protein in said library to two or more of: (a) a nucleic acid comprising a barcode, (b) a nucleic acid encoding a reporter protein, and (c) a nucleic acid encoding a localization signal, to form a payload construct; (iii) manufacturing a library of AAV variants in producer cells by providing adenovirus helper and AAV rep functions in trans; (iv) purifying the library of AAV variants; (v) contacting a cell, cell line, or tissue in vitro or in vivo with the library of AAV variants; (vi) recovering the AAV variants from the target cell, cell line, or tissue; and (vii) identifying the AAV capsid variant with the desired characteristic.

[00232] In some embodiments, the method of identifying an AAV capsid variant with a desired characteristic compared to a natural AAV serotype, comprises: (i) inserting a plurality of nucleic acids encoding peptides, into a population of nucleic acids encoding a hypervariable and/or surface-exposed loop of an AAV capsid protein to create a library of nucleic acids encoding AAV variant capsid proteins; (ii) linking each nucleic acid encoding an AAV variant capsid protein in said library to (a) a nucleic acid comprising a barcode, (b) a nucleic acid encoding a reporter protein, and (c) a nucleic acid encoding a localization signal, to form a payload construct; (iii) manufacturing a library of AAV variants in producer cells by providing adenovirus helper and AAV rep functions in trans; (iv) purifying the library of AAV variants; (v) contacting a cell, cell line, or tissue in vitro or in vivo with the library of AAV variants; (vi) recovering the AAV variants from the target cell, cell line, or tissue; and (vii) identifying the AAV capsid variant with the desired characteristic.

[00233] In some embodiments, the steps for directed evolution of AAV capsid proteins to identify AAV capsid variants with a desired characteristic compared to a natural AAV serotype comprise (i) insertion of peptides into hypervariable and/or surface-exposed loops in capsid proteins from one or more AAV serotypes creating libraries of modified variant capsids for each AAV serotype; (ii) packaging of the variant AAVs in producer cells wherein adenovirus helper and AAV *rep* functions are supplied in trans;

(iii) purification of viral capsid library pools; (iv) administration of the pools *in vitro* or *in vivo*; (v) recovery of AAV variants from target tissues or cell lines; (vi) next-generation sequencing to determine the identity of the engineered variant capsid sequences; (vii) repeated rounds of *in vitro* or *in vivo* selection where variants are isolated from a target tissue or cell line; and (viii) full evaluation of enriched variants.

[00234] In some embodiments, the desired characteristic is enhanced cell or tissue tropism as compared to the natural AAV serotype. These methods may also be adapted for selecting AAV capsid variants that evade a pre-existing host antibody response and/or the development of AAV variants that will not provoke a host response.

[00235] In some embodiments, capsid proteins, for example from AAV1, AAV2, AAV3B, AAV5, AAV6, AAV8 and AAV9 are chosen for starting points. In some embodiments, capsid proteins from less well characterized AAV serotypes are chosen, including but not limited to AAV3, AAV4, AAV7, AAV11, AAVrh10, AAVrh39, and AAVrh74. In some embodiments, a library of AAV variants comprises AAV variant capsid proteins derived from a single AAV serotype. In some embodiments, a library of AAV variants comprises AAV variant capsid proteins derived from 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, or more AAV serotypes. In some embodiments, the AAV variant capsid proteins derived from 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, or more AAV serotypes are combined once individual serotype libraries are developed. In some embodiments, combinatorial libraries are generated by modifying nucleic acids encoding AAV capsid proteins from 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, or more serotypes in the same pool.

[00236] In some embodiments, directed evolution comprises mutating the AAV capsid (*e.g.*, insertions, deletions and/or substitutions). In some embodiments, the mutations (*e.g.*, insertions, deletions and/or substitutions) are introduced into a DNA sequence encoding an exposed loop in the capsid protein. In some embodiments, directed evolution comprises insertion of peptides into exposed loops (*e.g.* hypervariable regions) in the AAV capsid.

[00237] In some embodiments, the libraries are packaged in HEK293 cells where the helper functions (*e.g.* E2A, E4, VA, E1A and E1B) are supplied in *trans*. In some embodiments, the AAV rep function comprises rep78, rep 68, rep 52, and rep40 genes. In some embodiments, the rep genes are supplied in *trans*. In some embodiments, the start codon of the rep78 and/or the rep68 gene is altered from ACG to ATG to increase replication of the capsid library construct containing inverted terminal repeats (ITRs),

thereby improving AAV library manufacturing yield. In some embodiments, the *cap* genes are supplied as payload to the manufactured AAVs. In some embodiments, the capsid gene is controlled by the p40 promoter such that it is only expressed during manufacturing in HEK293 cells in the presence of helper virus functions.

[00238] In some embodiments, the libraries are selected in cells. In some embodiments, the individual serotype libraries are combined to generate a single library comprising 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, or more serotypes where each AAV variant also comprises the peptide inserted into the AAV variant capsid. In some embodiments, single serotype libraries are used wherein each AAV in that serotype library comprises a peptide inserted into the AAV variant capsid. In some embodiments, the cells are treated with the libraries and then monitored for the expression of the reporter gene in the cytoplasm of the cell or in the organelle of interest. In some embodiments, the organelle of interest is the nucleus. In some embodiments, the organelles comprising the AAV payload or genome as evidenced by the expression of the reporter gene are isolated from the cells. In some embodiments, the organelle is the nucleus. In some embodiments, the nucleic acid is extracted from the organelle (*e.g.* nucleus). In some embodiments, the nucleic acid extracted is RNA, while in some embodiments, the nucleic acid extracted is DNA. In some embodiments, the extracted RNA is subject to reverse transcription to generate cDNA which is then amplified using primers specific to the barcoded region and sequenced. In some embodiments, the extracted DNA is amplified and sequenced using the primers specific for the introduced variable sequence. In some embodiments, enrichment of specific AAV variants is observed following selection in cells.

[00239] In some embodiments, the cell used includes, but is not limited to, a cell from the CNS, heart, lung, trachea, esophagus, muscle, bone, cartilage, stomach, pancreas, intestine, liver, bladder, kidney, ureter, urethra, uterus, fallopian tube, ovary, testes, prostate, eye, blood, lymph, or oral mucosa.

[00240] In some embodiments, the cell includes, but is not limited to, neurons, glial cells, astrocytes, oligodendroglia, microglia, Schwann cells, ependymal cells, hepatocytes, stellate fat storing cells, Kupffer cells, liver endothelial cells, epithelial cells, cardiomyocytes, smooth muscle cells, T-cells, B cells, hematopoietic stem cells, and embryonic stem cells.

[00241] In some embodiments, the libraries are selected in animals. In some embodiments, the individual serotype libraries are combined to generate a single library

comprising 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, or more serotypes where each AAV also comprises the peptide inserted into the AAV variant capsid. In some embodiments, single serotype libraries are used wherein each AAV in that serotype library comprises a peptide inserted into the AAV variant capsid. In some embodiments, the animals are treated with the libraries *via* intravenous, intracranial, or intrathecal injection, or by injection by some other route (*e.g.* nasal, hepatic, intracerebroventricular, intracisternal, intravitreal, intracochlear, etc.). Following a sufficient time for the AAV to traffic to the desired tissue or organ (for example, 7, 10, 14, 18, 21, 24, 28, 30 days or more), the animal is sacrificed, and the tissue/organ of interest is harvested. In some embodiments, the cells in the tissues are monitored for the expression of the reporter gene in the cytoplasm of the cell or in the organelle of interest. In some embodiments, the organelle of interest is the nucleus. In some embodiments, the organelles comprising the AAV payload as evidenced by the expression of the reporter gene are isolated from the tissue. In some embodiments, the organelle is the nucleus. In some embodiments, the nucleic acid is extracted from the organelle (*e.g.* nucleus). In some embodiments, the nucleic acid extracted is RNA, while in some embodiments, the nucleic acid extracted is DNA. In some embodiments, the extracted RNA is subject to reverse transcription to generate cDNA which is then amplified using primers specific to the barcoded region and sequenced. In some embodiments, the extracted DNA is amplified and sequenced using the primers specific for the introduced variable sequence. In some embodiments, enrichment of specific AAV variants is observed following selection *in vivo*.

[00242] In either of these embodiments, the selection of AAV variants through cells or *in vivo* may be performed in 1, 2, 3, 4, 5 or more rounds, in each case pooling the AAV variants obtained from the previous round or synthesizing a subset of variants that were enriched and re-selecting in the cells or *in vivo*.

[00243] In some embodiments, following the desired number of selection rounds, the variants are analyzed. In some embodiments, the individual variants are used to deliver a transgene to a desired cell or organ *in vivo*. After analysis of the delivery capability of the variants, the best candidates are selected for future use.

[00244] In some embodiments, each member of the library comprises a nucleic acid comprising two barcode sequences. In some embodiments, each member of the library comprises a first nucleic acid comprising a first barcode and a second nucleic acid comprising a second barcode. In some embodiments, the first nucleic acid comprising

the first barcode and the second nucleic acid comprising the second barcode are different. In some embodiments, the first nucleic acid comprising the first barcode comprises a sequence selected from any one of sequences SEQ ID NO: 111-154 or is selected from any one of sequences SEQ ID NO: 111-154. In some embodiments of the method, library of AAV variants, AAV variant, or nucleic acid disclosed herein, the second nucleic acid comprising the second barcode comprises a sequence selected from any one of sequences SEQ ID NO: 155-198 or is selected from any one of sequences SEQ ID NO: 155-198. In some embodiments, the first nucleic acid comprising the first barcode comprises a sequence selected from any one of sequences SEQ ID NO: 111-154 or is selected from any one of sequences SEQ ID NO: 111-154 and the second nucleic acid comprising the second barcode comprises a sequence selected from any one of sequences SEQ ID NO: 155-198 or is selected from any one of sequences SEQ ID NO: 155-198. In some embodiments, each of the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode is independently operatively linked to a promoter. In some embodiments, said promoter is different for each of the first barcode and the second barcode. In some embodiments, each of the first nucleic acid comprising the first barcode and the second nucleic acid are independently controlled under a different promoter. In some embodiments, the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the second nucleic acid comprising the second barcode is each independently an RNA Pol II promoter (e.g., human synapsin promoter (hSyn1), transthyretin promoter (TTR), cytokeratin 18, cytokeratin 19, unc-45 myosin chaperon B (unc45b) promoter, cardiac troponin T (cTnT) promoter, glial fibrillary acidic protein (GFAP) promoter, myelin basic protein (MBP) promoter, or methyl CpG-binding protein *2* (Mecp2) promoter). In some embodiments, the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the second nucleic acid comprising the second barcode is each independently an RNA Pol III promoter (e.g., U6 promoter, H1 promoter or 7SK promoter). In some embodiments, the promoter operatively linked to the first nucleic acid comprising the first barcode is an RNA Pol II promoter and the promoter operatively linked to the second nucleic acid comprising the second barcode is an RNA Pol III promoter. In some embodiments, the nucleic acid comprising the barcode further comprises a reporter gene, a nuclear localization signal and a polyadenylation signal.

AAV Variants

[00245] Described herein are AAV variants used to develop AAV capsids with a desired characteristic compared to a natural AAV serotype. In some embodiments, the desired characteristic is enhanced cell or tissue tropism as compared to the natural AAV serotype. In some embodiments, the desired characteristic is the evasion of a pre-existing host antibody response. In some embodiments, the desired characteristic is reduced immunogenicity so as to not provoke a host response.

[00246] In some embodiments, an AAV variant of the disclosure comprises: a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and one or more of: b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a); c) a nucleic acid encoding a localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein.

[00247] In some embodiments, an AAV variant of the disclosure comprises: a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and two or more of: b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a); c) a nucleic acid encoding a localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein.

[00248] In some embodiments, an AAV variant of the disclosure comprises: a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and three or more of: b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a); c) a nucleic acid encoding a localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein.

[00249] In some embodiments, an AAV variant of the disclosure comprises: a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a); c) a nucleic acid encoding a

localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein.

[00250] In some embodiments, an AAV variant of the disclosure comprises: a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and one or more of: b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a) in the nucleic acid sequence flanking the peptide insertion site; c) a nucleic acid encoding a localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein.

[00251] In some embodiments, an AAV variant of the disclosure comprises: a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and two or more of: b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a) in the nucleic acid sequence flanking the peptide insertion site; c) a nucleic acid encoding a localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein.

[00252] In some embodiments, an AAV variant of the disclosure comprises: a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and three or more of: b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a) in the nucleic acid sequence flanking the peptide insertion site; c) a nucleic acid encoding a localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein.

[00253] In some embodiments, an AAV variant of the disclosure comprises: a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a) in the nucleic acid sequence flanking the peptide insertion site; c) a nucleic acid encoding a localization signal; d) a nucleic acid comprising a barcode; and e) a nucleic acid encoding a reporter protein.

[00254] In any of the above embodiments, the nucleic acid encoding an AAV variant capsid protein, the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are present on separate nucleic acid molecules. In some embodiments, the nucleic acid encoding

an AAV variant capsid protein, the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are present on a single nucleic acid molecule. In some embodiments, the nucleic acid encoding an AAV variant capsid protein, and the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are linked to each other in any order. In some embodiments, each member of the library comprises a 5'ITR sequence, the nucleic acid comprising a barcode, the nucleic acid encoding a reporter protein, the nucleic acid encoding an AAV variant capsid protein, and a 3'ITR sequence, in that order.

[00255] The various components of the AAV variants (e.g., AAV variant capsid protein, inserted peptides, silent mutations flanking the peptide insertion site, localization signal, barcode, reporter protein, promoter(s) or related nucleic acid sequences, etc.) are disclosed elsewhere herein.

[00256] In another aspect, the present disclosure provides a nucleic acid molecule encoding an AAV variant disclosed herein. In some embodiments, the nucleic acid molecule comprises a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and one or more of: b) a nucleic acid sequence encoding a variant capsid protein comprising one or more silent mutations in the nucleotide sequence flanking the peptide insertion site in the hypervariable and/or surface-exposed loop of the variant capsid protein; c) a nucleic acid sequence encoding a localization signal; d) a nucleic acid sequence comprising a barcode; and e) a nucleic acid sequence encoding a reporter protein.

[00257] In some embodiments, the present disclosure provides a nucleic acid molecule comprising two or more of: a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and two or more of: b) a nucleic acid sequence encoding a variant capsid protein comprising one or more silent mutations in the nucleotide sequence flanking the peptide insertion site in the hypervariable and/or surface-exposed loop of the variant capsid protein; c) a nucleic acid sequence encoding a localization signal; d) a nucleic acid sequence comprising a barcode; and e) a nucleic acid sequence encoding a reporter protein.

[00258] In some embodiments, the present disclosure provides a nucleic acid molecule comprising a) a nucleic acid sequence encoding an AAV variant capsid protein

comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and three or more of: b) a nucleic acid sequence encoding a variant capsid protein comprising one or more silent mutations in the nucleotide sequence flanking the peptide insertion site in the hypervariable and/or surface-exposed loop of the variant capsid protein; c) a nucleic acid sequence encoding a localization signal; d) a nucleic acid sequence comprising a barcode; and e) a nucleic acid sequence encoding a reporter protein.

[00259] In some embodiments, the present disclosure provides a nucleic acid molecule comprising a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; b) a nucleic acid sequence encoding a variant capsid protein comprising one or more silent mutations in the nucleotide sequence flanking the peptide insertion site in the hypervariable and/or surface-exposed loop of the variant capsid protein; c) a nucleic acid sequence encoding a localization signal; d) a nucleic acid sequence comprising a barcode; and e) a nucleic acid sequence encoding a reporter protein.

[00260] In some embodiments, the barcode nucleic acid sequence comprises more than one barcode sequences. In some embodiments, the barcode nucleic acid sequence comprises two or more barcode sequences. In some embodiments, the barcode nucleic acid sequence comprises a first nucleic acid comprising a first barcode and a second nucleic acid comprising a second barcode. In some embodiments, the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode are different. In some embodiments, the first nucleic acid comprising the first barcode sequence comprises a sequence selected from any one of sequences SEQ ID NO: 111-154. In some embodiments, the first barcode sequence is selected from any one of sequences SEQ ID NO: 111-154. In some embodiments, the second nucleic acid comprising the second barcode sequence comprises a sequence selected from any one of sequences SEQ ID NO: 155-198. In some embodiments, the second nucleic acid comprising the second barcode sequence is selected from any one of sequences SEQ ID NO: 155-198. In some embodiments, each of the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode is independently operatively linked to a promoter. In some embodiments, the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the second nucleic acid comprising the second barcode is each

independently an RNA Pol II promoter. In some embodiments, the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the second nucleic acid comprising the second barcode is each independently an RNA Pol III promoter (e.g., a promoter selected from the group of U6 promoter, H1 promoter and 7SK promoter). In some embodiments, the promoter operatively linked to the first nucleic acid comprising the first barcode is operatively linked to an RNA Pol II promoter and the promoter operatively linked to the second nucleic acid comprising the second barcode is an RNA Pol III promoter (e.g., a promoter selected from the group of human synapsin promoter (hSyn1), transthyretin promoter (TTR), cytokeratin 18, cytokeratin 19, unc-45 myosin chaperon B (unc45b) promoter, cardiac troponin T (cTnT) promoter, glial fibrillary acidic protein (GFAP) promoter, myelin basic protein (MBP) promoter, and methyl CpG-binding protein *2* (Mecp2) promoter.

[00261] In some embodiments, the AAV variant is selected from any one the following: (i) the AAV serotype is AAV1 and the peptide is inserted at amino acid position 590 of the capsid protein, (ii) the AAV serotype is AAV6 and the peptide is inserted at amino acid position 454 or 590 of the capsid protein, (iii) the AAV serotype is AAV2 and the peptide is inserted at amino acid position 588 of the capsid protein, (iv) the AAV serotype is AAV3B and the peptide is inserted at amino acid position 589 of the capsid protein, (v) the AAV serotype is AAV5 and the peptide is inserted at amino acid position 578 of the capsid protein, (vi) the AAV serotype is AAV8 and the peptide is inserted at amino acid position 591 of the capsid protein, or (vii) the AAV serotype is AAV9 and the peptide is inserted at amino acid position 266, 455, or 589 of the capsid protein, wherein the positions correspond to the numbering of VP1 in the AAV serotype.

[00262] In some embodiments of the AAV variants disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 1-32 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype. In some embodiments of the AAV variants disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 68-110 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype. In some embodiments of the AAV variants disclosed herein, the peptide inserted at position 590 of the capsid protein of an AAV1 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 68 to SEQ ID NO: 75. In some embodiments of the AAV variants

disclosed herein, the peptide inserted at position 590 of the capsid protein of an AAV1 serotype comprises the amino acid sequence SEQ ID NO: 71. In some embodiments of the AAV variants disclosed herein, the peptide inserted at position 590 of the capsid protein of an AAV1 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 1, SEQ ID NO: 2 and SEQ ID NO: 3.

[00263] In some embodiments of the AAV variants disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 1-32 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype. In some embodiments of the AAV variants disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 68-110 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype. In some embodiments of the AAV variants disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 1-32 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype. In some embodiments of the AAV variants disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 68-110 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype. In some embodiments of the AAV variants disclosed here, the peptide inserted at position 454 of the capsid protein of an AAV6 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 19 to SEQ ID NO: 27. In some embodiments of the AAV variants disclosed here, the peptide inserted at position 590 of the capsid protein of an AAV6 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 19 to SEQ ID NO: 27.

[00264] In some embodiments of the AAV variants disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 1-32 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype. In some embodiments of the AAV variants disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 68-110 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype. In some embodiments of the AAV variants disclosed here, the peptide inserted at position 588 of the capsid protein of an AAV2 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 90 to SEQ ID NO: 110. In some embodiments of the AAV variants disclosed here, the peptide inserted at position 588 of the capsid protein of an AAV2 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 95, SEQ ID NO: 94, SEQ ID NO: 96, SEQ ID NO: 101, SEQ ID

NO: 103, SEQ ID NO: 106, SEQ ID NO: 91 and SEQ ID NO: 102. In some embodiments of the AAV variants disclosed here, the peptide inserted at position 588 of the capsid protein of an AAV2 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 4-7.

[00265] In some embodiments of the AAV variants disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 1-32 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype. In some embodiments of the AAV variants disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 68-110 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype. In some embodiments of the AAV variants disclosed here, the peptide inserted at position 589 of the capsid protein of an AAV3B serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 76- 85. In some embodiments of the AAV variants disclosed here, the peptide inserted at position 589 of the capsid protein of an AAV3B serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 77, SEQ ID NO: 79, SEQ ID NO: 76 and SEQ ID NO: 83. In some embodiments of the AAV variants disclosed here, the peptide inserted at position 589 of the capsid protein of an AAV3B serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 8 to SEQ ID NO: 11.

[00266] In some embodiments of the AAV variants disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 1-32 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype. In some embodiments of the AAV variants disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 68-110 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype. In some embodiments of the AAV variants disclosed here, the peptide inserted at position 578 of the capsid protein of an AAV5 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 28 to SEQ ID NO: 32.

[00267] In some embodiments of the AAV variants disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 1-32 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype. In some embodiments of the AAV variants disclosed herein, a peptide comprising the amino

acid sequence of any one of SEQ ID NO. 68-110 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype.

[00268] In some embodiments of the AAV variants disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 1-32 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype. In some embodiments of the AAV variants disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 68-110 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype. In some embodiments of the AAV variants disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 1-32 is inserted at amino acid position 455 of the capsid protein of an AAV9 serotype. In some embodiments of the AAV variants disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 68-110 is inserted at amino acid position 455 of the capsid protein of an AAV9 serotype. In some embodiments of the AAV variants disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 1-32 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype. In some embodiments of the AAV variants disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 68-110 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype. In some embodiments of the AAV variants disclosed here, the peptide inserted at position 266 of the capsid protein of an AAV9 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 12 to SEQ ID NO: 18. In some embodiments of the AAV variants disclosed here, the peptide inserted at position 266 of the capsid protein of an AAV9 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 86 to SEQ ID NO: 89. In some embodiments of the AAV variants disclosed here, the peptide inserted at position 266 of the capsid protein of an AAV9 serotype comprises an amino acid sequence of SEQ ID NO: 89. In some embodiments of the AAV variants disclosed here, the peptide inserted at position 455 of the capsid protein of an AAV9 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 12 to SEQ ID NO: 18. In some embodiments of the AAV variants disclosed here, the peptide inserted at position 455 of the capsid protein of an AAV9 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 86 to SEQ ID NO: 89. In some embodiments of the AAV variants disclosed here, the peptide inserted at position 455 of the capsid protein of an AAV9

serotype comprises an amino acid sequence of SEQ ID NO: 89. In some embodiments of the AAV variants disclosed here, the peptide inserted at position 455 of the capsid protein of an AAV9 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 12 to SEQ ID NO: 18. In some embodiments of the AAV variants disclosed here, the peptide inserted at position 589 of the capsid protein of an AAV9 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 86 to SEQ ID NO: 89. In some embodiments of the AAV variants disclosed here, the peptide inserted at position 589 of the capsid protein of an AAV9 serotype comprises an amino acid sequence of SEQ ID NO: 89.

[00269] In some embodiments, an AAV3B variant comprises a peptide comprising any one of the sequences selected from the group consisting of EQFRNLA (SEQ ID NO: 78), TDFRSPQ (SEQ ID NO: 80), TGAFSST (SEQ ID NO: 77), FNSPVIQ (SEQ ID NO: 79), PYASITG (SEQ ID NO: 76) and YGSRSVD (SEQ ID NO: 83). In some embodiments, an AAV3B variant comprises a peptide sequence selected from the group consisting of sequences EQFRNLA (SEQ ID NO: 78), TDFRSPQ (SEQ ID NO: 80), TGAFSST (SEQ ID NO: 77), FNSPVIQ (SEQ ID NO: 79), PYASITG (SEQ ID NO: 76) and YGSRSVD (SEQ ID NO: 83).

[00270] In some embodiments, an AAV1 variant comprises a peptide comprising the sequence SVVVSSDSSKRPNL (SEQ ID NO: 71). In some embodiments, an AAV1 variant comprises the peptide sequence SVVVSSDSSKRPNL (SEQ ID NO: 71).

[00271] In some embodiments, an AAV2 variant comprises a peptide comprising any one of the sequences selected from the group consisting of RPLTAND (SEQ ID NO: 95), PRDTFNG (SEQ ID NO: 94), PLRMVNE (SEQ ID NO: 96), ENFSKVA (SEQ ID NO: 101), LGNGKMTVQP (SEQ ID NO: 103), GRNTVGLSSA (SEQ ID NO: 106), TSNSRTE (SEQ ID NO: 91) and RDALSGLRPE (SEQ ID NO: 102). In some embodiments, an AAV2 variant comprises a peptide sequence selected from the group consisting of RPLTAND (SEQ ID NO: 95), PRDTFNG (SEQ ID NO: 94), PLRMVNE (SEQ ID NO: 96), ENFSKVA (SEQ ID NO: 101), LGNGKMTVQP (SEQ ID NO: 103), GRNTVGLSSA (SEQ ID NO: 106), TSNSRTE (SEQ ID NO: 91) and RDALSGLRPE (SEQ ID NO: 102). In some embodiments, an AAV2 variant comprises a peptide comprising any one of the sequences selected from the group consisting of RPLTAND (SEQ ID NO: 95), PRDTFNG (SEQ ID NO: 94), and PLRMVNE (SEQ ID NO: 96). In some embodiments, an AAV2 variant comprises a

peptide comprising any one of the sequences selected from the group consisting of ENFSKVA (SEQ ID NO: 101), LGNGKMTVQP (SEQ ID NO: 103), GRNTVGLSSA (SEQ ID NO: 106), TSNSRTE (SEQ ID NO: 91) and RDALSGLRPE (SEQ ID NO: 102). In some embodiments, an AAV2 variant comprises a peptide sequence selected from the group consisting of RPLTAND (SEQ ID NO: 95), PRDTFNG (SEQ ID NO: 94), and PLRMVNE (SEQ ID NO: 96). In some embodiments, an AAV2 variant comprises a peptide sequence selected from the group consisting of ENFSKVA (SEQ ID NO: 101), LGNGKMTVQP (SEQ ID NO: 103), GRNTVGLSSA (SEQ ID NO: 106), TSNSRTE (SEQ ID NO: 91) and RDALSGLRPE (SEQ ID NO: 102).

[00272] In some embodiments, an AAV9 variant comprises a peptide comprising the sequence NIPKAYG (SEQ ID NO: 89). In some embodiments, an AAV9 variant comprises the peptide sequence NIPKAYG (SEQ ID NO: 89).

[00273] In some embodiments, an AAV3B variant comprises a peptide comprising the amino acid sequence EQFRNLA (SEQ ID NO: 78). In some embodiments, an AAV3B variant comprises a peptide comprising the amino acid sequence TDFRSPQ (SEQ ID NO: 80). In some embodiments, an AAV3B variant comprises a peptide comprising the amino acid sequence TGAFSST (SEQ ID NO: 77). In some embodiments, an AAV3B variant comprises a peptide comprising the amino acid sequence FNSPVIQ (SEQ ID NO: 79). In some embodiments, an AAV3B variant comprises a peptide comprising the amino acid sequence PYASITG (SEQ ID NO: 76). In some embodiments, an AAV3B variant comprises a peptide comprising an amino acid sequence YGSRSVD (SEQ ID NO: 83).

[00274] In some embodiments, an AAV2 variant comprises a peptide comprising the amino acid sequence RPLTAND (SEQ ID NO: 95). In some embodiments, an AAV2 variant comprises a peptide comprising the amino acid sequence PRDTFNG (SEQ ID NO: 94). In some embodiments, the peptide comprises amino acid sequence PLRMVNE (SEQ ID NO: 96). In some embodiments, an AAV2 variant comprises a peptide comprising the amino acid sequence ENFSKVA (SEQ ID NO: 101). In some embodiments, an AAV2 variant comprises a peptide comprising the amino acid sequence LGNGKMTVQP (SEQ ID NO: 103). In some embodiments, an AAV2 variant comprises a peptide comprising the amino acid sequence GRNTVGLSSA (SEQ ID NO: 106). In some embodiments, an AAV2 variant comprises a peptide comprising the amino acid sequence TSNSRTE (SEQ ID NO: 91). In some embodiments, an AAV2

variant comprises a peptide comprising an amino acid sequence RDALSGLRPE (SEQ ID NO: 102).

[00275] In some embodiments, an AAV1 variant comprises a peptide comprising an amino acid sequence selected from the group consisting of KSPQSKV (SEQ ID NO:1), SDLRSKV (SEQ ID NO:2) and TTTVRKV (SEQ ID NO:3). In some embodiments, an AAV1 variant comprises a peptide selected from the group consisting of KSPQSKV (SEQ ID NO:1), SDLRSKV (SEQ ID NO:2) and TTTVRKV (SEQ ID NO:3).

[00276] In some embodiments, an AAV1 variant comprises a peptide comprising an amino acid sequence selected from the group consisting of AALRDIR (SEQ ID NO:68), PAIKTYS (SEQ ID NO: 69), TGDRISSRTL (SEQ ID NO: 70), SVVVSSDSSKRPRNL (SEQ ID NO: 71), VGARLSA (SEQ ID NO: 72), IEKPNTSTKK (SEQ ID NO: 73), DTVRSKN (SEQ ID NO: 74), and KELNKAR (SEQ ID NO: 75). In some embodiments, an AAV1 variant comprises a peptide selected from the group consisting of AALRDIR (SEQ ID NO:68), PAIKTYS (SEQ ID NO: 69), TGDRISSRTL (SEQ ID NO: 70), SVVVSSDSSKRPRNL (SEQ ID NO: 71), VGARLSA (SEQ ID NO: 72), IEKPNTSTKK (SEQ ID NO: 73), DTVRSKN (SEQ ID NO: 74), and KELNKAR (SEQ ID NO: 75).

[00277] In some embodiments, an AAV2 variant comprises a peptide comprising an amino acid sequence selected from the group consisting of GRSDMAG (SEQ ID NO: 4), LLSSERS (SEQ ID NO: 5), EQRPNVS (SEQ ID NO: 6) and TRQISSD (SEQ ID NO: 7). In some embodiments, an AAV2 variant comprises a peptide selected from the group consisting of GRSDMAG (SEQ ID NO: 4), LLSSERS (SEQ ID NO: 5), EQRPNVS (SEQ ID NO: 6) and TRQISSD (SEQ ID NO: 7).

[00278] In some embodiments, an AAV2 variant comprises a peptide comprising an amino acid sequence selected from the group consisting of MTLTRQE (SEQ ID NO: 90), TSNSRTE (SEQ ID NO: 91), EVRGGPS (SEQ ID NO: 92), VISDRSS (SEQ ID NO: 93), PRDTFNG (SEQ ID NO: 94), RPLTAND (SEQ ID NO: 95), PLRMVNE (SEQ ID NO: 96), DVGIRPS (SEQ ID NO: 97), KDSTAFG (SEQ ID NO: 98), YPGRNPD (SEQ ID NO: 99), ISDTRIS (SEQ ID NO: 100), ENFSKVA (SEQ ID NO: 101), RDALSGLRPE (SEQ ID NO: 102), LGNGKMTVQP (SEQ ID NO: 103), VSNPLNQ (SEQ ID NO: 104), LNERGLG (SEQ ID NO: 105), GRNTVGLSSA (SEQ ID NO: 106), VGHAGNP (SEQ ID NO: 107), SRAGTVP (SEQ ID NO: 108), GLVAKLP (SEQ ID NO: 109), and AESLRTP (SEQ ID NO: 110). In some

embodiments, an AAV2 variant comprises a peptide selected from the group consisting of MTLTRQE (SEQ ID NO: 90), TSNSRTE (SEQ ID NO: 91), EVRGGPS (SEQ ID NO: 92), VISDRSS (SEQ ID NO: 93), PRDTFNG (SEQ ID NO: 94), RPLTAND (SEQ ID NO: 95), PLRMVNE (SEQ ID NO: 96), DVGIRPS (SEQ ID NO: 97), KDSTAFG (SEQ ID NO: 98), YPGRNPD (SEQ ID NO: 99), ISDTRIS (SEQ ID NO: 100), ENFSKVA (SEQ ID NO: 101), RDALSGLRPE (SEQ ID NO: 102), LGNGKMTVQP (SEQ ID NO: 103), VSNPLNQ (SEQ ID NO: 104), LNERGLG (SEQ ID NO: 105), GRNTVGLSSA (SEQ ID NO: 106), VGHAGNP (SEQ ID NO: 107), SRAGTVP (SEQ ID NO: 108), GLVAKLP (SEQ ID NO: 109), and AESLRTP (SEQ ID NO: 110).

[00279] In some embodiments, an AAV3B variant comprises a peptide comprising an amino acid sequence selected from the group consisting of QGALAQV (SEQ ID NO: 8), YPSSNTP (SEQ ID NO: 9), MLNPRTE (SEQ ID NO: 10) and QMRTRDE (SEQ ID NO: 11). In some embodiments, an AAV3B variant comprises a peptide selected from the group consisting of QGALAQV (SEQ ID NO: 8), YPSSNTP (SEQ ID NO: 9), MLNPRTE (SEQ ID NO: 10) and QMRTRDE (SEQ ID NO: 11).

[00280] In some embodiments, an AAV3B variant comprises a peptide comprising an amino acid sequence selected from the group consisting of PYASITG (SEQ ID NO: 76), TGAFSST (SEQ ID NO: 77), EQFRNLA (SEQ ID NO: 78), FNSPVIQ (SEQ ID NO: 79), TDFRSPQ (SEQ ID NO:80), MYSLMKD (SEQ ID NO:81), LYLSSAS (SEQ ID NO: 82), YGSRSVD (SEQ ID NO:83), LYSHQVS (SEQ ID NO: 84), and ISTHSPP (SEQ ID NO: 85). In some embodiments, an AAV3B variant comprises a peptide selected from the group consisting of PYASITG (SEQ ID NO: 76), TGAFSST (SEQ ID NO: 77), EQFRNLA (SEQ ID NO: 78), FNSPVIQ (SEQ ID NO: 79), TDFRSPQ (SEQ ID NO:80), MYSLMKD (SEQ ID NO:81), LYLSSAS (SEQ ID NO: 82), YGSRSVD (SEQ ID NO:83), LYSHQVS (SEQ ID NO: 84), and ISTHSPP (SEQ ID NO: 85).

[00281] In some embodiments, an AAV9 variant comprises a peptide comprising an amino acid sequence selected from the group consisting of MPGRAPI (SEQ ID NO: 12), LGRLTAN (SEQ ID NO: 13), SYSTSRS (SEQ ID NO: 14), TRPSSTN (SEQ ID NO: 15), VPQSSSR (SEQ ID NO: 16), VSRSYPA (SEQ ID NO: 17) and QRARPDT (SEQ ID NO: 18). In some embodiments, an AAV9 variant comprises a peptide selected from the group consisting of MPGRAPI (SEQ ID NO: 12), LGRLTAN (SEQ

ID NO: 13), SYSTSRS (SEQ ID NO: 14), TRPSSTN (SEQ ID NO: 15), VPQSSSR (SEQ ID NO: 16), VSRSYPA (SEQ ID NO: 17) and QRARPDT (SEQ ID NO: 18).

[00282] In some embodiments, an AAV9 variant comprises a peptide comprising an amino acid sequence selected from the group consisting of RQPTTIP (SEQ ID NO: 86), RSTSSLL (SEQ ID NO: 87), FRLSSPQ (SEQ ID NO: 88), and NIPKAYG (SEQ ID NO: 89). In some embodiments, an AAV9 variant comprises a peptide selected from the group consisting of RQPTTIP (SEQ ID NO: 86), RSTSSLL (SEQ ID NO: 87), FRLSSPQ (SEQ ID NO: 88), and NIPKAYG (SEQ ID NO: 89).

[00283] In some embodiments, an AAV6 variant comprises a peptide comprising an amino acid sequence selected from the group consisting of SQLTPHS (SEQ ID NO: 19), LGSHLPS (SEQ ID NO: 20), YTLSSGQ (SEQ ID NO: 21), SSRIPPD (SEQ ID NO: 22), WTETIPR (SEQ ID NO: 23), HGLQGVA (SEQ ID NO: 24), TMRVSDQ (SEQ ID NO: 25), GSSKVVM (SEQ ID NO: 26), and SALDRGV (SEQ ID NO: 27). In some embodiments, an AAV6 variant comprises a peptide selected from the group consisting of SQLTPHS (SEQ ID NO: 19), LGSHLPS (SEQ ID NO: 20), YTLSSGQ (SEQ ID NO: 21), SSRIPPD (SEQ ID NO: 22), WTETIPR (SEQ ID NO: 23), HGLQGVA (SEQ ID NO: 24), TMRVSDQ (SEQ ID NO: 25), GSSKVVM (SEQ ID NO: 26), and SALDRGV (SEQ ID NO: 27).

[00284] In some embodiments, an AAV5 variant comprises a peptide comprising an amino acid sequence selected from the group consisting of KELGTQR (SEQ ID NO: 28), RSSDVQR (SEQ ID NO: 29), PSAPKTF (SEQ ID NO: 30), HTKRSEY (SEQ ID NO: 31), and IKGSNLP (SEQ ID NO: 32). In some embodiments, an AAV5 variant comprises a peptide selected from the group consisting of KELGTQR (SEQ ID NO: 28), RSSDVQR (SEQ ID NO: 29), PSAPKTF (SEQ ID NO: 30), HTKRSEY (SEQ ID NO: 31), and IKGSNLP (SEQ ID NO: 32).

Peptides

[00285] Described herein are inserted peptides identified using the methods of the present disclosure that confer a desired characteristic to an AAV variant compared to a natural AAV serotype. In some embodiments, the desired characteristic is enhanced cell or tissue tropism as compared to the natural AAV serotype. In some embodiments, an inserted peptide of the disclosure allows an AAV variant to evade a pre-existing host antibody response. In some embodiments, an inserted peptide of the disclosure renders

an AAV variant less immunogenic such that it will not provoke a host response. In some embodiments, the inserted peptides are capable of directing an AAV vector to a particular target cell or tissue.

[00286] An inserted peptide can be 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 20, 25, 30, or more amino acids in length or a range between any two of these values. In some embodiments, the peptide is 7 amino acids long. In some embodiments, the peptide is 10 amino acids long. In some embodiments, the peptide is 15 amino acids long.

[00287] In some embodiments, the inserted peptide comprises at least 4 contiguous amino acids of an amino acid sequence set forth in SEQ ID Nos. 1-32. In some embodiments, the peptide comprises at least 5 contiguous amino acids of an amino acid sequence set forth in SEQ ID Nos. 1-32. In some embodiments, the peptide comprises at least 6 contiguous amino acids of an amino acid sequence set forth in SEQ ID Nos. 1-32. In some embodiments, the peptide comprises an amino acid sequence set forth in SEQ ID Nos. 1-32. In some embodiments, the peptide comprises an amino acid sequence with at least about 60%, about 65%, about 70%, about 75%, about 80%, about 85%, about 90%, about 91%, about 92%, about 93%, about 94%, about 95%, about 96%, about 97%, about 98%, about 99% or more sequence identity to an amino acid sequence set forth in SEQ ID Nos. 1-32. In some embodiments, the inserted peptide comprises at least 4 contiguous amino acids of an amino acid sequence set forth in SEQ ID Nos. 68-110. In some embodiments, the peptide comprises at least 5 contiguous amino acids of an amino acid sequence set forth in SEQ ID Nos. 68-110. In some embodiments, the peptide comprises at least 6 contiguous amino acids of an amino acid sequence set forth in SEQ ID Nos. 68-110. In some embodiments, the peptide comprises an amino acid sequence set forth in SEQ ID Nos. 68-110. In some embodiments, the peptide comprises an amino acid sequence with at least about 60%, about 65%, about 70%, about 75%, about 80%, about 85%, about 90%, about 91%, about 92%, about 93%, about 94%, about 95%, about 96%, about 97%, about 98%, about 99% or more sequence identity to an amino acid sequence set forth in SEQ ID Nos. 68-110.

[00288] In some embodiments, the peptide comprises any one of the sequences selected from the group consisting of EQFRNLA (SEQ ID NO: 78), TDFRSPQ (SEQ ID NO: 80), TGAFSST (SEQ ID NO: 77), FNSPVIQ (SEQ ID NO: 79), PYASITG (SEQ ID NO: 76) and YGSRSVD (SEQ ID NO: 83). In some embodiments, the peptide sequence is selected from the group consisting of sequences EQFRNLA (SEQ ID NO:

78), TDFRSPQ (SEQ ID NO: 80), TGAFSST (SEQ ID NO: 77), FNSPVIQ (SEQ ID NO: 79), PYASITG (SEQ ID NO: 76) and YGSRSVD (SEQ ID NO: 83). In some embodiments, the peptide comprises sequence SVVVSSDSSKRPNL (SEQ ID NO: 71). In some embodiments, the peptide sequence is SVVVSSDSSKRPNL (SEQ ID NO: 71). In some embodiments, the peptide comprises any one of the sequences selected from the group consisting of RPLTAND (SEQ ID NO: 95), PRDTFNG (SEQ ID NO: 94), PLRMVNE (SEQ ID NO: 96), ENFSKVA (SEQ ID NO: 101), LGNGKMTVQP (SEQ ID NO: 103), GRNTVGLSSA (SEQ ID NO: 106), TSNSRTE (SEQ ID NO: 91) and RDALSGLRPE (SEQ ID NO: 102). In some embodiments, the peptide sequence is selected from the group consisting of sequences RPLTAND (SEQ ID NO: 95), PRDTFNG (SEQ ID NO: 94), PLRMVNE (SEQ ID NO: 96), ENFSKVA (SEQ ID NO: 101), LGNGKMTVQP (SEQ ID NO: 103), GRNTVGLSSA (SEQ ID NO: 106), TSNSRTE (SEQ ID NO: 91) and RDALSGLRPE (SEQ ID NO: 102). In some embodiments, the peptide comprises sequence NIPKAYG (SEQ ID NO: 89). In some embodiments, the peptide sequence is NIPKAYG (SEQ ID NO: 89).

[00289] In some embodiments, the peptide comprises an amino acid sequence selected from the group consisting of EQFRNLA (SEQ ID NO: 78) , TDFRSPQ (SEQ ID NO: 80), TGAFSST (SEQ ID NO: 77) , FNSPVIQ (SEQ ID NO: 79), PYASITG (SEQ ID NO: 76), YGSRSVD (SEQ ID NO: 83), SVVVSSDSSKRPNL (SEQ ID NO: 71), RPLTAND (SEQ ID NO: 95), PRDTFNG (SEQ ID NO: 94) and PLRMVNE (SEQ ID NO: 96). In some embodiments, the peptide sequence is selected from the group consisting of EQFRNLA (SEQ ID NO: 78) , TDFRSPQ (SEQ ID NO: 80), TGAFSST (SEQ ID NO: 77) , FNSPVIQ (SEQ ID NO: 79), PYASITG (SEQ ID NO: 76), YGSRSVD (SEQ ID NO: 83), SVVVSSDSSKRPNL (SEQ ID NO: 71), RPLTAND (SEQ ID NO: 95), PRDTFNG (SEQ ID NO: 94) and PLRMVNE (SEQ ID NO: 96).

[00290] In some embodiments, the peptide comprises an amino acid sequence selected from the group consisting of ENFSKVA (SEQ ID NO: 101), LGNGKMTVQP, GRNTVGLSSA (SEQ ID NO: 103), TSNSRTE (SEQ ID NO: 91), RDALSGLRPE (SEQ ID NO: 102) and NIPKAYG (SEQ ID NO: 89). In some embodiments, the peptide sequence is selected from the group consisting of EQFRNLA (SEQ ID NO: 78), TDFRSPQ (SEQ ID NO: 80), TGAFSST (SEQ ID NO: 77) , FNSPVIQ (SEQ ID NO: 79), PYASITG (SEQ ID NO: 76), YGSRSVD (SEQ ID NO: 83), SVVVSSDSSKRPNL (SEQ ID NO: 71), RPLTAND (SEQ ID NO: 95), PRDTFNG (SEQ ID NO: 94) and PLRMVNE (SEQ ID NO: 96).

[00291] In some embodiments, the peptide comprises amino acid sequence EQFRNLA (SEQ ID NO: 78). In some embodiments, the peptide comprises amino acid sequence TDFRSPQ (SEQ ID NO: 80). In some embodiments, the peptide comprises amino acid sequence TGAFSST (SEQ ID NO: 77). In some embodiments, the peptide comprises amino acid sequence FNSPVIQ (SEQ ID NO: 79). In some embodiments, the peptide comprises amino acid sequence PYASITG (SEQ ID NO: 76). In some embodiments, the peptide comprises amino acid sequence YGSRSVD (SEQ ID NO: 83). In some embodiments, the peptide comprises amino acid sequence RPLTAND (SEQ ID NO: 95). In some embodiments, the peptide comprises amino acid sequence PRDTFNG (SEQ ID NO: 94). In some embodiments, the peptide comprises amino acid sequence PLRMVNE (SEQ ID NO: 96). In some embodiments, the peptide comprises amino acid sequence ENFSKVA (SEQ ID NO: 101). In some embodiments, the peptide comprises amino acid sequence LGNGKMTVQP (SEQ ID NO: 103). In some embodiments, the peptide comprises amino acid sequence GRNTVGLSSA (SEQ ID NO: 106). In some embodiments, the peptide comprises amino acid sequence TSNSRTE (SEQ ID NO: 91). In some embodiments, the peptide comprises amino acid sequence RDALSGLRPE (SEQ ID NO: 102).

[00292] In some embodiments, the peptide comprises an amino acid sequence selected from the group consisting of KSPQSKV (SEQ ID NO:1), SDLRSKV (SEQ ID NO:2) and TTTVRKV (SEQ ID NO:3). In some embodiments, the peptide is selected from the group consisting of KSPQSKV (SEQ ID NO:1), SDLRSKV (SEQ ID NO:2) and TTTVRKV (SEQ ID NO:3).

[00293] In some embodiments, the peptide comprises an amino acid sequence selected from the group consisting of AALRDIR (SEQ ID NO:68), PAIKTYS (SEQ ID NO: 69), TGDRISSRTL (SEQ ID NO: 70), SVVVSSDSSKRPRNL (SEQ ID NO: 71), VGARLSA (SEQ ID NO: 72), IEKPNTSTKK (SEQ ID NO: 73), DTVRSKN (SEQ ID NO: 74), and KELNKAR (SEQ ID NO: 75). In some embodiments, the peptide is selected from the group consisting of AALRDIR (SEQ ID NO:68), PAIKTYS (SEQ ID NO: 69), TGDRISSRTL (SEQ ID NO: 70), SVVVSSDSSKRPRNL (SEQ ID NO: 71), VGARLSA (SEQ ID NO: 72), IEKPNTSTKK (SEQ ID NO: 73), DTVRSKN (SEQ ID NO: 74), and KELNKAR (SEQ ID NO: 75).

[00294] In some embodiments, the peptide comprises an amino acid sequence selected from the group consisting of GRSDMAG (SEQ ID NO: 4), LLSSERS (SEQ ID NO:

5), EQRPNVS (SEQ ID NO: 6) and TRQISSD (SEQ ID NO: 7). In some embodiments, the peptide is selected from the group consisting of GRSDMAG (SEQ ID NO: 4), LLSSERS (SEQ ID NO: 5), EQRPNVS (SEQ ID NO: 6) and TRQISSD (SEQ ID NO: 7).

[00295] In some embodiments, the peptide comprises an amino acid sequence selected from the group consisting of MTLTRQE (SEQ ID NO: 90), TSNSRTE (SEQ ID NO: 91), EVRGGPS (SEQ ID NO: 92), VISDRSS (SEQ ID NO: 93), PRDTFNG (SEQ ID NO: 94), RPLTAND (SEQ ID NO: 95), PLRMVNE (SEQ ID NO: 96), DVGIRPS (SEQ ID NO: 97), KDSTAFG (SEQ ID NO: 98), YPGRNPD (SEQ ID NO: 99), ISDTRIS (SEQ ID NO: 100), ENFSKVA (SEQ ID NO: 101), RDALSGLRPE (SEQ ID NO: 102), LGNGKMTVQP (SEQ ID NO: 103), VSNPLNQ (SEQ ID NO: 104), LNERGLG (SEQ ID NO: 105), GRNTVGLSSA (SEQ ID NO: 106), VGHAGNP (SEQ ID NO: 107), SRAGTVP (SEQ ID NO: 108), GLVAKLP (SEQ ID NO: 109), and AESLRTP (SEQ ID NO: 110). In some embodiments, the peptide is selected from the group consisting of MTLTRQE (SEQ ID NO: 90), TSNSRTE (SEQ ID NO: 91), EVRGGPS (SEQ ID NO: 92), VISDRSS (SEQ ID NO: 93), PRDTFNG (SEQ ID NO: 94), RPLTAND (SEQ ID NO: 95), PLRMVNE (SEQ ID NO: 96), DVGIRPS (SEQ ID NO: 97), KDSTAFG (SEQ ID NO: 98), YPGRNPD (SEQ ID NO: 99), ISDTRIS (SEQ ID NO: 100), ENFSKVA (SEQ ID NO: 101), RDALSGLRPE (SEQ ID NO: 102), LGNGKMTVQP (SEQ ID NO: 103), VSNPLNQ (SEQ ID NO: 104), LNERGLG (SEQ ID NO: 105), GRNTVGLSSA (SEQ ID NO: 106), VGHAGNP (SEQ ID NO: 107), SRAGTVP (SEQ ID NO: 108), GLVAKLP (SEQ ID NO: 109), and AESLRTP (SEQ ID NO: 110).

[00296] In some embodiments, the peptide comprises an amino acid sequence selected from the group consisting of QGALAQV (SEQ ID NO: 8), YPSSNTP (SEQ ID NO: 9), MLNPRTE (SEQ ID NO: 10) and QMRTRDE (SEQ ID NO: 11). In some embodiments, the peptide is selected from the group consisting of QGALAQV (SEQ ID NO: 8), YPSSNTP (SEQ ID NO: 9), MLNPRTE (SEQ ID NO: 10) and QMRTRDE (SEQ ID NO: 11).

[00297] In some embodiments, the peptide comprises an amino acid sequence selected from the group consisting of PYASITG (SEQ ID NO: 76), TGAFSST (SEQ ID NO: 77), EQFRNLA (SEQ ID NO: 78), FNSPVIQ (SEQ ID NO: 79), TDFRSPQ (SEQ ID NO:80), MYSLMKD (SEQ ID NO:81), LYLSSAS (SEQ ID NO: 82), YGSRSVD

(SEQ ID NO:83), LYSHQVS (SEQ ID NO: 84), and ISTHSPP (SEQ ID NO: 85). In some embodiments, the peptide is selected from the group consisting of PYASITG (SEQ ID NO: 76), TGAFSST (SEQ ID NO: 77), EQFRNLA (SEQ ID NO: 78), FNSPVIQ (SEQ ID NO: 79), TDFRSPQ (SEQ ID NO:80), MYSLMKD (SEQ ID NO:81), LYLSSAS (SEQ ID NO: 82), YGSRSVD (SEQ ID NO:83), LYSHQVS (SEQ ID NO: 84), and ISTHSPP (SEQ ID NO: 85).

[00298] In some embodiments, the peptide comprises an amino acid sequence selected from the group consisting of MPGRAPI (SEQ ID NO: 12), LGRLTAN (SEQ ID NO: 13), SYSTSRS (SEQ ID NO: 14), TRPSSTN (SEQ ID NO: 15), VPQSSSR (SEQ ID NO: 16), VSRSYPA (SEQ ID NO: 17) and QRARPDT (SEQ ID NO: 18). In some embodiments, the peptide is selected from the group consisting of MPGRAPI (SEQ ID NO: 12), LGRLTAN (SEQ ID NO: 13), SYSTSRS (SEQ ID NO: 14), TRPSSTN (SEQ ID NO: 15), VPQSSSR (SEQ ID NO: 16), VSRSYPA (SEQ ID NO: 17) and QRARPDT (SEQ ID NO: 18).

[00299] In some embodiments, the peptide comprises an amino acid sequence selected from the group consisting of RQPTTIP (SEQ ID NO: 86), RSTSSLL (SEQ ID NO: 87), FRLSSPQ (SEQ ID NO: 88), and NIPKAYG (SEQ ID NO: 89). In some embodiments, the peptide is selected from the group consisting of RQPTTIP (SEQ ID NO: 86), RSTSSLL (SEQ ID NO: 87), FRLSSPQ (SEQ ID NO: 88), and NIPKAYG (SEQ ID NO: 89).

[00300] In some embodiments, the peptide comprises an amino acid sequence selected from the group consisting of SQLTPHS (SEQ ID NO: 19), LGSHLPS (SEQ ID NO: 20), YTLSSGQ (SEQ ID NO: 21), SSRIPPD (SEQ ID NO: 22), WTETIPR (SEQ ID NO: 23), HGLQGVA (SEQ ID NO: 24), TMRVSDQ (SEQ ID NO: 25), GSSKVVM (SEQ ID NO: 26), and SALDRGV (SEQ ID NO: 27). In some embodiments, the peptide is selected from the group consisting of SQLTPHS (SEQ ID NO: 19), LGSHLPS (SEQ ID NO: 20), YTLSSGQ (SEQ ID NO: 21), SSRIPPD (SEQ ID NO: 22), WTETIPR (SEQ ID NO: 23), HGLQGVA (SEQ ID NO: 24), TMRVSDQ (SEQ ID NO: 25), GSSKVVM (SEQ ID NO: 26), and SALDRGV (SEQ ID NO: 27).

[00301] In some embodiments, the peptide comprises an amino acid sequence selected from the group consisting of KELGTQR (SEQ ID NO: 28), RSSDVQR (SEQ ID NO: 29), PSAPKTF (SEQ ID NO: 30), HTKRSEY (SEQ ID NO: 31), and IKGSNLP (SEQ ID NO: 32). In some embodiments, the peptide is selected from the group consisting

of KELGTQR (SEQ ID NO: 28), RSSDVQR (SEQ ID NO: 29), PSAPKTF (SEQ ID NO: 30), HTKRSEY (SEQ ID NO: 31), and IKGSNLP (SEQ ID NO: 32).

[00302] In some embodiments, the disclosure provides a capsid protein comprising an inserted peptide, wherein the peptide is inserted at i) amino acid position 590 of an AAV1 capsid protein, (ii) amino acid position 454 or 590 of an AAV6 capsid protein, (iii) amino acid position 588 of an AAV2 capsid protein, (iv) amino acid position 589 of an AAV3B capsid protein, (v) amino acid position 578 of an AAV5 capsid protein, (vi) amino acid position 591 of the an AAV8 capsid protein, or (vi) amino acid position 266, 455, or 589 of an AAV9 capsid protein, wherein the positions correspond to the numbering of VP1 in the AAV serotype.

[00303] In some embodiments of the capsid proteins disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 1-32 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype. In some embodiments of the capsid proteins disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 68-110 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype. In some embodiments of the capsid proteins disclosed herein, the peptide inserted at position 590 of the capsid protein of an AAV1 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 68 to SEQ ID NO: 75. In some embodiments of the capsid proteins disclosed herein, the peptide inserted at position 590 of the capsid protein of an AAV1 serotype comprises the amino acid sequence SEQ ID NO: 71. In some embodiments of the capsid proteins disclosed herein, the peptide inserted at position 590 of the capsid protein of an AAV1 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 1, SEQ ID NO: 2 and SEQ ID NO: 3.

[00304] In some embodiments of the capsid proteins disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 1-32 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype. In some embodiments of the capsid proteins disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 68-110 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype. In some embodiments of the capsid proteins disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 1-32 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype. In some embodiments of the capsid proteins disclosed herein, a peptide

comprising the amino acid sequence of any one of SEQ ID NO. 68-110 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype. In some embodiments of the capsid proteins disclosed here, the peptide inserted at position 454 of the capsid protein of an AAV6 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 19 to SEQ ID NO: 27. In some embodiments of the capsid proteins disclosed here, the peptide inserted at position 590 of the capsid protein of an AAV6 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 19 to SEQ ID NO: 27.

[00305] In some embodiments of the capsid proteins disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 1-32 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype. In some embodiments of the capsid proteins disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 68-110 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype. In some embodiments of the capsid proteins disclosed here, the peptide inserted at position 588 of the capsid protein of an AAV2 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 90 to SEQ ID NO: 110. In some embodiments of the capsid proteins disclosed here, the peptide inserted at position 588 of the capsid protein of an AAV2 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 95, SEQ ID NO: 94, SEQ ID NO: 96, SEQ ID NO: 101, SEQ ID NO: 103, SEQ ID NO: 106, SEQ ID NO: 91 and SEQ ID NO: 102. . In some embodiments of the capsid proteins disclosed here, the peptide inserted at position 588 of the capsid protein of an AAV2 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 4-7.

[00306] In some embodiments of the capsid proteins disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 1-32 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype. In some embodiments of the capsid proteins disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 68-110 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype. In some embodiments of the capsid proteins disclosed here, the peptide inserted at position 589 of the capsid protein of an AAV3B serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 76- 85. In some embodiments of the capsid proteins

disclosed here, the peptide inserted at position 589 of the capsid protein of an AAV3B serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 77, SEQ ID NO: 79, SEQ ID NO: 76 and SEQ ID NO: 83. In some embodiments of the capsid proteins disclosed here, the peptide inserted at position 589 of the capsid protein of an AAV3B serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 8 to SEQ ID NO: 11.

[00307] In some embodiments of the capsid proteins disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 1-32 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype. In some embodiments of the capsid proteins disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 68-110 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype. In some embodiments of the capsid proteins disclosed here, the peptide inserted at position 578 of the capsid protein of an AAV5 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 28 to SEQ ID NO: 32.

[00308] In some embodiments of the capsid proteins disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 1-32 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype. In some embodiments of the capsid proteins disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 68-110 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype.

[00309] In some embodiments of the capsid proteins disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 1-32 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype. In some embodiments of the capsid proteins disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 68-110 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype. In some embodiments of the capsid proteins disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 1-32 is inserted at amino acid position 455 of the capsid protein of an AAV9 serotype. In some embodiments of the capsid proteins disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 68-110 is inserted at

amino acid position 455 of the capsid protein of an AAV9 serotype. In some embodiments of the capsid proteins disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 1-32 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype. In some embodiments of the capsid proteins disclosed herein, a peptide comprising the amino acid sequence of any one of SEQ ID NO. 68-110 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype. In some embodiments of the capsid proteins disclosed here, the peptide inserted at position 266 of the capsid protein of an AAV9 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 12 to SEQ ID NO: 18. In some embodiments of the capsid proteins disclosed here, the peptide inserted at position 266 of the capsid protein of an AAV9 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 86 to SEQ ID NO: 89. In some embodiments of the capsid proteins disclosed here, the peptide inserted at position 266 of the capsid protein of an AAV9 serotype comprises an amino acid sequence of SEQ ID NO: 89. In some embodiments of the capsid proteins disclosed here, the peptide inserted at position 455 of the capsid protein of an AAV9 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 12 to SEQ ID NO: 18. In some embodiments of the capsid proteins disclosed here, the peptide inserted at position 455 of the capsid protein of an AAV9 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 86 to SEQ ID NO: 89. In some embodiments of the capsid proteins disclosed here, the peptide inserted at position 455 of the capsid protein of an AAV9 serotype comprises an amino acid sequence of SEQ ID NO: 89. In some embodiments of the capsid proteins disclosed here, the peptide inserted at position 455 of the capsid protein of an AAV9 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 12 to SEQ ID NO: 18. In some embodiments of the capsid proteins disclosed here, the peptide inserted at position 589 of the capsid protein of an AAV9 serotype comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 86 to SEQ ID NO: 89. In some embodiments of the capsid proteins disclosed here, the peptide inserted at position 589 of the capsid protein of an AAV9 serotype comprises an amino acid sequence of SEQ ID NO: 89.

[00310] Also disclosed herein are AAV capsid proteins comprising an inserted peptide as disclosed herein. In some embodiments, the capsid protein is VP1, VP2, or VP3. In

some embodiments, the peptide is inserted at a location between residues 450 and 600 of the capsid protein. In some embodiments, the peptide is inserted at (i) position 590 of an AAV1 capsid protein, (ii) position 454 or 590 of an AAV6 capsid protein, (iii) position 588 of an AAV2 capsid protein, (iv) position 589 of an AAV3B capsid protein, (v) position 578 of an AAV5 capsid protein, (vi) position 591 of an AAV8 capsid protein, or (vii) position 266, 455, or 589 of an AAV9 capsid protein, wherein the positions correspond to the numbering of VP1 in the AAV serotype. In some embodiments, the peptide is inserted at position 590 of an AAV1 capsid protein. In some embodiments, the peptide is inserted at position 454 or 590 of an AAV6 capsid protein. In some embodiments, the peptide is inserted at position 588 of an AAV2 capsid protein. In some embodiments, the peptide is inserted at position 589 of an AAV3B capsid protein. In some embodiments, the peptide is inserted at position 578 of an AAV5 capsid protein. In some embodiments, the peptide is inserted at position 591 of an AAV8 capsid protein. In some embodiments, the peptide is inserted at position 266, 455, or 589 of an AAV9 capsid protein. It is understood that other sites in the capsid proteins may be selected for insertion. It will also be understood that the amino acid sequences may be inserted at corresponding positions of VP2 or VP3.

[00311] Also disclosed herein are nucleic acid sequences encoding the peptides, capsid proteins and AAV variants disclosed herein.

[00312] Further, disclosed herein are AAV vectors comprising the inserted peptides disclosed herein. In some embodiments, the peptide is part of a capsid protein of the AAV vector.

[00313] In some embodiments, the inserted peptide of the disclosure has cell or tissue tropism for a target cell or tissue. In some embodiments, the target cell or tissue includes, but is not limited to, a cell from the CNS, heart, lung, trachea, esophagus, muscle, bone, cartilage, stomach, pancreas, intestine, liver, bladder, kidney, ureter, urethra, uterus, fallopian tube, ovary, testes, prostate, eye, blood, lymph, or oral mucosa. In some embodiments, the target cell or tissue is from the liver. In some embodiments, the target cell or tissue is from the CNS. In some embodiments, the target cell includes, but is not limited to, neurons, glial cells, astrocytes, oligodendroglia, microglia, Schwann cells, ependymal cells, hepatocytes, stellate fat storing cells, Kupffer cells, liver endothelial cells, epithelial cells, cardiomyocytes, smooth muscle cells, T-cells, B cells, hematopoietic stem cells, and embryonic stem cells.

[00314] A vector comprising an inserted peptide of the disclosure may be used to deliver a nucleic acid to a target cell or tissue. In one aspect, the present disclosure provides a method of delivering a nucleic acid to a target cell or tissue comprising administering an AAV vector comprising the nucleic acid, wherein the AAV vector comprises a targeting protein of the disclosure. In some embodiments, the target cell or tissue includes, but is not limited to, a cell from the CNS, heart, lung, trachea, esophagus, muscle, bone, cartilage, stomach, pancreas, intestine, liver, bladder, kidney, ureter, urethra, uterus, fallopian tube, ovary, testes, prostate, eye, blood, lymph, or oral mucosa. In some embodiments, the target cell or tissue is from the liver. In some embodiments, the target cell or tissue is from the CNS. In some embodiments, the target cell includes, but is not limited to, neurons, glial cells, astrocytes, oligodendroglia, microglia, Schwann cells, ependymal cells, hepatocytes, stellate fat storing cells, Kupffer cells, liver endothelial cells, epithelial cells, cardiomyocytes, smooth muscle cells, T-cells, B cells, hematopoietic stem cells, and embryonic stem cells.

DNA-binding molecules/domains

[00315] Described herein are compositions comprising a DNA-binding molecule/domain that specifically binds to a target site in any gene or locus of interest. Any DNA-binding molecule/domain can be used in the compositions and methods disclosed herein, including but not limited to a zinc finger DNA-binding domain, a TALE DNA binding domain, the DNA-binding portion (guide or sgRNA) of a CRISPR/Cas nuclease, or a DNA-binding domain from a meganuclease. In the methods and compositions described herein, it is understood that the term ""Cas" includes both Cas9 and Cfp1 proteins. Thus, as used herein, a "CRISPR/Cas system" refers both CRISPR/Cas and/or CRISPR/Cfp1 systems, including both nuclease, nickase and/or transcription factor systems.

[00316] In some embodiments, other Cas proteins may be used. Some exemplary Cas proteins include Cas9, Cpf1 (also known as Cas12a), C2c1, C2c2 (also known as Cas13a), C2c3, Cas1, Cas2, Cas4, CasX and CasY; and include engineered and natural variants thereof (Burstein, *et al.* (2017) *Nature* 542:237-241) for example HF1/spCas9 (Kleinstiver, *et al.* (2016) *Nature* 529: 490-495; Cebrian-Serrano and Davies (2017) *Mamm Genome* (2017) 28(7):247-261); split Cas9 systems (Zetsche, *et al.* (2015) *Nat Biotechnol* 33(2):139-142), trans-spliced Cas9 based on an intein-extein system (Troung, *et al.* (2015) *Nucl Acid Res* 43(13):6450-8); mini-SaCas9 (Ma, *et al.* (2018)

ACS Synth Biol 7(4):978-985). Thus, in the methods and compositions described herein, it is understood that the term ‘“Cas” includes all Cas variant proteins, both natural and engineered. Thus, as used herein, a “CRISPR/Cas system” refers to any CRISPR/Cas system, including both nuclease, nickase and/or transcription factor systems.

Systems

[00317] The DNA-editing complexes (or component molecules thereof) described herein may be delivered to a target cell by the methods and compositions as described herein. Delivery may be to isolated cells (which in turn may be administered to a living subject for *ex vivo* cell therapy) or a living subject. Delivery of gene editing molecules to cells and subjects are known in the art.

[00318] Suitable cells include but not limited to eukaryotic and prokaryotic cells and/or cell lines. Non-limiting examples of such cells or cell lines generated from such cells include T-cells, COS, CHO (e.g., CHO-S, CHO-K1, CHO-DG44, CHO-DUXB11, CHO-DUKX, CHOK1SV), VERO, MDCK, WI38, V79, B14AF28-G3, BHK, HaK, NS0, SP2/0-Ag14, HeLa, HEK293 (e.g., HEK293-F, HEK293-H, HEK293-T), and perC6 cells as well as insect cells such as *Spodoptera fugiperda* (Sf), or fungal cells such as *Saccharomyces*, *Pichia* and *Schizosaccharomyces*. In certain embodiments, the cell line is a CHO-K1, MDCK or HEK293 cell line. Suitable cells also include stem cells such as, by way of example, embryonic stem cells, induced pluripotent stem cells (iPS cells), hematopoietic stem cells, neuronal stem cells and mesenchymal stem cells.

[00319] DNA-editing complexes as described herein may also be delivered using vectors of the invention containing sequences encoding one or more of the components (*e.g.,* fusion molecules). Additionally, additional nucleic acids (*e.g.*, donors) also may be delivered via these vectors. Furthermore, it will be apparent that any of these vectors may comprise one or more DNA-binding protein-encoding sequences and/or additional nucleic acids as appropriate. Thus, when one or more DNA-binding proteins as described herein are introduced into the cell, and additional DNAs as appropriate, they may be carried on the same vector or on different vectors. When multiple vectors are used, each vector may comprise a sequence encoding one or multiple DNA-binding proteins and additional nucleic acids as desired. Conventional viral and non-viral based gene transfer methods can be used to introduce nucleic acids encoding engineered DNA-binding proteins in cells (*e.g.,* mammalian cells) and target tissues and to co-

introduce additional nucleotide sequences as desired. Such methods can also be used to administer nucleic acids (*e.g.*, encoding DNA-binding proteins and/or donors) to cells *in vitro*. In certain embodiments, nucleic acids are administered for *in vivo* or *ex vivo* gene therapy uses.

[00320] Packaging cells are used to form virus particles that are capable of infecting a host cell. Such cells include HEK293 cells, which package adenovirus or AAV. Viral vectors used in gene therapy are usually generated by a producer cell line that packages a nucleic acid vector into a viral particle. The vectors typically contain the minimal viral sequences required for packaging and subsequent integration into a host (if applicable), other viral sequences being replaced by an expression cassette encoding the protein to be expressed. The missing viral functions are supplied in *trans* by the packaging cell line. For example, AAV vectors used in gene therapy typically only possess inverted terminal repeat (ITR) sequences from the AAV genome which are required for packaging and integration into the host genome. Viral DNA is packaged in a cell line, which contains a helper plasmid encoding the other AAV genes, namely rep and cap, but lacking ITR sequences. The cell line is also infected with adenovirus as a helper. The helper virus promotes replication of the AAV vector and expression of AAV genes from the helper plasmid. The helper plasmid is not packaged in significant amounts due to a lack of ITR sequences. Contamination with adenovirus can be reduced by, *e.g.*, heat treatment to which adenovirus is more sensitive than AAV. In some embodiments, baculovirus systems are used to produce the AAV (see for example Smith *et al* (2009) *Mol Ther* 434:37-54).

[00321] In many gene therapy applications, it is desirable that the gene therapy vector be delivered with a high degree of specificity to a particular tissue type. Accordingly, a viral vector can be modified to have specificity for a given cell type by expressing a ligand as a fusion protein with a viral coat protein on the outer surface of the virus. The ligand is chosen to have affinity for a receptor known to be present on the cell type of interest. For example, Han, *et al.* (1995) *Proc. Natl. Acad. Sci. USA* 92:9747-9751, reported that Moloney murine leukemia virus can be modified to express human heregulin fused to gp70, and the recombinant virus infects certain human breast cancer cells expressing human epidermal growth factor receptor. This principle can be extended to other virus-target cell pairs, in which the target cell expresses a receptor and the virus expresses a fusion protein comprising a ligand for the cell-surface receptor. For example, filamentous phage can be engineered to display antibody

fragments (*e.g.*, FAB or Fv) having specific binding affinity for virtually any chosen cellular receptor. Although the above description applies primarily to viral vectors, the same principles can be applied to nonviral vectors. Such vectors can be engineered to contain specific uptake sequences which favor uptake by specific target cells.

[00322] Delivery methods for CRISPR/Cas systems can comprise those methods described above. For example, in animal models, *in vitro* transcribed Cas encoding mRNA or recombinant Cas protein can be directly injected into one-cell stage embryos using glass needles to genome-edited animals. To express Cas and guide RNAs in cells *in vitro*, typically plasmids that encode them are transfected into cells via lipofection or electroporation. Also, recombinant Cas protein can be complexed with *in vitro* transcribed guide RNA where the Cas-guide RNA ribonucleoprotein is taken up by the cells of interest (Kim, *et al.* (2014) *Genome Res* 24(6):1012). For therapeutic purposes, Cas and guide RNAs can be delivered by a combination of viral and non-viral techniques. For example, mRNA encoding Cas may be delivered via nanoparticle delivery while the guide RNAs and any desired transgene or repair template are delivered via AAV (Yin, *et al.* (2016) *Nat Biotechnol* 34(3):328).

[00323] Gene therapy vectors can be delivered *in vivo* by administration to an individual patient (subject), typically by systemic administration (*e.g.*, intravenous, intraperitoneal, intramuscular, subdermal, or intracranial infusion) or topical application, as described below. Alternatively, vectors can be delivered to cells *ex vivo*, such as cells explanted from an individual patient (*e.g.*, lymphocytes, bone marrow aspirates, tissue biopsy) or universal donor hematopoietic stem cells, followed by re-implantation of the cells into a patient, usually after selection for cells which have incorporated the vector.

[00324] *Ex vivo* cell transfection for diagnostics, research, transplant or for gene therapy (*e.g.*, via re-infusion of the transfected cells into the host organism) is well known to those of skill in the art. In some embodiments, cells are isolated from the subject organism, transfected with a DNA-binding proteins nucleic acid (gene or cDNA), and re-infused back into the subject organism (*e.g.*, patient). Various cell types suitable for ex vivo transfection are well known to those of skill in the art (see, *e.g.*, Freshney, *et al.*, Culture of Animal Cells, A Manual of Basic Technique (3rd ed. 1994))

and the references cited therein for a discussion of how to isolate and culture cells from patients).

[00325] In one embodiment, stem cells are used in *ex vivo* procedures for cell transfection and gene therapy. The advantage to using stem cells is that they can be differentiated into other cell types *in vitro*, or can be introduced into a mammal (such as the donor of the cells) where they will engraft in the bone marrow. Methods for differentiating CD34+ cells in vitro into clinically important immune cell types using cytokines such a GM-CSF, IFN-γ and TNF-α are known (see Inaba, *et al.* (1992) *J. Exp. Med.* 176:1693-1702).

[00326] The vectors as described herein containing therapeutic DNA-binding proteins (or nucleic acids encoding these proteins) can also be administered directly to an organism for transduction of cells *in vivo*. Administration is by any of the routes normally used for introducing a molecule into ultimate contact with blood or tissue cells including, but not limited to, injection, infusion, topical application and electroporation. Suitable methods of administering such nucleic acids are available and well known to those of skill in the art, and, although more than one route can be used to administer a particular composition, a particular route can often provide a more immediate and more effective reaction than another route.

[00327] Pharmaceutically acceptable carriers are determined in part by the particular composition being administered, as well as by the particular method used to administer the composition. Accordingly, there is a wide variety of suitable formulations of pharmaceutical compositions available, as described below (see, *e.g.*, Remington's Pharmaceutical Sciences, 17th ed., 1989).

[00328] As noted above, the disclosed methods and compositions can be used in any type of cell including, but not limited to, prokaryotic cells, fungal cells, Archaeal cells, plant cells, insect cells, animal cells, vertebrate cells, mammalian cells and human cells, including T-cells and stem cells of any type. Suitable cell lines for protein expression are known to those of skill in the art and include, but are not limited to COS, CHO (e.g., CHO-S, CHO-K1, CHO-DG44, CHO-DUXB11), VERO, MDCK, WI38, V79, B14AF28-G3, BHK, HaK, NS0, SP2/0-Ag14, HeLa, HEK293 (e.g., HEK293-F, HEK293-H, HEK293-T), perC6, insect cells such as *Spodoptera fugiperda* (Sf), and

fungal cells such as *Saccharomyces*, *Pichia* and *Schizosaccharomyces*. Progeny, variants and derivatives of these cell lines can also be used.

Applications

[00329] Engineered AAV capsids can be used for many different applications of *in vivo* and *ex vivo* gene therapy and genome editing. The AAV variants disclosed herein were generated through the use of directed evolution involving the use of cell and *in vivo* selections following administration. In some embodiments, the variant capsid proteins disclosed herein, when present in an AAV virion, confer increased transduction of a cell, tissue or organelle compared to the transduction of the cell, tissue or organelle by an AAV virion comprising the corresponding parental AAV capsid protein or wild-type AAV. For example, in some embodiments, the variant capsid proteins disclosed herein, when present in an AAV virion, confer more efficient transduction of cells, tissues or organelle than AAV virions comprising the corresponding parental AAV capsid protein or wild-type AAV capsid protein, *e.g.* the cells, tissues or organelles take up more AAV virions comprising the variant AAV capsid protein than AAV virions comprising the parental AAV capsid protein or wild-type AAV. In some such embodiments, the AAV variant virion or variant rAAV exhibits at least 2-fold, at least 5 -fold, at least 10-fold, at least 15 -fold, at least 20-fold, at least 25-fold, at least 30-fold, at least 40-fold, at least 50-fold, or more than 50-fold, increased transduction of a cell, tissue or organelle compared to the transduction of the cell, tissue or organelle by a wild-type AAV virion or rAAV comprising the corresponding parental AAV capsid protein. In some embodiments, the cell or tissue includes, but is not limited to, a cell or tissue from the CNS, heart, lung, trachea, esophagus, muscle, bone, cartilage, stomach, pancreas, intestine, liver, bladder, kidney, ureter, urethra, uterus, fallopian tube, ovary, testes, prostate, eye, blood, lymph, or oral mucosa. In some embodiments, the cell or tissue is from the liver. In some embodiments, the cell or tissue is from the CNS. In some embodiments, the target cell includes, but is not limited to, neurons, glial cells, astrocytes, oligodendroglia, microglia, Schwann cells, ependymal cells, hepatocytes, stellate fat storing cells, Kupffer cells, liver endothelial cells, epithelial cells, cardiomyocytes, smooth muscle cells, T-cells, B cells, hematopoietic stem cells, and embryonic stem cells. In some embodiments, the AAV variant virion or variant rAAV exhibits at least 2-fold, at least 5 -fold, at least 10-fold, at least 15-fold, at least 20-fold, at least 25-fold, at least 30-fold, at least 40-fold, at least 50-fold, at least 100-fold, at least 1000-fold or more than 1000-fold, increased transduction of a cell, tissue

or organelle compared to the transduction of the cell, tissue or organelle by a wild-type AAV1, AAV2, AAV3B, AAV4, AAV5, AAV6, AAV8 or AAV9 virion. In certain such embodiments, the variant capsid proteins disclosed herein, when present in an AAV virion, confer broader transduction of primate CNS cells than AAV virions comprising the corresponding parental AAV capsid protein or wild type AAV capsid protein. In some embodiments, the variant AAV virion transduces cell types not transduced by virions comprising the corresponding parental AAV capsid protein, and hence more types of cells in the CNS than the corresponding parental AAV virion. In some embodiments, the AAV variant virion preferentially transduces a CNS cell, *e.g.*, a rAAV virion infects a CNS cell with 2-fold, 5- fold, 10-fold, 15-fold, 20-fold, 25-fold, 50-fold, or more than 50-fold, specificity than another cell. In some embodiments, the transduced CNS cell is a neuron or glial cell, including without limitation, an astrocyte, oligodendroglia, microglia, Schwann cell, or ependymal cell.

[00330] In certain such embodiments, the variant capsid proteins disclosed herein, when present in an AAV virion, confer broader transduction of primate liver cells than AAV virions comprising the corresponding parental AAV capsid protein or wild type AAV capsid protein. In some embodiments, the variant AAV virion transduces cell types not transduced by virions comprising the corresponding parental AAV capsid protein, and hence more types of cells in the liver than the corresponding parental AAV virion. In some embodiments, the AAV variant virion preferentially transduces a liver cell, *e.g.*, a rAAV virion infects a liver cell with 2-fold, 5- fold, 10-fold, 15-fold, 20-fold, 25-fold, 50-fold, or more than 50-fold, specificity than another cell. In some embodiments, the transduced liver cell is, without limitation, a hepatocyte, stellate fat storing cell, Kupffer cell or liver endothelial cell.

[00331] An increase in transduction of a CNS or liver cell, *e.g.* increased efficiency of transduction, broader transduction, more preferential transduction, etc. may be readily assessed *in vitro* or *in vivo* by any number of methods in the art for measuring gene expression. For example, the AAV may be packaged with a genome comprising an expression cassette comprising a reporter gene, *e.g.* a fluorescent protein, under the control of or operatively linked to a ubiquitous or cell type and/or tissue specific promoter, and the extent of transduction assessed by detecting the fluorescent protein by, *e.g.*, fluorescence microscopy. As another example, the AAV may be packaged with a genome comprising a barcoded nucleic acid sequence, and the extent of transduction assessed by detecting the nucleic acid sequence by, *e.g.*, PCR. As another

example, the AAV may be packaged with a genome comprising an expression cassette comprising a therapeutic gene for the treatment of a disease, and the extent of transduction assessed by detecting the treatment of the disease in a subject in need of treatment that was administered the AAV.

[00332] Exemplary genetic diseases that may be treated and/or prevented by the compositions and methods described herein include, but are not limited to, achondroplasia, achromatopsia, acid maltase deficiency, adenosine deaminase deficiency (OMIM No.102700), adrenoleukodystrophy, aicardi syndrome, alpha-1 antitrypsin deficiency, alpha-thalassemia, androgen insensitivity syndrome, apert syndrome, arrhythmogenic right ventricular, dysplasia, ataxia telangictasia, barth syndrome, beta-thalassemia, blue rubber bleb nevus syndrome, canavan disease, chronic granulomatous diseases (CGD), cri du chat syndrome, cystic fibrosis, dercum's disease, ectodermal dysplasia, fanconi anemia, fibrodysplasia ossificans progressive, fragile X syndrome, galactosemis, Gaucher's disease, generalized gangliosidoses (*e.g.*, GM1), hemochromatosis, the hemoglobin C mutation in the 6th codon of beta-globin (HbC), hemophilia, Huntington's disease, Hurler Syndrome, hypophosphatasia, Klinefelter syndrome, Krabbes Disease, Langer-Giedion Syndrome, leukocyte adhesion deficiency (LAD, OMIM No. 116920), leukodystrophy, long QT syndrome, Marfan syndrome, Moebius syndrome, mucopolysaccharidosis (MPS), nail patella syndrome, nephrogenic diabetes insipdius, neurofibromatosis, Neimann-Pick disease, osteogenesis imperfecta, phenylketonuria (PKU). porphyria, Prader-Willi syndrome, progeria, Proteus syndrome, retinoblastoma, Rett syndrome, Rubinstein-Taybi syndrome, Sanfilippo syndrome, severe combined immunodeficiency (SCID), Shwachman syndrome, sickle cell disease (sickle cell anemia), Smith-Magenis syndrome, Stickler syndrome, Tay-Sachs disease, Thrombocytopenia Absent Radius (TAR) syndrome, Treacher Collins syndrome, trisomy, tuberous sclerosis, Turner's syndrome, urea cycle disorder, von Hippel-Landau disease, Waardenburg syndrome, Williams syndrome, Wilson's disease, Wiskott-Aldrich syndrome, X-linked lymphoproliferative syndrome (XLP, OMIM No. 308240).

[00333] Additional exemplary diseases that can be treated by targeted DNA base editing include acquired immunodeficiencies, lysosomal storage diseases (*e.g.*, Gaucher's disease, GM1, Fabry disease and Tay-Sachs disease), mucopolysaccharidosis (*e.g.* Hunter's disease, Hurler's disease), hemoglobinopathies (*e.g.*, sickle cell diseases, HbC, α-thalassemia, β-thalassemia) and hemophilias.

[00334] Such methods also allow for treatment of infections (viral or bacterial) in a host (*e.g.,* by blocking expression of viral or bacterial receptors, thereby preventing infection and/or spread in a host organism). Non-limiting examples of viruses or viral receptors that may be targeted include herpes simplex virus (HSV), such as HSV-1 and HSV-2, varicella zoster virus (VZV), Epstein-Barr virus (EBV) and cytomegalovirus (CMV), HHV6 and HHV7. The hepatitis family of viruses includes hepatitis A virus (HAV), hepatitis B virus (HBV), hepatitis C virus (HCV), the delta hepatitis virus (HDV), hepatitis E virus (HEV) and hepatitis G virus (HGV). Other viruses or their receptors may be targeted, including, but not limited to, Picornaviridae (*e.g.*, polioviruses, etc.); Caliciviridae; Togaviridae (*e.g.*, rubella virus, dengue virus, *etc.*); Flaviviridae; Coronaviridae; Reoviridae; Birnaviridae; Rhabdoviridae (*e.g.*, rabies virus, etc.); Filoviridae; Paramyxoviridae (*e.g.*, mumps virus, measles virus, respiratory syncytial virus, *etc.*); Orthomyxoviridae (*e.g.*, influenza virus types A, B and C, *etc.*); Bunyaviridae; Arenaviridae; Retroviradae; lentiviruses (*e.g.*, HTLV-I; HTLV-II; HIV-1 (also known as HTLV-III, LAV, ARV, hTLR, *etc.*) HIV-II); simian immunodeficiency virus (SIV), human papillomavirus (HPV), influenza virus and the tick-borne encephalitis viruses. See, *e.g.* Virology, 3rd Edition (W. K. Joklik ed. 1988); Fundamental Virology, 2nd Edition (B. N. Fields and D. M. Knipe, eds. 1991), for a description of these and other viruses. Receptors for HIV, for example, include CCR-5 and CXCR-4.

[00335] Gene products delivered by the subject AAV variants can be used to alter the level of gene products or gene product activity directly or indirectly linked to muscle diseases and trauma. Skeletal, cardiac or smooth muscle transduced with subject AAV variants can also be used as a biofactory to produce and secrete therapeutic proteins for the treatment of diseases in trans in distant organs. Genes whose gene products are directly or indirectly linked to genetic diseases include, *e.g.*, genes encoding any of the following gene products: dystrophin including mini- and micro -dystrophins (DMD; *e.g.* GenBank Accession Number NP 003997.1); titin (TTN); titin cap (TCAP) cc-sarcoglycan (SGCA), β-sarcoglycan (SGCB), γ-sarcoglycan (SGCG) or δ-sarcoglycan (SGCD); alpha- 1 -antitrypsin (Al-AT); myosin heavy chain 6 (MYH6); myosin heavy chain 7 (MYH7); myosin heavy chain 11 (MYH11); myosin light chain 2 (ML2); myosin light chain 3 (ML3); myosin light chain kinase 2 (MYLK2); myosin binding protein C (MYBPC3); desmin (DES); dynamin 2 (DNM2); laminin cc2 (LAMA2); lamin A/C (LMNA); lamin B (LMNB); lamin B receptor (LBR); dysferlin (DYSF);

emerin (EMD); insulin; blood clotting factors, including but not limited to, factor VIII and factor IX; erythropoietin (EPO); lipoprotein lipase (LPL); sarcoplasmic reticulum Ca2++-ATPase (SERCA2A), S100 calcium binding protein Al (S100A1); myotubularin (MTM); DM1 protein kinase (DMPK; *e.g.* GenBank Accession Number NG_009784.1); glycogen phosphorylase L (PYGL); glycogen phosphorylase, muscle associated (PYGM; *e.g.* GenBank Accession Number NP 005600.1); glycogen synthase 1 (GYS1); glycogen synthase 2 (GYS2); cc-galactosidase A (GLA; e.g. GenBank Accession Number NP_000160.1; SEQ ID NO:67); a-N-acetylgalactosaminidase (NAGA); acid cc-glucosidase (GAA; e.g. GenBank Accession Number NP_000143.2; SEQ ID NO:68), sphingomyelinase phosphodiesterase 1 (SMPD1); lysosomal acid lipase (LIP A); collagen type I al chain (COL1 Al); collagen type I o2 chain (COL1A2); collagen type III al chain (COL3A1); collagen type V al chain (COL5A1); collagen type V a2 chain (COL5A2); collagen type VI al chain (COL6A1); collagen type VI o2 chain (COL6A2); collagen type VI a3 chain (COL6A3); procollagen-lysine 2-oxoglutarate 5-dioxygenase (PLOD1); lysosomal acid lipase (LIP A); frataxin (FXN; e.g. GenBank Accession Number NP_000135.2); myostatin (MSTN); β-N-acetyl hexosaminidase A (HEXA); β-N-acetylhexosaminidase B (HEXB); β-glucocerebrosidase (GBA); adenosine monophosphate deaminase 1 (AMPD1); β-globin (HBB); iduronidase (IDUA); iduronate 2-sulfate (IDS); troponin 1 (TNNI3); troponin T2 (TNNT2); troponin C (TNNC1); tropomyosin 1 (TPM1); tropomyosin 3 (TPM3); N-acetyl-a-glucosaminidase (NAGLU); N-sulfoglucosamine sulfohydrolase (SGSH); heparan-a-glucosaminide N-acetyltransferase (HGSNAT); integrin a 7 (IGTA7); integrin a 9 (IGTA9); glucosamine(N-acetyl)-6-sulfatase (GNS); galactosamine(N-acetyl)-6-sulfatase (GALNS); β-galactosidase (GLB1); β-glucuronidase (GUSB); hyaluronoglucosaminidase 1 (HYALl); acid ceramidase (ASAHl); galactosylcermidase (GALC); cathepsin A (CTSA); cathepsin D (CTSA); cathepsin K (CTSK); GM2 ganglioside activator (GM2A); arylsulfatase A (ARSA); arylsulfatase B (ARSB); formylglycine- generating enzyme (SUMF1); neuraminidase 1 (NEU1); N-acetylglucosamine-1 -phosphate transferase a (GNPTA); N-acetylglucosamine-1 -phosphate transferase β (GNPTB); N-acetylglucosamine-1 -phosphate transferase γ (GNPTG); mucolipin-1 (MCOLN1); NPC intracellular transporter 1 (NPC1); NPC intracellular transporter 2 (NPC2); ceroid lipofuscinosis 5 (CLN5); ceroid lipofuscinosis 6 (CLN6); ceroid lipofuscinosis 8 (CLN8); palmitoyl protein thioesterase 1 (PPT1); tripeptidyl peptidase 1 (TPP1); battenin (CLN3); DNAJ

heat shock protein family 40 member C5 (DNAJC5); major facilitator superfamily domain containing 8 (MFSD8); mannosidase a class 2B member 1 (MAN2B1); mannosidase β (MANBA); aspartylglucosaminidase (AGA); cc-L-fucosidase (FUCA1); cystinosin, lysosomal cysteine transporter (CTNS); sialin; solute carrier family 2 member 10 (SLC2A10); solute carrier family 17 member 5 (SLC17A5); solute carrier family 6 member 19 (SLC6A19); solute carrier family 22 member 5 (SLC22A5); solute carrier family 37 member 4 (SLC37A4); lysosomal associated membrane protein 2 (LAMP2); sodium voltage-gated channel a subunit 4 (SCN4A); sodium voltage-gated channel β subunit 4 (SCN4B); sodium voltage-gated channel a subunit 5 (SCN5A); sodium voltage-gated channel a subunit 4 (SCN4A); calcium voltage-gated channel subunit ale (CACNA1C); calcium voltage-gated channel subunit eels (CACNA1S); phosphoglycerate kinase 1 (PGK1); phosphoglycerate mutase 2 (PGAM2); amylo-a-l,6-glucosidase,4-cc-glucanotransferase (AGL); potassium voltage-gated channel ISK-related subfamily member 1 (KCNE1); potassium voltage-gated channel ISK-related subfamily member 2 (KCNE2); potassium voltage-gated channel subfamily J member 2 (KCNJ2); potassium voltage-gated channel subfamily J member 5 (KCNJ5); potassium voltage-gated channel subfamily H member 2 (KCNH2); potassium voltage-gated channel KQT-like subfamily member 1 (KCNQ1); hyperpolarization-activated cyclic nucleotide-gated potassium channel 4 (HCN4); chloride voltage- gated channel 1 (CLCN1); carnitine palmitoyltransferase 1 A (CPT1 A); ryanodine receptor 1 (RYR1); ryanodine receptor 2 (RYR2); bridging integrator 1 (BIN1); LARGE xylosyl- and glucuronyltransferase 1 (LARGE1); docking protein 7 (DOK7); fukutin (FKTN); fukutin related protein (FKRP); selenoprotein N (SELENON); protein O-mannosyltransferase 1 (POMT1); protein O-mannosyltransferase 2 (POMT2); protein O-linked mannose N-acetylglucosaminyltransferase 1 (POMGNT1); protein O-linked mannose N-acetylglucosaminyltransferase 2 (POMGNT2); protein-O-mannose kinase (POMK); isoprenoid synthase domain containing (ISPD); plectin (PLEC); cholinergic receptor nicotinic epsilon subunit (CHRNE); choline O-acetyltransferase (CHAT); choline kinase β (CHKB); collagen like tail subunit of asymmetric acetylcholinesterase (COLQ); receptor associated protein of the synapse (RAPSN); four and a half LIM domains 1 (FHLl); β-1,4-glucuronyltransferase 1 (B4GAT1); β-1 -N-acetylgalactosaminyltransferase 2 (B3GALNT2); dystroglycan 1 (DAG1); transmembrane protein 5 (TMEM5); transmembrane protein 43 (TMEM43); SECIS

binding protein 2 (SECISBP2); glucosamine (UDP-N-acetyl)-2-epimerase/N-acetylmannosamine kinase (GNE); anoctamin 5 (AN05); structural maintenance of chromosomes flexible hinge domain containing 1 (SMCHD1); lactate dehydrogenase A (LDHA); lactate dehydrogenase B (LHDB); calpain 3 (CAPN3); caveolin 3 (CAV3); tripartite motif containing 32 (TRIM32); CCHC-type zinc finger nucleic acid binding protein (CNBP); nebulin (NEB); actin, ccl, skeletal muscle (ACTA1); actin, ccl, cardiac muscle (ACTC1); actinin cc2 (ACTN2); poly(A) -binding protein nuclear 1 (PABPNl); LEM domain-containing protein 3 (LEMD3); zinc metalloproteinase STE24 (ZMPSTE24); microsomal triglyceride transfer protein (MTTP); a cholinergic receptor nicotinic ccl subunit; a tocopherol transferase protein (TTPA); kinesin family member 21 A (KIF21 A); paired-like homeobox 2a (PHOX2A); heparan sulfate proteoglycan 2 (HSPG2); stromal interaction molecule 1 (STIM1); notch 1 (NOTCH1); notch 3 (NOTCH3); dystrobrevin a (DTNA); protein kinase AMP- activated, noncatalytic j2 (PRKAG2); cysteine- and glycine-rich protein 3 (CSRP3); viniculin (VCL); myozenin 2 (MyoZ2); myopalladin (MYPN); junctophilin 2 (JPH2); phospholamban (PLN); calreticulin 3 (CALR3); nexilin F-actin-binding protein (NEXN); LIM domain binding 3 (LDB3); eyes absent 4 (EYA4); huntingtin (HTT); androgen receptor (AR); protein tyrosine phosphate non-receptor type 11 (PTPNl l); junction plakoglobin (JUP); desmoplakin (DSP); plakophilin 2 (PKP2); desmoglein 2 (DSG2); desmocollin 2 (DSC2); catenin cc3 (CTNNA3); NK2 homeobox 5 (NKX2-5); A-kinase anchor protein 9 (AKAP9); A-kinase anchor protein 10 (AKAP10); guanine nucleotide-binding protein a- inhibiting activity polypeptide 2 (GNAI2); ankyrin 2 (ANK2); syntropbin cc-1 (SNTA1); calmodulin 1 (CALM1); calmodulin 2 (CALM2); HTRA serine peptidase 1 (HTRA1); fibrillin 1 (FBN1); fibrillin 2 (FBN2); xylosyltransferase 1 (XYLT1); xylosyltransferase 2 (XYLT2); tafazzin (TAZ); homogentisate 1 ,2-dioxygenase (HGD); glucose-6-phosphatase catalytic subunit (G6PC); 1,4-alpha-glucan enzyme 1 (GBEl); phosphofructokinase, muscle (PFKM); phosphorylase kinase regulatory subunit alpha 1 (PHKA1); phosphorylase kinase regulatory subunit alpha 2 (PHKA2); phosphorylase kinase regulatory subunit beta (PHKB); phosphorylase kinase catalytic subunit gamma 2 (PHKG2); phosphoglycerate mutase 2 (PGAM2); cystathionine-beta-synthase (CBS); methylenetetrahydrofolate reductase (MTHFR); 5-methyltetrahydro folate-homocysteine methyltransferase (MTR); 5 -methyl tetrahydrofolate-homocysteine methyltransferase reductase (MTRR); methylmalonic aciduria and homocystinuria, cblD type (MMADHC); mitochondrial DNA, including,

but not limited to mitochondrially encoded NADH:ubiquinone oxidoreductase core subunit 1 (MT-ND1); mitochondrially encoded NADH:ubiquinone oxidoreductase core subunit 5 (MT-ND5); mitochondrially encoded tRNA glutamic acid (MT-TE); mitochondrially encoded tRNA histadine (MT-TH); mitochondrially encoded tRNA leucine 1 (MT-TLl); mitochondrially encoded tRNA lysine (MT-TK); mitochondrially encoded tRNA serine 1 (MT-TS1); mitochondrially encoded tRNA valine (MT-TV); mitogen- activated protein kinase 1 (MAP2K1); B-Raf proto-oncogene, serine/threonine kinase (BRAF); raf-1 proto-oncogene, serine/threonine kinase (RAF1); growth factors, including, but not limited to insulin growth factor 1 (IGF-1); transforming growth factor β3 (TGF 3); transforming growth factor β receptor, type I (TGF Rl); transforming growth factor β receptor, type II (TGF R2), fibroblast growth factor 2 (FGF2), fibroblast growth factor 4 (FGF4), vascular endothelial growth factor A (VEGF-A), vascular endothelial growth factor B (VEGF-B); vascular endothelial growth factor C (VEGF-C), vascular endothelial growth factor D (VEGF-D), vascular endothelial growth factor receptor 1 (VEGFR1), and vascular endothelial growth factor receptor 2 (VEGFR2); interleukins; immunoadhesins; cytokines; and antibodies. In some embodiments, genes that encode products that are immunomodulators are delivered. Exemplary immunomodulatory genes include cytokines, chemokines, and the fusion proteins or antibodies that are specific for them and/or their receptors, *e.g.* the anti-IL-6 fusion protein Rilonacept 1, the Complement Factor H-specific antibody lampamizumab, etc.

[00336] In some embodiments, genes encoding a site-specific endonuclease are delivered. Exemplary endonucleases include naturally occurring restriction enzymes and the like. In some embodiments, the endonucleases delivered include zinc finger nucleases, TALENs, megaTALs, meganucleases, CRISPR/Cas systems including Cas9, CasX, CasY and the like. Such site-specific nucleases can be engineered to cut specific locations within a genome, and non-homologous end joining can then repair the break while inserting or deleting several nucleotides (also referred to as "INDELs"). Such site-specific endonucleases then throw the protein out of frame and effectively knock out the gene.

[00337] In some embodiments of the variant rAAV vector disclosed herein, a nucleotide sequence encoding a gene product of interest is operably linked to a constitutive promoter. Suitable constitutive promoters include *e.g.* cytomegalovirus promoter (CMV) (Stinski *et al.* (1985) *Journal of Virology* 55(2): 431 -441), CMV

early enhancer/chicken β-actin (CBA) promoter/rabbit β-globin intron (CAG) (Miyazaki *et al.* (1989) *Gene* 79(2): 269-277, CBSB (Jacobson *et al.* (2006) *Molecular Therapy* 13(6): 1074-1084), human elongation factor la promoter (EFI a) (Kim *et al.* (1990) *Gene* 91 (2): 217-223), human phosphoglycerate kinase promoter (PGK) (Singer-Sam *et al.* (1984) *Gene* 32(3): 409-417, mitochondrial heavy-strand promoter (Loderio *et al.* (2012) *Proc Natl Acad Sci USA* 109(17): 6513-6518), ubiquitin promoter (Wulff *et al.* (1990) *FEBS Letters* 261 : 101 -105). In other embodiments, a nucleotide sequence encoding a gene product of interest is operably linked to an inducible promoter. In some instances, a nucleotide sequence encoding a gene product of interest is operably linked to a tissue-specific or cell type- specific regulatory element. For example, in some instances, a nucleotide sequence encoding a gene product of interest is operably linked to a liver-specific regulatory element (*e.g.*, a liver specific promoter), *e.g.*, a regulatory element that confers selective expression of the operably linked gene in a liver cell. Suitable liver-specific regulatory elements include, e.g., the albumin promoter, the alpha 1-antitrypsin, and the transthyretin promoter (TTR). In some instances, a gene of interest is operably linked to a CNS specific promoter or regulatory element. Suitable CNS specific promoters include, but are not limited to, the GFAP promoter (astrocytes), SYN1 promoter (neurons) and the NSE/RU5' promoter (mature neurons). In some instances, a gene of interest is operably linked to a ligand responsive promoter or molecular switch (for example, the TetR system (Berens and Hillen (2003) *Eur J Biochem* 270: 3109-3121).

[00338] As noted above, the compositions and methods described herein can be used for gene modification, gene correction, and gene disruption.

[00339] The compositions and methods described herein can also be applied to stem cell based therapies, including but not limited to editing that results in: correction of somatic cell mutations; disruption of dominant negative alleles; disruption of genes required for the entry or productive infection of pathogens into cells; enhanced tissue engineering, for example, by editing gene activity to promote the differentiation or formation of functional tissues; and/or disrupting gene activity to promote the differentiation or formation of functional tissues; blocking or inducing differentiation, for example, by editing genes that block differentiation to promote stem cells to differentiate down a specific lineage pathway. Cell types for this procedure include but are not limited to, T-cells, B cells, hematopoietic stem cells, and embryonic stem cells. Additionally, induced pluripotent stem cells (iPSC) may be used which would also be

generated from a patient's own somatic cells. Therefore, these stem cells or their derivatives (differentiated cell types or tissues) could be potentially engrafted into any person regardless of their origin or histocompatibility.

[00340] The compositions and methods can also be used for somatic cell therapy, thereby allowing production of stocks of cells that have been modified to enhance their biological properties. Such cells can be infused into a variety of patients, independent of the donor source of the cells and their histocompatibility to the recipient.

[00341] In addition to therapeutic applications, the DNA-editing complexes described herein can be used for cell line engineering and the construction of disease models.

EXAMPLES

Example 1: Library construction

[00342] *Overview*: The methods and compositions disclosed herein are useful in designing and identifying AAV capsids that can be used for a variety of applications including specific delivery to tissues, cells or organelles, and to the discovery of AAV capsids that are capable of evading anti-AAV neutralizing antibodies that may be present in patients to be dosed using AAV. The methods describe insertion of random sequences (libraries) into one of the surface-exposed loops and/or hypervariable regions in the AAV capsid protein to confer new and/or improved attributes to the AAV. The methods also include the insertion of the random sequences into the capsid proteins of many naturally occurring AAV serotypes producing several AAV libraries for screening. The libraries of these AAV variants are then injected into animals or used to infect cell lines. To aid in the identification of AAV variants that are capable of enhanced transduction of desired tissues, cells or organelles, the genome of the AAV variants may comprise a fluorescent reporter protein for tracking the delivery and transgene expression of the AAV. In some embodiments, the reporter protein is linked to a barcode that is bioinformatically associated with the random sequences inserted into the capsid gene. In some embodiments, the AAV libraries are subject to *in vivo* selection wherein nuclei in the desired tissue and/or cells are isolated following exposure to the AAV variant libraries. The inserted sequences can be then identified through sequencing of the associated barcode, or by purification and sequencing of AAV payload nucleic acid from cells expressing the reporter gene. The selected AAV nucleic acid sequence can then be analyzed to determine the parent AAV serotype comprising the inserted sequences as well as determining the inserted amino acids

themselves. The process may be repeated 2, 3 or more rounds where the AAV variants isolated from the first round are pooled or synthesized and used to inject a second set of animals or another set of cells to further bolster confidence in the specificity and performance of the isolated AAV variants.

[00343] *Construction*: Capsid libraries were constructed by insertion of peptides into the exposed loops of the capsid proteins. Libraries comprising insertions that encoded 7, 10 or 15 amino acid peptides were made in the capsid proteins of AAVs 1, 2, 3B, 5, 6, 8 and 9. The AAV capsid sequences were each manufactured synthetically (ATUM). Prior to insertion of the sequences encoding the peptides, silent mutations were introduced into the areas encoding the capsid proteins adjacent to the insertion site. In this way, the same set of primers (*e.g.* DO112_MiCap1_VRVIII_Fwd and DO113_MiCap1_VRVIII_Rev) could be used on all libraries (see Fig. 1). In addition, restriction enzyme sites needed for molecular cloning including HindIII, AgeI, and BsaI were ablated by silent mutagenesis. Table 1 below shows the wildtype sequences for each capsid gene in the region that the mutations were introduced. Mutated nucleotides are indicated in bold. The resulting sequences can be amplified with a conserved NGS primer pair.

[00344] A similar approach was used to design conserved primer binding sites flanking other variable regions or surface exposed loops in the capsid gene. The full capsid gene nucleotide sequences that were synthesized are included below:

Table 1: Positions of silent mutations for primer binding sites flanking the VR-VIII insertion region

Capsid	Wildtype Forward Sequence (Nucleotides for mutation in bold)	aa positions	Wildtype Reverse Sequence (Nucleotides for mutation in bold)	aa positions
AAV1	TAACCC**T**GTGGCCA CCGAA (SEQ ID NO:33)	571	GACGT**G**TACCTGCAG GGTCC**C** (SEQ ID NO:34)	612, 617
AAV2	**C**AA**T**CCCGTGGC**T**A C**GG**A**G** (SEQ ID NO:35)	568, 569, 572, 573, 574	GA**T**GT**G**TACCT**T**CAG GG**G**CC**C** (SEQ ID NO:36)	610, 611, 613, 615, 616, 617
AAV3B	**C**AA**T**CC**T**GTGGCA**A** CA**G**A**G** (SEQ ID NO:37)	569, 570, 571, 573, 574, 575	GACGT**G**TACCT**T**CA**A** GG**A**CCT (SEQ ID NO:38)	612, 614, 615, 616
AAV6	TAACCCCGTGGCCA CCGAA	N/A	GACGTATACCTGCAG GGTCCT	N/A

	(SEQ ID NO:39)		(SEQ ID NO:40)	
AAV8	TAACCC**T**GTGGC**T**A C**A**GA**G** (SEQ ID NO:41)	573, 575, 576, 577	GACGT**G**TACCTGCAG GGTCC**C** (SEQ ID NO:42)	614, 619
AAV9	TAACCC**GG**TA**G**CA**A** C**GG**A**G** (SEQ ID NO:43)	571, 572, 573, 574, 575	GA**T**GT**G**TACCTGCA**A** GG**A**CC**C** (SEQ ID NO:44)	611, 612, 615, 616, 617

[00345] AAV1 synthesized VP1 capsid gene (SEQ ID No: 45)

ATGGCTGCCGATGGTTATCTTCCAGATTGGCTCGAGGACAACCTCTCTGAG
GGCATTCGCGAGTGGTGGGACTTGAAACCTGGAGCCCCGAAGCCCAAAGC
CAACCAGCAAAAGCAGGACGACGGCCGGGGTCTGGTGCTTCCTGGCTACA
AGTACCTCGGACCCTTCAACGGACTCGACAAGGGGGAGCCCGTCAACGCG
GCGGACGCAGCGGCCCTCGAGCACGACAAGGCCTACGACCAGCAGCTCA
AAGCGGGTGACAATCCGTACCTGCGGTATAACCACGCCGACGCCGAGTTT
CAGGAGCGTCTGCAAGAAGATACGTCTTTTGGGGGCAACCTCGGGCGAGC
AGTCTTCCAGGCCAAGAAGCGGGTTCTCGAACCTCTCGGTCTGGTTGAGG
AAGGCGCTAAGACGGCTCCTGGAAAGAAACGTCCGGTAGAGCAGTCGCC
ACAAGAGCCAGACTCCTCCTCGGGCATCGGCAAGACAGGCCAGCAGCCC
GCTAAAAAGAGACTCAATTTTGGTCAGACTGGCGACTCAGAGTCAGTCCC
CGATCCACAACCTCTCGGAGAACCTCCAGCAACCCCCGCTGCTGTGGGAC
CTACTACAATGGCTTCAGGCGGTGGCGCACCAATGGCAGACAATAACGAA
GGCGCCGACGGAGTGGGTAATGCCTCAGGAAATTGGCATTGCGATTCCAC
ATGGCTGGGCGACAGAGTCATCACCACCAGCACCCGCACCTGGGCCTTGC
CCACCTACAATAACCACCTCTACAAGCAAATCTCCAGTGCTTCAACGGGG
GCCAGCAACGACAACCACTACTTCGGCTACAGCACCCCCTGGGGGTATTT
TGATTTCAACAGATTCCACTGCCACTTTTCACCACGTGACTGGCAGCGACT
CATCAACAACAATTGGGGATTCCGGCCCAAGAGACTCAACTTCAAACTCT
TCAACATCCAAGTCAAGGAGGTCACGACGAATGATGGCGTCACAACCATC
GCTAATAACCTTACCAGCACGGTTCAAGTCTTCTCGGACTCGGAGTACCA
GCTTCCGTACGTCCTCGGCTCTGCGCACCAGGGCTGCCTCCCTCCGTTCCC
GGCGGACGTGTTCATGATTCCGCAATACGGCTACCTGACGCTCAACAATG
GCAGCCAAGCCGTGGGACGTTCATCCTTTTACTGCCTGGAATATTTCCCTT
CTCAGATGCTGAGAACGGGCAACAACTTTACCTTCAGCTACACCTTTGAG
GAAGTGCCTTTCCACAGCAGCTACGCGCACAGCCAGAGCCTGGACCGGCT
GATGAATCCTCTCATCGACCAGTACCTGTATTACCTGAACAGAACTCAAA
ATCAGTCCGGAAGTGCCCAAAACAAGGACTTGCTGTTTAGCCGTGGATCT
CCAGCTGGCATGTCTGTTCAGCCCAAAAACTGGCTACCTGGACCCTGTTAC
CGGCAGCAGCGCGTTTCTAAAACAAAAACAGACAACAACAACAGCAATT
TTACCTGGACTGGTGCTTCAAAATATAACCTCAATGGGCGTGAATCCATC
ATCAACCCTGGCACTGCTATGGCCTCACACAAAGACGACGAAGACAAGTT
CTTTCCCATGAGCGGTGTCATGATTTTTGGAAAAGAGAGCGCCGGAGCTT
CAAACACTGCATTGGACAATGTCATGATTACAGACGAAGAGGAAATTAAA
GCCACTAACCCCGTGGCCACCGAAAGATTTGGGACCGTGGCAGTCAATTT
CCAGAGCAGCAGCACAGACCCTGCGACCGGAGATGTGCATGCTATGGGA
GCATTACCTGGCATGGTGTGGCAAGATAGAGACGTATACCTGCAGGGTCC
TATTTGGGCCAAAATTCCTCACACAGATGGACACTTTCACCCGTCTCCTCT
TATGGGCGGCTTTGGACTCAAGAACCCGCCTCCTCAGATCCTCATCAAAA

ACACGCCTGTTCCTGCGAATCCTCCGGCGGAGTTTTCAGCTACAAAGTTTG
CTTCATTCATCACCCAATACTCCACAGGACAAGTGAGCGTGGAGATTGAA
TGGGAGCTGCAGAAAGAAAACAGCAAGCGCTGGAATCCCGAAGTGCAGT
ACACATCCAATTATGCAAAATCTGCCAACGTTGATTTTACTGTGGACAAC
AATGGACTTTATACTGAGCCTCGCCCCATTGGCACCCGTTACCTTACCCGT
CCCCTGTAA

[00346] AAV2 synthesized VP1 capsid gene (SEQ ID No: 46)

ATGGCTGCCGATGGTTATCTTCCAGATTGGCTCGAGGACACTCTCTCTGAA
GGAATAAGACAGTGGTGGAAGCTCAAACCTGGCCCACCACCACCAAAGC
CCGCAGAGCGGCATAAGGACGACAGCAGGGGTCTTGTGCTTCCTGGGTAC
AAGTACCTCGGACCCTTCAACGGACTCGACAAGGGAGAGCCGGTCAACG
AGGCAGACGCCGCGGCCCTCGAGCACGACAAAGCCTACGACCGGCAGCT
CGACAGCGGAGACAACCCGTACCTCAAGTACAACCACGCCGACGCGGAG
TTTCAGGAGCGCCTTAAAGAAGATACGTCTTTTGGGGGCAACCTCGGACG
AGCAGTCTTCCAGGCGAAAAAGAGGGTTCTTGAACCTCTGGGCCTGGTTG
AGGAACCTGTTAAGACGGCTCCGGGAAAAAAGAGGCCGGTAGAGCACTC
TCCTGTGGAGCCAGACTCCTCCTCGGGAACCGGAAAGGCGGGCCAGCAGC
CTGCAAGAAAAAGACTCAATTTTGGTCAGACTGGCGACGCAGACTCAGTA
CCTGACCCCCAGCCTCTCGGACAGCCACCAGCAGCCCCCTCTGGTCTGGG
AACTAATACGATGGCTACAGGCAGTGGCGCACCAATGGCAGACAATAAC
GAGGGCGCCGACGGAGTGGGTAATTCCTCGGGAAATTGGCATTGCGATTC
CACATGGATGGGCGACAGAGTCATCACCACCAGCACCCGAACCTGGGCCC
TGCCCACCTACAACAACCACCTCTACAAACAAATTTCCAGCCAATCAGGA
GCCTCGAACGACAATCACTACTTTGGCTACAGCACCCCCTGGGGGTATTTT
GATTTCAACAGATTCCACTGCCACTTTTCACCACGTGACTGGCAAAGACTC
ATCAACAACAACTGGGGATTCCGACCCAAGAGACTCAACTTCAAGCTCTT
TAACATTCAAGTCAAAGAGGTCACGCAGAATGACGGTACGACGACGATTG
CCAATAACCTTACCAGCACGGTTCAGGTGTTTACTGACTCGGAGTACCAG
CTCCCGTACGTCCTCGGCTCGGCGCATCAAGGCTGCCTCCCTCCGTTCCCG
GCGGACGTCTTCATGGTGCCACAGTATGGATACCTCACCCTGAACAACGG
GAGTCAGGCAGTAGGACGCTCTTCATTTTACTGCCTGGAGTACTTTCCTTC
TCAGATGCTGCGTACCGGAAACAACTTTACCTTCAGCTACACTTTTGAGGA
CGTTCCTTTCCACAGCAGCTACGCTCACAGCCAGAGTCTGGACCGTCTCAT
GAATCCTCTCATCGACCAGTACCTGTATTACCTGAGCAGAACAAACACTC
CAAGTGGAACCACCACGCAGTCAAGGCTTCAGTTTTCTCAGGCCGGAGCG
AGTGACATTCGGGACCAGTCTAGGAACTGGCTTCCTGGACCCTGTTACCG
GCAGCAGCGAGTATCAAAGACATCTGCGGATAACAACAACAGTGAATAC
TCGTGGACTGGAGCTACCAAGTACCACCTCAATGGCAGAGACTCTCTGGT
GAATCCGGGCCCGGCCATGGCAAGCCACAAGGACGATGAAGAAAAGTTT
TTTCCTCAGAGCGGGGTTCTCATCTTTGGGAAGCAAGGCTCAGAGAAAAC
AAATGTGGACATTGAAAAGGTCATGATTACAGACGAAGAGGAAATCAGG
ACAACTAACCCCGTGGCCACCGAACAGTATGGTTCTGTATCTACCAACCT
CCAGAGAGGCAACAGACAAGCAGCTACCGCAGATGTCAACACACAAGGC
GTTCTTCCAGGCATGGTCTGGCAGGACAGAGACGTATACCTGCAGGGTCC
TATTTGGGCAAAGATTCCACACACGGACGGACATTTTCACCCCTCTCCCCT
CATGGGTGGATTCGGACTTAAACACCCTCCTCCACAGATTCTCATCAAGA
ACACCCCGGTACCTGCGAATCCTTCGACCACCTTCAGTGCGGCAAAGTTT
GCTTCCTTCATCACACAGTACTCCACGGGACAGGTCAGCGTGGAGATTGA
ATGGGAGCTGCAGAAGGAAAACAGCAAACGCTGGAATCCCGAAATTCAG

TACACTTCCAACTACAACAAGTCTGTTAATGTGGACTTTACTGTGGACACT
AATGGCGTGTATTCAGAGCCTCGCCCCATTGGCACCAGATACCTGACTCG
TAATCTGTAA

[00347] AAV3B synthesized VP1 capsid gene (SEQ ID No: 47)

ATGGCTGCTGACGGTTATCTTCCAGATTGGCTCGAGGACAACCTTTCTGAA
GGCATTCGTGAGTGGTGGGCTCTGAAACCTGGAGTCCCTCAACCCAAAGC
GAACCAACAACACCAGGACAACCGTCGGGGTCTTGTGCTTCCGGGTTACA
AATACCTCGGACCCGGTAACGGACTCGACAAAGGAGAGCCGGTCAACGA
GGCGGACGCGGCAGCCCTCGAACACGACAAAGCCTACGACCAGCAGCTC
AAGGCCGGTGACAACCCGTACCTCAAGTACAACCACGCCGACGCCGAGTT
TCAGGAGCGTCTTCAAGAAGATACGTCTTTTGGGGGCAACCTTGGCAGAG
CAGTCTTCCAGGCCAAAAAGAGGATCCTTGAGCCTCTTGGTCTGGTTGAG
GAAGCAGCTAAAACGGCTCCTGGAAAGAAGAGGCCTGTAGATCAGTCTCC
TCAGGAACCGGACTCATCATCTGGTGTTGGCAAATCGGGCAAACAGCCTG
CCAGAAAAAGACTCAATTTTGGTCAGACTGGCGACTCAGAGTCAGTCCCA
GACCCTCAACCTCTCGGAGAACCACCAGCAGCCCCCACAAGTTTGGGATC
TAATACAATGGCTTCAGGCGGTGGCGCACCAATGGCAGACAATAACGAG
GGTGCCGATGGAGTGGGTAATTCCTCAGGAAATTGGCATTGCGATTCCCA
ATGGCTGGGCGACAGAGTCATCACCACCAGCACCCGAACCTGGGCCCTGC
CCACTTACAACAACCATCTCTACAAGCAAATCTCCAGCCAATCAGGAGCT
TCAAACGACAACCACTACTTTGGCTACAGCACCCCCTGGGGGTATTTTGAT
TTCAACAGATTCCACTGCCACTTCTCACCACGTGACTGGCAGCGACTCATT
AACAACAACTGGGGATTCCGGCCCAAGAAACTCAGCTTCAAGCTCTTCAA
CATCCAAGTTAAAGAGGTCACGCAGAACGATGGCACGACGACTATTGCCA
ATAACCTTACCAGCACGGTTCAAGTGTTTACGGACTCGGAGTATCAGCTC
CCGTACGTGCTCGGGTCGGCGCACCAAGGCTGCCTCCCTCCGTTCCCGGC
GGACGTCTTCATGGTCCCTCAGTATGGATACCTCACCCTGAACAACGGAA
GTCAAGCGGTGGGACGCTCATCCTTTTACTGCCTGGAGTACTTCCCTTCGC
AGATGCTAAGGACTGGAAATAACTTCCAATTCAGCTATACCTTCGAGGAT
GTACCTTTTCACAGCAGCTACGCTCACAGCCAGAGTTTGGATCGCTTGATG
AATCCTCTCATCGACCAGTACCTGTATTACCTGAACAGAACGCAAGGAAC
AACCTCTGGAACAACCAACCAATCACGGCTGCTTTTTAGCCAGGCTGGGC
CTCAGTCTATGTCTTTGCAGGCCAGAAATTGGCTACCTGGACCCTGTTACC
GGCAGCAGAGACTTTCAAAGACTGCTAACGACAACAACAACAGTAACTTT
CCTTGGACAGCGGCCAGCAAATATCATCTCAATGGCCGCGACTCGCTGGT
GAATCCAGGACCAGCTATGGCCAGTCACAAGGACGATGAAGAAAAATTTT
TCCCTATGCACGGCAATCTAATATTTGGCAAAGAAGGGACAACGGCAAGT
AACGCAGAATTAGATAATGTAATGATTACGGATGAAGAAGAGATTCGTAC
CACTAACCCCGTGGCCACCGAACAGTATGGAACTGTGGCAAATAACTTGC
AGAGCTCAAATACAGCTCCCACGACTAGAACTGTCAATGATCAGGGGGCC
TTACCTGGCATGGTGTGGCAAGATCGTGACGTATACCTGCAGGGTCCTATT
TGGGCAAAGATTCCTCACACGGATGGACACTTTCATCCTTCTCCTCTGATG
GGAGGCTTTGGACTGAAACATCCGCCTCCTCAAATCATGATCAAAAATAC
TCCGGTACCGGCAAATCCTCCGACGACTTTCAGCCCGGCCAAGTTTGCTTC
ATTTATCACTCAGTACTCCACTGGACAGGTCAGCGTGGAGATTGAATGGG
AGCTGCAGAAAGAAAACAGCAAACGTTGGAATCCAGAGATTCAGTACAC
TTCCAACTACAACAAGTCTGTTAATGTGGACTTTACTGTAGACACTAATGG

TGTTTATAGTGAACCTCGCCCTATTGGAACCCGGTATCTCACACGAAACTT
GTGA

[00348] AAV5 synthesized VP1 capsid gene (SEQ ID No: 48)

ATGTCTTTTGTTGATCACCCTCCAGATTGGTTGGAAGAAGTTGGTGAAGGT
CTTCGCGAGTTTTTGGGCCTTGAAGCGGGCCCACCGAAACCAAAACCCAA
TCAGCAGCATCAAGATCAAGCCCGTGGTCTTGTGCTGCCTGGTTATAACTA
TCTCGGACCCGGAAACGGACTCGATCGAGGAGAGCCTGTCAACAGGGCA
GACGAGGTCGCGCGAGAGCACGACATCTCGTACAACGAGCAGCTTGAGG
CGGGAGACAACCCCTACCTCAAGTACAACCACGCGGACGCCGAGTTTCAG
GAGAAGCTCGCCGACGACACATCCTTCGGGGGAAACCTCGGAAAGGCAG
TCTTTCAGGCCAAGAAAAGGGTTCTCGAACCTTTTGGCCTGGTTGAAGAG
GGTGCTAAGACGGCCCCTACCGGAAAGCGGATAGACGACCACTTTCCAAA
AAGAAAGAAGGCTCGGACCGAAGAGGACTCCAAGCCTTCCACCTCGTCA
GACGCCGAAGCTGGACCCAGCGGATCCCAGCAGCTGCAAATCCCAGCCCA
ACCAGCCTCAAGTTTGGGAGCTGATACAATGTCTGCGGGAGGTGGCGGCC
CATTGGGCGACAATAACCAAGGTGCCGATGGAGTGGGCAATGCCTCGGG
AGATTGGCATTGCGATTCCACGTGGATGGGGGACAGAGTCGTCACCAAGT
CCACCCGAACCTGGGTGCTGCCCAGCTACAACAACCACCAGTACCGAGAG
ATCAAAAGCGGCTCCGTCGACGGAAGCAACGCCAACGCCTACTTTGGATA
CAGCACCCCCTGGGGGTACTTTGACTTTAACCGCTTCCACAGCCACTGGA
GCCCCCGAGACTGGCAAAGACTCATCAACAACTACTGGGGCTTCAGACCC
CGGTCCCTCAGAGTCAAAATCTTCAACATTCAAGTCAAAGAGGTCACGGT
GCAGGACTCCACCACCACCATCGCCAACAACCTCACCTCCACCGTCCAAG
TGTTTACGGACGACGACTACCAGCTGCCCTACGTCGTCGGCAACGGGACC
GAGGGATGCCTGCCGGCCTTCCCTCCGCAGGTCTTTACGCTGCCGCAGTAC
GGTTACGCGACGCTGAACCGCGACAACACAGAAAATCCCACCGAGAGGA
GCAGCTTCTTCTGCCTAGAGTACTTTCCCAGCAAGATGCTGAGAACGGGC
AACAACTTTGAGTTTACCTACAACTTTGAGGAGGTGCCCTTCCACTCCAGC
TTCGCTCCCAGTCAGAACCTGTTCAAGCTGGCCAACCCGCTGGTGGACCA
GTACTTGTACCGCTTCGTGAGCACAAATAACACTGGCGGAGTCCAGTTCA
ACAAGAACCTGGCCGGGAGATACGCCAACACCTACAAAAACTGGTTCCCG
GGGCCCATGGGCCGAACCCAGGGCTGGAACCTGGGCTCCGGGGTCAACC
GCGCCAGTGTCAGCGCCTTCGCCACGACCAATAGGATGGAGCTCGAGGGC
GCGAGTTACCAGGTGCCCCCGCAGCCGAACGGCATGACCAACAACCTCCA
GGGCAGCAACACCTATGCCCTGGAGAACACTATGATCTTCAACAGCCAGC
CGGCGAACCCGGGCACCACCGCCACGTACCTCGAGGGCAACATGCTCATC
ACCAGCGAGAGCGAGACGCAGCCGGTGAACCGCGTGGCGTACAACGTCG
GCGGGCAGATGGCCACCAACAACCAGAGCTCCACCACTGCCCCCGCGACC
GGCACGTACAACCTCCAGGAAATCGTGCCCGGCAGCGTGTGGATGGAGA
GGGACGTGTACCTCCAAGGACCCATCTGGGCCAAGATCCCAGAGACGGG
GGCGCACTTTCACCCCTCTCCGGCCATGGGCGGATTCGGACTCAAACACC
CACCGCCCATGATGCTCATCAAGAACACGCCTGTGCCCGGAAATATCACC
AGCTTCTCGGACGTGCCCGTCAGCAGCTTCATCACCCAGTACAGCACCGG
GCAGGTCACCGTGGAGATGGAGTGGGAGCTCAAGAAGGAAAACTCCAAG
AGGTGGAACCCAGAGATCCAGTACACAAACAACTACAACGACCCCCAGTT

TGTGGACTTTGCCCCGGACAGCACCGGGGAATACAGAACCACCAGACCTA
TCGGAACCCGATACCTTACCCGACCCCTTTAA

[00349] AAV6 synthesized VP1 capsid gene (SEQ ID No: 49)

ATGGCTGCCGATGGTTATCTTCCAGATTGGCTCGAGGACAACCTCTCTGAG
GGCATTCGCGAGTGGTGGGACTTGAAACCTGGAGCCCCGAAACCCAAAGC
CAACCAGCAAAAGCAGGACGACGGCCGGGGTCTGGTGCTTCCTGGCTACA
AGTACCTCGGACCCTTCAACGGACTCGACAAGGGGGAGCCCGTCAACGCG
GCGGATGCAGCGGCCCTCGAGCACGACAAGGCCTACGACCAGCAGCTCA
AAGCGGGTGACAATCCGTACCTGCGGTATAACCACGCCGACGCCGAGTTT
CAGGAGCGTCTGCAAGAAGATACGTCTTTTGGGGGCAACCTCGGGCGAGC
AGTCTTCCAGGCCAAGAAGAGGGTTCTCGAACCTTTTGGTCTGGTTGAGG
AAGGTGCTAAGACGGCTCCTGGAAAGAAACGTCCGGTAGAGCAGTCGCC
ACAAGAGCCAGACTCCTCCTCGGGCATTGGCAAGACAGGCCAGCAGCCCG
CTAAAAAGAGACTCAATTTTGGTCAGACTGGCGACTCAGAGTCAGTCCCC
GACCCACAACCTCTCGGAGAACCTCCAGCAACCCCCGCTGCTGTGGGACC
TACTACAATGGCTTCAGGCGGTGGCGCACCAATGGCAGACAATAACGAAG
GCGCCGACGGAGTGGGTAATGCCTCAGGAAATTGGCATTGCGATTCCACA
TGGCTGGGCGACAGAGTCATCACCACCAGCACCCGAACATGGGCCTTGCC
CACCTATAACAACCACCTCTACAAGCAAATCTCCAGTGCTTCAACGGGGG
CCAGCAACGACAACCACTACTTCGGCTACAGCACCCCCTGGGGGTATTTT
GATTTCAACAGATTCCACTGCCATTTCTCACCACGTGACTGGCAGCGACTC
ATCAACAACAATTGGGGATTCCGGCCCAAGAGACTCAACTTCAAGCTCTT
CAACATCCAAGTCAAGGAGGTCACGACGAATGATGGCGTCACGACCATCG
CTAATAACCTTACCAGCACGGTTCAAGTCTTCTCGGACTCGGAGTACCAGT
TGCCGTACGTCCTCGGCTCTGCGCACCAGGGCTGCCTCCCTCCGTTCCCGG
CGGACGTGTTCATGATTCCGCAGTACGGCTACCTAACGCTCAACAATGGC
AGCCAGGCAGTGGGACGGTCATCCTTTTACTGCCTGGAATATTTCCCATCG
CAGATGCTGAGAACGGGCAATAACTTTACCTTCAGCTACACCTTCGAGGA
CGTGCCTTTCCACAGCAGCTACGCGCACAGCCAGAGCCTGGACCGGCTGA
TGAATCCTCTCATCGACCAGTACCTGTATTACCTGAACAGAACTCAGAATC
AGTCCGGAAGTGCCCAAAACAAGGACTTGCTGTTTAGCCGGGGCTCTCCA
GCTGGCATGTCTGTTCAGCCCAAAAACTGGCTACCTGGACCCTGTTACCG
GCAGCAGCGCGTTTCTAAAACAAAAACAGACAACAACAACAGCAACTTT
ACCTGGACTGGTGCTTCAAAATATAACCTTAATGGGCGTGAATCTATAAT
CAACCCTGGCACTGCTATGGCCTCACACAAAGACGACAAAGACAAGTTCT
TTCCCATGAGCGGTGTCATGATTTTTGGAAAGGAGAGCGCCGGAGCTTCA
AACACTGCATTGGACAATGTCATGATCACAGACGAAGAGGAAATCAAAG
CCACTAACCCCGTGGCCACCGAAAGATTTGGGACTGTGGCAGTCAATCTC
CAGAGCAGCAGCACAGACCCTGCGACCGGAGATGTGCATGTTATGGGAG
CCTTACCTGGAATGGTGTGGCAAGACAGAGACGTATACCTGCAGGGTCCT
ATTTGGGCCAAAATTCCTCACACGGATGGACACTTTCACCCGTCTCCTCTC
ATGGGCGGCTTTGGACTTAAGCACCCGCCTCCTCAGATCCTCATCAAAAA
CACGCCTGTTCCTGCGAATCCTCCGGCAGAGTTTTCGGCTACAAAGTTTGC
TTCATTCATCACCCAGTATTCCACAGGACAAGTGAGCGTGGAGATTGAAT
GGGAGCTGCAGAAAGAAAACAGCAAACGCTGGAATCCCGAAGTGCAGTA
TACATCTAACTATGCAAAATCTGCCAACGTTGATTTCACTGTGGACAACA

ATGGACTTTATACTGAGCCTCGCCCCATTGGCACCCGTTACCTCACCCGTC
CCCTGTAA

[00350] AAV8 synthesized VP1 capsid gene (SEQ ID No: 50)

ATGGCTGCCGATGGTTATCTTCCAGATTGGCTCGAGGACAACCTCTCTGAG
GGCATTCGCGAGTGGTGGGCGCTGAAACCTGGAGCCCCGAAGCCCAAAG
CCAACCAGCAAAAGCAGGACGACGGCCGGGGTCTGGTGCTTCCTGGCTAC
AAGTACCTCGGACCCTTCAACGGACTCGACAAGGGGGAGCCCGTCAACGC
GGCGGACGCAGCGGCCCTCGAGCACGACAAGGCCTACGACCAGCAGCTG
CAGGCGGGTGACAATCCGTACCTGCGGTATAACCACGCCGACGCCGAGTT
TCAGGAGCGTCTGCAAGAAGATACGTCTTTTGGGGGCAACCTCGGGCGAG
CAGTCTTCCAGGCCAAGAAGCGGGTTCTCGAACCTCTCGGTCTGGTTGAG
GAAGGCGCTAAGACGGCTCCTGGAAAGAAGAGGCCGGTAGAGCCATCAC
CCCAGCGTTCTCCAGACTCCTCTACGGGCATCGGCAAGAAAGGCCAACAG
CCCGCCAGAAAAAGACTCAATTTTGGTCAGACTGGCGACTCAGAGTCAGT
TCCAGACCCTCAACCTCTCGGAGAACCTCCAGCAGCGCCCTCTGGTGTGG
GACCTAATACAATGGCTGCAGGCGGTGGCGCACCAATGGCAGACAATAA
CGAAGGCGCCGACGGAGTGGGTAGTTCCTCGGGAAATTGGCATTGCGATT
CCACATGGCTGGGCGACAGAGTCATCACCACCAGCACCCGAACCTGGGCC
CTGCCCACCTACAACAACCACCTCTACAAGCAAATCTCCAACGGGACATC
GGGAGGAGCCACCAACGACAACACCTACTTCGGCTACAGCACCCCCTGGG
GGTATTTTGATTTCAACAGATTCCACTGCCACTTTTCACCACGTGACTGGC
AGCGACTCATCAACAACAACTGGGGATTCCGGCCCAAGAGACTCAGCTTC
AAGCTCTTCAACATCCAGGTCAAGGAGGTCACGCAGAATGAAGGCACCA
AGACCATCGCCAATAACCTCACCAGCACCATCCAGGTGTTTACGGACTCG
GAGTACCAGCTGCCGTACGTTCTCGGCTCTGCCCACCAGGGCTGCCTCCCT
CCGTTCCCGGCGGACGTGTTCATGATTCCCCAGTACGGCTACCTAACACTC
AACAACGGTAGTCAGGCCGTGGGACGCTCCTCCTTCTACTGCCTGGAATA
CTTTCCTTCGCAGATGCTGAGAACCGGCAACAACTTCCAGTTTACTTACAC
CTTCGAGGACGTGCCTTTCCACAGCAGCTACGCCCACAGCCAGAGCTTGG
ACCGGCTGATGAATCCTCTCATCGACCAGTACCTGTATTACCTGTCTCGGA
CTCAAACAACAGGAGGCACGGCAAATACGCAGACTCTGGGCTTCAGCCA
AGGTGGGCCTAATACAATGGCCAATCAGGCAAAGAACTGGCTGCCTGGAC
CCTGTTACCGGCAGCAGCGCGTCTCAACGACAACCGGGCAAAACAACAAT
AGCAACTTTGCCTGGACTGCTGGGACCAAATACCATCTGAATGGAAGAAA
TTCATTGGCTAATCCTGGCATCGCTATGGCAACACACAAAGACGACGAGG
AGCGTTTTTTTCCCAGTAACGGGATCCTGATTTTTGGCAAACAAAATGCTG
CCAGAGACAATGCGGATTACAGCGATGTCATGCTCACCAGCGAGGAAGA
AATCAAAACCACTAACCCCGTGGCCACCGAAGAATACGGTATCGTGGCAG
ATAACTTGCAGCAGCAAAACACGGCTCCTCAAATTGGAACTGTCAACAGC
CAGGGGGCCTTACCCGGTATGGTCTGGCAGAACCGGGACGTATACCTGCA
GGGTCCTATTTGGGCCAAGATTCCTCACACGGACGGCAACTTCCACCCGT
CTCCGCTGATGGGCGGCTTTGGCCTGAAACATCCTCCGCCTCAGATCCTGA
TCAAGAACACGCCTGTACCTGCGGATCCTCCGACCACCTTCAACCAGTCA
AAGCTGAACTCTTTCATCACGCAATACAGCACCGGACAGGTCAGCGTGGA
GATTGAATGGGAGCTGCAGAAGGAAAACAGCAAGCGCTGGAACCCCGAG
ATCCAGTACACCTCCAACTACTACAAATCTACAAGTGTGGACTTTGCTGTT

AATACAGAAGGCGTGTACTCTGAACCCCGCCCCATTGGCACCCGTTACCT
CACCCGTAATCTGTAA

[00351] AAV9 synthesized VP1 capsid gene (SEQ ID No: 51)

ATGGCTGCCGATGGTTATCTTCCAGATTGGCTCGAGGACAACCTTAGTGA
AGGAATTCGCGAGTGGTGGGCTTTGAAACCTGGAGCCCCTCAACCCAAGG
CAAATCAACAACATCAAGACAACGCTCGAGGTCTTGTGCTTCCGGGTTAC
AAATACCTTGGACCCGGCAACGGACTCGACAAGGGGGAGCCGGTCAACG
CAGCAGACGCGGCGGCCCTCGAGCACGACAAGGCCTACGACCAGCAGCT
CAAGGCCGGAGACAACCCGTACCTCAAGTACAACCACGCCGACGCCGAG
TTCCAGGAGCGGCTCAAAGAAGATACGTCTTTTGGGGGCAACCTCGGGCG
AGCAGTCTTCCAGGCCAAAAAGAGGCTTCTTGAACCTCTTGGTCTGGTTG
AGGAAGCGGCTAAGACGGCTCCTGGAAAGAAGAGGCCTGTAGAGCAGTC
TCCTCAGGAACCGGACTCCTCCGCGGGTATTGGCAAATCGGGTGCACAGC
CCGCTAAAAAGAGACTCAATTTTGGTCAGACTGGCGACACAGAGTCAGTC
CCAGACCCTCAACCAATCGGAGAACCTCCCGCAGCCCCCTCAGGTGTGGG
ATCTCTTACAATGGCTTCAGGTGGTGGCGCACCAGTGGCAGACAATAACG
AAGGTGCCGATGGAGTGGGTAGTTCCTCGGGAAATTGGCATTGCGATTCC
CAATGGCTGGGCGACAGAGTCATCACCACCAGCACCCGAACCTGGGCCCT
GCCCACCTACAACAATCACCTCTACAAGCAAATCTCCAACAGCACATCTG
GAGGATCTTCAAATGACAACGCCTACTTCGGCTACAGCACCCCCTGGGGG
TATTTTGATTTCAACAGATTCCACTGCCATTTCTCACCACGTGACTGGCAG
CGACTCATCAACAACAACTGGGGATTCCGGCCTAAGCGACTCAACTTCAA
GCTCTTCAACATTCAGGTCAAAGAGGTTACGGACAACAATGGAGTCAAGA
CCATCGCCAATAACCTTACCAGCACGGTCCAGGTCTTCACGGACTCAGAC
TATCAGCTCCCGTACGTGCTCGGGTCGGCTCACGAGGGCTGCCTCCCTCCG
TTCCCGGCGGACGTTTTCATGATTCCTCAGTACGGGTATCTGACGCTTAAT
GATGGAAGCCAGGCCGTGGGTCGTTCGTCCTTTTACTGCCTGGAATATTTC
CCGTCGCAAATGCTAAGAACGGGTAACAACTTCCAGTTCAGCTACGAGTT
TGAGAACGTACCTTTCCATAGCAGCTACGCTCACAGCCAAAGCCTGGACC
GACTAATGAATCCACTCATCGACCAGTACCTGTATTACCTGTCAAAGACT
ATTAACGGTTCTGGACAGAATCAACAAACGCTAAAATTCAGTGTGGCCGG
ACCCAGCAACATGGCTGTCCAGGGAAGAAACTACATACCTGGACCCTGTT
ACCGGCAGCAGCGTGTCTCAACCACTGTGACTCAAAACAACAACAGCGAA
TTTGCTTGGCCTGGAGCTTCTTCTTGGGCTCTCAATGGACGTAATAGCTTG
ATGAATCCTGGACCTGCTATGGCCAGCCACAAAGAAGGAGAGGACCGTTT
CTTTCCTTTGTCTGGATCTTTAATTTTTGGCAAACAAGGAACTGGAAGAGA
CAACGTGGATGCGGACAAAGTCATGATAACCAACGAAGAAGAAATTAAA
ACTACTAACCCCGTGGCCACCGAATCCTATGGACAAGTGGCCACAAACCA
CCAGAGTGCCCAAGCACAGGCGCAGACCGGCTGGGTTCAAAACCAAGGA
ATACTTCCGGGTATGGTTTGGCAGGACAGAGACGTATACCTGCAGGGTCC
TATTTGGGCCAAAATTCCTCACACGGACGGCAACTTTCACCCTTCTCCGCT
GATGGGAGGGTTTGGAATGAAGCACCCGCCTCCTCAGATCCTCATCAAAA
ACACACCTGTACCTGCGGATCCTCCAACGGCCTTCAACAAGGACAAGCTG
AACTCTTTCATCACCCAGTATTCTACTGGCCAAGTCAGCGTGGAGATTGAA
TGGGAGCTGCAGAAGGAAAACAGCAAGCGCTGGAACCCGGAGATCCAGT
ACACTTCCAACTATTACAAGTCTAATAATGTTGAATTTGCTGTTAATACTG

AAGGTGTATATAGTGAACCCCGCCCCATTGGCACCAGATACCTGACTCGT
AATCTGTAA

[00352] AAV1 VP1 capsid protein (SEQ ID No: 206)
MAADGYLPDWLEDNLSEGIREWWDLKPGAPKPKANQQKQDDGRG
LVLPGYKYLGPFNGLDKGEPVNAADAAALEHDKAYDQQLKAGDNPYLRYNHADAE
FQERLQEDTSFGGNLGRAVFQAKKRVLEPLGLVEEGAKTAPGKKRPVEQSPQEPDSS
SGIGKTGQQPAKKRLNFGQTGDSESVPDPQPLGEPPATPAAVGPTTMASGGGAPMAD
NNEGDGVGNASGNWHCDSTWLGDRVITTSTRTWALPTYNNHLYKQISSASTGASND
NHYFGYSTPWGYFDFNRFHCHFSPRDWQRLINNNWGFRPKRLNFKLFNIQVKEVTT
NDGVTTIANNLTSTVQVFSDSEYQLPYVLGSAHQGCLPPFPADVFMIPQYGYLTLNN
GSQAVGRSSFYCLEYFPSQMLRTGNNFTFSYTFEEVPFHSSYAHSQSLDRLMNPLIDQ
YLYYLNRTQNQSGSAQNKDLLFSRGSPAGMSVQPKNWLPGPCYRQQRVSKTKTDN
NNSNFTWTGASKYNLNGRESIINPGTAMASHKDDEDKFFPMSGVMIFGKESAGASNT
ALDNVMITDEEEIKATNPVATERFGTVAVNFQSSSTDPATGDVHAMGALPGMVWQD
RDVYLQGPIWAKIPHTDGHFHPSPLMGGFGLKNPPPQILIKNTPVPANPPAEFSATKFA
SFITQYSTGQVSVEIEWELQKENSKRWNPEVQYTSNYAKSANVDFTVDNNGLYTEPR
PIGTRYLTRPL

[00353] AAV2 VP1 capsid protein (SEQ ID No: 207)
MAADGYLPDWLEDTLSEGIRQWWKLKPGPPPPKPAERHKDDSRG
LVLPGYKYLGPFNGLDKGEPVNEADAAALEHDKAYDRQLDSGDNPYLKYNHADAE
FQERLKEDTSFGGNLGRAVFQAKKRVLEPLGLVEEPVKTAPGKKRPVEHSPVEPDSS
SGTGKAGQQPARKRLNFGQTGDADSVPDPQPLGQPPAAPSGLGTNTMATGSGAPMA
DNNEGADGVGNSSGNWHCDSTWMGDRVITTSTRTWALPTYNNHLYKQISSQSGAS
NDNHYFGYSTPWGYFDFNRFHCHFSPRDWQRLINNNWGFRPKRLNFKLFNIQVKEV
TQNDGTTTIANNLTSTVQVFTDSEYQLPYVLGSAHQGCLPPFPADVFMVPQYGYLTL
NNGSQAVGRSSFYCLEYFPSQMLRTGNNFTFSYTFEDVPFHSSYAHSQSLDRLMNPLI
DQYLYYLSRTNTPSGTTTQSRLQFSQAGASDIRDQSRNWLPGPCYRQQRVSKTSADN
NNSEYSWTGATKYHLNGRDSLVNPGPAMASHKDDEEKFFPQSGVLIFGKQGSEKTN
VDIEKVMITDEEEIRTTNPVATEQYGSVSTNLQRGNRQAATADVNTQGVLPGMVWQ
DRDVYLQGPIWAKIPHTDGHFHPSPLMGGFGLKHPPPQILIKNTPVPANPSTTFSAAKF
ASFITQYSTGQVSVEIEWELQKENSKRWNPEIQYTSNYNKSVNVDFTVDTNGVYSEP
RPIGTRYLTRNL

[00354] AAV3B VP1 capsid protein (SEQ ID No: 208)

MAADGYLPDWLEDNLSEGIREWWALKPGVPQPKANQQHQDNRRG
LVLPGYKYLGPGNGLDKGEPVNEADAAALEHDKAYDQQLKAGDNPYLKYNHADA
EFQERLQEDTSFGGNLGRAVFQAKKRILEPLGLVEEAAKTAPGKKRPVDQSPQEPDSS
SGVGKSGKQPARKRLNFGQTGDSESVPDPQPLGEPPAAPTSLGSNTMASGGGAPMA
DNNEGADGVGNSSGNWHCDSQWLGDRVITTSTRTWALPTYNNHLYKQISSQSGASN
DNHYFGYSTPWGYFDFNRFHCHFSPRDWQRLINNNWGFRPKKLSFKLFNIQVKEVT
QNDGTTTIANNLTSTVQVFTDSEYQLPYVLGSAHQGCLPPFPADVFMVPQYGYLTLN
NGSQAVGRSSFYCLEYFPSQMLRTGNNFQFSYTFEDVPFHSSYAHSQSLDRLMNPLID
QYLYYLNRTQGTTSGTTNQSRLLFSQAGPQSMSLQARNWLPGPCYRQQRLSKTAND
NNNSNFPWTAASKYHLNGRDSLVNPGPAMASHKDDEEKFFPMHGNLIFGKEGTTAS
NAELDNVMITDEEEIRTTNPVATEQYGTVANNLQSSNTAPTTRTVNDQGALPGMVW
QDRDVYLQGPIWAKIPHTDGHFHPSPLMGGFGLKHPPPQIMIKNTPVPANPPTTFSPA

KFASFITQYSTGQVSVEIEWELQKENSKRWNPEIQYTSNYNKSVNVDFTVDTNGVYS
EPRPIGTRYLTRNL

[00355] AAV5 VP1 capsid protein (SEQ ID No: 209)

MSFVDHPPDWLEEVGEGLREFLGLEAGPPKPKPNQQHQDQARGLVLPGYNYLGPGN
GLDRGEPVNRADEVAREHDISYNEQLEAGDNPYLKYNHADAEFQEKLADDTSFGGN
LGKAVFQAKKRVLEPFGLVEEGAKTAPTGKRIDDHFPKRKKARTEEDSKPSTSSDAE
AGPSGSQQLQIPAQPASSLGADTMSAGGGGPLGDNNQGADGVGNASGDWHCDSTW
MGDRVVTKSTRTWVLPSYNNHQYREIKSGSVDGSNANAYFGYSTPWGYFDFNRFHS
HWSPRDWQRLINNYWGFRPRSLRVKIFNIQVKEVTVQDSTTTIANNLTSTVQVFTDD
DYQLPYVVGNGTEGCLPAFPPQVFTLPQYGYATLNRDNTENPTERSSFFCLEYFPSK
MLRTGNNFEFTYNFEEVPFHSSFAPSQNLFKLANPLVDQYLYRFVSTNNTGGVQFN
KNLAGRYANTYKNWFPGPMGRTQGWNLGSGVNRASVSAFATTNRMELEGASYQV
PPQPNGMTNNLQGSNTYALENTMIFNSQPANPGTTATYLEGNMLITSESETQPVNRV
AYNVGGQMATNNQSSTTAPATGTYNLQEIVPGSVWMERDVYLQGPIWAKIPETGAH
FHPSPAMGGFGLKHPPPMMLIKNTPVPGNITSFSDVPVSSFITQYSTGQVTVEMEWEL
KKENSKRWNPEIQYTNNYNDPQFVDFAPDSTGEYRTTRPIGTRYLTRPL

[00356] AAV6 VP1 capsid protein (SEQ ID No: 210)

MAADGYLPDWLEDNLSEGIREWWDLKPGAPKPKANQQKQDDGRGLVLPGY
KYLGPFNGLDKGEPVNAADAAALEHDKAYDQQLKAGDNPYLRYNHADAEF
QERLQEDTSFGGNLGRAVFQAKKRVLEPFGLVEEGAKTAPGKKRPVEQSPQE
PDSSSGIGKTGQQPAKKRLNFGQTGDSESVPDPQPLGEPPATPAAVGPTTMAS
GGGAPMADNNEGADGVGNASGNWHCDSTWLGDRVITTSTRTWALPTYNNH
LYKQISSASTGASNDNHYFGYSTPWGYFDFNRFHCHFSPRDWQRLINNNWGF
RPKRLNFKLFNIQVKEVTTNDGVTTIANNLTSTVQVFSDSEYQLPYVLGSAHQ
GCLPPFPADVFMIPQYGYLTLNNGSQAVGRSSFYCLEYFPSQMLRTGNNFTFS
YTFEDVPFHSSYAHSQSLDRLMNPLIDQYLYYLNRTQNQSGSAQNKDLLFSR
GSPAGMSVQPKNWLPGPCYRQQRVSKTKTDNNNSNFTWTGASKYNLNGRE
SIINPGTAMASHKDDKDKFFPMSGVMIFGKESAGASNTALDNVMITDEEEIKA
TNPVATERFGTVAVNLQSSSTDPATGDVHVMGALPGMVWQDRDVYLQGPI
WAKIPHTDGHFHPSPLMGGFGLKHPPPQILIKNTPVPANPPAEFSATKFASFIT
QYSTGQVSVEIEWELQKENSKRWNPEVQYTSNYAKSANVDFTVDNNGLYTE
PRPIGTRYLTRPL

[00357] AAV8 VP1 capsid protein (SEQ ID No: 211)

MAADGYLPDWLEDNLSEGIREWWALKPGAPKPKANQQKQDDGRGLVLPGY
KYLGPFNGLDKGEPVNAADAAALEHDKAYDQQLQAGDNPYLRYNHADAEF
QERLQEDTSFGGNLGRAVFQAKKRVLEPLGLVEEGAKTAPGKKRPVEPSPQR
SPDSSTGIGKKGQQPARKRLNFGQTGDSESVPDPQPLGEPPAAPSGVGPNTMA
AGGGAPMADNNEGADGVGSSSGNWHCDSTWLGDRVITTSTRTWALPTYNN
HLYKQISNGTSGGATNDNTYFGYSTPWGYFDFNRFHCHFSPRDWQRLINNN
WGFRPKRLSFKLFNIQVKEVTQNEGTKTIANNLTSTIQVFTDSEYQLPYVLGS
AHQGCLPPFPADVFMIPQYGYLTLNNGSQAVGRSSFYCLEYFPSQMLRTGNN
FQFTYTFEDVPFHSSYAHSQSLDRLMNPLIDQYLYYLSRTQTTGGTANTQTLG
FSQGGPNTMANQAKNWLPGPCYRQQRVSTTTGQNNNSNFAWTAGTKYHLN
GRNSLANPGIAMATHKDDEERFFPSNGILIFGKQNAARDNADYSDVMLTSEE

EIKTTNPVATEEYGIVADNLQQQNTAPQIGTVNSQGALPGMVWQNRDVYLQ
GPIWAKIPHTDGNFHPSPLMGGFGLKHPPPQILIKNTPVPADPPTTFNQSKLNS
FITQYSTGQVSVEIEWELQKENSKRWNPEIQYTSNYYKSTSVDFAVNTEGVYS
EPRPIGTRYLTRNL

[00358] AAV9 VP1 capsid protein (SEQ ID No: 212)

MAADGYLPDWLEDNLSEGIREWWALKPGAPQPKANQQHQDNARGLVLPGY
KYLGPGNGLDKGEPVNAADAAALEHDKAYDQQLKAGDNPYLKYNHADAEF
QERLKEDTSFGGNLGRAVFQAKKRLLEPLGLVEEAAKTAPGKKRPVEQSPQE
PDSSAGIGKSGAQPAKKRLNFGQTGDTESVPDPQPIGEPPAAPSGVGSLTMAS
GGGAPVADNNEGADGVGSSSGNWHCDSQWLGDRVITTSTRTWALPTYNNH
LYKQISNSTSGGSSNDNAYFGYSTPWGYFDFNRFHCHFSPRDWQRLINNNWG
FRPKRLNFKLFNIQVKEVTDNNGVKTIANNLTSTVQVFTDSDYQLPYVLGSA
HEGCLPPFPADVFMIPQYGYLTLNDGSQAVGRSSFYCLEYFPSQMLRTGNNF
QFSYEFENVPFHSSYAHSQSLDRLMNPLIDQYLYYLSKTINGSGQNQQTLKFS
VAGPSNMAVQGRNYIPGPSYRQQRVSTTVTQNNNSEFAWPGASSWALNGRN
SLMNPGPAMASHKEGEDRFFPLSGSLIFGKQGTGRDNVDADKVMITNEEEIK
TTNPVATESYGQVATNHQSAQAQAQTGWVQNQGILPGMVWQDRDVYLQGP
IWAKIPHTDGNFHPSPLMGGFGMKHPPPQILIKNTPVPADPPTAFNKDKLNSFI
TQYSTGQVSVEIEWELQKENSKRWNPEIQYTSNYYKSNNVEFAVNTEGVYSE
PRPIGTRYLTRNL

[00359] An exemplary selection of the NGS primers are depicted in the table below, wherein the variable region is indicated in the primer name.

Table 2: Primers used for next-generation sequencing analysis

Primer name	Primer nucleotide sequence (5'-3')	SEQ ID NO:
DO106_MiCap1_VRI_Fwd	ACACGACGCTCTTCCGATCT NNNNAGAGTCATCACCACCA GCACC	52
DO107_MiCap1_VRI_Rev	GACGTGTGCTCTTCCGATCTN NNNGAAATCAAAATACCCCC AGGG	53
DO108_MiCap1_VRIV_Fwd	ACACGACGCTCTTCCGATCT NNNNATCGACCAGTACCTGT ATTACCTG	54
DO109_MiCap1_VRIV_Rev	GACGTGTGCTCTTCCGATCTN NNNTGCCGGTAACAGGGTCC AG	55
DO112_MiCap1_VRVIII_Fwd	ACACGACGCTCTTCCGATCT NNNNTAACCCCGTGGCCACC GAA	56

DO113_MiCap1_VRVIII_Rev	GACGTGTGCTCTTCCGATCTNNNNAGGACCCTGCAGGTATACGTCT	57
DO319_AAV5_MiCap1_VRVIII_Fwd	ACACGACGCTCTTCCGATCTNNNNGTGAACCGCGTGGCGTACAAC	58
DO320_AAV5_MiCap1_VRVIII_Rev	GACGTGTGCTCTTCCGATCTNNNNGGGTCCTTGGAGGTACACGTCC	59

[00360] Gibson assembly was used to generate the capsid libraries where the introduced peptides were encoded by the primers used to amplify the right fragment (see Fig. 2). Two PCR products from the capsid gene sequence ("Cap") were amplified (left and right fragments) that had an overlap region to facilitate assembly using the Gibson assembly procedure into a plasmid backbone (see *e.g.* Gibson *et al* (2009) *Nat Meth* 6(5):343-345). Specifically, the primer for the right fragment ("RF Fwd") comprises random nucleotide sequences encoding the inserted peptide built into the primer. This primer also comprises sequences encoding the overlap region so this right fragment amplified product will overlap with the amplified left fragment. Finally, the RF Fwd primer comprises a homology region which has homology to the right fragment of the sequence encoding the capsid.

[00361] The insertion position for the peptides differed for each AAV serotype (numbering begins at VP1 start codon). Table 2 below shows the amino acid position within the capsid protein where the peptide insertion occurred. Note that two libraries in the AAV6 capsid were constructed where the fragments were inserted into either position 454 or 590. Also note that three libraries based on the AAV9 capsid were constructed where the fragments were inserted into either position 266, 455, or 589.

Table 3: Insertion sites of peptides

Serotype	**Insertion site (aa position)**
AAV1	590
AAV2	588
AAV3B	589
AAV5	578

AAV6	454
AAV6	590
AAV8	591
AAV9	266
AAV9	455
AAV9	589

[00362] The Gibson assembly reactions were transformed into electrocompetent *E. coli* and the resulting plasmid library purified. The plasmid DNA library was transfected into HEK293 cells at low multiplicity of transfection to preserve the linkage between capsid genotype and phenotype.

[00363] The libraries were then manufactured to generate a library of viral capsids for testing. Wild type AAV comprises gene sequences that encode the "Rep" proteins Rep78, Rep68, Rep52, and Rep40 necessary for replication of the viral nucleic acid and for packing it into a viral particle in the presence of adenovirus helper functions. The AAV libraries described herein do not contain "Rep" in *cis* with viral ITRs and "Cap", therefore, to achieve efficient packaging of the libraries into viral capsids, the replication gene ("rep") and the adenovirus helper functions (for example E2A, E4, VA, E1A and E1B) are supplied in *trans* during viral manufacturing. For example, a helper plasmid that supplies Rep in *trans* during viral manufacturing was constructed. The Rep gene (NC_001401, nucleotides 191-2252) was amplified from a standard AAV helper plasmid using the following primers:

Table 4: Primers for amplifying a Rep gene

Primer name	Primer nucleotide sequence (5'-3')	SEQ ID NO:
DO7_Rep_Fwd	GTACTCTAGAGTCCTGTATTAGA GGTCACGTGA	60
DO8_Rep_Rev	TGCTGCATGCTGTACCGAATTAA CATGTTTATTGGTACGATCAGAG AGAGTGTCCTCGAGC	61

[00364] These primers add XbaI and SphI sites respectively and amplify the entire Rep gene. The amplified Rep fragment was then cloned by restriction digest and ligation into the XbaI and SphI sites in the multiple cloning site of pUC19 to generate

pRepInTrans. An additional modification was introduced by site-directed mutagenesis using the following primers to convert the VP1 ACG start codon to ATG generating pRepInTrans-ATG.

Table 5: Primers for modification of Rep gene

Primer name	Primer nucleotide sequence (5'-3')	SEQ ID NO:
DO444_QCRep78_Fwd	ACCCCGCCATGGTGGCTGCGCGTT	62
DO445_QCRep78_Rev	AACGCGCAGCCACCATGGCGGGGT	63

[00365] The ACG to ATG modification was introduced in order to increase replication of the capsid construct through greater Rep78/68 expression and thereby improve AAV library manufacturing yield. Removal of Rep renders AAV replication-deficient, an important feature for selections in non-human primates that frequently harbor AAV helper viruses including herpes simplex virus (see Morton *et al* (2008) *ILAR J* 49(2):137-44). In addition, removal of Rep is superior to a simple genetic knockout that still invites the possibility of recombination with a Rep plasmid supplied in trans that could reconstitute replication competent AAV.

[00366] The AAV libraries are then packaged in an HEK293 production system by transient transfection and purified using cesium chloride density gradient ultracentrifugation (for an exemplary process, see Xiao and Samulski (1998) *J Virol* 40:241-247).

[00367] The goal of this technique is to develop methods that can be used in all species, tissues, cell types and tissue processing conditions. Thus, AAVs are designed to carry the capsid libraries described above and some type of identifying marker that links the sequence of the variant capsid gene in a single AAV to a unique barcode identifier also carried by the AAV such that subsequent independent sequencing of the barcode will identify the linked capsid mutations. Further, the single AAV will also carry a reporter gene of some type such that the successful delivery of the AAV particle to its intended target (for example an organ (*e.g.* liver or CNS), and or specific cell types within an organ (*e.g.* hepatocytes or neurons)) can be monitored and selected for.

[00368] In addition, in this example, the reporter gene included a localization signal to cause the reporter to be localized to the cell nucleus once the cell had been transduced by the variant AAV capsid. Initially, an SV40 large T-antigen (PKKKRKV, SEQ ID NO:64) was introduced at the N-terminus of EGFP or mCherry. A second method used

a KASH domain fused to the C-terminus of the EGFP or mCherry. KASH domains localize proteins to the nuclear envelope, in effect tethering the reporter to the nucleus and preventing diffusion out of the nuclear pore complex. A third method fused a histone H2B gene to the C-terminus of the EGFP, mClover3 or mRuby3 reporter (see Fig. 3A and B). The hSyn1 (synapsin) promoter used to drive expression of the fluorescent reporter was selected to be specific for expression in neurons. Other promoters may be used for other targeted tissues or cells including the liver-specific transthyretin promoter. The underlying concept is to have the sequence comprising the variant AAV capsid linked physically to the reporter in the target tissue, cell or organelle. In this way, the target tissue, cell or organelle could be isolated using the fluorescent protein once successfully transduced with the AAV particle such that the user could then determine what capsid variant allowed transduction of the AAV particle into the target tissue, cell or organelle.

[00369] In some examples, a barcode is inserted into each AAV genome comprising a variant capsid protein to allow the user to identify the mutation in the capsid protein by independent sequencing analysis of the barcode once the library had been through *in vivo* selection (see below). The underlying concept is to have the sequence comprising the variant AAV capsid linked physically to the reporter in the target tissue, cell or organelle. In this way, the target tissue, cell or organelle could be isolated using the fluorescent protein once successfully transduced with the AAV particle such that the user could then determine what capsid variant allowed transduction of the AAV particle into the target tissue, cell or organelle. In some examples, each peptide coding sequence is synthesized with multiple different nucleic acid sequences, all encoding the same peptide. Each nucleic acid sequence is linked to a unique bar code such that performance (*e.g.* enrichment) of a peptide variant can be verified when two or more variants are identified with the same peptide sequence, but the variants comprise different nucleic acid sequences encoding that peptide.

[00370] For libraries generated by DNA synthesis and subsequent molecular cloning steps, all barcode and peptide encoding sequences were designed computationally. Importantly, sequences comprising restriction enzyme recognition sites that would be used for later cloning were omitted. The sequences were designed to have 40-60% GC content, no homopolymers greater than 3 in length, and minimal similarity (edit distance) between sequences.

[00371] To bioinformatically link each barcode with each mutated capsid sequence, two approaches were performed.

[00372] Method 1 employed ILLUMINA® sequencing. First, a barcode was inserted into the expression constructs as outlined in Figs. 4A and B. To insert the barcode sequences, the 5' Gibson assembly region #1 was synthesized as a DNA fragment linked to the variable region in the capsid gene linked in turn to the 3' Gibson assembly region #2 (see Fig. 4A, step 1). Thus, the synthetic sequence comprises a variable barcode region and a variable capsid sequence. It also comprises two restriction nuclease sites between the barcode sequence and the variable sequence. Type IIs restriction sites BsaI were used to facilitate scarless assembly of the final construct. A separate PCR procedure was performed where the 3' sequence of the capsid gene was amplified (step 2). Next, an intermediate AAV construct was generated by Gibson assembly where the construct comprised in a 5' to 3' order the 5' ITR, the SV40 poly A signal, the barcode, the two restriction endonuclease sites, the variant capsid sequences, the 3' region of the capsid protein, the polyA sequence for the capsid expression construct and the 3' ITR (step 3). In an alternate approach (Fig. 4C) steps 1-3 are modified. In step 1, two DNA fragments are synthesized. Fragment A comprises Gibson assembly region #1, a BsaI site, the variable capsid region, and a region homologous to the capsid gene that is used as a PCR primer. Fragment B comprises Gibson assembly region #2, a random barcode, a BsaI site, and Gibson assembly region #1. Next, a PCR procedure is performed where the 3' sequence of capsid gene is amplified using fragment A synthesized in step 1 as a PCR primer. Next, an intermediate AAV construct is generated by Gibson assembly where the construct comprises in a 5' to 3' order the 5' ITR, the SV40 poly A signal, the barcode, the two restriction endonuclease sites, the variant capsid sequences, the 3' region of the capsid protein, the polyA sequence for the capsid expression construct and the 3' ITR (step 3). For both approaches described in Figs. 4A/B and 4C/D steps 4-7 are equivalent. Paired-end ILLUMINA® sequencing is performed to span the barcode and variant capsid sequences in both directions (step 4). The sequences generated thus link specific barcode sequences to specific variant sequences in the capsid gene. ILLUMINA® sequencing at Step 4 indicated a 99.6% correct match between the barcode and variant sequence specified during synthesis. Step 5 comprised digestion with the BsaI restriction enzyme. Step 6 was a PCR amplification step where the H2B, EGFP, cell-

type specific promoter (*e.g.* hSyn1), p40 promoter, and the 5' end of the capsid gene were prepared. Alternatively, the H2B, EGFP, cell-type specific promoter (*e.g.* hSyn1), p40 promoter, and the 5' end of the capsid gene can be prepared in a separate donor plasmid, digested with BsaI, and gel purified. Step 7 was the scarless golden gate cloning step to assemble the final construct. Sanger sequencing of a sample of the final library demonstrated that 88/88 individual clones showed the correct specified linkage between the barcode and the variant capsid sequences.

[00373] Method 2 employed both ILLUMINA® and OXFORD NANOPORE® sequencing. First, the AAV capsid libraries were assembled through the method shown in Fig. 2 where the variable sequences were added into the capsid gene using primers. Next, the capsid gene libraries were cloned into a vector comprising the reporter gene and random barcode sequences (see Fig. 5). To link each random barcode sequence with each variant capsid sequence, two types of sequencing analyses were performed. Standard ILLUMINA® sequencing is highly accurate for short stretches of nucleic acid (approximately 300 bp), while OXFORD NANOPORE® sequencing can give much longer sequence reads. However, OXFORD NANOPORE® sequencing has an approximate 12% error rate and can generate indels in the reading sequence, so is not suitable for this purpose on its own. Thus, two sets of ILLUMINA® sequencing reactions were initially performed: one set that sequenced the barcode region and one set that sequenced the variable capsid sequence. Following that, an OXFORD NANOPORE® sequencing reaction was completed to provide long read lengths that spanned the entire AAV viral genome. Although less accurate than the ILLUMINA® sequencing, the Nanopore sequencing provides long-read length data that permits matching of known barcode sequences with known variant capsid sequences.

[00374] The result of both of these methods was that a 'lookup' table was created matching each barcode to each variant capsid sequence. Once an AAV was isolated from a target cell, tissue or organelle, only sequencing of nucleic acid barcode was necessary because through use of the lookup table, one could then know the sequence of the variant capsid.

[00375] The libraries were tested in primary mouse cortical neurons (Gibco) *in vitro*. The libraries were a mixture of all the AAV variants in each of the serotypes. Cells were treated with the AAV variants over a dose range of $3x10^3$, $1x10^4$, $3x10^4$, $1x10^5$, and $3x10^5$ vector genomes per cell and EGFP positive nuclei were isolated as described

below. Separately, total RNA was isolated from the infected neurons and used for reverse transcription to cDNA following standard protocols and a primer specific to the AAV mRNA transcripts, DO441_AAVSpecific_RT: 5' GGTTACAAATAAAGCAATAGCATCAC (SEQ ID NO:65). The resulting cDNA barcodes were then sequenced by ILLUMINA® sequencing with NGS primers DO439_RNABarcode_Fwd: 5' ACACGACGCTCTTCCGATCTNNNNGCATCACAAATTTCACAAATAAAGC (SEQ ID NO:66) and DO440_RNABarcode_Rev: 5' GACGTGTGCTCTTCCGATCTNNNNGCCGTGTCCGAGGGTACTAAG (SEQ ID NO: 67) to quantify variant performance. The results of a sample of the AAV variants recovered are shown in Fig. 6, where the log2 fold change represents the enrichment of the variant isolated from transduced cells as compared to its frequency in the administered library. The X axis of Fig. 6 represents the relative variability of variant performance across sample replicates. As can be seen, variant performance often clusters based on parent serotype, with variants comprising peptide insertions into AAV1 being the most enriched and least variable. Fig. 7A shows the AAV1 serotype variants plotted alone, and also indicates the performance of the wildtype AAV1 serotype (no inserted amino acids in the capsid sequence). As can be seen, there were a great deal of variants that showed an increased enrichment as compared to the wildtype AAV1 serotype. Similarly, Fig. 7B shows the variants based on peptide insertions into AAV2 plotted alone and indicates the relative performance of wildtype AAV2. The methods produced AAV2 variants that showed an enrichment in transgene expression in comparison with the wildtype sequence. A comparison was also done to see if the different methods of identifying the enriched AAV variants produced similar results. Fig. 8 shows that variant performance evaluated based on RNA isolation, cDNA synthesis, and barcode quantification was similar to performance evaluated by isolation of EGFP positive nuclei and sequencing of the variable capsid region. Additionally, library performance was evaluated in Neuro2A cells (ATCC CCL-131) and iCell neurons derived from human induced pluripotent stem cells (NCR-100-010-001, Cellular Dynamics International). Individual variant performance differed across cell lines that present different selective pressures. The methods described herein to evaluate variant performance were consistently applicable and successful. The variants were as follows:

Table 6. AAV variants evaluated.

AAV variant	SEQ ID NO
KSPHPSV (AAV1)	SEQ ID NO: 199
IKSNLTY (AAV1)	SEQ ID NO: 200
STSPHAPSKE (AAV2)	SEQ ID NO: 201
HATPQFDPSQ (AAV6)	SEQ ID NO: 202
SALGLQAKAY (AAV9)	SEQ ID NO: 203

Example 2: *In vivo* selection of variant AAV libraries in mice

[00376] The goal of the construction of these AAV libraries was to identify AAV capsid variants that would allow delivery of AAV to any tissue, cell or organelle in any species.

[00377] *CNS delivery*. One potential use of this technology is the delivery of genome editing, transgenes and regulators of gene expression to specific cell types. Thus, it was important for this particular application to identify AAV variants that would not only target particular cells within particular tissues, but would also travel to the nucleus within the cell and mediate transgene expression. In addition, isolation of nuclei from tissues is straight forward as compared to isolation of specific whole cell bodies from tissue. Nuclei have uniform morphology across tissues and are easily stained for DNA content to facilitate FACS analysis (*e.g.* DAPI or Hoescht dyes). For example, neurons have very extended cell bodies and are difficult to isolate intact from brain tissue. Also, some components within the brain such as lipofuscin and myelin basic protein can autofluorescence, confounding analyses that are dependent on the fluorescence signal of reporter genes (*see* for example Hainsworth *et al* (2017) *Neuropathol Appl Neurobiol* 44(4): 417-426). Thus, as shown in Figs. 3A and 3B different approaches were taken to localize the reporter genes in the AAV genomes to the nucleus including fusing them to nuclear localization sequences (SV40 NLS), nuclear envelope binding protein domains (KASH) and histone binding domains for incorporation into nuclear chromatin (H2B).

[00378] Constructs were made to test delivery into HEK293 cells. Constructs comprising just the reporter alone with no nuclear localization sequence (EGFP and mCherry) were compared to those in which the reporters had been fused to an SV40 NLS, or to a KASH domain (see Fig. 9). All constructs showed fluorescence in the cells, while the NLS tagged constructs showed localization within the nucleus and the

KASH linked constructs showed the reporter was bound to the nuclear envelope. However, upon isolation of the nuclei from the HEK293 transduced cells, only the KASH linked constructs showed retention of the signal. Signal loss after nuclei isolation is likely due to the small size of the reporter proteins (27 kDa) relative to the nuclear pore cutoff (60 kDa) in the non-tethered constructs. In the absence of a living cell the active transport mechanisms for nuclear import of the reporter are lost and the reporter can diffuse out of the nucleus. Further testing was done with fusion of the reporter to the H2B domain and robust retention of the signal in isolated nuclei was also observed. All H2B constructs drove highly efficient incorporation of the reporter into the nuclear chromatin that was stable after both nuclei isolation and freeze/thaw treatment of cells and tissue

[00379] Nuclei were isolated from cultured cells and tissue essentially as described in the protocol by Krishnaswami *et al.* (described in Kelder *et al* (2016) *Nat Protoc* 11(3):499). In brief, 2-3 mm^3 sections of tissue were excised with a sterile razor blade. If cultured cells were being used, the cells were collected and resuspended at approximately $1x10^6$ cells per mL in cold PBS. The tissue or cells were homogenized using a dounce homogenizer in a Tris buffer comprising sucrose, $MgCl_2$, KCL, and NuPAGE sample reducing agent (Thermo). Also included was 0.1% Triton and Hoescht 33352 (Molecular Probes). The homogenate was then filtered using a 40 or 70 micron Flowmi cell strainer (Flowmi) to remove remaining tissue fragments or high order aggregates of nuclei.

[00380] The AAV capsid library constructs comprising the EGFP-H2B, mClover3-H2B, mRuby3-H2B, and EGFP-KASH under the control of the neuron specific hSynapsin1 promoter were evaluated in C57BL/6J mice. AAV capsid libraries were manufactured by standard techniques and administered by tail vein intravenous injection at a dose of $2x10^{11}$ vector genomes per mouse (n=3 per group). Two weeks after administration of the test article, mice were sacrificed, and the left hemisphere of the brain was preserved in 4% paraformaldehyde for immunohistochemistry studies targeting the expressed reporter to confirm nuclear localization by techniques know in the art. The right hemisphere was flash frozen for FACS sorting of transduced neuronal nuclei. Images from the immunohistochemistry studies verified nuclear localization for each of the constructs in the tissue (see Figs. 10A and 10B) although for the mRuby3 constructs, direct visualization of the nuclear localized mRuby3 native fluorescence was used.

[00381] Nuclei were isolated from the frozen central nervous system mouse tissues as described above, stained with Hoescht dye during nuclei isolation, and sorted for EGFP, mClover3, mRuby3, or EGFP-KASH signal by using a Sony SH800 cell sorter according to manufacturer's instructions. For FACS sorting, the 70 micron chip was used, at sample pressure 5, in semi-purity mode. The FACS plots were gated on singlets to prevent sorting of doublets, triplets, or higher order groupings of attached nuclei. Samples were sorted into Tris buffer, pH 7.5, comprising sucrose and $MgCl_2$.

[00382] DNA was isolated from the sorted cells using a Roche High Pure Viral nucleic acid kit according to manufacturer's protocols.

[00383] The FACS plots (Fig. 11) demonstrate that EGFP positive nuclei could be isolated from central nervous tissues in the mice injected with the libraries comprising the EGFP-H2B construct. Further, signal could be detected in the thalamus of mice treated with the mClover3 construct and in the cortex of mice treated with the EGFP-KASH libraries (Figs. 12 and 13). Importantly, reporter signal above background could not be detected in either liver or cardiac tissue when mice were injected with the EGFP-H2B libraries (where EGFP-H2B was driven by the neuron specific hSynapsin promoter), see Fig. 14.

Example 3: *In vivo* selection in non-human primates

[00384] *Liver delivery*: The methods and compositions described herein also were used to identify liver targeting AAV variants from the libraries. In these experiments, the liver-specific promoter transthyretin (TTR) was used to express the reporter genes. The library constructs were thus modified to comprise the TTR promoter in place of the hSynapsin promoter. The libraries were first tested in cells *in vitro*, where a dose response was seen. HepG2 cells (ATCC HB-8065) were transduced with the AAV libraries across a range of multiplicity of infections (MOI) and then nuclei were sorted as above to measure fluorescence from the reporter gene. The results (see Figs 15A-C) demonstrated a dose response, which is summarized in Table 7 below:

Table 7: Dose response in HepG2 cells

MOI	% EGFP positive
Mock	0.2
3e3	0.5
1e4	2.5
3e4	8.6
1e5	36.9
3e5	53.3
1e6	64.3

[00385] Dose response experiments were also done in nonhuman primate hepatocytes (BioIVT) where a dose response was also observed (see Table 8 below).

Table 8: Dose response in NHP hepatocytes

MOI	% EGFP Positive
Mock	0.6
3e3	1.3
3e4	3.8
3e5	12.4

[00386] In a similar manner, the dose response was measured in primary human hepatocytes (Corning), and the data is shown below in Table 9.

Table 9: Dose response in primary human hepatocytes

MOI	% EGFP Positive
Mock	0.4
5e4	6.7
1e5	20.0
2e5	35.4
4e5	47.3
8e5	50.2

[00387] Library variant performance was also evaluated in C57BL/6J mice using the libraries where the reporter gene was driven by the TTR promoter. AAV capsid libraries were manufactured by standard techniques and administered by tail vein intravenous injection at a dose of 2E11 vector genomes per mouse (n=3 males and n=3 females). Two weeks after administration of the test article, mice were sacrificed and the liver removed to evaluate targeting of the expressed EGFP transgene.

[00388] The selections were also performed in non-human primates (cynomolgus macaques) to isolate AAV variants that would have the most relevance for transduction of human liver.

[00389] In selection round 1, a library pool comprising AAV variants from all the different serotypes was injected at a dose of 5E12 vector genomes per kilogram. In this first round, millions of unique variants were injected into one male and one female NHP. After 15 days the NHPs were sacrificed and the liver analyzed. A pool of successful AAV variants recovered from the NHP livers was generated and sequenced. The AAV variants were then used to make a single library comprising approximately 500,000 unique variants. These were then injected into a new NHP pair intravenously at a dose of 1.6E13 vector genomes per kilogram. After 28 days, the NHP were sacrificed and their livers analyzed. Endpoints analyzed were enrichment of the

individual AAV variants in the liver tissue as compared with the administered library formulation, the enrichment in hepatocyte nuclei expressing EGFP encoded by the AAV variants, and sequencing of the mRNA barcodes to determine enrichment of AAV capsid variants compared to the administered library formulation.

[00390] Nuclei were isolated from the livers as described above and EGFP positive hepatocyte nuclei were sorted by FACS. The results (Fig. 16, Panel A) showed that the EGFP signal was readily detectable above background. The numbers of EGFP positive nuclei isolated from three samples of each individual liver lobe for each NHP are shown below in Table 10. In addition, immunohistochemistry detection of EGFP was performed (Fig. 16, Panel B) to demonstrate nuclear localization of the reporter gene.

Table 10: Number of AAV variants isolated from male and female NHP liver tissue.

	NHP 1001 (Male)		NHP 1501 (Female)	
Tissue Region	**GFP+ Nuclei (%)**	**Sorted Count**	**GFP+ Nuclei (%)**	**Sorted Count**
Left lateral lobe 1	6.0	133,043	1.5	28,746
Left lateral lobe 2	4.4	44,044	1.2	24,641
Left lateral lobe 3	4.1	71,123	1.2	18,762
Right lateral lobe 1	2.4	31,872	1.9	31,814
Right lateral lobe 2	4.5	76,013	1.6	34,736
Right lateral lobe 3	4.6	54,185	1.5	24,675
Left medial lobe 1	3.2	66,751	1.7	18,433
Left medial lobe 2	3.6	45,289	1.6	17,613
Left medial lobe 3	2.9	40,757	1.7	17,961
Right medial lobe 1	3.8	51,326	1.2	21,438
Right medial lobe 2	3.7	58,040	0.9	12,986
Right medial lobe 3	3.2	52,832	1.5	16,695
Quadrate lobe 1	4.0	57,774	0.8	10,325
Quadrate lobe 2	2.7	44,248	1.1	13,333
Quadrate lobe 3	3.5	58,053	1.3	15,150

[00391] Interestingly, a comparison of the top 2500 AAV variants isolated after application of distinct selective pressures indicates striking differences in the parent

serotypes of AAV variants that were most heavily enriched (Figs. 17A and B). HepG2 and primary human hepatocytes were evaluated *in vitro* while mice and NHP were evaluated *in vivo*. These significant species-specific differences support AAV selections in animal models that are closer to human, for example NHP.

[00392] Approximately 100 AAV variants were selected for in-depth analysis based on their consistent fold enrichment in NHP mRNA, NHP EGFP positive hepatic nuclei, and NHP liver total genomic DNA. Variants excluded included those with low yield in HEK293 AAV manufacturing and a low confidence of the mapping of the barcode by Nanopore sequencing. Clustering analysis was also performed to select AAV variants that comprise unique physicochemical properties (for example, recurrent amino acid motifs or strong hydrophobicity) in response to the selective pressure.

[00393] The top 32 sequences from this initial analysis are shown in Fig. 18 and Table 11. The analysis shows the parent serotype as well as the fold enrichment in liver observed after selection in non-human primate. Also shown is the sequence of the peptide inserted into the capsid loop. Importantly, the ability to produce each AAV variant in a HEK293 AAV production system was tracked to insure any AAV identified by the methods described herein could be produced efficiently. Thus, in some embodiments, the inserted peptide sequence and AAV parent serotype may be any one of those set forth in Table 11.

Table 11

Inserted Peptide Sequence	**AAV parent serotype**	**SEQ ID NO**	**Inserted Peptide Sequence**	**AAV parent serotype**	**SEQ ID NO**
KSPQSKV	AAV1	1	VSRSYPA	AAV9	17
SDLRSKV	AAV1	2	QRARPDT	AAV9	18
TTTVRKV	AAV1	3	SQLTPHS	AAV6	19
GRSDMAG	AAV2	4	LGSHLPS	AAV6	20
LLSSERS	AAV2	5	YTLSSGQ	AAV6	21
EQRPNVS	AAV2	6	SSRIPPD	AAV6	22
TRQISSD	AAV2	7	WTETIPR	AAV6	23
QGALAQV	AAV3B	8	HGLQGVA	AAV6	24
YPSSNTP	AAV3B	9	TMRVSDQ	AAV6	25
MLNPRTE	AAV3B	10	GSSKVVM	AAV6	26
QMRTRDE	AAV3B	11	SALDRGV	AAV6	27
MPGRAPI	AAV9	12	KELGTQR	AAV5	28
LGRLTAN	AAV9	13	RSSDVQR	AAV5	29
SYSTSRS	AAV9	14	PSAPKTF	AAV5	30
TRPSSTN	AAV9	15	HTKRSEY	AAV5	31
VPQSSSR	AAV9	16	IKGSNLP	AAV5	32

[00394] *CNS delivery*: Additional experiments were conducted to identify AAV variants with improved transduction of the CNS using the methods described herein. For these experiments the hSynapsin promoter (hSyn1) was used to express the reporter gene and mRNA barcode. The selections were performed in non-human primates (cynomolgus macaques) to isolate AAV variants that would have the most relevance for transduction of the human CNS.

[00395] In non-human primate selection round 1 a library pool comprising AAV variants based on serotypes AAV1, AAV2, AAV3B, AAV6, AAV8, and AAV9 was injected by lumbar intrathecal puncture at a total dose of 1E13 vector genomes. In this first round, millions of unique variants were injected into one male and one female NHP. After 15 days the NHPs were sacrificed and the CNS tissues were analyzed to assess AAV variant performance.

[00396] A subset of the AAV variants with high fold enrichment in the round 1 CNS non-human primate selection were synthesized using Method 1 described above to generate the library for round 2 selection. The total size of the round 2 library was 10,818 variants. Each AAV variant was synthesized using three different nucleotide sequences that code for the same peptide. Each nucleotide sequence was linked to a unique mRNA barcode driven by the hSyn1 promoter in order to rank transgene expression in neurons. The inclusion of three replicate sequences enables increased confidence in assessing variant performance since each of the three sequences can be treated independently during bioinformatic analysis.

[00397] The library prepared for round 2 selection to target the CNS was first evaluated *in vitro* in Neuro2A cells (ATCC CCL-131) (Fig. 19), primary mouse cortical neurons (Gibco) (Fig. 20), and iCell human neurons derived from human induced pluripotent stem cells (NCR-100-010-001, Cellular Dynamics International) (Fig. 21) as described in Example 1.

[00398] The round 2 library was next evaluated in C57BL/6J mice by unilateral intracerebroventricular injection at a dose of 1.59E11 vector genomes per mouse in a volume of 10 microliters (n=3 males and n=3 females). 28 days after administration of the test article, mice were sacrificed, and CNS tissues removed to evaluate library performance (Fig. 22). Analysis was completed on brain regions contralateral to the injected hemisphere to avoid confounding transduction associated with the injection tract.

[00399] Finally, the round 2 library was administered intrathecally into two male and one female cynomolgus macaques at a dose of 4.37E13 vg per animal. After 28 days, the NHPs were sacrificed and CNS tissues were analyzed. The brain was sliced at a 3 mm coronal slice thickness. Each slice was hemisected along the mid-sagittal plane. Punch samples (3 mm) were obtained from the brain slices from the left hemisphere for analysis of vector genome DNA. The right hemisphere was placed in RNAlater and refrigerated for approximately 24 hours to preserve RNA integrity. After storage, 3 mm punches were collected sampling various brain regions. The spinal cord was divided into cervical, thoracic, and lumbar segments for analysis.

[00400] Library AAV variant performance was assessed by analysis of vector genome DNA frequency (Figs. 23-25) as well as by quantification of cDNA reverse-transcribed from library mRNA transcript expressed specifically in neurons (Figs. 26-28). These two data sets are referred to as DNA analysis and RNA analysis respectively. Next-generation sequencing analysis of non-human primate CNS tissues identified high performing AAV variants exhibiting transduction superior to parental wild type serotypes. A subset of these top performing variants was selected for further evaluation based on their performance across different metrics, including enrichment in both DNA and RNA analyses. A summary of the variant performance for this subset is shown in Figs. 29A-29D. The analysis shows the parent serotype as well as the fold enrichment in tissue observed after selection in non-human primate. Also shown is the peptide sequence of the peptide inserted into the capsid loop. The variants are numbered 1-43 (SEQ ID Nos.: 68-110, see Table 12) and this numbering is used to annotate their performance relative to the rest of the library in the bubble plots in Figs. 19 through 28. In some embodiments, the inserted peptide and AAV parent serotype may be any one of those set forth in Table 12.

Table 12

No.	Inserted Peptide Sequence	AAV parent serotype	SEQ ID NO	No	Inserted Peptide Sequence	AAV parent serotype	SEQ ID NO
1	AALRDIR	AAV1	68	23	MTLTRQE	AAV2	90
2	PAIKTYS	AAV1	69	24	TSNSRTE	AAV2	91
3	TGDRISSRTL	AAV1	70	25	EVRGGPS	AAV2	92
4	SVVVSSDSSK RPRNL	AAV1	71	26	VISDRSS	AAV2	93
5	VGARLSA	AAV1	72	27	PRDTFNG	AAV2	94
6	IEKPNTSTKK	AAV1	73	28	RPLTAND	AAV2	95
7	DTVRSKN	AAV1	74	29	PLRMVNE	AAV2	96

8	KELNKAR	AAV1	75	30	DVGIRPS	AAV2	97
9	PYASITG	AAV3B	76	31	KDSTAFG	AAV2	98
10	TGAFSST	AAV3B	77	32	YPGRNPD	AAV2	99
11	EQFRNLA	AAV3B	78	33	ISDTRIS	AAV2	100
12	FNSPVIQ	AAV3B	79	34	ENFSKVA	AAV2	101
13	TDFRSPQ	AAV3B	80	35	RDALSGLRP E	AAV2	102
14	MYSLMKD	AAV3B	81	36	LGNGKMTV QP	AAV2	103
15	LYLSSAS	AAV3B	82	37	VSNPLNQ	AAV2	104
16	YGSRSVD	AAV3B	83	38	LNERGLG	AAV2	105
17	LYSHQVS	AAV3B	84	39	GRNTVGLSS A	AAV2	106
18	ISTHSPP	AAV3B	85	40	VGHAGNP	AAV2	107
19	RQPTTIP	AAV9	86	41	SRAGTVP	AAV2	108
20	RSTSSLL	AAV9	87	42	GLVAKLP	AAV2	109
21	FRLSSPQ	AAV9	88	43	AESLRTP	AAV2	110
22	NIPKAYG	AAV9	89				

Example 4: Evaluation of top performing AAV variants identified in library screens

[00401] After two rounds of selection in non-human primate a subset of highly enriched variants was identified in liver and CNS tissues (Figs. 18 and 29 respectively). Rather than proceeding directly to individual evaluation of just one or two variants, we instead generated a barcoded expression cassette to enable head-to-head comparison of dozens of the top performing variants in liver and CNS. In this approach the barcodes linked to each AAV are known with certainty because each AAV variant is manufactured and titered separately prior to pooling. Each AAV is manufactured with a vector genome (Fig. 30) containing a cell-type specific RNA polymerase II promoter (e.g. transthyretin or hSynapsin1) driving expression of the EGFP-H2B transgene and a unique barcode nucleotide sequence. A second RNA polymerase III promoter (e.g. hU6) was also included to provide an independent assessment of vector performance. The hU6 promoter is ubiquitously expressed in all cell types and therefore enables assessment of expression in all cell and tissue types. Moreover, the hU6 transcript is restricted to the nucleus, an advantage for single nuclei sequencing approaches. All barcodes listed in Table 13 were designed computationally to minimize the potential for transcriptional bias.

Table 13: Unique barcodes used for pooled AAV variant evaluation

Cassette No.	RNA polymerase II barcode	SEQ ID NO:	RNA polymerase III barcode	SEQ ID NO:
1	AAATCACCTGAC	111	CTTGTCGATAAG	155
2	TGATTCTTCTAC	112	GTGGTAAGCACG	156
3	GGCCACTGGTTG	113	AACTGGCTCCCA	157
4	AATCTATCGCCT	114	TGCGATCGTACA	158
5	AGACGATCAAGG	115	CAGAGGATAGCT	159
6	GTGTAGTGATCG	116	GAGGAGTCTCAT	160
7	TGGTAGTTTCCA	117	AGTTCCCACGGA	161
8	GATCAGTTGCGG	118	CCCTTCAGCAGT	162
9	CTTGGGACACAC	119	CGTACTCCGCGA	163
10	GATGCGGCCTCG	120	TCACCGACGTGG	164
11	CGCATCCTCGTT	121	CAACGGTCTTCC	165
12	ACGATGTCTACG	122	GTAACAGTCCGG	166
13	GTGTTCCACCTG	123	GTCGAGGATACC	167
14	GGAGGGAGCTGG	124	TGCGATGTGATG	168
15	CATAACTCTTGC	125	TAACCCGCCGAA	169
16	TGACAGTCTCGC	126	CGACCAACGACA	170
17	CTACCAGGATTC	127	CTGCTGCCATCA	171
18	ACACATGATGGC	128	CTAGTACACGCG	172
19	GGTGCTCGCAAT	129	TAGGTGCTAGTG	173
20	GATTGCACCGCA	130	TCCTCCCAGGAT	174
21	AACGGAGGCTGC	131	TAGGCGGCATTA	175
22	GGGAGAGTTCCG	132	CTTAGGCTAGCT	176
23	CGGGTAGCCGAA	133	CGACGTGCGATA	177
24	TGACCTAATTGG	134	ACCATTCCATCG	178
25	GGGTGAAGGATT	135	TGGAAAGGCCTA	179
26	CTGTGAGAGAAG	136	GGGAACATTGGA	180
27	ACTTGGTTCCGC	137	AAGTGAACGCGC	181
28	GTTGGCTGTACC	138	AGCAACGTTGTA	182
29	TGTAAGCTGTAG	139	AAGTGACGGACC	183
30	AGCTACCCTGGA	140	AGTAACGCCCGT	184
31	CCAAACAAGCGT	141	TGGGCTATGACA	185
32	GCTTGCCCATCC	142	CTGCAGTGAAGT	186
33	CATTCCGGGTTA	143	ATTCTGTTCGCA	187
34	CTTTGCCGGTAC	144	CTTCCTCACCTC	188
35	CATCAACTGTGC	145	GAGAGTCGAAAC	189
36	GCACAGCCGAAT	146	AGTCGTGAATCG	190
37	ATGCATCGGTCA	147	GGTGACAACAAT	191
38	GAACCAGAATGC	148	GCCTAGTAGCAT	192
39	CGGACGGTATGG	149	ACAGAAGCGCCT	193
40	TCCTATGAACAA	150	CTAGTTGAGTTC	194
41	TGGGAGTAGAGG	151	AAGTTCAGGATA	195
42	GCTCAACGATCG	152	TTGCCTCTATTC	196
43	GGACTAGGATAT	153	TGAACGTCTAAG	197
44	CCATTGTGGGAA	154	CGCTATCACGCA	198

[00402] An example of the application of this expression cassette to evaluate a subset of high performing CNS-tropic AAV variants (listed in Fig. 29A-D) identified from library screening is shown in Fig. 31. In addition to the engineered serotypes developed in this work several control serotypes were included: AAV9, PHP.B, and AAV2_HSPGKO. AAV9 has been evaluated extensively in the field for its CNS transduction properties including in human clinical trials (Lowes *et al.* Pediatr Neurol. 2019; 98:39-45), accordingly it is the primary benchmark for performance. PHP.B is an engineered AAV9 serotype that was previously shown to exhibit high potency in C57BL/6J mice (Deverman *et al.* Nat Biotechnol. 2016; 34(2):204-9), these properties do not extend to non-human primates (Hordeaux *et al.* Mol Ther. 2018 Mar; 26(3):664-668). AAV2_HSPGKO is a variant of AAV2 with two mutations (R585A and R588A) that abolish binding to heparan sulfate proteoglycan (HSPG) (Opie *et al.* Virol. 2003 Jun;77(12):6995-7006). This serotype has also been previously evaluated in non-human primates (Naidoo *et al.* Mol Ther. 2018 Oct 3;26(10):2418-2430). In this experiment, barcoded AAV variants were evaluated *in vitro* in Neuro2A cells, primary mouse cortical neurons, and iCell human neurons derived from human induced pluripotent stem cells. Virus was produced in HEK293T cells, purified using a CsCl density-gradient, and titered by real time qPCR according to methods known in the art. Each individually manufactured and barcoded virus was then mixed together to form a single pool for downstream evaluation and the frequency of each variant in this pool was assessed by next-generation sequencing (NGS). The vector genome cassette described in Fig. 30 was employed for the pooled evaluation to enable distinct barcoded transcript quantifications from the hSyn1 pol II promoter and the hU6 pol III promoter. The barcoded virus pool was used to infect cells at $3x10^5$, $1x10^5$, $3x10^4$, $1x10^4$, $3x10^3$, and $1x10^3$ vector genome copies per cell. After either 72 hours (Neuro2A), 48 hours (primary mouse cortical neurons), or 96 hours (hiPSC derived human neurons) total RNA was extracted and AAV transcripts were reverse transcribed using gene specific primers targeting the hSyn1 and hU6 transcripts respectively. Next-generation sequencing was then applied to quantify the percentage of NGS reads derived from each AAV variant. These percentages were normalized by the frequency of each AAV variant in the pool that was used for infection. The results show a distribution of performance with several AAV variants based on AAV1 and AAV2 exhibiting high performance across all three cell types. Generally, the performance of AAV variants

based on AAV3B was lower. The observed trends in variant performance were successfully predicted by the round 2 library data obtained in the same cell types (Figs. 19, 20, 21). In addition, these data show the successful application of the dual pol II hSyn1 and pol III hU6 barcode measurement approach. In homogeneous cell lines like Neuro2A, the agreement between the hSyn1 and hU6 measurements is high. In primary mouse cortical neurons and hiPSC derived neurons there is a greater heterogeneity of neuronal subtypes, leading to a greater divergence in the two measurements. However, generally the two measurements are still correlated.

Example 5: *In vitro* evaluation of CNS-tropic variants for transduction of non-neuronal cells

[00403] The same subset of CNS-tropic AAV variants and controls were evaluated for transduction of non-neuronal cell types *in vitro* (Fig. 32). In this experiment, barcoded AAV variants were evaluated for transduction of iCell human astrocytes derived from human induced pluripotent stem cells and iCell human endothelial cells derived from human induced pluripotent stem cells. The identical AAV barcoded pool test article and methodology described above in Example 4 was used with the following specifications. For evaluation in hiPSC-derived astrocytes $3x10^5$, $1x10^5$, $3x10^4$, $1x10^4$, $3x10^3$, and $1x10^3$ vector genome copies per cell were used for infection. For evaluation in hiPSC-derived endothelial cells $3x10^5$, $1x10^5$, and $3x10^4$ vector genome copies per cell were used for infection. Both the astrocytes and endothelial cells were harvested 72 hours post-infection. Total RNA was extracted and AAV transcripts were reverse transcribed using gene specific primers targeting the hU6 transcript, the hSyn1 transcript was not probed because the hSyn1 promoter has minimal activity in non-neuronal cell types. Next-generation sequencing was then applied to quantify the percentage of NGS reads derived from each AAV variant. These percentages were normalized by the frequency of each AAV variant in the pool that was used for infection. In hiPSC-derived astrocytes the results show a distribution of performance with several AAV variants based on AAV2 exhibiting high performance. Generally, the performance of AAV variants based on AAV1 and AAV9 was lower. In hiPSC-derived endothelial cells the results show a distribution of performance with several AAV variants based on AAV1 and AAV2 exhibiting high performance. Generally, the performance of AAV variants based on AAV3B and AAV9 was lower.

Example 6: *In vivo* evaluation of CNS-tropic AAV variants in mice and rats

[00404] The same subset of CNS-tropic AAV variants was further evaluated for transduction of the central nervous system in C57BL/6J mice and Sprague-Dawley rats *in vivo* (Figs 33 and 34). Transduction in rodents was assessed in order to complete a thorough evaluation of AAV performance across species that are commonly used for the development of therapeutics. For evaluation in C57BL/6J mice 1E11 vector genomes in a volume of 10 microliters was administered by unilateral intracerebroventricular injection into the left lateral ventricle (n=3 males and n=3 females). For evaluation in Sprague-Dawley rats 2E11 vector genomes in a volume of 20 microliters was administered by unilateral intracerebroventricular injection into the left lateral ventricle (n=3 males and n=3 females). Animals were sacrificed 32 days after administration of the test article and CNS tissues were dissected. Analysis was completed on brain regions contralateral to the injected hemisphere to avoid confounding from transduction associated with the injection tract. Total RNA was extracted from CNS tissues and AAV transcripts were reverse transcribed using gene specific primers targeting the hSyn1 and hU6 transcripts respectively. Next-generation sequencing was then applied to quantify the percentage of NGS reads derived from each AAV variant. These percentages were normalized by the frequency of each AAV variant in the pool that was administered.

[00405] In C57BL/6J mice the hSyn1 barcode measurements of transcripts expressed in neuronal cells show a distribution of performance with many AAV variants based on peptide insertions into AAV1 and AAV2 disclosed herein exhibiting high performance relative to the AAV9 benchmark. As expected, the PHP.B control serotype is high performing in C57BL/6J mice. Generally, the performance of AAV variants based on AAV9 and AAV3B was lower. In C57BL/6J mice, the hU6 barcode measurements of transcripts expressed in all cell types show a distribution of performance with many AAV variants based on peptide insertions into AAV2 and especially AAV1 disclosed herein exhibiting high performance relative to the AAV9 benchmark. Generally, the performance of AAV variants based on AAV9 and AAV3B was lower. Fig. 33.

[00406] In Sprague-Dawley rats the hSyn1 barcode measurements of transcripts expressed in neuronal cells show a distribution of performance with many AAV variants based on peptide insertions into AAV1 and AAV2 disclosed herein exhibiting high performance relative to the AAV9 benchmark. As expected, the PHP.B control serotype performs worse in Sprague-Dawley rats than it does in C57BL/6J mice.

Generally, the performance of AAV variants based on AAV9 and AAV3B was lower. In Sprague-Dawley rats the hU6 barcode measurements of transcripts expressed in all cell types shows a distribution of performance with many AAV variants based on peptide insertions into AAV1 and AAV2 disclosed herein exhibiting high performance relative to the AAV9 benchmark. Generally, the performance of AAV variants based on AAV9 and AAV3B was lower. Fig. 34.

Example 7: *In vivo* evaluation of CNS-tropic AAV variants in non-human primates

[00407] We next further evaluated the same subset of CNS-tropic AAV variants for transduction of the central nervous system in non-human primates (cynomolgus macaques) *in vivo*. Among the various evaluations described above, assessment of transduction in cynomolgus macaques is of particular importance for clinical translation to humans since non-human primates best exemplify the genetics and physiology of the human CNS. The pool of AAV variants was administered intrathecally into one male and one female cynomolgus macaque at a dose of $5.2x10^{13}$ vector genomes (vg) per animal. For intrathecal administration a threaded catheter was employed to deposit the test article closer to the brain at the cervical and thoracic levels. Animals were sacrificed 57 days after administration of the test article. The brain was sliced at a 3 mm coronal slice thickness. Each slice was hemisected along the mid-sagittal plane. Punch samples (3 mm) were obtained from the brain slices from the left hemisphere for analysis of AAV genomic DNA. The right hemisphere was placed in RNAlater and refrigerated for approximately 24 hours to preserve RNA integrity. After storage, 3 mm punches were collected sampling various brain regions. The spinal cord was divided into cervical, thoracic, and lumbar segments for analysis. Genomic DNA and total RNA were extracted separately from the CNS tissues and subsequent analyses are referred to as DNA analysis and RNA analysis respectively. For DNA analysis, each of the unique barcodes, hSyn1 and hU6, was amplified separately by PCR. Next-generation sequencing was applied to quantify the percentage of NGS reads derived from each AAV variant. Note that for DNA analysis there is no cellular restriction provided by the promoters, therefore, the hSyn1 and hU6 barcodes are expected to amplify with equal likelihood. For RNA analysis, AAV transcripts were reverse transcribed using gene specific primers targeting the hSyn1 (neuronal) and hU6 (all cell types) transcripts respectively. Next-generation sequencing was then applied to quantify the percentage of NGS reads derived from each AAV variant. For both DNA and RNA analyses, these

percentages were normalized by the frequency of each AAV variant in the pool that was administered.

[00408] In cynomolgus macaques, the RNA analysis results (Fig. 35), based on hSyn1 barcode measurements of transcripts expressed in neuronal cells, show a distribution of performance with many AAV variants based on peptide insertions into AAV3B, AAV2, and AAV1 disclosed herein exhibiting high performance relative to the AAV9 benchmark. Generally, the performance of AAV variants based on AAV9 was lower. In cynomolgus macaques, the hU6 barcode measurements of transcripts expressed in all cell types show a distribution of performance with many AAV variants based on peptide insertions into AAV3B, AAV2, and AAV1 disclosed herein exhibiting high performance relative to the AAV9 benchmark. Generally, the performance of AAV variants based on AAV9 was lower. Fold improvement of the serotypes disclosed herein compared to the AAV9 benchmark are plotted in Figs 37 and 38.

[00409] In cynomolgus macaques, the DNA analysis results (Fig. 36) based on hSyn1 and hU6 barcode measurements of AAV vector genomes in CNS tissues show a distribution of performance with many AAV variants across all serotypes including engineered variants based on AAV9 exhibiting very high performance relative to the wild-type AAV9 benchmark. Fold improvement of the serotypes disclosed herein compared to the AAV9 benchmark are plotted in Figs 39 and 40.

[00410] Although the RNA analysis indicates which AAV variants provided highest levels of productive transgene expression in neurons and all CNS cells, it is notable that the DNA analysis suggests there are additional AAVs that are very highly enriched in brain tissue.

[00411] An overview of serotype performance across all cell culture and *in vivo* evaluations is plotted in Figs 41 and 42. The results show differences in transduction across species and highlight the value of performing serotype screening and evaluations in non-human primates.

[00412] All patents, patent applications and publications mentioned herein are hereby incorporated by reference in their entirety.

[00413] Although disclosure has been provided in some detail by way of illustration and example for the purposes of clarity of understanding, it will be apparent to those skilled in the art that various changes and modifications can be practiced without departing from the spirit or scope of the disclosure. Accordingly, the foregoing descriptions and examples should not be construed as limiting.

[00414] Particular embodiments of the disclosure are set forth in the following numbered paragraphs:

[00415] 1. A method of identifying an AAV capsid variant with a desired characteristic compared to a natural AAV serotype, comprising:

(i) contacting a cell, cell line, or tissue with a library of AAV variants, wherein each member of the library comprises:

a) a nucleic acid encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and one or more of:

b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a);

c) a nucleic acid encoding a localization signal;

d) a nucleic acid comprising a barcode; and

e) a nucleic acid encoding a reporter protein;

(ii) allowing the AAV variants in said library to transduce the cell, cell line, or tissue;

(iii) recovering from the cell, cell line, or tissue the AAV variant; and

(iv) identifying the AAV capsid variant with the desired characteristic.

[00416] 2. A method of identifying an AAV capsid variant with a desired characteristic compared to a natural AAV serotype, comprising:

(i) contacting a cell, cell line, or tissue with a library of AAV variants, wherein each member of the library comprises:

a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and one or more of:

b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a) in the nucleic acid sequence flanking the peptide insertion site;

c) a nucleic acid encoding a localization signal;

d) a nucleic acid comprising a barcode; and

e) a nucleic acid encoding a reporter protein;

(ii) allowing the AAV variants in said library to transduce the cell, cell line, or tissue;

(iii) recovering from the cell, cell line, or tissue the AAV variant; and

(iv) identifying the AAV capsid variant with the desired characteristic.

[00417] 3. The method of embodiment 1, wherein each member of the library comprises one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a).

[00418] 4. The method of embodiment 2, wherein each member of the library comprises one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a) in the nucleic acid sequence flanking the peptide insertion site.

[00419] 5. The method of any one of embodiments 1-4, wherein each member of the library comprises a nucleic acid encoding a localization signal.

[00420] 6. The method of any one of embodiments 1-5, wherein each member of the library comprises a nucleic acid comprising a barcode.

[00421] 7. The method of any one of embodiments 1-6, wherein each member of the library comprises a nucleic acid encoding a reporter protein.

[00422] 8. The method of any one of embodiments 1-7, wherein the nucleic acid encoding an AAV variant capsid protein, and the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are located in separate nucleic acid molecules.

[00423] 9. The method of any one of embodiments 1-7, wherein the nucleic acid encoding an AAV variant capsid protein, the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are located in one nucleic acid molecule.

[00424] 10. The method of embodiment 9, wherein the nucleic acid encoding an AAV variant capsid protein, and the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are linked to each other in any order.

[00425] 11. The method of embodiment 10, wherein each member of the library comprises: a 5'ITR sequence, the nucleic acid comprising a barcode, the nucleic acid encoding a reporter protein, the nucleic acid encoding an AAV variant capsid protein, and a 3'ITR sequence, in that order.

[00426] 12. The method of any one of embodiments 1-11, wherein the library of AAV variants comprises AAV variant capsid proteins derived from two or more AAV serotypes.

[00427] 13. The method of any one of embodiments 1-12, wherein the AAV serotype of the library of AAV variants is selected from one or more of: AAV1, AAV2, AAV3B,

AAV5, AAV6, AAV8, AAV9, AAV3, AAV4, AAV7, AAV11, AAVrh10, AAVrh39, and AAVrh74.

[00428] 14. The method of any one of embodiments 1-13, wherein the nucleic acid encoding the reporter protein and the nucleic acid encoding an AAV variant capsid are each independently operatively linked to a promoter.

[00429] 15. The method of any one of embodiments 1-14, wherein the desired characteristic is enhanced cell or tissue tropism.

[00430] 16. A method of identifying an AAV capsid variant with a desired characteristic compared to a natural AAV serotype, comprising:

(i) inserting a plurality of nucleic acids encoding peptides, into a population of nucleic acids encoding a hypervariable and/or surface-exposed loop of an AAV capsid protein to create a library of nucleic acids encoding AAV variant capsid proteins;

(ii) linking each nucleic acid encoding an AAV variant capsid protein in said library to one or more of:

(a) a nucleic acid comprising a barcode,

(b) a nucleic acid encoding a reporter protein, and

(c) a nucleic acid encoding a localization signal;

(iii) manufacturing a library of AAV variants in producer cells by providing adenovirus helper and AAV rep functions *in trans*;

(iv) purifying the library of AAV variants;

(v) contacting a cell, cell line, or tissue with the library of AAV variants;

(vi) recovering the AAV variants from the target cell, cell line, or tissue; and

(vii) identifying the AAV capsid variant with the desired characteristic.

[00431] 17. The method of embodiment 16, wherein each nucleic acid encoding an AAV variant capsid protein in said library is linked to a nucleic acid comprising a barcode.

[00432] 18. The method of any one of embodiments 1-17, wherein each member of the library comprises a first nucleic acid comprising a first barcode and a second nucleic acid comprising a second barcode.

[00433] 19. The method of embodiment 18, wherein the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode are different.

[00434] 20. The method of embodiment 18 or 19, wherein the first nucleic acid comprising the first barcode comprises a sequence selected from any one of sequences SEQ ID NO: 111-154.

[00435] 21. The method of embodiment 18 or 19, wherein the first nucleic acid comprising the first barcode is selected from any one of sequences SEQ ID NO: 111-154.

[00436] 22. The method of embodiment 18 or 19, wherein the second nucleic acid comprising the second barcode comprises a sequence selected from any one of sequences SEQ ID NO: 155-198.

[00437] 23. The method of embodiment 18 or 19, wherein the second nucleic acid comprising the second barcode is selected from any one of sequences SEQ ID NO: 155-198.

[00438] 24. The method of any one of embodiments 18-23, wherein each of the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode is independently operatively linked to a promoter.

[00439] 25. The method of embodiment 24, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the second nucleic acid comprising the second barcode is each independently an RNA Pol II promoter.

[00440] 26. The method of embodiment 24, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the nucleic acid comprising the second barcode is each independently an RNA Pol III promoter.

[00441] 27. The method of embodiment 24, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode is an RNA Pol II promoter and the promoter operatively linked to the second nucleic acid comprising the second barcode is an RNA Pol III promoter.

[00442] 28. The method of any one of embodiments 25-27, wherein each RNA Pol II promoter is independently selected from the group consisting of: human synapsin promoter (hSyn1), transthyretin promoter (TTR), cytokeratin 18, cytokeratin 19, unc-45 myosin chaperon B (unc45b) promoter, cardiac troponin T (cTnT) promoter, glial fibrillary acidic protein (GFAP) promoter, myelin basic protein (MBP) promoter, and methyl CpG-binding protein *2 (*Mecp2) promoter.

[00443] 29. The method of any one of embodiments 26-27, wherein each RNA Pol III promoter is independently selected from the group consisting of U6 promoter, H1 promoter and 7SK promoter.

[00444] 30. The method of any one of embodiments 16-29, wherein each nucleic acid encoding an AAV variant capsid protein in said library is linked to a nucleic acid encoding a reporter protein.

[00445] 31. The method of any one of embodiments 16-30, wherein each nucleic acid encoding an AAV variant capsid protein in said library is linked to a nucleic acid encoding a localization signal.

[00446] 32. The method of any one of embodiments 16-31, wherein each nucleic acid encoding an AAV variant capsid protein further comprises one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site.

[00447] 33. The method of any one of embodiments 16-32, wherein step (iv) further comprises combining libraries of variant AAVs based on two or more AAV serotypes to generate a single pool.

[00448] 34. The method of any one of embodiments 16-33, wherein the population of nucleic acid sequences encoding a hypervariable and/or surface-exposed loop of an AAV capsid protein comprises sequences derived from two or more AAV serotypes.

[00449] 35. The method of any one of embodiments 16-34, wherein the AAV serotype is selected from one or more of: AAV1, AAV2, AAV3B, AAV5, AAV6, AAV8, AAV9, AAV3, AAV4, AAV7, AAV11, AAVrh10, AAVrh39, and AAVrh74.

[00450] 36. The method of any one of embodiments 16-35, wherein the helper functions comprise one or more of E2A, E4, VA, E1A, and E1B.

[00451] 37. The method of any one of embodiments 16-36, wherein the AAV rep function comprises rep78, rep 68, rep 52 and rep40 genes.

[00452] 38. The method of embodiment 37, wherein the start codon of the rep78 and/or rep68 gene is modified from ACG to ATG.

[00453] 39. The method of any one of embodiments 16-38, wherein the producer cells are HEK293 cells.

[00454] 40. The method of any one of embodiments 16-39, wherein the nucleic acid encoding an AAV variant capsid protein, the nucleic acid comprising a barcode, the nucleic acid encoding a reporter protein, and/or a nucleic acid encoding a localization signal are linked to each other in any order.

[00455] 41. The method of any one of embodiments 16-40, wherein each member of the library comprises: a 5'ITR sequence, the nucleic acid comprising a barcode, the nucleic acid encoding a reporter protein, the nucleic acid encoding an AAV variant capsid protein, and a 3'ITR sequence, in that order.

[00456] 42. The method of any one of embodiments 16-41, wherein the nucleic acid encoding a reporter protein and the nucleic acid encoding an AAV variant capsid are each independently operatively linked to a promoter.

[00457] 43. The method of any one of embodiments 16-42, wherein the desired characteristic is enhanced cell or tissue tropism.

[00458] 44. The method of any one of embodiments 1-43, wherein the peptide has a length of 4-15 amino acids.

[00459] 45. The method of any one of embodiments 1-44, wherein the peptide has a length of 6-15 amino acids.

[00460] 46. The method of embodiment 45, wherein the peptide has a length of 7, 10, or 15 amino acids.

[00461] 47. The method of embodiment 46, wherein the peptide has a length of 7 amino acids.

[00462] 48. The method of any one of embodiments 1-47, wherein the peptide is inserted into a region selected from the group consisting of VR-I, VR-II, VR-III, VR-IV, VR-V, VR-VI, VR-VII, VR-VIII and VR-IX region of the capsid protein.

[00463] 49. The method of embodiment 48, wherein the peptide is inserted into the VR-I of the capsid protein.

[00464] 50. The method of embodiment 48, wherein the peptide is inserted into the VR-IV of the capsid protein.

[00465] 51. The method of embodiment 48, wherein the peptide is inserted into the VR-VIII of the capsid protein.

[00466] 52. The method of any one of embodiments 1-49, wherein the peptide is inserted into the capsid protein VP1, VP2, or VP3.

[00467] 53. The method of any one of embodiments 1-50, wherein the peptide is inserted at a location between amino acid residues 450 and 600 of the capsid protein.

[00468] 54. The method of any one of embodiments 1-51, wherein

(i) the AAV serotype is AAV1 and the peptide is inserted at amino acid position 590 of the capsid protein,

(ii) the AAV serotype is AAV6 and the peptide is inserted at amino acid position 454 or 590 of the capsid protein,

(iii) the AAV serotype is AAV2 and the peptide is inserted at amino acid position 588 of the capsid protein,

(iv) the AAV serotype is AAV3B and the peptide is inserted at amino acid position 589 of the capsid protein,

(v) the AAV serotype is AAV5 and the peptide is inserted at amino acid position 578 of the capsid protein,

(vi) the AAV serotype is AAV8 and the peptide is inserted at amino acid position 591 of the capsid protein, or

(vii) the AAV serotype is AAV9 and the peptide is inserted at amino acid position 266, 455, or 589 of the capsid protein,

wherein the positions correspond to the numbering of VP1 in the AAV serotype.

[00469] 55. The method of any one of embodiments 1-54, wherein the reporter protein is a fluorescent protein.

[00470] 56. The method of embodiment 55, wherein the reporter protein is selected from the group consisting of: EGFP, mCherry, mClover3, mRuby3, mApple, iRFP, tdTomato, mVenus, YFP, RFP, firefly luciferase, and nanoluciferase.

[00471] 57. The method of any one of embodiments 1-56, wherein the nucleic acid encoding an AAV variant capsid protein is operatively linked to a p40 promoter.

[00472] 58. The method of any one of embodiments 1-57, wherein the nucleic acid encoding a reporter protein is operatively linked to a cell type and/or tissue specific promoter.

[00473] 59. The method of embodiment 58, wherein the cell type and/or tissue specific promoter is selected from the group consisting of: human synapsin promoter (hSyn1), transthyretin promoter (TTR), cytokeratin 18, cytokeratin 19, unc-45 myosin chaperon B (unc45b) promoter, cardiac troponin T (cTnT) promoter, glial fibrillary acidic protein (GFAP) promoter, myelin basic protein (MBP) promoter, and methyl CpG-binding protein *2 (*Mecp2) promoter.

[00474] 60. The method of embodiment 59, wherein the cell type and/or tissue specific promoter is the hSyn1 promoter.

[00475] 61. The method of embodiment 60, wherein the cell type and/or tissue specific promoter is the TTR promoter.

[00476] 62. The method of any one of embodiments 1-61, wherein the reporter protein is fused to the localization signal.

[00477] 63. The method of embodiment 62, wherein the localization signal is fused N-terminally, C-terminally or both N-terminally and C-terminally to the reporter protein.

[00478] 64. The method of any one of embodiments 1-63, wherein the localization signal is a nuclear localization signal (NLS), a nuclear envelope binding domain or a histone binding domain.

[00479] 65. The method of embodiment 64, wherein the NLS is the SV40 NLS.

[00480] 66. The method of embodiment 64, wherein the nuclear envelope binding domain is a KASH domain.

[00481] 67. The method of embodiment 64, wherein the histone binding domain is H2B.

[00482] 68. The method of any one of embodiments 1-67, wherein the nucleic acid comprising the barcode is 5-18 nucleotides long.

[00483] 69. The method of any one of embodiments 1-68, wherein the nucleic acid comprising the barcode comprises a sequence selected from any one of sequences SEQ ID NO: 111-154.

[00484] 70. The method of any one of embodiments 1-68, wherein the nucleic acid comprising the barcode comprises a sequence selected from any one of sequences SEQ ID NO: 155-198.

[00485] 71. The method of any one of embodiments 1-68, wherein the nucleic acid comprising the barcode is selected from any one of sequences SEQ ID NO: 111-154.

[00486] 72. The method of any one of embodiments 1-68, wherein the nucleic acid comprising the barcode is selected from any one of sequences SEQ ID NO: 155-198.

[00487] 73. The method of any one of embodiments 1-72, wherein the AAV capsid variant with the desired characteristic is identified through sequencing of the associated one or more barcodes.

[00488] 74. The method of any one of embodiments 1-73, wherein the AAV capsid variant with the desired characteristic is identified by purification and sequencing of the AAV genome.

[00489] 75. The method of any one of embodiments 1-74, wherein the cell, cell line or tissue is selected from the group consisting of CNS, heart, lung, trachea, esophagus, muscle, bone, cartilage, stomach, pancreas, intestine, liver, bladder, kidney, ureter,

urethra, uterus, fallopian tube, ovary, testes, prostate, eye, blood, lymph, and oral mucosa.

[00490] 76. The method of any one of embodiments 1-74, wherein the cell is selected from: neurons, glial cells, astrocytes, oligodendroglia, microglia, Schwann cells, ependymal cells, hepatocytes, stellate fat storing cells, Kupffer cells, liver endothelial cells, epithelial cells, cardiomyocytes, smooth muscle cells, T-cells, B cells, hematopoietic stem cells, and embryonic stem cells.

[00491] 77. A library of AAV variants, wherein each member of said library comprises:

a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and

one or more of:

b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a);

c) a nucleic acid encoding a localization signal;

d) a nucleic acid comprising a barcode; and

e) a nucleic acid encoding a reporter protein.

[00492] 78. A library of AAV variants, wherein each member of said library comprises:

a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and

one or more of:

b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a) in the nucleic acid sequence flanking the peptide insertion site;

c) a nucleic acid encoding a localization signal;

d) a nucleic acid comprising a barcode; and

e) a nucleic acid encoding a reporter protein.

[00493] 79. The library of embodiment 77, wherein each member of the library comprises one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a).

[00494] 80. The library of embodiment 78, wherein each member of the library comprises one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a) in the nucleic acid sequence flanking the peptide insertion site.

[00495] 81. The library of any one of embodiments 77-80, wherein each member of the library comprises a nucleic acid encoding a localization signal.

[00496] 82. The library of any one of embodiments 77-81, wherein each member of the library comprises a nucleic acid comprising a barcode.

[00497] 83. The library of any one of embodiments 77-82, wherein each member of the library comprises a first nucleic acid comprising a first barcode and a second nucleic acid comprising a second barcode.

[00498] 84. The library of embodiment 83, wherein the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode are different.

[00499] 85. The library of embodiment 84, wherein the first nucleic acid comprising the first barcode sequence comprises a sequence selected from any one of sequences SEQ ID NO: 111-154.

[00500] 86. The library of embodiment 84, wherein the first nucleic acid comprising the first barcode sequence is selected from any one of sequences SEQ ID NO: 111-154.

[00501] 87. The library of embodiment 84, wherein the second nucleic acid comprising the second barcode sequence comprises a sequence selected from any one of sequences SEQ ID NO: 155-198.

[00502] 88. The library of embodiment 84, wherein the second nucleic acid comprising the second barcode sequence is selected from any one of sequences SEQ ID NO: 155-198.

[00503] 89. The library of any one of embodiments 83-88, wherein each of the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode is independently operatively linked to a promoter.

[00504] 90. The library of embodiment 89, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the second nucleic acid comprising the second barcode is each independently an RNA Pol II promoter.

[00505] 91. The library of embodiment 89, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the second nucleic acid comprising the second barcode is each independently an RNA Pol III promoter.

[00506] 92. The library of embodiment 89, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode is operatively linked to an RNA Pol

II promoter and the promoter operatively linked to the second nucleic acid comprising the second barcode is an RNA Pol III promoter.

[00507] 93. The library of any one of embodiments 90-91, wherein the RNA Pol II promoter is selected from the group consisting of: human synapsin promoter (hSyn1), transthyretin promoter (TTR), cytokeratin 18, cytokeratin 19, unc-45 myosin chaperon B (unc45b) promoter, cardiac troponin T (cTnT) promoter, glial fibrillary acidic protein (GFAP) promoter, myelin basic protein (MBP) promoter, and methyl CpG-binding protein *2* (Mecp2) promoter.

[00508] 94. The library of any one of embodiments 91-93, wherein the RNA Pol III promoter is selected from the group consisting of U6 promoter, H1 promoter and 7SK promoter.

[00509] 95. The library of any one of embodiments 77-94, wherein each member of the library comprises a nucleic acid encoding a reporter protein.

[00510] 96. The library of any one of embodiments 77-95, wherein the nucleic acid encoding an AAV variant capsid protein, and the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are located in separate nucleic acid molecules.

[00511] 97. The library of any one of embodiments 77-95, wherein the nucleic acid encoding an AAV variant capsid protein, the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are located in one nucleic acid molecule.

[00512] 98. The library of embodiment 97, wherein the nucleic acid encoding an AAV variant capsid protein, and the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are linked to each other in any order.

[00513] 99. The library of embodiment 97, wherein each member of the library comprises: a 5'ITR sequence, the nucleic acid comprising a barcode, the nucleic acid encoding a reporter protein, the nucleic acid encoding an AAV variant capsid protein, and a 3'ITR sequence, in that order.

[00514] 100. The library of any one of embodiments 77-99, wherein the AAV variants are derived from one or more of: AAV1, AAV2, AAV3B, AAV5, AAV6, AAV8, AAV9, AAV3, AAV4, AAV7, AAV11, AAVrh10, AAVrh39, and AAVrh74.

[00515] 101. The library of embodiment 100, wherein the library of AAV variants comprises AAV variant capsid proteins derived from two or more AAV serotypes.

[00516] 102. The library of any one of embodiments 77-101, wherein the peptide has a length of 4-15 amino acids.

[00517] 103. The library of embodiment 102, wherein the peptide has a length of 6-15 amino acids.

[00518] 104. The library of embodiment 103, wherein the peptide has a length of 7, 10, or 15 amino acids.

[00519] 105. The library of embodiment 104, wherein the peptide has a length of 7 amino acids.

[00520] 106. The library of any one of embodiments 77-105, wherein the peptide comprises at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO: 1-32.

[00521] 107. The library of embodiment 106, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 1-32.

[00522] 108. The library of any one of embodiments 77-106, wherein the peptide comprises at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO: 68-110.

[00523] 109. The library of embodiment 108, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 68-110.

[00524] 110. The library of any one of embodiments 77-109, wherein the peptide is inserted into a region selected from the group consisting of VR-I, VR-II, VR-III, VR-IV, VR-V, VR-VI, VR-VII, VR-VIII and VR-IX region of the capsid protein.

[00525] 111. The library of embodiment 110, wherein the peptide is inserted into the VR-I of the capsid protein.

[00526] 112. The library of embodiment 110, wherein the peptide is inserted into the VR-IV of the capsid protein.

[00527] 113. The library of embodiment 110, wherein the peptide is inserted into the VR-VIII of the capsid protein.

[00528] 114. The library of any one of embodiments 77-113, wherein the peptide is inserted into the capsid protein VP1, VP2, or VP3.

[00529] 115. The library of any one of embodiments 77-114, wherein the peptide is inserted at a location between amino acid residues 450 and 600 of the capsid protein.

[00530] 116. The library of any one of embodiments 77-115, wherein

(i) the AAV serotype is AAV1 and the peptide is inserted at amino acid position 590 of the capsid protein,

(ii) the AAV serotype is AAV6 and the peptide is inserted at amino acid position 454 or 590 of the capsid protein,

(iii) the AAV serotype is AAV2 and the peptide is inserted at amino acid position 588 of the capsid protein,

(iv) the AAV serotype is AAV3B and the peptide is inserted at amino acid position 589 of the capsid protein,

(v) the AAV serotype is AAV5 and the peptide is inserted at amino acid position 578 of the capsid protein,

(vi) the AAV serotype is AAV8 and the peptide is inserted at amino acid position 591 of the capsid protein, or

(vii) the AAV serotype is AAV9 and the peptide is inserted at amino acid position 266, 455, or 589 of the capsid protein,

wherein the positions correspond to the numbering of VP1 in the AAV serotype.

[00531] 117. The library of any one of embodiments 77-116, wherein the reporter protein is a fluorescent protein.

[00532] 118. The library of embodiment 117, wherein the reporter protein is selected from the group consisting of: EGFP, mCherry, mClover3, mRuby3, mApple, iRFP, tdTomato, mVenus, YFP, RFP, firefly luciferase, and nanoluciferase.

[00533] 119. The library of any one of embodiments 77-118, wherein the nucleic acid encoding an AAV variant capsid protein is operatively linked to a p40 promoter.

[00534] 120. The library of any one of embodiments 77-119, wherein the nucleic acid encoding a reporter protein is operatively linked to a cell type and/or tissue specific promoter.

[00535] 121. The library of embodiment 120, wherein the cell type and/or tissue specific promoter is selected from the group consisting of: human synapsin promoter (hSyn1), transthyretin promoter (TTR), cytokeratin 18, cytokeratin 19, unc-45 myosin chaperon B (unc45b) promoter, cardiac troponin T (cTnT) promoter, glial fibrillary acidic protein (GFAP) promoter, myelin basic protein (MBP) promoter, and methyl CpG-binding protein *2* (Mecp2) promoter.

[00536] 122. The library of embodiment 121, wherein the cell type and/or tissue specific promoter is the hSyn1 promoter.

[00537] 123. The library of embodiment 121, wherein the cell type and/or tissue specific promoter is the TTR promoter.

[00538] 124. The library of any one of embodiments 77-123, wherein the reporter protein is fused to the localization signal.

[00539] 125. The library of embodiment 124, wherein the localization signal is fused N-terminally, C-terminally or both N-terminally and C-terminally to the reporter protein.

[00540] 126. The library of any one of embodiments 77-125, wherein the localization signal is a nuclear localization signal (NLS), a nuclear envelope binding domain or a histone binding domain.

[00541] 127. The library of embodiment 126, wherein the NLS is the SV40 NLS.

[00542] 128. The library of embodiment 126, wherein the nuclear envelope binding domain is a KASH domain.

[00543] 129. The library of embodiment 126, wherein the histone binding domain is H2B.

[00544] 130. The library of any one of embodiments 77-129, wherein the nucleic acid comprising the barcode is 5-18 nucleotides long.

[00545] 131. The library of any one of embodiments 77-130, wherein the nucleic acid comprising the barcode comprises a sequence selected from any one of sequences SEQ ID NO: 111-154.

[00546] 132. The library of any one of embodiments 77-130, wherein the nucleic acid comprising the barcode comprises a sequence selected from any one of sequences SEQ ID NO: 155-198.

[00547] 133. The library of any one of embodiments 77-132, wherein the nucleic acid comprising the barcode is selected from any one of sequences SEQ ID NO: 111-154.

[00548] 134. The library of any one of embodiments 77-132, wherein the nucleic acid comprising the barcode is selected from any one of sequences SEQ ID NO: 155-198.

[00549] 135. An AAV variant comprising:

a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and

one or more of:

b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a);

c) a nucleic acid encoding a localization signal;

d) a nucleic acid comprising a barcode; and

e) a nucleic acid encoding a reporter protein.

[00550] 136. An AAV variant comprising:

a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and

one or more of:

b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a) in the nucleic acid sequence flanking the peptide insertion site;

c) a nucleic acid encoding a localization signal;

d) a nucleic acid comprising a barcode; and

e) a nucleic acid encoding a reporter protein.

[00551] 137. The variant of embodiment 135, wherein the variant comprises one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a).

[00552] 138. The variant of embodiment 136, wherein the variant comprises one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a) in the nucleic acid sequence flanking the peptide insertion site.

[00553] 139. The variant of any one of embodiments 135-136, wherein the variant comprises a nucleic acid encoding a localization signal.

[00554] 140. The variant of any one of embodiment 135-139, wherein the variant comprises a nucleic acid comprising a barcode.

[00555] 141. The variant of any one of embodiments 138-139, wherein the variant comprises a first nucleic acid comprising a first barcode and a second nucleic acid comprising a second barcode.

[00556] 142. The variant of embodiment 141, wherein the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode are different.

[00557] 143. The variant of embodiment 142, wherein the first nucleic acid comprising the first barcode sequence comprises a sequence selected from any one of sequences SEQ ID NO: 111-154.

[00558] 144. The variant of embodiment 142, wherein the first nucleic acid comprising the first barcode sequence is selected from any one of sequences SEQ ID NO: 111-154.

[00559] 145. The variant of embodiment 142, wherein the second nucleic acid comprising the second barcode sequence comprises a sequence selected from any one of sequences SEQ ID NO: 155-198.

[00560] 146. The variant of embodiment 142, wherein the second nucleic acid comprising the second barcode sequence is selected from any one of sequences SEQ ID NO: 155-198.

[00561] 147. The variant of any one of embodiments 142-146, wherein each of the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode is independently operatively linked to a promoter.

[00562] 148. The variant of embodiment 147, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the second nucleic acid comprising the second barcode is each independently an RNA Pol II promoter.

[00563] 149. The variant of embodiment 147, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the second nucleic acid comprising the second barcode is each independently an RNA Pol III promoter.

[00564] 150. The variant of embodiment 147, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode is operatively linked to an RNA Pol II promoter and the promoter operatively linked to the second nucleic acid comprising the second barcode is an RNA Pol III promoter.

[00565] 151. The variant of any one of embodiments 148-150, wherein the RNA Pol II promoter is selected from the group consisting of: human synapsin promoter (hSyn1), transthyretin promoter (TTR), cytokeratin 18, cytokeratin 19, unc-45 myosin chaperon B (unc45b) promoter, cardiac troponin T (cTnT) promoter, glial fibrillary acidic protein (GFAP) promoter, myelin basic protein (MBP) promoter, and methyl CpG-binding protein *2* (Mecp2) promoter.

[00566] 152. The variant of any one of embodiments 149-151, wherein the RNA Pol III promoter is selected from the group consisting of U6 promoter, H1 promoter and 7SK promoter.

[00567] 153. The variant of any one of embodiment 135-152, wherein the variant comprises a nucleic acid encoding a reporter protein.

[00568] 154. The variant of any one of embodiments 135-153, wherein the nucleic acid encoding an AAV variant capsid protein, and the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are located in separate nucleic acid molecules.

[00569] 155. The variant of any one of embodiments 135-154, wherein the nucleic acid encoding an AAV variant capsid protein, the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are located in one nucleic acid molecule.

[00570] 156. The variant of embodiment 155, wherein the nucleic acid encoding an AAV variant capsid protein, and the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are linked to each other in any order.

[00571] 157. The variant of embodiment 156, wherein the variant comprises: a 5'ITR sequence, the nucleic acid comprising a barcode, the nucleic acid encoding a reporter protein, the nucleic acid encoding an AAV variant capsid protein, and a 3'ITR sequence, in that order.

[00572] 158. The variant of any one of embodiments 135-157, wherein the AAV variant is derived from the group consisting of: AAV1, AAV2, AAV3B, AAV5, AAV6, AAV8, AAV9, AAV3, AAV4, AAV7, AAV11, AAVrh10, AAVrh39, and AAVrh74.

[00573] 159. The variant of any one of embodiments 135-158, wherein the peptide has a length of 4-15 amino acids.

[00574] 160. The variant of embodiment 159, wherein the peptide has a length of 6-15 amino acids.

[00575] 161. The variant of embodiment 160, wherein the peptide has a length of 7, 10, or 15 amino acids.

[00576] 162. The variant of embodiment 161, wherein the peptide has a length of 7 amino acids.

[00577] 163. The variant of any one of embodiments 135-162, wherein the inserted peptide comprises at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO: 1-32.

[00578] 164. The variant of embodiment 163, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 1-32.

[00579] 165. The variant of any one of embodiments 135-162, wherein the inserted peptide comprises at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO: 68-110.

[00580] 166. The variant of embodiment 165, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 68-110.

[00581] 167. The variant of any one of embodiments 135-166, wherein the peptide is inserted into a region selected from the group consisting of VR-I, VR-II, VR-III, VR-IV, VR-V, VR-VI, VR-VII, VR-VIII and VR-IX region of the capsid protein.

[00582] 168. The variant of embodiment 167, wherein the peptide is inserted into the VR-I of the capsid protein.

[00583] 169. The variant of embodiment 167, wherein the peptide is inserted into the VR-IV of the capsid protein.

[00584] 170. The variant of embodiment 168, wherein the peptide is inserted into VR-VIII of the capsid protein.

[00585] 171. The variant of any one of embodiments 135-170, wherein the peptide is inserted into the capsid protein VP1, VP2, or VP3.

[00586] 172. The variant of any one of embodiments 135-171, wherein the peptide is inserted at a location between amino acid residues 450 and 600 of the capsid protein.

[00587] 173. The variant of any one of embodiments 135-172, wherein

(i) the AAV serotype is AAV1 and the peptide is inserted at amino acid position 590 of the capsid protein,

(ii) the AAV serotype is AAV6 and the peptide is inserted at amino acid position 454 or 590 of the capsid protein,

(iii) the AAV serotype is AAV2 and the peptide is inserted at amino acid position 588 of the capsid protein,

(iv) the AAV serotype is AAV3B and the peptide is inserted at amino acid position 589 of the capsid protein,

(v) the AAV serotype is AAV5 and the peptide is inserted at amino acid position 578 of the capsid protein,

(vi) the AAV serotype is AAV8 and the peptide is inserted at amino acid position 591 of the capsid protein, or

(vii) the AAV serotype is AAV9 and the peptide is inserted at amino acid position 266, 455, or 589 of the capsid protein,

wherein the positions correspond to the numbering of VP1 in the AAV serotype.

[00588] 174. The variant of any one of embodiments 135-173, wherein the reporter protein is a fluorescent protein.

[00589] 175. The variant of embodiment 174, wherein the reporter protein is selected from the group consisting of: EGFP, mCherry, mClover3, mRuby3, mApple, iRFP, tdTomato, mVenus, YFP, RFP, firefly luciferase, and nanoluciferase.

[00590] 176. The variant of any one of embodiments 135-175, wherein the nucleic acid encoding an AAV variant capsid protein is operatively linked to a p40 promoter.

[00591] 177. The variant of any one of embodiments 138-176, wherein the nucleic acid encoding a reporter protein is operatively linked to a cell type and/or tissue specific promoter.

[00592] 178. The variant of embodiment 177, wherein the cell type and/or tissue specific promoter is selected from the group consisting of: human synapsin promoter (hSyn1), transthyretin promoter (TTR), cytokeratin 18, cytokeratin 19, unc-45 myosin chaperon B (unc45b) promoter, cardiac troponin T (cTnT) promoter, glial fibrillary acidic protein (GFAP) promoter, myelin basic protein (MBP) promoter, and methyl CpG-binding protein *2* (Mecp2) promoter.

[00593] 179. The variant of embodiment 178, wherein the cell type and/or tissue specific promoter is the hSyn1 promoter.

[00594] 180. The variant of embodiment 178, wherein the cell type and/or tissue specific promoter is the TTR promoter.

[00595] 181. The variant of any one of embodiments 135-180, wherein the reporter protein is fused to the localization signal.

[00596] 182. The variant of embodiment 181, wherein the localization signal is fused N-terminally, C-terminally or both N-terminally and C-terminally to the reporter protein.

[00597] 183. The variant of any one of embodiments 135-182, wherein the localization signal is a nuclear localization signal (NLS), a nuclear envelope binding domain or a histone binding domain.

[00598] 184. The variant of embodiment 183, wherein the NLS is the SV40 NLS.

[00599] 185. The variant of embodiment 183, wherein the nuclear envelope binding domain is a KASH domain.

[00600] 186. The variant of embodiment 183, wherein the histone binding domain is H2B.

[00601] 187. The variant of any one of embodiments 135-186, wherein the nucleic acid comprising the barcode is 5-18 nucleotides long.

[00602] 188. The variant of any one of embodiments 135-187, wherein the nucleic acid comprising the barcode comprises a sequence selected from any one of sequences SEQ ID NO: 111-154.

[00603] 189. The variant of embodiment 188, wherein the nucleic acid comprising the barcode is selected from any one of sequences SEQ ID NO: 111-154.

[00604] 190. The variant of any one of embodiments 135-187, wherein the nucleic acid comprising the barcode comprises a sequence selected from any one of sequences SEQ ID NO: 155-198.

[00605] 191. The variant of embodiment 190, wherein the nucleic acid comprising the barcode is selected from any one of sequences SEQ ID NO: 155-198.

[00606] 192. The variant of any one of embodiments 135-191, wherein the AAV variant is derived from AAV1.

[00607] 193 The variant of embodiment 192, wherein the variant comprises a peptide comprising an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 68 to SEQ ID NO: 75.

[00608] 194. The variant of embodiment 192, wherein the variant comprises a peptide comprising an amino acid sequence selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2 and SEQ ID NO: 3.

[00609] 195. The variant of embodiment 192, wherein the variant comprises a peptide comprising the amino acid sequence SEQ ID NO: 71.

[00610] 196. The variant of any one of embodiments 135-191, wherein the AAV variant is derived from AAV2.

[00611] 197. The variant of embodiment 196, wherein the variant comprises a peptide comprising an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 90 to SEQ ID NO: 110.

[00612] 198. The variant of embodiment 196, wherein the variant comprises a peptide comprising any one of the sequences selected from the group consisting of SEQ ID NO: 95, SEQ ID NO: 94, SEQ ID NO: 96, SEQ ID NO: 101, SEQ ID NO: 103, SEQ ID NO: 106, SEQ ID NO: 91 and SEQ ID NO: 102.

[00613] 199. The variant of embodiment 196, wherein the variant comprises a peptide comprising an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 4-7.

[00614] 200. The variant of any one of embodiments 135-191, wherein the AAV variant is derived from AAV3B.

[00615] 201. The variant of embodiment 200, wherein the variant comprises a peptide comprising any one of the sequences selected from the group consisting of SEQ ID NO:

78, SEQ ID NO: 80, SEQ ID NO: 77, SEQ ID NO: 79, SEQ ID NO: 76 and SEQ ID NO: 83.

[00616] 202. The variant of embodiment 200, wherein the variant comprises a peptide comprising an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 8 to SEQ ID NO: 11.

[00617] 203. The variant of any one of embodiments 135-191, wherein the AAV variant is derived from AAV5.

[00618] 204. The variant of embodiment 203, wherein the variant comprises a peptide comprising an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 28 to SEQ ID NO: 32.

[00619] 205. The variant of any one of embodiments 135-191, wherein the AAV variant is derived from AAV6.

[00620] 206. The variant of embodiment 205, wherein the variant comprises a peptide comprising an amino acid sequence selected from the group consisting of consisting of any one of SEQ ID NO: 19 to SEQ ID NO: 27.

[00621] 207. The variant of any one of embodiments 135-191, wherein the AAV variant is derived from AAV9.

[00622] 208. The variant of embodiment 207, wherein the variant comprises a peptide comprising an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 12 to SEQ ID NO: 18.

[00623] 209. The variant of embodiment 207, wherein the variant comprises a peptide comprising an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 86 to SEQ ID NO: 89.

[00624] 210. The variant of embodiment 207, wherein the variant comprises a peptide comprising the sequence SEQ ID NO: 89.

[00625] 211. A nucleic acid molecule comprising:

a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and

one or more of:

b) a nucleic acid sequence encoding a variant capsid protein comprising one or more silent mutations in the nucleotide sequence flanking the peptide insertion site in the hypervariable and/or surface-exposed loop of the variant capsid protein;

c) a nucleic acid sequence encoding a localization signal;

d) a nucleic acid sequence comprising a barcode; and

e) a nucleic acid sequence encoding a reporter protein.

[00626] 212. The nucleic acid molecule of embodiment 211, wherein the nucleic acid sequence encoding an AAV variant capsid protein comprises one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a).

[00627] 213. The nucleic acid molecule of embodiment 212, wherein the nucleic acid molecule comprises a nucleic acid encoding a localization signal.

[00628] 214. The nucleic acid molecule of embodiment 212, wherein the nucleic acid molecule comprises a nucleic acid comprising a barcode.

[00629] 215. The nucleic acid molecule of embodiments 211-214, wherein the nucleic acid molecule comprises a first nucleic acid comprising a first barcode and a second nucleic acid comprising a second barcode.

[00630] 216. The nucleic acid molecule of embodiment 215, wherein the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode are different.

[00631] 217. The nucleic acid molecule of embodiment 216, wherein the first nucleic acid comprising the first barcode sequence comprises a sequence selected from any one of sequences SEQ ID NO: 111-154.

[00632] 218. The nucleic acid molecule of embodiment 217, wherein the first nucleic acid comprising the first barcode sequence is selected from any one of sequences SEQ ID NO: 111-154.

[00633] 219. The nucleic acid molecule of embodiment 216, wherein the second nucleic acid comprising the second barcode sequence comprises a sequence selected from any one of sequences SEQ ID NO: 155-198.

[00634] 220. The nucleic acid molecule of embodiment 217, wherein the second nucleic acid comprising the second barcode sequence is selected from any one of sequences SEQ ID NO: 155-198.

[00635] 221. The nucleic acid molecule of any one of embodiments 215-220, wherein each of the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode is independently operatively linked to a promoter.

[00636] 222. The nucleic acid molecule of embodiment 221, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter

operatively linked to the second nucleic acid comprising the second barcode is each independently an RNA Pol II promoter.

[00637] 223. The nucleic acid molecule of embodiment 221, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the second nucleic acid comprising the second barcode is each independently an RNA Pol III promoter.

[00638] 224. The nucleic acid molecule of embodiment 221, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode is operatively linked to an RNA Pol II promoter and the promoter operatively linked to the second nucleic acid comprising the second barcode is an RNA Pol III promoter.

[00639] 225. The nucleic acid molecule of any one of embodiments 222-224, wherein the RNA Pol II promoter is selected from the group consisting of: human synapsin promoter (hSyn1), transthyretin promoter (TTR), cytokeratin 18, cytokeratin 19, unc-45 myosin chaperon B (unc45b) promoter, cardiac troponin T (cTnT) promoter, glial fibrillary acidic protein (GFAP) promoter, myelin basic protein (MBP) promoter, and methyl CpG-binding protein *2* (Mecp2) promoter.

[00640] 226. The nucleic acid molecule of any one of embodiments 223-224, wherein the RNA Pol III promoter is selected from the group consisting of U6 promoter, H1 promoter and 7SK promoter.

[00641] 227. The nucleic acid molecule of any one of embodiments 211-226, where the nucleic acid molecule comprises a nucleic acid encoding a reporter protein.

[00642] 228. The nucleic acid molecule of any one of embodiments 211-227, wherein the AAV variants are derived from one or more of: AAV1, AAV2, AAV3B, AAV5, AAV6, AAV8, AAV9, AAV3, AAV4, AAV7, AAV11, AAVrh10, AAVrh39, and AAVrh74.

[00643] 229. The nucleic acid molecule of any one of embodiments 211-228, wherein the inserted peptide has a length of 4-15 amino acids.

[00644] 230. The nucleic acid molecule of embodiment 229, wherein the inserted peptide comprises at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO: 1-32.

[00645] 231. The nucleic acid molecule of embodiment 229, wherein the inserted peptide comprises at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO: 68-110.

[00646] 232. The nucleic acid molecule of any one of embodiments 211-231, wherein the nucleic acid encoding a reporter protein is operatively linked to a cell type and/or tissue specific promoter.

[00647] 233. The nucleic acid molecule of embodiment 232, wherein the cell type and/or tissue specific promoter is the hSyn1 promoter.

[00648] 234. The nucleic acid molecule of any one of embodiments 211-233, wherein the nucleic acid comprising the barcode comprises a sequence selected from any one of sequences SEQ ID NO: 111-154.

[00649] 235. The nucleic acid molecule of any one of embodiments 211-233, wherein the nucleic acid comprising the barcode comprises a sequence selected from any one of sequences SEQ ID NO: 155-198.

[00650] 236. Use of an AAV variant according to any one of embodiments 135-210 to deliver a transgene to a target cell or tissue.

[00651] 237. An AAV vector comprising a nucleic acid molecule encoding a peptide that comprises at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO: 1-32.

[00652] 238. The AAV vector of embodiment 237, wherein the nucleic acid encodes a peptide that comprises an amino acid sequence set forth in any one of SEQ ID NO: 1-32.

[00653] 239. The AAV vector of embodiment 237 or 238, wherein the nucleic acid encodes a peptide having a sequence of any of one of SEQ ID NO: 1-32.

[00654] 240. An AAV vector comprising a nucleic acid molecule encoding a peptide that comprises at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO:68-110.

[00655] 241. The AAV vector of embodiment 240, wherein the nucleic acid encodes a peptide that comprises an amino acid sequence set forth in any one of SEQ ID NO: 68-110.

[00656] 242. The AAV vector of embodiment 240 or 241, wherein the nucleic acid encodes a peptide having the sequence of any of one of SEQ ID NO: 68-110.

[00657] 243. The AAV vector of embodiment 240, wherein the nucleic acid encodes a peptide that comprises an amino acid sequence set forth in any one of SEQ ID NO: 71, 76-80, 83, 89, 91, 94-96, 101-103 and 106.

[00658] 244. The AAV vector of any one of embodiments 237-243, wherein the peptide is a part of a capsid protein.

[00659] 245. The AAV vector of embodiment 244, wherein the capsid protein is VP1, VP2, or VP3.

[00660] 246. The AVV vector of any one of embodiments 237-245, wherein the peptide is inserted at a location between amino acid residues 450 and 600 of the capsid protein.

[00661] 247. The AAV vector of embodiment 246, wherein the peptide is inserted at

(i) amino acid position 590 of an AAV1 capsid protein,

(ii) amino acid position 454 or 590 of an AAV6 capsid protein,

(iii) amino acid position 588 of an AAV2 capsid protein,

(iv) amino acid position 589 of an AAV3B capsid protein,

(v) amino acid position 578 of an AAV5 capsid protein,

(vi) amino acid position 591 of the an AAV8 capsid protein, or

(vi) amino acid position 266, 455, or 589 of an AAV9 capsid protein,

wherein the positions correspond to the numbering of VP1 in the AAV serotype.

[00662] 248. A pharmaceutical composition comprising the AAV vector of any one of embodiments 237-247 and a pharmaceutically acceptable carrier.

[00663] 249. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 1-32.

[00664] 250. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 68-110.

[00665] 251. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 71, 76-80, 83, 89, 91, 94-96, 101-103 and 106.

[00666] 252. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 71, 76-80, 83 and 94-96.

[00667] 253. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 89, 91, 101-103 and 106.

[00668] 254. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 68 to SEQ ID NO: 75.

[00669] 255. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 1, SEQ ID NO: 2 and SEQ ID NO: 3.

[00670] 256. A peptide comprising an amino acid sequence set forth in SEQ ID NO: 71.

[00671] 257. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 90 to SEQ ID NO: 110.

[00672] 258. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 95, SEQ ID NO: 94, SEQ ID NO: 96, SEQ ID NO: 101, SEQ ID NO: 103, SEQ ID NO: 106, SEQ ID NO: 91 and SEQ ID NO: 102.

[00673] 259. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 4-7.

[00674] 260. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 77, SEQ ID NO: 79, SEQ ID NO: 76 and SEQ ID NO: 83.

[00675] 261. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 8 to SEQ ID NO: 11.

[00676] 262. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 28 to SEQ ID NO: 32.

[00677] 263. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 19 to SEQ ID NO: 27.

[00678] 264. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 12 to SEQ ID NO: 18.

[00679] 265. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 86 to SEQ ID NO: 89.

[00680] 266. A peptide comprising an amino acid sequence set forth in SEQ ID NO: 89.

[00681] 267. The peptide of any one of embodiments 249-266, wherein the peptide is part of an AAV vector.

[00682] 268. The peptide of embodiment 267, wherein the peptide is part of a capsid protein of the AAV vector.

[00683] 269. A nucleic acid molecule encoding the peptide of any one of embodiments 249-268.

[00684] 270. A capsid protein comprising a peptide comprising at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO: 1-32.

[00685] 271. A capsid protein comprising a peptide comprising at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO:68-110.

[00686] 272. The capsid protein of embodiment 270, wherein the peptide comprises the amino acid sequence set forth in any one of SEQ ID NO: 1-32.

[00687] 273. The capsid protein of embodiment 271, wherein the peptide comprises the amino acid sequence set forth in any one of SEQ ID NO: 68-110.

[00688] 274. The capsid protein of embodiment 270, comprising the amino acid sequence set forth in any one of SEQ ID NO: 1-32.

[00689] 275. The capsid protein of embodiment 271, comprising the amino acid sequence set forth in any one of SEQ ID NO:68-110.

[00690] 276. The capsid protein of embodiment 271, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 71, 76-80, 83, 89, 91, 94-96, 101-103 and 106.

[00691] 277. The capsid protein of embodiment 271, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 71, 76-80, 83 and 94-96.

[00692] 278. The capsid protein of embodiment 271, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 89, 91, 101-103 and 106.

[00693] 279. The capsid protein of embodiment 271, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 68 to SEQ ID NO: 75.

[00694] 280. The capsid protein of embodiment 270, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 1, SEQ ID NO: 2 and SEQ ID NO: 3.

[00695] 281. The capsid protein of embodiment 271, wherein the peptide comprises an amino acid sequence set forth in SEQ ID NO: 71.

[00696] 282. The capsid protein of embodiment 271, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 90 to SEQ ID NO: 110.

[00697] 283. The capsid protein of embodiment 271, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 95, SEQ ID NO: 94, SEQ ID NO: 96, SEQ ID NO: 101, SEQ ID NO: 103, SEQ ID NO: 106, SEQ ID NO: 91 and SEQ ID NO: 102.

[00698] 284. The capsid protein of embodiment 270, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 4-7.

[00699] 285. The capsid protein of embodiment 271, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 77, SEQ ID NO: 79, SEQ ID NO: 76 and SEQ ID NO: 83.

[00700] 286. The capsid protein of embodiment 270, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 8 to SEQ ID NO: 11.

[00701] 287. The capsid protein of embodiment 270, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 28 to SEQ ID NO: 32.

[00702] 288. The capsid protein of embodiment 270, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 19 to SEQ ID NO: 27.

[00703] 289. The capsid protein of embodiment 270, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 12 to SEQ ID NO: 18.

[00704] 290. The capsid protein of embodiment 271, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 86 to SEQ ID NO: 89.

[00705] 291. The capsid protein of embodiment 271, wherein the peptide comprises an amino acid sequence set forth in SEQ ID NO: 89.

[00706] 292. A nucleic acid molecule encoding the capsid protein of any one of embodiments 269-291.

[00707] 293. A method of delivering a nucleic acid to a target cell or tissue of a subject, comprising: administering a composition comprising an AAV vector according to any one of embodiments 237-247.

[00708] 294. The method of embodiment 293, wherein the capsid protein comprises an amino acid sequence set forth in any one of SEQ ID NO: 1-32.

[00709] 295. The method of embodiment 293, wherein the capsid protein comprises an amino acid sequence set forth in any one of SEQ ID NO:68-110.

[00710] 296. The method of any one of embodiments 293-295, wherein the target cell, cell line or tissue is selected from the group consisting of CNS, heart, lung, trachea, esophagus, muscle, bone, cartilage, stomach, pancreas, intestine, liver, bladder, kidney, ureter, urethra, uterus, fallopian tube, ovary, testes, prostate, eye, blood, lymph, and oral mucosa.

[00711] 297. The method of any one of embodiments 293-295, wherein the target cell is selected from the group consisting of neurons, glial cells, astrocytes, oligodendroglia, microglia, Schwann cells, ependymal cells, hepatocytes, stellate fat storing cells, Kupffer cells, liver endothelial cells, epithelial cells, cardiomyocytes, smooth muscle cells, T-cells, B cells, hematopoietic stem cells, and embryonic stem cells.

[00712] 298. The method of embodiment 296, wherein the target cell or tissue is from liver.

[00713] 299. The method of embodiment 296, wherein the target cell or tissue is from CNS.

[00714] 300. A pharmaceutical composition comprising the variant of any one of embodiments 135-211 and a pharmaceutically acceptable carrier.

[00715] 301. The library of embodiment 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype.

[00716] 302. The library of embodiment 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype.

[00717] 303. The library of embodiment 302, wherein the peptide comprises an amino acid sequence of any one of SEQ ID NO: 68-75.

[00718] 304. The library of embodiment 302, wherein the peptide comprises the amino acid sequence SEQ ID NO: 71.

[00719] 305. The library of embodiment 301, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 1, SEQ ID NO: 2 and SEQ ID NO: 3.

[00720] 306. The library of embodiment 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype.

[00721] 307. The library of embodiment 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype.

[00722] 308. The library of embodiment 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype.

[00723] 309. The library of embodiment 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype.

[00724] 310. The library of any one of embodiments 306 and 308, wherein the peptide comprises an amino acid sequence of any one of SEQ ID NO: 19 to SEQ ID NO: 27.

[00725] 311. The library of embodiment 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype.

[00726] 312. The library of embodiment 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype.

[00727] 313. The library of embodiment 312, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 90 to SEQ ID NO: 110.

[00728] 314. The library of embodiments 312, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 95, SEQ ID NO: 94, SEQ ID NO: 96, SEQ ID NO: 101, SEQ ID NO: 103, SEQ ID NO: 106, SEQ ID NO: 91 and SEQ ID NO: 102.

[00729] 315. The library of embodiments 311, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 4-7.

[00730] 316. The library of embodiment 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype.

[00731] 317. The library of embodiment 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype.

[00732] 318. The library of embodiment 317, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 76- 85.

[00733] 319. The library of embodiment 317, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 77, SEQ ID NO: 79, SEQ ID NO: 76 and SEQ ID NO: 83.

[00734] 320. The library of embodiment 316, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 8 to SEQ ID NO: 11.

[00735] 321. The library of embodiment 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype.

[00736] 322. The library of embodiment 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype.

[00737] 323. The library of embodiment 321, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one SEQ ID NO: 28 to SEQ ID NO: 32.

[00738] 324. The library of embodiment 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype.

[00739] 325. The library of embodiment 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype.

[00740] 326. The library of embodiment 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype.

[00741] 327. The library of embodiment 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype.

[00742] 328. The library of embodiment 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 455 of the capsid protein of an AAV9 serotype.

[00743] 329. The library of embodiment 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 455 of the capsid protein of an AAV9 serotype.

[00744] 330. The library of embodiment 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype.

[00745] 331. The library of embodiment 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype.

[00746] 332. The library of any one of embodiments 326, 328, and 330, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 12 to SEQ ID NO: 18.

[00747] 333. The library of any one of embodiments 327, 329, and 331, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 86 to SEQ ID NO: 89.

[00748] 334. The library of any one of embodiments 327, 329, and 331, wherein the peptide comprises the sequence of SEQ ID NO: 89.

[00749] 335. The AAV variant of embodiment 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype.

[00750] 336. The AAV variant of embodiment 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype.

[00751] 337. The AAV variant of embodiment 336, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 68 to SEQ ID NO: 75.

[00752] 338. The AAV variant of embodiment 336, wherein the peptide comprises the amino acid sequence SEQ ID NO: 71.

[00753] 339. The AAV variant of embodiment 335, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 1, SEQ ID NO: 2 and SEQ ID NO: 3.

[00754] 340. The AAV variant of embodiment 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype.

[00755] 341. The AAV variant of embodiment 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype.

[00756] 342. The AAV variant of embodiment 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype.

[00757] 343. The AAV variant of embodiment 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype.

[00758] 344. The AAV variant of any one of embodiments 340 and 342, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 19 to SEQ ID NO: 27.

[00759] 345. The AAV variant of embodiment 173, wherein a peptide comprising the amino acid sequence of SEQ ID NO: 1-32 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype.

[00760] 346. The AAV variant of embodiment 173, wherein a peptide comprising the amino acid sequence of SEQ ID NO: 68-110 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype.

[00761] 347. The AAV variant of embodiment 346, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 90 to SEQ ID NO: 110.

[00762] 348. The AAV variant of embodiments 346, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 95, SEQ ID NO: 94, SEQ ID NO: 96, SEQ ID NO: 101, SEQ ID NO: 103, SEQ ID NO: 106, SEQ ID NO: 91 and SEQ ID NO: 102.

[00763] 349. The AAV variant of embodiments 345, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 4-7.

[00764] 350. The AAV variant of embodiment 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype.

[00765] 351. The AAV variant of embodiment 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype.

[00766] 352. The AAV variant of embodiment 351, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 77, SEQ ID NO: 79, SEQ ID NO: 76 and SEQ ID NO: 83.

[00767] 353. The AAV variant of embodiment 350, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 8 to SEQ ID NO: 11.

[00768] 354. The AAV variant of embodiment 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype.

[00769] 355. The AAV variant of embodiment 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype.

[00770] 356. The AAV variant of embodiment 354, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one SEQ ID NO: 28 to SEQ ID NO: 32.

[00771] 357. The AAV variant of embodiment 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype.

[00772] 358. The AAV variant of embodiment 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype.

[00773] 359. The AAV variant of embodiment 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype.

[00774] 360. The AAV variant of embodiment 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype.

[00775] 361. The AAV variant of embodiment 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 455 of the capsid protein of an AAV9 serotype.

[00776] 362. The AAV variant of embodiment 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 455 of the capsid protein of an AAV9 serotype.

[00777] 363. The AAV variant of embodiment 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype.

[00778] 364. The AAV variant of embodiment 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype.

[00779] 365. The AAV variant of any one of embodiments 359, 361, and 363, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 12 to SEQ ID NO: 18.

[00780] 366. The AAV variant of any one of embodiments 360, 362, and 364, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 86 to SEQ ID NO: 89.

[00781] 367. The AAV variant of any one of embodiments 360, 362, and 364, wherein the peptide comprises the sequence of SEQ ID NO: 89.

[00782] 368. The AAV vector of embodiment 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype.

[00783] 369. The AAV vector of embodiment 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype.

[00784] 370. The AAV vector of embodiment 369, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 68 to SEQ ID NO: 75.

[00785] 371. The AAV vector of embodiment 369, wherein the peptide comprises the amino acid sequence SEQ ID NO: 71.

[00786] 372. The AAV vector of embodiment 368, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 1, SEQ ID NO: 2 and SEQ ID NO: 3.

[00787] 373. The AAV vector of embodiment 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype.

[00788] 374. The AAV vector of embodiment 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype.

[00789] 375. The AAV vector of embodiment 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype.

[00790] 376. The AAV vector of embodiment 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype.

[00791] 377. The AAV vector of any one of embodiments 373 and 375, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 19 to SEQ ID NO: 27.

[00792] 378. The AAV vector of embodiment 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype.

[00793] 379. The AAV vector of embodiment 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype.

[00794] 380. The AAV vector of embodiment 379, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 90 to SEQ ID NO: 110.

[00795] 381. The AAV vector of embodiments 379, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 95, SEQ ID NO: 94, SEQ ID NO: 96, SEQ ID NO: 101, SEQ ID NO: 103, SEQ ID NO: 106, SEQ ID NO: 91 and SEQ ID NO: 102.

[00796] 382. The AAV vector of embodiments 378, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 4-7.

[00797] 383. The AAV vector of embodiment 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype.

[00798] 384. The AAV vector of embodiment 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype.

[00799] 385. The AAV vector of embodiment 384, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 77, SEQ ID NO: 79, SEQ ID NO: 76 and SEQ ID NO: 83.

[00800] 386. The AAV vector of embodiment 383, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 8 to SEQ ID NO: 11.

[00801] 387. The AAV vector of embodiment 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype.

[00802] 388. The AAV vector of embodiment 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype.

[00803] 389. The AAV vector of embodiment 387, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one SEQ ID NO: 28 to SEQ ID NO: 32.

[00804] 390. The AAV vector of embodiment 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype.

[00805] 391. The AAV vector of embodiment 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype.

[00806] 392. The AAV vector of embodiment 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype.

[00807] 393. The AAV vector of embodiment 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype.

[00808] 394. The AAV vector of embodiment 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 455 of the capsid protein of an AAV9 serotype.

[00809] 395. The AAV vector of embodiment 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 455 of the capsid protein of an AAV9 serotype.

[00810] 396. The AAV vector of embodiment 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype.

[00811] 397. The AAV vector of embodiment 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype.

[00812] 398. The AAV vector of any one of embodiments 392, 394, and 396, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 12 to SEQ ID NO: 18.

[00813] 399. The AAV vector of any one of embodiments 393, 395, and 397, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 86 to SEQ ID NO: 89.

[00814] 400. The AAV vector of any one of embodiments 393, 395, and 397, wherein the peptide comprises the sequence of SEQ ID NO: 89.

[00815] 401. A capsid protein comprising an inserted peptide, wherein the peptide is inserted at

(i) amino acid position 590 of an AAV1 capsid protein,

(ii) amino acid position 454 or 590 of an AAV6 capsid protein,

(iii) amino acid position 588 of an AAV2 capsid protein,

(iv) amino acid position 589 of an AAV3B capsid protein,

(v) amino acid position 578 of an AAV5 capsid protein,

(vi) amino acid position 591 of the an AAV8 capsid protein, or

(vi) amino acid position 266, 455, or 589 of an AAV9 capsid protein,

wherein the positions correspond to the numbering of VP1 in the AAV serotype.

[00816] 402. The capsid protein of embodiment 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype.

[00817] 403. The capsid protein of embodiment 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype.

[00818] 404. The capsid protein of embodiment 403, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 68 to SEQ ID NO: 75.

[00819] 405. The capsid protein of embodiment 403, wherein the peptide comprises the amino acid sequence SEQ ID NO: 71.

[00820] 406. The capsid protein of embodiment 402, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 1, SEQ ID NO: 2 and SEQ ID NO: 3.

[00821] 407. The capsid protein of embodiment 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype.

[00822] 408. The capsid protein of embodiment 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype.

[00823] 409. The capsid protein of embodiment 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype.

[00824] 410. The capsid protein of embodiment 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype.

[00825] 411. The capsid protein of any one of embodiments 407 and 409, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 19 to SEQ ID NO: 27.

[00826] 412. The capsid protein of embodiment 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype.

[00827] 413. The capsid protein of embodiment 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype.

[00828] 414. The capsid protein of embodiment 413, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 90 to SEQ ID NO: 110.

[00829] 415. The capsid protein of embodiments 413, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 95, SEQ ID NO: 94, SEQ ID NO: 96, SEQ ID NO: 101, SEQ ID NO: 103, SEQ ID NO: 106, SEQ ID NO: 91 and SEQ ID NO: 102.

[00830] 416. The capsid protein of embodiments 412, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 4-7.

[00831] 417. The capsid protein of embodiment 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype.

[00832] 418. The capsid protein of embodiment 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype.

[00833] 419. The capsid protein of embodiment 418, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 77, SEQ ID NO: 79, SEQ ID NO: 76 and SEQ ID NO: 83.

[00834] 420. The capsid protein of embodiment 417, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 8 to SEQ ID NO: 11.

[00835] 421. The capsid protein of embodiment 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype.

[00836] 422. The capsid protein of embodiment 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype.

[00837] 423. The capsid protein of embodiment 421, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one SEQ ID NO: 28 to SEQ ID NO: 32.

[00838] 424. The capsid protein of embodiment 401, wherein a peptide comprising the amino acid sequence of SEQ ID NO: 1-32 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype.

[00839] 425. The capsid protein of embodiment 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype.

[00840] 426. The capsid protein of embodiment 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype.

[00841] 427. The capsid protein of embodiment 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype.

[00842] 428. The capsid protein of embodiment 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 455 of the capsid protein of an AAV9 serotype.

[00843] 429. The capsid protein of embodiment 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 455 of the capsid protein of an AAV9 serotype.

[00844] 430. The capsid protein of embodiment 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype.

[00845] 431. The capsid protein of embodiment 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype.

[00846] 432. The capsid protein of any one of embodiments 426, 428, and 430, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 12 to SEQ ID NO: 18.

[00847] 433. The capsid protein of any one of embodiments 427, 429, and 431, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 86 to SEQ ID NO: 89.

[00848] 434. The capsid protein of any one of embodiments 427, 429, and 431, wherein the peptide comprises the sequence of SEQ ID NO: 89.

[00849] 435. A nucleic acid molecule encoding the capsid protein of any one of embodiments 401 to 434.

CLAIMS

What is claimed is:

1. A method of identifying an AAV capsid variant with a desired characteristic compared to a natural AAV serotype, comprising:

(i) contacting a cell, cell line, or tissue with a library of AAV variants, wherein each member of the library comprises:

a) a nucleic acid encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and

one or more of:

b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a);

c) a nucleic acid encoding a localization signal;

d) a nucleic acid comprising a barcode; and

e) a nucleic acid encoding a reporter protein;

(ii) allowing the AAV variants in said library to transduce the cell, cell line, or tissue;

(iii) recovering from the cell, cell line, or tissue the AAV variant; and

(iv) identifying the AAV capsid variant with the desired characteristic.

2. A method of identifying an AAV capsid variant with a desired characteristic compared to a natural AAV serotype, comprising:

(i) contacting a cell, cell line, or tissue with a library of AAV variants, wherein each member of the library comprises:

a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and one or more of:

b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a) in the nucleic acid sequence flanking the peptide insertion site;

c) a nucleic acid encoding a localization signal;

d) a nucleic acid comprising a barcode; and

e) a nucleic acid encoding a reporter protein;

(ii) allowing the AAV variants in said library to transduce the cell, cell line, or tissue;

(iii) recovering from the cell, cell line, or tissue the AAV variant; and

(iv) identifying the AAV capsid variant with the desired characteristic.

3. The method of claim 1, wherein each member of the library comprises one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a).

4. The method of claim 2, wherein each member of the library comprises one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a) in the nucleic acid sequence flanking the peptide insertion site.

5. The method of any one of claims 1-4, wherein each member of the library comprises a nucleic acid encoding a localization signal.

6. The method of any one of claims 1-5, wherein each member of the library comprises a nucleic acid comprising a barcode.

7. The method of any one of claims 1-6, wherein each member of the library comprises a nucleic acid encoding a reporter protein.

8. The method of any one of claims 1-7, wherein the nucleic acid encoding an AAV variant capsid protein, and the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are located in separate nucleic acid molecules.

9. The method of any one of claims 1-7, wherein the nucleic acid encoding an AAV variant capsid protein, the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are located in one nucleic acid molecule.

10. The method of claim 9, wherein the nucleic acid encoding an AAV variant capsid protein, and the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are linked to each other in any order.

11. The method of claim 10, wherein each member of the library comprises: a 5'ITR sequence, the nucleic acid comprising a barcode, the nucleic acid encoding a reporter protein, the nucleic acid encoding an AAV variant capsid protein, and a 3'ITR sequence, in that order.

12. The method of any one of claims 1-11, wherein the library of AAV variants comprises AAV variant capsid proteins derived from two or more AAV serotypes.

13. The method of any one of claims 1-12, wherein the AAV serotype of the library of AAV variants is selected from one or more of: AAV1, AAV2, AAV3B, AAV5, AAV6, AAV8, AAV9, AAV3, AAV4, AAV7, AAV11, AAVrh10, AAVrh39, and AAVrh74.

14. The method of any one of claims 1-13, wherein the nucleic acid encoding the reporter protein and the nucleic acid encoding an AAV variant capsid are each independently operatively linked to a promoter.

15. The method of any one of claims 1-14, wherein the desired characteristic is enhanced cell or tissue tropism.

16. A method of identifying an AAV capsid variant with a desired characteristic compared to a natural AAV serotype, comprising:

(i) inserting a plurality of nucleic acids encoding peptides, into a population of nucleic acids encoding a hypervariable and/or surface-exposed loop of an AAV capsid protein to create a library of nucleic acids encoding AAV variant capsid proteins;

(ii) linking each nucleic acid encoding an AAV variant capsid protein in said library to one or more of:

(a) a nucleic acid comprising a barcode,

(b) a nucleic acid encoding a reporter protein, and

(c) a nucleic acid encoding a localization signal;

(iii) manufacturing a library of AAV variants in producer cells by providing adenovirus helper and AAV rep functions *in trans*;

(iv) purifying the library of AAV variants;

(v) contacting a cell, cell line, or tissue with the library of AAV variants;

(vi) recovering the AAV variants from the target cell, cell line, or tissue; and

(vii) identifying the AAV capsid variant with the desired characteristic.

17. The method of claim 16, wherein each nucleic acid encoding an AAV variant capsid protein in said library is linked to a nucleic acid comprising a barcode.

18. The method of any one of claims 1-17, wherein each member of the library comprises a first nucleic acid comprising a first barcode and a second nucleic acid comprising a second barcode.

19. The method of claim 18, wherein the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode are different.

20. The method of claim 18 or 19, wherein the first nucleic acid comprising the first barcode comprises a sequence selected from any one of sequences SEQ ID NO: 111-154.

21. The method of claim 18 or 19, wherein the first nucleic acid comprising the first barcode is selected from any one of sequences SEQ ID NO: 111-154.

22. The method of claim 18 or 19, wherein the second nucleic acid comprising the second barcode comprises a sequence selected from any one of sequences SEQ ID NO: 155-198.

23. The method of claim 18 or 19, wherein the second nucleic acid comprising the second barcode is selected from any one of sequences SEQ ID NO: 155-198.

24. The method of any one of claims 18-23, wherein each of the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode is independently operatively linked to a promoter.

25. The method of claim 24, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the second nucleic acid comprising the second barcode is each independently an RNA Pol II promoter.

26. The method of claim 24, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the nucleic acid comprising the second barcode is each independently an RNA Pol III promoter.

27. The method of claim 24, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode is an RNA Pol II promoter and the promoter operatively linked to the second nucleic acid comprising the second barcode is an RNA Pol III promoter.

28. The method of any one of claims 25-27, wherein each RNA Pol II promoter is independently selected from the group consisting of: human synapsin promoter (hSyn1), transthyretin promoter (TTR), cytokeratin 18, cytokeratin 19, unc-45 myosin chaperon B (unc45b) promoter, cardiac troponin T (cTnT) promoter, glial fibrillary acidic protein (GFAP) promoter, myelin basic protein (MBP) promoter, and methyl CpG-binding protein *2 (*Mecp2) promoter.

29. The method of any one of claims 26-27, wherein each RNA Pol III promoter is independently selected from the group consisting of U6 promoter, H1 promoter and 7SK promoter.

30. The method of any one of claims 16-29, wherein each nucleic acid encoding an AAV variant capsid protein in said library is linked to a nucleic acid encoding a reporter protein.

31. The method of any one of claims 16-30, wherein each nucleic acid encoding an AAV variant capsid protein in said library is linked to a nucleic acid encoding a localization signal.

32. The method of any one of claims 16-31, wherein each nucleic acid encoding an AAV variant capsid protein further comprises one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site.

33. The method of any one of claims 16-32, wherein step (iv) further comprises combining libraries of variant AAVs based on two or more AAV serotypes to generate a single pool.

34. The method of any one of claims 16-33, wherein the population of nucleic acid sequences encoding a hypervariable and/or surface-exposed loop of an AAV capsid protein comprises sequences derived from two or more AAV serotypes.

35. The method of any one of claims 16-34, wherein the AAV serotype is selected from one or more of: AAV1, AAV2, AAV3B, AAV5, AAV6, AAV8, AAV9, AAV3, AAV4, AAV7, AAV11, AAVrh10, AAVrh39, and AAVrh74.

36. The method of any one of claims 16-35, wherein the helper functions comprise one or more of E2A, E4, VA, E1A, and E1B.

37. The method of any one of claims 16-36, wherein the AAV rep function comprises rep78, rep 68, rep 52 and rep40 genes.

38. The method of claim 37, wherein the start codon of the rep78 and/or rep68 gene is modified from ACG to ATG.

39. The method of any one of claims 16-38, wherein the producer cells are HEK293 cells.

40. The method of any one of claims 16-39, wherein the nucleic acid encoding an AAV variant capsid protein, the nucleic acid comprising a barcode, the nucleic acid encoding a reporter protein, and/or a nucleic acid encoding a localization signal are linked to each other in any order.

41. The method of any one of claims 16-40, wherein each member of the library comprises: a 5'ITR sequence, the nucleic acid comprising a barcode, the nucleic acid encoding a reporter protein, the nucleic acid encoding an AAV variant capsid protein, and a 3'ITR sequence, in that order.

42. The method of any one of claims 16-41, wherein the nucleic acid encoding a reporter protein and the nucleic acid encoding an AAV variant capsid are each independently operatively linked to a promoter.

43. The method of any one of claims 16-42, wherein the desired characteristic is enhanced cell or tissue tropism.

44. The method of any one of claims 1-43, wherein the peptide has a length of 4-15 amino acids.

45. The method of any one of claims 1-44, wherein the peptide has a length of 6-15 amino acids.

46. The method of claim 45, wherein the peptide has a length of 7, 10, or 15 amino acids.

47. The method of claim 46, wherein the peptide has a length of 7 amino acids.

48. The method of any one of claims 1-47, wherein the peptide is inserted into a region selected from the group consisting of VR-I, VR-II, VR-III, VR-IV, VR-V, VR-VI, VR-VII, VR-VIII and VR-IX region of the capsid protein.

49. The method of claim 48, wherein the peptide is inserted into the VR-I of the capsid protein.

50. The method of claim 48, wherein the peptide is inserted into the VR-IV of the capsid protein.

51. The method of claim 48, wherein the peptide is inserted into the VR-VIII of the capsid protein.

52. The method of any one of claims 1-49, wherein the peptide is inserted into the capsid protein VP1, VP2, or VP3.

53. The method of any one of claims 1-50, wherein the peptide is inserted at a location between amino acid residues 450 and 600 of the capsid protein.

54. The method of any one of claims 1-51, wherein

(i) the AAV serotype is AAV1 and the peptide is inserted at amino acid position 590 of the capsid protein,

(ii) the AAV serotype is AAV6 and the peptide is inserted at amino acid position 454 or 590 of the capsid protein,

(iii) the AAV serotype is AAV2 and the peptide is inserted at amino acid position 588 of the capsid protein,

(iv) the AAV serotype is AAV3B and the peptide is inserted at amino acid position 589 of the capsid protein,

(v) the AAV serotype is AAV5 and the peptide is inserted at amino acid position 578 of the capsid protein,

(vi) the AAV serotype is AAV8 and the peptide is inserted at amino acid position 591 of the capsid protein, or

(vii) the AAV serotype is AAV9 and the peptide is inserted at amino acid position 266, 455, or 589 of the capsid protein,

wherein the positions correspond to the numbering of VP1 in the AAV serotype.

55. The method of any one of claims 1-54, wherein the reporter protein is a fluorescent protein.

56. The method of claim 55, wherein the reporter protein is selected from the group consisting of: EGFP, mCherry, mClover3, mRuby3, mApple, iRFP, tdTomato, mVenus, YFP, RFP, firefly luciferase, and nanoluciferase.

57. The method of any one of claims 1-56, wherein the nucleic acid encoding an AAV variant capsid protein is operatively linked to a p40 promoter.

58. The method of any one of claims 1-57, wherein the nucleic acid encoding a reporter protein is operatively linked to a cell type and/or tissue specific promoter.

59. The method of claim 58, wherein the cell type and/or tissue specific promoter is selected from the group consisting of: human synapsin promoter (hSyn1), transthyretin promoter (TTR), cytokeratin 18, cytokeratin 19, unc-45 myosin chaperon B (unc45b) promoter, cardiac troponin T (cTnT) promoter, glial fibrillary acidic protein (GFAP) promoter, myelin basic protein (MBP) promoter, and methyl CpG-binding protein *2 (*Mecp2) promoter.

60. The method of claim 59, wherein the cell type and/or tissue specific promoter is the hSyn1 promoter.

61. The method of claim 60, wherein the cell type and/or tissue specific promoter is the TTR promoter.

62. The method of any one of claims 1-61, wherein the reporter protein is fused to the localization signal.

63. The method of claim 62, wherein the localization signal is fused N-terminally, C-terminally or both N-terminally and C-terminally to the reporter protein.

64. The method of any one of claims 1-63, wherein the localization signal is a nuclear localization signal (NLS), a nuclear envelope binding domain or a histone binding domain.

65. The method of claim 64, wherein the NLS is the SV40 NLS.

66. The method of claim 64, wherein the nuclear envelope binding domain is a KASH domain.

67. The method of claim 64, wherein the histone binding domain is H2B.

68. The method of any one of claims 1-67, wherein the nucleic acid comprising the barcode is 5-18 nucleotides long.

69. The method of any one of claims 1-68, wherein the nucleic acid comprising the barcode comprises a sequence selected from any one of sequences SEQ ID NO: 111-154.

70. The method of any one of claims 1-68, wherein the nucleic acid comprising the barcode comprises a sequence selected from any one of sequences SEQ ID NO: 155-198.

71. The method of any one of claims 1-68, wherein the nucleic acid comprising the barcode is selected from any one of sequences SEQ ID NO: 111-154.

72. The method of any one of claims 1-68, wherein the nucleic acid comprising the barcode is selected from any one of sequences SEQ ID NO: 155-198.

73. The method of any one of claims 1-72, wherein the AAV capsid variant with the desired characteristic is identified through sequencing of the associated one or more barcodes.

74. The method of any one of claims 1-73, wherein the AAV capsid variant with the desired characteristic is identified by purification and sequencing of the AAV genome.

75. The method of any one of claims 1-74, wherein the cell, cell line or tissue is selected from the group consisting of CNS, heart, lung, trachea, esophagus, muscle, bone,

cartilage, stomach, pancreas, intestine, liver, bladder, kidney, ureter, urethra, uterus, fallopian tube, ovary, testes, prostate, eye, blood, lymph, and oral mucosa.

76. The method of any one of claims 1-74, wherein the cell is selected from: neurons, glial cells, astrocytes, oligodendroglia, microglia, Schwann cells, ependymal cells, hepatocytes, stellate fat storing cells, Kupffer cells, liver endothelial cells, epithelial cells, cardiomyocytes, smooth muscle cells, T-cells, B cells, hematopoietic stem cells, and embryonic stem cells.

77. A library of AAV variants, wherein each member of said library comprises:

a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and

one or more of:

b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a);

c) a nucleic acid encoding a localization signal;

d) a nucleic acid comprising a barcode; and

e) a nucleic acid encoding a reporter protein.

78. A library of AAV variants, wherein each member of said library comprises:

a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and

one or more of:

b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a) in the nucleic acid sequence flanking the peptide insertion site;

c) a nucleic acid encoding a localization signal;

d) a nucleic acid comprising a barcode; and

e) a nucleic acid encoding a reporter protein.

79. The library of claim 77, wherein each member of the library comprises one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a).

80. The library of claim 78, wherein each member of the library comprises one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a) in the nucleic acid sequence flanking the peptide insertion site.

81. The library of any one of claims 77-80, wherein each member of the library comprises a nucleic acid encoding a localization signal.

82. The library of any one of claims 77-81, wherein each member of the library comprises a nucleic acid comprising a barcode.

83. The library of any one of claims 77-82, wherein each member of the library comprises a first nucleic acid comprising a first barcode and a second nucleic acid comprising a second barcode.

84. The library of claim 83, wherein the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode are different.

85. The library of claim 84, wherein the first nucleic acid comprising the first barcode sequence comprises a sequence selected from any one of sequences SEQ ID NO: 111-154.

86. The library of claim 84, wherein the first nucleic acid comprising the first barcode sequence is selected from any one of sequences SEQ ID NO: 111-154.

87. The library of claim 84, wherein the second nucleic acid comprising the second barcode sequence comprises a sequence selected from any one of sequences SEQ ID NO: 155-198.

88. The library of claim 84, wherein the second nucleic acid comprising the second barcode sequence is selected from any one of sequences SEQ ID NO: 155-198.

89. The library of any one of claims 83-88, wherein each of the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode is independently operatively linked to a promoter.

90. The library of claim 89, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the second

nucleic acid comprising the second barcode is each independently an RNA Pol II promoter.

91. The library of claim 89, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the second nucleic acid comprising the second barcode is each independently an RNA Pol III promoter.

92. The library of claim 89, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode is operatively linked to an RNA Pol II promoter and the promoter operatively linked to the second nucleic acid comprising the second barcode is an RNA Pol III promoter.

93. The library of any one of claims 90-91, wherein the RNA Pol II promoter is selected from the group consisting of: human synapsin promoter (hSyn1), transthyretin promoter (TTR), cytokeratin 18, cytokeratin 19, unc-45 myosin chaperon B (unc45b) promoter, cardiac troponin T (cTnT) promoter, glial fibrillary acidic protein (GFAP) promoter, myelin basic protein (MBP) promoter, and methyl CpG-binding protein *2* (Mecp2) promoter.

94. The library of any one of claims 91-93, wherein the RNA Pol III promoter is selected from the group consisting of U6 promoter, H1 promoter and 7SK promoter.

95. The library of any one of claims 77-94, wherein each member of the library comprises a nucleic acid encoding a reporter protein.

96. The library of any one of claims 77-95, wherein the nucleic acid encoding an AAV variant capsid protein, and the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are located in separate nucleic acid molecules.

97. The library of any one of claims 77-95, wherein the nucleic acid encoding an AAV variant capsid protein, the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are located in one nucleic acid molecule.

98. The library of claim 97, wherein the nucleic acid encoding an AAV variant capsid protein, and the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are linked to each other in any order.

99. The library of claim 97, wherein each member of the library comprises: a 5'ITR sequence, the nucleic acid comprising a barcode, the nucleic acid encoding a reporter protein, the nucleic acid encoding an AAV variant capsid protein, and a 3'ITR sequence, in that order.

100. The library of any one of claims 77-99, wherein the AAV variants are derived from one or more of: AAV1, AAV2, AAV3B, AAV5, AAV6, AAV8, AAV9, AAV3, AAV4, AAV7, AAV11, AAVrh10, AAVrh39, and AAVrh74.

101. The library of claim 100, wherein the library of AAV variants comprises AAV variant capsid proteins derived from two or more AAV serotypes.

102. The library of any one of claims 77-101, wherein the peptide has a length of 4-15 amino acids.

103. The library of claim 102, wherein the peptide has a length of 6-15 amino acids.

104. The library of claim 103, wherein the peptide has a length of 7, 10, or 15 amino acids.

105. The library of claim 104, wherein the peptide has a length of 7 amino acids.

106. The library of any one of claims 77-105, wherein the peptide comprises at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO: 1-32.

107. The library of claim 106, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 1-32.

108. The library of any one of claims 77-106, wherein the peptide comprises at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO: 68-110.

109. The library of claim 108, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 68-110.

110. The library of any one of claims 77-109, wherein the peptide is inserted into a region selected from the group consisting of VR-I, VR-II, VR-III, VR-IV, VR-V, VR-VI, VR-VII, VR-VIII and VR-IX region of the capsid protein.

111. The library of claim 110, wherein the peptide is inserted into the VR-I of the capsid protein.

112. The library of claim 110, wherein the peptide is inserted into the VR-IV of the capsid protein.

113. The library of claim 110, wherein the peptide is inserted into the VR-VIII of the capsid protein.

114. The library of any one of claims 77-113, wherein the peptide is inserted into the capsid protein VP1, VP2, or VP3.

115. The library of any one of claims 77-114, wherein the peptide is inserted at a location between amino acid residues 450 and 600 of the capsid protein.

116. The library of any one of claims 77-115, wherein

(i) the AAV serotype is AAV1 and the peptide is inserted at amino acid position 590 of the capsid protein,

(ii) the AAV serotype is AAV6 and the peptide is inserted at amino acid position 454 or 590 of the capsid protein,

(iii) the AAV serotype is AAV2 and the peptide is inserted at amino acid position 588 of the capsid protein,

(iv) the AAV serotype is AAV3B and the peptide is inserted at amino acid position 589 of the capsid protein,

(v) the AAV serotype is AAV5 and the peptide is inserted at amino acid position 578 of the capsid protein,

(vi) the AAV serotype is AAV8 and the peptide is inserted at amino acid position 591 of the capsid protein, or

(vii) the AAV serotype is AAV9 and the peptide is inserted at amino acid position 266, 455, or 589 of the capsid protein,

wherein the positions correspond to the numbering of VP1 in the AAV serotype.

117. The library of any one of claims 77-116, wherein the reporter protein is a fluorescent protein.

118. The library of claim 117, wherein the reporter protein is selected from the group consisting of: EGFP, mCherry, mClover3, mRuby3, mApple, iRFP, tdTomato, mVenus, YFP, RFP, firefly luciferase, and nanoluciferase.

119. The library of any one of claims 77-118, wherein the nucleic acid encoding an AAV variant capsid protein is operatively linked to a p40 promoter.

120. The library of any one of claims 77-119, wherein the nucleic acid encoding a reporter protein is operatively linked to a cell type and/or tissue specific promoter.

121. The library of claim 120, wherein the cell type and/or tissue specific promoter is selected from the group consisting of: human synapsin promoter (hSyn1), transthyretin promoter (TTR), cytokeratin 18, cytokeratin 19, unc-45 myosin chaperon B (unc45b) promoter, cardiac troponin T (cTnT) promoter, glial fibrillary acidic protein (GFAP) promoter, myelin basic protein (MBP) promoter, and methyl CpG-binding protein *2* (Mecp2) promoter.

122. The library of claim 121, wherein the cell type and/or tissue specific promoter is the hSyn1 promoter.

123. The library of claim 121, wherein the cell type and/or tissue specific promoter is the TTR promoter.

124. The library of any one of claims 77-123, wherein the reporter protein is fused to the localization signal.

125. The library of claim 124, wherein the localization signal is fused N-terminally, C-terminally or both N-terminally and C-terminally to the reporter protein.

126. The library of any one of claims 77-125, wherein the localization signal is a nuclear localization signal (NLS), a nuclear envelope binding domain or a histone binding domain.

127. The library of claim 126, wherein the NLS is the SV40 NLS.

128. The library of claim 126, wherein the nuclear envelope binding domain is a KASH domain.

129. The library of claim 126, wherein the histone binding domain is H2B.

130. The library of any one of claims 77-129, wherein the nucleic acid comprising the barcode is 5-18 nucleotides long.

131. The library of any one of claims 77-130, wherein the nucleic acid comprising the barcode comprises a sequence selected from any one of sequences SEQ ID NO: 111-154.

132. The library of any one of claims 77-130, wherein the nucleic acid comprising the barcode comprises a sequence selected from any one of sequences SEQ ID NO: 155-198.

133. The library of any one of claims 77-132, wherein the nucleic acid comprising the barcode is selected from any one of sequences SEQ ID NO: 111-154.

134. The library of any one of claims 77-132, wherein the nucleic acid comprising the barcode is selected from any one of sequences SEQ ID NO: 155-198.

135. An AAV variant comprising:

a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and

one or more of:

b) one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a);

c) a nucleic acid encoding a localization signal;

d) a nucleic acid comprising a barcode; and

e) a nucleic acid encoding a reporter protein.

136. An AAV variant comprising:

a) an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and

one or more of:

b) one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a) in the nucleic acid sequence flanking the peptide insertion site;

c) a nucleic acid encoding a localization signal;

d) a nucleic acid comprising a barcode; and

e) a nucleic acid encoding a reporter protein.

137. The variant of claim 135, wherein the variant comprises one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a).

138. The variant of claim 136, wherein the variant comprises one or more silent mutations in the nucleic acid encoding the AAV variant capsid protein of a) in the nucleic acid sequence flanking the peptide insertion site.

139. The variant of any one of claims 135-136, wherein the variant comprises a nucleic acid encoding a localization signal.

140. The variant of any one of claim 135-139, wherein the variant comprises a nucleic acid comprising a barcode.

141. The variant of any one of claims 138-139, wherein the variant comprises a first nucleic acid comprising a first barcode and a second nucleic acid comprising a second barcode.

142. The variant of claim 141, wherein the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode are different.

143. The variant of claim 142, wherein the first nucleic acid comprising the first barcode sequence comprises a sequence selected from any one of sequences SEQ ID NO: 111-154.

144. The variant of claim 142, wherein the first nucleic acid comprising the first barcode sequence is selected from any one of sequences SEQ ID NO: 111-154.

145. The variant of claim 142, wherein the second nucleic acid comprising the second barcode sequence comprises a sequence selected from any one of sequences SEQ ID NO: 155-198.

146. The variant of claim 142, wherein the second nucleic acid comprising the second barcode sequence is selected from any one of sequences SEQ ID NO: 155-198.

147. The variant of any one of claims 142-146, wherein each of the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode is independently operatively linked to a promoter.

148. The variant of claim 147, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the second nucleic acid comprising the second barcode is each independently an RNA Pol II promoter.

149. The variant of claim 147, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the second nucleic acid comprising the second barcode is each independently an RNA Pol III promoter.

150. The variant of claim 147, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode is operatively linked to an RNA Pol II promoter and the promoter operatively linked to the second nucleic acid comprising the second barcode is an RNA Pol III promoter.

151. The variant of any one of claims 148-150, wherein the RNA Pol II promoter is selected from the group consisting of: human synapsin promoter (hSyn1), transthyretin promoter (TTR), cytokeratin 18, cytokeratin 19, unc-45 myosin chaperon B (unc45b) promoter, cardiac troponin T (cTnT) promoter, glial fibrillary acidic protein (GFAP) promoter, myelin basic protein (MBP) promoter, and methyl CpG-binding protein *2* (Mecp2) promoter.

152. The variant of any one of claims 149-151, wherein the RNA Pol III promoter is selected from the group consisting of U6 promoter, H1 promoter and 7SK promoter.

153. The variant of any one of claim 135-152, wherein the variant comprises a nucleic acid encoding a reporter protein.

154. The variant of any one of claims 135-153, wherein the nucleic acid encoding an AAV variant capsid protein, and the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are located in separate nucleic acid molecules.

155. The variant of any one of claims 135-154, wherein the nucleic acid encoding an AAV variant capsid protein, the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are located in one nucleic acid molecule.

156. The variant of claim 155, wherein the nucleic acid encoding an AAV variant capsid protein, and the nucleic acid encoding a localization signal, the nucleic acid comprising a barcode, and/or the nucleic acid encoding a reporter protein, are linked to each other in any order.

157. The variant of claim 156, wherein the variant comprises: a 5'ITR sequence, the nucleic acid comprising a barcode, the nucleic acid encoding a reporter protein, the nucleic acid encoding an AAV variant capsid protein, and a 3'ITR sequence, in that order.

158. The variant of any one of claims 135-157, wherein the AAV variant is derived from the group consisting of: AAV1, AAV2, AAV3B, AAV5, AAV6, AAV8, AAV9, AAV3, AAV4, AAV7, AAV11, AAVrh10, AAVrh39, and AAVrh74.

159. The variant of any one of claims 135-158, wherein the peptide has a length of 4-15 amino acids.

160. The variant of claim 159, wherein the peptide has a length of 6-15 amino acids.

161. The variant of claim 160, wherein the peptide has a length of 7, 10, or 15 amino acids.

162. The variant of claim 161, wherein the peptide has a length of 7 amino acids.

163. The variant of any one of claims 135-162, wherein the inserted peptide comprises at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO: 1-32.

164. The variant of claim 163, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 1-32.

165. The variant of any one of claims 135-162, wherein the inserted peptide comprises at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO: 68-110.

166. The variant of claim 165, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 68-110.

167. The variant of any one of claims 135-166, wherein the peptide is inserted into a region selected from the group consisting of VR-I, VR-II, VR-III, VR-IV, VR-V, VR-VI, VR-VII, VR-VIII and VR-IX region of the capsid protein.

168. The variant of claim 167, wherein the peptide is inserted into the VR-I of the capsid protein.

169. The variant of claim 167, wherein the peptide is inserted into the VR-IV of the capsid protein.

170. The variant of claim 168, wherein the peptide is inserted into VR-VIII of the capsid protein.

171. The variant of any one of claims 135-170, wherein the peptide is inserted into the capsid protein VP1, VP2, or VP3.

172. The variant of any one of claims 135-171, wherein the peptide is inserted at a location between amino acid residues 450 and 600 of the capsid protein.

173. The variant of any one of claims 135-172, wherein

(i) the AAV serotype is AAV1 and the peptide is inserted at amino acid position 590 of the capsid protein,

(ii) the AAV serotype is AAV6 and the peptide is inserted at amino acid position 454 or 590 of the capsid protein,

(iii) the AAV serotype is AAV2 and the peptide is inserted at amino acid position 588 of the capsid protein,

(iv) the AAV serotype is AAV3B and the peptide is inserted at amino acid position 589 of the capsid protein,

(v) the AAV serotype is AAV5 and the peptide is inserted at amino acid position 578 of the capsid protein,

(vi) the AAV serotype is AAV8 and the peptide is inserted at amino acid position 591 of the capsid protein, or

(vii) the AAV serotype is AAV9 and the peptide is inserted at amino acid position 266, 455, or 589 of the capsid protein,

wherein the positions correspond to the numbering of VP1 in the AAV serotype.

174. The variant of any one of claims 135-173, wherein the reporter protein is a fluorescent protein.

175. The variant of claim 174, wherein the reporter protein is selected from the group consisting of: EGFP, mCherry, mClover3, mRuby3, mApple, iRFP, tdTomato, mVenus, YFP, RFP, firefly luciferase, and nanoluciferase.

176. The variant of any one of claims 135-175, wherein the nucleic acid encoding an AAV variant capsid protein is operatively linked to a p40 promoter.

177. The variant of any one of claims 138-176, wherein the nucleic acid encoding a reporter protein is operatively linked to a cell type and/or tissue specific promoter.

178. The variant of claim 177, wherein the cell type and/or tissue specific promoter is selected from the group consisting of: human synapsin promoter (hSyn1), transthyretin promoter (TTR), cytokeratin 18, cytokeratin 19, unc-45 myosin chaperon B (unc45b) promoter, cardiac troponin T (cTnT) promoter, glial fibrillary acidic protein (GFAP) promoter, myelin basic protein (MBP) promoter, and methyl CpG-binding protein *2* (Mecp2) promoter.

179. The variant of claim 178, wherein the cell type and/or tissue specific promoter is the hSyn1 promoter.

180. The variant of claim 178, wherein the cell type and/or tissue specific promoter is the TTR promoter.

181. The variant of any one of claims 135-180, wherein the reporter protein is fused to the localization signal.

182. The variant of claim 181, wherein the localization signal is fused N-terminally, C-terminally or both N-terminally and C-terminally to the reporter protein.

183. The variant of any one of claims 135-182, wherein the localization signal is a nuclear localization signal (NLS), a nuclear envelope binding domain or a histone binding domain.

184. The variant of claim 183, wherein the NLS is the SV40 NLS.

185. The variant of claim 183, wherein the nuclear envelope binding domain is a KASH domain.

186. The variant of claim 183, wherein the histone binding domain is H2B.

187. The variant of any one of claims 135-186, wherein the nucleic acid comprising the barcode is 5-18 nucleotides long.

188. The variant of any one of claims 135-187, wherein the nucleic acid comprising the barcode comprises a sequence selected from any one of sequences SEQ ID NO: 111-154.

189. The variant of claim 188, wherein the nucleic acid comprising the barcode is selected from any one of sequences SEQ ID NO: 111-154.

190. The variant of any one of claims 135-187, wherein the nucleic acid comprising the barcode comprises a sequence selected from any one of sequences SEQ ID NO: 155-198.

191. The variant of claim 190, wherein the nucleic acid comprising the barcode is selected from any one of sequences SEQ ID NO: 155-198.

192. The variant of any one of claims 135-191, wherein the AAV variant is derived from AAV1.

193 The variant of claim 192, wherein the variant comprises a peptide comprising an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 68 to SEQ ID NO: 75.

194. The variant of claim 192, wherein the variant comprises a peptide comprising an amino acid sequence selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2 and SEQ ID NO: 3.

195. The variant of claim 192, wherein the variant comprises a peptide comprising the amino acid sequence SEQ ID NO: 71.

196. The variant of any one of claims 135-191, wherein the AAV variant is derived from AAV2.

197. The variant of claim 196, wherein the variant comprises a peptide comprising an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 90 to SEQ ID NO: 110.

198. The variant of claim 196, wherein the variant comprises a peptide comprising any one of the sequences selected from the group consisting of SEQ ID NO: 95, SEQ ID NO: 94, SEQ ID NO: 96, SEQ ID NO: 101, SEQ ID NO: 103, SEQ ID NO: 106, SEQ ID NO: 91 and SEQ ID NO: 102.

199. The variant of claim 196, wherein the variant comprises a peptide comprising an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 4-7.

200. The variant of any one of claims 135-191, wherein the AAV variant is derived from AAV3B.

201. The variant of claim 200, wherein the variant comprises a peptide comprising any one of the sequences selected from the group consisting of SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 77, SEQ ID NO: 79, SEQ ID NO: 76 and SEQ ID NO: 83.

202. The variant of claim 200, wherein the variant comprises a peptide comprising an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 8 to SEQ ID NO: 11.

203. The variant of any one of claims 135-191, wherein the AAV variant is derived from AAV5.

204. The variant of claim 203, wherein the variant comprises a peptide comprising an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 28 to SEQ ID NO: 32.

205. The variant of any one of claims 135-191, wherein the AAV variant is derived from AAV6.

206. The variant of claim 205, wherein the variant comprises a peptide comprising an amino acid sequence selected from the group consisting of consisting of any one of SEQ ID NO: 19 to SEQ ID NO: 27.

207. The variant of any one of claims 135-191, wherein the AAV variant is derived from AAV9.

208. The variant of claim 207, wherein the variant comprises a peptide comprising an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 12 to SEQ ID NO: 18.

209. The variant of claim 207, wherein the variant comprises a peptide comprising an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 86 to SEQ ID NO: 89.

210. The variant of claim 207, wherein the variant comprises a peptide comprising the sequence SEQ ID NO: 89.

211. A nucleic acid molecule comprising:

a) a nucleic acid sequence encoding an AAV variant capsid protein comprising a peptide inserted into a hypervariable and/or surface-exposed loop of the variant capsid protein; and

one or more of:

b) a nucleic acid sequence encoding a variant capsid protein comprising one or more silent mutations in the nucleotide sequence flanking the peptide insertion site in the hypervariable and/or surface-exposed loop of the variant capsid protein;

c) a nucleic acid sequence encoding a localization signal;

d) a nucleic acid sequence comprising a barcode; and

e) a nucleic acid sequence encoding a reporter protein.

212. The nucleic acid molecule of claim 211, wherein the nucleic acid sequence encoding an AAV variant capsid protein comprises one or more silent mutations in the nucleic acid sequence flanking the peptide insertion site in the AAV variant capsid protein of a).

213. The nucleic acid molecule of claim 212, wherein the nucleic acid molecule comprises a nucleic acid encoding a localization signal.

214. The nucleic acid molecule of claim 212, wherein the nucleic acid molecule comprises a nucleic acid comprising a barcode.

215. The nucleic acid molecule of claims 211-214, wherein the nucleic acid molecule comprises a first nucleic acid comprising a first barcode and a second nucleic acid comprising a second barcode.

216. The nucleic acid molecule of claim 215, wherein the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode are different.

217. The nucleic acid molecule of claim 216, wherein the first nucleic acid comprising the first barcode sequence comprises a sequence selected from any one of sequences SEQ ID NO: 111-154.

218. The nucleic acid molecule of claim 217, wherein the first nucleic acid comprising the first barcode sequence is selected from any one of sequences SEQ ID NO: 111-154.

219. The nucleic acid molecule of claim 216, wherein the second nucleic acid comprising the second barcode sequence comprises a sequence selected from any one of sequences SEQ ID NO: 155-198.

220. The nucleic acid molecule of claim 217, wherein the second nucleic acid comprising the second barcode sequence is selected from any one of sequences SEQ ID NO: 155-198.

221. The nucleic acid molecule of any one of claims 215-220, wherein each of the first nucleic acid comprising the first barcode and the second nucleic acid comprising the second barcode is independently operatively linked to a promoter.

222. The nucleic acid molecule of claim 221, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the second nucleic acid comprising the second barcode is each independently an RNA Pol II promoter.

223. The nucleic acid molecule of claim 221, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode and the promoter operatively linked to the second nucleic acid comprising the second barcode is each independently an RNA Pol III promoter.

224. The nucleic acid molecule of claim 221, wherein the promoter operatively linked to the first nucleic acid comprising the first barcode is operatively linked to an RNA Pol II promoter and the promoter operatively linked to the second nucleic acid comprising the second barcode is an RNA Pol III promoter.

225. The nucleic acid molecule of any one of claims 222-224, wherein the RNA Pol II promoter is selected from the group consisting of: human synapsin promoter (hSyn1), transthyretin promoter (TTR), cytokeratin 18, cytokeratin 19, unc-45 myosin chaperon B (unc45b) promoter, cardiac troponin T (cTnT) promoter, glial fibrillary acidic protein (GFAP) promoter, myelin basic protein (MBP) promoter, and methyl CpG-binding protein *2* (Mecp2) promoter.

226. The nucleic acid molecule of any one of claims 223-224, wherein the RNA Pol III promoter is selected from the group consisting of U6 promoter, H1 promoter and 7SK promoter.

227. The nucleic acid molecule of any one of claims 211-226, where the nucleic acid molecule comprises a nucleic acid encoding a reporter protein.

228. The nucleic acid molecule of any one of claims 211-227, wherein the AAV variants are derived from one or more of: AAV1, AAV2, AAV3B, AAV5, AAV6, AAV8, AAV9, AAV3, AAV4, AAV7, AAV11, AAVrh10, AAVrh39, and AAVrh74.

229. The nucleic acid molecule of any one of claims 211-228, wherein the inserted peptide has a length of 4-15 amino acids.

230. The nucleic acid molecule of claim 229, wherein the inserted peptide comprises at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO: 1-32.

231. The nucleic acid molecule of claim 229, wherein the inserted peptide comprises at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO: 68-110.

232. The nucleic acid molecule of any one of claims 211-231, wherein the nucleic acid encoding a reporter protein is operatively linked to a cell type and/or tissue specific promoter.

233. The nucleic acid molecule of claim 232, wherein the cell type and/or tissue specific promoter is the hSyn1 promoter.

234. The nucleic acid molecule of any one of claims 211-233, wherein the nucleic acid comprising the barcode comprises a sequence selected from any one of sequences SEQ ID NO: 111-154.

235. The nucleic acid molecule of any one of claims 211-233, wherein the nucleic acid comprising the barcode comprises a sequence selected from any one of sequences SEQ ID NO: 155-198.

236. Use of an AAV variant according to any one of claims 135-210 to deliver a transgene to a target cell or tissue.

237. An AAV vector comprising a nucleic acid molecule encoding a peptide that comprises at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO: 1-32.

238. The AAV vector of claim 237, wherein the nucleic acid encodes a peptide that comprises an amino acid sequence set forth in any one of SEQ ID NO: 1-32.

239. The AAV vector of claim 237 or 238, wherein the nucleic acid encodes a peptide having a sequence of any of one of SEQ ID NO: 1-32.

240. An AAV vector comprising a nucleic acid molecule encoding a peptide that comprises at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO:68-110.

241. The AAV vector of claim 240, wherein the nucleic acid encodes a peptide that comprises an amino acid sequence set forth in any one of SEQ ID NO: 68-110.

242. The AAV vector of claim 240 or 241, wherein the nucleic acid encodes a peptide having the sequence of any of one of SEQ ID NO: 68-110.

243. The AAV vector of claim 240, wherein the nucleic acid encodes a peptide that comprises an amino acid sequence set forth in any one of SEQ ID NO: 71, 76-80, 83, 89, 91, 94-96, 101-103 and 106.

244. The AAV vector of any one of claims 237-243, wherein the peptide is a part of a capsid protein.

245. The AAV vector of claim 244, wherein the capsid protein is VP1, VP2, or VP3.

246. The AVV vector of any one of claims 237-245, wherein the peptide is inserted at a location between amino acid residues 450 and 600 of the capsid protein.

247. The AAV vector of claim 246, wherein the peptide is inserted at

(i) amino acid position 590 of an AAV1 capsid protein,

(ii) amino acid position 454 or 590 of an AAV6 capsid protein,

(iii) amino acid position 588 of an AAV2 capsid protein,

(iv) amino acid position 589 of an AAV3B capsid protein,

(v) amino acid position 578 of an AAV5 capsid protein,

(vi) amino acid position 591 of the an AAV8 capsid protein, or

(vi) amino acid position 266, 455, or 589 of an AAV9 capsid protein,

wherein the positions correspond to the numbering of VP1 in the AAV serotype.

248. A pharmaceutical composition comprising the AAV vector of any one of claims 237-247 and a pharmaceutically acceptable carrier.

249. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 1-32.

250. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 68-110.

251. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 71, 76-80, 83, 89, 91, 94-96, 101-103 and 106.

252. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 71, 76-80, 83 and 94-96.

253. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 89, 91, 101-103 and 106.

254. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 68 to SEQ ID NO: 75.

255. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 1, SEQ ID NO: 2 and SEQ ID NO: 3.

256. A peptide comprising an amino acid sequence set forth in SEQ ID NO: 71.

257. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 90 to SEQ ID NO: 110.

258. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 95, SEQ ID NO: 94, SEQ ID NO: 96, SEQ ID NO: 101, SEQ ID NO: 103, SEQ ID NO: 106, SEQ ID NO: 91 and SEQ ID NO: 102.

259. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 4-7.

260. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 77, SEQ ID NO: 79, SEQ ID NO: 76 and SEQ ID NO: 83.

261. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 8 to SEQ ID NO: 11.

262. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 28 to SEQ ID NO: 32.

263. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 19 to SEQ ID NO: 27.

264. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 12 to SEQ ID NO: 18.

265. A peptide comprising an amino acid sequence set forth in any one of SEQ ID NO: 86 to SEQ ID NO: 89.

266. A peptide comprising an amino acid sequence set forth in SEQ ID NO: 89.

267. The peptide of any one of claims 249-266, wherein the peptide is part of an AAV vector.

268. The peptide of claim 267, wherein the peptide is part of a capsid protein of the AAV vector.

269. A nucleic acid molecule encoding the peptide of any one of claims 249-268.

270. A capsid protein comprising a peptide comprising at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO: 1-32.

271. A capsid protein comprising a peptide comprising at least 4 contiguous amino acids of an amino acid sequence set forth in any one of SEQ ID NO:68-110.

272. The capsid protein of claim 270, wherein the peptide comprises the amino acid sequence set forth in any one of SEQ ID NO: 1-32.

273. The capsid protein of claim 271, wherein the peptide comprises the amino acid sequence set forth in any one of SEQ ID NO: 68-110.

274. The capsid protein of claim 270, comprising the amino acid sequence set forth in any one of SEQ ID NO: 1-32.

275. The capsid protein of claim 271, comprising the amino acid sequence set forth in any one of SEQ ID NO:68-110.

276. The capsid protein of claim 271, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 71, 76-80, 83, 89, 91, 94-96, 101-103 and 106.

277. The capsid protein of claim 271, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 71, 76-80, 83 and 94-96.

278. The capsid protein of claim 271, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 89, 91, 101-103 and 106.

279. The capsid protein of claim 271, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 68 to SEQ ID NO: 75.

280. The capsid protein of claim 270, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 1, SEQ ID NO: 2 and SEQ ID NO: 3.

281. The capsid protein of claim 271, wherein the peptide comprises an amino acid sequence set forth in SEQ ID NO: 71.

282. The capsid protein of claim 271, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 90 to SEQ ID NO: 110.

283. The capsid protein of claim 271, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 95, SEQ ID NO: 94, SEQ ID NO: 96, SEQ ID NO: 101, SEQ ID NO: 103, SEQ ID NO: 106, SEQ ID NO: 91 and SEQ ID NO: 102.

284. The capsid protein of claim 270, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 4-7.

285. The capsid protein of claim 271, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 77, SEQ ID NO: 79, SEQ ID NO: 76 and SEQ ID NO: 83.

286. The capsid protein of claim 270, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 8 to SEQ ID NO: 11.

287. The capsid protein of claim 270, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 28 to SEQ ID NO: 32.

288. The capsid protein of claim 270, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 19 to SEQ ID NO: 27.

289. The capsid protein of claim 270, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 12 to SEQ ID NO: 18.

290. The capsid protein of claim 271, wherein the peptide comprises an amino acid sequence set forth in any one of SEQ ID NO: 86 to SEQ ID NO: 89.

291. The capsid protein of claim 271, wherein the peptide comprises an amino acid sequence set forth in SEQ ID NO: 89.

292. A nucleic acid molecule encoding the capsid protein of any one of claims 269-291.

293. A method of delivering a nucleic acid to a target cell or tissue of a subject, comprising: administering a composition comprising an AAV vector according to any one of claims 237-247.

294. The method of claim 293, wherein the capsid protein comprises an amino acid sequence set forth in any one of SEQ ID NO: 1-32.

295. The method of claim 293, wherein the capsid protein comprises an amino acid sequence set forth in any one of SEQ ID NO:68-110.

296. The method of any one of claims 293-295, wherein the target cell, cell line or tissue is selected from the group consisting of CNS, heart, lung, trachea, esophagus, muscle, bone, cartilage, stomach, pancreas, intestine, liver, bladder, kidney, ureter, urethra, uterus, fallopian tube, ovary, testes, prostate, eye, blood, lymph, and oral mucosa.

297. The method of any one of claims 293-295, wherein the target cell is selected from the group consisting of neurons, glial cells, astrocytes, oligodendroglia, microglia, Schwann cells, ependymal cells, hepatocytes, stellate fat storing cells, Kupffer cells,

liver endothelial cells, epithelial cells, cardiomyocytes, smooth muscle cells, T-cells, B cells, hematopoietic stem cells, and embryonic stem cells.

298. The method of claim 296, wherein the target cell or tissue is from liver.

299. The method of claim 296, wherein the target cell or tissue is from CNS.

300. A pharmaceutical composition comprising the variant of any one of claims 135-211 and a pharmaceutically acceptable carrier.

301. The library of claim 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype.

302. The library of claim 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype.

303. The library of claim 302, wherein the peptide comprises an amino acid sequence of any one of SEQ ID NO: 68-75.

304. The library of claim 302, wherein the peptide comprises the amino acid sequence SEQ ID NO: 71.

305. The library of claim 301, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 1, SEQ ID NO: 2 and SEQ ID NO: 3.

306. The library of claim 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype.

307. The library of claim 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype.

308. The library of claim 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype.

309. The library of claim 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype.

310. The library of any one of claims 306 and 308, wherein the peptide comprises an amino acid sequence of any one of SEQ ID NO: 19 to SEQ ID NO: 27.

311. The library of claim 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype.

312. The library of claim 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype.

313. The library of claim 312, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 90 to SEQ ID NO: 110.

314. The library of claims 312, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 95, SEQ ID NO: 94, SEQ ID NO: 96, SEQ ID NO: 101, SEQ ID NO: 103, SEQ ID NO: 106, SEQ ID NO: 91 and SEQ ID NO: 102.

315. The library of claims 311, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 4-7.

316. The library of claim 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype.

317. The library of claim 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype.

318. The library of claim 317, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 76- 85.

319. The library of claim 317, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 77, SEQ ID NO: 79, SEQ ID NO: 76 and SEQ ID NO: 83.

320. The library of claim 316, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 8 to SEQ ID NO: 11.

321. The library of claim 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype.

322. The library of claim 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype.

323. The library of claim 321, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one SEQ ID NO: 28 to SEQ ID NO: 32.

324. The library of claim 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype.

325. The library of claim 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype.

326. The library of claim 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype.

327. The library of claim 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype.

328. The library of claim 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 455 of the capsid protein of an AAV9 serotype.

329. The library of claim 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 455 of the capsid protein of an AAV9 serotype.

330. The library of claim 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype.

331. The library of claim 116, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype.

332. The library of any one of claims 326, 328, and 330, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 12 to SEQ ID NO: 18.

333. The library of any one of claims 327, 329, and 331, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 86 to SEQ ID NO: 89.

334. The library of any one of claims 327, 329, and 331, wherein the peptide comprises the sequence of SEQ ID NO: 89.

335. The AAV variant of claim 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype.

336. The AAV variant of claim 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype.

337. The AAV variant of claim 336, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 68 to SEQ ID NO: 75.

338. The AAV variant of claim 336, wherein the peptide comprises the amino acid sequence SEQ ID NO: 71.

339. The AAV variant of claim 335, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 1, SEQ ID NO: 2 and SEQ ID NO: 3.

340. The AAV variant of claim 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype.

341. The AAV variant of claim 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype.

342. The AAV variant of claim 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype.

343. The AAV variant of claim 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype.

344. The AAV variant of any one of claims 340 and 342, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 19 to SEQ ID NO: 27.

345. The AAV variant of claim 173, wherein a peptide comprising the amino acid sequence of SEQ ID NO: 1-32 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype.

346. The AAV variant of claim 173, wherein a peptide comprising the amino acid sequence of SEQ ID NO: 68-110 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype.

347. The AAV variant of claim 346, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 90 to SEQ ID NO: 110.

348. The AAV variant of claims 346, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 95, SEQ ID NO: 94, SEQ ID NO: 96, SEQ ID NO: 101, SEQ ID NO: 103, SEQ ID NO: 106, SEQ ID NO: 91 and SEQ ID NO: 102.

349. The AAV variant of claims 345, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 4-7.

350. The AAV variant of claim 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype.

351. The AAV variant of claim 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype.

352. The AAV variant of claim 351, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 77, SEQ ID NO: 79, SEQ ID NO: 76 and SEQ ID NO: 83.

353. The AAV variant of claim 350, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 8 to SEQ ID NO: 11.

354. The AAV variant of claim 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype.

355. The AAV variant of claim 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype.

356. The AAV variant of claim 354, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one SEQ ID NO: 28 to SEQ ID NO: 32.

357. The AAV variant of claim 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype.

358. The AAV variant of claim 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype.

359. The AAV variant of claim 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype.

360. The AAV variant of claim 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype.

361. The AAV variant of claim 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 455 of the capsid protein of an AAV9 serotype.

362. The AAV variant of claim 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 455 of the capsid protein of an AAV9 serotype.

363. The AAV variant of claim 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype.

364. The AAV variant of claim 173, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype.

365. The AAV variant of any one of claims 359, 361, and 363, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 12 to SEQ ID NO: 18.

366. The AAV variant of any one of claims 360, 362, and 364, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 86 to SEQ ID NO: 89.

367. The AAV variant of any one of claims 360, 362, and 364, wherein the peptide comprises the sequence of SEQ ID NO: 89.

368. The AAV vector of claim 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype.

369. The AAV vector of claim 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype.

370. The AAV vector of claim 369, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 68 to SEQ ID NO: 75.

371. The AAV vector of claim 369, wherein the peptide comprises the amino acid sequence SEQ ID NO: 71.

372. The AAV vector of claim 368, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 1, SEQ ID NO: 2 and SEQ ID NO: 3.

373. The AAV vector of claim 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype.

374. The AAV vector of claim 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype.

375. The AAV vector of claim 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype.

376. The AAV vector of claim 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype.

377. The AAV vector of any one of claims 373 and 375, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 19 to SEQ ID NO: 27.

378. The AAV vector of claim 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype.

379. The AAV vector of claim 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype.

380. The AAV vector of claim 379, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 90 to SEQ ID NO: 110.

381. The AAV vector of claims 379, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 95, SEQ ID NO: 94, SEQ ID NO: 96, SEQ ID NO: 101, SEQ ID NO: 103, SEQ ID NO: 106, SEQ ID NO: 91 and SEQ ID NO: 102.

382. The AAV vector of claims 378, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 4-7.

383. The AAV vector of claim 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype.

384. The AAV vector of claim 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype.

385. The AAV vector of claim 384, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 77, SEQ ID NO: 79, SEQ ID NO: 76 and SEQ ID NO: 83.

386. The AAV vector of claim 383, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 8 to SEQ ID NO: 11.

387. The AAV vector of claim 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype.

388. The AAV vector of claim 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype.

389. The AAV vector of claim 387, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one SEQ ID NO: 28 to SEQ ID NO: 32.

390. The AAV vector of claim 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype.

391. The AAV vector of claim 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype.

392. The AAV vector of claim 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype.

393. The AAV vector of claim 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype.

394. The AAV vector of claim 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 455 of the capsid protein of an AAV9 serotype.

395. The AAV vector of claim 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 455 of the capsid protein of an AAV9 serotype.

396. The AAV vector of claim 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype.

397. The AAV vector of claim 247, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype.

398. The AAV vector of any one of claims 392, 394, and 396, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 12 to SEQ ID NO: 18.

399. The AAV vector of any one of claims 393, 395, and 397, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 86 to SEQ ID NO: 89.

400. The AAV vector of any one of claims 393, 395, and 397, wherein the peptide comprises the sequence of SEQ ID NO: 89.

401. A capsid protein comprising an inserted peptide, wherein the peptide is inserted at

(i) amino acid position 590 of an AAV1 capsid protein,

(ii) amino acid position 454 or 590 of an AAV6 capsid protein,

(iii) amino acid position 588 of an AAV2 capsid protein,

(iv) amino acid position 589 of an AAV3B capsid protein,

(v) amino acid position 578 of an AAV5 capsid protein,

(vi) amino acid position 591 of the an AAV8 capsid protein, or

(vi) amino acid position 266, 455, or 589 of an AAV9 capsid protein,

wherein the positions correspond to the numbering of VP1 in the AAV serotype.

402. The capsid protein of claim 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype.

403. The capsid protein of claim 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 590 of the capsid protein of an AAV1 serotype.

404. The capsid protein of claim 403, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 68 to SEQ ID NO: 75.

405. The capsid protein of claim 403, wherein the peptide comprises the amino acid sequence SEQ ID NO: 71.

406. The capsid protein of claim 402, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 1, SEQ ID NO: 2 and SEQ ID NO: 3.

407. The capsid protein of claim 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype.

408. The capsid protein of claim 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 454 of the capsid protein of an AAV6 serotype.

409. The capsid protein of claim 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype.

410. The capsid protein of claim 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 590 of the capsid protein of an AAV6 serotype.

411. The capsid protein of any one of claims 407 and 409, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 19 to SEQ ID NO: 27.

412. The capsid protein of claim 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype.

413. The capsid protein of claim 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 588 of the capsid protein of an AAV2 serotype.

414. The capsid protein of claim 413, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 90 to SEQ ID NO: 110.

415. The capsid protein of claims 413, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 95, SEQ ID NO: 94, SEQ ID NO: 96, SEQ ID NO: 101, SEQ ID NO: 103, SEQ ID NO: 106, SEQ ID NO: 91 and SEQ ID NO: 102.

416. The capsid protein of claims 412, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 4-7.

417. The capsid protein of claim 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype.

418. The capsid protein of claim 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 589 of the capsid protein of an AAV3B serotype.

419. The capsid protein of claim 418, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 77, SEQ ID NO: 79, SEQ ID NO: 76 and SEQ ID NO: 83.

420. The capsid protein of claim 417, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 8 to SEQ ID NO: 11.

421. The capsid protein of claim 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype.

422. The capsid protein of claim 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 578 of the capsid protein of an AAV5 serotype.

423. The capsid protein of claim 421, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one SEQ ID NO: 28 to SEQ ID NO: 32.

424. The capsid protein of claim 401, wherein a peptide comprising the amino acid sequence of SEQ ID NO: 1-32 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype.

425. The capsid protein of claim 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 591 of the capsid protein of an AAV8 serotype.

426. The capsid protein of claim 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype.

427. The capsid protein of claim 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 266 of the capsid protein of an AAV9 serotype.

428. The capsid protein of claim 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 455 of the capsid protein of an AAV9 serotype.

429. The capsid protein of claim 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 455 of the capsid protein of an AAV9 serotype.

430. The capsid protein of claim 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 1-32 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype.

431. The capsid protein of claim 401, wherein a peptide comprising the amino acid sequence of any one of SEQ ID NO: 68-110 is inserted at amino acid position 589 of the capsid protein of an AAV9 serotype.

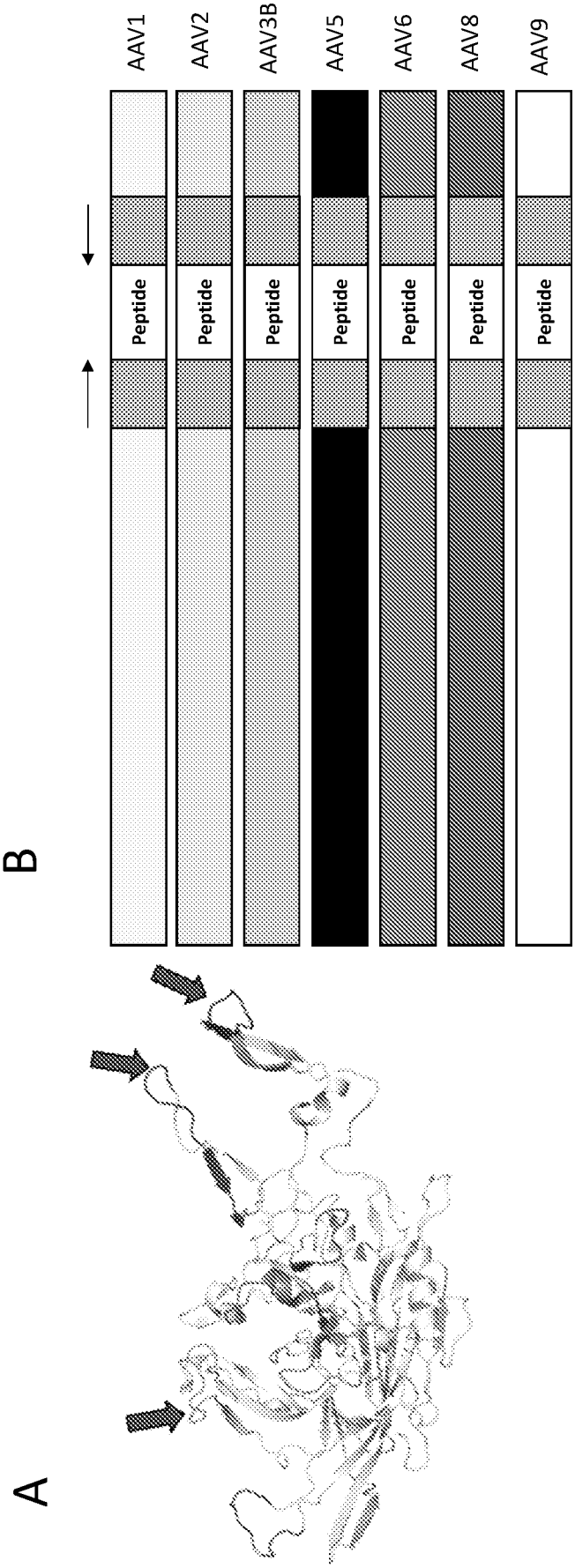
432. The capsid protein of any one of claims 426, 428, and 430, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 12 to SEQ ID NO: 18.

433. The capsid protein of any one of claims 427, 429, and 431, wherein the peptide comprises an amino acid sequence selected from the group consisting of any one of SEQ ID NO: 86 to SEQ ID NO: 89.

434. The capsid protein of any one of claims 427, 429, and 431, wherein the peptide comprises the sequence of SEQ ID NO: 89.

435. A nucleic acid molecule encoding the capsid protein of any one of claims 401 to 434.

FIG. 1



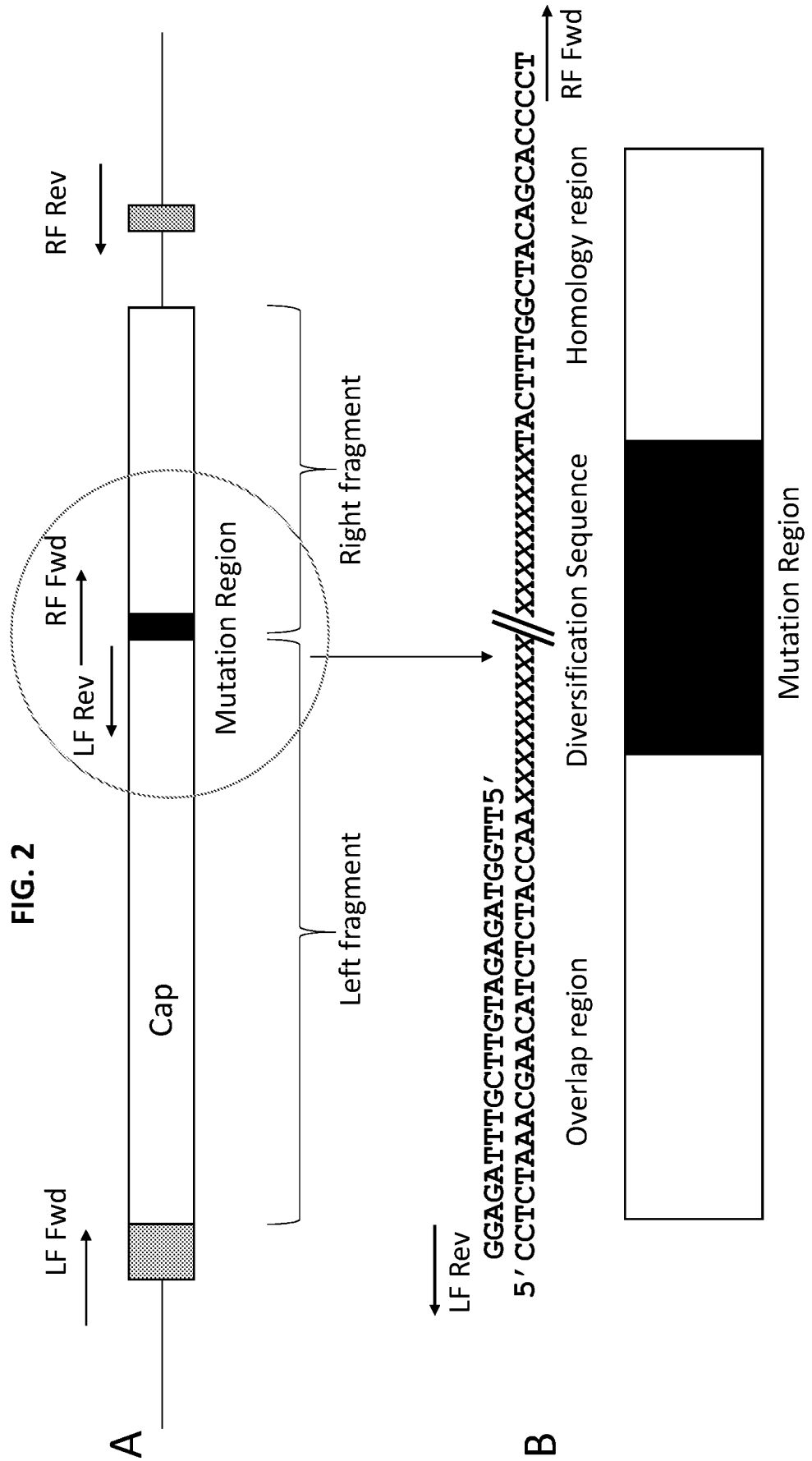

A
LF Fwd
Cap
LF Rev
RF Fwd
Mutation Region
RF Rev
Left fragment
Right fragment
B
LF Rev
GGAGATTTGCTTGTAGAGATGGTT5′
5′ CCTCTAAACGAACATCTCTACCAAXXXXXXXXXX//XXXXXXXXXXTACTTTGGCTACAGCACCCCT
Overlap region
Diversification Sequence
Homology region
RF Fwd
Mutation Region

FIG. 2

FIG. 3A

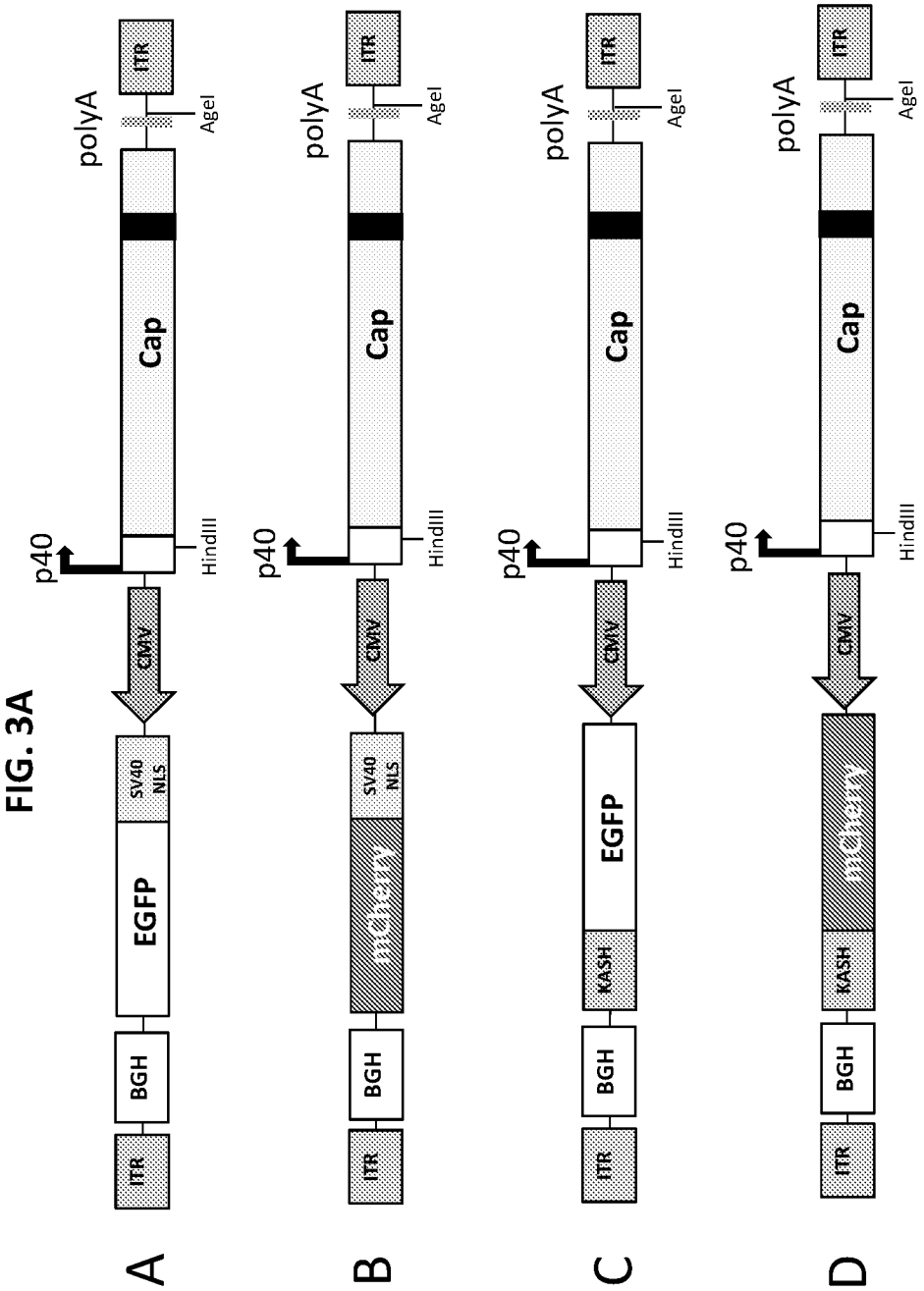

A
ITR
BGH
EGFP
SV40 NLS
CMV
p40
Cap
polyA
ITR
AgeI
HindIII
B
ITR
BGH
mCherry
SV40 NLS
CMV
p40
Cap
polyA
ITR
AgeI
HindIII
C
ITR
BGH
KASH
EGFP
CMV
p40
Cap
polyA
ITR
AgeI
HindIII
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BGH
KASH
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polyA
ITR
AgeI
HindIII

FIG. 3B

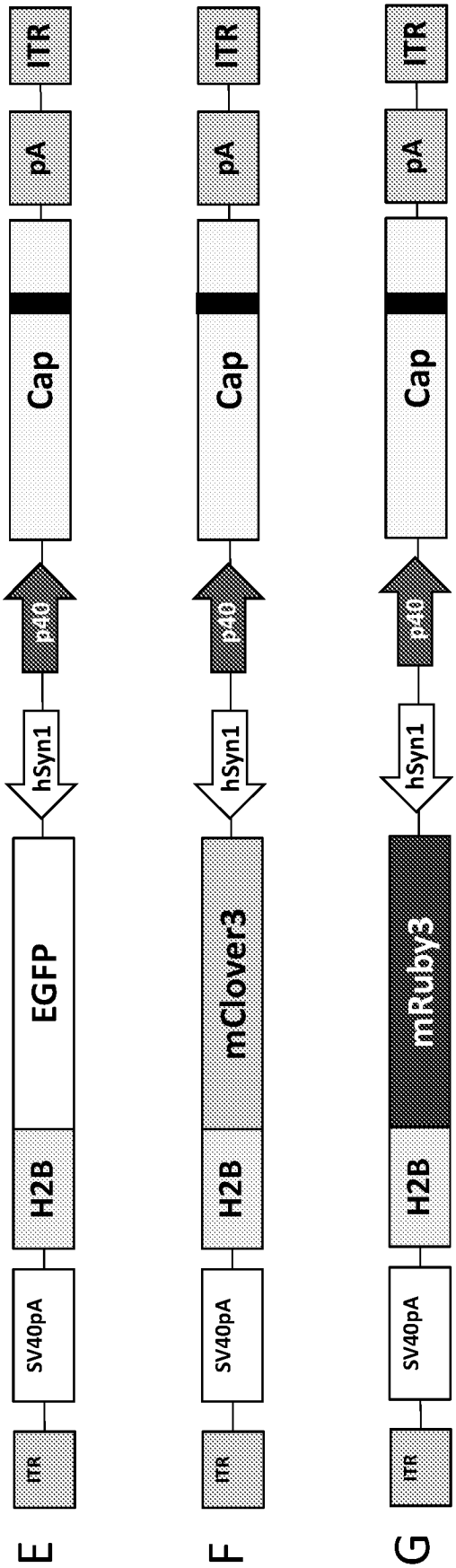

ITR
pA
Cap
p10
hSyn1
EGFP
H2B
SV40pA
ITR
E
ITR
pA
Cap
p10
hSyn1
mClover3
H2B
SV40pA
ITR
F
ITR
pA
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H2B
SV40pA
ITR
G

FIG. 4A

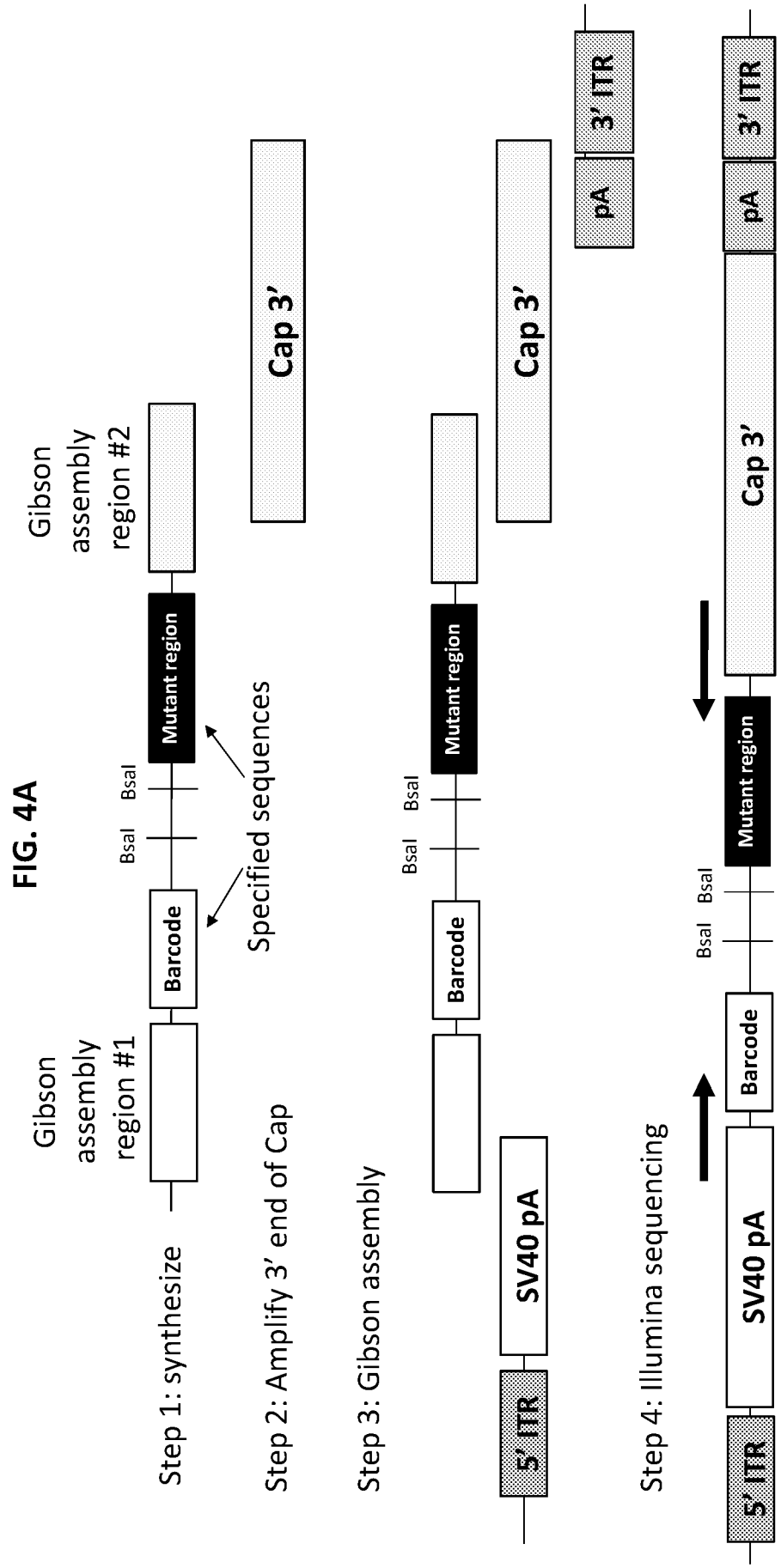

Gibson assembly region #1
Barcode
BsaI
BsaI
Mutant region
Gibson assembly region #2
Cap 3'
Specified sequences
Step 1: synthesize
Step 2: Amplify 3' end of Cap
Step 3: Gibson assembly
5' ITR
SV40 pA
pA
3' ITR
Step 4: Illumina sequencing

FIG. 4B


Step 5: Bsal digestion
5' ITR
SV40 pA
Barcode
Bsal
Bsal
Mutant region
Cap 3'
pA
3' ITR
Step 6: PCR amplification of reporter gene, promoter and 5' cap fragment or digestion from a pre-assembled donor plasmid
Bsal
H2B
EGFP
hSyn1
p40
Bsal
Cap 5'
Step 7: Golden Gate cloning to achieve final construct
5' ITR
SV40 pA
Barcode
H2B
EGFP
hSyn1
p40
Cap
pA
3' ITR

FIG. 4C

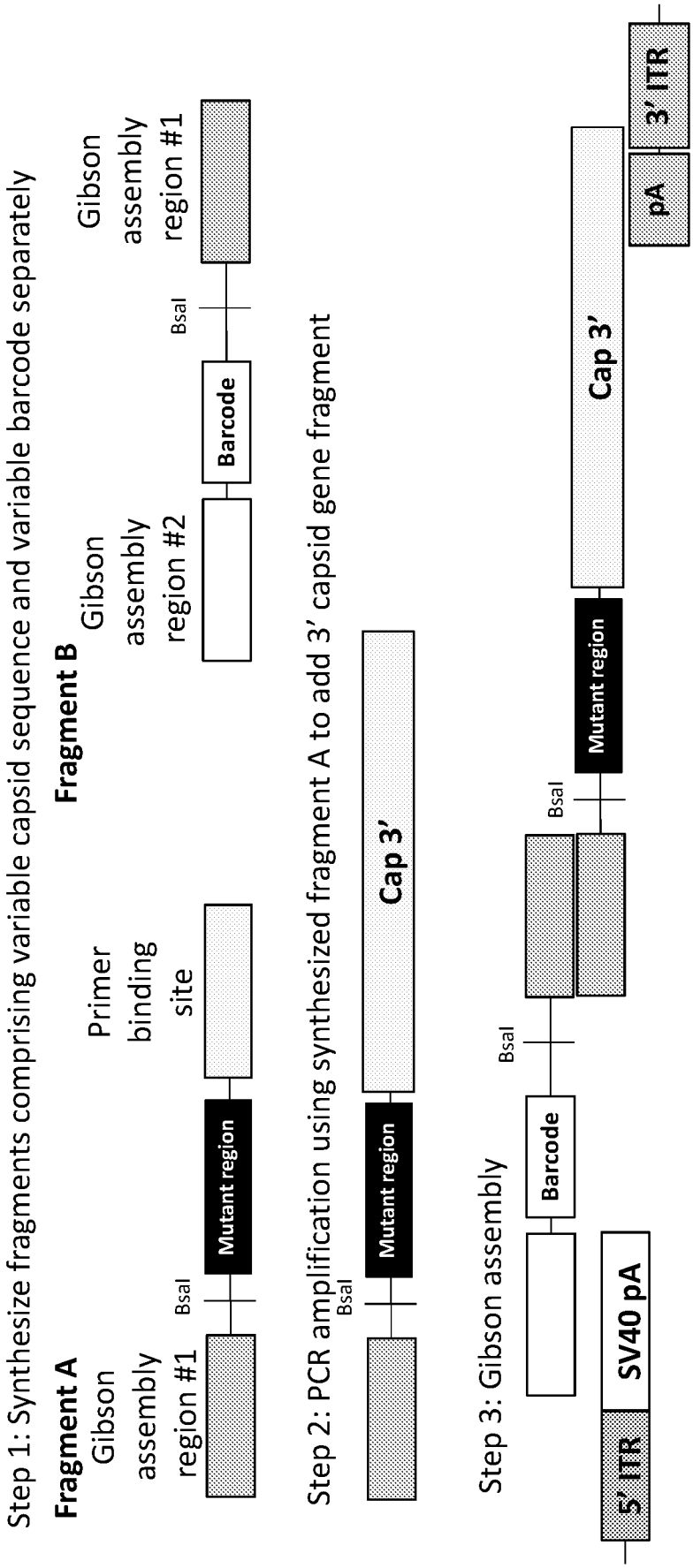

Step 1: Synthesize fragments comprising variable capsid sequence and variable barcode separately
Fragment A
Gibson assembly region #1
BsaI
Mutant region
Primer binding site
Fragment B
Gibson assembly region #2
Barcode
BsaI
Gibson assembly region #1
Step 2: PCR amplification using synthesized fragment A to add 3' capsid gene fragment
BsaI
Mutant region
Cap 3'
Step 3: Gibson assembly
BsaI
Barcode
Mutant region
Cap 3'
pA
3' ITR
5' ITR
SV40 pA

FIG. 4D

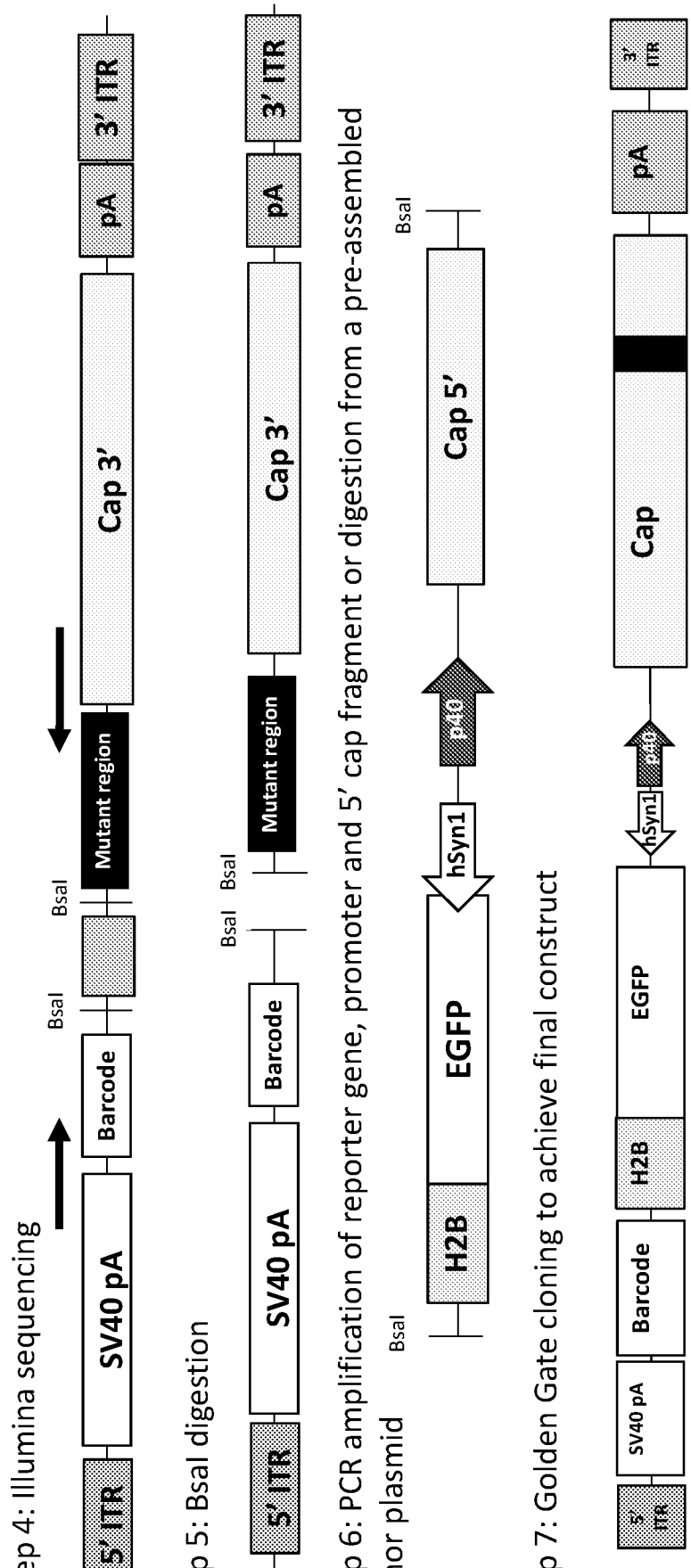

Step 4: Illumina sequencing
5' ITR
SV40 pA
Barcode
BsaI
BsaI
Mutant region
Cap 3'
pA
3' ITR
Step 5: BsaI digestion
5' ITR
SV40 pA
Barcode
BsaI
BsaI
Mutant region
Cap 3'
pA
3' ITR
Step 6: PCR amplification of reporter gene, promoter and 5' cap fragment or digestion from a pre-assembled donor plasmid
BsaI
H2B
EGFP
hSyn1
p40
Cap 5'
BsaI
Step 7: Golden Gate cloning to achieve final construct
5' ITR
SV40 pA
Barcode
H2B
EGFP
hSyn1
p40
Cap
pA
3' ITR

FIG. 5

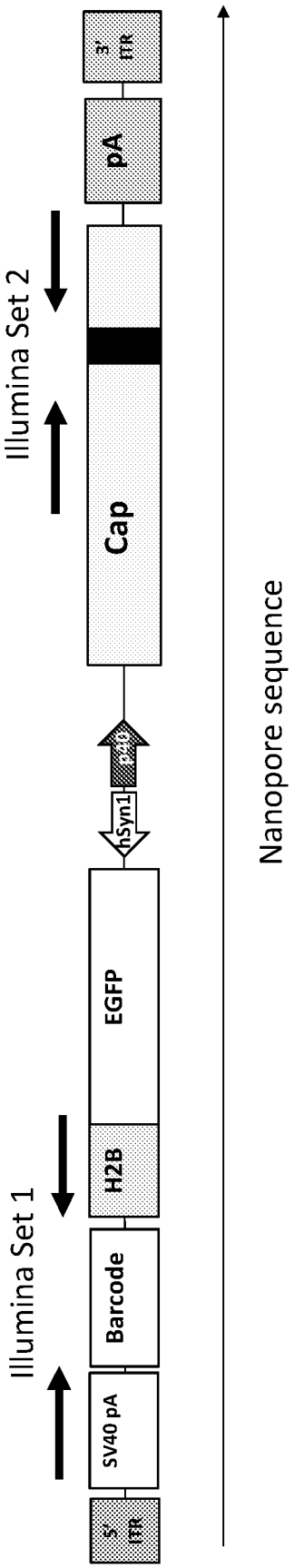

5' ITR
SV40 pA
Barcode
H2B
EGFP
hSyn1
Cap
pA
3' ITR
Illumina Set 1
Illumina Set 2
Nanopore sequence

FIG. 6

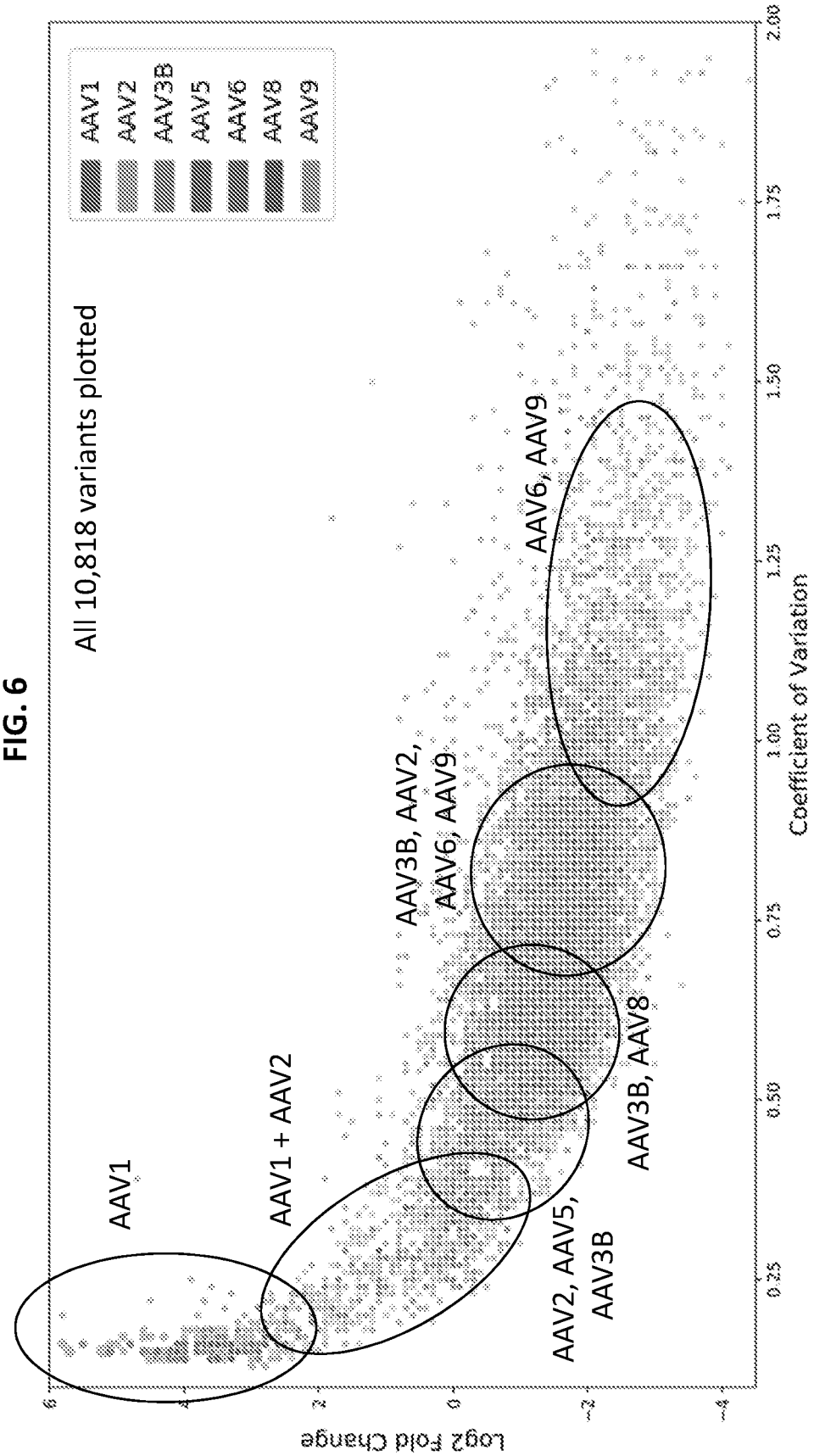

All 10,818 variants plotted
AAV1
AAV2
AAV3B
AAV5
AAV6
AAV8
AAV9
AAV1
AAV1 + AAV2
AAV3B, AAV2, AAV6, AAV9
AAV2, AAV5, AAV3B
AAV3B, AAV8
AAV6, AAV9
log2 Fold Change
Coefficient of Variation
6
4
2
0
-2
-4
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2.00

FIG. 7A

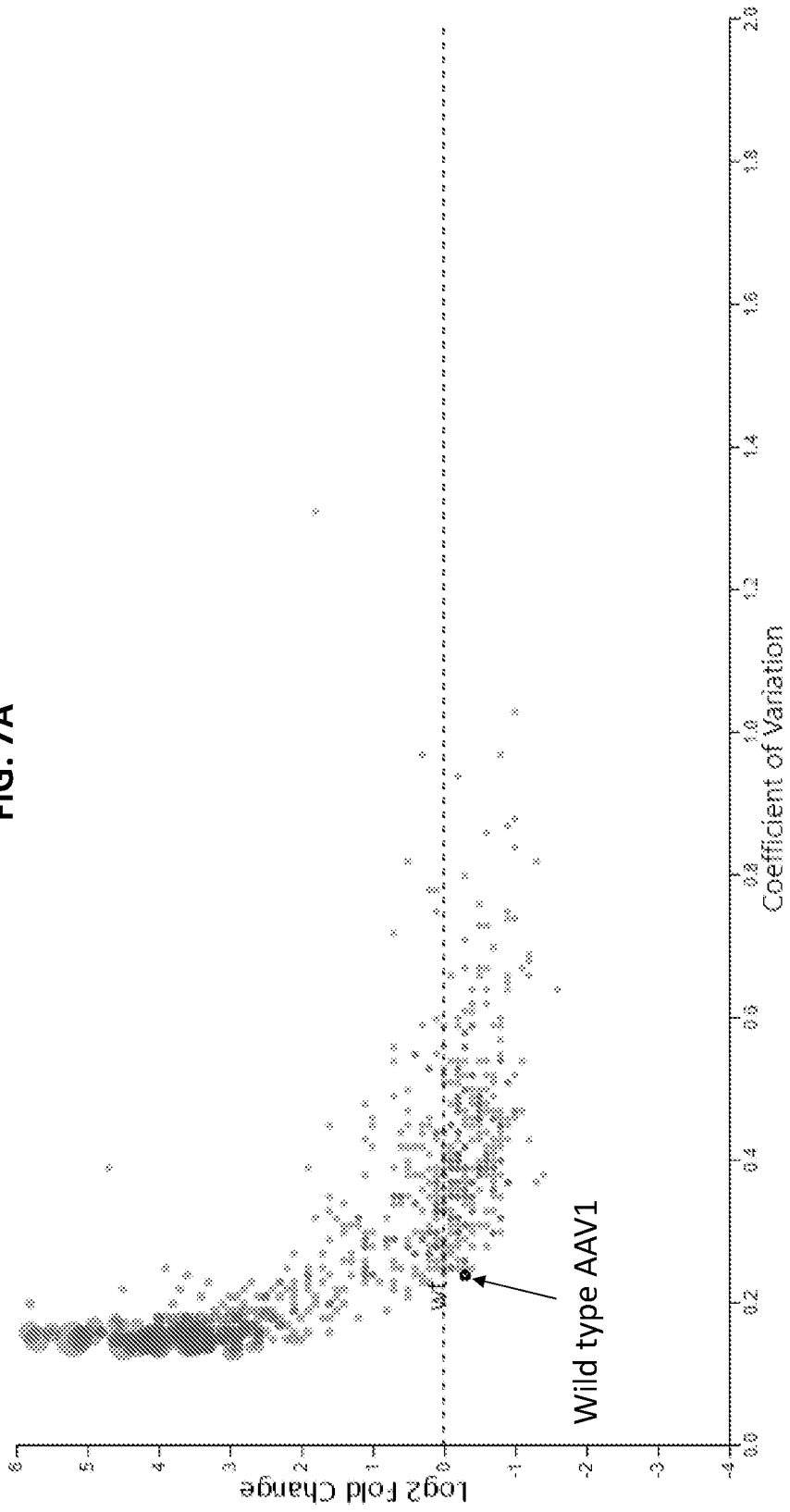


FIG. 7B

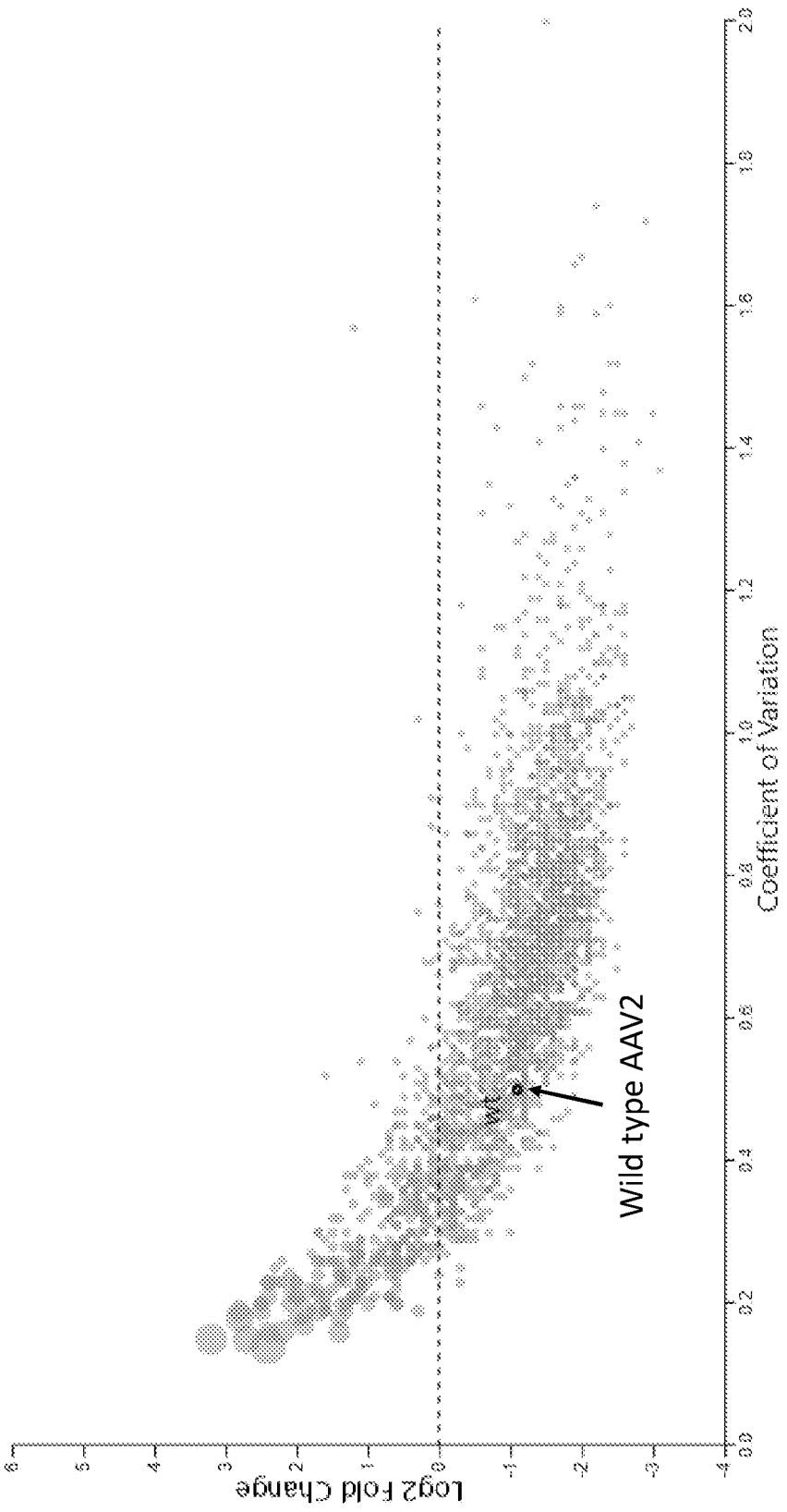

log2 Fold Change
Coefficient of Variation
Wild type AAV2
WT

FIG. 8

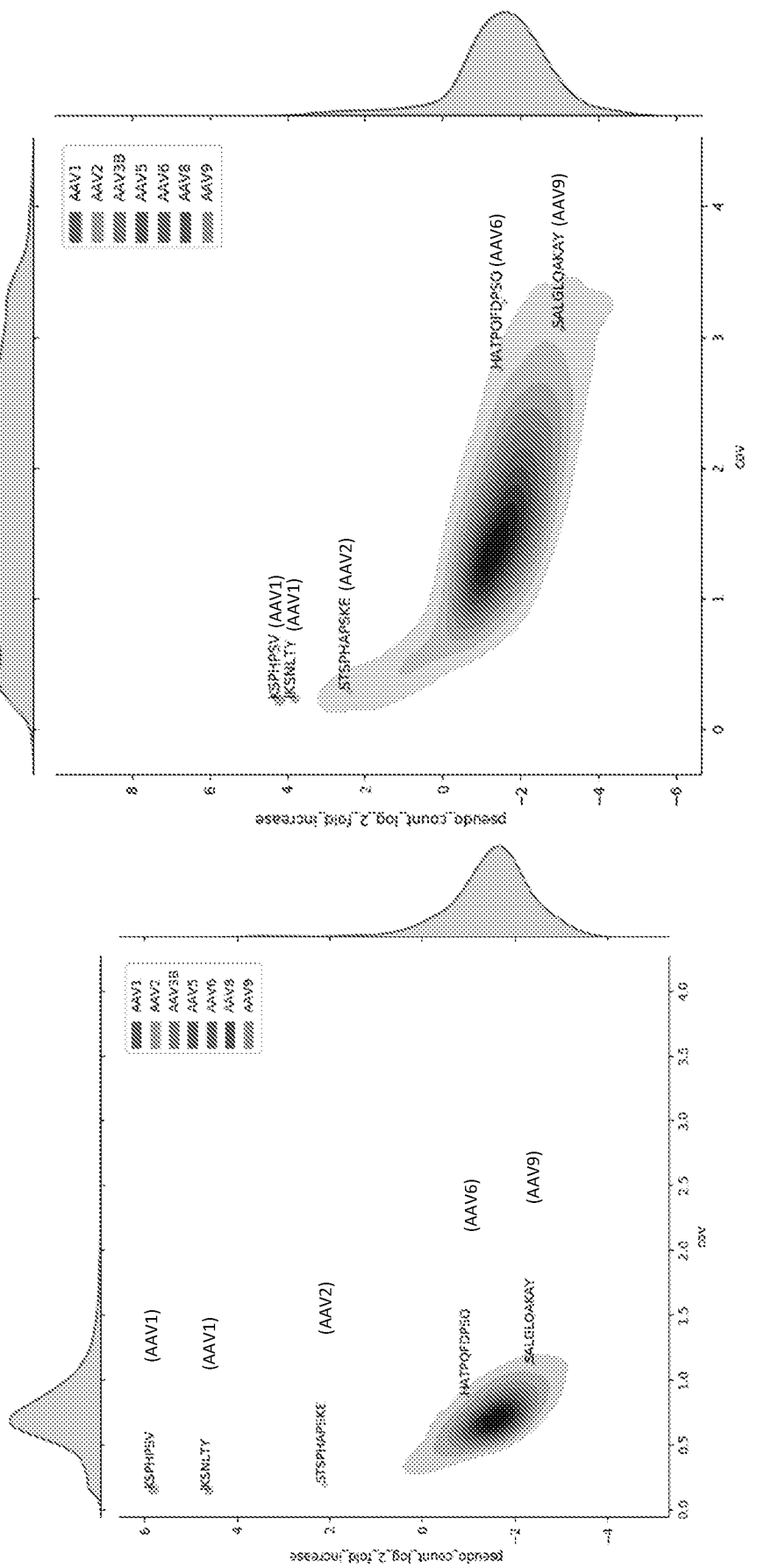

AAV1
AAV2
AAV3B
AAV5
AAV6
AAV8
AAV9
(AAV1)
(AAV1)
(AAV2)
(AAV6)
(AAV9)
csv
pseudo_count_log_2_fold_increase

FIG. 9

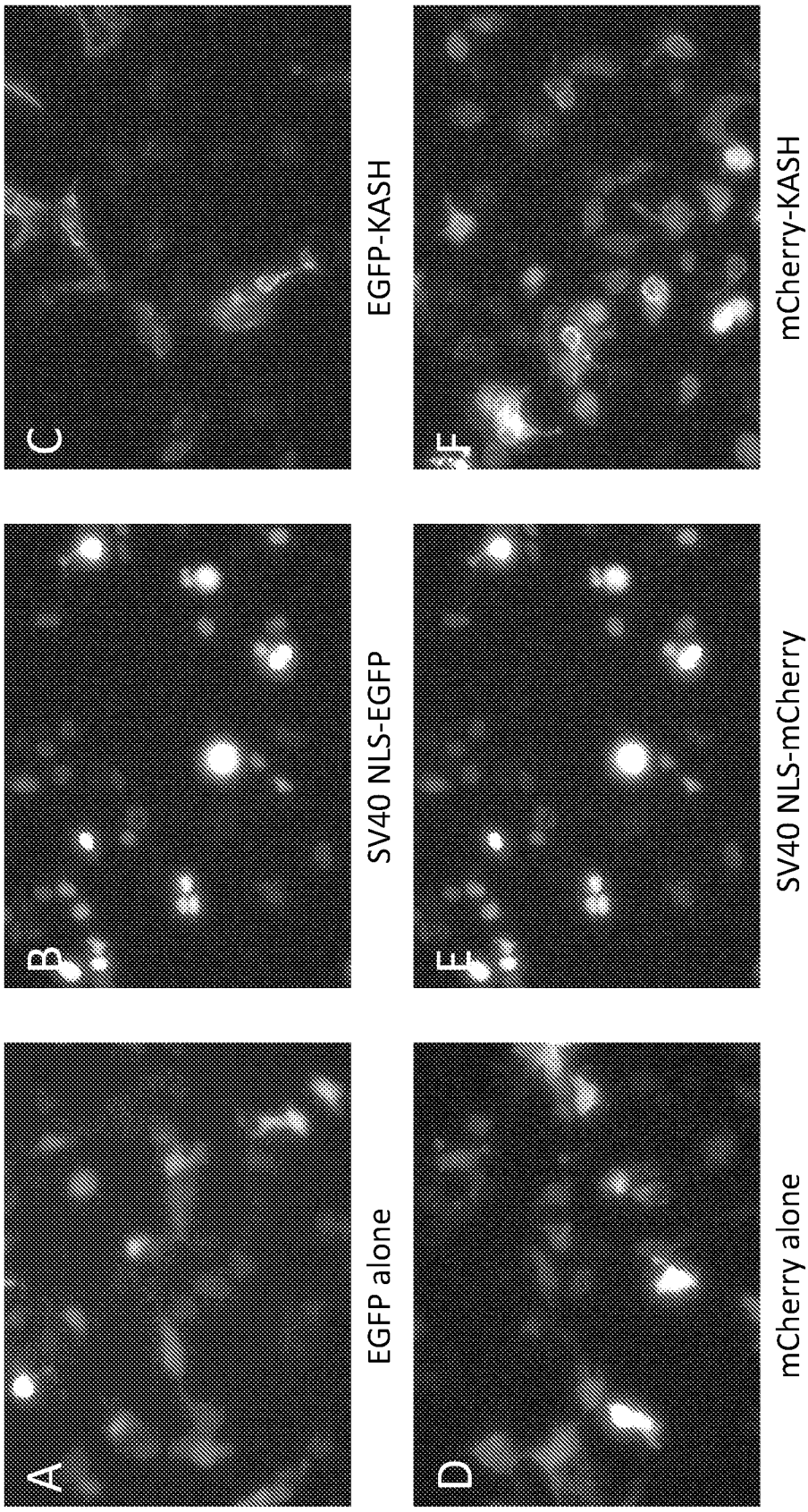
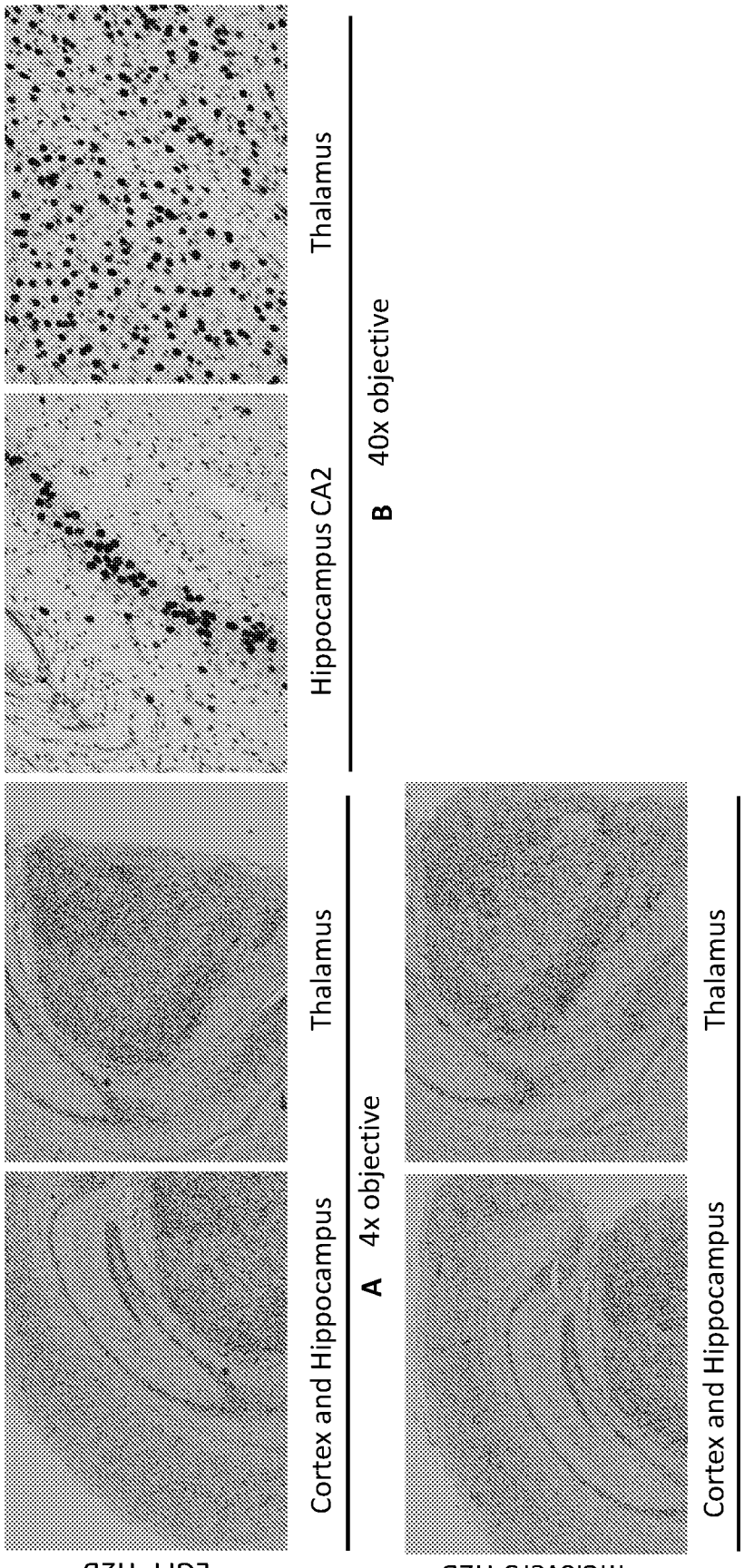

A
EGFP alone
B
SV40 NLS-EGFP
C
EGFP-KASH
D
mCherry alone
E
SV40 NLS-mCherry
F
mCherry-KASH

FIG. 10A


EGFP-H2B
mClover3-H2B
Cortex and Hippocampus
Thalamus
Hippocampus CA2
Thalamus
Cortex and Hippocampus
Thalamus
A 4x objective
B 40x objective
C 4x objective

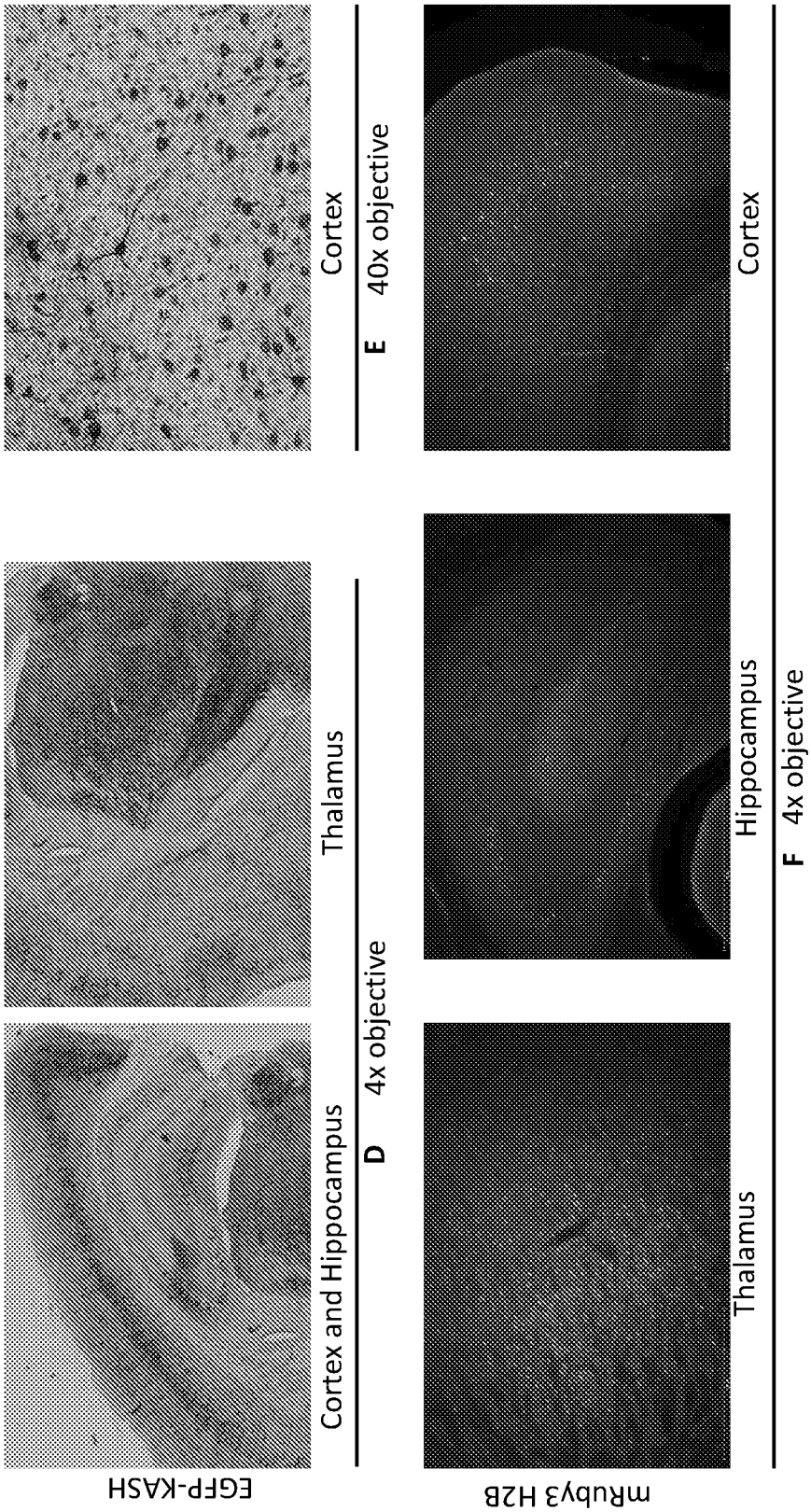

EGFP-KASH
mRuby3 H2B
Cortex and Hippocampus
Thalamus
Thalamus
Hippocampus
Cortex
D 4x objective
E 40x objective
F 4x objective

FIG. 10B

FIG. 11

EGFP-H2B positive nuclei

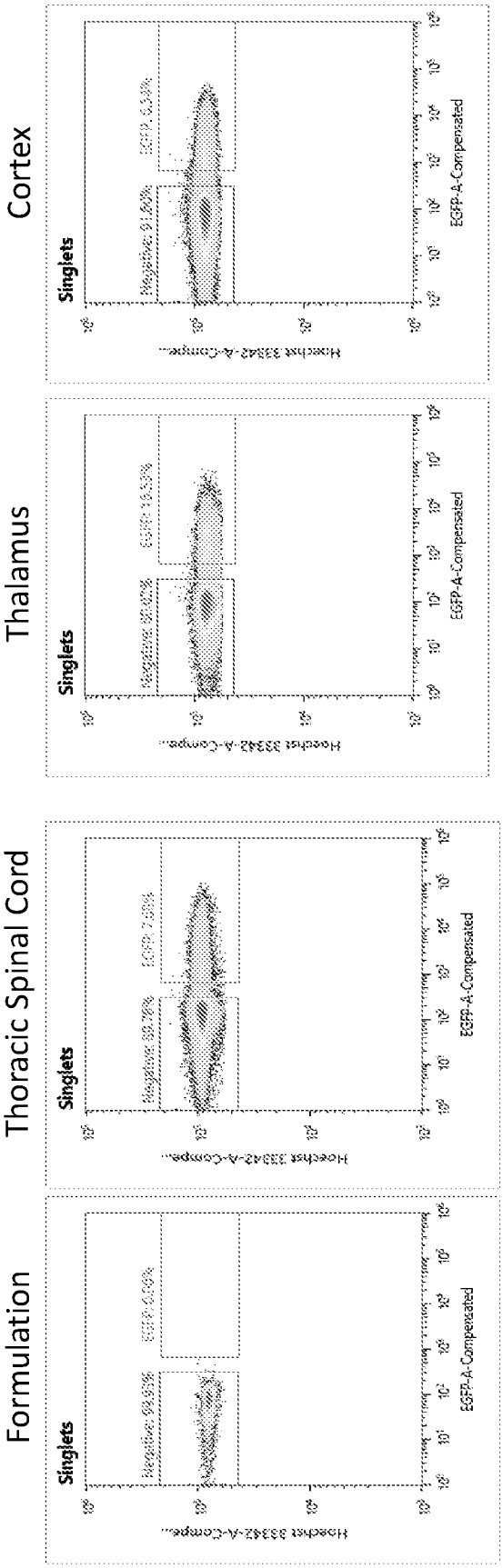


FIG. 12

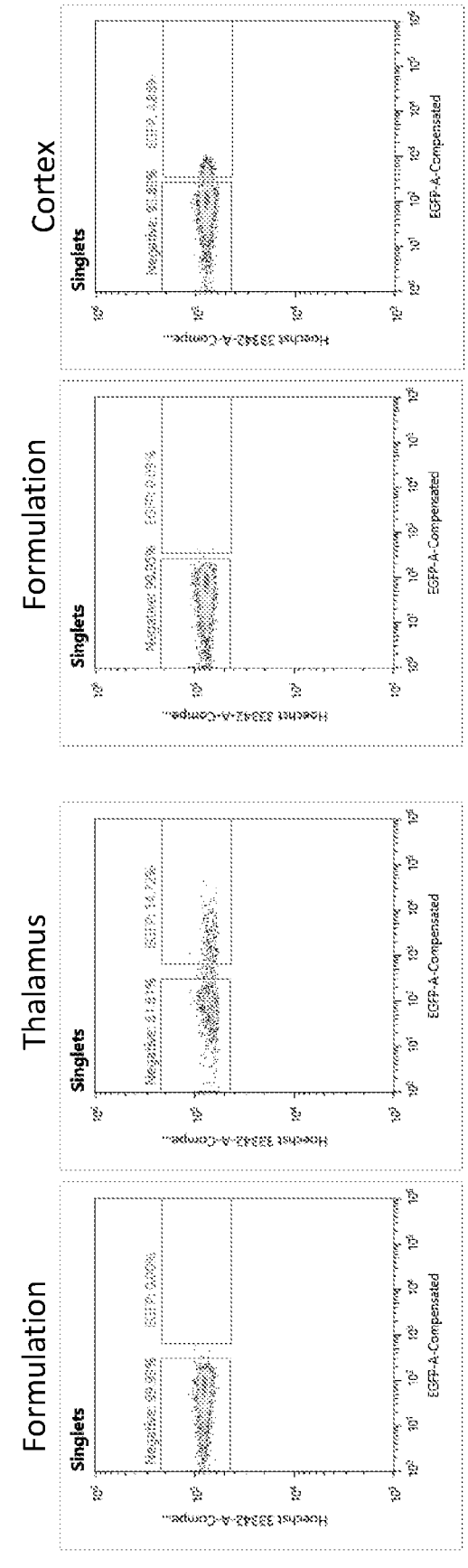
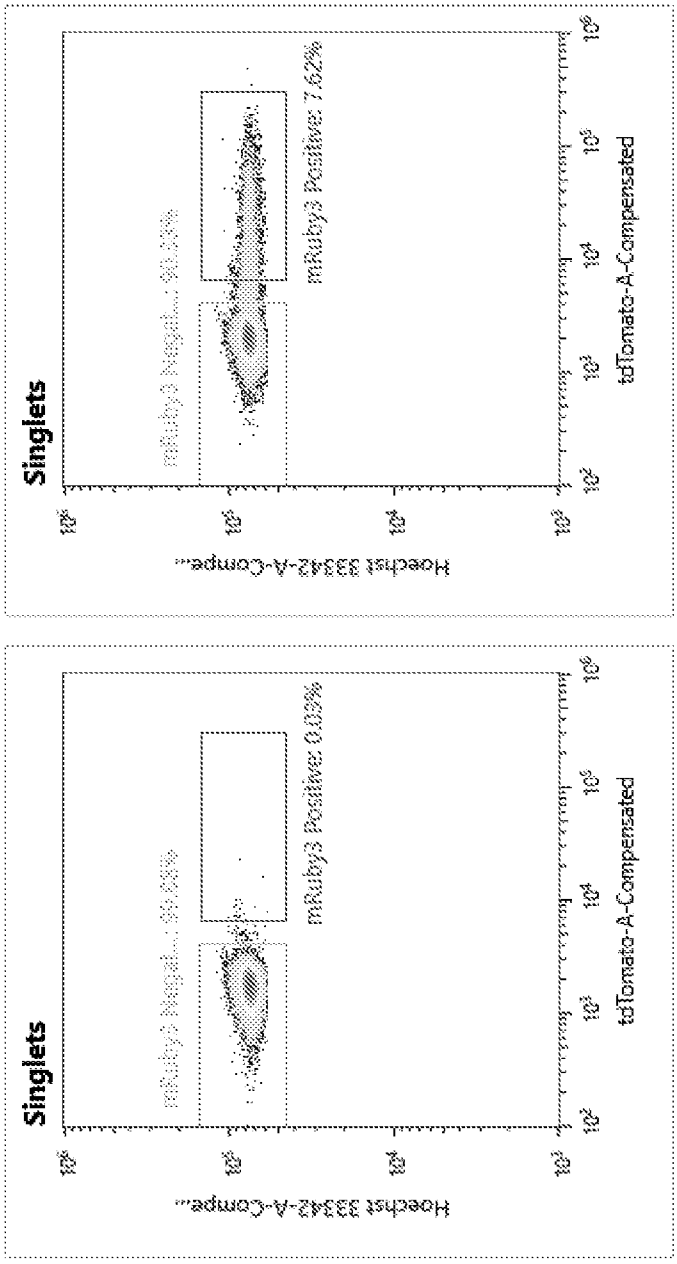

Formulation
Thalamus
Formulation
Cortex
Singlets
EGFP-A-Compensated
mClover3 positive nuclei
EGFP KASH positive nuclei

FIG. 13


Formulation
Cortex
Singlets
Hoechst 33342-A-Compe...
tdTomato-A-Compensated
mRuby3 Positive 0.03%
mRuby3 Positive 7.62%

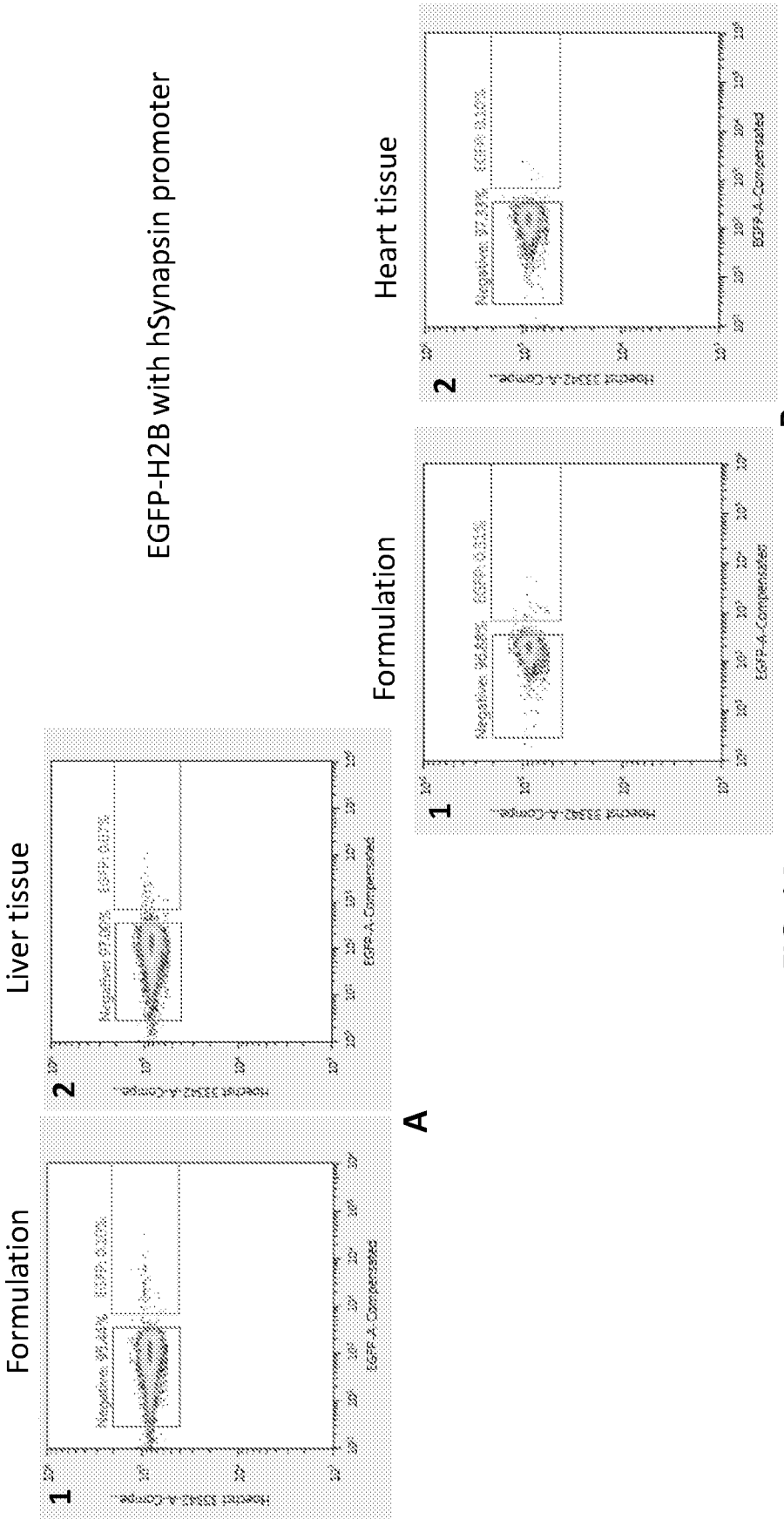

EGFP-H2B with hSynapsin promoter
Liver tissue
Heart tissue
Formulation
Formulation
1
2
1
2
A
B
EGFP-A-Compensated
EGFP-A-Compensated

FIG. 14

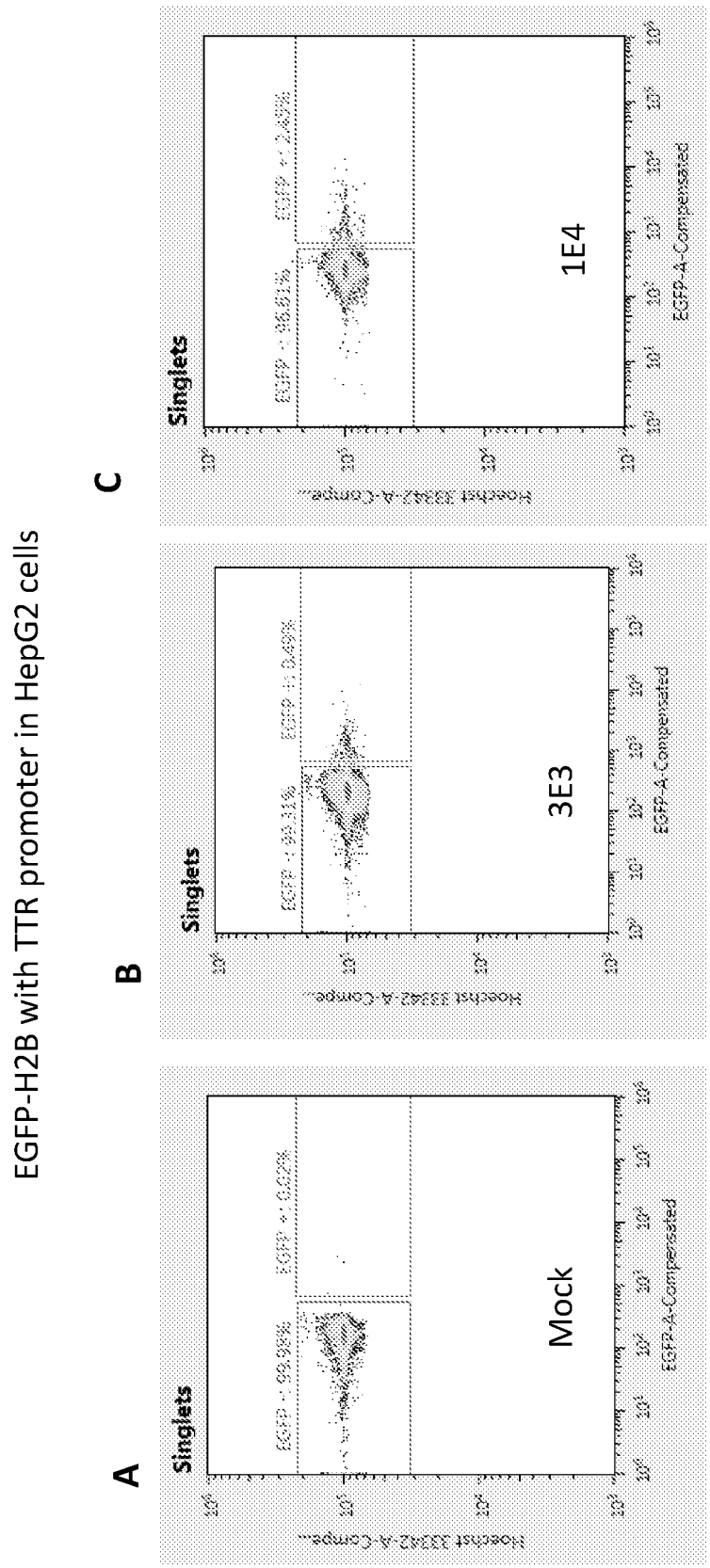

EGFP-H2B with TTR promoter in HepG2 cells
A
B
C
Singlets
Hoechst 33342-A-Compe...
EGFP-A-Compensated
Mock
3E3
1E4

FIG. 15A

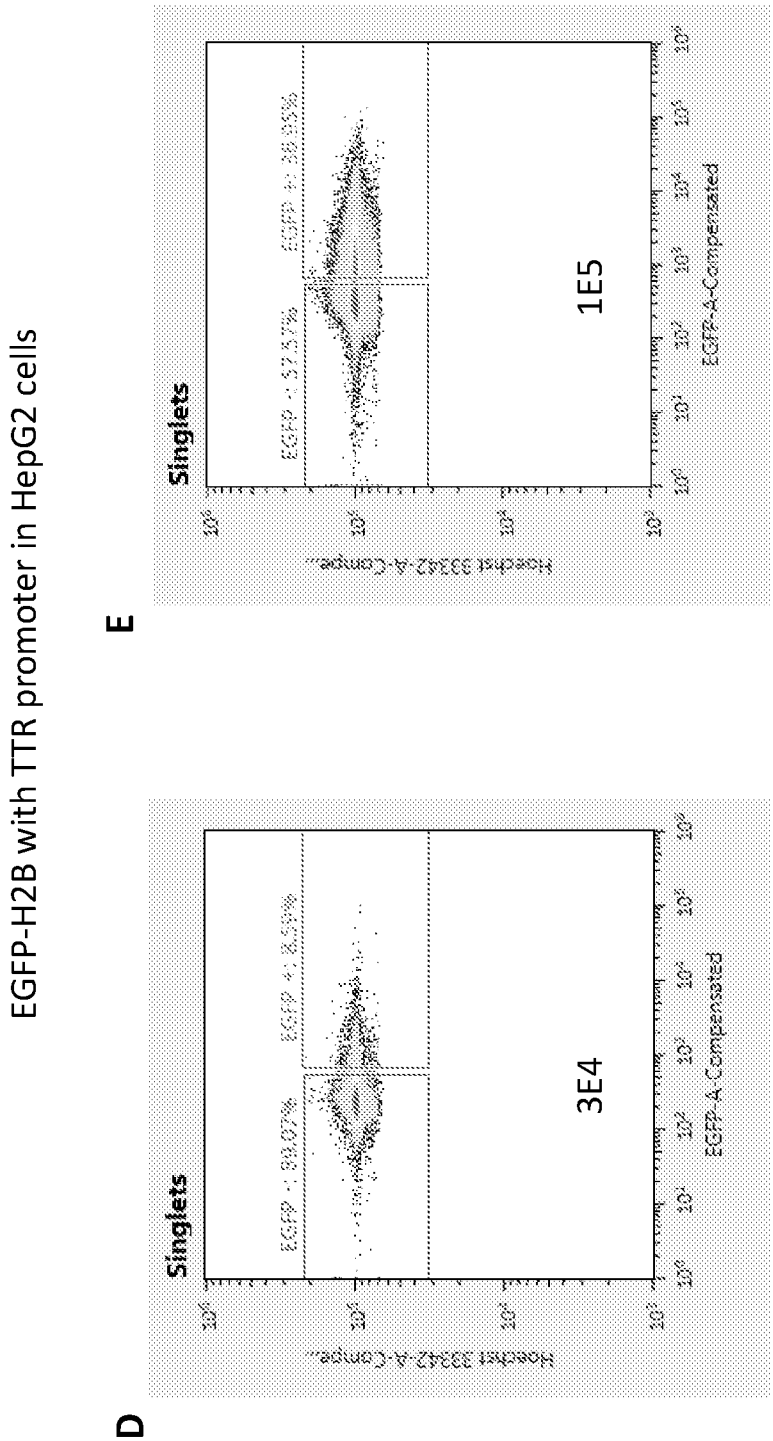

EGFP-H2B with TTR promoter in HepG2 cells
D
Singlets
3E4
EGFP-A-Compensated
E
Singlets
1E5
EGFP-A-Compensated

FIG. 15B

EGFP-H2B with TTR promoter in HepG2 cells

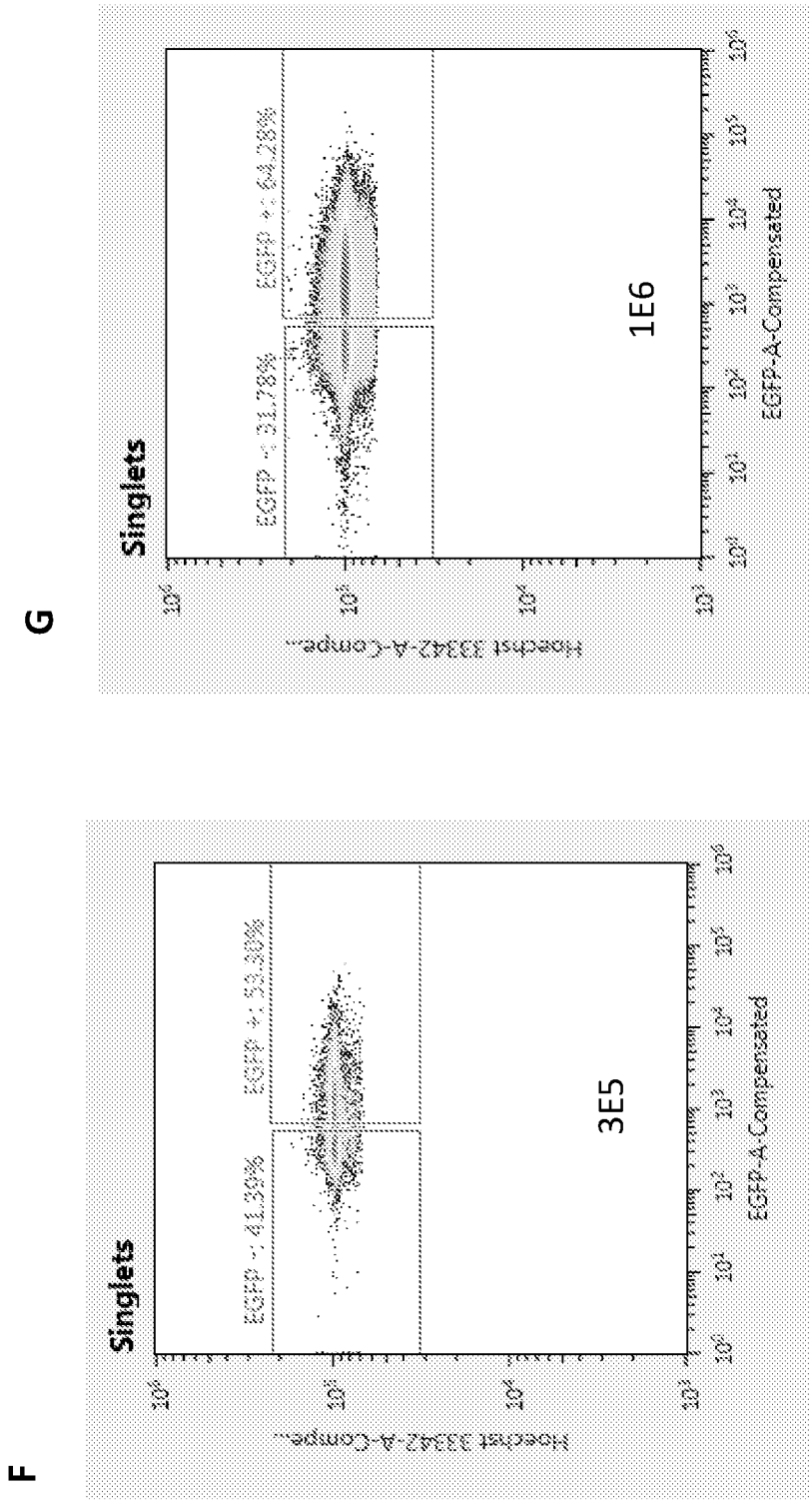


FIG. 15C

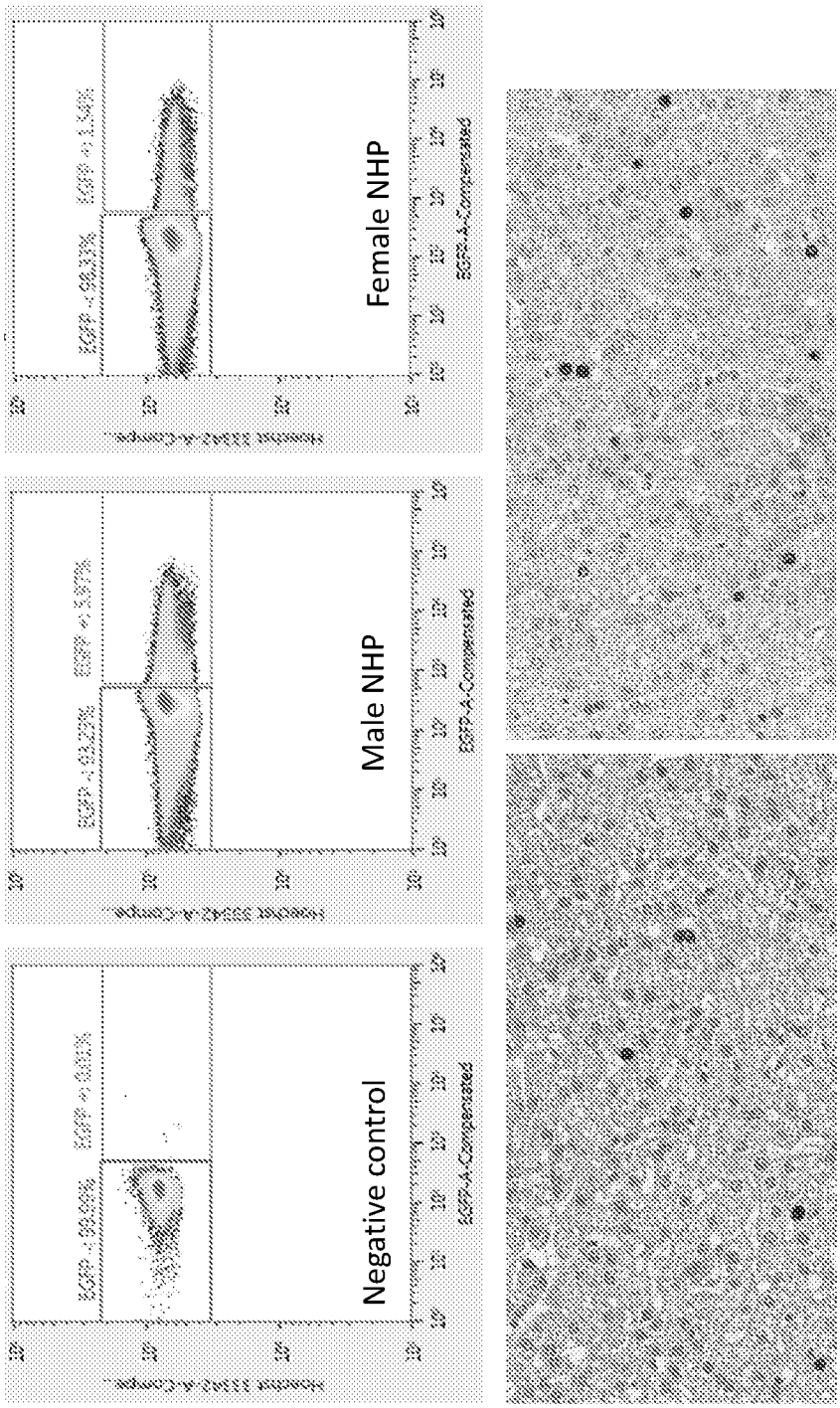


FIG. 16

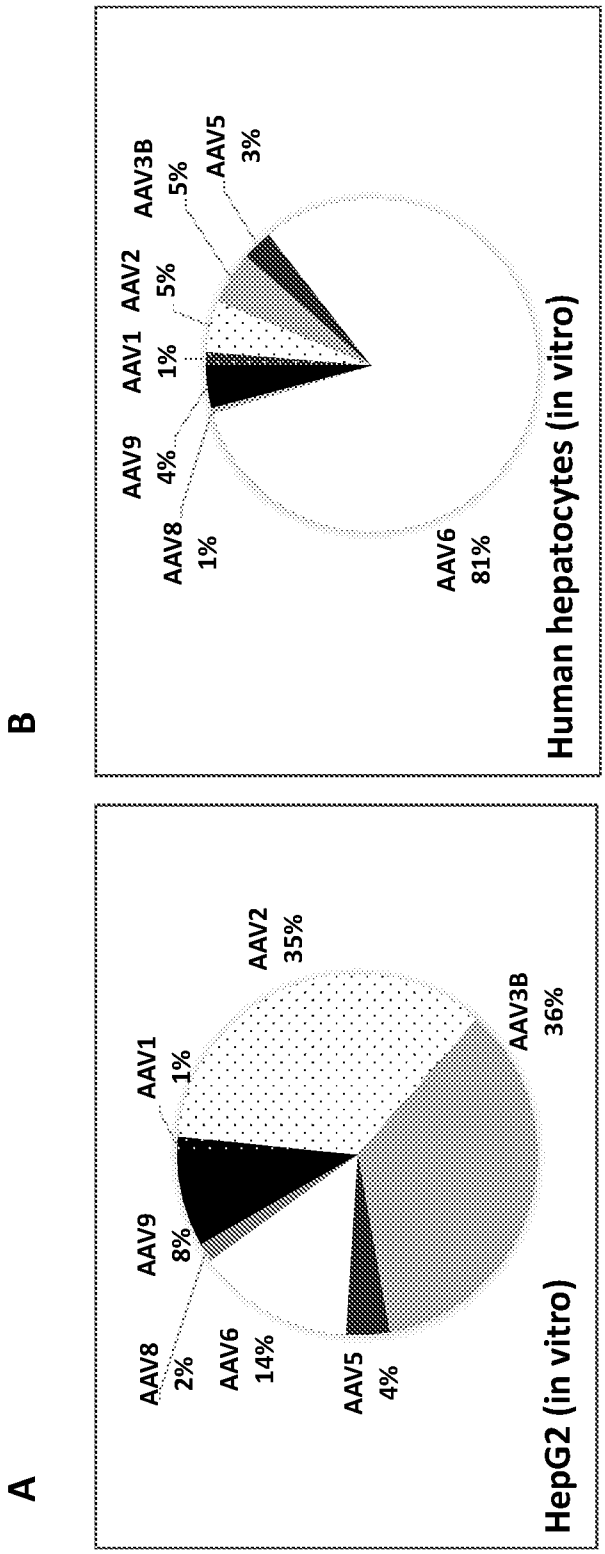

A
HepG2 (in vitro)
AAV2 35%
AAV3B 36%
AAV1 1%
AAV9 8%
AAV8 2%
AAV6 14%
AAV5 4%
B
Human hepatocytes (in vitro)
AAV3B 5%
AAV5 3%
AAV2 5%
AAV1 1%
AAV9 4%
AAV8 1%
AAV6 81%

FIG. 17A

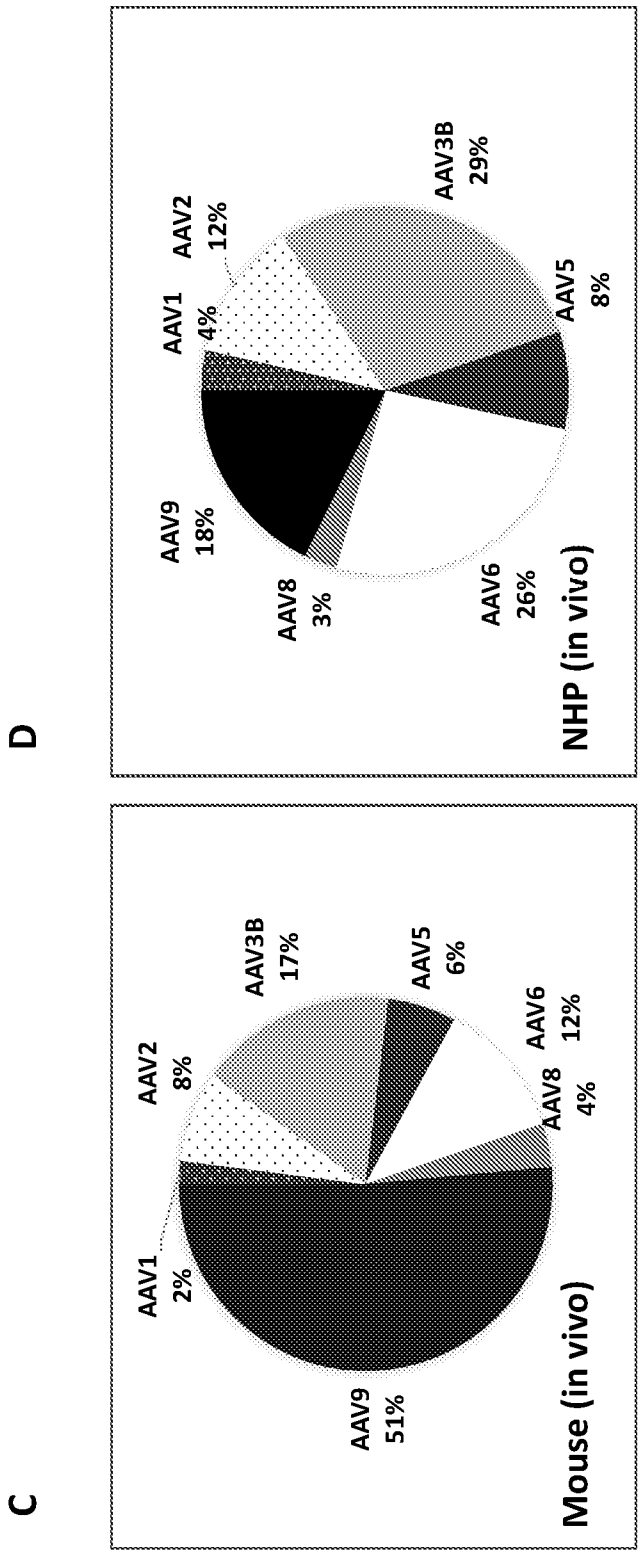

C
Mouse (in vivo)
AAV1 2%
AAV2 8%
AAV3B 17%
AAV5 6%
AAV6 12%
AAV8 4%
AAV9 51%
D
NHP (in vivo)
AAV1 4%
AAV2 12%
AAV3B 29%
AAV5 8%
AAV6 26%
AAV8 3%
AAV9 18%

FIG. 17B

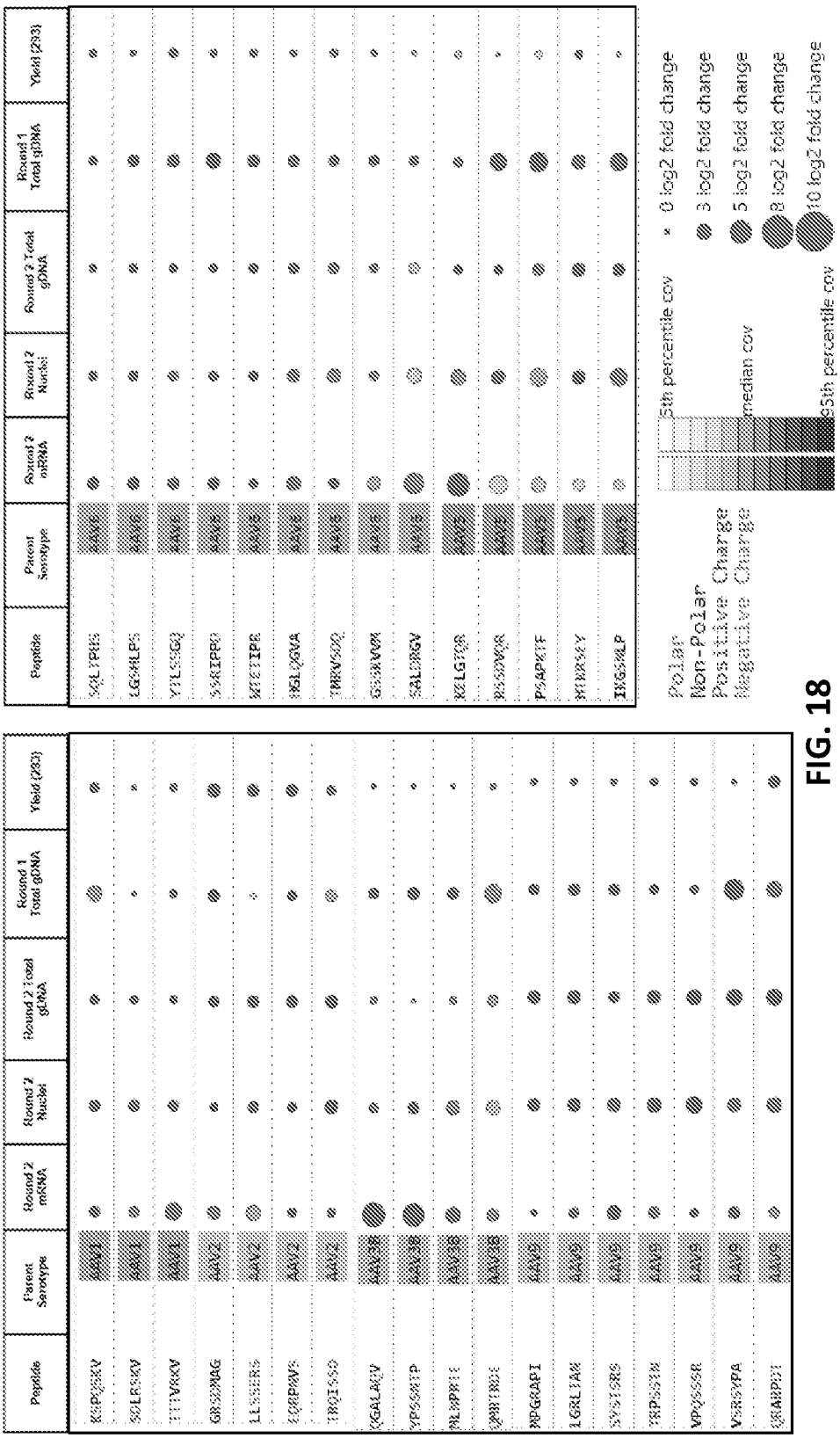

Peptide
Parent Serotype
Round 2 mRNA
Round 2 Nuclei
Round 2 Total gDNA
Round 1 Total gDNA
Yield (293)
Polar
Non-Polar
Positive Charge
Negative Charge
5th percentile cov
median cov
95th percentile cov
0 log2 fold change
3 log2 fold change
5 log2 fold change
8 log2 fold change
10 log2 fold change

FIG. 18

FIG. 19

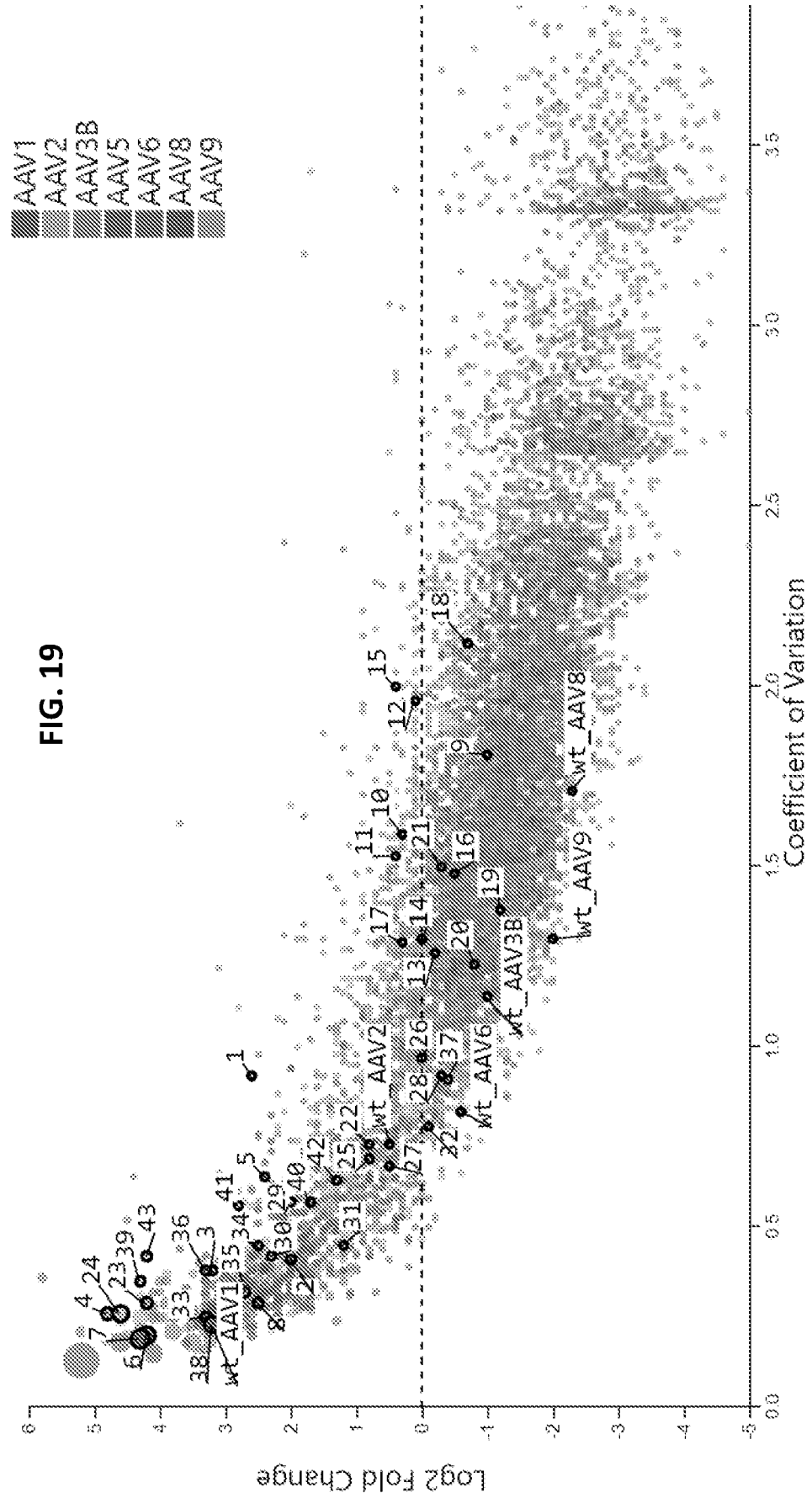

AAV1
AAV2
AAV3B
AAV5
AAV6
AAV8
AAV9
Log2 Fold Change
Coefficient of Variation
wt_AAV1
wt_AAV2
wt_AAV3B
wt_AAV5
wt_AAV6
wt_AAV8
wt_AAV9

FIG. 20

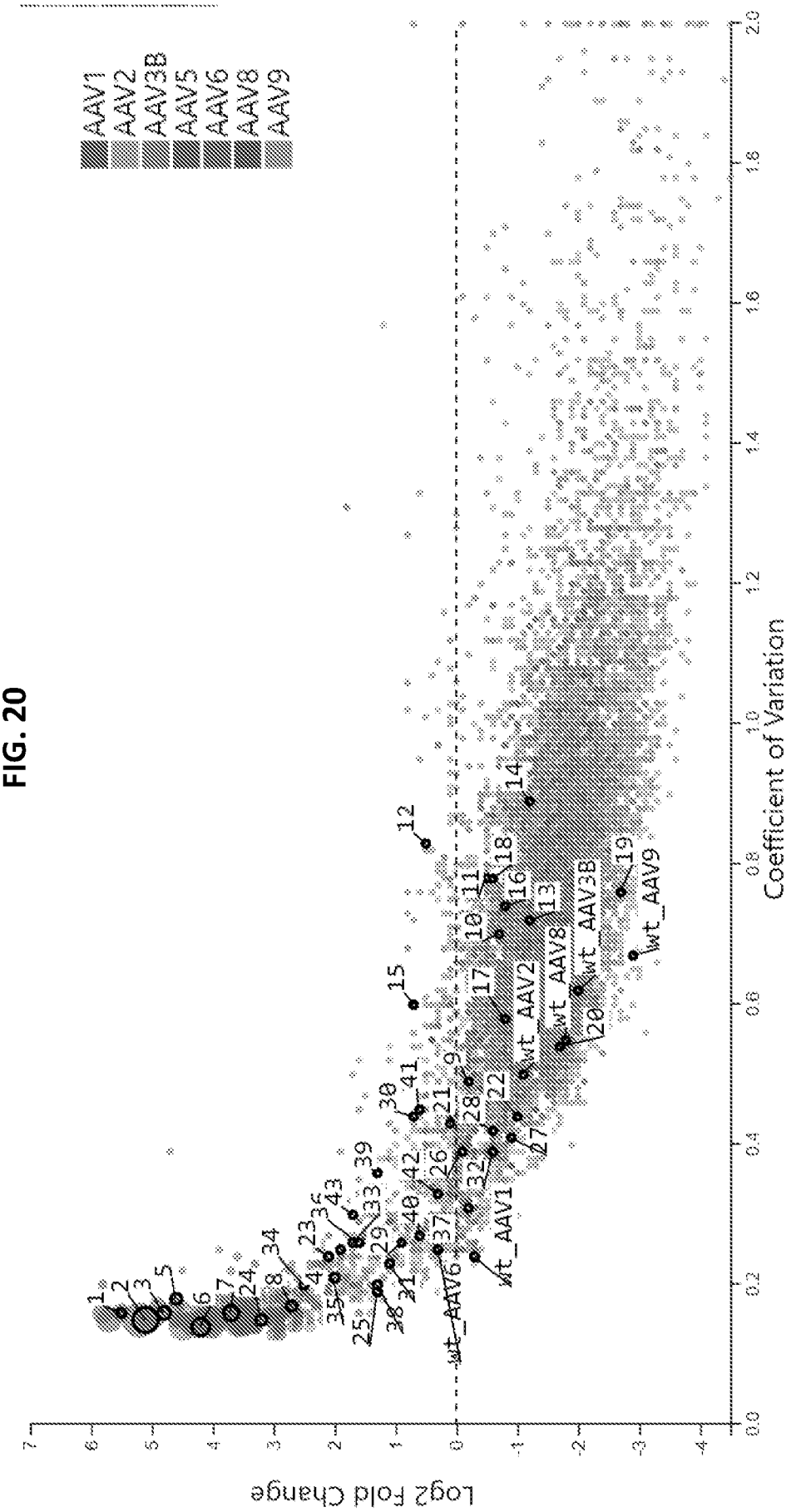

AAV1
AAV2
AAV3B
AAV5
AAV6
AAV8
AAV9
Log2 Fold Change
Coefficient of Variation
wt_AAV1
wt_AAV2
wt_AAV3B
wt_AAV5
wt_AAV6
wt_AAV8
wt_AAV9

FIG. 21

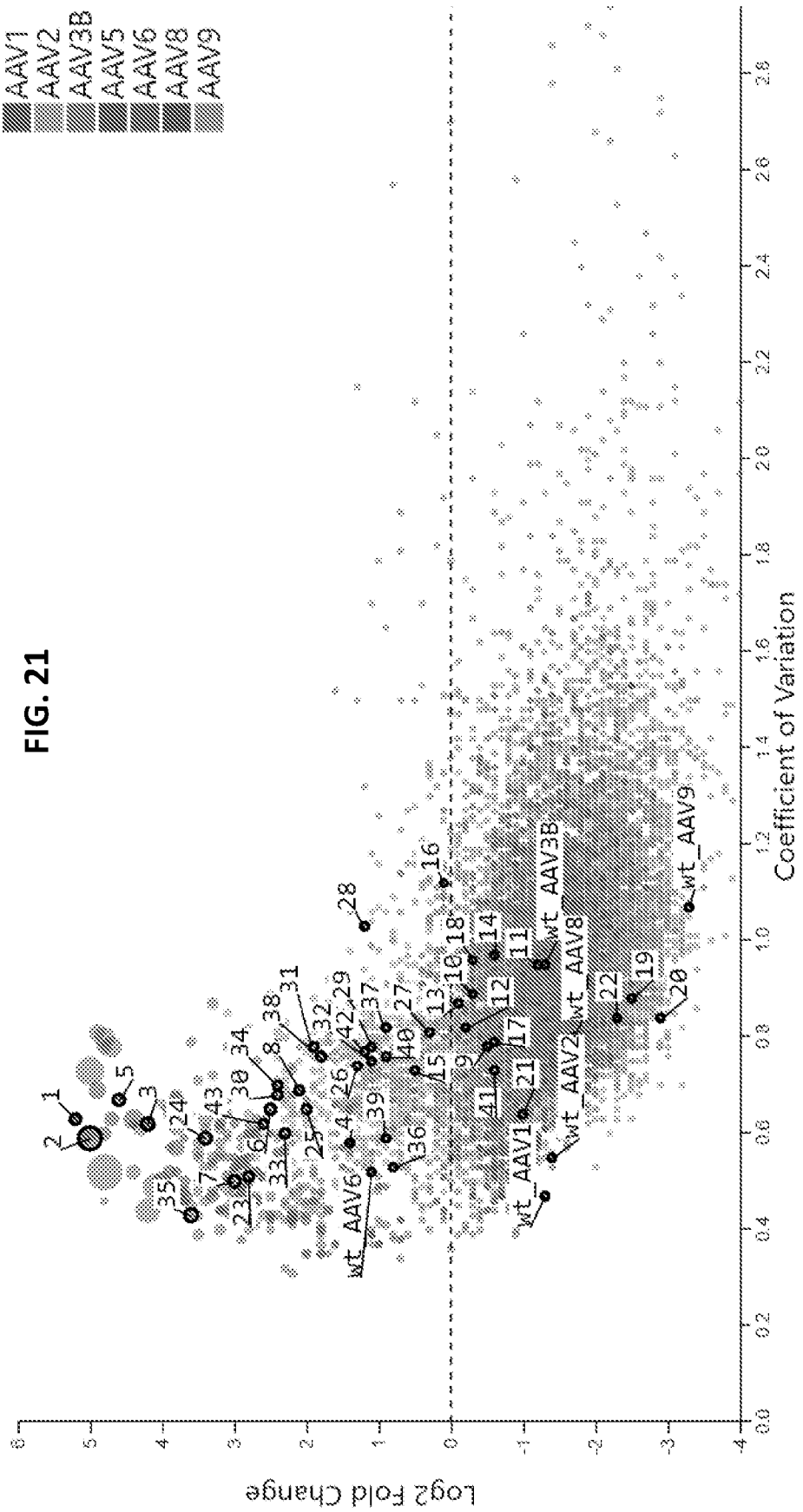

AAV1
AAV2
AAV3B
AAV5
AAV6
AAV8
AAV9
Log2 Fold Change
Coefficient of Variation
wt_AAV1
wt_AAV2
wt_AAV3B
wt_AAV6
wt_AAV8
wt_AAV9

FIG. 22

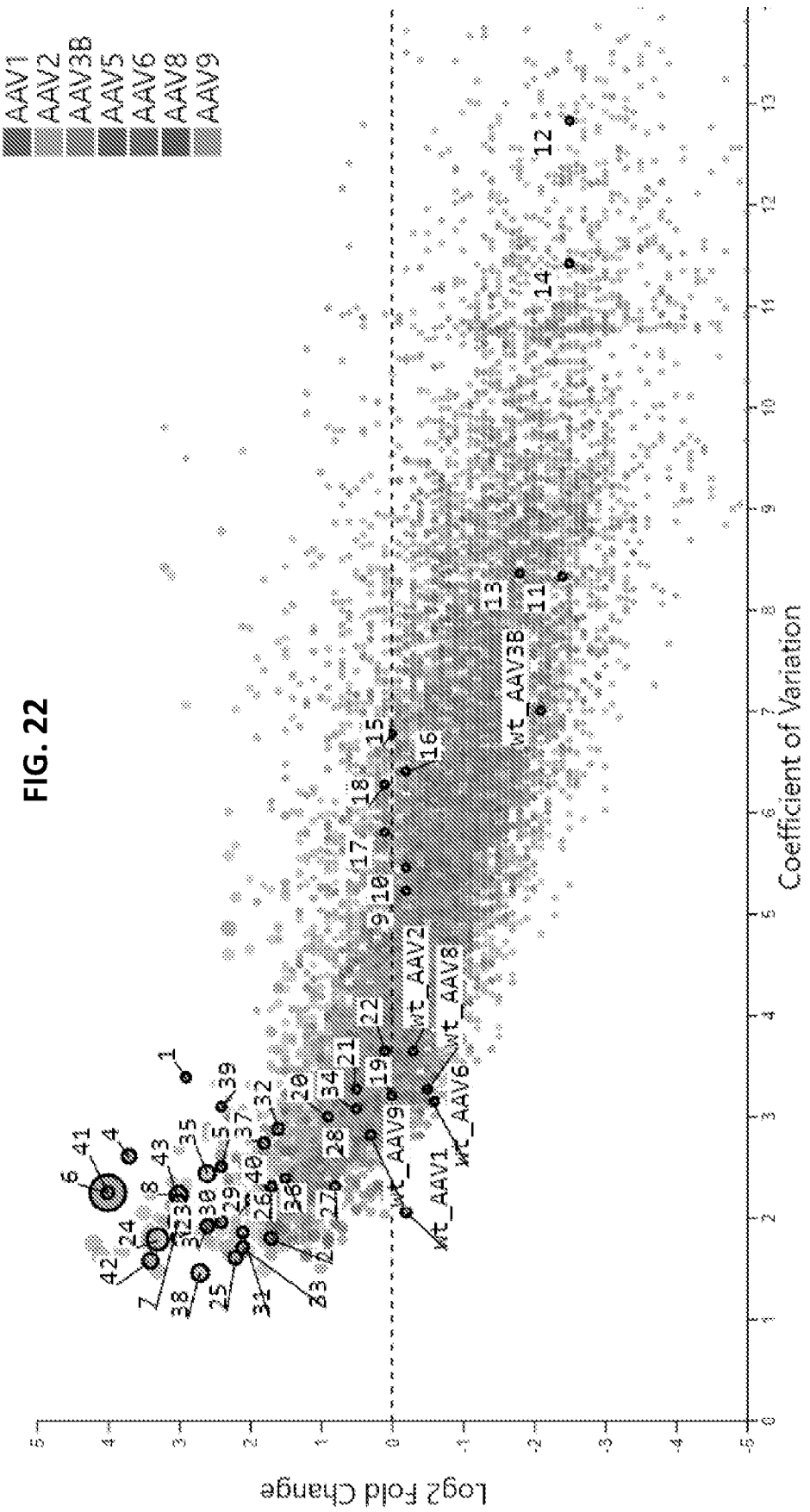
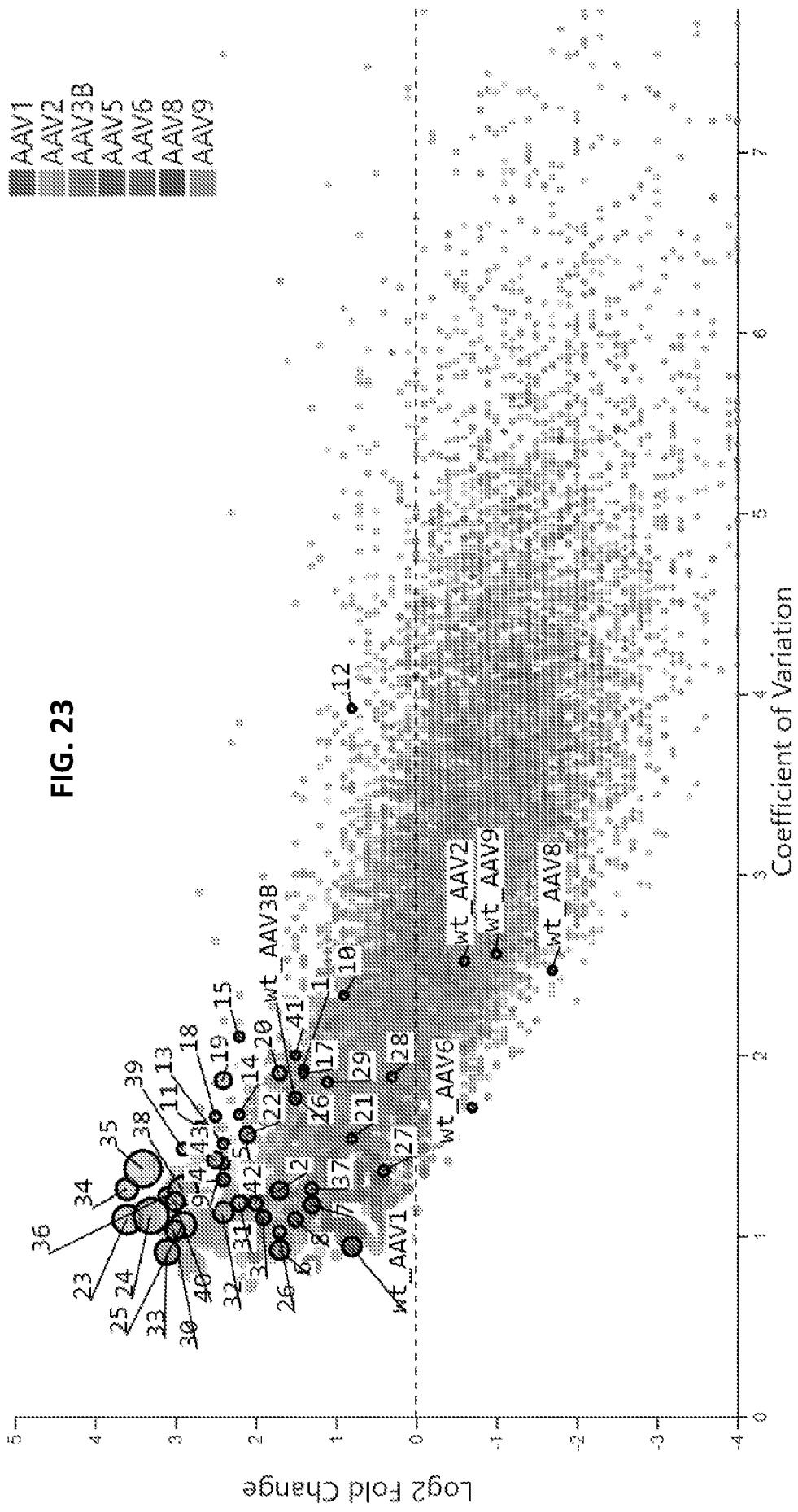

AAV1
AAV2
AAV3B
AAV5
AAV6
AAV8
AAV9
Log2 Fold Change
Coefficient of Variation
wt_AAV1
wt_AAV2
wt_AAV3B
wt_AAV6
wt_AAV8
wt_AAV9

FIG. 23


AAV1
AAV2
AAV3B
AAV5
AAV6
AAV8
AAV9
Log2 Fold Change
Coefficient of Variation
wt_AAV1
wt_AAV2
wt_AAV3B
wt_AAV6
wt_AAV8
wt_AAV9

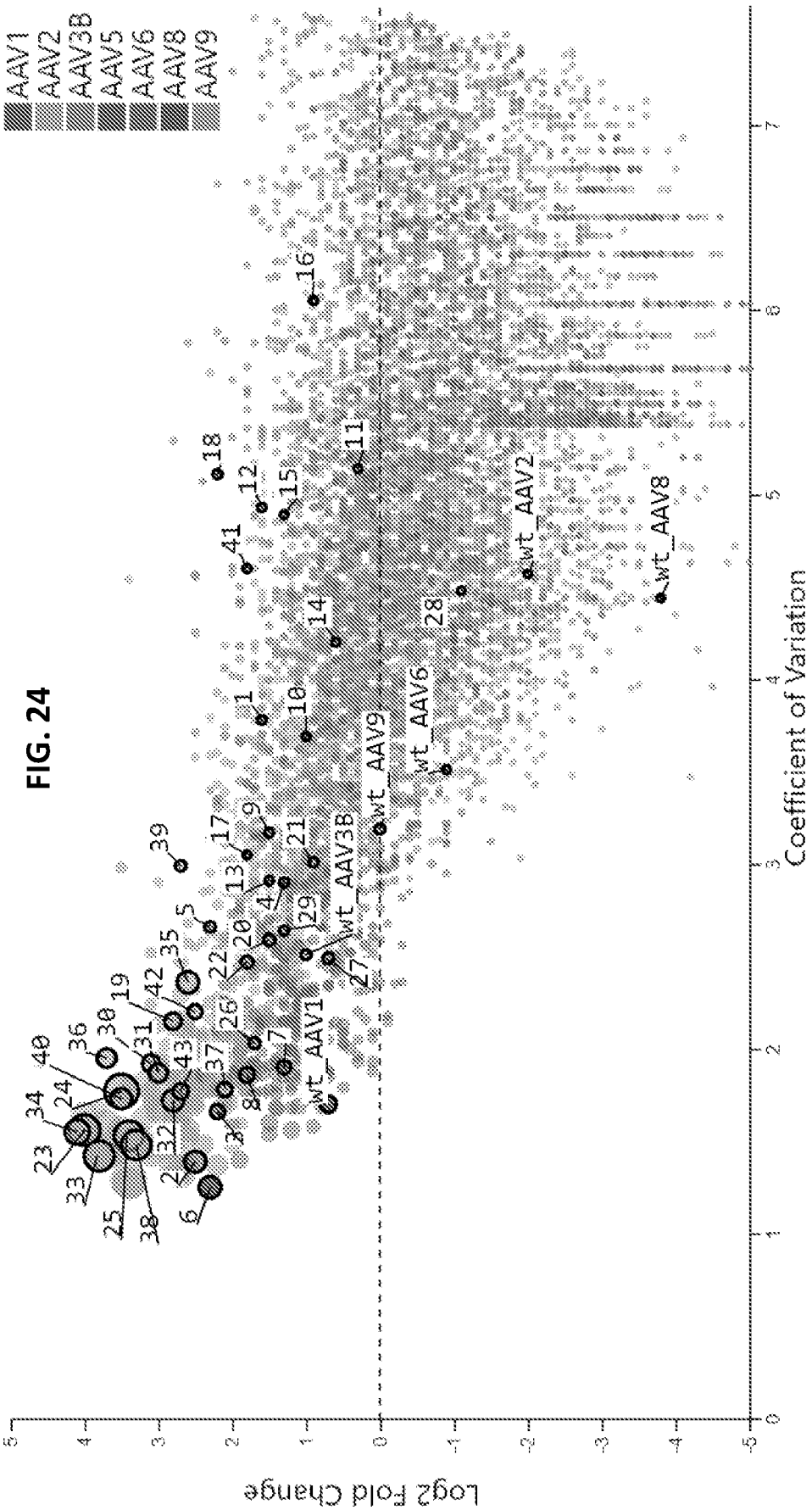

AAV1
AAV2
AAV3B
AAV5
AAV6
AAV8
AAV9
wt_AAV1
wt_AAV2
wt_AAV3B
wt_AAV6
wt_AAV8
wt_AAV9
Log2 Fold Change
Coefficient of Variation

FIG. 24

FIG. 25

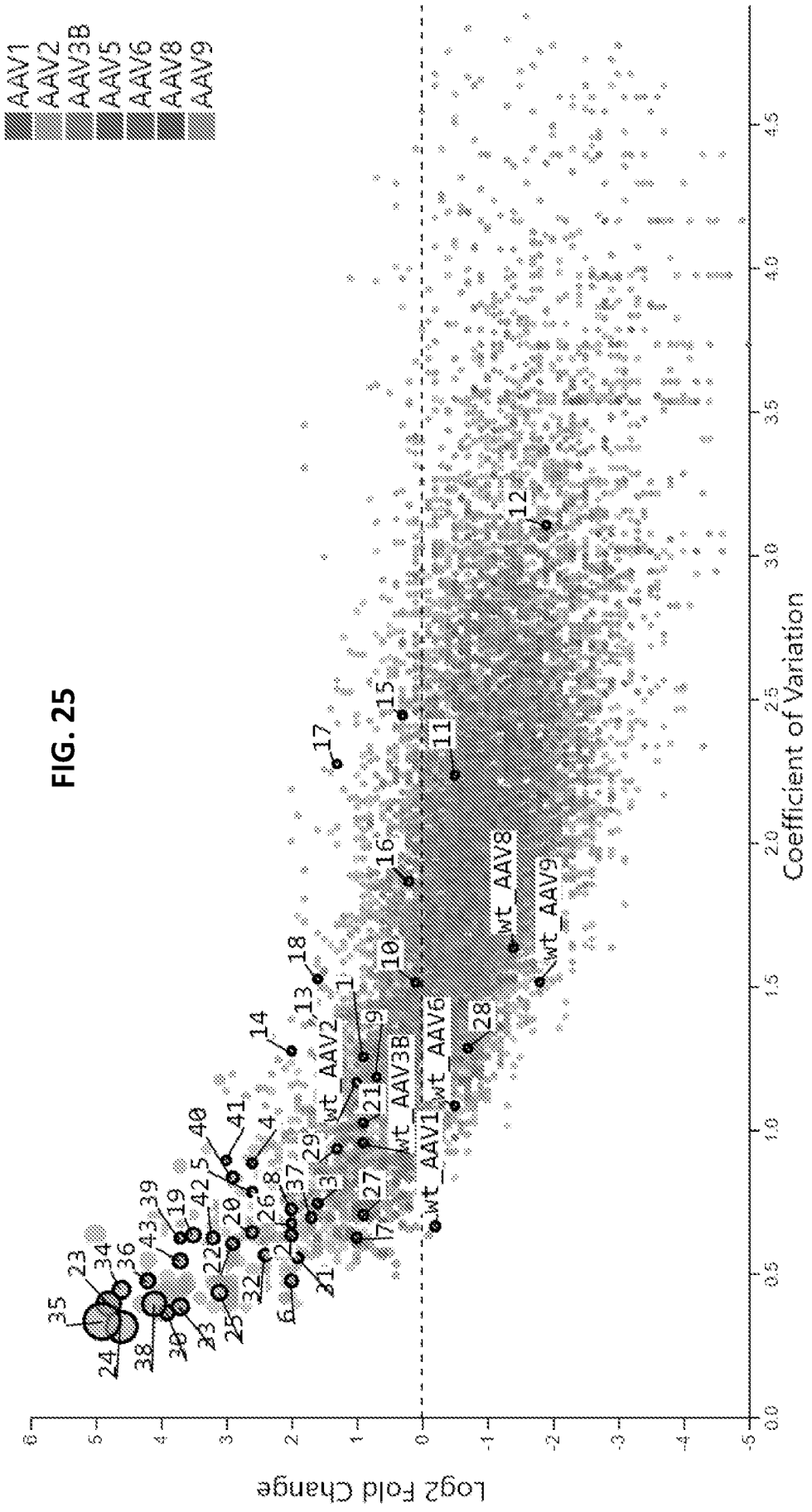

AAV1
AAV2
AAV3B
AAV5
AAV6
AAV8
AAV9
wt_AAV1
wt_AAV2
wt_AAV3B
wt_AAV6
wt_AAV8
wt_AAV9
Log2 Fold Change
Coefficient of Variation

FIG. 26

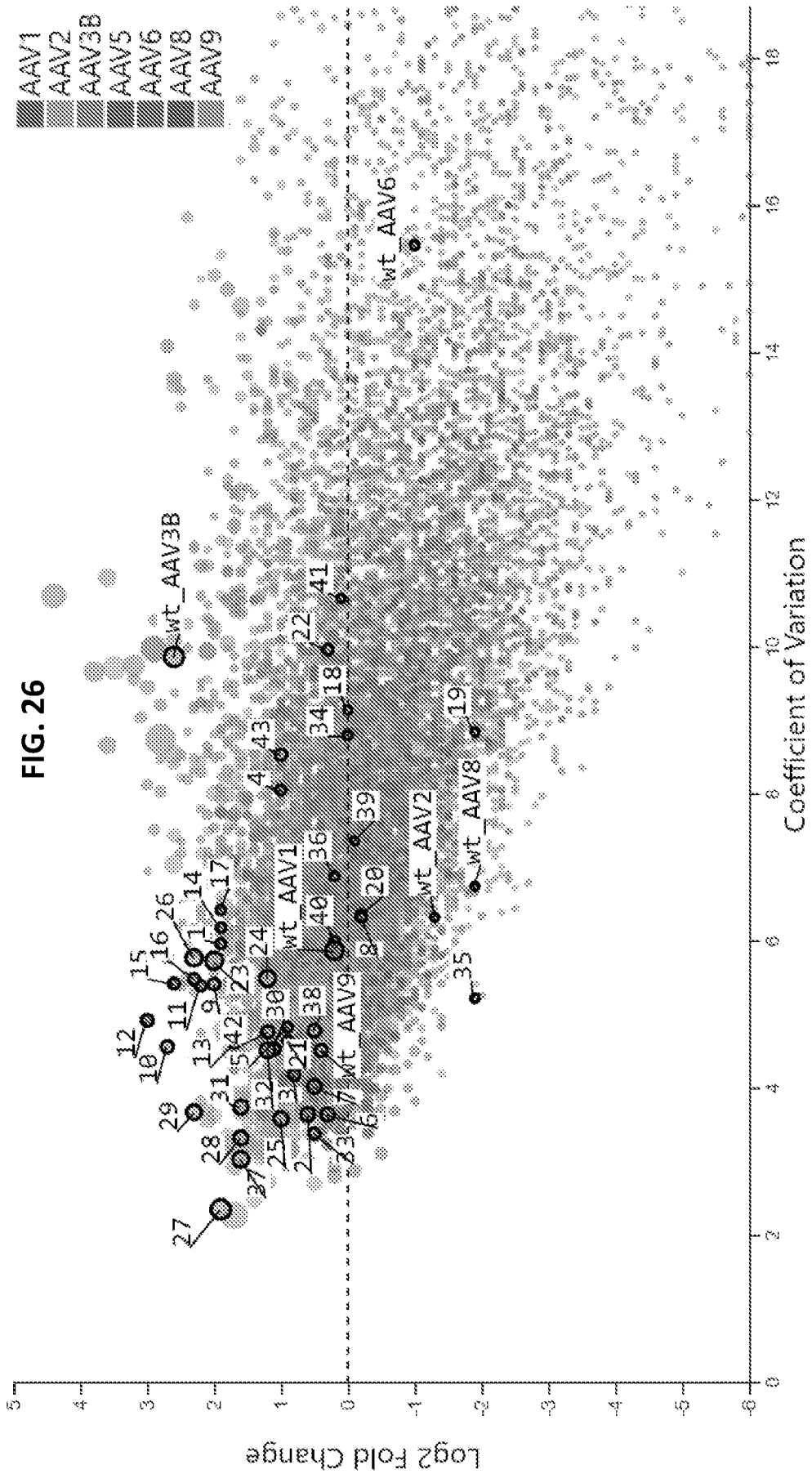

AAV1
AAV2
AAV3B
AAV5
AAV6
AAV8
AAV9
wt_AAV3B
wt_AAV6
wt_AAV1
wt_AAV2
wt_AAV8
wt_AAV9
Log2 Fold Change
Coefficient of Variation

FIG. 27

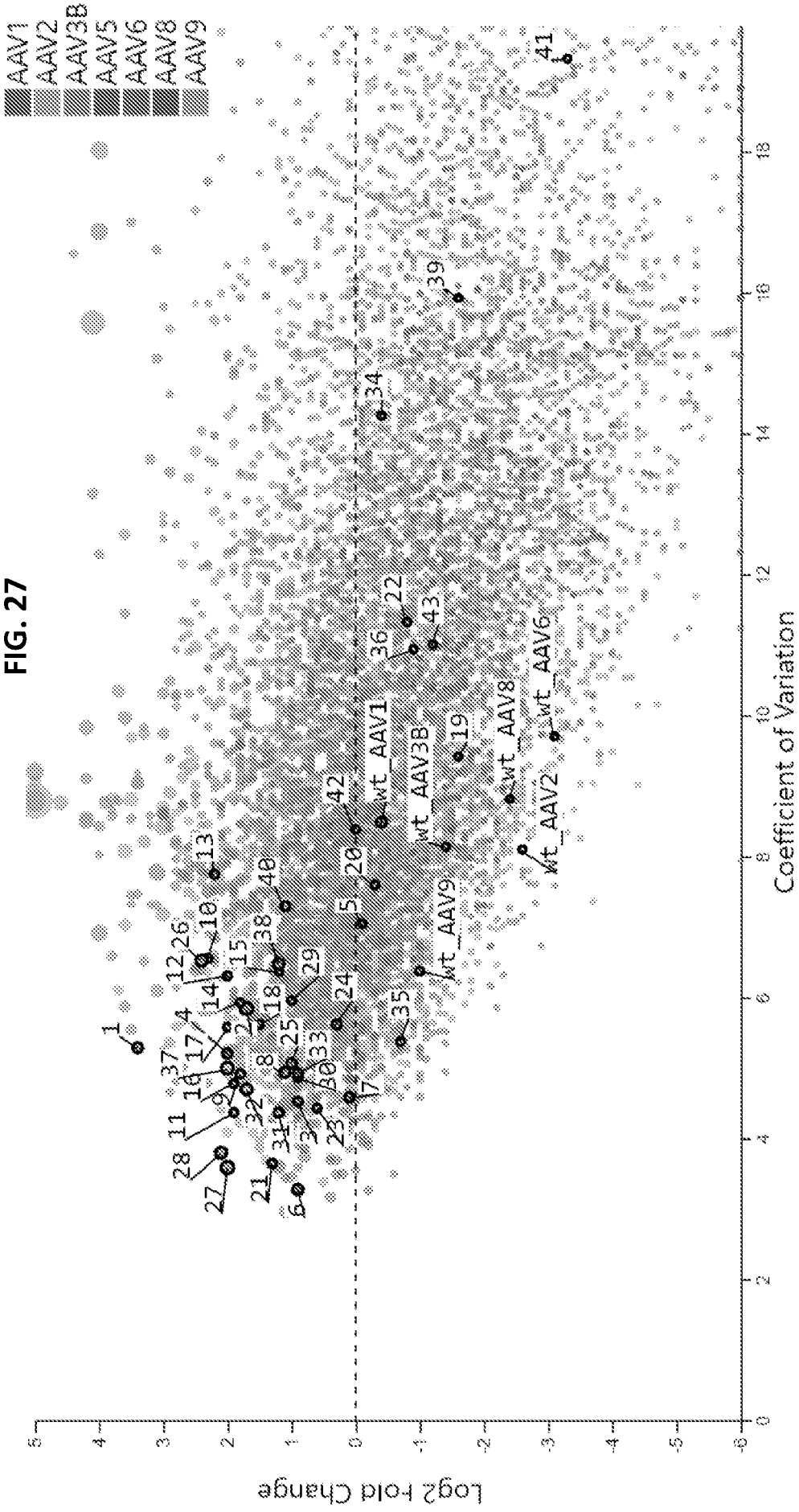

AAV1
AAV2
AAV3B
AAV5
AAV6
AAV8
AAV9
wt_AAV1
wt_AAV2
wt_AAV3B
wt_AAV5
wt_AAV6
wt_AAV8
wt_AAV9
Log2 Fold Change
Coefficient of Variation

FIG. 28

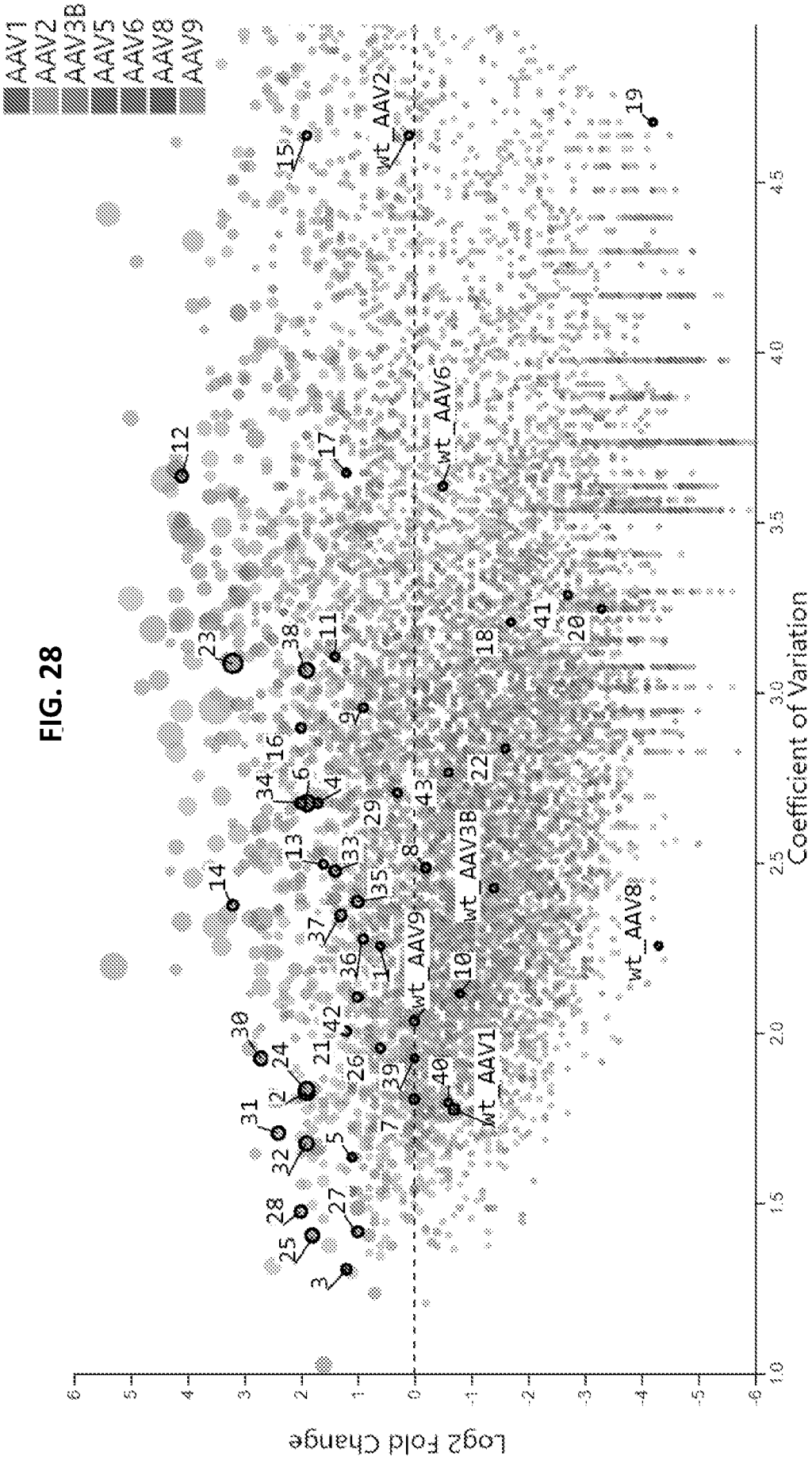

AAV1
AAV2
AAV3B
AAV5
AAV6
AAV8
AAV9
wt_AAV1
wt_AAV2
wt_AAV3B
wt_AAV6
wt_AAV8
wt_AAV9
Log2 Fold Change
Coefficient of Variation

FIG. 29A

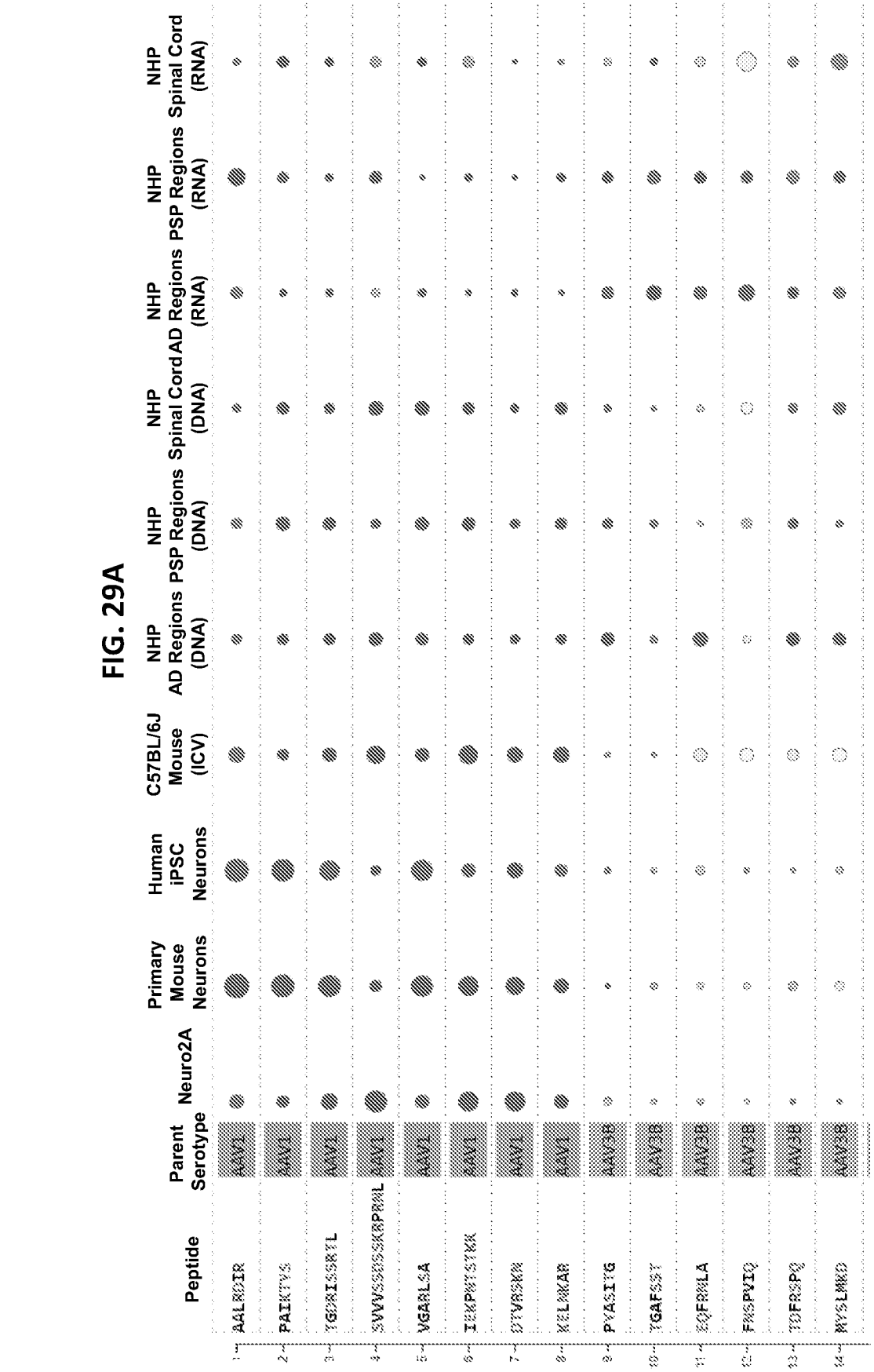

Peptide
Parent Serotype
Neuro2A
Primary Mouse Neurons
Human iPSC Neurons
C57BL/6J Mouse (ICV)
NHP AD Regions (DNA)
NHP PSP Regions (DNA)
NHP Spinal Cord (DNA)
NHP AD Regions (RNA)
NHP PSP Regions (RNA)
NHP Spinal Cord (RNA)
AALEQIR
PAIKTYS
YGNISSRTL
SVVSSQSSSKRPAAL
VGARLSA
IEKPWTSTKK
DTVASKM
KELMKAR
PVASITG
YGAFSST
EQFRALA
FASPVIQ
TDFRSPQ
MYSLMKD
AAV1
AAV3B

FIG. 29B

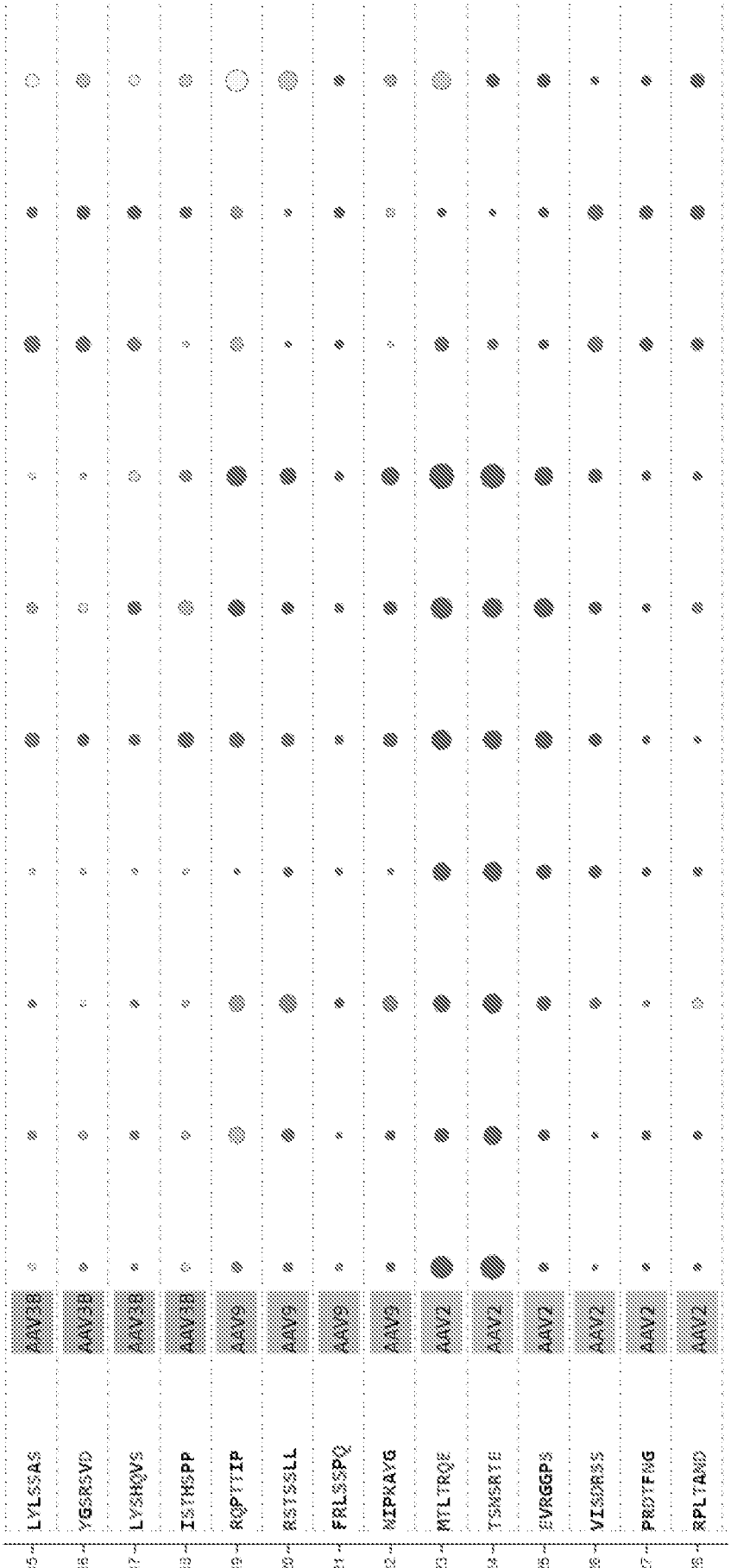

Peptide
Parent Serotype
Neuro2A
Primary Mouse Neurons
Human iPSC Neurons
C57BL/6J Mouse (ICV)
NHP AD Regions (DNA)
NHP PSP Regions (DNA)
NHP Spinal Cord (DNA)
NHP AD Regions (RNA)
NHP PSP Regions (RNA)
NHP Spinal Cord (RNA)
15
LYLSSAS
AAV38
16
YGSRSVD
AAV38
17
LYSHQVS
AAV38
18
ISTNSPP
AAV38
19
RQPTTIP
AAV9
20
RSTSSLL
AAV9
21
FRLSSPQ
AAV9
22
MIPKAYG
AAV9
23
MTLTRQE
AAV2
24
TSMSRTE
AAV2
25
EVRGGPS
AAV2
26
VISDRSS
AAV2
27
PRDTFNG
AAV2
28
RPLTAWD
AAV2

FIG. 29C

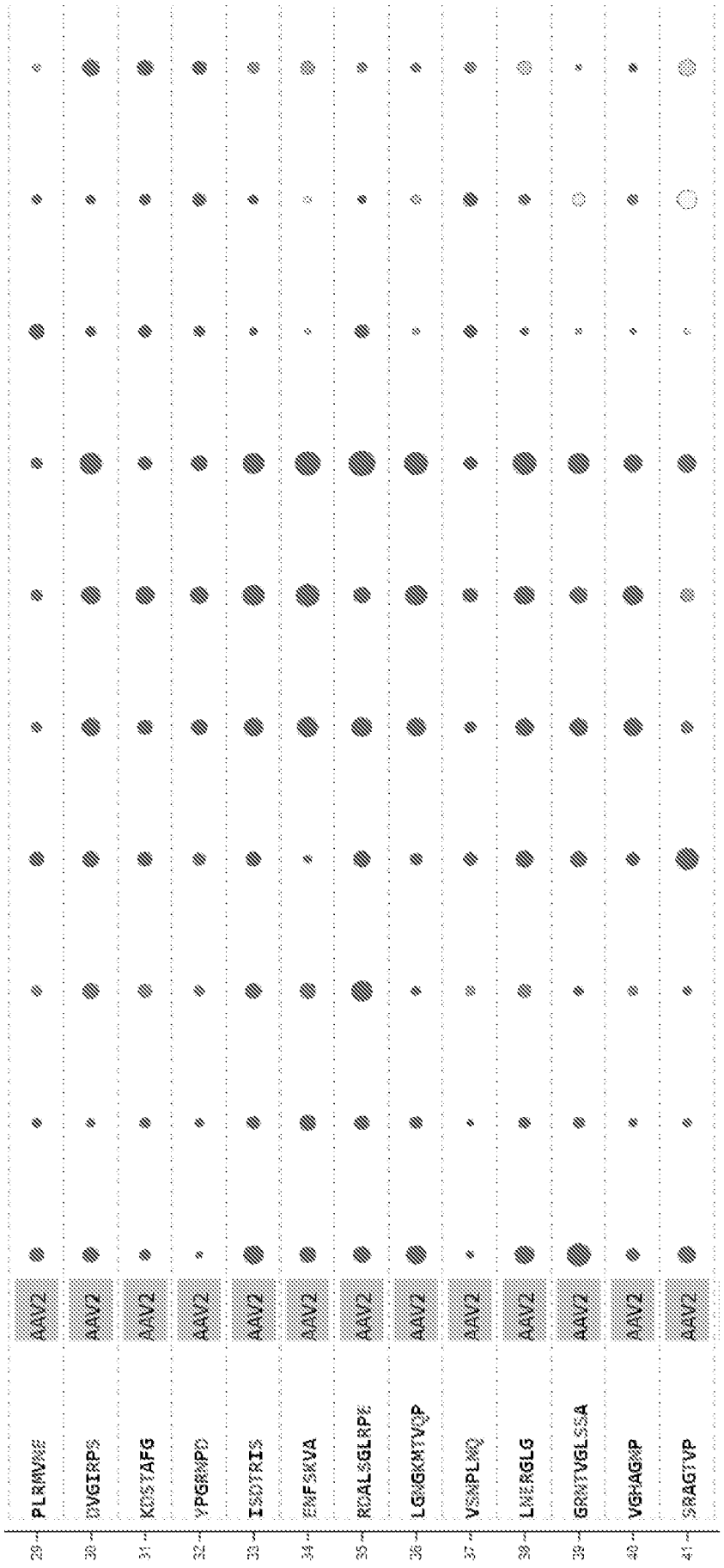

Peptide
Parent Serotype
Neuro2A
Primary Mouse Neurons
Human iPSC Neurons
C57BL/6J Mouse (ICV)
NHP AD Regions (DNA)
NHP PSP Regions (DNA)
NHP Spinal Cord (DNA)
NHP AD Regions (RNA)
NHP PSP Regions (RNA)
NHP Spinal Cord (RNA)
29
30
31
32
33
34
35
36
37
38
39
40
41
AAV2

FIG. 29D

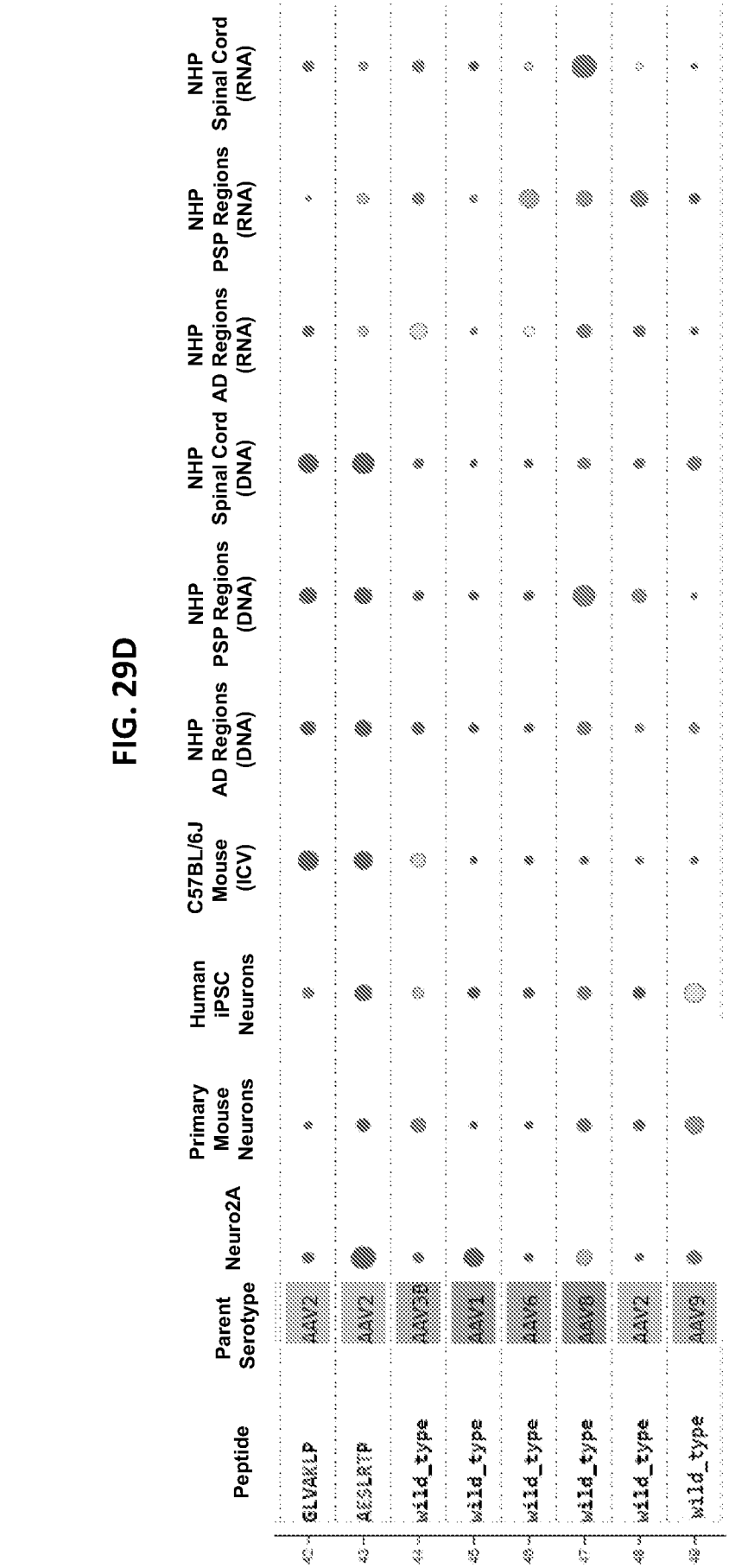

Peptide
Parent Serotype
Neuro2A
Primary Mouse Neurons
Human iPSC Neurons
C57BL/6J Mouse (ICV)
NHP AD Regions (DNA)
NHP PSP Regions (DNA)
NHP Spinal Cord (DNA)
NHP AD Regions (RNA)
NHP PSP Regions (RNA)
NHP Spinal Cord (RNA)
GLVAKLP
AAV2
AESLRTP
AAV2
wild_type
AAV38
wild_type
AAV1
wild_type
AAV6
wild_type
AAV9
wild_type
AAV2
wild_type
AAV9
Polar
Non-Polar
Positive Charge
Negative Charge
5th percentile cov
median cov
95th percentile cov
+/-0 log2 fold change
+/-3 log2 fold change
+/-5 log2 fold change
+/-8 log2 fold change
+/-10 log2 fold change
log2 fold change < 0
log2 fold change >= 0

FIG. 30

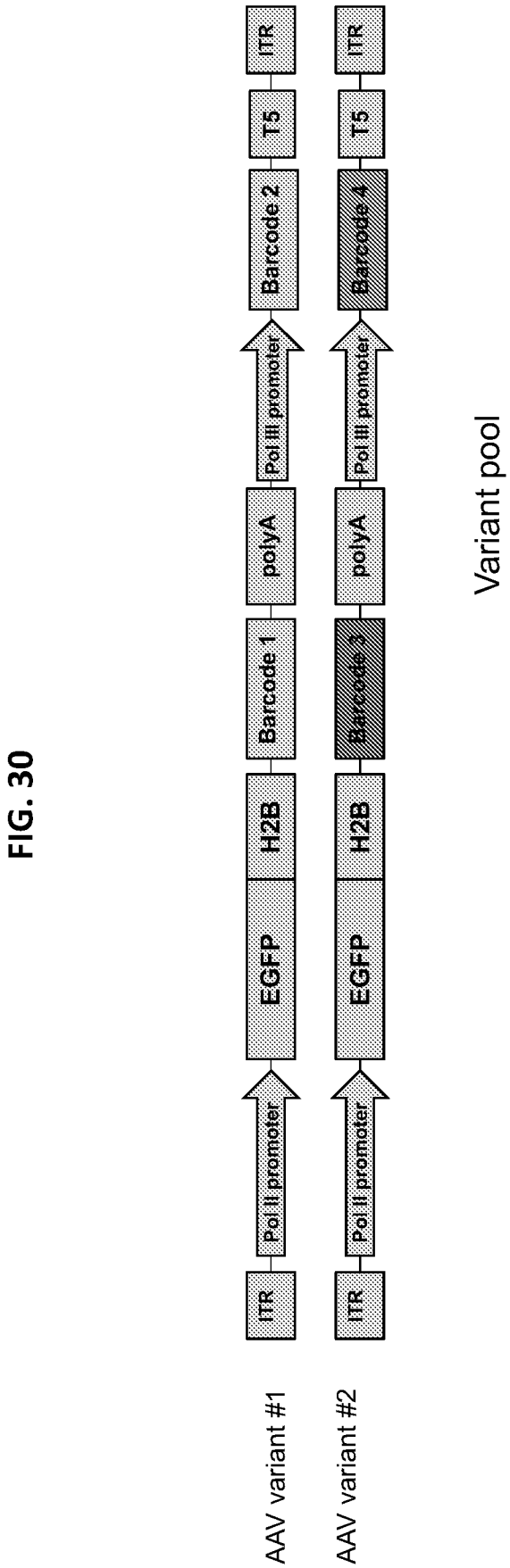

AAV variant #1
AAV variant #2
ITR
Pol II promoter
EGFP
H2B
Barcode 1
Barcode 3
polyA
Pol III promoter
Barcode 2
Barcode 4
T5
ITR
Variant pool

FIG. 31

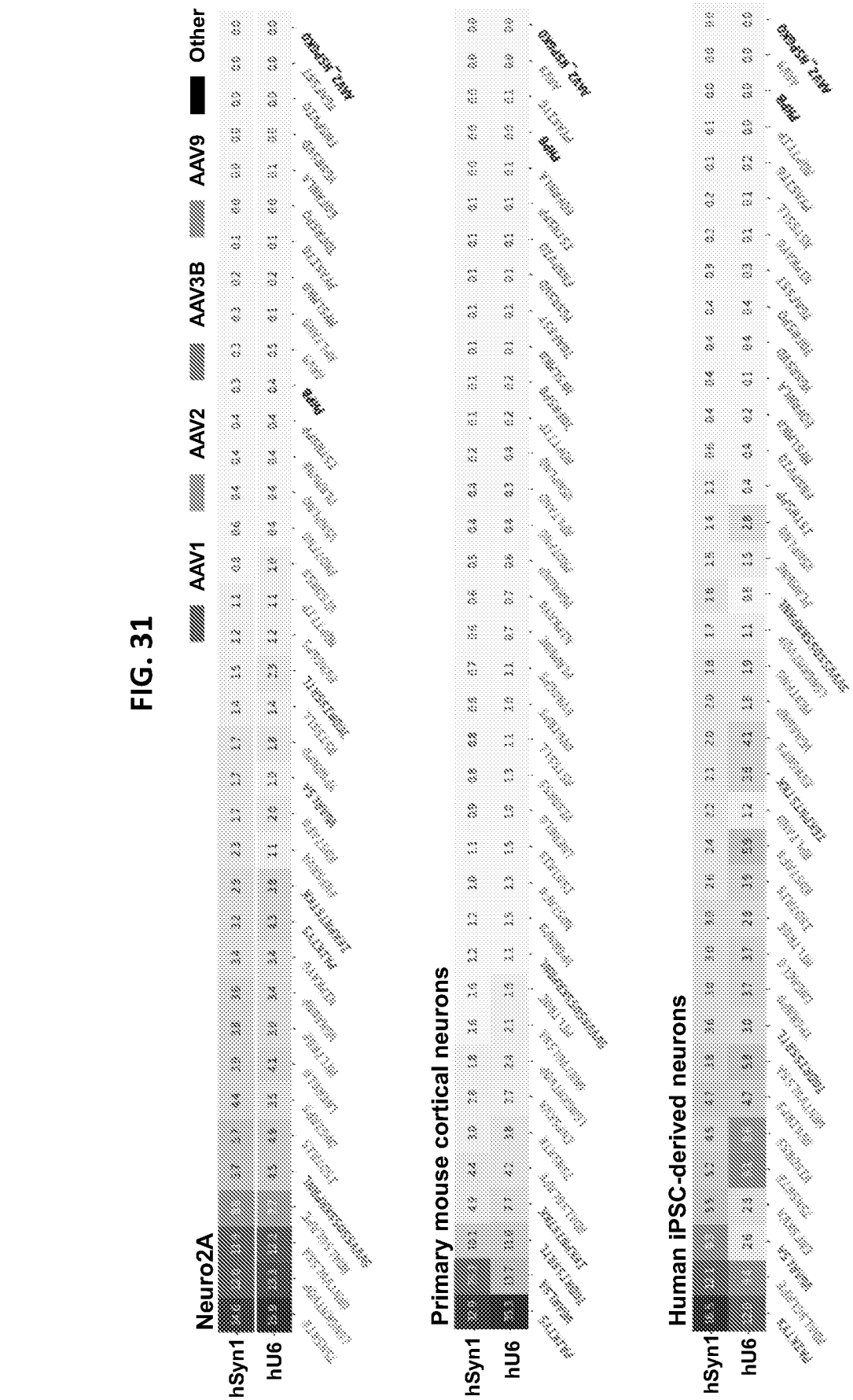

Neuro2A
Primary mouse cortical neurons
Human iPSC-derived neurons
hSyn1
hU6
AAV1
AAV2
AAV3B
AAV9
Other

FIG. 32

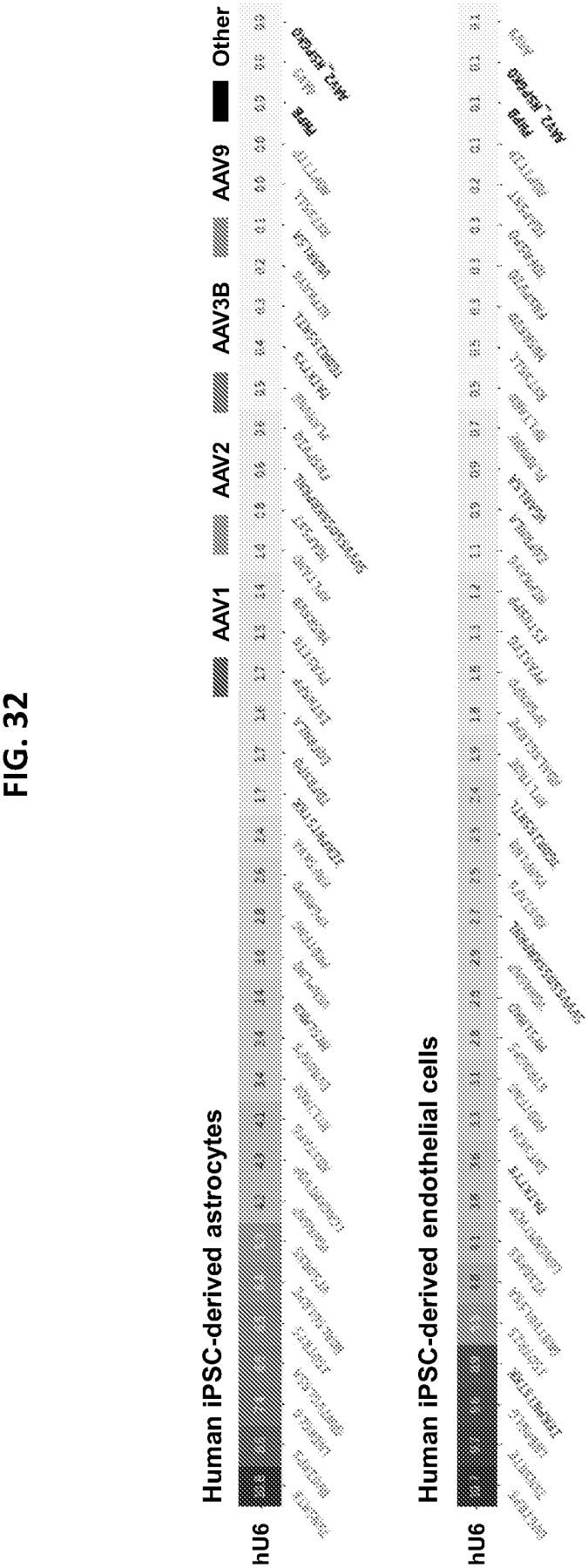

Human iPSC-derived astrocytes
AAV1
AAV2
AAV3B
AAV9
Other
hU6
Human iPSC-derived endothelial cells
hU6

FIG. 33

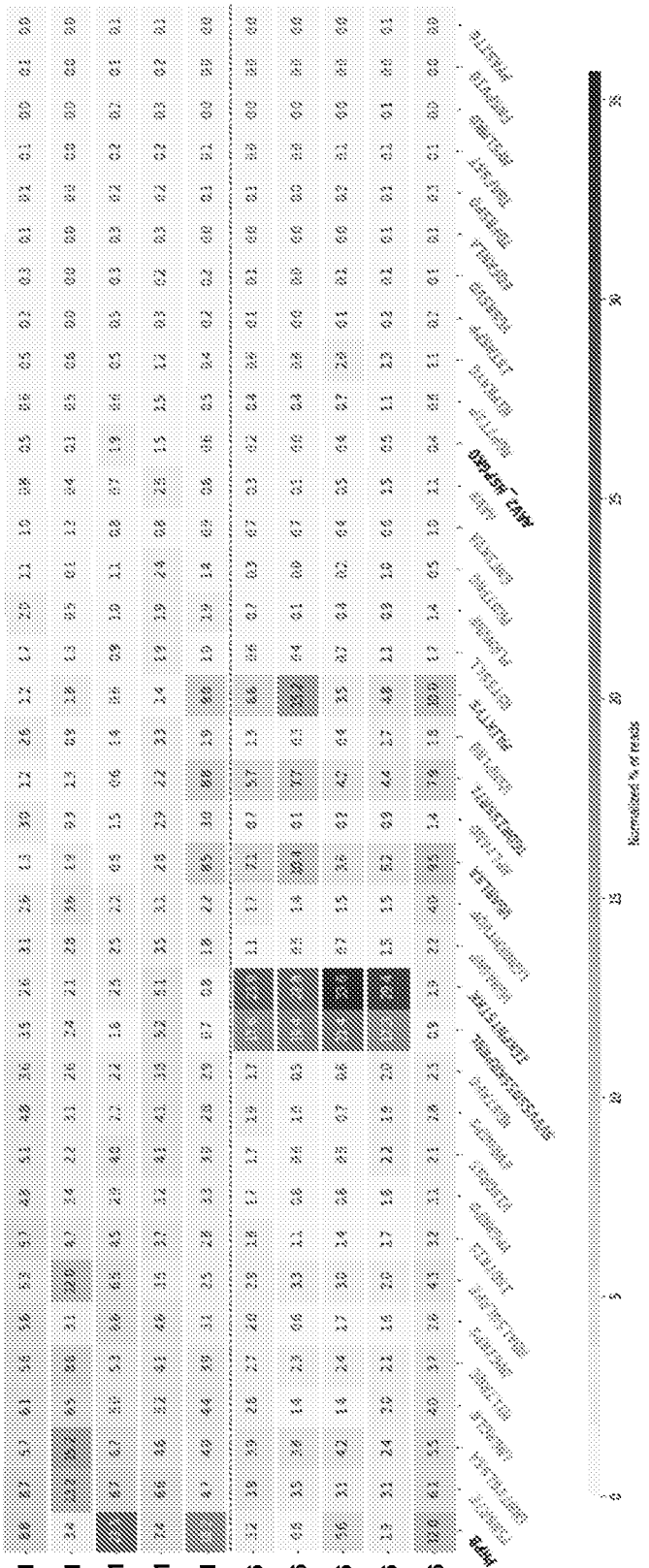

C57BL/6J mice
AAV1
AAV2
AAV3B
AAV9
Other
Brainstem_hSyn1
Cerebellum_hSyn1
Cortex_hSyn1
Deep_Regions_hSyn1
Spinal_Cord_hSyn1
Brainstem_hU6
Cerebellum_hU6
Cortex_hU6
Deep_Regions_hU6
Spinal_Cord_hU6
Normalized % of reads

FIG. 34

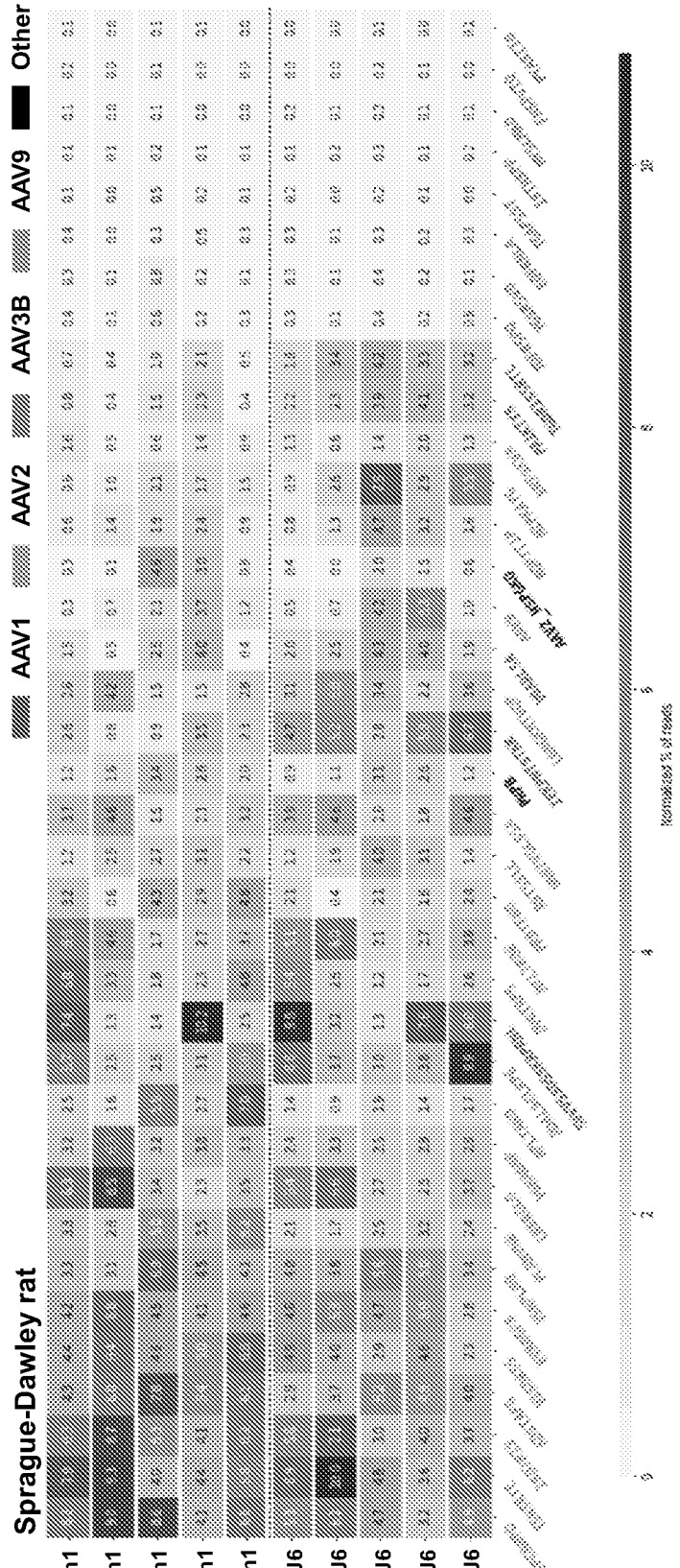

Sprague-Dawley rat
AAV1
AAV2
AAV3B
AAV9
Other
Brainstem_hSyn1
Cerebellum_hSyn1
Cortex_hSyn1
Deep_Regions_hSyn1
Spinal_Cord_hSyn1
Brainstem_hU6
Cerebellum_hU6
Cortex_hU6
Deep_Regions_hU6
Spinal_Cord_hU6
normalized % of reads

FIG. 35

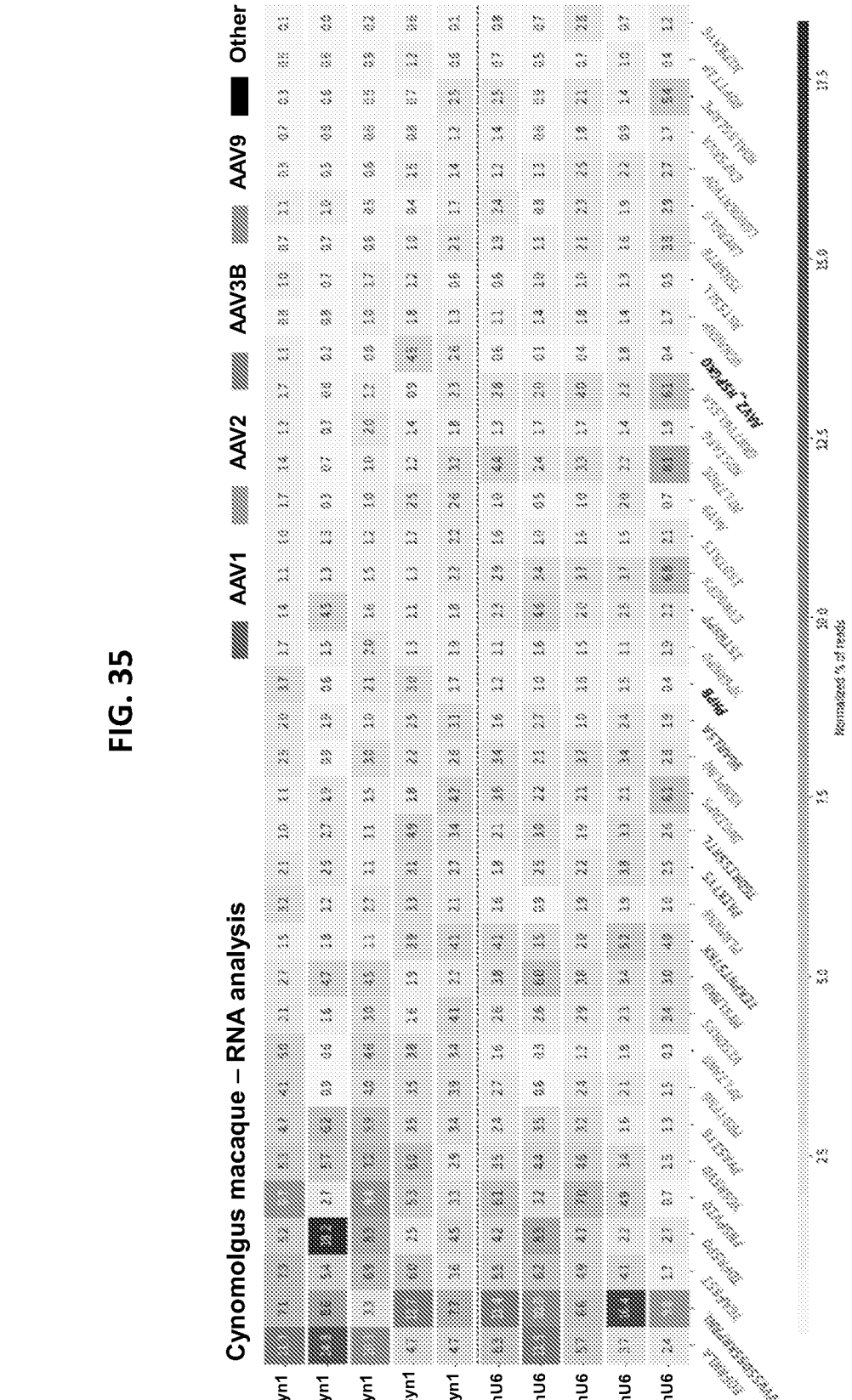

Cynomolgus macaque – RNA analysis
AAV1
AAV2
AAV3B
AAV9
Other
Brainstem_hSyn1
Cerebellum_hSyn1
Cortex_hSyn1
Deep_Regions_hSyn1
Spinal_Cord_hSyn1
Brainstem_hU6
Cerebellum_hU6
Cortex_hU6
Deep_Regions_hU6
Spinal_Cord_hU6
Normalized % of reads

FIG. 36

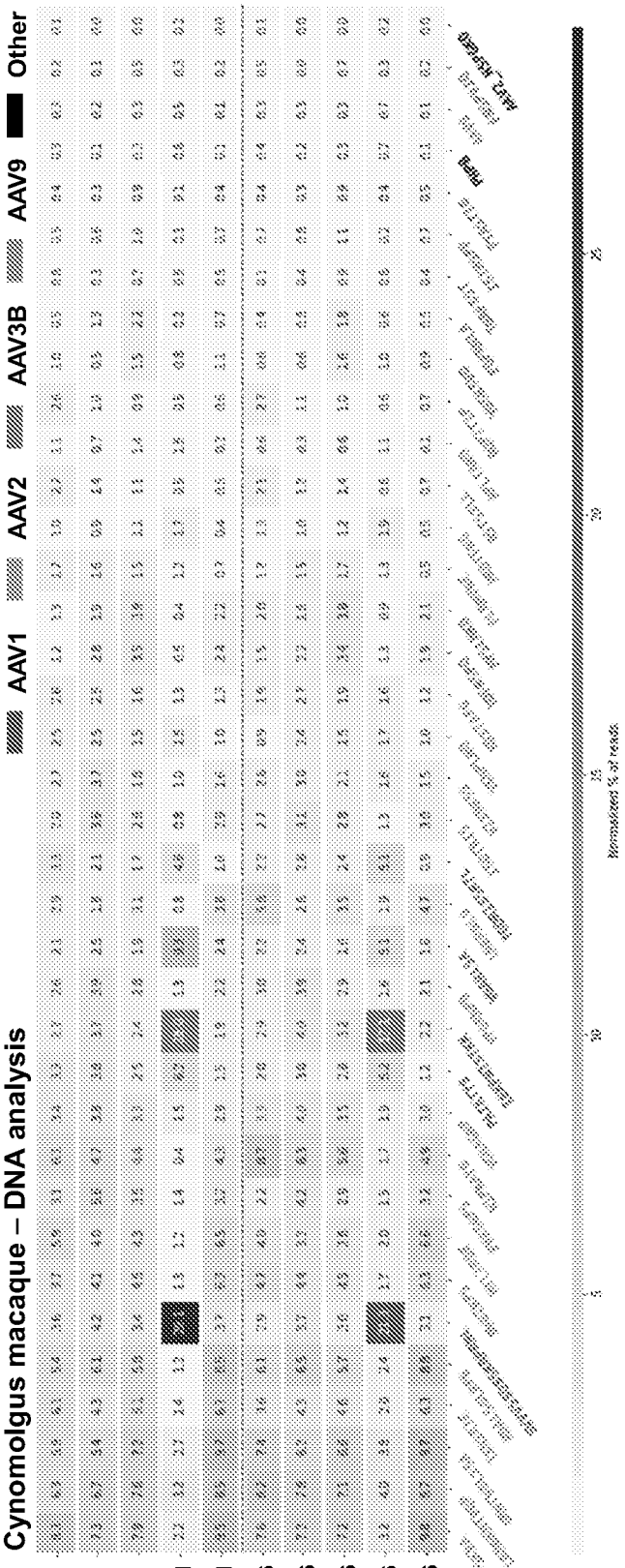

Cynomolgus macaque – DNA analysis
AAV1
AAV2
AAV3B
AAV9
Other
Brainstem_hSyn1
Cerebellum_hSyn1
Cortex_hSyn1
Deep_Regions_hSyn1
Spinal_Cord_hSyn1
Brainstem_hU6
Cerebellum_hU6
Cortex_hU6
Deep_Regions_hU6
Spinal_Cord_hU6
Normalized % of reads

FIG. 37

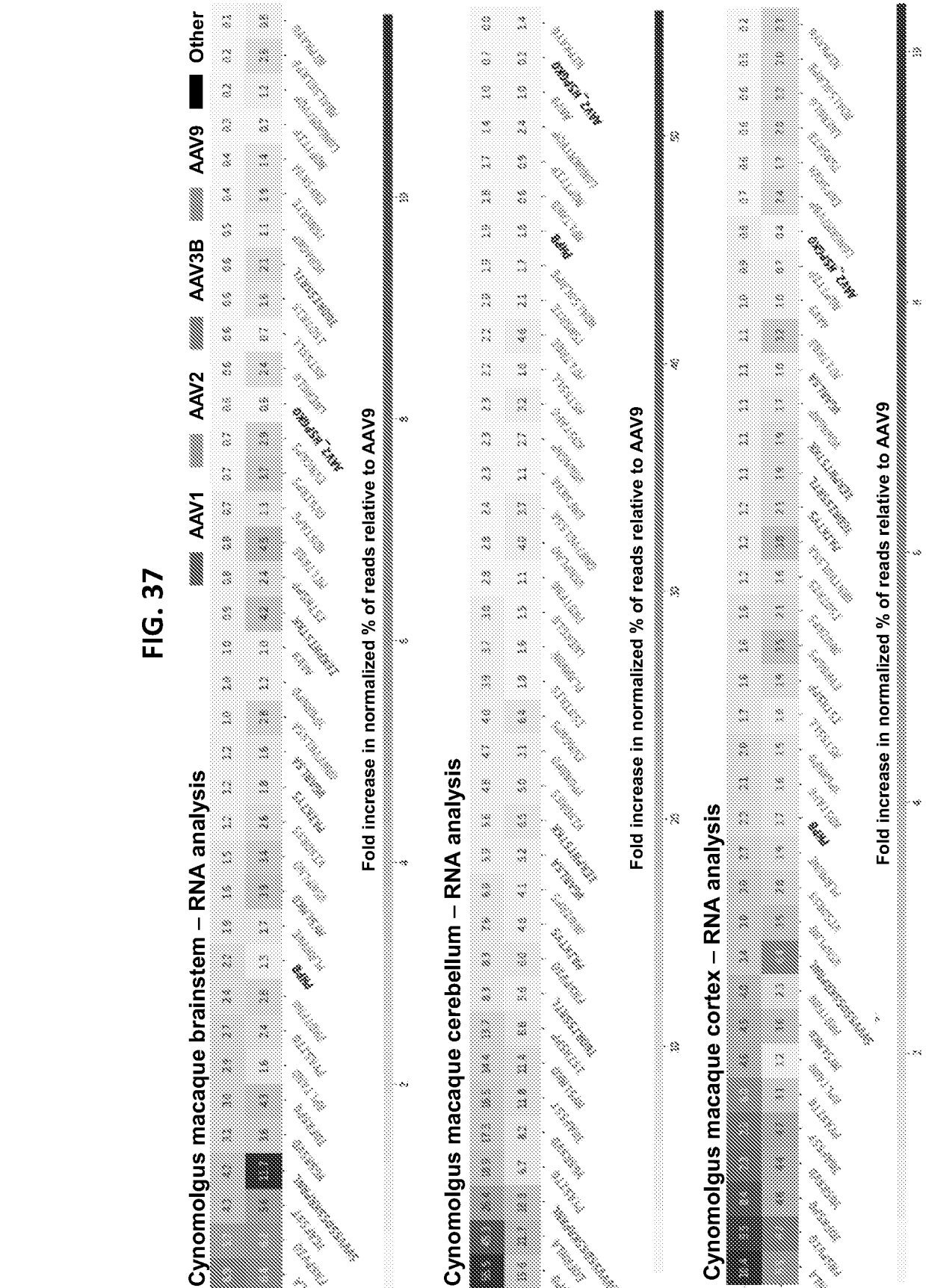

Cynomolgus macaque brainstem – RNA analysis
AAV1
AAV2
AAV3B
AAV9
Other
hSyn1
hU6
Fold increase in normalized % of reads relative to AAV9
Cynomolgus macaque cerebellum – RNA analysis
hSyn1
hU6
Fold increase in normalized % of reads relative to AAV9
Cynomolgus macaque cortex – RNA analysis
hSyn1
hU6
Fold increase in normalized % of reads relative to AAV9

FIG. 38

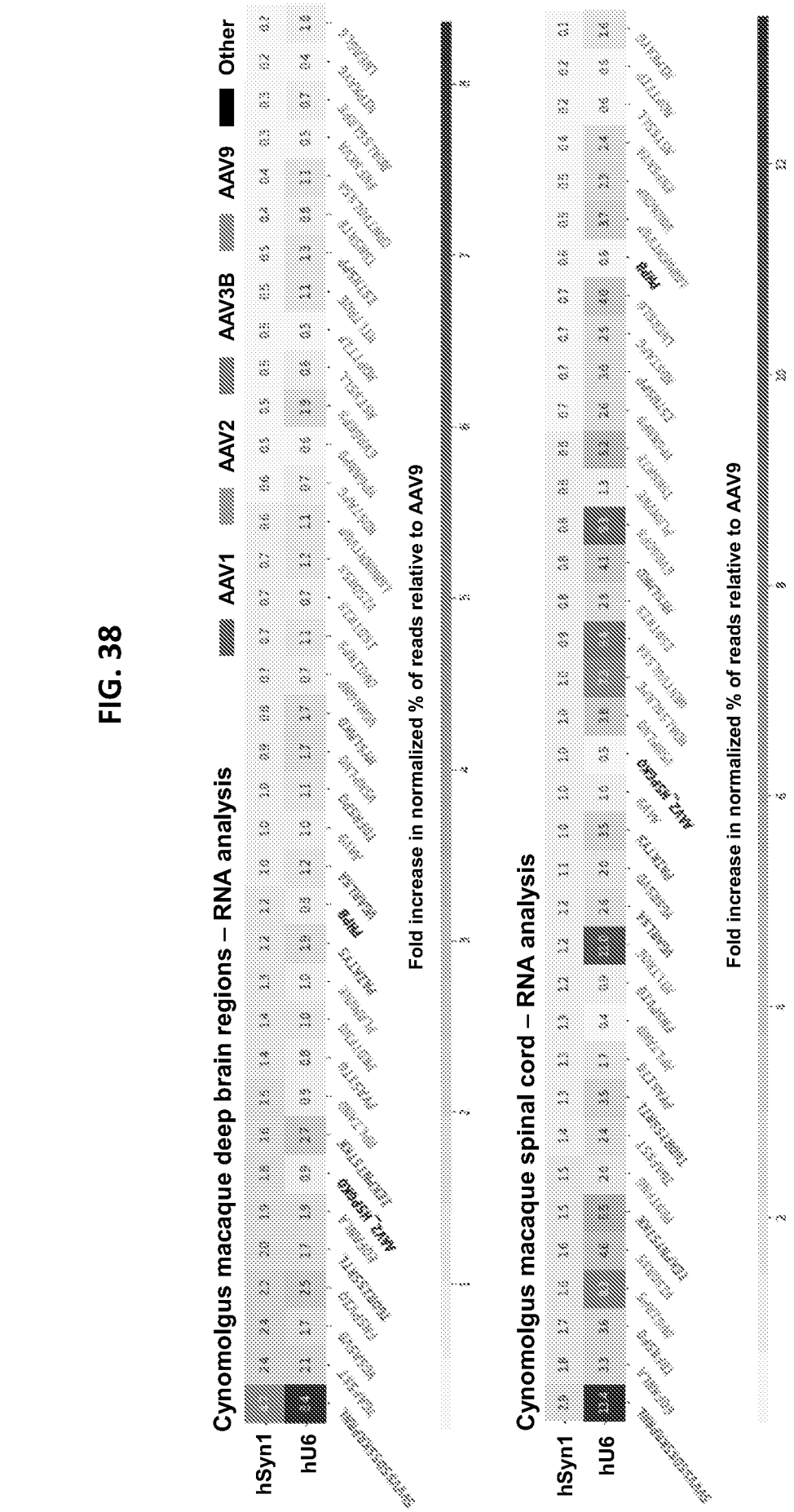

Cynomolgus macaque deep brain regions – RNA analysis
AAV1
AAV2
AAV3B
AAV9
Other
hSyn1
hU6
Fold increase in normalized % of reads relative to AAV9
Cynomolgus macaque spinal cord – RNA analysis
hSyn1
hU6
Fold increase in normalized % of reads relative to AAV9

FIG. 39

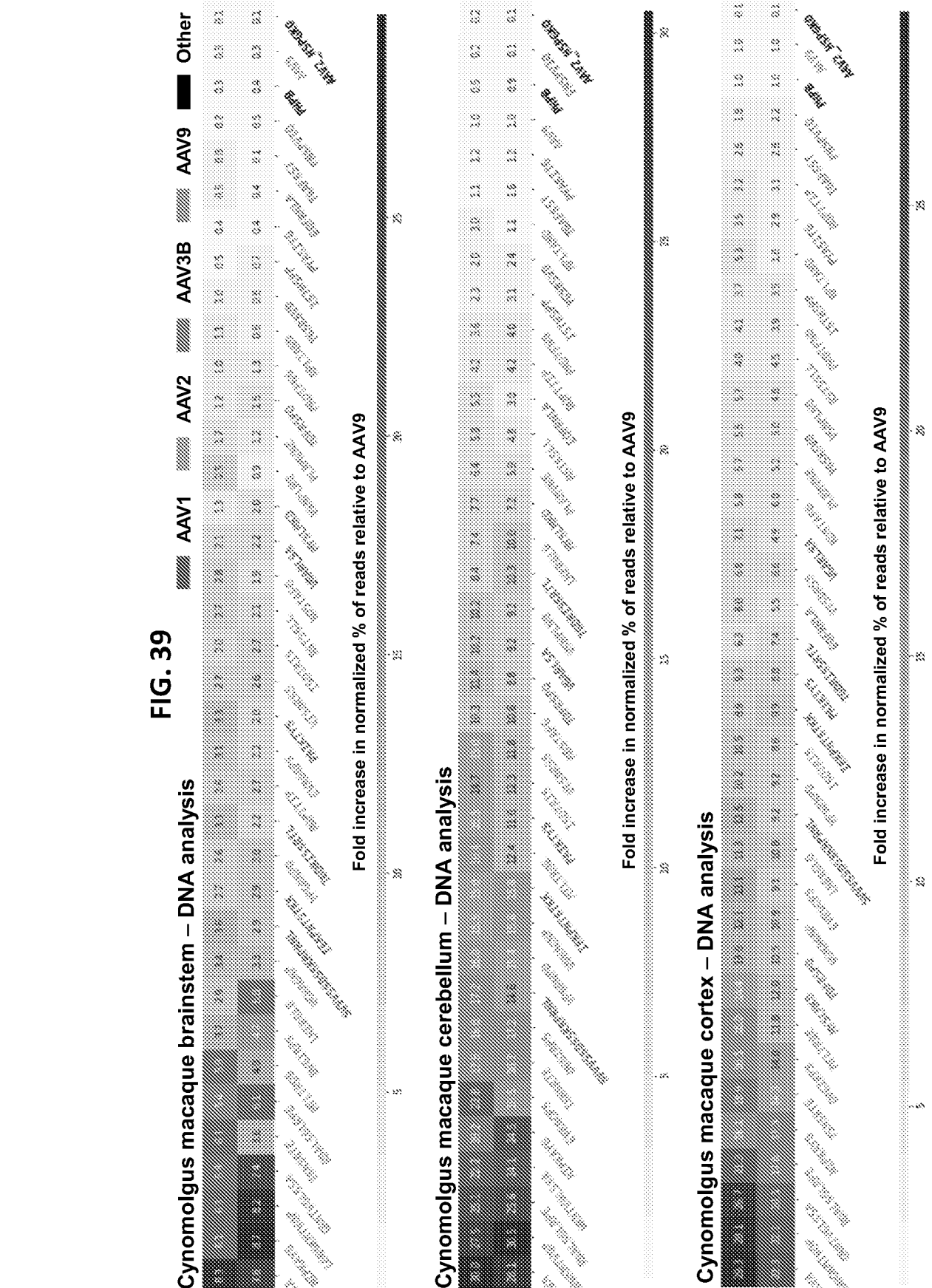

Cynomolgus macaque brainstem – DNA analysis
AAV1
AAV2
AAV3B
AAV9
Other
hSyn1
hU6
Fold increase in normalized % of reads relative to AAV9
Cynomolgus macaque cerebellum – DNA analysis
hSyn1
hU6
Fold increase in normalized % of reads relative to AAV9
Cynomolgus macaque cortex – DNA analysis
hSyn1
hU6
Fold increase in normalized % of reads relative to AAV9

FIG. 40

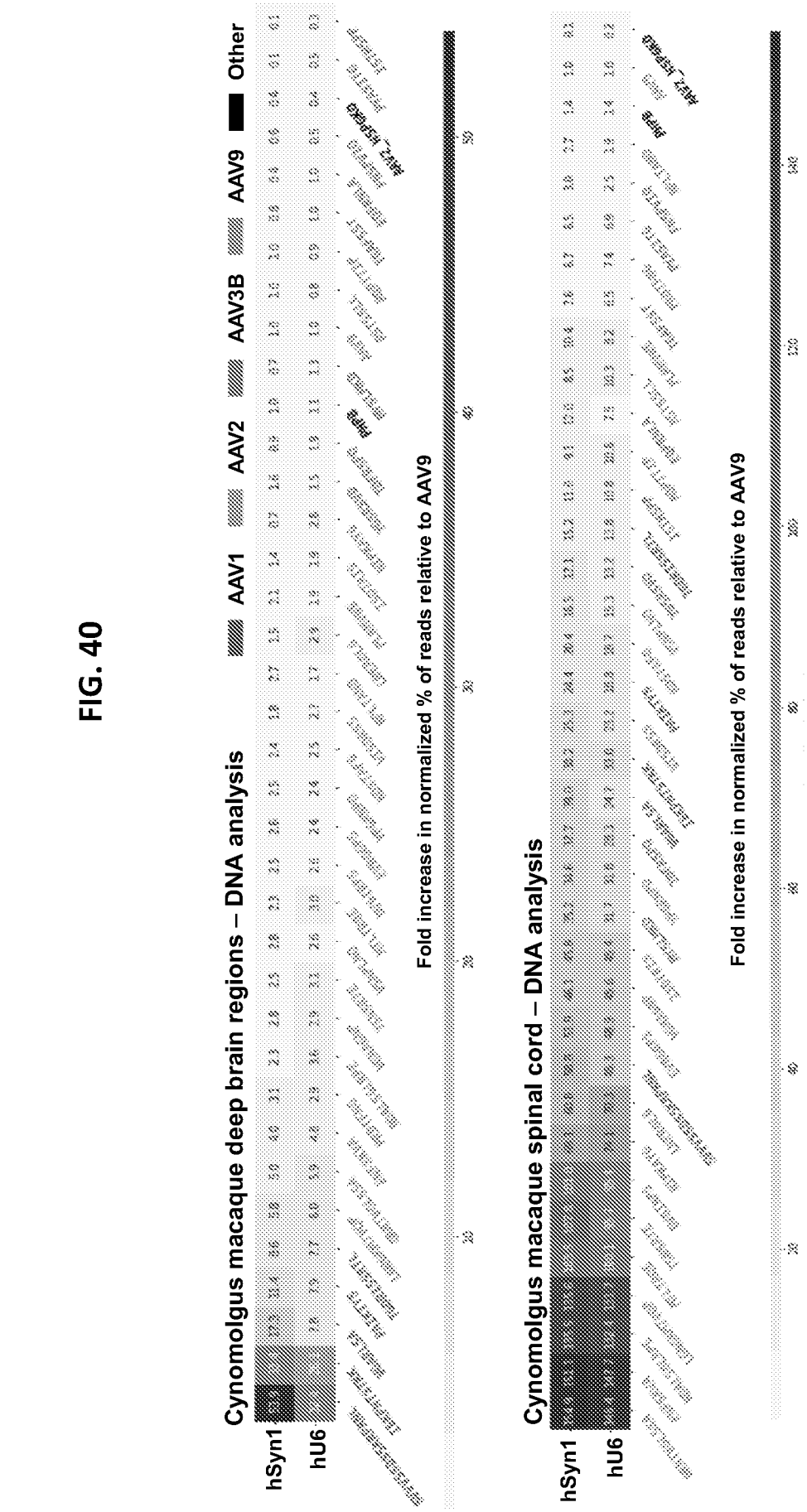

Cynomolgus macaque deep brain regions – DNA analysis
AAV1
AAV2
AAV3B
AAV9
Other
hSyn1
hU6
Fold increase in normalized % of reads relative to AAV9
Cynomolgus macaque spinal cord – DNA analysis
hSyn1
hU6
Fold increase in normalized % of reads relative to AAV9

FIG. 41

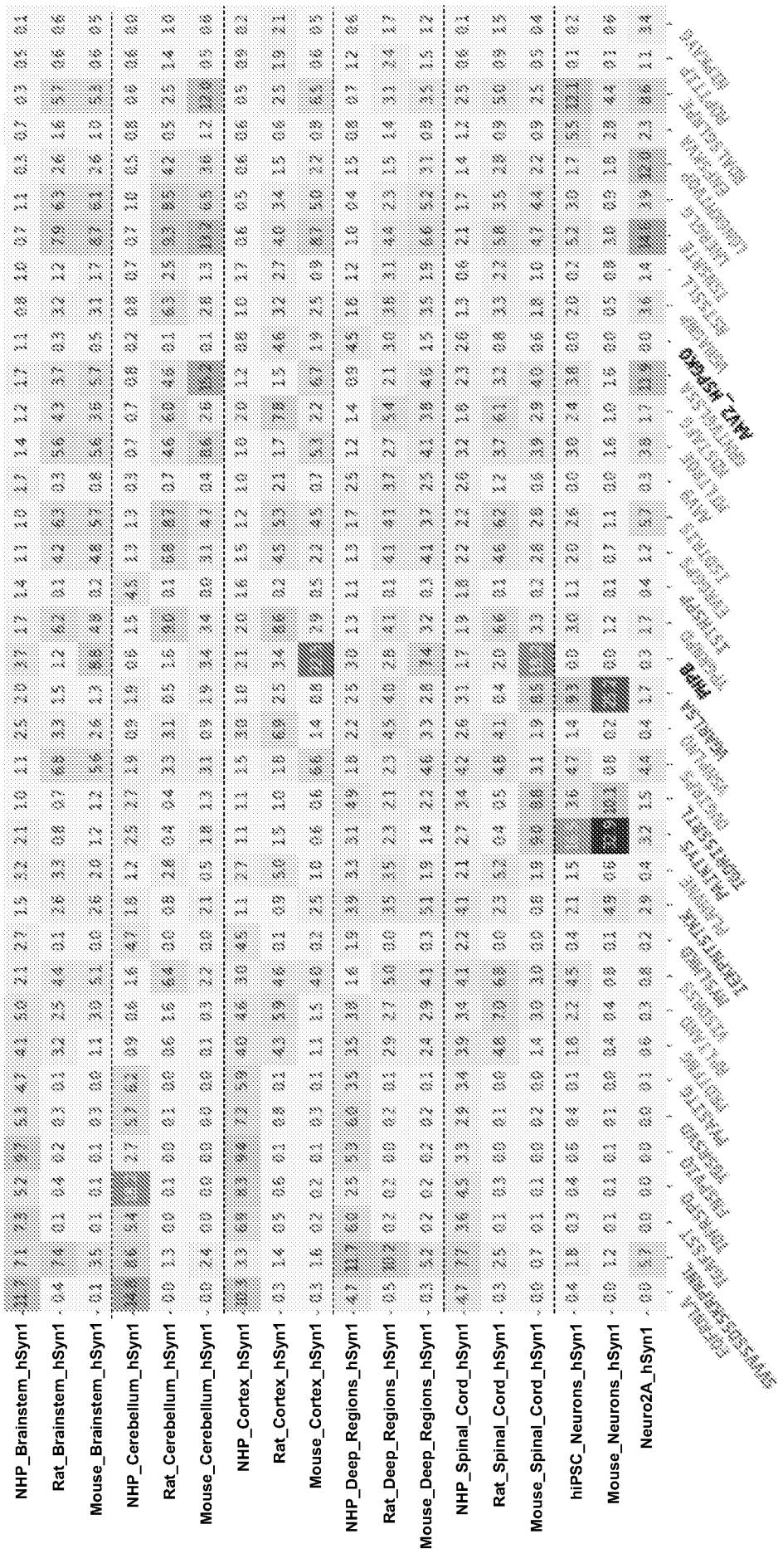
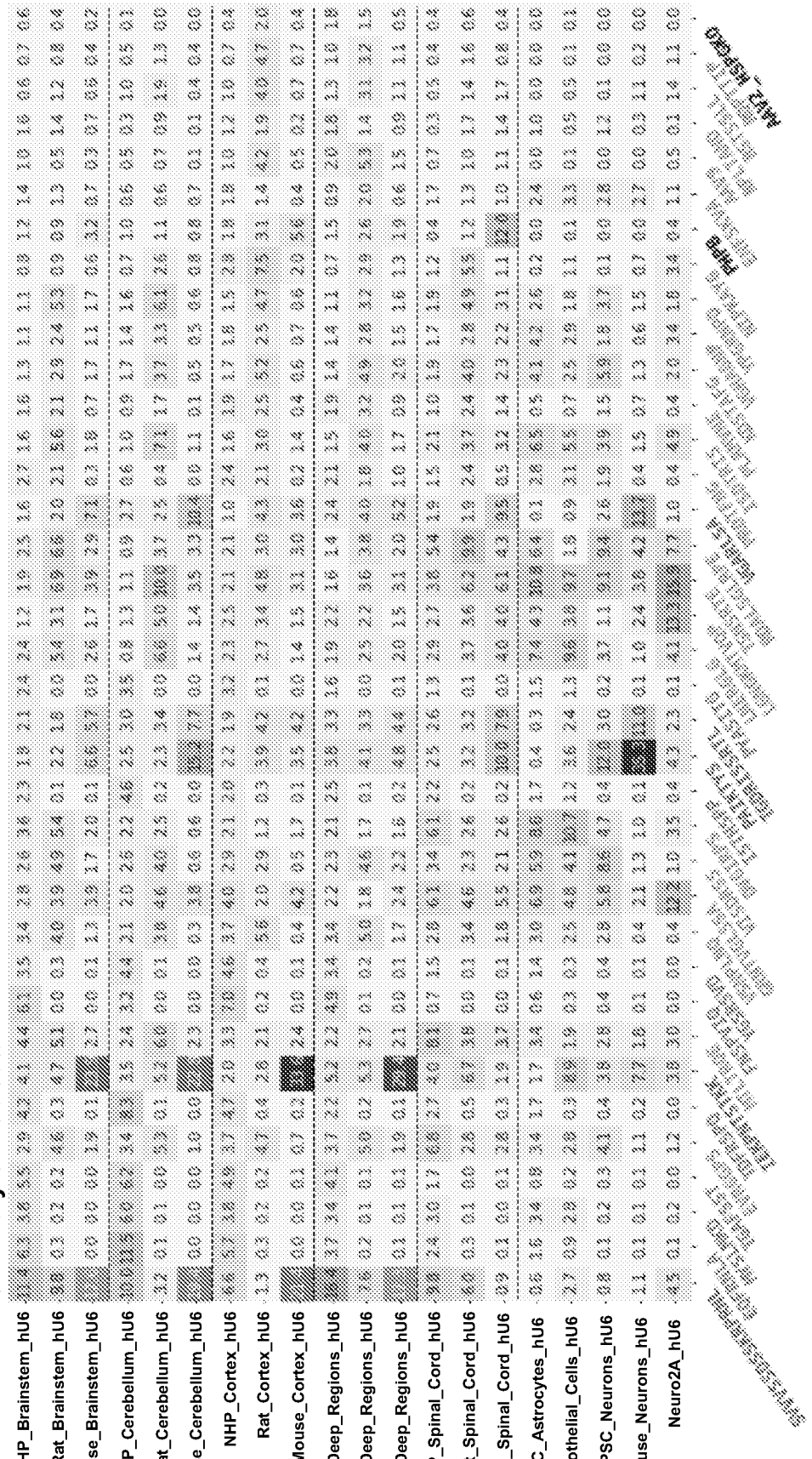

Summary of hSyn1 data
AAV1
AAV2
AAV3B
AAV9
Other
NHP_Brainstem_hSyn1
Rat_Brainstem_hSyn1
Mouse_Brainstem_hSyn1
NHP_Cerebellum_hSyn1
Rat_Cerebellum_hSyn1
Mouse_Cerebellum_hSyn1
NHP_Cortex_hSyn1
Rat_Cortex_hSyn1
Mouse_Cortex_hSyn1
NHP_Deep_Regions_hSyn1
Rat_Deep_Regions_hSyn1
Mouse_Deep_Regions_hSyn1
NHP_Spinal_Cord_hSyn1
Rat_Spinal_Cord_hSyn1
Mouse_Spinal_Cord_hSyn1
hiPSC_Neurons_hSyn1
Mouse_Neurons_hSyn1
Neuro2A_hSyn1
PHP.B
AAV2.7M8
AAV2.NN
AAV2.QuadYF
AAV2.rh8R
AAV3.NN
AAV3.QuadYF
AAV3B.NN
AAV3B.QuadYF
AAV5
AAV6
AAV6.2
AAV6.2FF
AAV7M8
AAV8
AAV8.2
AAV9.47
AAV9.84
AAV9.NN
AAV9.PHP.B
AAV9.PHP.eB
AAV9.QuadYF
AAVDJ
AAVDJ.8
AAVHSC15
AAVHSC16
AAVHSC17
AAVrh.10
AAVrh.39
AAVrh.43
AAVrh.74
AAVrh.8
AAVrh.8R
AAVrh.8R.A586R.R588T
AAVrh.8R.R533A
AAVrh.8R.R533A.A586R.R588T
AAVrh.8R.R533A.A586R.R588T.Y733F
AAVrh.8R.R533A.A586R.R588T.Y733F.Y500F
AAVrh.8R.R533A.A586R.R588T.Y733F.Y500F.Y444F
AAVrh.8R.R533A.A586R.R588T.Y733F.Y500F.Y444F.Y730F
AAVrh.8R.R533A.A586R.R588T.Y733F.Y500F.Y444F.Y730F.T491V
AAVrh.8R.R533A.A586R.R588T.Y733F.Y500F.Y444F.Y730F.T491V.K493V
AAVrh.8R.R533A.A586R.R588T.Y733F.Y500F.Y444F.Y730F.T491V.K493V.A561T
AAVrh.8R.R533A.A586R.R588T.Y733F.Y500F.Y444F.Y730F.T491V.K493V.A561T.Q457P
AAVrh.8R.R533A.A586R.R588T.Y733F.Y500F.Y444F.Y730F.T491V.K493V.A561T.Q457P.S459P
AAVrh.8R.R533A.A586R.R588T.Y733F.Y500F.Y444F.Y730F.T491V.K493V.A561T.Q457P.S459P.N496D
AAVrh.8R.R533A.A586R.R588T.Y733F.Y500F.Y444F.Y730F.T491V.K493V.A561T.Q457P.S459P.N496D.N498D
AAVrh.8R.R533A.A586R.R588T.Y733F.Y500F.Y444F.Y730F.T491V.K493V.A561T.Q457P.S459P.N496D.N498D.E531D
AAVrh.8R.R533A.A586R.R588T.Y733F.Y500F.Y444F.Y730F.T491V.K493V.A561T.Q457P.S459P.N496D.N498D.E531D.D532H
AAVrh.8R.R533A.A586R.R588T.Y733F.Y500F.Y444F.Y730F.T491V.K493V.A561T.Q457P.S459P.N496D.N498D.E531D.D532H.G555W
AAVrh.8R.R533A.A586R.R588T.Y733F.Y500F.Y444F.Y730F.T491V.K493V.A561T.Q457P.S459P.N496D.N498D.E531D.D532H.G555W.R585S.S586A
AAVrh.8R.R533A.A586R.R588T.Y733F.Y500F.Y444F.Y730F.T491V.K493V.A561T.Q457P.S459P.N496D.N498D.E531D.D532H.G555W.R585S.S586A.R588T
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AAVrh.8R.R533A.A586R.R588T.Y733F.Y500F.Y444F.Y730F.T491V.K493V.A561T.Q457P.S459P.N496D.N498D.E531D.D532H.G555W.R585S.S586A.R588T.Q590R.Q592E
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AAVrh.8R.R533A.A586R.R588T.Y733F.Y500F.Y444F.Y730F.T491V.K493V.A561T.Q457P.S459P.N496D.N498D.E531D.D532H.G555W.R585S.S586A.R588T.Q590R.Q592E.A593T.N594S.T595A.I596V.A597T.T598A.V599A.Y705F.Y731F.T492V.V708K.A581T.A583T.E584G.R585A.R588T
AAVrh.8R.R533A.A586R.R588T.Y733F.Y500F.Y444F.Y730F.T491V.K493V.A561T.Q457P.S459P.N496D.N498D.E531D.D532H.G555W.R585S.S586A.R588T.Q590R.Q592E.A593T.N594S.T595A.I596V.A597T.T598A.V599A.Y705F.Y731F.T492V.V708K.A581T.A583T.E584G.R585A.R588T.T503V
AAVrh.8R.R533A.A586R.R588T.Y733F.Y500F.Y444F.Y730F.T491V.K493V.A561T.Q457P.S459P.N496D.N498D.E531D.D532H.G555W.R585S.S586A.R588T.Q590R.Q592E.A593T.N594S.T595A.I596V.A597T.T598A.V599A.Y705F.Y731F.T492V.V708K.A581T.A583T.E584G.R585A.R588T.T503V.A581T
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FIG. 42


Summary of hU6 data
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AAV3B
AAV9
Other
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Mouse_Brainstem_hU6
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<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 1
Cys Glu Met Gln Leu Leu Gln Ser Gly Gly Gly Leu Val Gln Pro Gly
1 5 10 15

Gly Ser Leu Arg Leu Ser Cys Val Ala Ser Glu Val Thr Phe Asn Thr
20 25 30

Tyr Gly Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
35 40 45

Val Ser Tyr Met Ser Gly Gly Gly Gly Ser Ile Phe Tyr Ala Asp Ser
50 55 60

Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu

65 70 75 80

Tyr Leu Gln Met Asn Ser Leu Arg Gly Glu Asp Thr Ala Val Tyr Phe
85 90 95

Cys Ala Arg Val Thr Leu Gly Ser Tyr Phe Tyr Gly Met Asp Val Trp
100 105 110

Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
115 120 125

Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
130 135 140

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145 150 155 160

Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
165 170 175

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
180 185 190

Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
195 200 205

His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
210 215 220

<210> 2
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 2
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
20 25 30

Trp Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Asn Ile Lys Gln Asp Gly Ser Glu Lys Tyr Tyr Val Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Lys Ser Leu Tyr
65 70 75 80

```
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Asp Gly Gly Ser Gly Ser Tyr Phe Asp Cys Phe Asp Tyr Trp
            100                 105                 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
    130                 135                 140

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
        195                 200                 205

His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215                 220
```

<210> 3
<211> 223
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 3

```
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Ile Gln Pro Gly Arg
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Glu Asp Tyr
            20                  25                  30

Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ser Gly Ile Ser Trp Asn Ser Gly Asn Ile Gly Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

Leu Gln Met His Ser Leu Arg Pro Glu Asp Thr Ala Leu Tyr Tyr Cys
                85                  90                  95
```

Ala Lys Asp Ile Asn Phe Phe Gly Leu Gly Thr Gly Gly Gly Ala Met
100 105 110

Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr
115 120 125

Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
130 135 140

Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145 150 155 160

Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
165 170 175

Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
180 185 190

Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
195 200 205

Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Glu
210 215 220

<210> 4
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 4
Gln Ile Thr Leu Lys Glu Ser Gly Pro Thr Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Phe Ser Gly Phe Ser Leu Ser Thr Ser
20 25 30

Gly Val Gly Val Gly Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu
35 40 45

Trp Leu Ala Leu Ile Tyr Trp Asp Asp Asp Lys Arg Tyr Ser Pro Ser
50 55 60

Leu Lys Ser Arg Leu Thr Ile Thr Lys Asp Thr Ser Lys Asn Gln Val
65 70 75 80

Val Leu Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr
85 90 95

Cys Ala His Arg Ala Ile Val Gly Leu Phe Asp Tyr Trp Gly Gln Gly

```
            100                 105                 110

Thr Leu Val Thr Val Ser Ser
        115

<210> 5
<211> 223
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 5
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

Ser Val Lys Ile Ser Cys Lys Thr Ser Gly Tyr Thr Phe Thr Thr Tyr
            20                  25                  30

Tyr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

Gly Ile Ile Asn Thr Ser Gly Gly Ser Thr Ser Tyr Ala Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Met Thr Arg Asp Thr Ser Thr Asn Thr Val Tyr
65                  70                  75                  80

Met Glu Leu Ser Ser Leu Arg Tyr Glu Asp Thr Ala Met Tyr Tyr Cys
                85                  90                  95

Ala Arg Gly Gly Asp Gly Gly Pro Gln Asp Ala Phe Asp Ile Trp Gly
            100                 105                 110

Gln Gly Thr Lys Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro Lys
        115                 120                 125

Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val
    130                 135                 140

Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val
145                 150                 155                 160

Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro
                165                 170                 175

Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr
            180                 185                 190

Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val
        195                 200                 205
```

Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
210 215 220

<210> 6
<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 6
Val Gln Leu Val Asp Ser Gly Gly Gly Leu Val Gln Pro Gly Arg Ser
1 5 10 15

Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Val Phe Asp Asp Tyr Ala
20 25 30

Met His Trp Val Arg Gln Val Pro Gly Lys Gly Leu Glu Trp Val Ser
35 40 45

Gly Ile Ser Trp Asn Ser Val Ser Ile Gly Tyr Ala Asp Ser Val Lys
50 55 60

Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr Leu
65 70 75 80

Gln Met Asn Ser Leu Arg Pro Glu Asp Ala Ala Leu Tyr Tyr Cys Val
85 90 95

Lys Ser Phe Ser Ala Glu Tyr Tyr Tyr Tyr Tyr Tyr Gly Met Asp Val
100 105 110

Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly
115 120 125

Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
130 135 140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145 150 155 160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
165 170 175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
180 185 190

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
195 200 205

Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
210 215 220

<210> 7
<211> 122
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 7
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asn Tyr
20 25 30

Gly Phe Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Arg Ile Thr Thr Tyr Asn Arg Asp Thr Ile Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Phe Cys
85 90 95

Ala Arg Val Val Pro Gly Asp Ser Val Tyr Gly Ala Phe Asp Ile Trp
100 105 110

Gly Gln Gly Thr Met Val Thr Val Ser Ser
115 120

<210> 8
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 8
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Thr Ala Ser Gly Phe Thr Phe Asp Asp Tyr
20 25 30

Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

```
Ser Leu Ile Ser Gly Asp Gly Gly Gly Thr Tyr Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Ser Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Thr Glu Asp Thr Ala Leu Tyr Tyr Cys
                85                  90                  95

Ala Lys Arg Thr Pro Phe Gly Glu Trp Ala Phe Asp Tyr Trp Gly Gln
            100                 105                 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro Lys Val
        115                 120                 125

Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val Ile
    130                 135                 140

Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val Thr
145                 150                 155                 160

Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro Ser
                165                 170                 175

Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr Leu
            180                 185                 190

Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val Lys
        195                 200                 205

His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
    210                 215                 220

<210> 9
<211> 124
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 9
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Tyr Tyr
            20                  25                  30

Gly Met Tyr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Thr Phe Ile Arg Tyr Asp Gly Arg Asn Lys Tyr Tyr Ala Asp Ser Val
    50                  55                  60
```

```
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

Leu Glu Met Asn Thr Leu Arg Thr Glu Asp Thr Ala Met Tyr Phe Cys
                85                  90                  95

Ala Lys Asp Pro Gly Thr Phe Arg Asp His Leu Trp Ser Gly Val Asp
            100                 105                 110

Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 10
<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 10

```
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Arg
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Pro Phe Gly Asp Tyr
            20                  25                  30

Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ser Gly Ile Gly Trp Asp Ser Gly Gly Ile Gly Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Ile Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

Leu Glu Ile Asn Ser Leu Arg Pro Asp Asp Thr Ala Leu Tyr Tyr Cys
                85                  90                  95

Ala Lys Ala Ala Ala Thr Leu Pro Tyr Phe Arg Phe Ala Met Asp Val
            100                 105                 110

Trp Gly Gln Gly Thr Pro Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125

Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
    130                 135                 140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
```

```
                165                 170                 175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Asn Val
    210                 215                 220

<210> 11
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 11
Pro Gly Leu Leu Val Gln Ser Gly Gly Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

Ser Val Arg Val Ser Cys Lys Ala Ser Gly Tyr Ile Asp Ile Asn Asn
            20                  25                  30

Gly Ile Ser Trp Val Arg Gln Ala Pro Gly His Gly Leu Glu Trp Met
        35                  40                  45

Gly Trp Ile Ser Ile Tyr Ser Gly Asn Thr Lys Tyr Ala Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Met Thr Thr Ala Thr Ser Thr Ser Thr Val Tyr
65                  70                  75                  80

Met Glu Leu Arg Ser Leu Thr Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Val Gly Val Phe Lys Gly Leu Ala Pro Phe Gly Gly Phe Asp
            100                 105                 110

Pro Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys
        115                 120                 125

Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu
    130                 135                 140

Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145                 150                 155                 160

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
                165                 170                 175
```

Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
180 185 190

Val Thr Val Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn
195 200 205

Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
210 215 220

<210> 12
<211> 118
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 12
Leu Leu Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Thr Arg His
20 25 30

Gly Phe His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Val Ile Ser Ser Asp Gly Arg Lys Ile His Tyr Thr Asp Ser Val
50 55 60

Lys Gly Arg Phe Val Ile Ser Arg Asp Asp Ser Asp Asn Thr Val Tyr
65 70 75 80

Leu His Met Asn Ser Leu Arg Leu Gly Asp Thr Ala Leu Tyr Tyr Cys
85 90 95

Ala Arg Asp Ser Gly Gly Thr Pro Gly Pro Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 13
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 13
Cys Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly

1 5 10 15

Gly Ser Leu Thr Leu Ser Cys Val Gly Ser Arg Phe Thr Phe Ser Ser
20 25 30

Tyr Ala Met Asn Trp Val Arg Gln Ser Pro Gly Arg Gly Leu Glu Trp
35 40 45

Val Ala Ser Ile Ser Ala Thr Thr Gly Ser Thr Tyr Tyr Thr Asp Ser
50 55 60

Val Glu Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Arg Asp Thr Leu
65 70 75 80

Tyr Leu Gln Met Asn Ser Leu Arg Ala Asp Asp Thr Ala Leu Tyr Tyr
85 90 95

Cys Val Arg Ser Phe Val Gly Ala Val Pro Ala Tyr Pro Asn Phe Asp
100 105 110

Phe Trp Gly Pro Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys
115 120 125

Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu
130 135 140

Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145 150 155 160

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
165 170 175

Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
180 185 190

Val Thr Val Thr Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn
195 200 205

Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val
210 215 220

<210> 14
<211> 225
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 14
Gln Val Gln Leu Gln Gln Ser Gly Pro Gly Leu Val Lys Pro Ser Gln
1 5 10 15

```
Thr Leu Ser Leu Thr Cys Ala Ile Ser Gly Asp Gly Val Ser Ser Asn
            20                  25                  30

Ser Ala Ser Trp Asn Trp Val Arg Gln Ser Pro Ser Arg Gly Leu Glu
        35                  40                  45

Trp Leu Gly Arg Thr Tyr Tyr Arg Ser Lys Trp Tyr Asn Asp Tyr Ala
    50                  55                  60

Val Ser Val Lys Ser Arg Met Thr Ile Lys Ser Asp Thr Ser Lys Asn
65                  70                  75                  80

Gln Phe Ser Leu Gln Leu Asn Ser Val Thr Pro Glu Asp Thr Ala Val
                85                  90                  95

Tyr Tyr Cys Val Arg Gly Val Val Gly Ala Thr Leu Asp Asn Trp Gly
            100                 105                 110

Gln Gly Thr Leu Val Thr Val Ser Ser Gly Ser Ala Ser Ala Pro Thr
        115                 120                 125

Leu Phe Pro Leu Val Ser Cys Glu Asn Ser Pro Ser Asp Thr Ser Ser
    130                 135                 140

Val Ala Val Gly Cys Leu Ala Gln Asp Phe Leu Pro Asp Ser Ile Thr
145                 150                 155                 160

Phe Ser Trp Lys Tyr Lys Asn Asn Ser Asp Ile Ser Ser Thr Arg Gly
                165                 170                 175

Phe Pro Ser Val Leu Arg Gly Gly Lys Tyr Ala Ala Thr Ser Gln Val
            180                 185                 190

Leu Leu Pro Ser Lys Asp Val Met Gln Gly Thr Asp Glu His Val Val
        195                 200                 205

Cys Lys Val Gln His Pro Asn Gly Asn Lys Glu Lys Asn Val Pro Leu
    210                 215                 220

Pro
225
```

<210> 15
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 15

```
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Gly
1               5                   10                  15
```

```
Ser Leu Arg Leu Ser Cys Gly Ala Ser Gly Phe Ala Phe Ser Ser Asn
            20                  25                  30

Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ala Phe Ile His Tyr Asp Gly Arg Asn Lys His Tyr Thr Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Ala Ile Ser Val Asp Asp Ser Lys Thr Thr Leu Tyr
65                  70                  75                  80

Leu Gln Met Ser Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Val Lys Asp Ser Arg Val Thr Gly Gln Ser Ser Gly Tyr Ile Phe Asp
            100                 105                 110

Ser Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys
        115                 120                 125

Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu
    130                 135                 140

Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145                 150                 155                 160

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
                165                 170                 175

Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
            180                 185                 190

Val Thr Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn
        195                 200                 205

Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Glu
    210                 215                 220

<210> 16
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 16
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Ile Thr Phe Ser Ser Tyr
```

```
            20                  25                  30

Asp Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ser Ser Ile Ser Ser Ser Ser Ser Ser Ile Tyr Phe Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

Leu His Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Pro Arg Leu Gly Trp Tyr Phe Asp Leu Trp Gly Arg Gly Thr
            100                 105                 110

Leu Val Thr Val Ala Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
        115                 120                 125

Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
    130                 135                 140

Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160

Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
        195                 200                 205

Asn Thr Lys Val Asp Lys Arg Val
    210                 215

<210> 17
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 17
Gln Val Gln Leu Val Gln Ser Gly Gly Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Asn Phe Thr Asn Tyr
            20                  25                  30
```

```
Gly Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

Gly Trp Ile Ser Ala Tyr Asn Gly Asn Thr Asn Tyr Ala Gln Lys Leu
    50                  55                  60

Gln Gly Arg Val Thr Met Thr Thr Asp Thr Pro Thr Ser Thr Ala Tyr
65                  70                  75                  80

Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Glu Thr Ala Gly Gln Leu Ile Pro Phe Asp Tyr Trp Gly Gln
            100                 105                 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215
```

<210> 18
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 18

```
Val Glu Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Ser Phe Arg Ser Tyr
            20                  25                  30

Glu Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45
```

```
Ser Tyr Ile Gly Ile Gly Gly Asn Thr Ile Tyr Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Asp Tyr Met Gly Val Asp Phe Tyr Tyr Tyr Tyr Gly Met Asp
            100                 105                 110

Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys
        115                 120                 125

Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
    130                 135                 140

Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145                 150                 155                 160

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
                165                 170                 175

Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
            180                 185                 190

Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
        195                 200                 205

Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220

<210> 19
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 19
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Ile Phe Thr Ser Tyr
            20                  25                  30

Ala Ile His Trp Val Arg Gln Ala Pro Gly Gln Arg Leu Glu Trp Met
        35                  40                  45

Gly Trp Ile Asn Ala Gly Asn Gly Asn Thr Lys Tyr Ser Gln Lys Phe
```

```
    50                  55                  60

Gln Gly Arg Val Thr Ile Thr Arg Asp Thr Ser Ala Asn Thr Ala Tyr
65                  70                  75                  80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Ile Tyr Tyr Cys
                85                  90                  95

Ala Arg Asp Ile Ala Val Ala Ile Thr Asn Tyr Phe Gly Ser Trp Gly
            100                 105                 110

Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215

<210> 20
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 20
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Arg Pro Ser Glu
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Asp Val Ser Gly Tyr Leu Ile Ser Ser Gly
            20                  25                  30

Tyr Tyr Trp Gly Trp Val Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp
        35                  40                  45

Ile Gly Ser Val Tyr His Ser Gly Asn Ala Tyr Tyr Asn Pro Ser Leu
    50                  55                  60
```

```
Lys Gly Arg Val Thr Met Ser Val Asp Thr Ser Lys Asn Gln Phe Ser
65                  70                  75                  80

Leu Lys Leu Thr Ser Val Ala Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Glu His Arg Ser Gly Tyr Gln Arg Tyr Trp Gly Gln Gly Thr
            100                 105                 110

Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
        115                 120                 125

Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
    130                 135                 140

Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160

Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
        195                 200                 205

Asn Thr Lys Val Asp Lys Lys Val
    210                 215
```

<210> 21
<211> 223
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 21

```
Gln Ile Thr Leu Lys Glu Ser Gly Pro Thr Leu Val Lys Pro Thr Gln
1               5                   10                  15

Thr Leu Thr Leu Thr Cys Thr Phe Ser Gly Phe Ser Leu Asn Thr Ser
            20                  25                  30

Gly Val Gly Val Gly Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu
        35                  40                  45

Trp Leu Ala Leu Ile Tyr Trp Asp Asp Asp Glu Arg Tyr Arg Pro Ser
    50                  55                  60

Leu Lys Asn Arg Leu Thr Ile Thr Arg Asp Thr Ser Lys Asn Gln Val
65                  70                  75                  80
```

```
Val Leu Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr
                85                  90                  95

Cys Ala His Phe Ser Thr Val Ile Asn Phe Gly His Trp Gly Gln Gly
            100                 105                 110

Thr Leu Val Thr Val Ser Ser Gly Ser Ala Ser Ala Pro Thr Leu Phe
        115                 120                 125

Pro Leu Val Ser Cys Glu Asn Ser Pro Ser Asp Thr Ser Ser Val Ala
    130                 135                 140

Val Gly Cys Leu Ala Gln Asp Phe Leu Pro Asp Ser Ile Thr Phe Ser
145                 150                 155                 160

Trp Lys Tyr Lys Asn Asn Ser Asp Ile Ser Ser Thr Arg Gly Phe Pro
                165                 170                 175

Ser Val Leu Arg Gly Gly Lys Tyr Ala Ala Thr Ser Gln Val Leu Leu
            180                 185                 190

Pro Ser Lys Asp Val Met Gln Gly Thr Asp Glu His Val Val Cys Lys
        195                 200                 205

Val Gln His Pro Asn Gly Asn Lys Glu Lys Asn Val Pro Leu Pro
    210                 215                 220

<210> 22
<211> 115
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 22
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Val Gly Ser Gly Phe Thr Phe Ser Asn Tyr
            20                  25                  30

Ser Met Asn Trp Val Arg Gln Ala Pro Gly Arg Gly Leu Glu Trp Val
        35                  40                  45

Ser Ser Ile Ser Trp Gly Ser Ser Tyr Ile Asn Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

Leu Gln Met Thr Ser Leu Thr Ala Glu Asp Thr Ala Val Tyr Tyr Cys
```

85 90 95

Ala Cys Arg Arg Ile Tyr Gln Gly Phe Asp Pro Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr
115

<210> 23
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 23
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
20 25 30

Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Ser Ile Ser Ser Ser Ser Arg Tyr Ile Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ser Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Arg Ala Thr Ser Phe Asp Tyr Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu
115 120 125

Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys
130 135 140

Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
145 150 155 160

Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser
165 170 175

Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser
180 185 190

```
Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn
        195                 200                 205

Thr Lys Val Asp Lys Lys Val
    210                 215
```

<210> 24
<211> 213
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 24

```
Pro Val Leu Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Asp Ser Met Ser Phe Tyr
            20                  25                  30

Tyr Trp Thr Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Ile
        35                  40                  45

Gly Tyr Ile Tyr Tyr Ser Gly Asn Arg Asn Tyr Asn Pro Ser Leu Asn
    50                  55                  60

Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Glu Val Ser Leu
65                  70                  75                  80

Lys Leu Thr Ser Val Thr Ala Ala Asp Thr Ala Ala Tyr Tyr Cys Ala
                85                  90                  95

Arg Gly Arg Gly Glu Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr
            100                 105                 110

Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro
        115                 120                 125

Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val
    130                 135                 140

Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala
145                 150                 155                 160

Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly
                165                 170                 175

Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly
            180                 185                 190

Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys
        195                 200                 205
```

Val Asp Lys Arg Val
210

<210> 25
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 25
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Gly
20 25 30

Ser Tyr Tyr Trp Asn Trp Ile Arg Gln Pro Ala Gly Lys Gly Leu Glu
35 40 45

Trp Ile Gly Asn Ile Tyr Thr Ser Gly Asn Thr Asp Tyr Asn Pro Ser
50 55 60

Leu Lys Ser Arg Val Thr Ile Ser Leu Asp Thr Ser Lys Asn Gln Val
65 70 75 80

Ser Leu Asn Leu Thr Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
85 90 95

Cys Ala Thr Thr Pro Ser Ser Ser Trp Tyr Trp Tyr Phe Asp Pro Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
115 120 125

Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
130 135 140

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145 150 155 160

Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
165 170 175

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
180 185 190

Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
195 200 205

His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu

210 215 220

<210> 26
<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 26
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Gly Ser Gly Phe Ser Phe Ser Ser Tyr
20 25 30

Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Ser Ile Ser Ser Lys Ser Ser Ser Lys Asn Tyr Ile Asp Ser Val
50 55 60

Lys Asn Arg Phe Ile Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Leu Glu Leu Ile Ile Ala Ala Gly Ala Pro Leu Asp His
100 105 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
115 120 125

Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
130 135 140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145 150 155 160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
165 170 175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
180 185 190

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
195 200 205

Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Glu
210 215 220

<210> 27
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 27
Pro Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Arg Ser
20 25 30

Pro Tyr Phe Trp Gly Trp Ile Arg Gln Pro Pro Gly Arg Gly Leu Glu
35 40 45

Trp Ile Ala Ser Ile Tyr Tyr Arg Gly Thr Thr Ser Tyr Asn Pro Ser
50 55 60

Leu Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe
65 70 75 80

Ser Leu Lys Leu Arg Ser Val Thr Ala Ala Asp Thr Ala Val Phe Tyr
85 90 95

Cys Ala Arg Leu Val Thr Ser Pro Glu Glu Gly Gly Pro Trp Phe Asp
100 105 110

Pro Trp Gly Arg Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys
115 120 125

Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
130 135 140

Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145 150 155 160

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
165 170 175

Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
180 185 190

Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
195 200 205

Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
210 215 220

<210> 28
<211> 119

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 28
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Thr Ser Tyr
20 25 30

Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Leu Ile Trp Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Thr Glu Val Gly His His Phe Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Ile Thr Val Ser Ser
115

<210> 29
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 29
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Ser Gly Ser Ser Gly Ser Tyr
20 25 30

Tyr Leu Ser Trp Ile Arg Gln Pro Ala Gly Lys Gly Leu Glu Trp Ile
35 40 45

Gly Arg Met Tyr Thr Ser Gly Ser Thr His Tyr Asn Pro Ser Leu Lys
50 55 60

```
Ser Arg Val Thr Met Ser Val Asp Thr Ser Lys Asn Gln Phe Ser Leu
65                  70                  75                  80

Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala
                85                  90                  95

Lys Pro Trp Arg Ser Asp Gly Phe Asp Val Trp Gly Gln Gly Thr Val
            100                 105                 110

Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro Lys Val Phe Pro Leu
        115                 120                 125

Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val Ile Ala Cys Leu
    130                 135                 140

Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val Thr Trp Ser Glu
145                 150                 155                 160

Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro Ser Gln Asp Ala
                165                 170                 175

Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr Leu Pro Ala Thr
            180                 185                 190

Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val Lys His Tyr Thr
        195                 200                 205

Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
    210                 215

<210> 30
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 30
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Asn Phe Arg Asp Tyr
            20                  25                  30

Tyr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

Gly Trp Ile Asn Pro Asn Ser Gly Gly Thr Ile Ser Ala Gln Asn Phe
    50                  55                  60

Gln Gly Arg Val Thr Met Thr Arg Asp Thr Ser Ile Ser Thr Ala Tyr
65                  70                  75                  80
```

```
Met Glu Val Asn Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Val Gly Met Val Thr Asp Gly Phe Glu Ile Trp Gly Gln Gly Thr
            100                 105                 110

Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
        115                 120                 125

Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
    130                 135                 140

Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160

Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
        195                 200                 205

Asn Thr Lys Val Asp Lys Arg Val
    210                 215
```

<210> 31
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 31

```
Gln Val Gln Leu Gln Glu Ser Gly Ser Gly Leu Val Arg Pro Ser Gln
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Asn Ser Gly
            20                  25                  30

Asp Tyr His Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Asp Leu Glu
        35                  40                  45

Tyr Ile Gly Tyr Ile His His Thr Gly Ser Ala Tyr Tyr Asn Pro Ser
    50                  55                  60

Leu Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln His
65                  70                  75                  80

Ser Leu Arg Leu Thr Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
```

```
                85                  90                  95

Cys Ala Arg Leu Asp Leu Arg Thr Val Arg Phe Asp Pro Trp Gly Gln
            100                 105                 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro Lys Val
        115                 120                 125

Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val Ile
    130                 135                 140

Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val Thr
145                 150                 155                 160

Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro Ser
                165                 170                 175

Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr Leu
            180                 185                 190

Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val Lys
        195                 200                 205

His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
    210                 215                 220

<210> 32
<211> 226
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 32
Pro Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Ala Lys Pro Ser Glu
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Thr Ala Ser Gly Gly Ser Ile Ser Ser Ser
            20                  25                  30

Gly Tyr Tyr Trp Gly Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu
        35                  40                  45

Trp Ile Gly Ser Ile Tyr Tyr Ser Gly Asp Thr Tyr Tyr Asn Pro Ser
    50                  55                  60

Leu Lys Ser Arg Val Asn Ile Ala Val Asp Thr Ser Gln Asn Gln Phe
65                  70                  75                  80

Ser Leu Lys Leu Asn Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95
```

```
Cys Ala Arg His Ser Ser Gly Pro Pro Arg Leu Ala Phe Asp Ile Trp
            100                 105                 110

Gly Gln Gly Thr Met Val Thr Val Ser Ser Gly Ser Ala Ser Ala Pro
        115                 120                 125

Thr Leu Phe Pro Leu Val Ser Cys Glu Asn Ser Pro Ser Asp Thr Ser
    130                 135                 140

Ser Val Ala Val Gly Cys Leu Ala Gln Asp Phe Leu Pro Asp Ser Ile
145                 150                 155                 160

Thr Phe Ser Trp Lys Tyr Lys Asn Asn Ser Asp Ile Ser Ser Thr Arg
                165                 170                 175

Gly Phe Pro Ser Val Leu Arg Gly Gly Lys Tyr Ala Ala Thr Ser Gln
            180                 185                 190

Val Leu Leu Pro Ser Lys Asp Val Met Gln Gly Thr Asp Glu His Val
        195                 200                 205

Val Cys Lys Val Gln His Pro Asn Gly Asn Lys Glu Lys Asn Val Pro
    210                 215                 220

Leu Pro
225

<210> 33
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 33
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

Gly Met His Trp Val Arg Gln Val Pro Gly Lys Gly Leu Glu Gly Val
        35                  40                  45

Ala Val Ile Ser His Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
```

Ala Lys Asp Phe Ala Met Pro Thr Val Thr Thr Asp Tyr Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
115 120 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
130 135 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145 150 155 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
165 170 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
180 185 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
195 200 205

Pro Ser Asn Thr Lys Val Asp Lys Asn Glu
210 215

<210> 34
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 34
Gln Ile Thr Leu Lys Glu Ser Gly Pro Thr Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Phe Ser Gly Phe Ser Leu Thr Thr Ser
20 25 30

Gly Val Gly Val Gly Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu
35 40 45

Trp Leu Ala Leu Ile Tyr Trp Asp Asp Asp Lys Arg Tyr Ser Pro Ser
50 55 60

Leu Arg Ser Arg Leu Thr Ile Thr Lys Asp Thr Ser Lys Asn Gln Val
65 70 75 80

Val Leu Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr
85 90 95

Cys Val His Arg Pro Ser Leu Ala Tyr Trp Tyr Phe Asp Val Trp Gly

```
            100                 105                 110

Arg Gly Thr Leu Leu Thr Val Ser Ser
        115                 120

<210> 35
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 35
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Thr Tyr
            20                  25                  30

Glu Leu Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Ile
        35                  40                  45

Ser Tyr Ile Asn Thr Thr Ser Asp Pro Ile Tyr Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Val Phe
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Val Arg Glu Gly Asp Ser Arg Lys Tyr Tyr Ser Leu Asp Tyr Trp Gly
            100                 105                 110

Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205
```

Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
210 215

<210> 36
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 36
Pro Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Thr Phe Ser Ser Tyr
20 25 30

Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Gly Ile Ile Pro Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Pro Met Trp Val Ser Tyr Ala Phe Asp Ile Trp Gly Gln
100 105 110

Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
115 120 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
130 135 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145 150 155 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
165 170 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
180 185 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
195 200 205

Pro Ser Asn Thr Lys Val Asp Lys Asn Glu
210 215

<210> 37
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 37
Pro Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Asp
20 25 30

Asn Tyr Tyr Trp Ser Trp Leu Arg Gln His Pro Gly Lys Gly Leu Glu
35 40 45

Trp Ile Gly Tyr Ile Tyr Phe Ser Val Thr Thr Tyr Tyr Asn Pro Ser
50 55 60

Leu Lys Ser Arg Val Thr Ile Ser Leu Asp Thr Ser Lys Asn Gln Phe
65 70 75 80

Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
85 90 95

Cys Ala Ser Gly Tyr Val Ser Phe Asp Leu Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu
115 120 125

Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys
130 135 140

Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
145 150 155 160

Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser
165 170 175

Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser
180 185 190

Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn
195 200 205

Thr Lys Val Asp Lys Arg Val
210 215

<210> 38

<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 38
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Thr Cys Asn Val Ser Gly Ala Ser Ile Ser Ser Tyr
20 25 30

Tyr Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Ile
35 40 45

Gly Tyr Leu Ser Tyr Ser Gly Asn Thr Asn Ser Lys Pro Ser Leu Lys
50 55 60

Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe Ser Leu
65 70 75 80

Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala
85 90 95

Arg Glu Gly Ala Tyr Glu Ser Ser Gly Pro Asp Pro Phe Asp Ile Trp
100 105 110

Gly Gln Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
115 120 125

Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
130 135 140

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145 150 155 160

Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
165 170 175

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
180 185 190

Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
195 200 205

His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
210 215 220

<210> 39
<211> 220
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 39
Gln Val Gln Val Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Asn Thr Phe Thr Thr Tyr
20 25 30

Thr Ile Gln Trp Val Arg Gln Val Pro Gly Gln Arg Leu Glu Trp Met
35 40 45

Gly Trp Ile Asn Ala Gly Asn Gly Asp Ile Lys Tyr Ser Gln Lys Phe
50 55 60

Gln Asp Arg Val Thr Ile Thr Arg Asp Thr Ser Ala Asn Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Tyr Glu Asp Thr Ala Val Tyr Phe Cys
85 90 95

Ala Ser Leu Phe Leu Thr Tyr Tyr Gly Ser Gly Thr Tyr Tyr Arg Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
115 120 125

Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
130 135 140

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145 150 155 160

Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
165 170 175

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
180 185 190

Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
195 200 205

His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
210 215 220

<210> 40
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 40
Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
20 25 30

Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Thr Ile Ser Gly Ser Gly His Ser Thr Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Lys Ser Thr Leu Gly Gly Gly Phe Asp Phe Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
115 120 125

Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
130 135 140

Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145 150 155 160

Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
165 170 175

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
180 185 190

Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
195 200 205

Asn Thr Lys Val Asp Lys Lys Val
210 215

<210> 41
<211> 223
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody

VH chain

<400> 41
Val Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Arg Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asp Asp Tyr
20 25 30

Gly Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Gly Ile Asn Trp Asn Gly Gly Ser Thr Gly Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Leu Tyr His Cys
85 90 95

Ala Arg Val Gly Ser Ser Ser Trp Tyr Ser Ser Gly Arg Ser Pro Phe
100 105 110

Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr
115 120 125

Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
130 135 140

Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145 150 155 160

Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
165 170 175

Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
180 185 190

Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
195 200 205

Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
210 215 220

<210> 42
<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 42
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1   5   10   15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20   25   30

Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35   40   45

Ala Val Ile Ser Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val
    50   55   60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65   70   75   80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85   90   95

Ala Lys Asp Gln Ile Val Leu Glu Met Ala Thr Ser Pro Phe Asp Tyr
            100   105   110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115   120   125

Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser
    130   135   140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145   150   155   160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165   170   175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180   185   190

Thr Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val
        195   200   205

Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val
    210   215   220

<210> 43
<211> 223
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 43
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gln

```
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Gly
            20                  25                  30

Gly Tyr Tyr Trp Ser Trp Ile Arg Gln His Pro Gly Lys Gly Leu Glu
        35                  40                  45

Trp Ile Gly Tyr Ile Tyr Tyr Ser Gly Ser Thr Tyr Tyr Asn Pro Ser
    50                  55                  60

Leu Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95

Cys Ala Arg Asp Leu Ser Cys Ser Ser Thr Ser Cys His Asp Ala Phe
            100                 105                 110

Asp Ile Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr
        115                 120                 125

Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
    130                 135                 140

Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145                 150                 155                 160

Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
                165                 170                 175

Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
            180                 185                 190

Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
        195                 200                 205

Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215                 220

<210> 44
<211> 123
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 44
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15
```

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Gly Tyr
            20   25   30

Tyr Leu His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35   40   45

Gly Arg Ile Asn Pro Asn Ser Gly Gly Thr Asn Tyr Ala Gln Asn Phe
    50   55   60

Gln Gly Arg Val Thr Met Thr Arg Asp Thr Ser Ile Ser Thr Ala Tyr
65   70   75   80

Met Glu Leu Ser Ser Leu Lys Ser Asp Asp Thr Ala Val Phe Phe Cys
                85   90   95

Ala Arg Gly Pro Asn Phe His Glu Ser Ile Arg Asp Gly Phe Asp Ile
            100   105   110

Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser
        115   120

<210> 45
<211> 118
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 45
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1   5   10   15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20   25   30

Asp Phe His Trp Val Arg Gln Pro Thr Gly Lys Gly Leu Glu Trp Val
        35   40   45

Ser Ala Ile Gly Thr Ala Gly Asp Thr Leu Tyr Leu Asp Ser Val Lys
    50   55   60

Gly Arg Phe Thr Ile Ser Arg Glu Asn Ala Lys Asn Ser Leu Tyr Leu
65   70   75   80

Gln Met Asn Ser Leu Arg Ala Gly Asp Thr Ala Val Tyr Tyr Cys Ala
                85   90   95

Arg Val Asn Trp Asn Ser Asp Thr Phe Asp Ser Trp Gly Gln Gly Thr
            100   105   110

Leu Val Thr Val Ser Ser
        115

<210> 46
<211> 229
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 46
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Ser Tyr
20 25 30

Gly Met His Trp Ala Arg Gln Ala Pro Gly Arg Gly Leu Glu Trp Val
35 40 45

Ala Val Ile Ser Tyr Asp Gly Ser Asn Ser Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65 70 75 80

Leu Glu Met Asn Ser Leu Arg Ala Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Pro Gly Arg Asp Pro Tyr Leu Asp Leu Asp Tyr His Tyr
100 105 110

Gly Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala
115 120 125

Ser Pro Thr Ser Pro Lys Val Phe Pro Leu Ser Leu Cys Ser Thr Gln
130 135 140

Pro Asp Gly Asn Val Val Ile Ala Cys Leu Val Gln Gly Phe Phe Pro
145 150 155 160

Gln Glu Pro Leu Ser Val Thr Trp Ser Glu Ser Gly Gln Gly Val Thr
165 170 175

Ala Arg Asn Phe Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr
180 185 190

Thr Ser Ser Gln Leu Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys
195 200 205

Ser Val Thr Cys His Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val
210 215 220

Thr Val Pro Cys Pro

225

<210> 47
<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 47
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Glu Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asp Tyr
20 25 30

Tyr Met Ser Trp Ile Arg Gln Ala Pro Gly Lys Arg Leu Glu Trp Ile
35 40 45

Ser His Met Ser Ser Gly Gly Asn Arg Arg His Tyr Ala Asp Ser Val
50 55 60

Arg Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Met Arg Ala Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Lys Arg Ser Gly Met Thr Ser Asp Arg Arg Ile Asp Tyr
100 105 110

Trp Gly Gln Gly Thr Arg Val Thr Val Ser Ser Ala Ser Thr Lys Gly
115 120 125

Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
130 135 140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145 150 155 160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
165 170 175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
180 185 190

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
195 200 205

Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
210 215 220

<210> 48
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 48
Val Val Gln Leu Gly Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
20 25 30

His Met Asn Trp Val Arg Gln Ser Pro Glu Lys Gly Leu Glu Trp Val
35 40 45

Ser Tyr Ile Ser Ser Ser Gly Thr Tyr Ile Asp Tyr Ala Asp Ser Val
50 55 60

Arg Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65 70 75 80

Leu Gln Met Asn Ile Leu Arg Pro Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ser Gly Gly Tyr Tyr Ser Ser Ser His Met Asp Val Trp Gly Lys Gly
100 105 110

Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
115 120 125

Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
130 135 140

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145 150 155 160

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
165 170 175

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
180 185 190

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
195 200 205

Ser Asn Thr Lys Val Asp Lys Arg Val
210 215

<210> 49
<211> 218

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 49
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
20 25 30

Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Val Ile Ser Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Leu
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asp Thr Leu Tyr
65 70 75 80

Leu Gln Val Asn Ser Leu Arg Pro Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Val Asn Ile Ala Ala Ala Gly Thr Leu Asp Tyr Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
115 120 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
130 135 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145 150 155 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
165 170 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
180 185 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
195 200 205

Pro Ser Asn Thr Lys Val Asp Lys Asn Glu
210 215

<210> 50
<211> 226
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 50
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Glu Pro Gly Arg
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Leu Glu Glu Phe
20 25 30

Ala Met His Trp Val Arg Gln Val Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Ala Ile Ser Trp Asn Ser Gly Ser Ile Ala Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65 70 75 80

Leu Gln Met Asp Ser Leu Arg Ala Glu Asp Thr Ala Leu Tyr Tyr Cys
85 90 95

Val Lys Asp Met Gly Pro Ala Gly Thr Ala Ser Ala Tyr His Tyr His
100 105 110

Asn Gly Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
115 120 125

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
130 135 140

Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
145 150 155 160

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
165 170 175

Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
180 185 190

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
195 200 205

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
210 215 220

Arg Glu
225

<210> 51
<211> 216
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 51
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Asp Tyr
20 25 30

Tyr Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Glu Leu Glu Trp Ile
35 40 45

Gly Tyr Ile Tyr Tyr Ser Gly Ser Thr Asn Tyr Asn Pro Ser Leu Lys
50 55 60

Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe Ser Leu
65 70 75 80

Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala
85 90 95

Arg Leu Thr Thr Ser Thr Ser Ala Leu Ser Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
115 120 125

Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
130 135 140

Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145 150 155 160

Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
165 170 175

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
180 185 190

Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
195 200 205

Asn Thr Lys Val Asp Lys Ser Glu
210 215

<210> 52
<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 52
Pro Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Thr Phe Ser Ser Tyr
20 25 30

Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Gly Ile Ile Pro Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Asn Trp Asn Ser Ala Gly Thr Thr Glu Trp Phe Asp Pro
100 105 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
115 120 125

Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
130 135 140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145 150 155 160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
165 170 175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
180 185 190

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
195 200 205

Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
210 215 220

<210> 53
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody

VH chain

<400> 53
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Ser Ser Tyr
20 25 30

Gly Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Trp Ile Asn Gly Tyr Asn Gly Asn Thr Asn Tyr Ala Gln Lys Leu
50 55 60

Gln Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Asp Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Thr Leu Gln Lys Gly Asp Tyr Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser Ser
115

<210> 54
<211> 224
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 54
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Ser Tyr
20 25 30

Glu Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Tyr Ile Thr Ser Ser Gly Asp Thr Ile Tyr His Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Thr Lys Asn Ser Leu Tyr
65 70 75 80

Leu Gln Met Thr Gly Leu Arg Thr Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Ala Ser Arg Val Leu Glu Ser Lys Ser Trp His Gly Asp Ala
100 105 110

Phe Asp Val Trp Gly Arg Gly Thr Arg Val Ile Val Ser Ser Ala Ser
115 120 125

Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
130 135 140

Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145 150 155 160

Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
165 170 175

His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
180 185 190

Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile
195 200 205

Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
210 215 220

<210> 55
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 55
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Thr Phe Ser Ser Tyr
20 25 30

Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Gly Ile Ile Pro Ile Phe Gly Thr Thr Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Gly Leu Gly Gly Ser Gly Tyr Tyr Phe Asp Tyr Trp Gly Gln

```
            100                 105                 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

Pro Ser Asn Thr Lys Val Asp Lys Asn Glu
    210                 215

<210> 56
<211> 124
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 56
Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1               5                   10                  15

Ser Leu Lys Ile Ser Cys Arg Gly Ser Gly Asp Ser Phe Asn Lys Tyr
            20                  25                  30

Phe Ile Gly Trp Val Arg Gln Val Pro Gly Lys Ala Leu Glu Trp Met
        35                  40                  45

Gly Ile Ile Tyr Pro Gly Asp Ser Asp Thr Arg Tyr Ser Pro Ser Phe
    50                  55                  60

Gln Gly Gln Val Thr Ile Ser Ala Asp Lys Ser Ile Asn Ile Ala Tyr
65                  70                  75                  80

Leu Gln Trp Thr Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr Tyr Cys
                85                  90                  95

Ala Arg Gln Ala Phe Cys Gly Ala Asn Cys Trp Ser Gly Ala Tyr Asp
            100                 105                 110
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Ile Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser
        115   120

<210> 57
<211> 224
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 57
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1   5   10   15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Thr Tyr
            20   25   30

Gly Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35   40   45

Ala Val Thr Trp Tyr Glu Gly Thr Asn Glu Glu Tyr Ala Asp Ser Val
    50   55   60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Val Tyr
65   70   75   80

Leu Gln Met Asn Ser Leu Arg Val Asp Asp Thr Ala Val Tyr Tyr Cys
                85   90   95

Val Arg Arg Gly Ala Thr Val Phe Gln Gly Lys Ile Ile Lys Gly Tyr
            100   105   110

Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser Ala Ser
        115   120   125

Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
    130   135   140

Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145   150   155   160

Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
                165   170   175

His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
            180   185   190

Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile
        195   200   205

Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Glu
    210   215   220

<210> 58
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 58
Val Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Thr Ala Ser Gly Phe Ala Phe Ser Ser Tyr
20 25 30

Ala Met Thr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Val Met Ser Gly Ser Gly Ala Gly Thr Tyr Tyr Ala Asp Ala Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65 70 75 80

Leu Gln Met Glu Ser Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Lys Val Lys Gly Gly Ser Asn Asp Tyr Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu
115 120 125

Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys
130 135 140

Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
145 150 155 160

Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser
165 170 175

Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser
180 185 190

Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn
195 200 205

Thr Lys Val Asp Lys Asn Glu
210 215

<210> 59

<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 59
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn His
20 25 30

Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Val Ile Ser Tyr Asp Gly Gly Thr Lys Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Lys Ser Lys Asn Thr Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Pro Glu Asp Thr Ala Leu Tyr Tyr Cys
85 90 95

Ala Arg His Leu Tyr Gly Asp Phe Tyr Tyr Leu Asp Tyr Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
115 120 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
130 135 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145 150 155 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
165 170 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
180 185 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
195 200 205

Pro Ser Asn Thr Lys Val Asp Lys Arg Gly
210 215

<210> 60
<211> 218
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 60
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Arg Pro Gly Arg
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser His
20 25 30

Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Val Ile Trp Tyr Asp Gly Ser Thr Lys Tyr Tyr Thr Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Phe
65 70 75 80

Leu Gln Leu Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp His Arg Thr Gly Ser Tyr Tyr Pro Asp Tyr Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser Thr Ser Thr Lys Gly Pro Ser Val
115 120 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
130 135 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145 150 155 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
165 170 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
180 185 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
195 200 205

Pro Ser Asn Thr Lys Val Asp Lys Arg Val
210 215

<210> 61
<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 61
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Val Asp Asn Val
20 25 30

Asp Ser Tyr Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu
35 40 45

Trp Ile Ala Tyr Ile Tyr Phe Thr Gly Ser Thr Asn Tyr Asn Pro Ser
50 55 60

Leu Lys Ser Arg Val Thr Ile Ser Ile Asp Thr Ser Lys Asn Gln Phe
65 70 75 80

Ser Leu Lys Val Asn Ala Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
85 90 95

Cys Ala Arg Gly Val Arg Gln Gln Gln Val Arg Lys Trp Phe Asp Pro
100 105 110

Trp Gly Arg Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
115 120 125

Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
130 135 140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145 150 155 160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
165 170 175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
180 185 190

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
195 200 205

Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Asn Glu
210 215 220

<210> 62
<211> 223
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody

VH chain

<400> 62
Pro Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1 5 10 15

Ser Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Thr Thr Tyr
20 25 30

Trp Ile Gly Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp Met
35 40 45

Gly Ile Ile Tyr Pro Gly Asp Ser Asp Thr Arg Tyr Ser Pro Ser Phe
50 55 60

Gln Gly Gln Val Thr Ile Ser Ala Asp Lys Ser Ile Ser Thr Ala Tyr
65 70 75 80

Leu Gln Trp Asn Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr Tyr Cys
85 90 95

Ala Met Asp Asn Ser Gly Ser Gly Gly Val Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser Gly Ser Ala Ser Ala Pro Thr Leu Phe
115 120 125

Pro Leu Val Ser Cys Glu Asn Ser Pro Ser Asp Thr Ser Ser Val Ala
130 135 140

Val Gly Cys Leu Ala Gln Asp Phe Leu Pro Asp Ser Ile Thr Phe Ser
145 150 155 160

Trp Lys Tyr Lys Asn Asn Ser Asp Ile Ser Ser Thr Arg Gly Phe Pro
165 170 175

Ser Val Leu Arg Gly Gly Lys Tyr Ala Ala Thr Ser Gln Val Leu Leu
180 185 190

Pro Ser Lys Asp Val Met Gln Gly Thr Asp Glu His Val Val Cys Lys
195 200 205

Val Gln His Pro Asn Gly Asn Lys Glu Lys Asn Val Pro Leu Pro
210 215 220

<210> 63
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 63
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gln
1   5   10   15

Thr Leu Pro Leu Thr Cys Thr Val Ser Gly Asp Ser Ile Ser Ser Gly
            20   25   30

Ser Tyr Tyr Trp Ser Trp Ile Arg Gln Pro Ala Gly Lys Gly Leu Glu
        35   40   45

Trp Ile Gly Arg Ile Tyr Thr Ser Gly Ser Thr Lys Tyr Asn Pro Ser
    50   55   60

Leu Lys Ser Arg Ala Thr Ile Ser Ile Asp Thr Ser Lys Asn Gln Phe
65   70   75   80

Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85   90   95

Cys Ala Arg Asp Ser Tyr His Tyr Tyr Gly Met Asp Val Trp Gly Gln
            100   105   110

Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115   120   125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130   135   140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145   150   155   160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165   170   175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180   185   190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195   200   205

Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210   215

<210> 64
<211> 224
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 64
Gln Val Gln Leu Gln Gln Ser Gly Pro Gly Leu Val Lys Pro Ser Gln

```
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Ala Ile Ser Gly Asp Ser Val Ser Ser Asn
            20                  25                  30

Ser Ala Ala Trp His Trp Ile Arg Gln Ser Pro Ser Arg Gly Leu Glu
        35                  40                  45

Trp Leu Gly Arg Thr His Tyr Arg Ser Lys Trp Tyr Asn Glu Tyr Ala
    50                  55                  60

Val Ser Val Lys Ser Arg Ile Thr Ile Asn Pro Asp Ile Ser Lys Asn
65                  70                  75                  80

Gln Phe Ser Leu Gln Leu Ser Ser Val Thr Pro Glu Asp Thr Ala Val
                85                  90                  95

Tyr Tyr Cys Ala Arg Glu Thr Val Tyr Ile Ser Thr Tyr Tyr Tyr Gly
            100                 105                 110

Leu Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser
        115                 120                 125

Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
    130                 135                 140

Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145                 150                 155                 160

Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
                165                 170                 175

His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
            180                 185                 190

Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile
        195                 200                 205

Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220

<210> 65
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 65
Pro Val Gln Leu Ile Gln Ser Gly Ala Glu Val Arg Lys Pro Gly Ala
1               5                   10                  15
```

```
Ser Val Lys Val Ser Cys Lys Val Ser Gly Tyr Thr Leu Ser Glu Leu
            20                  25                  30

Ser Leu His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Met
        35                  40                  45

Gly Thr Phe Asp Pro Glu Asp Gly Glu Thr Val Tyr Ala Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Val Thr Glu Asp Thr Ser Thr Asp Thr Ala Tyr
65                  70                  75                  80

Ile Asp Leu Ser Ser Leu Lys Ser Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Thr Asp Gly Pro Leu His Thr Ser Gly Leu Asp Tyr Trp Gly Gln
            100                 105                 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala
    130                 135                 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215
```

<210> 66
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 66

```
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30
```

Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Ser Ile Ser Ser Ser Ser Ser Tyr Ile Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Cys Leu Gly Ala Glu Ala Asn Asp Ala Phe Asp Ile Trp Gly Gln
100 105 110

Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
115 120 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
130 135 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145 150 155 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
165 170 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
180 185 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
195 200 205

Pro Ser Asn Thr Lys Val Asp Lys Arg Val
210 215

<210> 67
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 67
Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Tyr
20 25 30

Ala Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Asp Trp Val

```
        35                  40                  45

Ser Ala Ile Ser Gly Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Ile Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Lys Val Pro Gly Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val
            100                 105                 110

Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser
        115                 120                 125

Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys
    130                 135                 140

Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu
145                 150                 155                 160

Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu
                165                 170                 175

Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr
            180                 185                 190

Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val
        195                 200                 205

Asp Lys Asn Glu
    210

<210> 68
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 68
Gln Val Lys Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1               5                   10                  15

Ser Val Lys Val Ser Cys Lys Thr Ser Gly Gly Pro Phe Ser Ser Tyr
            20                  25                  30

Thr Ile Thr Trp Val Arg Gln Ala Pro Gly Gln Gly Pro Glu Trp Met
        35                  40                  45
```

```
Gly Arg Ile Thr Pro Ile Phe Asn Ile Thr Asn Tyr Ala Gln Asn Phe
    50                  55                  60

Gln Gly Arg Met Thr Met Thr Ala Asp Lys Ser Thr Thr Thr Ala Tyr
65                  70                  75                  80

Met Glu Leu Ser Gly Leu Lys Ser Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Ala Gly Leu Ser Thr Ser Trp Pro Ser Trp Phe Asp Pro Trp
            100                 105                 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
    130                 135                 140

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
        195                 200                 205

His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220
```

<210> 69
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 69

```
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gln
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Val Asn Thr Gly
            20                  25                  30

Thr Ser Tyr Trp Thr Trp Val Arg Gln Arg Pro Gly Lys Gly Leu Glu
        35                  40                  45

Trp Ile Gly Phe Ile Tyr Tyr Ser Gly Ser Thr Tyr Tyr Asn Pro Ala
    50                  55                  60
```

```
Leu Glu Ser Arg Leu Thr Ile Ser Leu Asp Thr Ser Gln Asn Gln Phe
65                  70                  75                  80

Ser Leu Lys Leu Thr Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Phe
                85                  90                  95

Cys Ala Arg Asn Asp Ile Ser Phe Lys Gln Ser Ala Ile Asp Val Trp
            100                 105                 110

Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
    130                 135                 140

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
        195                 200                 205

His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220
```

<210> 70
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 70

```
Gln Val His Leu Ala Glu Ser Gly Gly Gly Val Val Gln Thr Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Val Ser Gly Phe His Phe Gly Ser His
            20                  25                  30

Gly Met Thr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Leu
        35                  40                  45

Ser Phe Ile Thr Tyr Asp Gly Gln Ile Lys Tyr Tyr Gly Gly Ser Val
    50                  55                  60

Lys Gly Arg Phe Asn Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu His
```

65 70 75 80

Leu His Met Asn Gly Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Lys Thr Lys Thr Met Gly Val Gly Gly Glu Tyr Phe Gly Leu Asp
100 105 110

Val Trp Gly Leu Gly Thr Thr Val Ile Val Ser Ser Ala Ser Thr Lys
115 120 125

Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
130 135 140

Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Ser
145 150 155 160

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
165 170 175

Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
180 185 190

Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
195 200 205

Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
210 215 220

<210> 71
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 71
Pro Leu Gln Leu His Glu Ser Gly Pro Gly Leu Ala Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Leu Ser Gly Gly Ser Ile Thr Thr Gly
20 25 30

Ser Tyr Tyr Trp Ala Trp Ile Arg Gln Ala Pro Gly Lys Ala Leu Glu
35 40 45

Trp Ile Gly Thr Ile Tyr Tyr Ser Gly Thr Thr Tyr Tyr Asn Ser Ser
50 55 60

Leu Asn Asn Arg Leu Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Leu
65 70 75 80

Ser Leu Lys Leu Val Ser Val Ala Ala Ala Asp Thr Ala Ile Tyr Tyr
85 90 95

Cys Ala Arg His Lys Ala Leu Trp Phe Gly Glu Ala Gly Ala Phe Asp
100 105 110

Ile Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys
115 120 125

Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
130 135 140

Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145 150 155 160

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
165 170 175

Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
180 185 190

Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
195 200 205

Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
210 215 220

<210> 72
<211> 223
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 72
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Arg
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asp Asp Tyr
20 25 30

Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Gly Ile Ser Trp Asn Ser Gly Ser Ile Gly Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Leu Tyr Tyr Cys
85 90 95

Ala Lys Asp Leu Leu Gly Phe Arg Asp Gln Arg Asn Tyr Tyr Gly Met
100 105 110

Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr
115 120 125

Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
130 135 140

Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145 150 155 160

Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
165 170 175

Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
180 185 190

Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
195 200 205

Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
210 215 220

<210> 73
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 73
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Ser Cys Thr Val Ser Gly Ala Ser Met Asn Asn Tyr
20 25 30

Tyr Trp Ser Trp Ile Arg Gln Ser Ala Gly Lys Gly Leu Glu Trp Ile
35 40 45

Gly Arg Ile Tyr Ser Ser Gly Asp Thr Asp Tyr Asn Pro Ser Leu Lys
50 55 60

Thr Arg Val Thr Met Ser Ile Asp Thr Ser Lys Asn Gln Phe Ser Leu
65 70 75 80

Asn Leu Asp Ser Val Thr Ala Ala Asp Thr Ala Thr Tyr Tyr Cys Ala
85 90 95

Arg Ser Phe Tyr Asp Thr Leu Phe Tyr Phe Glu Asn Trp Gly Gln Gly

100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 74
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 74
Gln Ile Thr Leu Lys Glu Ser Gly Pro Thr Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Phe Ser Gly Phe Ser Leu Thr Thr Thr
20 25 30

Asp Val Gly Val Gly Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu
35 40 45

Trp Leu Thr Ile Ile Tyr Trp Asp Asp Asp Glu Arg Tyr Ser Pro Ser
50 55 60

Leu Lys Ser Arg Leu Thr Ile Thr Lys Asp Thr Ser Lys Asn Gln Val
65 70 75 80

Val Leu Ser Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr
85 90 95

Cys Ala Arg Val Tyr Ser Thr Lys Trp Asp Phe Asp Tyr Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
115 120 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
130 135 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145 150 155 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
165 170 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
180 185 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
195 200 205

Pro Ser Asn Thr Lys Val Asp Lys Arg Val
210 215

<210> 75
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 75
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
20 25 30

Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Leu
35 40 45

Ser Tyr Val Ser Ser Ser Gly Ser Thr Met Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Thr Ala Lys Asn Ser Leu Phe
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Lys Gly Gly Pro Leu Arg Pro Phe Asp Ile Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
115 120 125

Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
130 135 140

Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145 150 155 160

Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
165 170 175

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
180 185 190

Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
195 200 205

Asn Thr Lys Val Asp Lys Lys Val
210 215

<210> 76
<211> 226
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 76
Ala Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1 5 10 15

Ser Leu Lys Ile Ser Cys Arg Gly Ser Gly Tyr Asn Phe Ile Ser His
20 25 30

Trp Ile Ser Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp Gln
35 40 45

Trp Leu Gly Arg Ile Asp Pro Ser Asp Ser Tyr Thr Asn Tyr Ser Pro
50 55 60

Ser Phe Arg Gly His Val Thr Ile Ser Val Asp Lys Ser Val Asn Thr
65 70 75 80

Ala Tyr Leu Gln Trp Asn Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr
85 90 95

Tyr Cys Ala Arg Leu Ser Arg Asp Gly Tyr Thr Ile Glu His Phe Asp
100 105 110

Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Pro Thr
115 120 125

Ser Pro Lys Val Phe Pro Leu Ser Leu Asp Ser Thr Pro Gln Asp Gly
130 135 140

Asn Val Val Val Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro
145 150 155 160

Leu Ser Val Thr Trp Ser Glu Ser Gly Gln Asn Val Thr Ala Arg Asn
165 170 175

Phe Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser
180 185 190

Gln Leu Thr Leu Pro Ala Thr Gln Cys Pro Asp Gly Lys Ser Val Thr
195 200 205

Cys His Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro
210 215 220

Cys Pro

225

<210> 77
<211> 224
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 77
Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1 5 10 15

Ser Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Thr Ser Phe
20 25 30

Trp Ile Gly Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp Met
35 40 45

Gly Ile Ile Phe Pro Ala Asp Ser Asp Thr Arg Tyr Ser Pro Ser Phe
50 55 60

Gln Gly Gln Val Ile Ile Ser Val Asp Lys Ser Ile Ser Thr Ala Tyr
65 70 75 80

Leu Gln Trp Ser Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr Tyr Cys
85 90 95

Ala Arg Arg Gly Val Ser Gly Gly Ser Ala Trp Thr Tyr Tyr Asn Phe
100 105 110

Phe Asp Pro Trp Gly Gln Gly Thr Leu Val Thr Val Ala Ser Ala Ser
115 120 125

Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
130 135 140

Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145 150 155 160

Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
165 170 175

His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
180 185 190

Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile
195 200 205

Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
210 215 220

<210> 78
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 78
Pro Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Asp Ser Tyr
20 25 30

Tyr Trp Ser Trp Leu Arg Gln Pro Pro Gly Arg Gly Leu Glu Trp Ile
35 40 45

Gly Tyr Ile Phe Tyr Ser Gly Ile Thr Asn Tyr Ser Pro Ser Leu Lys
50 55 60

Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe Ser Leu
65 70 75 80

Lys Leu Asn Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala
85 90 95

Arg Glu Leu Pro Val Ile Gly Arg Arg Thr Phe Asp Ile Trp Gly Gln
100 105 110

Gly Thr Met Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro Lys Val
115 120 125

Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val Ile
130 135 140

Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val Thr
145 150 155 160

Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro Ser
165 170 175

Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr Leu
180 185 190

Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val Lys
195 200 205

His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
210 215 220

<210> 79
<211> 227

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 79
Pro Val His Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Leu Ser Gly Gly Ile Phe Ser Tyr Phe
20 25 30

Ala Ile Ile Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Thr Ile Ile Pro Ile Phe Gly Thr Ser Asn Tyr Ala Glu Lys Phe
50 55 60

Gln Asp Arg Val Ala Ile Val Ala Asp Glu Ala Thr Ser Thr Val Tyr
65 70 75 80

Met Glu Val Asn Ser Leu Arg Ser Glu Asp Thr Ala Ile Tyr Phe Cys
85 90 95

Ala Arg Asp Ser Glu Val Glu Lys Ser Asp Gly Tyr Met Ala Ser Thr
100 105 110

Ala Glu Tyr Phe Gln Leu Trp Gly Gln Gly Thr Leu Val Thr Val Ser
115 120 125

Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser
130 135 140

Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp
145 150 155 160

Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr
165 170 175

Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr
180 185 190

Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln
195 200 205

Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp
210 215 220

Lys Lys Val
225

<210> 80

<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 80
Ser Ala Met His Leu Val Glu Ser Gly Gly Ala Val Val Gln Pro Gly
1 5 10 15

Glu Ser Leu Arg Leu Ser Cys Ser Ala Phe Glu Phe Ser Phe Gln Tyr
20 25 30

Phe Ser Met Phe Trp Val Arg Gln Ala Pro Thr Lys Gly Leu Glu Leu
35 40 45

Val Ala Gln Ile Thr Trp Asp Gly Ser Ile Ile Asn Tyr Ala Asp Ser
50 55 60

Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Ser Leu
65 70 75 80

Tyr Leu Gln Met Thr Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr
85 90 95

Cys Val Lys Ala Gly Val Pro Trp Glu Val Gln Arg Trp Phe Asp Pro
100 105 110

Trp Gly Gln Gly Thr Pro Val Thr Val Ser Ser Ala Ser Thr Lys Gly
115 120 125

Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser
130 135 140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145 150 155 160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
165 170 175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
180 185 190

Thr Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val
195 200 205

Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val
210 215 220

<210> 81
<211> 222
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 81
Gln Val His Leu Val Gln Ser Gly Ala Glu Val Lys Arg Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Gly Ser Gly Tyr Thr Leu Asn Asn Asp
20 25 30

Val Ala Phe Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Pro Glu Trp
35 40 45

Leu Gly Trp Ile Asn Ala Tyr Gln Gly Val Thr Asn Ile Ser Pro Asn
50 55 60

Phe Arg Ala Arg Val Thr Met Thr Thr Asp Thr Ser Thr Asn Thr Ile
65 70 75 80

Tyr Met Asp Leu Gln Asn Leu Arg Ser Asp Asp Thr Ala Ile Tyr Tyr
85 90 95

Cys Ala Arg Asp Arg Gln Gly Leu Gly Arg Met Asp Val Trp Gly Gln
100 105 110

Gly Thr Thr Val Ile Val Ser Ser Ala Ser Pro Thr Ser Pro Lys Val
115 120 125

Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val Ile
130 135 140

Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val Thr
145 150 155 160

Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro Ser
165 170 175

Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr Leu
180 185 190

Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val Lys
195 200 205

His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
210 215 220

<210> 82
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 82
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Arg Phe Asn Tyr Tyr
20 25 30

Trp Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Asn Ile Lys Glu Asp Gly Ser Glu Lys Tyr Tyr Val Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65 70 75 80

Leu Glu Met Asn Ser Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Leu Gly Ala Asn Tyr Tyr Phe Ala Tyr Trp Gly Gln Gly
100 105 110

Ala Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
115 120 125

Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
130 135 140

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145 150 155 160

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
165 170 175

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
180 185 190

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
195 200 205

Ser Asn Thr Lys Val Asp Lys Arg Val
210 215

<210> 83
<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody

VH chain

<400> 83
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gln
1 5 10 15

Thr Leu Ser Leu Thr Cys Ile Val Ser Gly Gly Ser Ile Ser Gly Asp
20 25 30

Lys Asn Phe Trp Ser Trp Val Arg Gln His Pro Glu Lys Gly Leu Glu
35 40 45

Trp Leu Gly Tyr Ile Ser Tyr Asn Gly Asn Thr Tyr Tyr Asn Pro Ser
50 55 60

Leu Ile Ser Arg Ile Ile Ile Ser Leu Asp Thr Pro Lys Asn Leu Phe
65 70 75 80

Ser Leu Arg Leu Ser Ser Val Thr Val Ala Asp Thr Ala Ile Tyr Tyr
85 90 95

Cys Ala Arg Glu Val Asp Ile Arg Gly Asp Ser Asp Ala Phe Asp Ile
100 105 110

Trp Gly Arg Gly Thr Val Val Thr Val Ser Ser Ala Ser Thr Lys Gly
115 120 125

Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser
130 135 140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145 150 155 160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
165 170 175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
180 185 190

Thr Val Thr Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val
195 200 205

Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val
210 215 220

<210> 84
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 84
Gln Val Arg Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1   5   10   15

Phe Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asp Tyr
            20   25   30

Glu Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Ile
        35   40   45

Ser His Ile Gly Ser Ser Gly Thr Tyr Ala Asp Ser Val Lys Gly Arg
    50   55   60

Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr Leu Gln Met
65   70   75   80

Ser Ser Leu Arg Ala Glu Asp Ala Gly Val Tyr Tyr Cys Ala Thr Thr
                85   90   95

Arg Asn Ser Ala Phe Leu Asn Trp Gly Gln Gly Thr Leu Val Thr Val
            100   105   110

Ser Ser Gly Ser Ala Ser Ala Pro Thr Leu Phe Pro Leu Val Ser Cys
        115   120   125

Glu Asn Ser Pro Ser Asp Thr Ser Ser Val Ala Val Gly Cys Leu Ala
    130   135   140

Gln Asp Phe Leu Pro Asp Ser Ile Thr Phe Ser Trp Lys Tyr Lys Asn
145   150   155   160

Asn Ser Asp Ile Ser Ser Thr Arg Gly Phe Pro Ser Val Leu Arg Gly
                165   170   175

Gly Lys Tyr Ala Ala Thr Ser Gln Val Leu Leu Pro Ser Lys Asp Val
            180   185   190

Met Gln Gly Thr Asp Glu His Val Val Cys Lys Val Gln His Pro Asn
        195   200   205

Gly Asn Lys Glu Lys Asn Val Pro Leu Pro
    210   215

<210> 85
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 85
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly

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1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Pro Pro Arg Ser Phe
            20                  25                  30

Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ser Ser Ile Ser Gly Leu Gly Asn Ser Ile Tyr Tyr Ala Glu Ser Val
    50                  55                  60

Lys Gly Arg Phe Ile Thr Ser Arg Asp Asn Ser Lys Ser Thr Val Phe
65                  70                  75                  80

Leu Leu Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Lys Ser Ala Phe Gly Gly Val Pro Asp Gly Phe Asp Ile Trp Gly
            100                 105                 110

Gln Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala
    130                 135                 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asp His
        195                 200                 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val
    210                 215

<210> 86
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 86
Pro Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15
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Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Tyr
            20                  25                  30

Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ala Val Ile Ser Asp Asp Gly Asn Asp Lys Asp Asn Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

Leu Arg Met Asn Ser Leu Arg Arg Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Asp Gly Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val
            100                 105                 110

Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser
        115                 120                 125

Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys
    130                 135                 140

Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu
145                 150                 155                 160

Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu
                165                 170                 175

Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr
            180                 185                 190

Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val
        195                 200                 205

Asp Lys Asn Val
    210

<210> 87
<211> 120
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 87
Glu Val Gln Leu Val Glu Ser Gly Gly Val Val Val Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asp Asp Tyr
            20                  25                  30
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Thr Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ser Leu Ile Ser Trp Asp Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Ser Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Thr Glu Asp Thr Ala Leu Tyr Tyr Cys
                85                  90                  95

Ala Lys Ala Gly Tyr Ser Phe Thr Thr Ala Pro Asp Tyr Trp Gly Gln
            100                 105                 110

Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 88
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 88

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Pro Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Asp Thr Phe Pro Asn Tyr
            20                  25                  30

Val Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Val
        35                  40                  45

Gly Cys Ile Asn Thr Asn Asn Gly Lys Thr Asn Tyr Val Gln Lys Leu
    50                  55                  60

Gln Gly Arg Val Ile Leu Thr Thr Asp Thr Ser Thr Asn Thr Ala Asn
65                  70                  75                  80

Met Glu Leu Arg Ser Leu Arg Phe Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Glu Arg Gly Gln Val Arg Ser Tyr Gly Met Asp Val Trp Gly
            100                 105                 110

Gln Gly Thr Ala Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala
```

130 135 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145 150 155 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
165 170 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
180 185 190

Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn Val Asp His
195 200 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
210 215

<210> 89
<211> 228
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 89
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Arg
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asp Asp Tyr
20 25 30

Ala Met His Trp Val Arg Gln Pro Pro Gly Arg Gly Leu Glu Trp Val
35 40 45

Ser Gly Ile Asp Trp Ser Gly Lys Thr Thr Glu Tyr Ala Gln Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Val Glu Asp Thr Ala Leu Tyr Phe Cys
85 90 95

Val Lys Ile Gly Gly Asp Gly Thr Ala Tyr Ala Trp Thr Phe Arg His
100 105 110

Phe Asp Ser Trp Gly Gln Gly Thr Arg Val Thr Val Ser Ser Ala Ser
115 120 125

Pro Thr Ser Pro Lys Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro
130 135 140

Asp Gly Asn Val Val Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln
145 150 155 160

Glu Pro Leu Ser Val Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala
165 170 175

Arg Asn Phe Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr
180 185 190

Ser Ser Gln Leu Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser
195 200 205

Val Thr Cys His Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr
210 215 220

Val Pro Cys Pro
225

<210> 90
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 90
Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
20 25 30

Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Ala Ile Ser Gly Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Gly Leu Gly Gly Asp Trp Asn Tyr Leu Ala Tyr Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
115 120 125

Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Gly Gly Thr Ala Ala
130 135 140

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Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Thr Cys Asn Val Asn His Lys
        195                 200                 205

Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215

<210> 91
<211> 226
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 91
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Tyr
            20                  25                  30

Asp Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Thr Val Val Ser Tyr Asp Gly Thr Asn Lys Tyr Tyr Ala Glu Ser Val
    50                  55                  60

Gln Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Thr Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Lys Glu Gly Gly Trp Gly Asn Thr Val Thr Thr Ser Tyr Tyr Tyr
            100                 105                 110

Tyr Gly Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
        115                 120                 125

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
    130                 135                 140

Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
```

145 150 155 160

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
165 170 175

Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
180 185 190

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
195 200 205

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
210 215 220

Arg Val
225

<210> 92
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 92
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Arg Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Val Gly Ser Gly Phe Thr Phe Ser Pro Tyr
20 25 30

Ser Ile Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Ser Ile Thr Ser Thr Ser Ser Tyr Leu Asp Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Val Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Thr Arg Asp Gly Gly Tyr Phe Ala Thr Gly Glu Phe Asp Tyr Trp Gly
100 105 110

Gln Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
115 120 125

Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
130 135 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145 150 155 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
165 170 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
180 185 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
195 200 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Ala
210 215

<210> 93
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 93
Pro Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gln
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Thr Ser Gly
20 25 30

Ser Tyr Phe Trp Ser Trp Ile Arg Gln Pro Ala Gly Glu Gly Leu Glu
35 40 45

Trp Ile Gly Arg Ile Tyr Thr Ser Gly Ser Thr Asn Tyr Asn Pro Ser
50 55 60

Leu Lys Ser Arg Val Thr Ile Ser Ala Asp Thr Ser Lys Asn His Phe
65 70 75 80

Ser Leu Glu Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Met Tyr Phe
85 90 95

Cys Ala Arg Glu Arg Phe Gly Gln Gly Ala Leu Asp Tyr Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro Lys Val
115 120 125

Phe Pro Leu Ser Leu Asp Ser Thr Pro Gln Asp Gly Asn Val Val Val
130 135 140

Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val Thr
145 150 155 160

Trp Ser Glu Ser Gly Gln Asn Val Thr Ala Arg Asn Phe Pro Pro Ser
165 170 175

Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr Leu
180 185 190

Pro Ala Thr Gln Cys Pro Asp Gly Lys Ser Val Thr Cys His Val Lys
195 200 205

His Tyr Thr Asn Ser Ser Gln Asp Val Thr Val Pro Cys Pro
210 215 220

<210> 94
<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 94
Gln Leu His Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Val Ser Ser Ser
20 25 30

Ser Tyr Tyr Trp Gly Trp Val Arg Gln Pro Pro Gly Lys Gly Leu Glu
35 40 45

Trp Ile Gly His Val Tyr Tyr Ser Gly Arg Thr Tyr Tyr Asn Pro Ser
50 55 60

Leu Lys Ser Arg Ala Thr Ile Ser Leu Asp Thr Ser Lys Asn Gln Phe
65 70 75 80

Ser Leu Lys Leu Ser Ser Leu Thr Ala Thr Asp Thr Ala Val Tyr Tyr
85 90 95

Cys Ala Thr Ile Val Ala Ala Tyr Ser Tyr Gly Phe Glu Phe Asp Pro
100 105 110

Trp Gly Gln Gly Ile Leu Val Ile Val Ser Ser Ala Ser Thr Lys Gly
115 120 125

Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
130 135 140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145 150 155 160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe

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                165                 170                 175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Ala
    210                 215                 220

<210> 95
<211> 226
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 95
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Tyr
            20                  25                  30

Asp Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Thr Val Val Ser Tyr Asp Gly Thr Asn Lys Tyr Tyr Ala Glu Ser Val
    50                  55                  60

Gln Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Thr Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Lys Glu Gly Gly Trp Gly Asn Thr Val Thr Thr Ser Tyr Tyr Tyr
            100                 105                 110

Tyr Gly Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
        115                 120                 125

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
    130                 135                 140

Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
145                 150                 155                 160

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
                165                 170                 175
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Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
180 185 190

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
195 200 205

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
210 215 220

Arg Val
225

<210> 96
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 96
Val Gln Leu Val Gln Ser Gly Ala Glu Val Arg Lys Pro Gly Glu Ser
1 5 10 15

Leu Thr Ile Ser Cys Lys Thr Ser Gly Tyr Ala Phe Ile Gly Asn Trp
20 25 30

Ile Gly Trp Val Arg Gln Arg Pro Gly Lys Gly Leu Glu Trp Ile Gly
35 40 45

Met Ile Tyr Pro Val Asp Ser Asp Thr Arg Tyr Ser Pro Ser Phe Gln
50 55 60

Gly Gln Val Thr Ile Ser Val Asp Lys Ser Ile Arg Thr Ala Tyr Leu
65 70 75 80

Gln Trp Asn Ser Leu Arg Ala Ser Asp Thr Ala Thr Tyr Tyr Cys Ala
85 90 95

Arg Gln Gly Phe Glu Ala Leu Val Ile Arg Gly Phe Asp Tyr Trp Gly
100 105 110

Gln Gly Thr Val Val Thr Val Ser Ser
115 120

<210> 97
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 97
Glu Gly Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1   5   10   15

Ser Leu Arg Leu Ser Cys Glu Ala Ser Gly Phe Thr Phe Ser Phe Ser
            20   25   30

Ser Tyr Ala Met Ser Trp Val Arg Gln Ala Pro Gly Arg Gly Leu Glu
        35   40   45

Trp Val Ser Val Thr Gly Gly Ser Gly Tyr Thr Lys Tyr Tyr Ala Asp
    50   55   60

Ser Val Lys Gly Arg Phe Thr Val Ser Arg Asp Asn Ser Lys Asn Thr
65   70   75   80

Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Leu Tyr
                85   90   95

Tyr Cys Ala Arg Arg Ser Thr Ser Ser Pro Ser Phe Ser Thr Leu Asp
            100   105   110

Val Trp Gly Arg Gly Ala Thr Val Ile Val Ser Ser Ala Ser Thr Lys
        115   120   125

Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
    130   135   140

Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145   150   155   160

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
                165   170   175

Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
            180   185   190

Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
        195   200   205

Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210   215   220

<210> 98
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 98

```
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asn Asn Tyr
            20                  25                  30

Glu Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ser Tyr Ile Ser Ser Ser Gly Ser Thr Ile Tyr Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Gln Met Val Thr Thr Arg Gly Tyr Trp Gly Gln Gly Thr Leu
            100                 105                 110

Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu
        115                 120                 125

Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys
    130                 135                 140

Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
145                 150                 155                 160

Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser
                165                 170                 175

Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser
            180                 185                 190

Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn
        195                 200                 205

Thr Lys Val Asp Lys Asn Val
    210                 215
```

<210> 99
<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 99

```
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15
```

```
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Asn
            20                  25                  30

Trp Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ala Asn Ile Lys Glu Asp Gly Ser Glu Lys Tyr Tyr Val Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Phe Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Val Pro Ser Arg Tyr Gly Arg Ser Arg Gly Ala Phe Asp Ile
            100                 105                 110

Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125

Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
    130                 135                 140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165                 170                 175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220

<210> 100
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 100
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gln
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Gly
```

```
            20                  25                  30

Gly Tyr Tyr Trp Ser Trp Ile Arg Gln His Pro Gly Lys Gly Leu Glu
        35                  40                  45

Trp Ile Gly Tyr Ile Tyr Tyr Ser Gly Ser Thr Tyr Tyr Asn Pro Ser
    50                  55                  60

Leu Lys Ser Leu Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95

Cys Ala Arg Asn Leu Tyr Arg Leu Gly Trp Phe Asp Pro Trp Gly Gln
            100                 105                 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215

<210> 101
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 101
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30
```

```
Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ala Ile Ile Ser Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Lys Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Lys Ser Lys Gly Asn Tyr Arg Asp Ala Met Asp Val Trp Gly Gln
            100                 105                 110

Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215

<210> 102
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 102
Gln Val Leu Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asp Tyr
            20                  25                  30

Tyr Met Ser Trp Ile Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45
```

```
Ser Tyr Ile Gly Ser Ser Thr Thr Ala Ile Tyr Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Arg Asn Ser Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Thr Ser Tyr Thr Val Thr Thr Phe Tyr Gly Met Asp Val Trp Gly
            100                 105                 110

Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215

<210> 103
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 103
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gln
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Ala Val Ser Gly Gly Ser Ile Ser Ser Gly
            20                  25                  30

Gly Tyr Pro Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu
        35                  40                  45

Trp Ile Gly Tyr Ile Ser Tyr Ser Gly Ser Thr Asp Tyr Asn Pro Ser
```

```
    50                  55                  60

Leu Lys Ser Arg Val Thr Ile Ser Leu Asp Thr Ser Ser Asn Gln Phe
65                  70                  75                  80

Ser Leu Asn Leu Ser Ser Leu Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95

Cys Ala Arg Gly Ala Ala Phe Tyr Tyr Gly Met Asp Val Trp Gly Gln
            100                 105                 110

Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215

<210> 104
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 104
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ile Tyr
            20                  25                  30

Tyr Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Ile
        35                  40                  45

Gly Tyr Ile Tyr Tyr Ser Gly Ser Thr Asn Tyr Asn Pro Ser Leu Lys
    50                  55                  60
```

```
Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe Ser Leu
65                  70                  75                  80

Lys Leu Arg Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala
                85                  90                  95

Arg Asp Thr Tyr Gly Asp Pro Arg Gly Asp Tyr Phe Asp Tyr Trp Gly
            100                 105                 110

Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215
```

<210> 105
<211> 123
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 105

```
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Thr Val Ala Asn Ser Ser Ile Ser Ser Tyr
            20                  25                  30

Tyr Trp Ser Trp Val Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Ile
        35                  40                  45

Gly Tyr Ile Ser Tyr Ser Gly Ser Thr Asn Tyr Asn Pro Ser Leu Lys
    50                  55                  60

Ser Arg Val Thr Met Ser Leu Asp Thr Pro Lys Ser Gln Phe Ser Leu
65                  70                  75                  80
```

```
Asn Leu Ser Ser Val Thr Gly Ala Asp Thr Ala Ile Tyr Tyr Cys Ala
                85                  90                  95

Arg Leu Trp Gly Ser Gly Asp Trp Trp Pro Ser Leu Tyr Phe Asp Ser
            100                 105                 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 106
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 106

```
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asn Ser Tyr
            20                  25                  30

Trp Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ala Asn Ile Lys Gln Asp Gly Ser Glu Lys Tyr Tyr Val Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Ile Arg Arg Ile Ala Ala Thr Ser Phe Asp Tyr Trp Gly Gln
            100                 105                 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
```

```
            180                 185                 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

Pro Ser Asn Thr Lys Val Asp Lys Asn Val
    210                 215
```

<210> 107
<211> 225
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 107

```
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Arg
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asp Asp Tyr
            20                  25                  30

Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ser Gly Ile Ser Trp Asn Ser Gly Ser Ile Gly Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Leu Tyr Tyr Cys
                85                  90                  95

Ala Lys Ile Ala Arg Arg Pro Pro Ser Phe Tyr Asp Tyr Met Asp Val
            100                 105                 110

Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser Ala Ser Pro Thr Ser
        115                 120                 125

Pro Lys Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn
    130                 135                 140

Val Val Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu
145                 150                 155                 160

Ser Val Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe
                165                 170                 175

Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln
            180                 185                 190
```

Leu Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys
195 200 205

His Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys
210 215 220

Pro
225

<210> 108
<211> 225
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 108
Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1 5 10 15

Ser Leu Lys Ile Ser Cys Gln Gly Ser Gly Tyr Arg Phe Asn Ala Tyr
20 25 30

Trp Ile Gly Trp Val Arg Gln Ile Pro Gly Lys Gly Leu Glu Trp Met
35 40 45

Gly Ile Ile Tyr Pro Gly Asp Ser Asp Thr Lys Tyr Ser Pro Ser Phe
50 55 60

Gln Gly Gln Val Thr Ile Ser Ala Asp Lys Ser Ile Ser Thr Ala Tyr
65 70 75 80

Leu Gln Trp Asn Gly Leu Glu Ala Ser Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Ser Thr Ser Ser Ser Thr Ser Asp Phe His Tyr Met Asp Val
100 105 110

Trp Gly Lys Gly Thr Thr Val Thr Ile Ser Ser Ala Ser Pro Thr Ser
115 120 125

Pro Lys Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn
130 135 140

Val Val Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu
145 150 155 160

Ser Val Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe
165 170 175

Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln
180 185 190

Leu Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys
195 200 205

His Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys
210 215 220

Pro
225

<210> 109
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 109
His Val Gln Leu Leu Gln Ser Gly Pro Gly Leu Val Lys Pro Ser Gln
1 5 10 15

Thr Leu Ser Leu Thr Cys Ala Ile Ser Gly Asp Ser Val Ser Ser Thr
20 25 30

Ser Gly Ala Trp Asn Trp Ile Arg Gln Ser Pro Ser Arg Gly Leu Glu
35 40 45

Trp Leu Gly Arg Thr Tyr Tyr Arg Ser Gln Trp Met Asn Asp Tyr Ala
50 55 60

Glu Ser Val Arg Ser Arg Ile Thr Ile Asn Pro Asp Thr Ser Lys Asn
65 70 75 80

Gln Phe Ser Leu Gln Leu Lys Ser Val Thr Pro Glu Asp Thr Ala Val
85 90 95

Tyr Tyr Cys Thr Arg Gly Trp Ala Phe Thr Ser Ser Asp Trp Gly Gln
100 105 110

Gly Thr Gln Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
115 120 125

Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala
130 135 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145 150 155 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
165 170 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro

180 185 190

Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His Lys
195 200 205

Pro Ser Asn Thr Lys Val Asp Lys Thr Val
210 215

<210> 110
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 110
His Val His Leu Gln Gln Ser Gly Pro Gly Leu Val Thr Pro Ser Gln
1 5 10 15

Thr Leu Ser Leu Thr Cys Ala Ile Ser Gly Asp Ser Val Ser Ser Asn
20 25 30

Ser Ala Ala Trp Asn Trp Ile Arg Gln Ser Pro Ser Arg Gly Leu Glu
35 40 45

Trp Leu Gly Arg Thr Tyr Tyr Arg Ser Lys Trp Tyr Asn Asp Tyr Ala
50 55 60

Val Ser Val Lys Ser Arg Ile Thr Phe Lys Ala Asp Thr Ser Lys Asn
65 70 75 80

Gln Phe Ser Leu Gln Leu Asp Ser Val Thr Pro Asp Asp Thr Ala Val
85 90 95

Tyr Tyr Cys Ala Gly Gly Trp Ala Leu Gly Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser Gly Ser Ala Ser Ala Pro Thr Leu Phe Pro
115 120 125

Leu Val Ser Cys Glu Asn Ser Pro Ser Asp Thr Ser Ser Val Ala Val
130 135 140

Gly Cys Leu Ala Gln Asp Phe Leu Pro Asp Ser Ile Thr Phe Ser Trp
145 150 155 160

Lys Tyr Lys Asn Asn Ser Asp Ile Ser Ser Thr Arg Gly Phe Pro Ser
165 170 175

Val Leu Arg Gly Gly Lys Tyr Ala Ala Thr Ser Gln Val Leu Leu Pro
180 185 190

Ser Lys Glu Val Met Gln Gly Thr Asp Glu His Val Val Cys Lys Val
195 200 205

Gln His Pro Asn Gly Asn Lys Glu Lys Asn Val Pro Leu Pro
210 215 220

<210> 111
<211> 116
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 111
Pro Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Tyr
20 25 30

Tyr Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Ile
35 40 45

Gly Tyr Leu Phe Tyr Ser Gly Ser Thr Asn Tyr Asn Pro Ser Leu Lys
50 55 60

Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe Ser Leu
65 70 75 80

Lys Leu Gly Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala
85 90 95

Arg His Arg Ile Phe Gly Leu Asp Val Trp Gly Gln Gly Thr Thr Val
100 105 110

Thr Val Ser Ser
115

<210> 112
<211> 230
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 112
Cys Ala Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro
1 5 10 15

Gly Glu Ser Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Thr

```
            20                  25                  30

Ser Tyr Trp Ile Gly Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu
        35                  40                  45

Trp Met Gly Ile Ile Tyr Pro Gly Asp Ser Asp Thr Arg Tyr Ser Pro
    50                  55                  60

Ser Phe Gln Gly Gln Val Thr Ile Ser Ala Asp Lys Ser Ile Ser Thr
65                  70                  75                  80

Ala Tyr Leu Gln Trp Ser Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr
                85                  90                  95

Tyr Cys Ala Arg Arg Gly Pro Thr Asp Thr Trp Ser Gly Glu Val Gly
            100                 105                 110

Tyr Tyr Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125

Ala Ser Pro Thr Ser Pro Lys Val Phe Pro Leu Ser Leu Cys Ser Thr
    130                 135                 140

Gln Pro Asp Gly Asn Val Val Ile Ala Cys Leu Val Gln Gly Phe Phe
145                 150                 155                 160

Pro Gln Glu Pro Leu Ser Val Thr Trp Ser Glu Ser Gly Gln Gly Val
                165                 170                 175

Thr Ala Arg Asn Phe Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr
            180                 185                 190

Thr Thr Ser Ser Gln Leu Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly
        195                 200                 205

Lys Ser Val Thr Cys His Val Lys His Tyr Thr Asn Pro Ser Gln Asp
    210                 215                 220

Val Thr Val Pro Cys Pro
225                 230

<210> 113
<211> 223
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 113
Gln Cys Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro
1               5                   10                  15
```

```
Gly Arg Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser
            20                  25                  30

Ser Tyr Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu
        35                  40                  45

Trp Val Ala Val Ile Trp Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp
    50                  55                  60

Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr
65                  70                  75                  80

Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr
                85                  90                  95

Tyr Cys Ala Arg Asp Gly Lys Thr Leu Gly Tyr Gly Gly Asn Ser Val
            100                 105                 110

Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr
        115                 120                 125

Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
    130                 135                 140

Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145                 150                 155                 160

Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
                165                 170                 175

Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
            180                 185                 190

Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
        195                 200                 205

Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220

<210> 114
<211> 224
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 114
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Val Ser Gly Phe Thr Phe Arg Ser Tyr
            20                  25                  30
```

```
Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ser Ser Ile Ser Ser Ser Ser Arg Tyr Val Asp Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Leu Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Phe Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Thr Glu Thr Lys Trp Glu Asp Arg Gly Leu Trp Asp Tyr Trp
            100                 105                 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro
        115                 120                 125

Lys Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val
    130                 135                 140

Val Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser
145                 150                 155                 160

Val Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro
                165                 170                 175

Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu
            180                 185                 190

Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His
        195                 200                 205

Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
    210                 215                 220

<210> 115
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 115
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1               5                   10                  15

Ser Val Lys Val Ser Cys Lys Thr Ser Gly Gly Thr Phe Ser Ser Tyr
            20                  25                  30

Thr Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Pro Glu Trp Met
```

```
        35                  40                  45

Gly Arg Ile Ile Pro Ile Leu Asn Ile Thr Asn Tyr Ala Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser Thr Thr Tyr
65                  70                  75                  80

Met Glu Met Gly Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Phe Cys
                85                  90                  95

Ala Arg Ser Phe Tyr Gly Ser Gly Leu Gln Trp Gly Gln Gly Thr Leu
            100                 105                 110

Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu
        115                 120                 125

Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys
    130                 135                 140

Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
145                 150                 155                 160

Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser
                165                 170                 175

Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser
            180                 185                 190

Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn
        195                 200                 205

Thr Lys Val Asp Lys Arg Val
    210                 215

<210> 116
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 116
Gly Val Asp Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Ser Phe Ser Arg Tyr
            20                  25                  30

Asn Ile Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45
```

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Ser Ser Ile Ser Ser Thr Ser Asn Tyr Ile Tyr Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Ala Met Gly Gly Tyr Thr Tyr Tyr Leu Asp Asp Trp Gly Gln
            100                 105                 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215

<210> 117
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 117
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Thr Asn Tyr
            20                  25                  30

Ala Ile His Trp Val Arg Gln Ala Pro Asp Lys Gly Leu Glu Trp Val
        35                  40                  45

Ser Val Ile Ser Tyr Asp Gly Ser Asp Glu Tyr Tyr Ala Asp Ser Val
    50                  55                  60
```

```
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Val Tyr
65                  70                  75                  80

Leu Gln Met Ser Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Arg Cys
                85                  90                  95

Ala Arg Ala Gly Lys Asp Gly Tyr Asn Phe Phe Tyr Tyr Gly Met Asp
            100                 105                 110

Val Trp Gly Gln Gly Thr Thr Val Ser Val Ser Ser Pro Ser Thr Lys
        115                 120                 125

Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
    130                 135                 140

Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145                 150                 155                 160

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
                165                 170                 175

Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
            180                 185                 190

Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
        195                 200                 205

Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Leu
    210                 215                 220

<210> 118
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 118
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Ser Phe Ser Ser Phe
            20                  25                  30

Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ala Val Ile Trp His Asp Gly Ser His Lys Ser His Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Val Tyr
```

65 70 75 80

Leu Gln Met Asn Ser Leu Gly Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Gly Ile Met Thr Thr Ala Ile Ser Tyr Tyr Phe Asp Tyr Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
115 120 125

Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
130 135 140

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145 150 155 160

Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
165 170 175

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
180 185 190

Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
195 200 205

His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
210 215 220

<210> 119
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 119
Glu Val Gln Leu Leu Gln Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
20 25 30

Ala Val Thr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Thr Ile Ser Gly Asp Gly Arg Ser Thr Tyr Phe Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Ala Ile Tyr Arg Asp Asn Ser Lys Asn Thr Leu Ser
65 70 75 80

Leu Leu Leu Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Lys Gly Glu Arg Asp Leu Thr Asp Tyr Gly Asp Pro Glu Tyr Phe
100 105 110

Gln His Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120 125

<210> 120
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 120
Gln Val Gln Val Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 5 10 15

Ser Leu Arg Leu Ser Cys Val Ala Ser Gly Phe Thr Phe Ser Ser His
20 25 30

Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Val Ile Ser Asp Asp Gly Lys Asn Lys Tyr Tyr Gly Asp Ser Val
50 55 60

Gln Gly Arg Phe Val Ile Ser Arg Asp Asn Ser Lys Asn Thr Ile Tyr
65 70 75 80

Leu Gln Met Tyr Asp Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Lys Asp Leu Arg Tyr Cys Ser Ala Arg Ser Ser Cys Phe Gly Ile
100 105 110

Asp Phe Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120 125

<210> 121
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 121
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly

1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Ser Phe Ser Thr Tyr
20 25 30

Trp Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Asn Ile Lys Gln Asp Gly Ser Glu Lys His Tyr Val Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Met Tyr Tyr Cys
85 90 95

Ala Arg Arg Ala Tyr Ser Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
100 105 110

Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala
115 120 125

Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu
130 135 140

Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly
145 150 155 160

Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser
165 170 175

Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu
180 185 190

Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr
195 200 205

Lys Val Asp Lys Ser Glu
210

<210> 122
<211> 223
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 122
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

```
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asn Asn Tyr
            20                  25                  30

Trp Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Val Trp Val
        35                  40                  45

Ser Arg Ile Ser Ser Asp Gly Ser Thr Thr Ala Ser Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Leu Phe
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Glu Gly Ala Pro Asp Asp Tyr Gly Asp Ser Gly Thr Ala Phe
            100                 105                 110

Asp Ile Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr
        115                 120                 125

Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
    130                 135                 140

Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145                 150                 155                 160

Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
                165                 170                 175

Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
            180                 185                 190

Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
        195                 200                 205

Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220

<210> 123
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 123
Glu Val His Leu Val Gln Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser His Gly
            20                  25                  30
```

```
Trp Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ala Arg Ile Arg Ser Lys Thr Asp Gly Gly Thr Thr Asp Tyr Ala Ala
    50                  55                  60

Pro Val Asn Gly Arg Phe Thr Ile Ser Arg Asp Ile Ser Ile Glu Thr
65                  70                  75                  80

Leu Tyr Leu Gln Met Asp Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr
                85                  90                  95

Tyr Cys Thr Thr Asp His Pro Tyr Gly Asp Tyr Ser Asp Asn Trp Gly
            100                 105                 110

Gln Gly Val Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215
```

<210> 124
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 124

```
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Arg Asn Asp
            20                  25                  30

Tyr Trp Ser Trp Ile Arg Gln Ser Pro Gly Lys Gly Leu Glu Trp Ile
```

```
        35                  40                  45

Gly Tyr Ile Ser Asp Ile Gly Asp Thr Asn Tyr Asn Pro Ser Phe Lys
    50                  55                  60

Ser Arg Ile Ser Ile Ser Leu Asp Thr Ser Lys Asn Gln Phe Ser Leu
65                  70                  75                  80

Lys Leu Asn Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala
                85                  90                  95

Lys Glu Leu Leu Gly Gly Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
            100                 105                 110

Ala Val Ser Thr Ala Ser Pro Thr Ser Pro Lys Val Phe Pro Leu Ser
        115                 120                 125

Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val Ile Ala Cys Leu Val
    130                 135                 140

Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val Thr Trp Ser Glu Ser
145                 150                 155                 160

Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro Ser Gln Asp Ala Ser
                165                 170                 175

Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr Leu Pro Ala Thr Gln
            180                 185                 190

Cys Leu Ala Gly Lys Ser Val Thr Cys His Val Lys His Tyr Thr Asn
        195                 200                 205

Pro Ser Gln Asp Val Thr Val Pro Cys Pro
    210                 215

<210> 125
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 125
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1               5                   10                  15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Thr Phe Ser Ser Tyr
            20                  25                  30

Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45
```

```
Gly Gly Ile Ile Pro Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Val Phe Gly Ser Ala Ala Gly Ala Phe Asp Ile Trp Gly Gln
            100                 105                 110

Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215

<210> 126
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 126
Pro Leu Gln Leu His Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Ser Val Ser Gly Gly Ser Ile Ser Ser Ser
            20                  25                  30

Asn Tyr Phe Trp Gly Trp Ile Arg Gln Ser Pro Gly Met Gly Leu Glu
        35                  40                  45

Trp Ile Gly Ser Ile Tyr Phe Ser Gly Lys Thr His Tyr Asn Pro Ser
    50                  55                  60
```

```
Leu Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn His Phe
65                  70                  75                  80

Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Phe Phe
                85                  90                  95

Cys Ala Arg His Asp Trp Arg Leu Tyr Ala Phe Asp Tyr Trp Gly Leu
            100                 105                 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215

<210> 127
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 127
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Gly Ser Gly Phe Thr Phe Ser Asp Tyr
            20                  25                  30

Trp Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Val Trp Val
        35                  40                  45

Ser Thr Ile Asn Arg Asp Gly Ser Tyr Thr Asn His Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Arg Ser Thr Leu Phe
```

65 70 75 80

Leu Gln Met Ser Ser Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Gly Gly Glu Thr Ser Pro Asp Tyr Trp Gly Gln Gly Thr Leu Val
100 105 110

Thr Val Ser Ser Gly Ser Ala Ser Ala Pro Thr Leu Phe Pro Leu Val
115 120 125

Ser Cys Glu Asn Ser Pro Ser Asp Thr Ser Ser Val Ala Val Gly Cys
130 135 140

Leu Ala Gln Asp Phe Leu Pro Asp Ser Ile Thr Phe Ser Trp Lys Tyr
145 150 155 160

Lys Asn Asn Ser Asp Ile Ser Ser Thr Arg Gly Phe Pro Ser Val Leu
165 170 175

Arg Gly Gly Lys Tyr Ala Ala Thr Ser Gln Val Leu Leu Pro Ser Lys
180 185 190

Asp Val Met Gln Gly Thr Asp Glu His Val Val Cys Lys Val Gln His
195 200 205

Pro Asn Gly Asn Lys Glu Lys Asn Val Pro Leu Pro
210 215 220

<210> 128
<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 128
Gln Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Asp Val Ser Ile Ile Ser Ser
20 25 30

Phe Tyr Tyr Trp Gly Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu
35 40 45

Trp Ile Gly Ser Val Tyr Tyr Ser Gly Ser Thr Ser Tyr Asn Pro Ser
50 55 60

Leu Lys Ser Arg Val Thr Ile Ser Ala Asp Thr Ser Lys Ala His Phe
65 70 75 80

```
Ser Leu Asn Leu Arg Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95

Cys Val Ser Arg Gly Pro Leu Gly Gly Ala Ala Ala Gly Pro Asp Tyr
            100                 105                 110

Trp Gly Gln Gly Ala Leu Val Ile Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125

Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
    130                 135                 140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165                 170                 175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220
```

<210> 129
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 129

```
Gln Val Arg Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gln
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Ala Ser Val Ser Ser Gly
            20                  25                  30

Ser Tyr Tyr Trp Ala Trp Val Arg Gln Ser Ala Ala Lys Gly Leu Glu
        35                  40                  45

Trp Ile Gly Arg Val Ser Pro Ser Gly Thr Asn Asn Tyr Asn Thr Ala
    50                  55                  60

Leu Lys Ser Arg Val Thr Ile Ser Leu Asp Thr Ala Arg Asn Gln Phe
65                  70                  75                  80

Ser Leu Thr Val Thr Ser Val Thr Ala Glu Asp Thr Ala Ile Tyr Tyr
                85                  90                  95
```

Cys Ala Arg Asp Val Arg Gly Trp Phe Val Pro Trp Gly Gln Gly Ser
100 105 110

Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
115 120 125

Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
130 135 140

Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145 150 155 160

Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
165 170 175

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
180 185 190

Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
195 200 205

Asn Thr Lys Val Asp Lys Ser Glu
210 215

<210> 130
<211> 224
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 130
Pro Val Gln Leu Val Gln Ser Gly Ala Val Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Thr Phe Ser Gly Tyr
20 25 30

Gly Ile Asn Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Arg Ile Ile Pro Ile Val Gly Glu Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Asn Ala Asp Lys Ser Thr Ser Thr Ala Thr
65 70 75 80

Leu Glu Val Arg Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Val Arg Asp Arg Asn Ile Val Ser Val Pro Gly Ala Ile Pro Tyr Gly

```
            100                 105                 110

Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser
        115                 120                 125

Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr
    130                 135                 140

Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145                 150                 155                 160

Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
                165                 170                 175

His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
            180                 185                 190

Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Thr
        195                 200                 205

Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220

<210> 131
<211> 116
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 131
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

Trp Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Val Trp Val
        35                  40                  45

Ser Arg Ile Asn Ser Asp Gly Ser Ser Thr Ser Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Gly Ser Asp Thr Leu Asp Tyr Trp Gly Gln Gly Thr Leu Val
            100                 105                 110
```

Thr Val Ser Ser
        115

<210> 132
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 132
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Leu Lys Pro Ser Gln
1   5   10   15

Thr Leu Ser Leu Ser Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Gly
            20   25   30

Asp Tyr Tyr Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu
        35   40   45

Trp Ile Gly Tyr Ile Tyr Tyr Asn Gly Ser Thr Tyr Tyr Ser Ser Ser
    50   55   60

Leu Arg Ser Arg Leu Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe
65   70   75   80

Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Ala Tyr Tyr
                85   90   95

Cys Ala Arg Val Gly Leu Thr Phe Ala Leu Phe Asp Pro Trp Gly Gln
            100   105   110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115   120   125

Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala
    130   135   140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145   150   155   160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165   170   175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180   185   190

Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn Val Asp His Lys
        195   200   205

Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210   215

<210> 133
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 133
Val Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
20 25 30

Ala Ile Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Ala Ile Ser Gly Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Asn Ser Ala Gly Ile Gln Leu Trp Ser Ser Asp Asn Trp Phe Asp
100 105 110

Pro Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys
115 120 125

Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
130 135 140

Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145 150 155 160

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
165 170 175

Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
180 185 190

Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
195 200 205

Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
210 215 220

<210> 134

<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 134
Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
20 25 30

Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Ala Ile Ser Ala Ser Gly Arg Thr Thr Tyr Tyr Ala Asp Ser Phe
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65 70 75 80

Leu Gln Met Ser Arg Leu Arg Gly Asp Asp Ala Ala Val Tyr Tyr Cys
85 90 95

Ala Lys Glu Gly Ile Glu Leu Met Ile Leu Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser Ser Thr Ser Pro Thr Ser Pro Lys Val Phe Pro Leu
115 120 125

Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val Ile Ala Cys Leu
130 135 140

Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val Thr Trp Ser Glu
145 150 155 160

Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro Ser Gln Asp Ala
165 170 175

Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr Leu Pro Ala Thr
180 185 190

Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val Lys His Tyr Thr
195 200 205

Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
210 215

<210> 135
<211> 223
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 135
Val Val Gln Leu Val Glu Ser Gly Gly Ala Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Leu Ser Ser Tyr
20 25 30

Ala Met Tyr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Tyr Val
35 40 45

Ser Ala Ile Thr Ala Asn Gly Gly Ser Thr Tyr Tyr Ala Asn Ser Val
50 55 60

Lys Gly Arg Phe Thr Val Ser Arg Asp Asn Ser Lys Lys Thr Val Tyr
65 70 75 80

Leu Gln Leu Gly Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Gly Ile Thr Leu Thr Arg Gly Val Ser Phe Asp Tyr Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Pro Ala Ser Pro Thr Ser Pro Lys
115 120 125

Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val
130 135 140

Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val
145 150 155 160

Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro
165 170 175

Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr
180 185 190

Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val
195 200 205

Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
210 215 220

<210> 136
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 136
Pro Leu Gln Leu Gln Glu Ser Gly Ser Gly Leu Val Lys Pro Ser Gln
1 5 10 15

Thr Leu Ser Leu Thr Cys Ala Val Ser Gly Gly Ser Ile Ser Ser Gly
20 25 30

Gly Tyr Ser Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu
35 40 45

Trp Leu Gly Tyr Ile Tyr His Arg Gly Thr Ser Tyr Tyr Asn Pro Ser
50 55 60

Leu Lys Ser Arg Val Thr Ile Ser Leu Asp Met Ser Lys Asn Gln Leu
65 70 75 80

Ser Leu Lys Leu Thr Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
85 90 95

Cys Ala Arg Asp Gly Gly Ala Phe Asp Ile Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser Ser
115

<210> 137
<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 137
Gln Val His Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Ser
20 25 30

Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Asp Trp Val
35 40 45

Ser Val Ile Ser Phe Asp Gly Ser Asn Gln Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Phe
65 70 75 80

```
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Asp Arg Leu Phe Thr Ala Ile Asn Ser Gly Tyr Phe Asp Tyr
            100                 105                 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125

Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
    130                 135                 140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165                 170                 175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215                 220
```

<210> 138
<211> 118
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 138

```
Gln Val Gln Leu Val Gln Pro Gly Gly Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser His
            20                  25                  30

Tyr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

Gly Met Ile Asp Pro Ser Gly Gly Ser Arg Thr Tyr Ala Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Met Thr Arg Asp Thr Ser Thr Ser Thr Val Tyr
65                  70                  75                  80

Met Glu Leu Ser Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
```

Ala Arg Glu Gly Ser Tyr Tyr Gly Ile Gly Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 139
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 139
Glu Val Gln Leu Val Glu Ser Gly Gly Val Val Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ala Tyr
20 25 30

Trp Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Val Trp Val
35 40 45

Ser Arg Ile Asn Thr Asp Gly Ser Ser Thr Ser Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Thr Asp Ser Gly Trp Leu Asp Ser Phe Asp Tyr Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 140
<211> 128
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 140
Gln Gly Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Ala Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Val Ser Gly Tyr Ser Leu Thr Glu Ile
            20   25   30

Ser Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35   40   45

Gly Gly Phe Asp Pro Glu Gly Gly Glu Thr Ile Tyr Ala Gln Lys Phe
    50   55   60

Gln Gly Arg Val Ser Met Thr Trp Asp Thr Ser Ile Asp Leu Ala Tyr
65   70   75   80

Met Glu Leu Arg Ser Leu Ser Ser Asp Asp Thr Ala Leu Tyr Tyr Cys
                85   90   95

Ala Thr Asp Gln Gly Cys Asp Asp Gly Ser Cys Tyr Val Gly His Tyr
            100   105   110

Tyr Gly Met Asp Val Trp Gly Gln Gly Thr Lys Val Thr Val Ser Ser
        115   120   125

<210> 141
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 141
Pro Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1   5   10   15

Thr Leu Ser Leu Thr Cys Ser Val Ser Gly Gly Ser Ile Arg Ser Ser
            20   25   30

Ala Pro Phe Trp Gly Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu
        35   40   45

Trp Ile Gly Asn Ile Tyr Tyr Asn Gly Asp Thr Ser Tyr Ser Pro Ser
    50   55   60

Leu Glu Asn Arg Val Thr Leu Phe Val Asp Thr Ser Lys Asn Gln Phe
65   70   75   80

Ser Leu Asn Leu Thr Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85   90   95

Cys Gly Arg Ile Met Thr Pro Ser Ile Asp Leu Trp Gly Gln Gly Lys
            100   105   110

Leu Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro Lys Val Phe Pro
        115   120   125

```
Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
    130                 135                 140

Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160

Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
        195                 200                 205

Asn Thr Lys Val Asp Lys Asn Glu
    210                 215

<210> 142
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 142
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Ile Phe Thr Thr Tyr
            20                  25                  30

Val Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

Gly Trp Ile Ser Ala Tyr Thr Gly Asn Thr Asn Tyr Pro Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Met Thr Thr Asp Thr Ala Thr Ser Thr Ala Tyr
65                  70                  75                  80

Met Glu Leu Lys Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Glu Gly Arg Gly Gly Gly Asp Phe Phe Asp Tyr Trp Gly Gln
            100                 105                 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
```

```
    130                 135                 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

Pro Ser Asn Thr Lys Val Asp Lys Asn Val
    210                 215

<210> 143
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 143
Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Arg Ser
1               5                   10                  15

Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asp Asp Tyr Ala
            20                  25                  30

Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ser
        35                  40                  45

Gly Ile Ile Trp Asn Ser Gly Thr Thr Gly Tyr Ala Asp Ser Val Lys
    50                  55                  60

Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Lys Ser Leu Tyr Leu
65                  70                  75                  80

Gln Met Asn Ser Leu Arg Thr Glu Asp Thr Ala Leu Tyr Tyr Cys Ala
                85                  90                  95

Lys Asp Gly Asp Ser Leu Gly Asp Phe Ser Thr Phe Asp Ile Trp Gly
            100                 105                 110

His Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140
```

```
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Asn Val
    210                 215
```

<210> 144
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 144

```
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Thr Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ser Ala Ser Gly Phe Thr Phe Asn Asn Tyr
            20                  25                  30

Trp Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Leu Trp Leu
        35                  40                  45

Ser Arg Ile Asn Thr Asp Gly Ser Arg Gly His Tyr Asp Asp Ser Val
    50                  55                  60

Gln Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Gln Thr Val Tyr
65                  70                  75                  80

Leu Gln Met Asp Gly Leu Arg Ala Glu Asp Thr Ala Val Tyr Phe Cys
                85                  90                  95

Ala Arg Asp Gly Tyr Asp Phe Arg Ala Phe Asp His Trp Gly Gln Gly
            100                 105                 110

Val Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125

Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160
```

```
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205

Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215

<210> 145
<211> 224
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 145
Gln Val Gln Leu Leu Glu Ser Gly Pro Gly Val Val Lys Pro Ser Glu
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Ser Val Ser Gly Asp Ser Val Ser Ser Phe
            20                  25                  30

Tyr Trp Thr Trp Ile Arg Gln Pro Pro Gly Lys Gly Pro Glu Trp Ile
        35                  40                  45

Gly Asn Ile Tyr His Ser Gly Ser Thr Asn Phe Asn Pro Ser Leu Lys
    50                  55                  60

Ser Arg Val Thr Ile Ser Leu Asp Met Ser Lys Asn Gln Phe Ser Leu
65                  70                  75                  80

His Leu Lys Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala
                85                  90                  95

Arg Ala Arg Gly Gly Gly Phe Cys Ser Asn Met Asp Cys Pro Ala Met
            100                 105                 110

Phe Asp Tyr Trp Gly Arg Gly Thr Leu Val Thr Val Ser Ala Ala Ser
        115                 120                 125

Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
    130                 135                 140

Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145                 150                 155                 160

Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
```

```
                165                 170                 175

His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
            180                 185                 190

Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile
        195                 200                 205

Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215                 220
```

<210> 146
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 146

```
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Ser Val Lys Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Val Ala Gly Gly Tyr Asn Phe Asn Asp Asp
            20                  25                  30

Arg Met Ser Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
        35                  40                  45

Glu Trp Val Gly Arg Ile Lys Ser Lys Ser Asp Gly Gly Ser Thr Asn
    50                  55                  60

Tyr Ala Ala Pro Val Gln Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser
65                  70                  75                  80

Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Lys Ile Glu Asp Thr
                85                  90                  95

Ala Val Tyr Tyr Cys Thr Thr Ile His Asp Tyr Gly Asp His Trp Gly
            100                 105                 110

Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 147
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 147
Glu Val Gln Leu Val Glu Ser Gly Gly Ala Leu Val Gln Pro Gly Gly
1   5   10   15

Ser Leu Arg Ile Ser Cys Ala Ala Ser Gly Phe Thr Val Ser Thr Asn
            20   25   30

Tyr Met Ser Trp Val Arg Gln Ala Pro Gly Lys Glu Leu Glu Trp Ile
        35   40   45

Ser Val Ile Tyr Ser Gly Gly Thr Thr Tyr Tyr Ala Ala Pro Val Lys
    50   55   60

Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser Lys Asn Thr Leu Tyr Leu
65   70   75   80

Gln Met Asn Ser Leu Arg Val Glu Asp Thr Ala Val Tyr His Cys Ala
                85   90   95

Arg Gly Leu Leu Arg Ser Leu Asp Val Trp Gly Gln Gly Thr Thr Val
            100   105   110

Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala
        115   120   125

Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala Leu Gly Cys Leu
    130   135   140

Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly
145   150   155   160

Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser
                165   170   175

Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Thr Ser Ser Asn Phe
            180   185   190

Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His Lys Pro Ser Asn Thr
        195   200   205

Lys Val Asp Lys Thr Val
    210

<210> 148
<211> 225
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 148
Glu Val His Leu Val Glu Ser Gly Gly Gly Phe Val Gln Pro Gly Gly

```
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asp His
            20                  25                  30

Tyr Met Asp Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Gly Arg Ile Lys Asn Arg Ala Asn Ser Tyr Asn Thr Glu Tyr Ala Ala
    50                  55                  60

Ser Val Arg Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser Asn Asn Ser
65                  70                  75                  80

Leu Phe Leu Gln Met Asn Ser Leu Thr Ala Glu Asp Thr Ala Val Tyr
                85                  90                  95

Tyr Cys Ala Arg Val Lys Leu Gly Ala Ser Ser Arg Val Phe Asp Val
            100                 105                 110

Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser Ala Ser Pro Thr Ser
        115                 120                 125

Pro Lys Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn
    130                 135                 140

Val Val Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu
145                 150                 155                 160

Ser Val Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe
                165                 170                 175

Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln
            180                 185                 190

Leu Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys
        195                 200                 205

His Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys
    210                 215                 220

Pro
225
```

<210> 149
<211> 120
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 149

```
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Asp Tyr
            20                  25                  30

Gly Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Gln Trp Val
        35                  40                  45

Ala Val Ile Ser Phe Asp Gly Ser Asp Lys Phe Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Ser Ile Ser Arg Asp Asn Ser Arg Asp Thr Val Tyr
65                  70                  75                  80

Leu Gln Met Asn Arg Leu Arg Pro Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Thr Thr Val Thr Pro Lys Val Thr Ser Phe Ala Ser Trp Gly Gln
            100                 105                 110

Gly Ser Leu Val Thr Val Ser Ala
        115                 120
```

<210> 150
<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 150

```
Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly
1               5                   10                  15

Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Asp Ile Arg Ser
            20                  25                  30

Tyr Thr Ile His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
        35                  40                  45

Val Ser Ser Ile Thr Ala Gly Gly Ser Phe Ile Asn Tyr Ala Asp Ser
    50                  55                  60

Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Gln Asn Ser Leu
65                  70                  75                  80

Phe Leu Gln Val Asp Arg Leu Arg Ala Glu Asp Thr Ala Leu Tyr Phe
                85                  90                  95

Cys Ala Arg Glu Gln Ser Pro Leu Tyr Phe Gly Pro Ser Leu Asp Val
            100                 105                 110
```

Trp Gly Gln Gly Thr Ser Val Ile Val Ser Leu Ala Ser Thr Lys Gly
        115   120   125

Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
    130   135   140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145   150   155   160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165   170   175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180   185   190

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195   200   205

Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210   215   220

<210> 151
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 151
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Asn Pro Gly Ala
1   5   10   15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
            20   25   30

Tyr Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35   40   45

Gly Trp Ile Asn Pro Asn Ser Gly Gly Thr Asn His Ala Gln Lys Phe
    50   55   60

Gln Gly Arg Val Thr Met Thr Arg Asp Met Ser Ile Asn Thr Ala Tyr
65   70   75   80

Met Glu Val Ser Gly Leu Arg Ser Asp Asp Thr Ala Ile Tyr Tyr Cys
                85   90   95

Ala Arg Glu Pro Tyr Ser Ser Tyr Ala Met Asp Val Trp Gly Gln Gly
            100   105   110

Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe

```
        115                 120                 125

Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205

Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215

<210> 152
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 152
Cys Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
1               5                   10                  15

Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn
            20                  25                  30

Tyr Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Lys Trp
        35                  40                  45

Val Ser Ser Ile Ser Tyr Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser
    50                  55                  60

Val Lys Gly Arg Val Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu
65                  70                  75                  80

Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr
                85                  90                  95

Cys Ala Lys Asp Gly Ser Glu Met Leu Leu Cys Asp Tyr Trp Gly Gln
            100                 105                 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125
```

```
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

Pro Ser Asn Thr Lys Val Asp Lys Ile Val
    210                 215
```

<210> 153
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 153

```
Cys Asp Val His Leu Val Gln Ser Gly Gly Gly Leu Val Lys Pro Gly
1               5                   10                  15

Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Asn Phe Asn Ser
            20                  25                  30

Tyr Thr Met Thr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Gln Trp
        35                  40                  45

Val Ser Ser Ile Ser Ser Ser Gly Gly Asp Ile Asn Tyr Ala Asp Ser
    50                  55                  60

Leu Lys Gly Arg Phe Ser Ile Ser Arg Asp Asn Ala Lys Asn Ser Val
65                  70                  75                  80

Phe Leu Gln Leu Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr
                85                  90                  95

Cys Ala Arg Asp Thr Arg Trp Arg Gly Leu Asp Ser Trp Gly Gln Gly
            100                 105                 110

Ile Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125

Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala Leu
    130                 135                 140
```

```
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Thr Ser
            180                 185                 190

Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His Lys Pro
        195                 200                 205

Ser Asn Thr Lys Val Asp Lys Thr Val
    210                 215
```

<210> 154
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 154

```
Gly Val Gln Leu Val Glu Ser Gly Gly Asp Leu Val Gln Pro Gly Arg
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asp Asp Tyr
            20                  25                  30

Ala Met His Trp Val Arg Gln Ser Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ser Ser Ile Ser Trp Asn Ser Gly Asp Ile Ala Tyr Gly Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Val Ser Arg Asp Asn Ala Lys Asn Ser Leu His
65                  70                  75                  80

Leu Gln Leu Asn Ser Leu Arg Val Glu Asp Ser Ala Leu Tyr Tyr Cys
                85                  90                  95

Ala Lys Asp Leu Leu Ala Val Pro Gly Leu Leu Asp Asp Trp Gly Gln
            100                 105                 110

Gly Thr Leu Val Thr Val Ser Thr Ala Ser Pro Thr Ser Pro Lys Val
        115                 120                 125

Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val Ile
    130                 135                 140

Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val Thr
```

145 150 155 160

Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro Ser
165 170 175

Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr Leu
180 185 190

Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val Lys
195 200 205

His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
210 215 220

<210> 155
<211> 213
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 155
Gln Val Leu Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Thr Phe Ser Ser Tyr
20 25 30

Gly Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Gly Met Ala Asn Tyr Ala Gln Lys Phe Gln Gly Arg Val Thr Ile
50 55 60

Ser Gly Asp Glu Ser Thr Ser Thr Ala Tyr Met Glu Leu Ser Asn Leu
65 70 75 80

Thr Ser Glu Asp Thr Ala Val Tyr Tyr Cys Ala Ser Arg Gly Gly Ser
85 90 95

Ser Arg Arg Tyr Gly Met Gly Val Trp Gly Gln Gly Thr Thr Val Thr
100 105 110

Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro
115 120 125

Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val
130 135 140

Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala
145 150 155 160

```
Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly
                165                 170                 175

Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly
            180                 185                 190

Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys
        195                 200                 205

Val Asp Lys Arg Val
    210
```

<210> 156
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 156

```
Cys Glu Val Gln Leu Leu Glu Ser Gly Gly Ala Leu Val Gln Pro Gly
1               5                   10                  15

Gly Ser Leu Arg Leu Ser Cys Ala Val Ser Gly Leu Thr Phe Asn Arg
            20                  25                  30

Phe Ala Met Thr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
        35                  40                  45

Val Ser His Ile Gly Gly Ser Gly Gly Tyr Thr Tyr Tyr Ala Asp Ser
    50                  55                  60

Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu
65                  70                  75                  80

Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr His
                85                  90                  95

Cys Val Lys Leu Lys Gly Ile Gly Ala Met Trp Thr Tyr Ala Met Asp
            100                 105                 110

Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys
        115                 120                 125

Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu
    130                 135                 140

Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145                 150                 155                 160

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
                165                 170                 175
```

Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
            180   185   190

Val Thr Val Thr Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn
        195   200   205

Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val
    210   215   220

<210> 157
<211> 227
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 157
Gln Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Asp
1   5   10   15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Tyr Ser Ile Ser Thr Ala
            20   25   30

Tyr Tyr Trp Gly Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp
        35   40   45

Ile Gly Ser Ile Phe His Ser Gly Ser Ala Tyr Tyr Asn Pro Ser Leu
    50   55   60

Asp Gly Arg Val Ser Leu Ser Val Asp Thr Ser Lys Asn Gln Phe Ser
65   70   75   80

Leu Arg Leu Lys Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys
                85   90   95

Ala Arg Asp Gln Gly Tyr Gly Asp Tyr Asp Tyr Pro Arg Asp Trp Ile
            100   105   110

Glu Pro Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Pro
        115   120   125

Thr Ser Pro Lys Val Phe Pro Leu Ser Leu Asp Ser Thr Pro Gln Asp
    130   135   140

Gly Asn Val Val Val Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu
145   150   155   160

Pro Leu Ser Val Thr Trp Ser Glu Ser Gly Gln Asn Val Thr Ala Arg
                165   170   175

Asn Phe Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser

```
            180                 185                 190

Ser Gln Leu Thr Leu Pro Ala Thr Gln Cys Pro Asp Gly Lys Ser Val
        195                 200                 205

Thr Cys His Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val
    210                 215                 220

Pro Cys Pro
225
```

<210> 158
<211> 123
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 158

```
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1               5                   10                  15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Asn Val Arg Ser Tyr
            20                  25                  30

Ser Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

Gly Gly Met Ile Thr Thr Phe Gly Lys Ala Asp Tyr Ala Leu Lys Phe
    50                  55                  60

Arg Asp Arg Val Thr Ile Thr Ala Asp Arg Ser Thr Asn Thr Val Tyr
65                  70                  75                  80

Met Glu Leu Ser Ser Leu Thr Ser Gln Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Ser Val Arg Asp Leu Val Ser Gly Thr Thr Tyr Tyr Tyr His Tyr
            100                 105                 110

Trp Gly Gln Gly Thr Leu Ile Ser Val Ser Ser
        115                 120
```

<210> 159
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 159
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1   5   10   15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Asp Ser Ile Ser Ser Asn
            20   25   30

Tyr Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Ile
        35   40   45

Gly Tyr Ile Tyr Tyr Ser Gly Ser Thr Asn Tyr Asn Pro Ser Leu Lys
    50   55   60

Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe Ser Val
65   70   75   80

Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala
                85   90   95

Arg Tyr Gly Asp Tyr Ser Phe Asp Pro Trp Gly Gln Gly Thr Leu Val
            100   105   110

Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala
        115   120   125

Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu
    130   135   140

Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly
145   150   155   160

Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser
                165   170   175

Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu
            180   185   190

Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr
        195   200   205

Lys Val Asp Lys Ser Glu
    210

<210> 160
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 160
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala

1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Phe Gly Tyr Arg Phe Ser Asn Phe
20 25 30

Gly Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Trp Ile Ser Ala Tyr Asn Gly Asn Thr Asn Tyr Ala Gln Lys Leu
50 55 60

Gln Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Val Val Asp Thr Val Leu Ala Asp Phe Asp Tyr Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
115 120 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
130 135 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145 150 155 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
165 170 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
180 185 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
195 200 205

Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
210 215

<210> 161
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 161
Gln Val His Leu Val Gln Ser Gly Ser Glu Phe Lys Lys Pro Gly Ala
1 5 10 15

```
Ser Val Lys Ile Ser Cys Lys Thr Ser Gly Tyr Thr Phe Thr Asn Tyr
            20                  25                  30

Ala Met Asn Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Val
        35                  40                  45

Gly Trp Ile Asn Thr Val Thr Gly Ile Pro Gly Tyr Ala Gln Gly Phe
    50                  55                  60

Thr Gly Arg Phe Ile Ile Ser Leu Asp Thr Ser Gly Arg Thr Ser Tyr
65                  70                  75                  80

Leu Gln Ile Asn Ser Leu Gln Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Ser Gly Gly Phe Gly Trp Ser Arg Asp Leu Asp Tyr Trp Gly
            100                 105                 110

Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Thr Cys Asn Val Asn His
        195                 200                 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215
```

<210> 162
<211> 223
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 162

```
Pro Gln Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser
1               5                   10                  15

Glu Thr Leu Ser Leu Thr Cys Ser Val Ser Gly Asp Ser Ile Ser Ser
            20                  25                  30
```

Ser Ser Tyr Phe Trp Gly Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu
        35   40   45

Glu Trp Ile Gly Ser Val Tyr Tyr Ser Gly Ser Thr Tyr Tyr Lys Pro
    50   55   60

Ser Leu Lys Ser Arg Leu Thr Ile Ser Val Asp Thr Ser Lys Lys Gln
65   70   75   80

Phe Ser Leu Asn Leu Ser Ser Met Thr Ala Ala Asp Thr Ala Val Tyr
                85   90   95

Tyr Cys Ala Arg His Gly Phe Trp Ser Gly Pro Ile Pro Asp Ala Phe
            100   105   110

Asp Ile Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr
        115   120   125

Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
    130   135   140

Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145   150   155   160

Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
                165   170   175

Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
            180   185   190

Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
        195   200   205

Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Asn Glu
    210   215   220

<210> 163
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 163
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val His Pro Gly Arg
1   5   10   15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Tyr
            20   25   30

Gly Met His Trp Leu Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val

```
        35                  40                  45

Ala Ile Ile Ala Tyr Asp Gly Ser Gln Lys Lys Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asp Thr Met Tyr
65                  70                  75                  80

Leu Gln Met Asn Asn Leu Arg Thr Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala His Glu Asp Tyr Gly Ser Gly Asn Gly Asn Tyr Trp Gly Gln Gly
            100                 105                 110

Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125

Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205

Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215

<210> 164
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 164
Pro Val His Leu Val Gln Ser Gly Ala Glu Val Arg Lys Pro Gly Ser
1               5                   10                  15

Ser Val Lys Val Ser Cys Met Ala Ser Gly Gly Ser Phe Asn Thr Tyr
            20                  25                  30

Ala Val Asn Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45
```

```
Gly Gly Ile Ile Pro Val Phe Gly Thr Thr Asn Tyr Ala Pro Arg Phe
    50                  55                  60

Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Ser Thr Val Tyr
65                  70                  75                  80

Met Glu Leu Thr Ser Leu Thr Ser Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Asp Arg Asp Ser Gly Tyr Glu Arg Asn Cys Leu Asp Pro Trp
            100                 105                 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr
    130                 135                 140

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

Val Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn Val Asp
        195                 200                 205

His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220

<210> 165
<211> 231
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 165
Gln Val Gln Leu Met Gln Ser Gly Ala Glu Val Lys Gln Pro Gly Ala
1               5                   10                  15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Asp Thr Phe Thr Ser Phe
            20                  25                  30

Ala Ile His Trp Val Arg Gln Val Ser Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

Gly Trp Ile Asn Ala Gly Asn Gly Asp Thr Lys Tyr Ser Gln Lys Ile
    50                  55                  60
```

```
Gln Gly Arg Ile Thr Ile Thr Arg Asp Thr Ser Ala Arg Thr Ala Tyr
65                  70                  75                  80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Gly Ala Pro Tyr Gly Ser Arg Ile Tyr Tyr Asp Tyr Asp Ser
            100                 105                 110

Tyr His Gly Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser
        115                 120                 125

Ser Ala Ser Pro Thr Ser Pro Lys Val Phe Pro Leu Ser Leu Cys Ser
    130                 135                 140

Thr Gln Pro Asp Gly Asn Val Val Ile Ala Cys Leu Val Gln Gly Phe
145                 150                 155                 160

Phe Pro Gln Glu Pro Leu Ser Val Thr Trp Ser Glu Ser Gly Gln Gly
                165                 170                 175

Val Thr Ala Arg Asn Phe Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu
            180                 185                 190

Tyr Thr Thr Ser Ser Gln Leu Thr Leu Pro Ala Thr Gln Cys Leu Ala
        195                 200                 205

Gly Lys Ser Val Thr Cys His Val Lys His Tyr Thr Asn Pro Ser Gln
    210                 215                 220

Asp Val Thr Val Pro Cys Pro
225                 230

<210> 166
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 166
Gln Val His Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gln
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Asp Ser Ile Ser Asn Gly
            20                  25                  30

Asp Tyr Cys Trp Asn Trp Ile Arg Gln Arg Pro Gly Lys Gly Leu Glu
        35                  40                  45

Trp Ile Gly Tyr Ile Tyr His Ser Gly Ser Thr Tyr Glu Asn Pro Ser
```

```
    50                  55                  60

Leu Arg Ser Arg Val Thr Met Ser Val Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

Ser Met Glu Leu Thr Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95

Cys Ala Arg Gly Lys Phe Asp Trp Phe Pro Arg Val Ser Ser Phe Asp
            100                 105                 110

Tyr Trp Gly Arg Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys
        115                 120                 125

Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
    130                 135                 140

Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145                 150                 155                 160

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
                165                 170                 175

Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
            180                 185                 190

Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
        195                 200                 205

Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215                 220

<210> 167
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 167
Val Val Gln Leu Val Glu Ser Gly Gly Asp Trp Val Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Ser Tyr
            20                  25                  30

Trp Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ala Ser Val Glu Gly Tyr Arg Ser Glu Glu Tyr Tyr Val Asp Ser Val
    50                  55                  60
```

```
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Val Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Ala Ala Tyr Tyr Ile Asp Thr Ser Gly Phe Asp Tyr Trp Gly Gln
            100                 105                 110

Gly Thr Gln Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro Lys Val
        115                 120                 125

Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val Ile
    130                 135                 140

Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val Thr
145                 150                 155                 160

Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro Ser
                165                 170                 175

Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr Leu
            180                 185                 190

Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val Lys
        195                 200                 205

His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
    210                 215                 220

<210> 168
<211> 224
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 168
Cys Glu Val Gln Leu Leu Glu Ser Gly Gly Lys Leu Val Gln Pro Gly
1               5                   10                  15

Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Tyr Asp Ser
            20                  25                  30

Tyr Val Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
        35                  40                  45

Val Ser Gly Ile Ser Ala Ser Gly Gly Gly Thr Tyr Tyr Ala Asp Ser
    50                  55                  60

Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu
65                  70                  75                  80
```

Tyr Leu Glu Met Asn Ser Leu Arg Ala Asp Asp Thr Ala Val Tyr Tyr
85 90 95

Cys Ala Lys Gly Arg Thr Tyr Ser Asn Asn Trp Leu Phe His Trp Tyr
100 105 110

Phe Asp Leu Trp Gly Arg Gly Thr Leu Val Thr Val Ser Ser Ala Ser
115 120 125

Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
130 135 140

Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145 150 155 160

Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
165 170 175

His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
180 185 190

Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile
195 200 205

Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Asn Glu
210 215 220

<210> 169
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 169
Pro Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Ser Gly Ser Val Ser Ser Gly
20 25 30

Ser His Tyr Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu
35 40 45

Trp Ile Gly Tyr Ile Tyr Tyr Ser Gly Thr Ser Asn Tyr Asn Pro Ser
50 55 60

Leu Lys Gly Arg Val Ala Ile Ser Val Asp Thr Ser Lys Asn Gln Phe
65 70 75 80

Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Ile Tyr Tyr

```
                85                  90                  95

Cys Ala Arg Val Phe Ser Thr Ile Phe His Gly Val Asp Pro Trp Gly
            100                 105                 110

Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215
```

<210> 170
<211> 224
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 170

```
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

Ser Val Lys Val Ser Cys Arg Ala Ser Gly Tyr Ser Phe Thr Gly Tyr
            20                  25                  30

Tyr Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

Gly Trp Ile Asn Pro Lys Thr Gly Asp Thr His Tyr Ala Gln Asn Phe
    50                  55                  60

Gln Gly Trp Val Thr Met Thr Arg Asp Thr Ser Ile Ser Thr Ala Tyr
65                  70                  75                  80

Met Glu Leu Thr Ile Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
```

Ala Arg His Leu Ser Ser Gly Glu Tyr His Tyr Gly Leu Asp Val Trp
100 105 110

Gly Gln Gly Thr Thr Val Thr Ala Ser Ser Ala Ser Pro Thr Ser Pro
115 120 125

Lys Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val
130 135 140

Val Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser
145 150 155 160

Val Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro
165 170 175

Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu
180 185 190

Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His
195 200 205

Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
210 215 220

<210> 171
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 171
Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg Ser
1 5 10 15

Leu Arg Leu Ser Cys Ala Ala Pro Gly Phe Thr Phe Ser Asn Tyr Gly
20 25 30

Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala
35 40 45

Val Ile Ser Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val Lys
50 55 60

Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu
65 70 75 80

Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala
85 90 95

Lys Gly Lys Gly Ile Val Gly Ala Thr Phe Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
115 120 125

Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
130 135 140

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145 150 155 160

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
165 170 175

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
180 185 190

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
195 200 205

Ser Asn Thr Lys Val Asp Lys Asn Val
210 215

<210> 172
<211> 224
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 172
Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly
1 5 10 15

Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn
20 25 30

Tyr Asn Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
35 40 45

Val Ser Ser Ile Ser Ser Ser Ser Ser Tyr Ile Tyr Tyr Ala Asp Ser
50 55 60

Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu
65 70 75 80

Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr
85 90 95

Cys Ala Arg Asp Ala Leu Asp Phe Asp Trp Leu Leu Ser Ala Gly Gly
100 105 110

Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser

```
        115                 120                 125

Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
    130                 135                 140

Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145                 150                 155                 160

Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
                165                 170                 175

His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
            180                 185                 190

Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile
        195                 200                 205

Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220

<210> 173
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 173
Pro Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Ser
            20                  25                  30

Ser Tyr Tyr Trp Gly Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu
        35                  40                  45

Trp Ile Gly Ser Ile Tyr Tyr Ser Gly Ser Thr Tyr Tyr Asn Pro Ser
    50                  55                  60

Leu Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Ser
                85                  90                  95

Cys Ala Arg Leu Leu Val Gly Gly Ala Phe Asp Ile Trp Gly Gln Gly
            100                 105                 110

Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125
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Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205

Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215

<210> 174
<211> 226
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 174
Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly
1               5                   10                  15

Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn
            20                  25                  30

Ala Trp Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
        35                  40                  45

Val Gly Arg Ile Lys Ser Lys Thr Asp Gly Gly Thr Thr Asp Tyr Ala
    50                  55                  60

Ala Pro Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser Lys Asn
65                  70                  75                  80

Thr Leu Tyr Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val
                85                  90                  95

Tyr Tyr Cys Thr Pro Gly Ser Cys Ser Gly Gly Ser Cys Tyr Ser Gly
            100                 105                 110

Asp Ala Phe Asp Ile Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser
        115                 120                 125

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
    130                 135                 140
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```
Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
145                 150                 155                 160

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
                165                 170                 175

Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
            180                 185                 190

Leu Ser Ser Met Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
        195                 200                 205

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
    210                 215                 220

Ser Glu
225

<210> 175
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 175
Gln Val His Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asn Tyr
            20                  25                  30

Phe Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Pro Glu Trp Met
        35                  40                  45

Gly Val Ile Asn Pro Ser Phe Gly Ser Thr Thr Tyr Ala Gln Lys Leu
    50                  55                  60

Gln Gly Arg Val Thr Met Thr Arg Glu Thr Ser Thr Ser Thr Val Tyr
65                  70                  75                  80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Glu Ser Leu Asp Ser Ala Ser Tyr Ser Thr Ile Ala His Trp
            100                 105                 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
```

```
    130                 135                 140

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
        195                 200                 205

His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215                 220

<210> 176
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 176
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1               5                   10                  15

Ser Val Lys Val Ser Cys Lys Ala Pro Gly Gly Thr Phe Asn Asn Tyr
            20                  25                  30

Gly Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

Gly Gly Ile Met Pro Met Phe Gly Arg Thr Ser Glu Thr Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Ile Ser Ala Asp Glu Ser Thr Ser Thr Val Tyr
65                  70                  75                  80

Met Glu Met Ser Ser Leu Arg Phe Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Asp Arg Gly Gly Asn Ser Trp Leu Asp Val Phe Asp Met Trp
            100                 105                 110

Gly Gln Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr
    130                 135                 140
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```
Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp
        195                 200                 205

His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val
    210                 215                 220

<210> 177
<211> 224
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 177
Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val His Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Val Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

Glu Met Thr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Ile
        35                  40                  45

Ser Tyr Ile Ser Ser Thr Gly Thr Thr Thr Tyr His Ala Asp Ser Val
    50                  55                  60

Arg Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Ser Ser Leu Phe
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Val Glu Asp Thr Ala Leu Tyr Tyr Cys
                85                  90                  95

Ala Arg Ser Pro Ala Ala Phe Gly Ser Glu Ser Tyr Phe Asp Ser Trp
            100                 105                 110

Gly Gln Gly Val Leu Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro
        115                 120                 125

Lys Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val
    130                 135                 140

Val Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser
145                 150                 155                 160
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```
Val Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro
                165                 170                 175

Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu
            180                 185                 190

Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His
        195                 200                 205

Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
    210                 215                 220
```

<210> 178
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 178

```
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Thr Thr Tyr
            20                  25                  30

Ala Val His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ala Val Ile Ser Asn Asp Gly Ser Asn Lys Asn Tyr Ala Asp Ser Val
    50                  55                  60

Arg Gly Arg Phe Ile Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Lys Asp Leu Leu Glu Asp Pro Tyr Phe Gly Asp Leu Leu Phe Asp
            100                 105                 110

Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys
        115                 120                 125

Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
    130                 135                 140

Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145                 150                 155                 160

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
```

```
                165                 170                 175

Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
            180                 185                 190

Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
        195                 200                 205

Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Asn Val
    210                 215                 220

<210> 179
<211> 223
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 179
Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Ser Gly Glu
1               5                   10                  15

Ser Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Thr Phe Thr Ser Tyr
            20                  25                  30

Trp Ile Ala Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp Met
        35                  40                  45

Gly Ile Ile Tyr Pro Gly Asp Ser Asp Thr Arg Tyr Ser Pro Ser Phe
    50                  55                  60

Gln Gly Gln Val Thr Ile Ser Ala Asp Lys Ser Ile Ser Thr Ala Tyr
65                  70                  75                  80

Leu Gln Trp Ser Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr Tyr Cys
                85                  90                  95

Val Arg Thr Pro Ala Val Gly Thr Asp Pro Asp Tyr Trp Gly Gln Gly
            100                 105                 110

Thr Leu Val Thr Val Ser Ser Gly Ser Ala Ser Ala Pro Thr Leu Phe
        115                 120                 125

Pro Leu Val Ser Cys Glu Asn Ser Pro Ser Asp Thr Ser Ser Val Ala
    130                 135                 140

Val Gly Cys Leu Ala Gln Asp Phe Leu Pro Asp Ser Ile Thr Phe Ser
145                 150                 155                 160

Trp Lys Tyr Lys Asn Asn Ser Asp Ile Ser Ser Thr Arg Gly Phe Pro
                165                 170                 175
```

Ser Val Leu Arg Gly Gly Lys Tyr Ala Ala Thr Ser Gln Val Leu Leu
180 185 190

Pro Ser Lys Asp Val Met Gln Gly Thr Asp Glu His Val Val Cys Lys
195 200 205

Val Gln His Pro Asn Gly Asn Lys Glu Lys Asn Val Pro Leu Pro
210 215 220

<210> 180
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 180
Glu Val Gln Leu Met Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Leu Thr Phe Ser Ile Tyr
20 25 30

Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Tyr Ile Ser Arg Gly Ser Ser Val Ile Tyr His Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asp Gly Lys Asn Leu Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Asp Asp Asp Thr Ala Met Tyr Tyr Cys
85 90 95

Ser Ser Gly Gly Ser Thr Ser Met Val Gly Arg Tyr Trp Gly Gln Gly
100 105 110

Ser Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
115 120 125

Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
130 135 140

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145 150 155 160

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
165 170 175

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
180 185 190

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
195 200 205

Ser Asn Thr Lys Val Asp Lys Arg Val
210 215

<210> 181
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 181
Gln Val Thr Leu Lys Glu Ser Gly Pro Val Leu Val Lys Pro Thr Glu
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Val Ser Gly Phe Ser Leu Ser Asn Ala
20 25 30

Arg Met Gly Val Ser Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu
35 40 45

Trp Leu Gly His Ile Phe Ser Asn Asp Glu Lys Ser Tyr Ser Thr Ser
50 55 60

Leu Lys Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Ser Gln Val
65 70 75 80

Val Leu Thr Leu Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr
85 90 95

Cys Ala Arg Met Thr Pro Phe Lys Phe Gly Leu Cys Pro Asp Tyr Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
115 120 125

Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
130 135 140

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145 150 155 160

Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
165 170 175

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
180 185 190

Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn

```
        195                 200                 205

His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220

<210> 182
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 182
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Val Tyr
            20                  25                  30

Tyr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

Gly Arg Ile Asn Pro Asn Ser Gly Gly Thr Asn Tyr Ala Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Met Thr Arg Asp Thr Ser Ile Ser Thr Ala Tyr
65                  70                  75                  80

Met Glu Leu Ser Arg Leu Thr Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Val Val Val Val Gly Thr Asp Tyr Gly Met Asp Val Trp Gly
            100                 105                 110

Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205
```

Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
210 215

<210> 183
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 183
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser Tyr
20 25 30

Gly Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Trp Ile Ser Ala Tyr Asn Gly Asn Thr Asn Tyr Ala Gln Lys Leu
50 55 60

Gln Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Arg Ser Leu Thr Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Gln Gly Leu Glu Arg Ala Asn Trp Phe Asp Pro Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
115 120 125

Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
130 135 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145 150 155 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
165 170 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
180 185 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
195 200 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
210 215

<210> 184
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 184
Gln Val His Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Arg
1 5 10 15

Thr Leu Ser Leu Thr Cys Ala Ile Ser Gly Asp Ser Val Ser Ser Thr
20 25 30

Ser Ala Ala Trp Asn Trp Ile Arg Gln Ser Pro Ser Gly Gly Leu Glu
35 40 45

Trp Leu Gly Arg Thr Phe Tyr Arg Thr Lys Trp Tyr Ser Glu Ser Thr
50 55 60

Gly Ser Leu Lys Ser Arg Ile Ile Val Asn Pro Asp Thr Ser Lys Asn
65 70 75 80

Gln Phe Ser Leu Gln Leu Asn Ser Val Thr Pro Glu Asp Thr Ala Val
85 90 95

Tyr Tyr Cys Ala Arg Gly Val Arg His Phe Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
115 120 125

Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
130 135 140

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145 150 155 160

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
165 170 175

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
180 185 190

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
195 200 205

Ser Asn Thr Lys Val Asp Lys Lys Val
210 215

<210> 185

<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 185
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gly
1 5 10 15

Thr Leu Ser Leu Thr Cys Ala Val Ser Gly Gly Ser Ile Ser Ser Ser
20 25 30

Asn Cys Trp Ser Trp Val Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp
35 40 45

Leu Gly Glu Ile Cys His Ser Gly Ser Thr Ser Tyr Asn Pro Ser Leu
50 55 60

Lys Ser Arg Val Thr Ile Ser Val Asp Lys Ser Lys Asn Gln Phe Ser
65 70 75 80

Leu Lys Leu Arg Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Ser Pro Leu Thr Val Val Phe Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
115 120 125

Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
130 135 140

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145 150 155 160

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
165 170 175

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
180 185 190

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
195 200 205

Ser Asn Thr Lys Val Asp Lys Lys Val
210 215

<210> 186
<211> 215
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 186
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Val Ser Ser Asn
20 25 30

Tyr Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Val Ile Tyr Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val Lys
50 55 60

Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Ser Leu
65 70 75 80

Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala
85 90 95

Arg Glu Ser Ser Ala Ala Gly Tyr Asp Tyr Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu
115 120 125

Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys
130 135 140

Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
145 150 155 160

Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser
165 170 175

Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser
180 185 190

Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn
195 200 205

Thr Lys Val Asp Lys Ser Val
210 215

<210> 187
<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 187
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Arg Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Thr Tyr
20 25 30

Tyr Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Leu Ile Asn Pro Asn Gly Gly Thr Thr Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Leu Ser Met Thr Thr Asp Thr Ser Thr Asn Thr Val Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Lys Leu Met Ser Gly Ile Val Ser Arg Gly Trp Phe Asp Pro
100 105 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
115 120 125

Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
130 135 140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145 150 155 160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
165 170 175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
180 185 190

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
195 200 205

Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Val
210 215 220

<210> 188
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody

VH chain

<400> 188
Pro Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Val Ser Ser Gly
20 25 30

Ser Tyr Tyr Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu
35 40 45

Trp Ile Gly Tyr Ile Tyr Tyr Ser Gly Ser Thr Asn Tyr Asn Pro Ser
50 55 60

Leu Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe
65 70 75 80

Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
85 90 95

Cys Ala Arg Asp Arg Gly Asp Tyr Val Thr His Trp Phe Asp Pro Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
115 120 125

Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
130 135 140

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145 150 155 160

Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
165 170 175

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
180 185 190

Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
195 200 205

His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
210 215 220

<210> 189
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 189
Gln Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Trp Glu
1   5   10   15

Thr Leu Ser Leu Ser Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Ser
            20   25   30

Phe Phe Tyr Trp Gly Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Gln
        35   40   45

Trp Ile Gly Asn Ile His Tyr Thr Gly Ser Thr Tyr Tyr Asn Pro Ser
    50   55   60

Leu Lys Ser Arg Ile Thr Met Ser Val Asp Thr Ser Lys Asn Gln Phe
65   70   75   80

Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85   90   95

Cys Ala Arg His Arg Val Gly Asp Ser Pro Gly Leu His Tyr Trp Gly
            100   105   110

Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115   120   125

Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130   135   140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145   150   155   160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165   170   175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180   185   190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195   200   205

Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210   215

<210> 190
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 190
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg

```
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ala Val Ile Ser Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Ser Pro Ile Ala Val Ala Ala Pro Phe Ala Tyr Trp Gly Gln Gly
            100                 105                 110

Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125

Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205

Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215
```

<210> 191
<211> 229
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 191

```
Cys Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
1               5                   10                  15
```

```
Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Thr
            20                  25                  30

Tyr Val Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
        35                  40                  45

Val Ser Leu Ile Ser Gly Ser Gly Gly Ser Thr His Tyr Ala Asp Ser
    50                  55                  60

Val Arg Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu
65                  70                  75                  80

Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr
                85                  90                  95

Cys Val Lys Asp Tyr Leu Ala Val Gly Gly Thr Tyr Tyr Asp Tyr Phe
            100                 105                 110

Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Gly Ser Ala
        115                 120                 125

Ser Ala Pro Thr Leu Phe Pro Leu Val Ser Cys Glu Asn Ser Pro Ser
    130                 135                 140

Asp Thr Ser Ser Val Ala Val Gly Cys Leu Ala Gln Asp Phe Leu Pro
145                 150                 155                 160

Asp Ser Ile Thr Phe Ser Trp Lys Tyr Lys Asn Asn Ser Asp Ile Ser
                165                 170                 175

Ser Thr Arg Gly Phe Pro Ser Val Leu Arg Gly Gly Lys Tyr Ala Ala
            180                 185                 190

Thr Ser Gln Val Leu Leu Pro Ser Lys Asp Val Met Gln Gly Thr Asp
        195                 200                 205

Glu His Val Val Cys Lys Val Gln His Pro Asn Gly Asn Lys Glu Lys
    210                 215                 220

Asn Val Pro Leu Pro
225
```

<210> 192
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 192

```
Pro Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15
```

```
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Ser
            20                  25                  30

Ser Tyr Tyr Trp Gly Trp Ile Arg Gln Ser Pro Gly Lys Gly Leu Glu
        35                  40                  45

Trp Met Gly Ser Ile Tyr Tyr Ser Gly Ser Thr Tyr Tyr Asn Pro Ser
    50                  55                  60

Leu Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

Ser Leu Asn Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95

Cys Ala Arg His Asp Tyr Arg Asn Tyr Phe Asp Tyr Trp Gly Gln Gly
            100                 105                 110

Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125

Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205

Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215

<210> 193
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 193
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

Ser Val Lys Val Ser Cys Gln Ala Ser Gly Tyr Thr Phe Thr Gly Tyr
```

```
            20                  25                  30

Tyr Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

Gly Trp Ile Asn Pro Asn Ser Gly Gly Thr Asn Tyr Ala Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Met Thr Arg Asp Thr Ser Ile Ser Thr Ala His
65                  70                  75                  80

Met Glu Leu Gly Arg Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Thr Pro Pro Ser Arg Tyr Gly Gly Asn Tyr Tyr Ala Asp Tyr Trp
            100                 105                 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
    130                 135                 140

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
        195                 200                 205

His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220

<210> 194
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 194
Pro Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Asp
1               5                   10                  15

Ser Leu Ser Ile Ser Cys Glu Val Ser Gly Tyr Ser Phe Thr Ser Tyr
            20                  25                  30
```

```
Trp Ile Gly Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp Met
        35                  40                  45

Ala Ile Ile Asn Pro Ala Asp Ser Asp Thr Arg Tyr Ser Pro Ser Phe
    50                  55                  60

Arg Gly Gln Val Thr Ile Ser Val Asp Lys Ser Ile Asn Thr Ala Tyr
65                  70                  75                  80

Leu Gln Trp Thr Ser Leu Gln Ala Ser Asp Thr Ala Met Tyr Tyr Cys
                85                  90                  95

Ala Arg Gln Gly Pro Thr Val Ala Ile Asp Phe Trp Gly Gln Gly Thr
            100                 105                 110

Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
        115                 120                 125

Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
    130                 135                 140

Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160

Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
        195                 200                 205

Asn Thr Lys Val Asp Lys Ser Glu
    210                 215
```

<210> 195
<211> 116
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 195

```
Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1               5                   10                  15

Ser Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Thr Thr Tyr
            20                  25                  30

Trp Ile Ala Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp Met
        35                  40                  45
```

Gly Ile Ile Tyr Pro Ala Asp Ser Asp Thr Arg Tyr Ser Pro Ser Phe
50 55 60

Gln Gly Gln Val Thr Met Ser Ala Asp Gln Ser Ile Asn Thr Ala Tyr
65 70 75 80

Leu Gln Trp Ser Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr Tyr Cys
85 90 95

Ala Arg Arg Gly Arg Glu Phe Asp Tyr Trp Gly Gln Gly Thr Leu Leu
100 105 110

Thr Val Ser Ser
115

<210> 196
<211> 223
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 196
Cys Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
1 5 10 15

Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Ile
20 25 30

Tyr Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
35 40 45

Val Ser Ala Ile Ser Tyr Ser Gly Asn Thr Thr Tyr Tyr Ala Asp Ser
50 55 60

Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu
65 70 75 80

Tyr Leu Gln Ile Asn Asn Leu Arg Ala Glu Asp Thr Ala Ile Tyr Tyr
85 90 95

Cys Ala Ile Gln Glu Lys Arg Glu Leu Gln Leu Arg Arg Glu Leu Asp
100 105 110

Asn Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr
115 120 125

Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
130 135 140

Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu

145 150 155 160

Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
165 170 175

Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
180 185 190

Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
195 200 205

Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
210 215 220

<210> 197
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 197
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser Tyr
20 25 30

Tyr Met Tyr Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Ile Ile Asn Pro Gly Gly Gly Ser Thr Ser Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Met Thr Arg Asp Thr Ser Thr Ser Thr Val Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Val Phe Arg Tyr Gly Met Asp Val Trp Gly Gln Gly Thr Thr
100 105 110

Val Thr Val Ser Ser
115

<210> 198
<211> 117
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 198
Gln Val Gln Val Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Val Ser Gly Leu Asp Phe Arg Asp Tyr
20 25 30

Tyr Val Asn Trp Ile Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Leu
35 40 45

Ser Tyr Ile Thr Ser Pro Gly Gly His Thr Ser Tyr Ser Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Val Tyr
65 70 75 80

Leu Gln Met Asp Ser Leu Thr Val Glu Asp Thr Ala Val Tyr Phe Cys
85 90 95

Ala Ile Lys Glu Gly Tyr Gly Leu Ser Asp Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser Ser
115

<210> 199
<211> 223
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 199
Val Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ile Ser Tyr
20 25 30

Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Asp Ile Ser Gly Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Leu Thr Ile Ser Arg Asp Asn Ser Asn Asn Thr Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys

```
                85                  90                  95

Ala Lys Glu Asp Gly Tyr Thr Gln Asn Phe Asp Tyr Trp Gly Gln Gly
            100                 105                 110

Thr Leu Val Thr Val Ser Ser Gly Ser Ala Ser Ala Pro Thr Leu Phe
        115                 120                 125

Pro Leu Val Ser Cys Glu Asn Ser Pro Ser Asp Thr Ser Ser Val Ala
    130                 135                 140

Val Gly Cys Leu Ala Gln Asp Phe Leu Pro Asp Ser Ile Thr Phe Ser
145                 150                 155                 160

Trp Lys Tyr Lys Asn Asn Ser Asp Ile Ser Ser Thr Arg Gly Phe Pro
                165                 170                 175

Ser Val Leu Arg Gly Gly Lys Tyr Ala Ala Thr Ser Gln Val Leu Leu
            180                 185                 190

Pro Ser Lys Asp Val Met Gln Gly Thr Asp Glu His Val Val Cys Lys
        195                 200                 205

Val Gln His Pro Asn Gly Asn Lys Glu Lys Asn Val Pro Leu Pro
    210                 215                 220

<210> 200
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 200
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser His
            20                  25                  30

Ala Ile His Trp Val Arg Gln Ala Pro Gly Gln Thr Phe Glu Trp Leu
        35                  40                  45

Gly Trp Ile Asn Pro Val Asn Gly Val Thr Lys Tyr Ser Gln Thr Phe
    50                  55                  60

Gln Asp Arg Val Thr Ile Val Arg Asp Lys Ser Ala Thr Thr Thr Tyr
65                  70                  75                  80

Met Asp Leu Ser Gly Leu Thr Phe Glu Asp Thr Ala Met Tyr Tyr Cys
                85                  90                  95
```

Ala Arg Val Leu Asp Phe Tyr Gly Ser Ser Val Leu Asp Tyr Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 201
<211> 115
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 201
His Val Gln Leu Val Gln Ser Gly Ser Glu Leu Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Leu Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asn Tyr
20 25 30

Ala Met Asn Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Trp Ile Asn Thr Asn Thr Gly Asn Pro Thr Tyr Ala Gln Gly Phe
50 55 60

Thr Gly Arg Phe Val Phe Ser Leu Asp Thr Ser Val Ser Thr Ala Tyr
65 70 75 80

Leu Gln Ile Ser Ser Leu Lys Ala Glu Asp Thr Ala Leu Tyr Tyr Cys
85 90 95

Ala Arg Asp Arg Pro Gly Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr
100 105 110

Val Ser Ser
115

<210> 202
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 202
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Phe

```
            20                  25                  30

Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Val Val Ile Ser Ser Asp Gly Ser Asn Lys Asn Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Asp Leu Gly Val Gly Ser Thr Thr Tyr Trp Gly Gln Gly Thr
            100                 105                 110

Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
        115                 120                 125

Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
    130                 135                 140

Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160

Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
        195                 200                 205

Asn Thr Lys Val Asp Lys Arg Val
    210                 215

<210> 203
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 203
Gly Glu Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser His Tyr
            20                  25                  30
```

```
Ala Met Thr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ser Gly Val Ser Gly Ser Gly Phe Thr Thr Tyr Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Gln Asn Thr Leu Tyr
65                  70                  75                  80

Leu His Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Ile Tyr Tyr Cys
                85                  90                  95

Val Lys Asp Leu Glu Val Ser Ile Gly His Asn Phe Asp Phe Trp Gly
            100                 105                 110

Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215
```

<210> 204
<211> 225
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 204

```
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45
```

```
Ser Ser Ile Ser Ser Ser Ser Ser Tyr Ile Tyr Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Asp Arg Gly Val Val Val Val Ala Ala Thr Pro Tyr Tyr Tyr
            100                 105                 110

Gly Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala
        115                 120                 125

Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser
    130                 135                 140

Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe
145                 150                 155                 160

Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly
                165                 170                 175

Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu
            180                 185                 190

Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr
        195                 200                 205

Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys
    210                 215                 220

Val
225
```

<210> 205
<211> 223
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 205

```
Gln Ile Thr Leu Lys Glu Ser Gly Pro Thr Leu Val Lys Pro Thr Gln
1               5                   10                  15

Thr Leu Thr Leu Thr Cys Thr Phe Ser Gly Phe Ser Leu Ser Thr Asn
            20                  25                  30

Gly Val Gly Val Gly Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu
```

```
        35                  40                  45

Trp Leu Ala Leu Ile Asn Trp Asp Asp Asp Lys Arg Tyr Ser Pro Ser
    50                  55                  60

Leu Lys Ser Arg Leu Thr Ile Thr Lys Asp Thr Ser Lys Asn Gln Val
65                  70                  75                  80

Val Leu Thr Met Thr Asn Leu Asp Pro Val Asp Thr Ala Thr Tyr Tyr
                85                  90                  95

Cys Val His Ala Arg Asp Asp Tyr Gly Asp Ser Ala Trp Ser Thr Gly
            100                 105                 110

Pro Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr
        115                 120                 125

Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
    130                 135                 140

Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145                 150                 155                 160

Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
                165                 170                 175

Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
            180                 185                 190

Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
        195                 200                 205

Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220

<210> 206
<211> 223
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 206
Leu Ile Thr Leu Lys Glu Ser Gly Pro Thr Leu Val Lys Pro Thr Gln
1               5                   10                  15

Thr Leu Thr Leu Thr Cys Thr Val Ser Gly Leu Ser Leu Ser Thr Ser
            20                  25                  30

Gly Val Ala Val Gly Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu
        35                  40                  45
```

```
Trp Leu Ala Leu Ile Tyr Trp Asp Asp Asp Thr Arg Tyr Ser Pro Ser
    50                  55                  60

Leu Lys Ser Arg Leu Ser Ile Thr Lys Asp Thr Ser Lys Asn Gln Val
65                  70                  75                  80

Val Leu Thr Met Arg Asn Val Asp Pro Val Asp Thr Ala Thr Tyr Tyr
                85                  90                  95

Cys Gly His Arg Arg Leu Leu Arg Gly Val Thr Thr Thr Val Tyr Phe
            100                 105                 110

Asp Pro Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr
        115                 120                 125

Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
    130                 135                 140

Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145                 150                 155                 160

Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
                165                 170                 175

Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
            180                 185                 190

Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
        195                 200                 205

Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220

<210> 207
<211> 223
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 207
Pro Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Asn Pro Ser Gln
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Gly
            20                  25                  30

Gly Tyr Cys Trp Ser Trp Val Arg Gln His Pro Gly Lys Gly Leu Glu
        35                  40                  45

Trp Ile Gly Cys Ile Tyr Tyr Ile Gly Thr Thr Tyr Tyr Met Arg Ser
    50                  55                  60
```

```
Leu Lys Ser Arg Leu Ile Ile Ser Ile Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

Ser Leu Lys Leu Thr Ser Val Thr Ala Ala Asp Ser Ala Val Tyr Tyr
                85                  90                  95

Cys Ala Arg Gly Gly Glu Leu Leu Gly Gly Phe Gly Tyr Ser Gly Met
            100                 105                 110

Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr
        115                 120                 125

Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser
    130                 135                 140

Glu Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145                 150                 155                 160

Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
                165                 170                 175

Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
            180                 185                 190

Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys
        195                 200                 205

Asn Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220

<210> 208
<211> 224
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 208
Glu Leu Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

Trp Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ala Asn Ile Asn Gln Asp Gly Gly Glu Lys Tyr Tyr Val Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
```

65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala His Tyr Tyr Tyr Asp Ser Ser Gly Tyr Tyr Gln Asn Ala Glu Tyr
100 105 110

Phe Gln Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser
115 120 125

Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
130 135 140

Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145 150 155 160

Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
165 170 175

His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
180 185 190

Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile
195 200 205

Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
210 215 220

<210> 209
<211> 226
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 209
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Arg Gly Thr Phe Ser Asn His
20 25 30

Ala Val Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Val
35 40 45

Gly Gly Ile Ile Pro Val Phe Gly Pro Pro Asn Tyr Ala Gln Lys Phe
50 55 60

Arg Gly Arg Val Thr Ile Thr Ala Asp Arg Ser Thr Asn Thr Ala Tyr
65 70 75 80

Met Glu Leu Asn Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Thr Gln Trp Gly Thr Asp Val Glu Ala Thr Asn Pro Tyr Tyr
100 105 110

Tyr Phe Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser
115 120 125

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
130 135 140

Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
145 150 155 160

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
165 170 175

Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
180 185 190

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
195 200 205

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
210 215 220

Arg Val
225

<210> 210
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 210
Gln Val Gln Leu Val Gln Ser Gly Thr Glu Met Lys Arg Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Thr Phe Asn Phe Tyr
20 25 30

Ala Ile Asn Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Gly Ile Val Pro Ile Phe Asp Thr Thr Thr Tyr Ala Gln Arg Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Thr Thr Val His
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Phe Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Gln Ser Gly Ala Asp Arg Phe Asp Ser Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
115 120 125

Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
130 135 140

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145 150 155 160

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
165 170 175

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
180 185 190

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
195 200 205

Ser Asn Thr Lys Val Asp Lys Ser Glu
210 215

<210> 211
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 211
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Ile Ser Cys Gln Ala Phe Gly Tyr Asn Phe Ile Asp Asn
20 25 30

Ala Ile His Trp Val Arg Gln Ala Pro Gly Gln Arg Pro Glu Trp Met
35 40 45

Gly Trp Ile Asn Ala Gly Asn Gly Asn Thr Arg Tyr Ser Gln Asn Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Lys Val Thr Ser Ala Ser Thr Ala Tyr
65 70 75 80

Met Glu Met Ser Arg Leu Lys Ser Glu Asp Thr Ala Val Tyr Phe Cys

85 90 95

Ala Arg Ser Ser Lys Trp Thr Asp Trp His Phe Asp Tyr Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
115 120 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
130 135 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145 150 155 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
165 170 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
180 185 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
195 200 205

Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
210 215

<210> 212
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 212
Gln Ile Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Thr Ser Gly Tyr Thr Phe Thr His Tyr
20 25 30

Gly Val Ala Trp Val Arg Gln Ala Pro Gly Gln Gly Pro Glu Trp Met
35 40 45

Gly Trp Ile Ser Pro Tyr Asn Gly Asn Ile Glu Tyr Gly Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Asn Thr Ala Tyr
65 70 75 80

Met Glu Leu Arg Ser Leu Arg Tyr Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

```
Ala Arg Asp Leu Asp Glu Ile Asn Ser Ser Trp Leu Asp Pro Trp Gly
            100                 105                 110

Gln Gly Thr Leu Ile Ile Val Ser Pro Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215
```

<210> 213
<211> 226
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 213

```
Val Val Gln Leu Leu Glu Ser Gly Gly Gly Val Val Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Tyr
            20                  25                  30

Ala Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Thr Gly Ile Ser Gly Pro Gly Glu Ser Ser Tyr Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Val Ser Arg Asp Asn Tyr Arg Asn Thr Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Asp Leu Gly Ala Glu Asp Thr Ala Thr Tyr Phe Cys
                85                  90                  95

Ala Lys Arg Pro Thr Ala Gly Asn Ser Tyr Gly Gly Tyr Tyr Phe Asp
            100                 105                 110
```

```
His Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Pro Thr
        115                 120                 125

Ser Pro Lys Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly
    130                 135                 140

Asn Val Val Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro
145                 150                 155                 160

Leu Ser Val Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn
                165                 170                 175

Phe Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser
            180                 185                 190

Gln Leu Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr
        195                 200                 205

Cys His Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro
    210                 215                 220

Cys Pro
225
```

<210> 214
<211> 224
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 214

```
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

Ser Val Lys Leu Ser Cys Lys Pro Ser Gly Tyr Thr Phe Ser Ser Tyr
            20                  25                  30

Tyr Ile His Trp Leu Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

Gly Ile Ile Asn Pro Ser Gly Gly Tyr Thr Ser Ser Ala Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Met Thr Arg Asp Thr Ser Thr Ser Thr Ile Tyr
65                  70                  75                  80

Met Glu Leu Ser Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Arg Gly Glu Val Gly Thr Met Val Arg Val Phe Arg Lys Pro
```

```
            100                 105                 110

Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser
        115                 120                 125

Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
    130                 135                 140

Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145                 150                 155                 160

Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
                165                 170                 175

His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
            180                 185                 190

Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile
        195                 200                 205

Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220

<210> 215
<211> 223
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 215
Pro Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1               5                   10                  15

Ser Leu Lys Ile Ser Cys Gln Gly Ser Gly Tyr Asn Phe Ser Arg Tyr
            20                  25                  30

Trp Ile Gly Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp Met
        35                  40                  45

Gly Val Val Phe Pro Gly Asp Ser Asp Ile Arg Tyr Ser Leu Ser Phe
    50                  55                  60

Gln Gly His Ile Thr Ile Tyr Ala Asp Asn Ser Ile Ser Thr Ala Tyr
65                  70                  75                  80

Leu Gln Trp Ser Ser Leu Lys Ala Ser Asp Thr Ala Ile Tyr Tyr Cys
                85                  90                  95

Ala Thr Thr Ser Thr Met Pro Met Pro Thr Arg Gly Arg Asp Trp Phe
            100                 105                 110
```

```
Asp Pro Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr
        115                 120                 125

Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
    130                 135                 140

Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145                 150                 155                 160

Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
                165                 170                 175

Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
            180                 185                 190

Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
        195                 200                 205

Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220
```

<210> 216
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 216

```
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Thr
1               5                   10                  15

Ser Leu Thr Leu Ser Cys Glu Ala Ser Gly Phe Thr Phe Asn Arg Tyr
            20                  25                  30

Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ala Val Ile Trp Tyr Asp Gly Thr Asn Lys Tyr Tyr Ala Asp Ser Val
    50                  55                  60

Arg Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Thr Leu Arg Gly Asp Asp Thr Ala Val Tyr Phe Cys
                85                  90                  95

Ala Gly Ala His Gly Asp Tyr Gly Leu Asp Tyr Trp Gly Gln Gly Thr
            100                 105                 110

Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
        115                 120                 125
```

```
Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
    130                 135                 140

Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160

Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
        195                 200                 205

Asn Thr Lys Val Asp Lys Arg Glu
    210                 215
```

<210> 217
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 217

```
Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1               5                   10                  15

Ser Leu Arg Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Thr Ser Phe
            20                  25                  30

Trp Ile Ser Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp Met
        35                  40                  45

Gly Arg Ile Asp Pro Ser Asp Ser Tyr Thr Asn Tyr Ser Pro Ser Phe
    50                  55                  60

Gln Gly His Val Thr Ile Ser Ala Asp Lys Ser Ile Ser Thr Ala Phe
65                  70                  75                  80

Leu Gln Trp Ser Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr Tyr Cys
                85                  90                  95

Ala Arg His Gln Gln Lys Tyr Ser Pro Ile Ser Pro Leu Asp Tyr Trp
            100                 105                 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
```

```
    130                 135                 140

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
        195                 200                 205

His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220

<210> 218
<211> 120
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 218
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Val Ile Lys Pro Gly Gly
1               5                   10                  15

Ser Leu Lys Leu Ser Cys Glu Gly Ser Gly Phe Thr Leu Asp Asp Tyr
            20                  25                  30

Val Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Ile
        35                  40                  45

Ser Ser Ile Ser Gly Asp Gly Thr Arg Thr Tyr Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asn Asn Gly Lys Asn Ser Leu Tyr
65                  70                  75                  80

Leu Gln Met Asp Ser Leu Arg Arg Glu Asp Thr Ala Leu Tyr Tyr Cys
                85                  90                  95

Ala Lys Asp Ala Arg Leu Ala Tyr Tyr Gly Met Asp Val Trp Gly Gln
            100                 105                 110

Gly Thr Thr Val Thr Val Ser Ser
        115                 120

<210> 219
<211> 121
<212> PRT
```

<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 219
Gln Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Asp Ser Ile Ser Ser Ser
20 25 30

Gly Phe Phe Trp Ala Trp Ile Arg Gln Ala Pro Gly Lys Gly Leu Asp
35 40 45

Trp Ile Gly Ser Thr Tyr His Arg Thr Thr Thr Thr Tyr Tyr Asn Pro
50 55 60

Ser Leu Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln
65 70 75 80

Phe Ser Leu Thr Leu Asn Ser Leu Thr Ala Ala Asp Thr Ala Val Tyr
85 90 95

Tyr Cys Ala Arg His Ser Ser Gly Tyr Ser Glu Leu Ala Tyr Trp Gly
100 105 110

Gln Gly Thr Leu Val Ile Val Ser Thr
115 120

<210> 220
<211> 223
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 220
Gln Glu Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Val Ser Gly Gly Pro Phe Lys Thr Tyr
20 25 30

Pro Ile Asn Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Gly Ile Thr Pro Asn Ser Gly Thr Pro Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Thr Thr Val Tyr

65 70 75 80

Met Gln Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Val His Asn Trp Asp Phe Tyr Tyr Gly Met Asp Val Trp Gly
100 105 110

Leu Gly Thr Thr Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro Lys
115 120 125

Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val
130 135 140

Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val
145 150 155 160

Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro
165 170 175

Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr
180 185 190

Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val
195 200 205

Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
210 215 220

<210> 221
<211> 226
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 221
Glu Val Gln Val Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Arg
1 5 10 15

Ser Leu Arg Leu Ser Cys Thr Pro Ser Gly Phe Thr Phe Gly Asp Asn
20 25 30

Ala Met Gly Trp Phe Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Gly Phe Ile Arg Ser Lys Ala Tyr Gly Gly Thr Arg Asp Tyr Ala Ala
50 55 60

Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser Lys Ser Ile
65 70 75 80

```
Ala Tyr Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr
                85                  90                  95

Tyr Cys Thr Arg Glu Arg Pro Pro Asn Cys Gly Ser Ser Cys Pro Glu
            100                 105                 110

Thr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Pro Thr
        115                 120                 125

Ser Pro Lys Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly
    130                 135                 140

Asn Val Val Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro
145                 150                 155                 160

Leu Ser Val Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn
                165                 170                 175

Phe Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser
            180                 185                 190

Gln Leu Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr
        195                 200                 205

Cys His Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro
    210                 215                 220

Cys Pro
225
```

<210> 222
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 222

```
Gln Val Gln Leu Val Gln Ser Gly Ser Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

Ser Val Arg Leu Ala Cys Lys Thr Ser Gly Tyr Thr Phe Ser Asn Tyr
            20                  25                  30

Gly Val Ser Trp Val Arg Gln Gly Pro Gly Arg Gly Leu Glu Trp Leu
        35                  40                  45

Gly Trp Ile Ser Gly Tyr Asn Gly Arg Thr His Ser Ala Asp Lys Phe
    50                  55                  60

Arg Asp Arg Val Thr Leu Thr Thr Asp Thr Ser Thr Thr Thr Val Tyr
65                  70                  75                  80
```

Val Asp Leu Lys Asn Leu Thr Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Val Gly Thr Ser His Trp Tyr Ser Asp Ser Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 223
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 223
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Met Val Gln Pro Gly Glu
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Asp Phe Thr Ser Tyr
20 25 30

Trp Met Ala Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Asn Met Asn Ala Asp Gly Ser Glu Lys His Tyr Val Asp Ser Val
50 55 60

Lys Gly Arg Phe Ser Ile Ser Arg Asp Asn Ala Lys Lys Leu Leu Phe
65 70 75 80

Leu Gln Met Asn Ser Leu Thr Val Asp Asp Thr Gly Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Glu Gly Arg Arg Glu Gly Ala Trp Gly Gln Gly Thr Gln
100 105 110

Val Ile Val Ser Ala
115

<210> 224
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 224

```
Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
1               5                   10                  15

Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser
            20                  25                  30

Tyr Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
        35                  40                  45

Val Ser Tyr Ile Ser Ser Ser Ser Ser Thr Ile Tyr Tyr Ala Asp Ser
    50                  55                  60

Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu
65                  70                  75                  80

Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr
                85                  90                  95

Cys Ala Arg Asp Ile Ala Leu Gly Arg Gly Gly Met Asp Val Trp Gly
            100                 105                 110

Gln Gly Thr Thr Val Thr Val Ser Ser Gly Ser Ala Ser Gly Pro Ser
        115                 120                 125

Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Asn Val
    210                 215

<210> 225
<211> 120
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 225
Gln Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15
```

```
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Val Ser Ile Gly Thr Ser
            20                  25                  30

Ser Tyr Tyr Trp Gly Trp Ile Arg Gln Pro Pro Ala Lys Gly Leu Glu
        35                  40                  45

Trp Ile Gly Ser Ile Tyr Tyr Ser Gly Ser Thr Tyr Tyr Asn Pro Ser
    50                  55                  60

Leu Lys Asn Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn His Phe
65                  70                  75                  80

Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95

Cys Ala Arg His Arg Thr Gly Gln Tyr Tyr Tyr Asn Ser Trp Gly Gln
            100                 105                 110

Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 226
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 226

```
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Ser Val Ser Gly Asp Ser Phe Ser Asp Tyr
            20                  25                  30

Tyr Trp Ser Trp Thr Arg Gln Ser Pro Gly Lys Gly Leu Glu Trp Leu
        35                  40                  45

Gly Tyr Met Phe Tyr Gly Gly Ser Thr Asn Tyr Asn Pro Ser Leu Lys
    50                  55                  60

Ser Arg Leu Thr Met Ser Val Asp Thr Ser Lys Lys His Val Tyr Leu
65                  70                  75                  80

Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala
                85                  90                  95

Ala Ser Gly Tyr Gly Asp His Val Ala Tyr Trp Gly Gln Gly Thr Leu
            100                 105                 110

Val Thr Val Ser Ser
```

115

<210> 227
<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 227
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 5 10 15

Ser Leu Arg Leu Ser Cys Val Ala Ser Gly Phe Thr Phe Ser Asn Tyr
20 25 30

Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Val Ile Trp Tyr Asp Gly Ser Asn Glu Tyr Tyr Arg Asp Ser Val
50 55 60

Glu Gly Arg Phe Thr Ile Ser Arg Asp Ser Ser Lys Asn Thr Leu Tyr
65 70 75 80

Leu Leu Val Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Gly Asn Gly Pro Lys Ser Gly Lys Tyr Ser Asp Phe Asp Tyr
100 105 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
115 120 125

Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
130 135 140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145 150 155 160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
165 170 175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
180 185 190

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
195 200 205

Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
210 215 220

<210> 228
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 228
Gln Val Gln Leu Val Gln Ser Gly Thr Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Arg Phe Thr Ser Asn
20 25 30

Gly Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Gln Trp Met
35 40 45

Gly Trp Ile Ser Thr Asp Ser Gly Asn Thr Asn Tyr Ala Gln Ser Phe
50 55 60

Gln Gly Arg Val Thr Leu Thr Arg Asp Thr Ser Thr Asn Thr Ala Tyr
65 70 75 80

Leu Glu Leu Arg Arg Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Lys Ser Trp Tyr Phe Asp Tyr Trp Gly Gln Gly Thr Leu
100 105 110

Val Ser Val Ser Ser
115

<210> 229
<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 229
Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Arg Pro Gly
1 5 10 15

Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asp Asp
20 25 30

Tyr Gly Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
35 40 45

Val Ser Gly Ile His Trp Asn Gly Gly Ser Thr Gly Tyr Ala Asp Ser

```
    50                  55                  60

Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu
65                  70                  75                  80

Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Leu Tyr His
                85                  90                  95

Cys Ala Arg Ser Thr Ala Ser Ser Gly Tyr Tyr Asp Ala Phe Asp Ile
            100                 105                 110

Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125

Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
    130                 135                 140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165                 170                 175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215                 220

<210> 230
<211> 227
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 230
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Ser Phe Ser Ala Tyr
            20                  25                  30

Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ala Ile Met Trp Tyr Asp Gly Asn Asn Lys Tyr Tyr Ala Asp Ser Val
    50                  55                  60
```

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Arg Arg Glu Tyr Ser Ser Ser Ser Arg Pro Ser Tyr His
100 105 110

Tyr Tyr Tyr Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser
115 120 125

Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser
130 135 140

Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp
145 150 155 160

Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr
165 170 175

Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr
180 185 190

Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln
195 200 205

Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp
210 215 220

Lys Ser Glu
225

<210> 231
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 231
Val Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val His Pro Gly Gly
1 5 10 15

Ser Leu Arg Ile Ser Cys Ala Ala Ser Glu Phe Thr Phe Ser Ala Tyr
20 25 30

Ala Met Thr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Ala Ile Ser Gly Ser Gly Gly Arg Thr Tyr Tyr Ala Asp Ser Leu
50 55 60

```
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys His Thr Leu Tyr
65                  70                  75                  80

Leu Leu Met Asn Ser Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Ser Arg Tyr Arg Ser Pro Ser Gly Ala Phe Asp Ile Trp Gly Gln
            100                 105                 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215

<210> 232
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 232
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Ala
            20                  25                  30

Trp Met Asn Trp Val Arg Gln Thr Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Gly Arg Ile Lys Thr Lys Thr Asp Gly Gly Thr Thr Asp Tyr Ala Glu
    50                  55                  60

Pro Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser Lys Asn Thr
```

65 70 75 80

Leu Tyr Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr
85 90 95

Tyr Cys Thr Arg Gly Ala Val Ala Asp Tyr Trp Gly Gln Gly Thr Gln
100 105 110

Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu
115 120 125

Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys
130 135 140

Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
145 150 155 160

Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser
165 170 175

Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser
180 185 190

Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn
195 200 205

Thr Lys Val Asp Lys Arg Val
210 215

<210> 233
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 233
Gln Val Gln Leu Lys Gln Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 5 10 15

Ser Leu Thr Leu Ser Cys Val Ala Ser Gly Leu Thr Phe Ser Asp Tyr
20 25 30

Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Val Ile Trp His Asp Gly Ser Lys Thr Asn Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Ile Ile Ile Ser Arg Asp Asn Ser Lys Ser Thr Val Tyr
65 70 75 80

```
Leu Gln Met Asn Arg Leu Arg Gly Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Thr Ser His Gly Gly Leu Val Pro Gly Gly Glu Asn Tyr Trp Gly
            100                 105                 110

Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215
```

<210> 234
<211> 123
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 234

```
Gln Val Gln Leu Val Gln Ser Gly Ser Glu Leu Lys Lys Pro Gly Ala
1               5                   10                  15

Ser Val Lys Val Ser Cys Thr Ser Ser Gly Tyr Val Phe Thr Ser Phe
            20                  25                  30

Gly Val Ser Trp Val Arg Gln Val Pro Gly Gln Gly Pro Glu Trp Met
        35                  40                  45

Gly Trp Ile Ser Pro Tyr Thr Arg Gln Thr Lys Tyr Ala Gln Ser Leu
    50                  55                  60

Gln Gly Arg Ile Thr Leu Thr Ala Asp Thr Ser Thr Asn Thr Thr Tyr
65                  70                  75                  80

Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Met Tyr Tyr Cys
                85                  90                  95
```

Val Arg Glu Glu Phe Gly Val Val Arg Gly Pro Asn Pro Phe Asp Val
100 105 110

Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser
115 120

<210> 235
<211> 224
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 235
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Glu Asp Phe
20 25 30

Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Phe Thr Arg Phe Asp Gly Ser Glu Lys Tyr Tyr Val Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Val Ser Arg Asp Asn Ser Lys Asn Thr Leu Phe
65 70 75 80

Leu His Met Asn Ser Leu Arg Pro Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Lys Thr Arg Ser Tyr Ser Ser Ala Asp Thr Thr Arg Pro Asn Ala
100 105 110

Pro Gly Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser
115 120 125

Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
130 135 140

Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145 150 155 160

Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
165 170 175

His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
180 185 190

Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile

```
        195                 200                 205

Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220
```

<210> 236
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 236

```
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Leu Ser Thr Tyr
            20                  25                  30

Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ala Val Ile Ser His Asp Gly Ser Asn Asn Tyr Tyr Ala Asp Tyr Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ile Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Lys Asp Gly Gln Thr Gly Thr Thr Thr Pro Tyr Phe Asp Tyr Trp
            100                 105                 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr
    130                 135                 140

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

Val Thr Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp
        195                 200                 205
```

```
His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val
    210                 215                 220
```

<210> 237
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 237

```
Pro Val Gln Leu Val Gln Ser Gly Ala Gln Val Lys Lys Pro Gly Ala
1               5                   10                  15

Ser Val Arg Leu Ser Cys Lys Ser Ser Gly Tyr Thr Phe Ser Asn Tyr
            20                  25                  30

Ala Ile His Trp Leu Arg Gln Ala Pro Gly Gln Arg Leu Glu Trp Val
        35                  40                  45

Gly Trp Ile His Val Gly Asn Asp His Thr Arg Tyr Ser Gln Ser Phe
    50                  55                  60

Gln Gly Arg Val Thr Ile Ser Ala Asp Thr Ser Ala Asn Thr Ala Tyr
65                  70                  75                  80

Met Glu Val Arg Gly Leu Arg Ser Glu Asp Thr Ser Leu Phe Tyr Cys
                85                  90                  95

Ala Arg Ala Gly Ala Glu Gly Val Asp Tyr Trp Gly Gln Gly Thr Gln
            100                 105                 110

Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro Lys Val Phe Pro Leu
        115                 120                 125

Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val Ile Ala Cys Leu
    130                 135                 140

Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val Thr Trp Ser Glu
145                 150                 155                 160

Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro Ser Gln Asp Ala
                165                 170                 175

Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr Leu Pro Ala Thr
            180                 185                 190

Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val Lys His Tyr Thr
        195                 200                 205

Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
    210                 215
```

<210> 238
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 238
Ala Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1 5 10 15

Ser Leu Arg Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Ser Thr Tyr
20 25 30

Trp Ile Ile Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp Ile
35 40 45

Gly Arg Phe Asp Pro Ser Asp Ser Tyr Asn Val Asn Ser Pro Ser Phe
50 55 60

Gln Gly His Val Thr Ile Ser Ala Asp Thr Ser Ile Asn Thr Ala Tyr
65 70 75 80

Leu Gln Trp Ser Ser Leu Lys Ala Ser Asp Ser Ala Met Tyr Tyr Cys
85 90 95

Ala Arg Arg Ser Asp Lys Ala Val Pro Gly Thr Phe Asp Gln Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
115 120 125

Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala
130 135 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145 150 155 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
165 170 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
180 185 190

Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His
195 200 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val
210 215

<210> 239

<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 239
Gln Ile Thr Leu Lys Glu Ser Gly Pro Thr Leu Leu Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Asn Phe Ser Gly Phe Ser Leu Thr Thr Tyr
20 25 30

Gly Val Gly Val Ala Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu
35 40 45

Trp Leu Ala Leu Ile Tyr Trp Asp Asp Asp Lys Arg Tyr Ser Pro Ser
50 55 60

Leu Lys Ser Arg Leu Thr Val Thr Lys Asp Thr Ser Lys Asn Gln Val
65 70 75 80

Val Leu Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr
85 90 95

Cys Ala His Arg Gly Gly Lys Asn Pro Arg Tyr Trp Tyr Phe Asp Leu
100 105 110

Trp Gly Arg Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
115 120 125

Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
130 135 140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145 150 155 160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
165 170 175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
180 185 190

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
195 200 205

Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
210 215 220

<210> 240
<211> 218
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 240
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Arg Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ala Tyr
20 25 30

Gly Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Ser Ile Ser Gly Asp Ser Arg Asp Ile Tyr Tyr Gly Ala Ser Met
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Ser Ser Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Gly Glu Gly Gly Glu Leu Trp Ala Phe Asp Tyr Trp Gly Leu
100 105 110

Gly Val Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
115 120 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
130 135 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145 150 155 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
165 170 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
180 185 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
195 200 205

Pro Ser Asn Thr Lys Val Asp Lys Lys Ala
210 215

<210> 241
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 241
Pro Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Gln Val Ser Cys Lys Gly Ser Gly Gly Thr Phe Ser Glu Tyr
20 25 30

Gly Ile Ser Trp Leu Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Gly Ile Ile Pro Val Leu Gly Ile Pro Asn Tyr Ala Gln Lys Phe
50 55 60

Arg Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Gly Ser Ala Tyr
65 70 75 80

Met Glu Val Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Gly Leu Arg Leu Ala Arg Gly Trp Phe His Pro Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Thr Ser Ala Ser Thr Lys Gly Pro Ser
115 120 125

Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
130 135 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145 150 155 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
165 170 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
180 185 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
195 200 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
210 215

<210> 242
<211> 120
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody

VH chain

<400> 242
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Ile Cys Thr Val Ser Gly Ala Ser Val Asn Ser Gly
20 25 30

Thr His Phe Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu
35 40 45

Trp Ile Gly Tyr Val Tyr Tyr Ser Gly Asn Thr Asn Tyr Asn Pro Ser
50 55 60

Leu Lys Ser Arg Val Ala Ile Ser Val Asp Thr Ser Lys Asn Gln Phe
65 70 75 80

Ser Leu Lys Leu Thr Ser Val Thr Ser Ala Asp Thr Ala Val Tyr Tyr
85 90 95

Cys Ala Arg Asp Phe Asp Asp Gly Tyr Asp Ile Arg Tyr Trp Gly Gln
100 105 110

Gly Thr Arg Val Ser Val Ser Ser
115 120

<210> 243
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 243
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ser Ala Ser Gly Phe Thr Phe Ser Ser Tyr
20 25 30

Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Tyr Val
35 40 45

Ser Ala Ile Ser Ser Asn Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65 70 75 80

Leu Gln Met Ser Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Val Lys Ser Pro Val Ala Ala Asn Asp Ala Phe Asp Ile Trp Gly Gln
100 105 110

Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
115 120 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
130 135 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145 150 155 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
165 170 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
180 185 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
195 200 205

Pro Ser Asn Thr Lys Val Asp Lys Ser Val
210 215

<210> 244
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 244
Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
1 5 10 15

Gly Ser Leu Arg Leu Ser Cys Val Ala Ser Gly Phe Thr Phe Ser Ser
20 25 30

Tyr Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Lys Trp
35 40 45

Val Ser Tyr Ile Ser Ser Ser Arg Ser Thr Ile Tyr Asn Ala Asp Ser
50 55 60

Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Lys Ser Leu
65 70 75 80

Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr
85 90 95

Cys Ala Arg Val Ser Val Ala Ala Pro Thr Cys Leu Asp Tyr Trp Gly

```
            100                 105                 110

Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215

<210> 245
<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 245
Gln Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Thr Val Ala Gly Asp Ser Ile Ser Arg Ser
            20                  25                  30

Asn Tyr Tyr Trp Ala Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu
        35                  40                  45

Trp Ile Gly Ser Ile Ile His Thr Gly Thr Thr Tyr His Asn Pro Ser
    50                  55                  60

Leu Arg Ser Arg Gly Thr Ile Leu Val Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Gly Leu Tyr Tyr
                85                  90                  95

Cys Ala Arg His Ser Gly His Asp Gln Leu Pro Leu Asp Phe Asp Asn
            100                 105                 110
```

```
Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125

Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
    130                 135                 140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165                 170                 175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215                 220
```

<210> 246
<211> 116
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 246

```
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Lys Phe
            20                  25                  30

Trp Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Val Trp Leu
        35                  40                  45

Ser Arg Ile Asn Thr Asp Gly Thr Val Thr Thr Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Ser Thr Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Gly Gly Gly Ser Gln Val Asp Phe Trp Gly Gln Gly Thr Leu Val
            100                 105                 110

Thr Val Ser Ser
        115
```

<210> 247
<211> 223
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 247
Gln Ile Thr Leu Lys Glu Ser Gly Pro Thr Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Phe Ser Gly Phe Ser Leu Thr Thr Thr
20 25 30

Gly Val Gly Val Gly Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu
35 40 45

Trp Leu Ala Leu Ile Tyr Trp Asp Asp Asp Lys Arg Tyr Ser Pro Ser
50 55 60

Leu Lys Ser Arg Leu Ile Ile Thr Lys Asp Thr Ser Lys Asn Gln Val
65 70 75 80

Val Leu Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr
85 90 95

Cys Ala His Arg Phe Gly Arg Gly Val Ser Tyr Tyr Tyr Tyr Gly Met
100 105 110

Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr
115 120 125

Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
130 135 140

Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145 150 155 160

Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
165 170 175

Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
180 185 190

Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
195 200 205

Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
210 215 220

<210> 248

<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 248
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Ile Phe Ser Ser Tyr
20 25 30

Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Val Ile Ser Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Lys Ser Lys Asn Thr Leu His
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Lys Asp Ser Gly Ser Asn Asp Asp Met Asp Val Trp Gly Lys Gly
100 105 110

Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
115 120 125

Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
130 135 140

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145 150 155 160

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
165 170 175

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
180 185 190

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
195 200 205

Ser Asn Thr Lys Val Asp Lys Ser Glu
210 215

<210> 249
<211> 219
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 249
Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
1 5 10 15

Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser
20 25 30

Tyr Glu Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
35 40 45

Val Ser Tyr Ile Ser Ser Ser Gly Ser Thr Ile Tyr Tyr Ala Asp Ser
50 55 60

Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu
65 70 75 80

Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr
85 90 95

Cys Ala Arg Arg Gly Phe Tyr Tyr Tyr Tyr Gly Met Asp Val Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
115 120 125

Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
130 135 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145 150 155 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
165 170 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
180 185 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
195 200 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
210 215

<210> 250
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 250
Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
1 5 10 15

Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser
20 25 30

Tyr Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
35 40 45

Val Ser Tyr Ile Ser Ser Ser Ser Ser Thr Ile Tyr Tyr Ala Asp Ser
50 55 60

Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu
65 70 75 80

Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr
85 90 95

Cys Ala Ser Leu Leu Gly Gly Asp Pro Asp Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
115 120 125

Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
130 135 140

Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145 150 155 160

Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
165 170 175

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
180 185 190

Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
195 200 205

Asn Thr Lys Val Asp Lys Lys Val
210 215

<210> 251
<211> 226
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody

VH chain

<400> 251
Pro Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Phe Ser Gly Phe Ser Leu Ser Thr Ser
20 25 30

Gly Met Cys Val Ser Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu
35 40 45

Trp Leu Ala Arg Ile Asp Trp Asp Asp Asp Lys Tyr Tyr Ser Thr Ser
50 55 60

Leu Lys Thr Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val
65 70 75 80

Val Leu Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr
85 90 95

Cys Ala Arg Met Gln Ile Val Ala Thr Thr Gln Thr Tyr Tyr Tyr Tyr
100 105 110

Tyr Gly Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
115 120 125

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
130 135 140

Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
145 150 155 160

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
165 170 175

Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
180 185 190

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
195 200 205

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
210 215 220

Ser Glu
225

<210> 252
<211> 218
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 252
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
20 25 30

Trp Met Thr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Asn Ile Lys Gln Asp Gly Ser Glu Lys Tyr Tyr Val Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Ser Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Ala Gly Tyr Asp Leu Phe Gly Trp Phe Asp Pro Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
115 120 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
130 135 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145 150 155 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
165 170 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
180 185 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
195 200 205

Pro Ser Asn Thr Lys Val Asp Lys Lys Leu
210 215

<210> 253
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VH chain

<400> 253
Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1   5   10   15

Ser Leu Arg Leu Ser Cys Val Ala Ser Gly Phe Thr Phe Ala Ser Tyr
            20   25   30

Gly Met Ala Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Thr Trp Ile
        35   40   45

Cys Phe Val Gly Ser Gly Asp Thr Thr His Tyr Ala Glu Ser Val Lys
    50   55   60

Gly Arg Phe Thr Cys Ser Arg Asp Asn Ser Asn Asn Thr Leu Tyr Leu
65   70   75   80

His Met Ser Gly Leu Arg Gly Ala Asp Thr Ala Lys Tyr Tyr Cys Ala
                85   90   95

Lys Pro Asn Ser Pro Phe Thr Gly Ser Gly Ser Phe His Asn Tyr Phe
            100   105   110

Asp Tyr Trp Gly Gln Gly Ala Leu Val Ile Val Ser Ser
        115   120   125

<210> 254
<211> 113
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 254
Glu Val Gln Val Val Glu Ser Gly Gly Gly Leu Gly Gln Pro Gly Gly
1   5   10   15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20   25   30

Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35   40   45

Ser Tyr Ile Ser Ser Ser Ser Ser Thr Lys Tyr Tyr Ala Asp Ser Val
    50   55   60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Lys Ser Leu Tyr
65   70   75   80

Leu Gln Met Asn Ser Leu Arg Asp Glu Asp Thr Ala Val Tyr Tyr Cys
                85   90   95

Ala Ser Pro Val Arg Pro Trp Gly Gln Gly Thr Leu Val Thr Val Ser
100 105 110

Ser

<210> 255
<211> 226
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 255
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Met Lys Lys Pro Gly Thr
1 5 10 15

Ser Val Lys Val Ser Cys Arg Thr Ser Gly Tyr Ile Phe Thr Gly Ser
20 25 30

Phe Met His Trp Val Arg Gln Ala Pro Ala Gln Gly Leu Glu Trp Met
35 40 45

Gly Trp Ile Asn Pro Lys Thr Gly Ala Thr Tyr Tyr Thr Glu Lys Phe
50 55 60

Lys Gly Arg Val Thr Leu Thr Arg Asp Thr Ser Ile Asn Thr Ala Tyr
65 70 75 80

Met Glu Met Thr Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Gly Phe Cys Asp Leu Pro Ala Cys Tyr Pro Val Pro Gln Tyr
100 105 110

Asn Trp Phe Asp Pro Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120 125

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
130 135 140

Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
145 150 155 160

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
165 170 175

Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
180 185 190

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
195 200 205

```
Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
    210                 215                 220

Arg Val
225
```

<210> 256
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 256

```
Pro Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gln
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Gly
            20                  25                  30

Thr Tyr Tyr Trp Ser Trp Ile Arg Gln Pro Ala Gly Lys Gly Leu Glu
        35                  40                  45

Trp Ile Gly Arg Ile Tyr Ala Ser Gly Ser Thr Asn Tyr Asn Pro Ser
    50                  55                  60

Leu Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

Ser Leu Lys Leu Thr Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95

Cys Ala Arg Tyr Ser Gly Ser Tyr Pro Leu Gly Phe Asp Tyr Trp Gly
            100                 105                 110

Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
```

```
        195                 200                 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215

<210> 257
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 257
Gly Ala Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro
1               5                   10                  15

Gly Gln Ser Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Thr
            20                  25                  30

Asn Tyr Trp Ile Gly Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu
        35                  40                  45

Trp Met Gly Ile Ile Tyr Pro Gly Asp Ser Asp Thr Arg Tyr Ser Pro
    50                  55                  60

Ser Phe Gln Gly Gln Val Thr Ile Ser Ala Asp Lys Ser Ile Ser Thr
65                  70                  75                  80

Ala Tyr Leu Gln Trp Ser Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr
                85                  90                  95

Tyr Cys Ala Arg His Glu Gly Ala Phe Asp Ile Trp Gly Gln Gly Thr
            100                 105                 110

Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
        115                 120                 125

Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
    130                 135                 140

Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160

Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
        195                 200                 205
```

Asn Thr Lys Val Asp Lys Lys Val
210 215

<210> 258
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 258
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Ala
20 25 30

Trp Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Gly Arg Ile Lys Ser Lys Thr Asp Gly Gly Thr Thr Asp Tyr Thr Ala
50 55 60

Pro Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser Lys Asn Thr
65 70 75 80

Leu Tyr Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr
85 90 95

Tyr Cys Thr Thr Asp Leu Ala Val Thr Thr Arg Phe Asp Tyr Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 259
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 259
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Pro Phe Ser Thr Tyr
20 25 30

Ala Leu His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val

```
        35                  40                  45

Ala Val Ile Ser Lys Asp Gly Asn Ser Lys Ser Ser Ala Glu Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Lys Ser Arg Asn Thr Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Pro Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Ser Thr Arg Thr Asp Ala Leu Asp Val Trp Gly Gln Gly Thr
            100                 105                 110

Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
        115                 120                 125

Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
    130                 135                 140

Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160

Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
        195                 200                 205

Asn Thr Lys Val Asp Lys Arg Val
    210                 215
```

<210> 260
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 260

```
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Lys Leu Ser Cys Ala Ala Ser Gly Phe Ser Phe Ser Gly Ser
            20                  25                  30

Ser Val His Trp Val Arg Gln Ala Ser Gly Lys Gly Leu Glu Trp Val
        35                  40                  45
```

```
Gly Arg Ile Arg Ser Lys Thr Lys Asn Tyr Ala Thr Ala Tyr Ala Ala
    50                  55                  60

Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser Lys Asn Thr
65                  70                  75                  80

Ala Phe Leu Gln Met Arg Ser Leu Lys Ala Glu Asp Thr Ala Val Tyr
                85                  90                  95

Tyr Cys Ala Lys Asn Asp Glu Met Asp Phe Lys Gly Tyr Asp Tyr Trp
            100                 105                 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
    130                 135                 140

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
        195                 200                 205

His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220
```

<210> 261
<211> 213
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 261

```
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Tyr
            20                  25                  30

Tyr Trp Ser Trp Ile Arg Gln Pro Ala Gly Lys Gly Leu Glu Trp Ile
        35                  40                  45

Gly Arg Ile Tyr Thr Ser Gly Ser Thr Asn Tyr Asn Pro Ser Leu Lys
    50                  55                  60
```

```
Ser Arg Val Thr Met Ser Val Asp Thr Ser Lys Asn Gln Phe Ser Leu
65                  70                  75                  80

Lys Met Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala
                85                  90                  95

Arg Gly Glu Leu Leu Phe Asp His Trp Gly Gln Gly Thr Leu Val Thr
            100                 105                 110

Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro
        115                 120                 125

Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val
    130                 135                 140

Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala
145                 150                 155                 160

Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly
                165                 170                 175

Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly
            180                 185                 190

Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys
        195                 200                 205

Val Asp Lys Asn Val
    210
```

<210> 262
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 262

```
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Arg
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Val Ala Ser Gly Phe Thr Phe Gly Asp Tyr
            20                  25                  30

Ala Val Asn Trp Phe Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Gly Phe Ile Ser Thr Lys Gly Tyr Asp Glu Thr Ala Glu Tyr Ala Ala
    50                  55                  60

Ser Val Lys Gly Arg Phe Thr Met Ser Arg Asp Asp Ser Lys Asn Ile
```

65 70 75 80

Ala Tyr Leu Leu Met Asp Ser Leu Lys Ala Glu Asp Thr Ala Met Tyr
85 90 95

Tyr Cys Ala Arg Glu Ser Thr Val Val Leu Asp Phe Trp Gly Gln Gly
100 105 110

Thr Leu Val Ala Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
115 120 125

Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
130 135 140

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145 150 155 160

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
165 170 175

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
180 185 190

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
195 200 205

Ser Asn Thr Lys Val Asp Lys Lys Val
210 215

<210> 263
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 263
Gln Val Gln Leu Val Asp Ser Gly Gly Gly Val Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Leu Ser Asn Tyr
20 25 30

Gly Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Phe Ile Pro Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Ile Ser Lys Asn Thr Leu Tyr
65 70 75 80

```
Leu Gln Met Asn Ser Leu Arg Thr Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Lys Arg Ser Thr Ala Val Gly Asp Phe Asp Pro Trp Gly Gln Gly
            100                 105                 110

Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125

Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160

Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205

Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215
```

<210> 264
<211> 225
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 264

```
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Ser Ile Thr Thr His
            20                  25                  30

Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Gln Trp Val
        35                  40                  45

Ala Tyr Ile Ser Thr Ser Thr Ser Thr Ile Tyr Tyr Ala Asp Ser Val
    50                  55                  60

Glu Gly Arg Phe Thr Ile Ser Arg Asp Lys Ala Lys Asn Ala Leu Tyr
65                  70                  75                  80

Leu Gln Met Asp Ser Leu Arg Ala Gln Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
```

Ala Arg Gly Pro Ser Asn Trp Asn Gly Gly Pro Glu His Met Asp Val
100 105 110

Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser Ala Ser Pro Thr Ser
115 120 125

Pro Lys Val Phe Pro Leu Ser Leu Asp Ser Thr Pro Gln Asp Gly Asn
130 135 140

Val Val Val Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu
145 150 155 160

Ser Val Thr Trp Ser Glu Ser Gly Gln Asn Val Thr Ala Arg Asn Phe
165 170 175

Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln
180 185 190

Leu Thr Leu Pro Ala Thr Gln Cys Pro Asp Gly Lys Ser Val Thr Cys
195 200 205

His Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys
210 215 220

Pro
225

<210> 265
<211> 211
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 265
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
20 25 30

Glu Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Tyr Ile Ser Ser Ser Gly Ser Thr Ile Tyr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys

```
                85                  90                  95

Ala Arg Asp Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser
            100                 105                 110

Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser
        115                 120                 125

Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp
    130                 135                 140

Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr
145                 150                 155                 160

Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr
                165                 170                 175

Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln
            180                 185                 190

Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp
        195                 200                 205

Lys Asn Val
    210
```

<210> 266
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 266

```
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ser Tyr Ile Ser Ser Ser Ser Ser Thr Ile Tyr Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Asp Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
```

```
Ala Arg Asp Pro Tyr Gly Ser Gly Thr Val Trp Phe Asp Pro Trp Gly
            100                 105                 110

Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

Lys Pro Ser Asn Thr Lys Val Asp Lys Asn Val
    210                 215
```

<210> 267
<211> 224
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 267

```
Glu Ala Gln Leu Val Glu Ser Gly Gly Gly Leu Ile Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Ser Val Ser Ser Lys
            20                  25                  30

Tyr Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ser Val Met Tyr Ser Gly Gly Ala Thr Tyr Tyr Ala Asp Ser Val Lys
    50                  55                  60

Gly Arg Phe Val Ile Ser Arg Asp Ser Ser Lys Asn Thr Val Phe Leu
65                  70                  75                  80

Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala
                85                  90                  95

Lys Thr Glu Tyr Thr Phe Leu Ser Gly Ser Asp Tyr Tyr Gln Tyr Gly
            100                 105                 110
```

Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser
115 120 125

Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
130 135 140

Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145 150 155 160

Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
165 170 175

His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
180 185 190

Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile
195 200 205

Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
210 215 220

<210> 268
<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VH chain

<400> 268
Pro Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1 5 10 15

Ser Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Thr Asn Tyr
20 25 30

Trp Ile Gly Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp Met
35 40 45

Gly Ile Ile Tyr Pro Gly Asp Ser Asp Thr Arg Tyr Ser Pro Ser Phe
50 55 60

Gln Gly Gln Val Thr Ile Ser Ala Asp Lys Ser Ile Ser Thr Ala Tyr
65 70 75 80

Leu Gln Trp Ser Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr Tyr Cys
85 90 95

Ala Arg Arg Gly Leu Leu Arg Gly Ser Asn Glu Gly Arg Phe Asp Tyr
100 105 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly

```
        115                 120                 125

Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
    130                 135                 140

Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165                 170                 175

Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220

<210> 269
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 269
Val Val Gln Leu Val Glu Ser Gly Gly Asp Leu Val Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Lys Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Gly Ser
            20                  25                  30

Ala Met His Trp Val Arg Gln Ala Ser Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Gly Arg Ile Arg Ser Lys Pro Asn Ser Tyr Ala Thr Ala Tyr Ala Val
    50                  55                  60

Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser Lys Asn Thr
65                  70                  75                  80

Ala Tyr Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr
                85                  90                  95

Tyr Cys Thr Arg Arg Gly Ser Ala Trp Thr Asp Pro Tyr Tyr Thr Asp
            100                 105                 110

Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys
        115                 120                 125
```

```
Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
    130                 135                 140

Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145                 150                 155                 160

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
                165                 170                 175

Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
            180                 185                 190

Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
        195                 200                 205

Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Glu
    210                 215                 220

<210> 270
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 270
Ser Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asp Tyr
            20                  25                  30

Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ala Val Ile Trp Tyr Asp Gly Ser Asn Glu Tyr Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Val Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Gly Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Asp Asp Val Pro Arg Gly Tyr Asp Tyr Trp Gly Gln Gly Thr
            100                 105                 110

Leu Val Thr Val Ser Ser Gly Ser Ala Ser Ala Pro Thr Leu Phe Pro
        115                 120                 125

Leu Val Ser Cys Glu Asn Ser Pro Ser Asp Thr Ser Ser Val Ala Val
    130                 135                 140
```

```
Gly Cys Leu Ala Gln Asp Phe Leu Pro Asp Ser Ile Thr Phe Ser Trp
145                 150                 155                 160

Lys Tyr Lys Asn Asn Ser Asp Ile Ser Ser Thr Arg Gly Phe Pro Ser
                165                 170                 175

Val Leu Arg Gly Gly Lys Tyr Ala Ala Thr Ser Gln Val Leu Leu Pro
            180                 185                 190

Ser Lys Asp Val Met Gln Gly Thr Asp Glu His Val Val Cys Lys Val
        195                 200                 205

Gln His Pro Asn Gly Asn Lys Glu Lys Asn Val Pro Leu Pro
    210                 215                 220

<210> 271
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VH chain

<400> 271
Ser Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Tyr Thr Phe Asn Asn Tyr
            20                  25                  30

Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ala Ile Ile Trp Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Glu Tyr Ile Val Pro Phe Tyr Gly Met Asp Val Trp Gly Gln
            100                 105                 110

Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
```

145 150 155 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
165 170 175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
180 185 190

Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
195 200 205

Pro Ser Asn Thr Lys Val Asp Lys Lys Val
210 215

<210> 272
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 272
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Ser Ile Thr Cys Arg Ala Ser Gln Gly Val Ser Ser Tyr
20 25 30

Leu Ala Trp Tyr Gln Lys Lys Pro Gly Arg Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Ser Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Thr Gly Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Thr Asn Thr Phe Pro Leu
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

```
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Cys
    210
```

<210> 273
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 273

```
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Gly Ser Tyr
            20                  25                  30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Pro Pro
                85                  90                  95

Arg Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175
```

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 274
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 274
Asp Ile Gln Met Thr Gln Ser Pro Ser Tyr Val Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Gly Ile Asp Val Trp
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Thr Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Gly Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Asn Ser Phe Pro Gly
85 90 95

Thr Phe Gly Pro Gly Thr Lys Val Asp Val Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr

```
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Cys
    210
```

<210> 275
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 275

```
Pro Ser Val Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Pro Gly Gln
1               5                   10                  15

Arg Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Ser Asn
            20                  25                  30

Tyr Val Tyr Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Phe Leu
        35                  40                  45

Ile Tyr Arg Asn Asn Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
    50                  55                  60

Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Arg
65                  70                  75                  80

Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ala Trp Glu Asp Ser Leu
                85                  90                  95

Ser Gly Pro Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110
```

<210> 276
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 276

```
Ser Ser Glu Leu Thr Gln Asp Pro Ala Val Ser Val Ala Leu Gly Gln
1               5                   10                  15

Thr Val Arg Ile Thr Cys Gln Gly Asp Ser Leu Arg Asn Tyr Tyr Ala
            20                  25                  30
```

```
Ser Trp Phe Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Phe
        35                  40                  45

Gly Lys Asn Tyr Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly Ser
    50                  55                  60

Asn Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala Glu
65                  70                  75                  80

Asp Glu Ala Asp Tyr Tyr Cys Asn Ser Arg Asp Arg Ser Gly Tyr Val
                85                  90                  95

Phe Gly Ser Gly Thr Lys Val Thr Val Leu Gly Gln Pro Lys Ala Asn
            100                 105                 110

Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125

Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130                 135                 140

Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys Ala Gly Val Glu
145                 150                 155                 160

Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175

Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190

Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195                 200                 205

Thr Glu Cys Ser
    210
```

<210> 277
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 277

```
Leu Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Thr
1               5                   10                  15

Thr Ala Trp Ile Ser Cys Gly Gly Asn Asn Ile Gly Ile Lys Ser Val
            20                  25                  30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Leu Leu Val Ile Ser
```

```
        35                  40                  45

Tyr Asp Ser Asp Arg Pro Ser Val Ile Pro Glu Arg Phe Ser Val Ser
    50                  55                  60

Asn Ser Gly Asn Thr Val Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65                  70                  75                  80

Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Asn Gly His Ser His
                85                  90                  95

Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
            100                 105                 110

Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
        115                 120                 125

Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
    130                 135                 140

Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145                 150                 155                 160

Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
                165                 170                 175

Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser
            180                 185                 190

Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
        195                 200                 205

Ala Pro Thr Glu Cys Ser
    210

<210> 278
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 278
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Tyr
            20                  25                  30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Arg Ala Pro Arg Leu Leu Ile
        35                  40                  45
```

```
Tyr Ala Ala Ser Arg Leu Gln Ile Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Arg Met Pro Cys
                85                  90                  95

Ser Phe Gly Gln Gly Thr Lys Leu Glu Ile
            100                 105
```

<210> 279
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 279

```
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Ser
            20                  25                  30

Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

Ile Tyr Asp Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser Pro
                85                  90                  95

Pro Ile Thr Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys Arg Thr Val
            100                 105                 110

Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
        115                 120                 125

Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
    130                 135                 140

Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
145                 150                 155                 160

Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
                165                 170                 175
```

Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
180 185 190

Leu Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
195 200 205

Lys Ser Phe Asn Arg Gly Glu Cys
210 215

<210> 280
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 280
His Phe Met Leu Thr Gln Pro His Ser Val Ser Glu Ser Pro Gly Lys
1 5 10 15

Thr Val Thr Ile Ser Cys Thr Arg Ser Ser Gly Asn Ile Ala Ser Tyr
20 25 30

Tyr Val Gln Trp Tyr Gln Gln Arg Pro Gly Ser Ala Pro Thr Thr Val
35 40 45

Ile Tyr Glu Asp Asp Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
50 55 60

Ala Ser Ile Asp Ser Ser Ser Asn Ser Ala Ser Leu Thr Ile Ser Gly
65 70 75 80

Leu Lys Thr Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Thr
85 90 95

Thr Asn Val Ile Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 281
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 281
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

```
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Ser
            20                  25                  30

Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

Ile Phe Gly Ala Ser Thr Arg Ala Ser Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

Gly Arg Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Asp Ser Ser Pro
                85                  90                  95

Phe Thr Phe Gly Pro Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
            100                 105                 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu
            180                 185                 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 282
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 282
Pro Ser Val Leu Thr Gln Pro Pro Ser Val Ser Ala Ala Pro Gly Gln
1               5                   10                  15

Asn Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Glu Asn Asn
            20                  25                  30
```

Asp Val Ser Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Val Ile
        35   40   45

Ile Tyr Glu Asn Asn Gln Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser
    50   55   60

Gly Ser Lys Ser Gly Thr Ser Ala Thr Leu Gly Ile Thr Gly Leu Gln
65   70   75   80

Thr Gly Asp Glu Ala Asp Tyr Tyr Cys Gly Thr Trp Asp Asp Asn Leu
                85   90   95

Ser Ala Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro
            100   105   110

Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu
        115   120   125

Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro
    130   135   140

Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala
145   150   155   160

Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala
                165   170   175

Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg
            180   185   190

Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr
        195   200   205

Val Ala Pro Thr Glu Cys Ser
    210   215

<210> 283
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 283
Asp Val Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Leu Gly
1   5   10   15

Gln Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Val His Ser
            20   25   30

Asp Gly Asn Thr Tyr Leu Asn Trp Phe Gln Gln Arg Pro Gly Gln Ser

```
        35                  40                  45

Pro Arg Arg Leu Ile Tyr Met Val Ser Asn Arg Asp Ser Gly Val Pro
    50                  55                  60

Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65                  70                  75                  80

Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Leu Gln Gly
                85                  90                  95

Thr His Trp Pro Pro Thr Ile Gly Gln Gly Thr Lys Val Glu Ile Glu
            100                 105                 110

<210> 284
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 284
Pro Ser Gly Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Pro Gly Gln
1               5                   10                  15

Arg Val Thr Met Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Arg Asn
            20                  25                  30

Tyr Val Tyr Trp Tyr Gln Gln Leu Pro Gly Ala Ala Pro Lys Leu Leu
        35                  40                  45

Ile Tyr Arg Asp Asn Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
    50                  55                  60

Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Arg
65                  70                  75                  80

Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ala Trp Asp Asp Asn Val
                85                  90                  95

Ser Gly Pro Gly Phe Gly Ala Gly Thr Arg Leu Thr Val Leu Gly Gln
            100                 105                 110

Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys
145                 150                 155                 160
```

Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr
165 170 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
180 185 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
195 200 205

Thr Val Ala Pro Thr Glu Cys Ser
210 215

<210> 285
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 285
Pro Ala Val Leu Thr Gln Ser Pro Ser Ala Ser Gly Thr Pro Gly Gln
1 5 10 15

Arg Val Thr Ile Ser Cys Phe Gly Ser Ile Ser Asn Ile Gly Ser Asn
20 25 30

Pro Val Asn Trp Tyr Gln Gln Val Pro Gly Ala Ala Pro Lys Leu Leu
35 40 45

Ile Tyr Ser Ser Ser Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
50 55 60

Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Gln
65 70 75 80

Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Thr Trp Asp Asp Ser Leu
85 90 95

Asn Gly Pro Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
100 105 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
115 120 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
130 135 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145 150 155 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
165 170 175

```
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 286
<211> 213
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 286
Glu Thr Val Met Thr Gln Ser Pro Ala Thr Leu Ser Val Ser Pro Gly
1               5                   10                  15

Asp Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Asn Val Asn Phe Asn
            20                  25                  30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
        35                  40                  45

Tyr Asp Ala Ser Thr Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly
    50                  55                  60

Ser Ala Ser Gly Thr Glu Phe Thr Leu Thr Ile Asn Ser Leu Gln Ser
65                  70                  75                  80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Asn Asn Trp Trp Thr
                85                  90                  95

Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala Ala Pro
            100                 105                 110

Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr
        115                 120                 125

Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys
    130                 135                 140

Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu
145                 150                 155                 160

Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser
                165                 170                 175

Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala
```

```
            180                 185                 190

Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe
        195                 200                 205

Asn Arg Gly Glu Trp
    210

<210> 287
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 287
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Ser
            20                  25                  30

Ser Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Phe Arg
                85                  90                  95

Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala
            100                 105                 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190
```

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
195 200 205

Ser Phe Asn Arg Gly Glu Trp
210 215

<210> 288
<211> 213
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 288
Pro Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1 5 10 15

Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Lys Gln Tyr Ala
20 25 30

Tyr Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
35 40 45

Lys Asp Ser Glu Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

Ser Ser Gly Thr Thr Val Thr Leu Thr Ile Ser Gly Val Gln Ala Glu
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Ala Asp Ser Ser Asp Thr Tyr
85 90 95

Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys Ala
100 105 110

Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala
115 120 125

Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala
130 135 140

Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val
145 150 155 160

Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser
165 170 175

Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr
180 185 190

Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala
195 200 205

Pro Thr Glu Cys Ser
    210

<210> 289
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 289
Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1   5   10   15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Tyr
            20   25   30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
        35   40   45

Tyr Asp Ala Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly
    50   55   60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65   70   75   80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ser Asn Trp Pro Leu
                85   90   95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
            100   105   110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115   120   125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130   135   140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145   150   155   160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165   170   175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180   185   190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195   200   205

Phe Asn Arg Gly Glu Trp

210

<210> 290
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 290
Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Gly Ser Tyr
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
35 40 45

Tyr Asp Ala Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65 70 75 80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Gly Ser Asn Trp Leu Ala
85 90 95

Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
100 105 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
115 120 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
130 135 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145 150 155 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
165 170 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
180 185 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
195 200 205

Ser Phe Asn Arg Gly Glu Cys
210 215

<210> 291
<211> 213
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 291
Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly Asp
1 5 10 15

Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ala Ile Ala Asn Ser Leu
20 25 30

Ala Trp Tyr Gln Gln Arg Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr
35 40 45

Ala Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly Ser
50 55 60

Gly Ser Gly Thr Asp Tyr Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu
65 70 75 80

Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Tyr Ile Asn Pro Arg Thr
85 90 95

Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala Pro
100 105 110

Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr
115 120 125

Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys
130 135 140

Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu
145 150 155 160

Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser
165 170 175

Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala
180 185 190

Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe
195 200 205

Asn Arg Gly Glu Cys
210

<210> 292
<211> 220

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 292
Gly Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Val Leu Tyr Ser
20 25 30

Ser Asn Asn Glu Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
35 40 45

Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
50 55 60

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65 70 75 80

Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
85 90 95

Tyr Tyr Ser Thr Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile
100 105 110

Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
115 120 125

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
130 135 140

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145 150 155 160

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
165 170 175

Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
180 185 190

Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
195 200 205

Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Trp
210 215 220

<210> 293
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 293
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Ser Cys Arg Ala Ser His Asn Ile Asn Thr Tyr
20 25 30

Leu Asn Trp Tyr Gln His Lys Pro Gly Lys Ala Pro Lys Ile Val Ile
35 40 45

Tyr Gly Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Ser Leu Thr Ile Ser Ser Leu Gln Arg
65 70 75 80

Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Ser Phe Asn Thr Val Leu
85 90 95

Thr Phe Gly Gly Gly Thr Arg Val Asp Ile
100 105

<210> 294
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 294
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1 5 10 15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr
20 25 30

Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
35 40 45

Met Ile Tyr Glu Val Ser Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr His Cys Ser Ser Tyr Thr Ile Thr
85 90 95

```
Ser Thr Leu Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

His Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 295
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 295

```
Gln Ser Val Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Pro Gly Gln
1               5                   10                  15

Gly Val Thr Ile Ser Cys Ser Gly Thr Ser Ala Asn Ile Gly Lys Asn
            20                  25                  30

Tyr Val Ser Trp Tyr Gln His Leu Pro Gly Thr Ala Pro Arg Leu Leu
        35                  40                  45

Ile Tyr Arg Ile Asp Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
    50                  55                  60

Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Arg
65                  70                  75                  80

Pro Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ala Trp Asp Asp Ser Leu
                85                  90                  95

Ser Gly Pro Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
```

```
            100                 105                 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 296
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 296
Asp Leu Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Ile Gly
1               5                   10                  15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Thr Tyr
            20                  25                  30

Phe Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Thr Ser Leu Gln Pro
65                  70                  75                  80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Thr Tyr Ser Asn Pro Trp
                85                  90                  95

Thr Phe Gly Gln Gly Thr Lys Val Asp Phe Lys Arg Thr Val Ala Ala
            100                 105                 110
```

```
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Trp
    210

<210> 297
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 297
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Lys Asn Tyr
            20                  25                  30

Val Asn Trp Tyr Gln Gln Lys Pro Gly Glu Ala Pro Asn Leu Leu Ile
        35                  40                  45

Phe Ala Ala Ser Asn Leu Gln Ser Gly Val Pro Ser Arg Phe Thr Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Phe Ser Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Glu Asp Phe Ala Ala Tyr Tyr Cys Gln Gln Thr Tyr Ser His Pro Arg
                85                  90                  95

Thr Phe Gly Gln Gly Thr Arg Val Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125
```

```
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Cys
    210

<210> 298
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 298
Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

Arg Val Thr Ile Ser Cys Thr Gly Ser Ser Ser Asn Ile Gly Ala Gly
            20                  25                  30

Tyr Asp Val His Trp Tyr Gln His Leu Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

Leu Ile Tyr Gly Asp Ser His Arg Pro Ser Gly Val Pro Asp Gly Phe
    50                  55                  60

Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser
                85                  90                  95

Leu Ser Gly Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly
            100                 105                 110

Gln Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
```

130 135 140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val
145 150 155 160

Lys Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys
165 170 175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
180 185 190

His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
195 200 205

Lys Thr Val Ala Pro Thr Glu Cys Ser
210 215

<210> 299
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 299
Ser Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Gln
1 5 10 15

Thr Ala Arg Ile Ala Cys Gly Gly Asn Asn Ile Gly Ser Lys Thr Val
20 25 30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Met Val Val Val Tyr
35 40 45

Asp Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Ser Asp His
85 90 95

Tyr Val Leu Gly Thr Gly Thr Lys Val Thr Val Leu
100 105

<210> 300
<211> 214
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 300
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Val Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Asp Ile Ser Asn Trp
20 25 30

Leu Ala Trp Tyr Leu Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Thr Ser Ser Phe Pro Arg
85 90 95

Thr Phe Gly Pro Gly Thr Lys Val Asp Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 301
<211> 213
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 301
Pro Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1   5   10   15

Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Asn Glu Asn Ala
            20   25   30

Phe Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
        35   40   45

Glu Asp Ile Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50   55   60

Ser Ser Gly Thr Thr Val Thr Leu Thr Ile Ser Gly Val Gln Ala Glu
65   70   75   80

Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Val Asp Ile Thr Ser Thr Trp
                85   90   95

Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys Ala
            100   105   110

Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala
        115   120   125

Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala
    130   135   140

Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val
145   150   155   160

Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser
                165   170   175

Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser Tyr
            180   185   190

Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala
        195   200   205

Pro Thr Glu Cys Ser
    210

<210> 302
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 302

```
Gln Ser Ala Leu Thr Gln Pro Pro Ser Val Ser Gly Ser Pro Gly Gln
1               5                  10                  15

Ser Val Thr Ile Ser Cys Thr Gly Thr Thr Ser Asp Ile Gly Ser Tyr
            20                  25                  30

Asp Arg Val Ser Trp Tyr Gln Lys Pro Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

Ile Ile Tyr Glu Val Ser His Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Ile Ser Ser
                85                  90                  95

Leu Thr Tyr Val Leu Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 303
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 303

```
Pro Ser Val Leu Thr Gln Pro Pro Ser Val Ser Ala Ala Pro Gly Gln
1               5                  10                  15
```

```
Lys Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Asn Asn
            20                  25                  30

Tyr Val Ser Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
        35                  40                  45

Ile Tyr Asp Asn Asn Lys Arg Pro Ser Gly Ile Arg Asp Arg Phe Ser
    50                  55                  60

Gly Ser Lys Ser Gly Thr Ser Ala Thr Leu Gly Ile Thr Gly Leu Gln
65                  70                  75                  80

Thr Gly Asp Glu Ala Asp Tyr Tyr Cys Gly Thr Trp Asp Ser Ser Leu
                85                  90                  95

Ser Val Gly Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
            100                 105                 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 304
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 304

```
Gly Val Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Leu Gly
1               5                   10                  15

Gln Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Val Tyr Ser
```

```
            20                  25                  30

Asp Gly Asn Thr Tyr Leu Asn Trp Phe Gln Gln Arg Pro Gly Gln Ser
        35                  40                  45

Pro Arg Arg Leu Ile Tyr Lys Val Ser Asn Arg Asp Ser Gly Val Pro
    50                  55                  60

Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65                  70                  75                  80

Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln Gly
                85                  90                  95

Thr His Trp Pro Ile Thr Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys
            100                 105                 110

Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
        115                 120                 125

Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
    130                 135                 140

Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
145                 150                 155                 160

Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
                165                 170                 175

Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
            180                 185                 190

Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
        195                 200                 205

Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Trp
    210                 215

<210> 305
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 305
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Ile Arg Ser Ser
            20                  25                  30
```

```
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Asp Ser Ser Ser
                85                  90                  95

Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
            100                 105
```

<210> 306
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 306

```
Pro Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

Arg Val Thr Ile Ser Cys Ser Gly Ser Thr Ser Asn Ile Gly Ala Gly
            20                  25                  30

Tyr Asp Val His Trp Tyr Gln Gln Phe Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

Leu Ile Tyr Gly Asn Ile Phe Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80

Gln Ala Glu Asp Glu Ala Ala Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser
                85                  90                  95

Leu Arg Gly Val Val Phe Gly Gly Gly Thr Tyr Leu Thr Val Leu Gly
            100                 105                 110

Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160
```

Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
165 170 175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
180 185 190

His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
195 200 205

Lys Thr Val Ala Pro Thr Glu Cys Ser
210 215

<210> 307
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 307
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Pro Arg
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser

```
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Trp
    210

<210> 308
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 308
Gly Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1               5                   10                  15

Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Asn Val Leu Tyr Ser
            20                  25                  30

Ser Asn Asn Lys Asn Tyr Leu Gly Trp Tyr Gln Gln Lys Pro Gly Gln
        35                  40                  45

Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
    50                  55                  60

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65                  70                  75                  80

Ile Asn Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
                85                  90                  95

Tyr Tyr Ser Thr Pro Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile
            100                 105                 110

Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115                 120                 125

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130                 135                 140

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175
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Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
            180   185   190

Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
        195   200   205

Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Trp
    210   215   220

<210> 309
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 309
Pro Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1   5   10   15

Lys Val Thr Ile Ser Cys Thr Gly Ser Ser Ser Asn Ile Gly Ala Gly
            20   25   30

Tyr Asp Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
        35   40   45

Leu Ile Tyr Arg Asn Asn Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
    50   55   60

Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65   70   75   80

Gln Thr Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Gly
                85   90   95

Leu Ser Gly Ser Lys Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val
            100   105   110

Leu Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser
        115   120   125

Ser Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser
    130   135   140

Asp Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser
145   150   155   160

Pro Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn
                165   170   175

Asn Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp
            180   185   190

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Lys Ser His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr
        195                 200                 205

Val Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 310
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 310
His Phe Met Leu Thr Gln Pro His Ser Val Ser Glu Ser Pro Gly Lys
1               5                   10                  15

Thr Val Thr Ile Ser Cys Thr Arg Ser Ser Gly Ser Ile Ala Ser Ser
            20                  25                  30

Tyr Val Gln Trp Tyr Gln Gln Arg Pro Gly Ser Ser Pro Thr Thr Met
        35                  40                  45

Ile Tyr Glu Asp Lys Lys Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
    50                  55                  60

Gly Ser Ile Asp Ser Ser Ser Asn Ser Ala Ser Leu Thr Ile Ser Gly
65                  70                  75                  80

Leu Lys Thr Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Leu
                85                  90                  95

Ser Thr Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
            100                 105                 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
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        195                 200                 205

Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 311
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 311
Asp Ile Gln Met Thr Gln Ser Pro Phe Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Tyr
            20                  25                  30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Glu Asp Phe Ala Thr Tyr Tyr Cys His Gln Ser Tyr Ser Thr Ser Leu
                85                  90                  95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205
```

Phe Asn Arg Gly Glu Cys
210

<210> 312
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 312
Ser Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Lys
1 5 10 15

Thr Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Ser Lys Ser Val
20 25 30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
35 40 45

Tyr Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Ser Asp His
85 90 95

Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
100 105 110

Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
115 120 125

Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
130 135 140

Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145 150 155 160

Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
165 170 175

Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser
180 185 190

Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
195 200 205

Ala Pro Thr Glu Cys Ser
210

<210> 313
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 313
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1 5 10 15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr
20 25 30

Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
35 40 45

Met Ile Tyr Asp Val Ser Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Thr Ser Ser
85 90 95

Ser Thr Gln Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
100 105 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
115 120 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
130 135 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145 150 155 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
165 170 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
180 185 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
195 200 205

Thr Val Ala Pro Thr Glu Cys Ser
210 215

<210> 314

<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 314
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Pro Lys
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Trp
210

<210> 315
<211> 108
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 315
Ala Ile Gln Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Ile Leu Thr Cys Arg Ala Ser Gln Gly Ile Asn Ser Ala
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Pro Pro Lys Leu Leu Ile
35 40 45

Tyr Ala Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Asn Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Phe Asn Thr Tyr Pro Leu
85 90 95

Tyr Thr Phe Gly Gln Gly Thr Lys Leu Asp Ile Thr
100 105

<210> 316
<211> 109
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 316
Val Ser Ser Glu Leu Thr Gln Asp Pro Ala Val Ser Val Ala Leu Gly
1 5 10 15

Gln Thr Val Arg Ile Thr Cys Gln Gly Asp Ser Leu Arg Arg Tyr Tyr
20 25 30

Ala Ser Trp Tyr Gln Gln Lys Ala Gly Gln Ala Pro Ile Leu Val Ile
35 40 45

Tyr Gly Glu Asn Asn Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala
65 70 75 80

Glu Asp Glu Ala Asp Tyr Tyr Cys Asp Ser Arg Asp Ser Ser Gly Asn

```
                85                  90                  95

Leu Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105

<210> 317
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 317
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Val Pro Ala Ser Val Gly
1               5                   10                  15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Gly Ile Arg Asn Trp
            20                  25                  30

Leu Ala Trp Tyr Arg Gln Arg Pro Gly Lys Ala Pro Glu Leu Leu Ile
        35                  40                  45

Tyr Ala Ala Ser Asn Leu Gln Phe Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Phe Ala Leu Thr Ile Ser Ser Val Gln Pro
65                  70                  75                  80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Thr Asn Ser Phe Pro Arg
                85                  90                  95

Thr Phe Gly Pro Gly Thr Lys Val Asp Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205
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Phe Asn Arg Gly Glu Trp
210

<210> 318
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 318
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Ile Thr Ile Thr Cys Arg Ala Ser Gln Ser Val Gly Thr Tyr
20 25 30

Leu Ser Trp Phe Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Ser Tyr Ser Val Pro Pro
85 90 95

Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
100 105 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
115 120 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
130 135 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145 150 155 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
165 170 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
180 185 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
195 200 205

Ser Phe Asn Arg Gly Glu Trp
210 215

<210> 319
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 319
Glu Val Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Asn
20 25 30

Tyr Leu Ala Trp Tyr Gln Gln Lys Leu Gly Gln Ala Pro Arg Leu Leu
35 40 45

Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
50 55 60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65 70 75 80

Ala Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser Pro
85 90 95

Arg Tyr Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Arg Arg Thr Val
100 105 110

Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
115 120 125

Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
130 135 140

Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
145 150 155 160

Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
165 170 175

Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
180 185 190

Leu Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
195 200 205

Lys Ser Phe Asn Arg Gly Glu Trp
210 215

<210> 320

<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 320
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Arg
20 25 30

Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
35 40 45

Ile His Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
50 55 60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65 70 75 80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ala Trp
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Trp
210

<210> 321
<211> 215
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 321
Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Gly Ser Ser
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
35 40 45

Phe Asp Ser Ser Asn Arg Ala Thr Ala Ile Pro Ala Arg Phe Thr Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65 70 75 80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ala Asn Trp Pro Pro
85 90 95

Ile Thr Phe Gly Gln Gly Thr Arg Leu Asp Ile Arg Arg Thr Val Ala
100 105 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
115 120 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
130 135 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145 150 155 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
165 170 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
180 185 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
195 200 205

Ser Phe Asn Arg Gly Glu Cys
210 215

<210> 322
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 322
Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Trp
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Val Ile
35 40 45

Tyr Lys Ala Ser Ser Leu Lys Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Tyr Pro Trp
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Trp
210

<210> 323
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody

VL chain

<400> 323
Pro Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Lys
1 5 10 15

Thr Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Ser Lys Ser Val
20 25 30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
35 40 45

Tyr Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Ser Asp His
85 90 95

Tyr Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro
100 105 110

Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu
115 120 125

Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro
130 135 140

Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala
145 150 155 160

Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala
165 170 175

Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg
180 185 190

Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr
195 200 205

Val Ala Pro Thr Glu Cys Ser
210 215

<210> 324
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 324
Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Thr Tyr
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
35 40 45

Tyr Asp Ala Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65 70 75 80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ser Asn Trp Pro Pro
85 90 95

Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Glu
100 105

<210> 325
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 325
Asp Ile Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Pro Gly
1 5 10 15

Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu His Ser
20 25 30

Asn Gly Tyr Asn Tyr Leu Asp Trp Tyr Val Gln Lys Pro Gly Gln Ser
35 40 45

Pro Gln Leu Leu Ile Tyr Leu Gly Ser Asn Arg Ala Ser Gly Val Thr
50 55 60

Asp Arg Leu Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Glu Ile
65 70 75 80

Gly Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln Ala
85 90 95

Leu Gln Thr Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Arg
100 105 110

Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu

```
        115                 120                 125

Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
    130                 135                 140

Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
145                 150                 155                 160

Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
                165                 170                 175

Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
            180                 185                 190

Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
        195                 200                 205

Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 326
<211> 213
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 326
Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1               5                   10                  15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Trp
            20                  25                  30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

Tyr Lys Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Tyr Ser Thr
                85                  90                  95

Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala Pro
            100                 105                 110

Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr
        115                 120                 125
```

Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys
130 135 140

Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu
145 150 155 160

Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser
165 170 175

Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala
180 185 190

Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe
195 200 205

Asn Arg Gly Glu Trp
210

<210> 327
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 327
Gln Thr Val Val Thr Gln Glu Pro Ser Val Ser Val Ser Pro Gly Gly
1 5 10 15

Thr Val Thr Leu Thr Cys Gly Leu Arg Ser Gly Ser Val Ser Thr Gly
20 25 30

Asn Tyr Pro Ser Trp Tyr Gln Gln Thr Pro Gly Gln Ala Pro Arg Thr
35 40 45

Leu Ile Tyr Asn Ile Asn Thr Arg Ser Ser Gly Val Pro His Arg Phe
50 55 60

Ser Ala Ser Ile Ile Asp Asn Arg Ala Ala Leu Thr Ile Thr Gly Ala
65 70 75 80

Gln Ser Asp Asp Glu Ser Leu Tyr Tyr Cys Leu Leu Tyr Met Gly Ser
85 90 95

Gly Ile Ser Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu
100 105 110

<210> 328
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 328
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Ser Thr Leu Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Ser
20 25 30

Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
35 40 45

Ile Tyr Gly Ala Ser Arg Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
50 55 60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65 70 75 80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln His Tyr Gly Ala Ser Pro
85 90 95

Pro Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val
100 105 110

Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
115 120 125

Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
130 135 140

Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
145 150 155 160

Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
165 170 175

Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
180 185 190

Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
195 200 205

Lys Ser Phe Asn Arg Gly Glu Cys
210 215

<210> 329
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody

VL chain

<400> 329
Pro Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Gln
1 5 10 15

Thr Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Ser Lys Ser Val
20 25 30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Met Val Val Tyr
35 40 45

Ala Asp Arg Glu Arg Pro Ser Gly Ile Pro Glu Arg Leu Ser Gly Ser
50 55 60

Asn Phe Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Asn Asn Asp His
85 90 95

Arg Glu Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro
100 105 110

Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu
115 120 125

Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro
130 135 140

Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala
145 150 155 160

Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala
165 170 175

Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys
180 185 190

Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr
195 200 205

Val Ala Pro Thr Glu Cys Ser
210 215

<210> 330
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 330
Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Arg Trp
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Lys Ala Ser Ala Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asp Ser Tyr Pro Leu
85 90 95

Ser Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Trp
210

<210> 331
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 331
Ala Thr Thr Leu Thr Gln Ser Pro Ala Phe Met Ser Ala Thr Pro Gly

```
1               5                   10                  15

Asp Arg Val Asn Ile Ser Cys Lys Ala Ser Gln Asp Ile Asp Asp Asp
            20                  25                  30

Met Asn Trp Tyr Gln Gln Lys Pro Gly Glu Ala Ala Ile Phe Ile Ile
        35                  40                  45

Gln Glu Ala Thr Thr Leu Val Pro Gly Val Pro Pro Arg Phe Ser Gly
    50                  55                  60

Ser Gly Tyr Gly Thr Asp Phe Thr Leu Thr Ile Asn Asn Ile Glu Ser
65                  70                  75                  80

Glu Asp Ala Ala Tyr Tyr Phe Cys Leu Gln His Asp Asn Phe Pro Tyr
                85                  90                  95

Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Trp
    210

<210> 332
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 332
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15
```

```
Glu Arg Ala Ile Leu Ser Cys Arg Ala Gly Gln Ser Ile Gly Ala Ala
            20                  25                  30

Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

Ile Ser Gly Ala Ser Arg Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser Pro
                85                  90                  95

Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
            100                 105                 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 333
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 333

```
Leu Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                   10                  15

Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Lys Lys Tyr Ala
            20                  25                  30
```

```
Tyr Trp Tyr Gln Gln Lys Ser Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

Glu Asp Ser Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

Ser Ser Gly Thr Met Ala Thr Leu Thr Ile Ser Gly Ala Gln Val Glu
65                  70                  75                  80

Asp Glu Ala Asp Tyr Tyr Cys Tyr Ser Thr Asp Ser Ser Gly Asn His
                85                  90                  95

Gly Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
            100                 105                 110

Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
        115                 120                 125

Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
    130                 135                 140

Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145                 150                 155                 160

Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
                165                 170                 175

Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser
            180                 185                 190

Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
        195                 200                 205

Ala Pro Thr Glu Cys Ser
    210

<210> 334
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 334
Asp Ile Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Pro Gly
1               5                   10                  15

Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu His Ser
            20                  25                  30

Asp Gly Tyr Asn Tyr Leu Asp Trp Tyr Leu Gln Lys Pro Gly Gln Ser
```

```
        35                  40                  45

Pro Gln Leu Leu Ile Tyr Leu Gly Ser Asn Arg Ala Ser Gly Val Pro
    50                  55                  60

Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65                  70                  75                  80

Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln Ala
                85                  90                  95

Leu Gln Thr Pro Asn Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
            100                 105                 110

Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
        115                 120                 125

Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
    130                 135                 140

Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
145                 150                 155                 160

Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
                165                 170                 175

Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
            180                 185                 190

Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
        195                 200                 205

Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 335
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 335
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr
            20                  25                  30

Asn Tyr Val Ser Trp Tyr Gln His His Pro Asp Lys Ala Pro Lys Leu
        35                  40                  45
```

```
Ile Ile Tyr Glu Val Lys Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
    50                  55                  60

Ser Gly Ser Lys Ser Asp Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Asn Ser Tyr Ser Ser Ser
                85                  90                  95

Ser Thr Leu Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Ser
            100                 105                 110

Gln Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

Lys Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 336
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 336

```
Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Ile Ser Ser Asn
            20                  25                  30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
        35                  40                  45

Tyr Asp Ala Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly
    50                  55                  60
```

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65 70 75 80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln His Ser Asn Trp Pro Glu
85 90 95

Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
100 105 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
115 120 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
130 135 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145 150 155 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
165 170 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
180 185 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
195 200 205

Ser Phe Asn Arg Gly Glu Cys
210 215

<210> 337
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 337
Ala Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1 5 10 15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr
20 25 30

Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
35 40 45

Met Ile Tyr Asp Val Ser Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu

65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Arg Ser Ser
85 90 95

Gly Val Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly Gln
100 105 110

Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
115 120 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
130 135 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys
145 150 155 160

Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr
165 170 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
180 185 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
195 200 205

Thr Val Ala Pro Thr Glu Cys Ser
210 215

<210> 338
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 338
Gln Val Val Met Thr Gln Thr Pro Leu Ser Leu Ser Val Thr Pro Gly
1 5 10 15

Gln Pro Ala Ser Ile Ser Cys Lys Ser Ser Gln Arg Leu Leu His Ser
20 25 30

Asp Gly Lys Thr Tyr Leu Tyr Trp Tyr Leu Gln Lys Pro Gly Gln Ser
35 40 45

Pro Gln Leu Leu Ile Tyr Glu Val Ser Asn Arg Phe Ser Gly Val Pro
50 55 60

Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65 70 75 80

```
Ser Arg Val Glu Ala Ala Asp Val Gly Val Tyr Tyr Cys Met Gln Ser
                85                  90                  95

Ile His Leu Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
            100                 105                 110

Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
        115                 120                 125

Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
    130                 135                 140

Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
145                 150                 155                 160

Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
                165                 170                 175

Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
            180                 185                 190

Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
        195                 200                 205

Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Trp
    210                 215

<210> 339
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 339
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Ser
            20                  25                  30

Phe Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Val Ala Asp Arg Phe Ser
    50                  55                  60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Asn Arg Leu Glu
65                  70                  75                  80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys His Gln Tyr Gly Gly Ser Pro
                85                  90                  95
```

Pro Asn Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val
100 105 110

Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
115 120 125

Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
130 135 140

Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
145 150 155 160

Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
165 170 175

Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
180 185 190

Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
195 200 205

Lys Ser Phe Asn Arg Gly Glu Cys
210 215

<210> 340
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 340
Asp Ile Gln Leu Thr Gln Ser Pro Ser Phe Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Asp Val Asp Thr Tyr
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Ala Ala Ser Thr Leu His Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ala Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Leu Asn Ser Tyr Pro Pro
85 90 95

Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala

```
            100                 105                 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 341
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 341
Gln Ser Val Leu Thr Gln Pro Pro Ser Leu Ser Ala Ala Pro Gly Gln
1               5                   10                  15

Lys Val Ile Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Lys Tyr
            20                  25                  30

Ser Val Phe Trp Tyr Gln Gln Val Pro Gly Thr Gly Pro Lys Leu Leu
        35                  40                  45

Ile Phe Asp Asn Asn Arg Arg Pro Ser Gly Ile Arg Asp Arg Phe Ser
    50                  55                  60

Ala Ser Lys Ser Gly Thr Ser Ala Thr Leu Glu Ile Thr Gly Leu Gln
65                  70                  75                  80

Thr Gly Asp Glu Ala His Tyr Tyr Cys Ala Thr Trp Asp Ser Ser Leu
                85                  90                  95

Thr Ala Gly Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Arg Gln
            100                 105                 110
```

```
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys
145                 150                 155                 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 342
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 342

```
Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

Asn Arg Ala Ala Leu Ser Cys Arg Ala Ser Gln Ser Val Gly Ser Ser
            20                  25                  30

Leu His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
        35                  40                  45

Tyr Asp Val Ser Asn Arg Ala Ala Gly Ile Pro Gly Arg Phe Ser Ala
    50                  55                  60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Asn Leu Glu Pro
65                  70                  75                  80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ser Ala Trp Pro Ile
                85                  90                  95

Thr Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125
```

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 343
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 343
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Ser
20 25 30

Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
35 40 45

Ile Ser Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
50 55 60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65 70 75 80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser Arg
85 90 95

Lys Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val
100 105 110

Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
115 120 125

Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg

130 135 140

Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
145 150 155 160

Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
165 170 175

Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
180 185 190

Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
195 200 205

Lys Ser Phe Asn Arg Gly Glu Cys
210 215

<210> 344
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 344
Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Val Trp
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Lys Ala Ser Thr Leu Glu Ala Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Glu Phe Ser Leu Thr Ile Ser Gly Leu Gln Pro
65 70 75 80

Asp Asp Phe Gly Thr Tyr Phe Cys Gln His Tyr Asp Ser Tyr Pro Trp
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Met Lys
100 105

<210> 345
<211> 215
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 345
Val Ser Ser Glu Leu Thr Gln Asp Pro Ala Val Ser Val Ala Leu Gly
1 5 10 15

Gln Thr Val Arg Ile Thr Cys Gln Gly Asp Ser Leu Arg Arg Tyr Tyr
20 25 30

Val Ser Trp Tyr Arg Gln Lys Pro Gly Glu Ala Pro Val Val Val Ile
35 40 45

Tyr Gly Lys Asn Asn Arg Pro Ser Trp Ile Pro Asp Arg Leu Ser Gly
50 55 60

Ser Ser Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala
65 70 75 80

Glu Asp Glu Ala Asp Tyr Tyr Cys Cys Ser Arg Asp Ser Ser Gly Asn
85 90 95

Pro Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro
100 105 110

Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu
115 120 125

Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro
130 135 140

Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala
145 150 155 160

Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala
165 170 175

Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys
180 185 190

Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr
195 200 205

Val Ala Pro Thr Glu Cys Ser
210 215

<210> 346
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 346
Val Ile Gln Met Thr Gln Ser Pro Thr Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Leu Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Ser Leu
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 347
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 347

```
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Ser
            20                  25                  30

Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

Ile Tyr Asp Ala Ser Ser Arg Ala Ala Gly Val Pro Asp Arg Phe Ser
    50                  55                  60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

Pro Glu Asp Phe Ala Val Tyr Phe Cys Gln Gln Tyr Asp Ser Ser Pro
                85                  90                  95

Pro Met Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Arg Arg Thr
            100                 105                 110

Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu
        115                 120                 125

Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro
    130                 135                 140

Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly
145                 150                 155                 160

Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr
                165                 170                 175

Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His
            180                 185                 190

Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val
        195                 200                 205

Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 348
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 348

```
Pro Ser Val Leu Thr Gln Pro Pro Ser Val Ser Ala Ala Pro Gly Gln
1               5                   10                  15
```

```
Lys Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Asp Asn Asn
            20                  25                  30

Tyr Val Ser Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
        35                  40                  45

Ile Tyr Glu Asn Asn Lys Arg Ala Ser Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

Gly Ser Lys Ser Gly Thr Ser Ala Thr Leu Gly Ile Thr Gly Leu Gln
65                  70                  75                  80

Thr Gly Asp Glu Ala Asp Tyr Tyr Cys Gly Thr Trp Asp Ser Ser Leu
                85                  90                  95

Ser Pro Gly Gly Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 349
<211> 213
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 349
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Thr Ile Ser Thr Tyr
```

```
            20                  25                  30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Glu Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Asn Ala Arg Thr
                85                  90                  95

Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala Pro
            100                 105                 110

Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr
        115                 120                 125

Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys
    130                 135                 140

Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu
145                 150                 155                 160

Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser
                165                 170                 175

Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala
            180                 185                 190

Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe
        195                 200                 205

Asn Arg Gly Glu Cys
    210

<210> 350
<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 350
Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1               5                   10                  15

Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Thr Val Leu His Ser
            20                  25                  30
```

```
Ser Asn Asn Arg Asn Tyr Leu Ala Trp Tyr Gln His Lys Pro Gly Gln
        35                  40                  45

Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
    50                  55                  60

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65                  70                  75                  80

Ile Asn Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
                85                  90                  95

Tyr Tyr Asp Thr Ala Pro Leu Thr Phe Gly Gly Gly Thr Lys Val Glu
            100                 105                 110

Ile Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser
        115                 120                 125

Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn
    130                 135                 140

Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala
145                 150                 155                 160

Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys
                165                 170                 175

Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp
            180                 185                 190

Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu
        195                 200                 205

Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215                 220

<210> 351
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 351
Glu Ile Val Met Thr Gln Ser Pro Ala Thr Leu Ser Val Ser Pro Gly
1               5                   10                  15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Asp Gly Asn
            20                  25                  30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
        35                  40                  45
```

```
Phe Asp Ala Ser Thr Arg Ala Thr Thr Ile Pro Val Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Ser
65                  70                  75                  80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Ser Lys Trp Pro Ile
                85                  90                  95

Thr Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Cys
    210
```

<210> 352
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 352

```
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Leu Gly
1               5                   10                  15

Asp Arg Ile Thr Ile Thr Cys Arg Ala Thr Gln Ser Ile Ser Asn Tyr
            20                  25                  30

Leu Asn Trp Tyr Gln Gln Lys Ser Gly Lys Val Pro Glu Leu Leu Ile
        35                  40                  45

Tyr Ala Ala Ser His Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
```

```
    50                  55                  60

Thr Gly Ser Gly Thr Asp Phe Ser Leu Thr Ile Ser Gly Leu Gln Pro
65                  70                  75                  80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Thr Tyr Thr Thr Pro Arg
                85                  90                  95

Thr Phe Gly Arg Gly Thr Thr Val Glu Ile Arg Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Cys
    210

<210> 353
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 353
Pro Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

Arg Val Thr Ile Ser Cys Thr Gly Ser Ser Ser Asn Ile Gly Ala Gly
            20                  25                  30

Tyr Asp Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

Leu Ile Tyr Gly Asn Ile Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60
```

```
Ser Gly Ser Lys Ser Gly Pro Ser Ala Ser Leu Thr Ile Thr Gly Leu
65                  70                  75                  80

Gln Ala Asp Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Arg
                85                  90                  95

Leu Ser Gly Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 354
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 354

```
Glu Ile Val Met Thr Gln Ser Pro Ala Thr Leu Ser Val Ser Pro Gly
1               5                   10                  15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Thr Asn
            20                  25                  30

Leu Ala Trp Tyr Gln Gln Arg Pro Gly Gln Ala Pro Arg Leu Phe Ile
        35                  40                  45

Phe Gly Ala Ser Thr Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Pro Gln Pro
65                  70                  75                  80
```

Glu Asp Ser Ala Val Tyr Tyr Cys Gln Gln Tyr Thr Thr Arg Pro Leu
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 355
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 355
Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Gly Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Gly Tyr
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
35 40 45

Tyr Asp Ala Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65 70 75 80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ser Lys Trp Pro Leu

```
                85                  90                  95

Thr Phe Gly Gly Gly Thr Gln Val Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Cys
    210

<210> 356
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 356
Gln Ser Val Val Thr Gln Pro Pro Ser Ala Ser Gly Pro Pro Gly Gln
1               5                   10                  15

Thr Val Thr Ile Ser Cys Ser Gly Gly Arg Ser Asn Val Ala Ser His
            20                  25                  30

Ala Val His Trp Tyr Gln His Leu Pro Gly Thr Ala Pro Lys Leu Leu
        35                  40                  45

Ile Tyr Asn Asp His Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
    50                  55                  60

Gly Ser Lys Ser Gly Pro Ser Ala Ser Leu Ala Ile Ser Gly Leu Arg
65                  70                  75                  80

Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Thr Trp Asp Asp Ser Leu
                85                  90                  95
```

```
Gly Gly Arg Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 357
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 357
Asp Ile Val Met Thr Gln Thr Pro Leu Ser Met Pro Val Thr Pro Gly
1               5                   10                  15

Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu Asp Ser
            20                  25                  30

Asp Asp Gly Lys Thr Tyr Leu Asp Trp Tyr Leu Gln Lys Pro Gly Gln
        35                  40                  45

Ser Pro Gln Leu Leu Ile Tyr Thr Val Ser Tyr Arg Ala Ser Gly Val
    50                  55                  60

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys
65                  70                  75                  80

Ile Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln
                85                  90                  95

Arg Ile Glu Phe Pro Phe Thr Phe Gly Pro Gly Thr Lys Val Asp Ile
            100                 105                 110
```

Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115   120   125

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130   135   140

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145   150   155   160

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165   170   175

Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
            180   185   190

Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
        195   200   205

Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210   215   220

<210> 358
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 358
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1   5   10   15

Thr Ala Ser Ile Thr Cys Ser Gly Asp Lys Leu Gly Asp Lys Tyr Ala
            20   25   30

Cys Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35   40   45

Gln Asp Ser Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50   55   60

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65   70   75   80

Asp Glu Ala Asp Tyr Tyr Cys Gln Ala Trp Asp Ser Ser Thr Ala Val
                85   90   95

Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100   105

<210> 359

<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 359
Pro Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1 5 10 15

Thr Ala Asn Ile Thr Cys Ser Gly Asp Lys Leu Gly Asp Ile Cys Val
20 25 30

Cys Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
35 40 45

Gln His Asn Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Ala Thr Gln Ala Thr
65 70 75 80

Asp Glu Ala Ile Tyr Tyr Cys Gln Ser Trp Asp Ser Ser Ser Val Leu
85 90 95

Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
100 105 110

Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
115 120 125

Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
130 135 140

Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
145 150 155 160

Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
165 170 175

Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
180 185 190

Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
195 200 205

Thr Glu Cys Ser
210

<210> 360
<211> 220
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 360
Gly Ile Val Met Thr Gln Ser Pro Asp Ser Leu Gly Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Leu Phe Tyr Ser
20 25 30

Ser Asn Asn Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
35 40 45

Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
50 55 60

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65 70 75 80

Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
85 90 95

Tyr Tyr Gly Arg Leu Phe Thr Phe Gly Pro Gly Thr Lys Val Asp Ile
100 105 110

Arg Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
115 120 125

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
130 135 140

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145 150 155 160

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
165 170 175

Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
180 185 190

Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
195 200 205

Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
210 215 220

<210> 361
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 361
Gln Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Tyr
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
35 40 45

Tyr Asp Ala Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly
50 55 60

Gly Gly Ser Glu Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65 70 75 80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ser Asn Trp Pro Pro
85 90 95

Arg Leu Pro Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val
100 105 110

Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
115 120 125

Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
130 135 140

Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
145 150 155 160

Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
165 170 175

Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
180 185 190

Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
195 200 205

Lys Ser Phe Asn Arg Gly Glu Cys
210 215

<210> 362
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody

VL chain

<400> 362
Gln Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Asn Tyr
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
35 40 45

Tyr Asp Ala Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65 70 75 80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ser Asn Trp Pro Pro
85 90 95

Tyr Thr Phe Gly Gln Gly Thr Lys Leu Asp Ile Lys Arg Thr Val Ala
100 105 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
115 120 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
130 135 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145 150 155 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
165 170 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
180 185 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
195 200 205

Ser Phe Asn Arg Gly Glu Cys
210 215

<210> 363
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 363
Asp Ile Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Pro Gly
1   5   10   15

Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu Gln Ser
            20   25   30

Asn Gly Asn Asn Tyr Leu Ala Trp Tyr Leu Gln Lys Pro Gly Gln Ser
        35   40   45

Pro Gln Leu Leu Ile Tyr Leu Gly Ser Asn Arg Ala Ser Gly Val Pro
    50   55   60

Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65   70   75   80

Ser Lys Leu Ala Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln Ala
                85   90   95

Leu Gln Thr Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Asp Ile Lys
            100   105   110

Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
        115   120   125

Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
    130   135   140

Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
145   150   155   160

Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
                165   170   175

Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
            180   185   190

Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
        195   200   205

Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210   215

<210> 364
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 364
Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly

```
1               5                   10                  15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Gly Trp
            20                  25                  30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Gln Leu Leu Ile
        35                  40                  45

Tyr Leu Val Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln His Tyr Asp Ser Tyr Ile Gly
                85                  90                  95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Cys
    210

<210> 365
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 365
Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Ala Ala Pro Gly Gln
1               5                   10                  15
```

```
Lys Val Thr Ile Ser Cys Ser Gly Gly Ser Ser Asn Ile Gly Asn Asn
            20                  25                  30

Tyr Val Ser Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Ile
        35                  40                  45

Ile Tyr Asp Asn Asp Lys Arg Pro Ala Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

Gly Ser Lys Ser Gly Ser Ser Ala Thr Leu Gly Ile Thr Gly Leu Gln
65                  70                  75                  80

Asn Gly Asp Glu Ala Glu Tyr Tyr Cys Gly Thr Trp Asp Ser Ser Leu
                85                  90                  95

Gly Gly Gly Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu Gly Gln
            100                 105                 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 366
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 366
Gln Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Asn Tyr
            20                  25                  30
```

```
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
        35                  40                  45

Tyr Asp Ala Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65                  70                  75                  80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ser Asn Trp Pro Pro
                85                  90                  95

Tyr Thr Phe Gly Gln Gly Thr Lys Leu Asp Ile Lys Arg Thr Val Ala
            100                 105                 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 367
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 367
Gly Ile Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Pro Gly
1               5                   10                  15

Glu Thr Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu Arg Arg
            20                  25                  30

Asp Gly Asn Asn Tyr Leu Glu Trp Tyr Leu Gln Lys Pro Gly Gln Pro
```

```
        35                  40                  45

Pro His Leu Leu Ile Tyr Leu Gly Ser Ile Arg Ala Ser Arg Val Pro
    50                  55                  60

Asp Arg Phe Ser Gly Thr Gly Ser Gly Thr Asp Phe Thr Leu Ile Ile
65                  70                  75                  80

Ser Arg Val Glu Ala Asp Asp Val Gly Val Tyr Tyr Cys Met Glu Ala
                85                  90                  95

Glu Gln Thr Pro Gly Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
            100                 105                 110
```

<210> 368
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 368

```
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Phe
            20                  25                  30

Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

Leu Ile Tyr Asp Val Ser Glu Arg Pro Ser Gly Val Ser Ser Arg Phe
    50                  55                  60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Thr Ser Ser
                85                  90                  95

Thr Thr Val Leu Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
            100                 105                 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160
```

```
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 369
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 369

```
Gly Val Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Leu Gly
1               5                   10                  15

Gln Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Val Tyr Ser
            20                  25                  30

Asp Gly Asn Thr Tyr Leu Asn Trp Phe Gln Gln Arg Pro Gly Gln Ser
        35                  40                  45

Pro Arg Arg Leu Ile Tyr Lys Val Ser Asn Arg Asp Ser Gly Val Pro
    50                  55                  60

Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65                  70                  75                  80

Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln Gly
                85                  90                  95

Thr His Trp Pro Pro Ile Thr Phe Gly Gln Gly Thr Arg Leu Glu Ile
            100                 105                 110

Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115                 120                 125

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130                 135                 140

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175
```

Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
            180   185   190

Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
        195   200   205

Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210   215   220

<210> 370
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 370
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1   5   10   15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Tyr
            20   25   30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35   40   45

Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50   55   60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Ala Ile Ser Ser Leu Gln Pro
65   70   75   80

Glu Asp Phe Ala Thr Tyr Tyr Cys His Gln Thr Tyr Ser Thr Arg Leu
                85   90   95

Thr Phe Gly Gly Gly Thr Glu Val Glu Ile Lys Arg Thr Val Ala Ala
            100   105   110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115   120   125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130   135   140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145   150   155   160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165   170   175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr

180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 371
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 371
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Gln Ala Ser Gln Asp Ile Ser Asn Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Asp Ala Ser Asn Leu Glu Thr Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asp Asn Leu Pro Leu
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195   200   205

Phe Asn Arg Gly Glu Cys
    210

<210> 372
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 372
Ser Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Gln
1   5   10   15

Thr Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Ser Lys Ser Val
            20   25   30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Val Tyr
        35   40   45

Asp Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50   55   60

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65   70   75   80

Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Ser Asp Pro
                85   90   95

Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
            100   105   110

Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
        115   120   125

Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
    130   135   140

Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145   150   155   160

Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
                165   170   175

Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser
            180   185   190

Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
        195   200   205

Ala Pro Thr Glu Cys Ser
210

<210> 373
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 373
Asp Ile Gln Leu Thr Gln Ser Pro Ser Phe Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Val Ile Ser Asp Tyr
20 25 30

Val Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Ala Ala Ser Thr Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Ser
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Leu Asn Ser Tyr Pro Pro
85 90 95

Val Thr Phe Gly Gln Gly Thr Arg Leu Asp Ile Lys Arg Thr Val Ala
100 105 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
115 120 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
130 135 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145 150 155 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
165 170 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
180 185 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
195 200 205

Ser Phe Asn Arg Gly Glu Cys

210 215

<210> 374
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 374
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Thr Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Val Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Gly Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Pro Tyr
85 90 95

Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 375
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 375
Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Arg Ile Ser Asn Trp
20 25 30

Leu Ala Trp Tyr Gln Gln Thr Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Lys Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Ser Ser Ser Ser Pro
85 90 95

Arg Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
100 105 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
115 120 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
130 135 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145 150 155 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
165 170 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
180 185 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
195 200 205

Ser Phe Asn Arg Gly Glu Cys
210 215

<210> 376
<211> 112

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 376
Asp Ile Leu Met Thr Gln Thr Pro Leu Ser Leu Ser Val Thr Pro Gly
1 5 10 15

Gln Pro Ala Ser Ile Ser Cys Lys Ser Ser Gln Ser Leu Leu Asn Pro
20 25 30

Asp Gly Lys Thr Tyr Leu Tyr Trp Tyr Leu Gln Lys Ser Gly Gln Pro
35 40 45

Pro Gln Leu Leu Ile Tyr Glu Leu Ser Asn Arg Phe Ser Gly Val Pro
50 55 60

Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65 70 75 80

Ser Arg Val Glu Ala Glu Asp Ile Gly Val Tyr Phe Cys Met Gln Ser
85 90 95

Leu Gln Leu Pro Ile Thr Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys
100 105 110

<210> 377
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 377
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Gly Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

```
Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Arg Leu
                85                  90                  95

Leu Thr Phe Gly Pro Gly Thr Lys Val Asp Ile Lys Arg Thr Val Ala
            100                 105                 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 378
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 378

```
Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

Arg Val Thr Ile Ser Cys Thr Gly Ser Ser Ser Asn Val Gly Ala Asp
            20                  25                  30

Tyr Asp Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

Leu Ile Tyr Gly Asn Arg Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Phe Asp Ser Ser
                85                  90                  95
```

```
Leu Arg Gly Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly
            100                 105                 110

Gln Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val
145                 150                 155                 160

Lys Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 379
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 379

```
Glu Ile Val Leu Thr Gln Ser Pro Asp Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Ser
            20                  25                  30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
        35                  40                  45

Tyr Tyr Ala Ser Asn Arg Ala Thr Asp Ile Pro Ala Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65                  70                  75                  80

Glu Asp Phe Ala Leu Tyr Tyr Cys Gln His Arg Ile Thr Trp Pro Pro
                85                  90                  95

Leu Ile Thr Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys Arg Thr Val
```

```
            100                 105                 110

Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
        115                 120                 125

Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
    130                 135                 140

Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
145                 150                 155                 160

Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
                165                 170                 175

Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
            180                 185                 190

Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
        195                 200                 205

Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 380
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 380
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Phe Asp Gly Lys
            20                  25                  30

Ser Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Thr Pro Arg Leu Leu
        35                  40                  45

Val Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Gly
    50                  55                  60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

Ser Glu Asp Phe Ala Val Tyr Phe Cys Gln Gln Tyr Ala Tyr Val Pro
                85                  90                  95

Ile Thr Phe Gly Gln Gly Thr Arg Leu Glu Arg Lys Arg Thr Val Ala
            100                 105                 110
```

```
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 381
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 381

```
Gly Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1               5                   10                  15

Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Ile Leu Tyr Ser
            20                  25                  30

Ser Asn Asn Lys Asp Ser Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
        35                  40                  45

Pro Pro Lys Leu Leu Ile Ser Ser Ala Ser Thr Arg Gln Ser Gly Val
    50                  55                  60

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65                  70                  75                  80

Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
                85                  90                  95

Tyr Tyr Ser Ile Pro Leu Thr Phe Gly Pro Gly Thr Lys Val Asp Ile
            100                 105                 110

Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115                 120                 125
```

```
Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130                 135                 140

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175

Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
            180                 185                 190

Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
        195                 200                 205

Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Trp
    210                 215                 220

<210> 382
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 382
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Leu Gly
1               5                   10                  15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Gly Ser
            20                  25                  30

His Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

Ile Tyr Asp Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser Pro
                85                  90                  95

Leu Trp Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
            100                 105

<210> 383
<211> 216
<212> PRT
<213> Artificial Sequence
```

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 383
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1 5 10 15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr
20 25 30

Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
35 40 45

Met Ile Tyr Asp Val Ser Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Thr Ser Ser
85 90 95

Ser Thr Gln Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly Gln
100 105 110

Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
115 120 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
130 135 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys
145 150 155 160

Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr
165 170 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
180 185 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
195 200 205

Thr Val Ala Pro Thr Glu Cys Ser
210 215

<210> 384
<211> 214
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 384
Pro Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1 5 10 15

Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Lys Lys Tyr Ala
20 25 30

Tyr Trp Tyr Gln Gln Lys Ser Gly Gln Ala Pro Val Leu Val Ile Tyr
35 40 45

Glu Asp Ser Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

Ser Ser Gly Thr Met Ala Thr Leu Thr Ile Ser Gly Ala Gln Val Glu
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Tyr Ser Thr Asp Ser Ser Gly Asn His
85 90 95

Arg Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
100 105 110

Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
115 120 125

Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
130 135 140

Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145 150 155 160

Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
165 170 175

Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser
180 185 190

Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
195 200 205

Ala Pro Thr Glu Cys Ser
210

<210> 385
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 385
Glu Ile Val Met Thr Gln Ser Pro Ala Thr Leu Ser Val Ser Pro Gly
1   5   10   15

Glu Thr Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Asn
            20   25   30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Met
        35   40   45

Tyr Gly Ala Ser Thr Arg Ala Thr Ser Val Pro Ala Arg Phe Ser Gly
    50   55   60

Ser Ala Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Ser
65   70   75   80

Glu Asp Phe Ala Leu Tyr Tyr Cys Gln Gln Tyr Asn Asn Trp Pro Gln
                85   90   95

Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala
            100   105   110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115   120   125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130   135   140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145   150   155   160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165   170   175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180   185   190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195   200   205

Ser Phe Asn Arg Gly Glu Trp
    210   215

<210> 386
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 386

```
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Ser
            20                  25                  30

Tyr Leu Val Trp Tyr Gln Gln Lys Ala Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Ser Asp Arg Phe Ser
    50                  55                  60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln His Phe Arg Ser Ser Pro
                85                  90                  95

Pro Thr Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr
            100                 105                 110

Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu
        115                 120                 125

Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro
    130                 135                 140

Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly
145                 150                 155                 160

Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr
                165                 170                 175

Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His
            180                 185                 190

Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val
        195                 200                 205

Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 387
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 387

```
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15
```

```
Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Leu Tyr
            20                  25                  30

Asn Phe Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

Met Ile Phe Asp Val Asn Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
    50                  55                  60

Ser Gly Ser Lys Ser Asp Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Ser Arg Thr
                85                  90                  95

Thr Thr Leu Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu Gly Gln
            100                 105                 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Ile Lys
145                 150                 155                 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 388
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 388
Pro Ala Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

Arg Val Thr Ile Ser Cys Thr Gly Ser Asn Ser Asn Ile Gly Ala Gly
```

```
            20                  25                  30

Tyr Tyr Val His Trp Tyr Gln His Arg Pro Gly Ala Ala Pro Lys Arg
        35                  40                  45

Leu Ile Tyr Ala Asp Ser Asp Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

Ser Gly Ser Arg Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Gly
                85                  90                  95

Leu Ser Ala Pro Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110

Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser
        115                 120                 125

Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp
    130                 135                 140

Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro
145                 150                 155                 160

Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn
                165                 170                 175

Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys
            180                 185                 190

Ser His Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val
        195                 200                 205

Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 389
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 389
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

Gln Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Thr Ser Ser
            20                  25                  30
```

```
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

Ile Tyr Ala Ala Ser Ser Arg Ala Thr Gly Thr Pro Asp Arg Phe Ser
    50                  55                  60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

Pro Glu Asp Phe Ala Val Tyr Ser Cys Gln Gln Tyr Gly Asn Ser Pro
                85                  90                  95

Pro Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
            100                 105                 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 390
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 390

```
Pro Ser Val Leu Thr Gln Pro Leu Ser Ala Ser Gly Thr Pro Gly Gln
1               5                   10                  15

Arg Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Asp Asn
            20                  25                  30

Phe Val Tyr Trp Tyr Gln Gln Phe Pro Gly Thr Ala Pro Lys Val Leu
        35                  40                  45
```

Ile Phe Lys Asn Asn Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Phe
50 55 60

Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Arg
65 70 75 80

Ser Glu Asp Glu Ala Glu Tyr Tyr Cys Ala Thr Trp Asp Asp Asp Leu
85 90 95

Ser Gly Pro Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu
100 105 110

<210> 391
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 391
Glu Thr Thr Leu Met Gln Ser Pro Ala Leu Ile Ser Ala Thr Pro Gly
1 5 10 15

Asp Lys Val His Ile Ser Cys Lys Ala Ser Gln Asp Ile Asp Asp Asp
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Glu Ala Pro Ile Leu Ile Ile
35 40 45

Glu Glu Ala Thr Asn Leu Gly Pro Gly Phe Ser Pro Arg Phe Ser Gly
50 55 60

Ser Gly Tyr Gly Thr Asp Phe Thr Leu Thr Ile Tyr Asp Ile Glu Ser
65 70 75 80

Gly Asp Ala Ala Phe Tyr Phe Cys Leu Gln His Asp Thr Phe Pro Leu
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
100 105

<210> 392
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 392

```
Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1               5                   10                  15

Asp Lys Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Val Gly Ser Trp
            20                  25                  30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

Ser Val Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Val Ser Ser Leu Gln Pro
65                  70                  75                  80

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Tyr Ser Trp
                85                  90                  95

Thr Phe Gly Gln Gly Thr Lys Val Glu Leu Lys Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Leu
    210
```

<210> 393
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 393

```
Asp Ile Gln Leu Thr Gln Ser Pro Ser Phe Leu Ser Ala Ser Val Gly
1               5                   10                  15
```

```
Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Asp Ile Ser Ser Phe
            20                  25                  30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Asp Leu Leu Ile
        35                  40                  45

Tyr Ala Ala Ser Thr Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Glu Asp Phe Ala Ala Tyr Tyr Cys Gln His Leu Thr Ser Phe Pro Tyr
                85                  90                  95

Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Leu
    210

<210> 394
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 394
Val Ser Ser Glu Leu Thr Gln Asp Pro Ala Val Ser Val Ala Leu Gly
1               5                   10                  15

Gln Thr Val Arg Ile Thr Cys Gln Gly Asp Ser Leu Arg Asp Tyr Ser
```

```
            20                  25                  30

Ala Ser Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Ile Leu Val Ile
        35                  40                  45

Phe Phe Arg Asn Lys Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly
    50                  55                  60

Ser Ala Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala
65                  70                  75                  80

Glu Asp Glu Ala Asp Tyr Tyr Cys Gly Ser Arg Asp Ser Ser Gly Asn
                85                  90                  95

Pro Ser Val Phe Gly Ala Gly Thr Lys Val Thr Val Leu Gly Gln Pro
            100                 105                 110

Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu
        115                 120                 125

Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro
    130                 135                 140

Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys Ala
145                 150                 155                 160

Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala
                165                 170                 175

Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg
            180                 185                 190

Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr
        195                 200                 205

Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 395
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 395
Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

Glu Gly Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ala Tyr
            20                  25                  30
```

```
Leu Gly Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
        35                  40                  45

Tyr Asp Thr Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65                  70                  75                  80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ser Asn Trp Leu Tyr
                85                  90                  95

Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Trp
    210

<210> 396
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 396
Ser Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Lys
1               5                   10                  15

Thr Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Ser Lys Ser Val
            20                  25                  30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45
```

```
Tyr Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65                  70                  75                  80

Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Ser Asp His
                85                  90                  95

Gln Glu Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro
            100                 105                 110

Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu
        115                 120                 125

Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro
    130                 135                 140

Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys Ala
145                 150                 155                 160

Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala
                165                 170                 175

Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg
            180                 185                 190

Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr
        195                 200                 205

Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 397
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 397
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

Ser Ile Thr Ile Ser Cys Thr Gly Ser Ser Ser Asp Val Gly Asn Tyr
            20                  25                  30

Asn Leu Val Ser Trp Tyr Gln Leu His Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

Met Ile Tyr Glu Val Ile Lys Arg Pro Ser Gly Val Ser Ser His Phe
```

```
    50                  55                  60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Cys Ser Tyr Ala Pro Ser
                85                  90                  95

Asn Thr Tyr Val Phe Gly Thr Gly Thr Arg Val Thr Val Leu Gly Gln
            100                 105                 110

Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys
145                 150                 155                 160

Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 398
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 398
Gln Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

Glu Arg Val Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Arg Ser His
            20                  25                  30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Met
        35                  40                  45

Tyr Asp Ala Phe Asn Arg Ala Thr Gly Thr Pro Ala Arg Phe Ser Gly
    50                  55                  60
```

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65 70 75 80

Glu Asp Phe Ala Ile Tyr Tyr Cys Gln Gln Arg Ser Asn Trp Pro Leu
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Leu
210

<210> 399
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 399
Val Ser Ser Glu Leu Thr Gln Asp Pro Ala Val Ser Val Ala Leu Gly
1 5 10 15

Gln Thr Val Arg Ile Thr Cys Gln Gly Asp Ser Leu Arg Ser Tyr Tyr
20 25 30

Ala Thr Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Leu Leu Val Ile
35 40 45

Phe Asp Lys Asp Lys Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly
50 55 60

Ser Ser Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Ala Gln Pro
65 70 75 80

```
Glu Asp Glu Ala Val Tyr Tyr Cys Asn Ser Arg Asp Ser Ser Ala His
                85                  90                  95

Asp His Leu Leu Phe Gly Gly Gly Thr Thr Leu Thr Val Leu Gly Gln
            100                 105                 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 400
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 400
Glu Val Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

Glu Arg Ala Thr Leu Phe Cys Lys Ala Ser Gln Ala Ile Val Ser Asn
            20                  25                  30

Tyr Leu Val Trp Tyr Gln Gln Lys Pro Gly Leu Ala Pro Arg Leu Leu
        35                  40                  45

Ile Tyr Ser Ala Ser Thr Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

Gly Gly Gly Ser Gly Thr Asp Phe Ser Leu Thr Ile Ser Gly Leu Glu
65                  70                  75                  80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln His Phe Gly Asp Ser Pro
```

```
                85                  90                  95

Leu Tyr Ile Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val
            100                 105                 110

Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
        115                 120                 125

Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
    130                 135                 140

Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
145                 150                 155                 160

Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
                165                 170                 175

Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
            180                 185                 190

Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
        195                 200                 205

Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 401
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 401
Pro Tyr Glu Leu Thr Gln Pro Leu Ser Val Ser Val Ala Leu Gly Gln
1               5                   10                  15

Thr Ala Arg Val Thr Cys Gly Gly Thr Asn Ile Gly Lys Lys Asp Val
            20                  25                  30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

Arg Asp Asp Asn Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Leu
    50                  55                  60

Asn Ser Gly His Thr Ala Thr Leu Thr Ile Ser Arg Ala Gln Ala Gly
65                  70                  75                  80

Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Thr Ala Val
                85                  90                  95
```

```
Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
            100                 105                 110

Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125

Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130                 135                 140

Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
145                 150                 155                 160

Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175

Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190

Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195                 200                 205

Thr Glu Cys Ser
    210
```

<210> 402
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 402

```
Leu Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Lys
1               5                   10                  15

Thr Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Ser Lys Ser Val
            20                  25                  30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

Asp Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65                  70                  75                  80

Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Ser Asp His
                85                  90                  95

Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Gln
            100                 105
```

<210> 403
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 403
Ser Tyr Glu Leu Thr Gln Thr Pro Ser Val Ser Val Ser Pro Gly Gln
1 5 10 15

Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Lys Gln Ser Val
20 25 30

Asn Trp Tyr Gln Gln Arg Pro Gly Gln Ala Pro Val Val Val Ile Cys
35 40 45

Lys Asp Thr Glu Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

Thr Ser Gly Thr Thr Val Thr Leu Thr Ile Gly Gly Val Gln Ala Glu
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Ala Asp Ser Ser Gly Phe Tyr
85 90 95

Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
100 105 110

Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
115 120 125

Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
130 135 140

Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145 150 155 160

Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
165 170 175

Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser
180 185 190

Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
195 200 205

Ala Pro Thr Glu Cys Ser
210

<210> 404

<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 404
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1 5 10 15

Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Lys Gln Tyr Ala
20 25 30

Tyr Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
35 40 45

Lys Asp Ser Glu Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

Ser Ser Gly Thr Thr Val Thr Leu Thr Ile Ser Gly Val Gln Ala Glu
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Ala Asp Ser Ser Ser Pro Val
85 90 95

Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
100 105 110

Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
115 120 125

Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
130 135 140

Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
145 150 155 160

Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
165 170 175

Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
180 185 190

Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
195 200 205

Thr Glu Cys Ser
210

<210> 405
<211> 213
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 405
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Pro Pro Gly Gln
1 5 10 15

Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Lys Lys Tyr Ala
20 25 30

Tyr Trp Tyr Gln Gln Lys Ser Gly Gln Ala Pro Val Leu Val Ile Tyr
35 40 45

Glu Asp Thr Lys Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly Ser
50 55 60

Ser Ser Gly Thr Met Ala Thr Leu Thr Ile Ser Gly Ala Gln Val Glu
65 70 75 80

Asp Asp Ala Asp Tyr Tyr Cys Tyr Ser Thr Asp Ser Arg Ala Thr Gly
85 90 95

Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys Ala
100 105 110

Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala
115 120 125

Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala
130 135 140

Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val
145 150 155 160

Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser
165 170 175

Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr
180 185 190

Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala
195 200 205

Pro Thr Glu Cys Ser
210

<210> 406
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 406
Ala Val Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Ser Cys Arg Ala Ser Gln Thr Ile Asp Thr Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Arg Pro Gly Lys Ala Pro Gln Leu Leu Ile
35 40 45

Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Ala
50 55 60

Ser Gly Ser Gly Thr His Phe Thr Leu Ile Ile Asn Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Pro Gln
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 407
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody

VL chain

<400> 407
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Gln Ala Thr Gln Gly Ile Thr Asn Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Val Leu Ile
35 40 45

Tyr Asp Ala Ser Asn Leu Glu Thr Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Asn Gly Ser Gly Thr His Phe Thr Phe Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Tyr Glu Asn Leu Pro Leu
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105

<210> 408
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 408
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Gln Ala Ser Gln Asp Ile Ser Thr Phe
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Asp Glu Ser Asn Leu Glu Thr Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Phe Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Phe Asp Asn Leu Pro Leu
85 90 95

Thr Phe Gly Gly Gly Thr Arg Leu Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115   120   125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130   135   140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145   150   155   160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165   170   175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180   185   190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195   200   205

Phe Asn Arg Gly Glu Cys
    210

<210> 409
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 409
Gln Ser Ala Leu Thr Gln Pro Arg Ser Val Ser Gly Ser Pro Gly Gln
1   5   10   15

Ser Val Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Ile Gly Gly Tyr
            20   25   30

Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Phe
        35   40   45

Val Ile Tyr Asp Val Ser Gln Arg Pro Ser Gly Val Pro Asp Arg Phe
    50   55   60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65   70   75   80

Gln Ala Asp Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Ala Gly Ser
                85   90   95

Tyr Thr Trp Val Phe Gly Gly Gly Thr Lys Val Ile Val Leu
            100   105   110

<210> 410

<211> 105
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 410
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1 5 10 15

Thr Ala Ser Ile Thr Cys Ser Gly Asp Lys Leu Gly Asp Lys Tyr Ala
20 25 30

Cys Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Val Val Ile Tyr
35 40 45

Gln Asp Thr Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Gln Ala Trp Asp Ser Ser Thr Val Val
85 90 95

Phe Gly Gly Gly Thr Lys Leu Thr Val
100 105

<210> 411
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 411
Pro Ser Val Leu Thr Gln Pro Pro Ser Leu Ser Ala Ala Pro Gly Gln
1 5 10 15

Arg Val Thr Ile Ser Cys Ser Gly Ser Thr Ser Asn Ile Gly Asn Asn
20 25 30

Phe Val Ser Trp Tyr Gln Gln Leu Pro Gly Ala Ala Pro Lys Leu Leu
35 40 45

Ile Tyr Asp Asn Asp Lys Arg Pro Ser Glu Ile Pro Asp Arg Phe Ser
50 55 60

Gly Ser Lys Ser Gly Thr Ser Ala Thr Leu Ala Ile Thr Gly Leu Gln
65 70 75 80

Thr Gly Asp Glu Ala Asp Tyr Tyr Cys Gly Thr Trp Asp Ser Ser Leu
85 90 95

Gly Ala Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu
100 105 110

<210> 412
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 412
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Ile Ser Ser Thr
20 25 30

Tyr Leu Val Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
35 40 45

Ile Tyr Ala Ala Ser Tyr Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
50 55 60

Gly Ser Gly Ser Gly Thr Asp Phe Ile Leu Thr Ile Ser Arg Leu Glu
65 70 75 80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser Leu
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser

195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 413
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 413
Glu Ile Glu Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Ser
20 25 30

Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
35 40 45

Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
50 55 60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65 70 75 80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser Pro
85 90 95

Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
100 105 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
115 120 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
130 135 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145 150 155 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
165 170 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu
180 185 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
195 200 205

Ser Phe Asn Arg Gly Glu Cys
210 215

<210> 414
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 414
Ala Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1 5 10 15

Ser Ile Thr Ile Ser Cys Asn Gly Ser Ser Ser Asp Val Gly Asp Tyr
20 25 30

Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
35 40 45

Met Ile Tyr Asp Val Ser Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Thr Ser Ser
85 90 95

Arg Ser Leu Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
100 105 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
115 120 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
130 135 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145 150 155 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
165 170 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
180 185 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
195 200 205

Thr Val Ala Pro Thr Glu Cys Ser
210 215

<210> 415
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 415
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Lys Val Thr Met Thr Cys Arg Ala Ser Gln Phe Ile Ser Val Tyr
20 25 30

Val Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Thr Ala Ser Ser Leu Glu Ser Gly Val Ser Ser Arg Phe Ser Gly
50 55 60

Gly Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Arg Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Ile Tyr Tyr Cys Gln Gln Thr Tyr Ser Thr Pro Trp
85 90 95

Thr Phe Gly Pro Gly Thr Arg Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 416

<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 416
Gly Glu Val Val Met Thr Gln Ser Pro Ala Thr Leu Ser Val Ser Pro
1 5 10 15

Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser
20 25 30

Lys Val Ala Trp Tyr Gln Gln Arg Pro Gly Arg Ala Pro Arg Leu Leu
35 40 45

Ile Tyr Gly Ala Ser Thr Arg Ala Thr Asp Ile Pro Ala Arg Phe Ser
50 55 60

Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln
65 70 75 80

Ser Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Asn Asn Trp Leu
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Trp
210

<210> 417
<211> 106
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 417
Ser Tyr Glu Leu Thr Gln Pro Ser Ser Val Ser Val Ser Pro Gly Gln
1 5 10 15

Thr Ala Arg Ile Thr Cys Ser Gly Asp Val Leu Ala Lys Asn Tyr Ala
20 25 30

Arg Trp Phe Gln Gln Lys Pro Gly Gln Ala Pro Leu Leu Val Ile Tyr
35 40 45

Lys Asp Asn Ile Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

Ser Ser Gly Thr Thr Val Thr Leu Thr Ile Ser Gly Ala His Val Asp
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Tyr Ser Thr Pro Asp Asn Asn Gly Val
85 90 95

Phe Gly Gly Gly Thr Lys Leu Ile Val Leu
100 105

<210> 418
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 418
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1 5 10 15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Ala Tyr
20 25 30

Pro Tyr Val Ser Trp Tyr Gln His His Pro Gly Arg Ala Pro Lys Leu
35 40 45

Thr Ile Phe Asp Val Ile Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Phe Tyr Tyr Cys Ser Ser Tyr Thr Thr Ser

85 90 95

Asn Ser Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Ser Gln
100 105 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
115 120 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
130 135 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145 150 155 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
165 170 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
180 185 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
195 200 205

Thr Val Ala Pro Thr Glu Cys Ser
210 215

<210> 419
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 419
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Leu Ser Ser Gly
20 25 30

Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
35 40 45

Ile Tyr Gly Ala Ser Tyr Arg Ala Thr Asp Ile Pro Asp Arg Phe Ser
50 55 60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65 70 75 80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Asp Asn Ser Pro
85 90 95

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Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
            100                 105                 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 420
<211> 113
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 420
Gly Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1               5                   10                  15

Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Leu Leu Tyr Arg
            20                  25                  30

Ser Asn Asp Lys Asn Tyr Phe Ala Trp Tyr Gln Gln Lys Pro Gly Gln
        35                  40                  45

Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
    50                  55                  60

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65                  70                  75                  80

Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
                85                  90                  95

Tyr Trp Gly Thr Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile
            100                 105                 110
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Lys

<210> 421
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 421
Pro Ala Val Leu Thr Gln Ala Pro Ser Val Ser Gly Ala Pro Gly Gln
1 5 10 15

Arg Val Thr Ile Ser Cys Thr Gly Ser Gly Ser Asn Ile Gly Ala Gly
20 25 30

Tyr Asp Ala His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
35 40 45

Leu Ile Tyr Arg Asn Thr Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Ser Ser Ala Ser Leu Ala Ile Thr Gly Leu
65 70 75 80

Gln Pro Glu Asp Glu Ala Glu Tyr Tyr Cys Gln Ser Tyr Asp Ser Gly
85 90 95

Leu Gly Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
100 105 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
115 120 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
130 135 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145 150 155 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
165 170 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
180 185 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
195 200 205

Thr Val Ala Pro Thr Glu Cys Ser

210 215

<210> 422
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 422
Gln Ser Ala Leu Thr Gln Pro Pro Ser Ala Ser Gly Ser Pro Gly Gln
1 5 10 15

Ser Val Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr
20 25 30

Asp His Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Val
35 40 45

Met Ile Tyr Glu Val Thr Lys Arg Pro Ser Gly Val Pro Asp Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Val Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Glu Tyr Tyr Cys Ser Ser Tyr Ala Gly Ile
85 90 95

Asn Asn Leu Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
100 105 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
115 120 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
130 135 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145 150 155 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
165 170 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
180 185 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
195 200 205

Thr Val Ala Pro Thr Glu Cys Ser
210 215

<210> 423
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 423
Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Trp
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Lys Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Tyr Ser Gln
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 424
<211> 214

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 424
Glu Ile Val Met Thr Gln Ser Pro Ala Thr Leu Ser Val Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Ile Val Thr Asn
20 25 30

Leu Ala Trp Phe Gln Gln Lys Pro Ala Gln Ala Pro Arg Leu Leu Ile
35 40 45

Tyr Gly Ala Ser Thr Arg Ala Thr Asp Val Pro Ala Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Val Ser Ser Leu Gln Ser
65 70 75 80

Glu Asp Phe Ala Ile Tyr Phe Cys Gln Gln Tyr Thr Asp Trp Pro Tyr
85 90 95

Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 425
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 425
Pro Leu Val Leu Thr Gln Ser Pro Ser Ala Ser Ala Ser Leu Gly Ala
1 5 10 15

Ser Val Lys Leu Thr Cys Thr Leu Ser Ser Gly His Ser Thr Tyr Ala
20 25 30

Ile Ala Trp His Gln Gln Arg Pro Glu Lys Gly Pro Arg Tyr Leu Met
35 40 45

Lys Leu Asn Ser Asp Gly Ser His Ile Lys Gly Asp Gly Ile Pro Ala
50 55 60

Arg Phe Ser Gly Ala Ser Ser Gly Val Asp Arg Tyr Leu Ile Ile Ser
65 70 75 80

Ser Ser Gln Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Thr Trp Gly
85 90 95

Thr Val Gly Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
100 105 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
115 120 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
130 135 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145 150 155 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
165 170 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
180 185 190

Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
195 200 205

Thr Val Ala Pro Thr Glu Cys Ser
210 215

<210> 426
<211> 215
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 426
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Gly Gln Ser Val Ser Ser Ser
20 25 30

Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
35 40 45

Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
50 55 60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65 70 75 80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser Pro
85 90 95

Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
100 105 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
115 120 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
130 135 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145 150 155 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
165 170 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
180 185 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
195 200 205

Ser Phe Asn Arg Gly Glu Cys
210 215

<210> 427
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 427
Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1   5   10   15

Arg Val Thr Ile Pro Cys Thr Gly Ser Ser Ser Asn Leu Gly Ala Gly
            20   25   30

Tyr Ala Val His Trp Tyr Gln Gln Leu Pro Ala Thr Thr Pro Lys Leu
        35   40   45

Leu Ile Tyr Ala Asn Ser Ser Arg Pro Ser Gly Val Pro Asp Arg Phe
    50   55   60

Ser Gly Ser Arg Ser Asp Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65   70   75   80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser
                85   90   95

Leu Ser Gly Tyr Val Phe Gly Thr Gly Thr Trp Val Thr Val Leu Ser
            100   105   110

Gln Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu
        115   120   125

Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130   135   140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val
145   150   155   160

Lys Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys
                165   170   175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180   185   190

His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195   200   205

Lys Thr Val Ala Pro Thr Glu Cys Ser
    210   215

<210> 428
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 428

Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1 5 10 15

Arg Ile Thr Ile Ser Cys Thr Gly Gly Ser Thr Asn Ile Gly Thr Ile
20 25 30

Tyr Asp Val His Trp Tyr Gln Gln Leu Pro Gly Ala Ala Pro Lys Leu
35 40 45

Leu Ile Tyr Gly Asn Ser Arg Arg Pro Ser Gly Val Pro Asp Arg Phe
50 55 60

Ser Ala Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu
65 70 75 80

Arg Pro Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Cys Phe Asp Thr Ser
85 90 95

Leu Thr Ala Lys Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
115 120 125

Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
130 135 140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145 150 155 160

Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
165 170 175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
180 185 190

His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
195 200 205

Lys Thr Val Ala Pro Thr Glu Cys Ser
210 215

<210> 429
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 429
Asp Ile Leu Leu Thr Gln Ser Pro Leu Phe Leu Ser Val Thr Pro Gly
1 5 10 15

Glu Pro Ala Ser Ile Ser Cys Arg Ser Asn Gln Ser Leu Leu Ser Ser
            20   25   30

Asn Gly His His Leu Leu Asp Trp Tyr Phe Gln Lys Pro Gly Gln Ser
        35   40   45

Pro Gln Leu Leu Met Phe Leu Gly Ser Thr Arg Ala Ser Gly Val Pro
    50   55   60

Asp Arg Phe Ser Gly Ser Ala Ser Gly Thr Glu Phe Thr Leu Lys Ile
65   70   75   80

Ser Thr Val Glu Ala Glu Asp Phe Gly Val Tyr Tyr Cys Met Gln Ala
                85   90   95

Leu Gln Val Pro Arg Thr Phe Gly Arg Gly Thr Lys Val Glu Ile Lys
            100   105   110

<210> 430
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 430
Asp Ile Gln Leu Thr Gln Ser Pro Ser Phe Leu Ser Ala Ser Val Gly
1   5   10   15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Gly Ile Ser Ser Tyr
            20   25   30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35   40   45

Tyr Ala Ala Ser Thr Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50   55   60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65   70   75   80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Leu Asn Ser Tyr Pro Leu
                85   90   95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
            100   105   110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115   120   125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala

130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Leu
210

<210> 431
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 431
Pro Ala Val Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Pro Gly Gln
1 5 10 15

Arg Val Thr Ile Ser Cys Ser Gly Ser Asn Ser Asn Ile Gly Ser Thr
20 25 30

Phe Val Tyr Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
35 40 45

Ile His Ser Asn Asn Gln Arg Pro Ser Gly Val Pro Asp Arg Val Ser
50 55 60

Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Arg
65 70 75 80

Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ala Trp Asp Asp Ser Leu
85 90 95

Ser Gly Pro Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
100 105 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
115 120 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
130 135 140

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Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 432
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 432
Asp Ile Val Leu Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Pro Gly
1               5                   10                  15

Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu His Ser
            20                  25                  30

Asn Gly Val Tyr Tyr Leu Asp Trp Tyr Leu Leu Lys Pro Gly Gln Ser
        35                  40                  45

Pro Gln Leu Val Ile Tyr Met Gly Ser Ser Arg Ala Ser Gly Val Pro
    50                  55                  60

Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Arg Leu Lys Ile
65                  70                  75                  80

Ser Arg Val Glu Ala Glu Asp Val Gly Ile Tyr Tyr Cys Met Gln Ala
                85                  90                  95

Leu Gln Thr Pro Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
            100                 105                 110

Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
        115                 120                 125

Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
    130                 135                 140

Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
145                 150                 155                 160
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Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
165 170 175

Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
180 185 190

Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
195 200 205

Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Trp
210 215

<210> 433
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 433
Val Ser Ser Glu Leu Thr Gln Asp Pro Ala Val Ser Val Ala Leu Gly
1 5 10 15

Gln Thr Val Arg Ile Thr Cys Gln Gly Asp Ser Leu Arg Ser Tyr Phe
20 25 30

Ala Thr Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile
35 40 45

Tyr Gly Lys Asn Ser Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly
50 55 60

Ser Thr Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Ala Gln Ala
65 70 75 80

Glu Asp Glu Ala Asp Tyr Tyr Cys Asn Ser Arg Asp Ser Ser Asp Asp
85 90 95

His Leu Glu Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
100 105 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
115 120 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
130 135 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145 150 155 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr

```
                165                 170                 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 434
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 434
Tyr Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1               5                   10                  15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Trp
            20                  25                  30

Leu Ala Trp Phe Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

Tyr Lys Ala Ser Thr Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Glu Ser Gly Thr Glu Phe Thr Leu Thr Ile Gly Ser Leu Gln Pro
65                  70                  75                  80

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Tyr Pro Arg
                85                  90                  95

Thr Phe Gly Gln Gly Thr Lys Val Asp Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175
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Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 435
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 435
Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Thr Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys Arg Ser Ser Gln Thr Val Leu Tyr Asp
20 25 30

Ser Asn Asn Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
35 40 45

Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Ile Arg Glu Ser Gly Val
50 55 60

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65 70 75 80

Ile Asn Thr Leu Gln Ala Glu Asp Val Ala Ile Tyr Phe Cys Gln Gln
85 90 95

Tyr Phe Thr Thr Pro Arg Thr Phe Gly Gln Gly Thr Lys Val Glu Ile
100 105 110

Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
115 120 125

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
130 135 140

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145 150 155 160

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
165 170 175

Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
180 185 190

Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
195 200 205

Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Leu
210 215 220

<210> 436
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 436
Pro Ala Val Leu Thr Gln Pro Pro Ser Val Ser Gly Thr Pro Gly Gln
1 5 10 15

Arg Val Thr Ile Ser Cys Ser Gly Gly Ser Ser Asn Ile Gly Gly Lys
20 25 30

Tyr Val Tyr Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Val Val
35 40 45

Ile Tyr Arg Asn Asn Gln Arg Pro Ser Gly Val Ser Asp Arg Phe Ser
50 55 60

Gly Ser Lys Ser Gly Ile Ser Ala Ser Leu Thr Ile Ser Gly Leu Arg
65 70 75 80

Ser Glu Asp Glu Ala Val Tyr Tyr Cys Ala Ala Trp Asp Asp Gly Leu
85 90 95

Gly Gly Leu Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Ala Leu Gly
100 105 110

Gln Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu
115 120 125

Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
130 135 140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val
145 150 155 160

Lys Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys
165 170 175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
180 185 190

His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu

```
        195                 200                 205

Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 437
<211> 213
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 437
Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1               5                   10                  15

Asp Arg Val Thr Ile Ser Cys Arg Ala Ser Gln Ser Ile Ser Asp Trp
            20                  25                  30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

Tyr Ala Ala Ser Ile Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Thr
65                  70                  75                  80

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Arg Gly Ser Thr
                85                  90                  95

Phe Gly Pro Gly Thr Lys Val Asp Ile Lys Arg Thr Val Ala Ala Pro
            100                 105                 110

Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr
        115                 120                 125

Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys
    130                 135                 140

Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu
145                 150                 155                 160

Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser
                165                 170                 175

Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala
            180                 185                 190

Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe
        195                 200                 205
```

Asn Arg Gly Glu Trp
210

<210> 438
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 438
Ser Tyr Val Leu Pro Gln Pro Pro Ser Val Ser Val Ala Pro Gly Gln
1 5 10 15

Thr Ala Lys Ile Thr Cys Gly Gly Asn Asn Pro Gly Ile Lys Ser Val
20 25 30

His Trp Tyr Gln Gln Arg Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
35 40 45

Asp Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

Asn Ser Gly Asn Thr Val Thr Leu Thr Ile Ser Trp Val Glu Ala Gly
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Arg Asn Ser His Arg
85 90 95

Val Ile Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
100 105 110

Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
115 120 125

Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
130 135 140

Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145 150 155 160

Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
165 170 175

Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser
180 185 190

Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
195 200 205

Ala Pro Thr Glu Cys Ser
210

<210> 439
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 439
Pro Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1 5 10 15

Arg Val Thr Ile Ser Cys Thr Gly Ser Thr Ser Asn Ile Gly Ala Asp
20 25 30

Tyr Asp Val His Trp Tyr Gln Gln Leu Pro Arg Thr Ala Pro Lys Leu
35 40 45

Leu Ile Tyr Ala Asn Asn Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Asn Ser
85 90 95

Leu Ser Ala Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
115 120 125

Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
130 135 140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145 150 155 160

Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
165 170 175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
180 185 190

His Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
195 200 205

Lys Thr Val Ala Pro Thr Glu Cys Ser
210 215

<210> 440

<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 440
Ser Ser Glu Leu Thr Gln Asp Pro Ala Val Ser Val Ala Leu Gly Gln
1 5 10 15

Thr Val Arg Ile Thr Cys Gln Gly Asp Ser Leu Arg Ser Phe Tyr Gly
20 25 30

Ser Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
35 40 45

Gly Glu Asn Asn Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly Ser
50 55 60

Ser Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala Glu
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Asn Ser Arg Asp Ser Ser Gly Asn His
85 90 95

Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
100 105 110

Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
115 120 125

Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
130 135 140

Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145 150 155 160

Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
165 170 175

Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser
180 185 190

Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
195 200 205

Ala Pro Thr Glu Cys Ser
210

<210> 441
<211> 217
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 441
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1 5 10 15

Ser Ile Thr Ile Ser Cys Thr Gly Ile Ser Ser Asp Val Asp Gly Tyr
20 25 30

Asn Tyr Val Ser Trp Tyr Gln Leu Tyr Ser Gly Lys Ala Pro Lys Leu
35 40 45

Ile Ile Tyr Asp Val Thr Asn Arg Pro Ser Gly Val Ser His Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Ile Arg Ser
85 90 95

Ser Thr Pro Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
115 120 125

Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
130 135 140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145 150 155 160

Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
165 170 175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
180 185 190

His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
195 200 205

Lys Thr Val Ala Pro Thr Glu Cys Ser
210 215

<210> 442
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 442
Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Val Leu Tyr Ser
20 25 30

Ser Asp Asn Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
35 40 45

Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
50 55 60

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65 70 75 80

Ile Ser Ser Leu Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
85 90 95

Tyr Tyr Asp Thr Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile
100 105 110

Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
115 120 125

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
130 135 140

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145 150 155 160

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
165 170 175

Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
180 185 190

Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
195 200 205

Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
210 215 220

<210> 443
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody

VL chain

<400> 443
Ala Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1 5 10 15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr
20 25 30

Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
35 40 45

Met Ile Tyr Glu Val Ser Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Thr Ser Ser
85 90 95

Ser Thr Leu Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
100 105 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
115 120 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
130 135 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145 150 155 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
165 170 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
180 185 190

Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
195 200 205

Thr Val Ala Pro Thr Glu Cys Ser
210 215

<210> 444
<211> 213
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 444
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Gln Ala Ser Gln Asp Ile Ser Asn Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Asp Ala Ser Asn Leu Glu Thr Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Phe Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Tyr Asp Asn Leu Trp Thr
85 90 95

Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala Pro
100 105 110

Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr
115 120 125

Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys
130 135 140

Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu
145 150 155 160

Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser
165 170 175

Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala
180 185 190

Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe
195 200 205

Asn Arg Gly Glu Cys
210

<210> 445
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 445
Pro Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Gln

1 5 10 15

Thr Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Ser Lys Ser Val
20 25 30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Val Tyr
35 40 45

Asp Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Ser Asp His
85 90 95

Leu Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly Gln Pro
100 105 110

Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu
115 120 125

Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro
130 135 140

Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys Ala
145 150 155 160

Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala
165 170 175

Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg
180 185 190

Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr
195 200 205

Val Ala Pro Thr Glu Cys Ser
210 215

<210> 446
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 446
Glu Ile Val Leu Ala Gln Ser Pro Gly Thr Leu Tyr Leu Ser Pro Gly
1 5 10 15

```
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Arg Gly Asn
            20                  25                  30

Tyr Leu Ala Trp Tyr Gln Gln Arg Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Gly
    50                  55                  60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Thr Arg Leu Leu
65                  70                  75                  80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys His Gln Tyr Gly Ser Ser Pro
                85                  90                  95

Arg Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
            100                 105                 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 447
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 447
Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Ala Ala Thr Gly Gln
1               5                   10                  15

Lys Val Thr Ile Ser Cys Ser Gly Gly Ser Ser Asn Ile Gly Ser Asn
            20                  25                  30
```

```
Tyr Val Ser Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
        35                  40                  45

Ile Phe Glu Asn Asn Lys Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

Gly Ser Lys Ser Gly Thr Ser Ala Thr Leu Gly Ile Thr Gly Leu Gln
65                  70                  75                  80

Thr Gly Asp Glu Ala Asp Tyr Tyr Cys Gly Thr Trp Asp Ser Ser Leu
                85                  90                  95

Thr Gly Gly Phe Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly
            100                 105                 110

Gln Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val
145                 150                 155                 160

Lys Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 448
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 448
Ser Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Lys
1               5                   10                  15

Thr Ala Thr Ile Ala Cys Gly Glu Asn Asn Ile Gly Ser Tyr Asn Val
            20                  25                  30

Asn Trp Tyr Gln Gln Arg Pro Gly Gln Ala Pro Val Leu Val Ile His
```

35 40 45

Ser Asp Ser Asp Arg Pro Ser Gly Ile Ser Glu Arg Phe Ser Gly Ser
50 55 60

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Thr Ser Asn Asp Val
85 90 95

Gly Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
100 105 110

Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
115 120 125

Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
130 135 140

Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145 150 155 160

Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
165 170 175

Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser
180 185 190

Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
195 200 205

Ala Pro Thr Glu Cys Ser
210

<210> 449
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 449
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Gly Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Arg Val Ser Ser Asn
20 25 30

Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
35 40 45

```
Ile Tyr Gly Pro Ser Ser Arg Ala Thr Gly Val Pro Asp Arg Phe Ser
    50                  55                  60

Ser Ser Gly Ser Gly Thr Asp Phe Thr Leu Ser Ile Ser Arg Leu Glu
65                  70                  75                  80

Pro Glu Asp Phe Ala Val Tyr Phe Cys Gln Gln Tyr Gly Ser Ser Pro
                85                  90                  95

Pro Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
            100                 105                 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 450
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 450
Ala Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Ser Tyr
            20                  25                  30

Asn Leu Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Glu Leu
        35                  40                  45

Met Ile Tyr Glu Gly Ser Lys Arg Pro Ser Gly Val Ser Asn Arg Phe
    50                  55                  60
```

```
Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Cys Ser Tyr Ala Gly Ser
                85                  90                  95

Ser Asn Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
            100                 105                 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 451
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 451

```
Asp Val Val Met Thr Gln Ser Pro Leu Tyr Leu Pro Val Thr Leu Gly
1               5                   10                  15

Gln Pro Ala Ser Ile Ser Cys Arg Ala Ser Gln Ser Leu Val Tyr Ser
            20                  25                  30

Asp Gly Asn Thr Tyr Leu Asn Trp Val His Gln Arg Pro Gly Gln Ser
        35                  40                  45

Pro Arg Arg Leu Ile Tyr Met Val Ser Gln Arg Gly Ser Gly Val Pro
    50                  55                  60

Asp Arg Phe Ser Gly Ser Gly Ser Asp Thr Asp Phe Thr Leu Lys Ile
```

65 70 75 80

Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln Gly
85 90 95

Thr His Trp Ser Ala Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg
100 105 110

Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln
115 120 125

Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr
130 135 140

Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
145 150 155 160

Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr
165 170 175

Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys
180 185 190

His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro
195 200 205

Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
210 215

<210> 452
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 452
Pro Ser Val Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Pro Gly Gln
1 5 10 15

Arg Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Ser Asn
20 25 30

Tyr Val Tyr Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
35 40 45

Ile Tyr Arg Asn Asn Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
50 55 60

Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Arg
65 70 75 80

Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ala Trp Asp Asp Ser Leu
85 90 95

Ser Gly Gln Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
100 105 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
115 120 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
130 135 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145 150 155 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
165 170 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
180 185 190

Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
195 200 205

Thr Val Ala Pro Thr Glu Cys Ser
210 215

<210> 453
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 453
Val Ser Ser Glu Leu Thr Gln Asp Pro Ala Val Ser Val Ala Leu Gly
1 5 10 15

Gln Thr Val Arg Ile Thr Cys Gln Gly Asp Ser Leu Arg Ser Tyr Tyr
20 25 30

Ala Ser Trp Tyr Gln Gln Arg Pro Gly Gln Ala Pro Val Leu Val Ile
35 40 45

Tyr Gly Lys Asn Asn Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly
50 55 60

Ser Ser Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala
65 70 75 80

Glu Asp Glu Ala Asp Tyr Tyr Cys Asn Ser Arg Asp Ser Ser Gly Asn
85 90 95

```
His Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly Gln Pro Lys
            100                 105                 110

Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
        115                 120                 125

Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
    130                 135                 140

Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys Ala Gly
145                 150                 155                 160

Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
                165                 170                 175

Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser
            180                 185                 190

Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
        195                 200                 205

Ala Pro Thr Glu Cys Ser
    210
```

<210> 454
<211> 213
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 454

```
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Tyr
            20                  25                  30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Pro Thr
                85                  90                  95

Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys Arg Thr Val Ala Ala Pro
```

```
            100                 105                 110

Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr
        115                 120                 125

Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys
    130                 135                 140

Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu
145                 150                 155                 160

Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser
                165                 170                 175

Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala
            180                 185                 190

Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe
        195                 200                 205

Asn Arg Gly Glu Cys
    210

<210> 455
<211> 213
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 455
Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Gln Thr
1               5                   10                  15

Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Tyr Arg Asn Val Tyr
            20                  25                  30

Trp Tyr His Gln Lys Pro Gly Gln Ala Pro Val Leu Val Val Tyr Asp
        35                  40                  45

Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser Asn
    50                  55                  60

Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly Asp
65                  70                  75                  80

Glu Ala Asp Tyr Phe Cys Gln Val Trp Glu Ser Gly Gly Asp His Pro
                85                  90                  95

Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys Ala
            100                 105                 110
```

```
Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala
        115                 120                 125

Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala
    130                 135                 140

Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val
145                 150                 155                 160

Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser
                165                 170                 175

Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr
            180                 185                 190

Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala
        195                 200                 205

Pro Thr Glu Cys Ser
    210

<210> 456
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 456
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Gly Ile Arg Asn Asp
            20                  25                  30

Leu Gly Trp Phe Gln Gln Lys Pro Gly Lys Ala Pro Lys Arg Leu Ile
        35                  40                  45

Tyr Ala Ala Ser Asn Leu Pro Ser Gly Val Ser Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Glu Asp Phe Ala Thr Tyr Tyr Cys Leu Gln His Asn Asn Tyr Pro Leu
                85                  90                  95

Thr Phe Gly Gln Gly Thr Lys Val Glu Phe Lys Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125
```

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 457
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 457
Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Trp
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Asp Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Asp Asp Phe Ala Thr Phe Tyr Cys Gln Gln Tyr Asn Ser Tyr Pro Tyr
85 90 95

Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala

130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 458
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 458
Asp Ile Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Pro Gly
1 5 10 15

Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu His Ser
20 25 30

Asn Gly Phe Asn Tyr Leu Asp Trp Tyr Leu Gln Lys Pro Gly Gln Ser
35 40 45

Pro Gln Leu Leu Ile Tyr Leu Gly Ser Asn Arg Ala Ser Gly Val Pro
50 55 60

Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65 70 75 80

Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln Ala
85 90 95

Leu Gln Ile Pro Arg Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
100 105 110

Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
115 120 125

Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
130 135 140

Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
145 150 155 160

Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
165 170 175

Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
180 185 190

Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
195 200 205

Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
210 215

<210> 459
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 459
Pro Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1 5 10 15

Thr Ala Ser Ile Thr Cys Ser Gly Asp Lys Leu Gly Asp Lys Tyr Ala
20 25 30

Cys Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
35 40 45

Gln Asp Ser Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Gln Ala Trp Asp Ser Asn Val His Val
85 90 95

Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly Gln Pro Lys Ala Asn
100 105 110

Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
115 120 125

Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
130 135 140

Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys Ala Gly Val Glu
145 150 155 160

```
Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175

Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190

Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195                 200                 205

Thr Glu Cys Ser
    210

<210> 460
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 460
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                   10                  15

Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Lys Lys Tyr Ala
            20                  25                  30

Phe Trp Tyr Gln Gln Lys Ser Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

Glu Asp Ser Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

Ser Ser Gly Thr Met Ala Thr Leu Thr Ile Ser Gly Ala Gln Val Glu
65                  70                  75                  80

Asp Glu Ser Asp Tyr Tyr Cys Tyr Ser Thr Asp Ser Ser Gly Asn Val
                85                  90                  95

Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
            100                 105                 110

Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
        115                 120                 125

Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
    130                 135                 140

Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145                 150                 155                 160

Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
```

```
                165                 170                 175

Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser
            180                 185                 190

Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
        195                 200                 205

Ala Pro Thr Glu Cys Ser
    210
```

<210> 461
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 461

```
Val Ser Ser Glu Leu Thr Gln Asp Pro Ala Val Ser Val Ala Leu Gly
1               5                   10                  15

Gln Thr Val Arg Ile Thr Cys Gln Gly Asp Ser Leu Arg Ser Tyr Tyr
            20                  25                  30

Ala Ser Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile
        35                  40                  45

Tyr Gly Lys Asn Asn Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly
    50                  55                  60

Ser Ser Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala
65                  70                  75                  80

Glu Asp Glu Ala Asp Tyr Tyr Cys Asn Ser Arg Asp Ser Ser Gly Asn
                85                  90                  95

Leu Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly Gln Pro
            100                 105                 110

Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu
        115                 120                 125

Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro
    130                 135                 140

Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys Ala
145                 150                 155                 160

Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala
                165                 170                 175
```

Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg
            180   185   190

Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr
        195   200   205

Val Ala Pro Thr Glu Cys Ser
    210   215

<210> 462
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 462
Asp Ile Ala Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1   5   10   15

Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Val Leu Tyr Ser
            20   25   30

Ser Ser Ser Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
        35   40   45

Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
    50   55   60

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65   70   75   80

Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
                85   90   95

Tyr Tyr Ser Ser Pro Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile
            100   105   110

Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115   120   125

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130   135   140

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145   150   155   160

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165   170   175

Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
            180   185   190

```
Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
        195                 200                 205

Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215                 220
```

<210> 463
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 463

```
Asp Ile Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Pro Gly
1               5                   10                  15

Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu His Ser
            20                  25                  30

Asn Gly Tyr Asn Tyr Leu Asp Trp Tyr Leu Gln Lys Pro Gly Gln Ser
        35                  40                  45

Pro Gln Leu Leu Ile Tyr Leu Gly Ser Asn Arg Ala Ser Gly Val Pro
    50                  55                  60

Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65                  70                  75                  80

Ser Arg Val Glu Ala Asp Asp Val Gly Val Tyr Tyr Cys Met Gln Ala
                85                  90                  95

Leu Gln Thr Pro Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile
            100                 105                 110

Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115                 120                 125

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130                 135                 140

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175

Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
            180                 185                 190

Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
```

195 200 205

Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
210 215 220

<210> 464
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 464
Ala Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1 5 10 15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr
20 25 30

Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Gln Leu
35 40 45

Met Ile Phe Asp Val Ser Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Asp Thr Ala Ser Leu Thr Ile Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Thr Ser Ser
85 90 95

Ser Thr Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
100 105 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
115 120 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
130 135 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145 150 155 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
165 170 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
180 185 190

Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
195 200 205

Thr Val Ala Pro Thr Glu Cys Ser
210 215

<210> 465
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 465
Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Val Leu Tyr Ser
20 25 30

Ser Asn Asn Lys Asn Tyr Leu Gly Trp Tyr Gln Gln Lys Pro Gly Glu
35 40 45

Pro Pro Lys Leu Val Ile His Trp Ala Ser Thr Arg Glu Ser Gly Val
50 55 60

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65 70 75 80

Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
85 90 95

Ser Tyr Ser Thr Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile
100 105 110

Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
115 120 125

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
130 135 140

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145 150 155 160

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
165 170 175

Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
180 185 190

Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
195 200 205

Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
210 215 220

<210> 466
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 466
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1 5 10 15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Ser Tyr
20 25 30

Asn Leu Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
35 40 45

Met Ile Tyr Glu Gly Ser Lys Arg Pro Ser Gly Val Ser Asn Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Cys Ser Tyr Ala Gly Ser
85 90 95

Ser Thr Pro Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 467
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 467
Pro Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Leu Ser Pro Gly Gln
1 5 10 15

Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Lys Lys Tyr Ala
20 25 30

Tyr Trp Tyr Gln Gln Lys Ser Gly Gln Ala Pro Val Leu Val Ile Tyr
35 40 45

Glu Asp Ser Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

Ser Ser Gly Thr Thr Ala Thr Leu Thr Ile Ser Gly Ala Gln Val Asp
65 70 75 80

Asp Glu Gly Asp Tyr Tyr Cys Tyr Ser Pro Asp Ser Ser Gly Asn Val
85 90 95

Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
100 105 110

Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
115 120 125

Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
130 135 140

Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145 150 155 160

Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
165 170 175

Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser
180 185 190

Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
195 200 205

Ala Pro Thr Glu Cys Ser
210

<210> 468
<211> 103
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 468
Glu Ile Val Met Thr Gln Ser Pro Ala Thr Leu Ser Val Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Asn
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
35 40 45

Tyr Gly Ala Ser Thr Arg Ala Thr Gly Leu Pro Ala Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Ser
65 70 75 80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Ser Arg Gly Thr Phe Gly Gly
85 90 95

Gly Thr Lys Val Glu Ile Lys
100

<210> 469
<211> 109
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 469
Glu Ile Val Leu Thr Gln Ser Pro Val Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Ser
20 25 30

Tyr Ile Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
35 40 45

Ile Tyr Gly Ala Ser Thr Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
50 55 60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65 70 75 80

Pro Glu Asp Cys Ala Val Phe Tyr Cys Gln Gln Tyr Gly Ser Ser His
85 90 95

Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg
100 105

<210> 470
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 470
Ser Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Lys
1 5 10 15

Thr Ala Arg Ile Thr Cys Gly Gly Asp Asn Ile Gly Ser Arg Ser Val
20 25 30

```
His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

Tyr Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65                  70                  75                  80

Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Ser Asp His
                85                  90                  95

Pro Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Arg Gln Pro
            100                 105                 110

Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu
        115                 120                 125

Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro
    130                 135                 140

Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala
145                 150                 155                 160

Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala
                165                 170                 175

Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys
            180                 185                 190

Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr
        195                 200                 205

Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 471
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 471
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Ile Gly Thr Tyr
            20                  25                  30

Asn Leu Val Ser Trp Tyr Gln Gln Arg Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45
```

Ile Ile Tyr Asp Val Ile Lys Arg Pro Ser Gly Ile Ser Asp Arg Phe
50 55 60

Ser Gly Ser Lys Ser Asp Asn Met Ala Ser Leu Thr Ile Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala His Tyr Tyr Cys Cys Ser Tyr Arg Ser Ser
85 90 95

Thr Ala Pro Val Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu
100 105 110

<210> 472
<211> 113
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 472
Gly Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Val Leu Ser Thr
20 25 30

Ser Asn Asn Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
35 40 45

Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
50 55 60

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65 70 75 80

Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
85 90 95

Tyr Phe Ser Thr Pro Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile
100 105 110

Lys

<210> 473
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody

VL chain

<400> 473
Ser Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Gln
1 5 10 15

Thr Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Ser Lys Ser Val
20 25 30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Val Tyr
35 40 45

Asp Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Gly Tyr Ser Asp Pro
85 90 95

Leu Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
100 105 110

Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
115 120 125

Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
130 135 140

Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145 150 155 160

Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
165 170 175

Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser
180 185 190

Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
195 200 205

Ala Pro Thr Glu Cys Ser
210

<210> 474
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 474
Glu Val Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln His Ile Ala Gly Arg
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

His Ser Ala Ser Ser Val Gln Arg Glu Val Pro Ser Arg Phe Gly Gly
50 55 60

Ser Gly Phe Gly Thr Asp Phe Thr Leu Thr Ile Tyr Ser Leu Gln Ala
65 70 75 80

Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Ser Tyr Tyr Thr Pro Pro
85 90 95

Thr Phe Ala Gly Gly Thr Arg Val Asp Leu Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 475
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 475
Arg Ser Val Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Pro Gly Gln

1 5 10 15

Arg Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Ser Asn
20 25 30

Thr Val Asn Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
35 40 45

Ile Tyr Ser Asn Asn Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
50 55 60

Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Gln
65 70 75 80

Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ala Trp Asp Asp Ser Leu
85 90 95

Asn Gly Leu Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
115 120 125

Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
130 135 140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145 150 155 160

Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
165 170 175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
180 185 190

His Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
195 200 205

Lys Thr Val Ala Pro Thr Glu Cys Ser
210 215

<210> 476
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 476
Asp Phe Leu Leu Thr Gln Pro His Ser Val Ser Glu Ser Pro Gly Lys
1 5 10 15

```
Thr Val Thr Ile Ser Cys Thr Arg Ser Ser Gly Ser Ile Ala Ser Asn
            20                  25                  30

Tyr Val Gln Trp Tyr Gln Gln Arg Pro Gly Ser Ser Pro Ser Thr Val
        35                  40                  45

Ile Tyr Glu Asp His Gln Arg Pro Ser Gly Val Pro Gly Arg Phe Ser
    50                  55                  60

Gly Ser Ile Asp Ser Ser Ser Asn Ser Ala Ser Leu Thr Ile Ser Gly
65                  70                  75                  80

Leu Lys Thr Glu Asp Glu Ala Asp Tyr Phe Cys Gln Ser Ser Asp Ser
                85                  90                  95

Asn Asn His Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 477
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 477

```
Arg Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

Arg Val Thr Ile Ser Cys Thr Gly Ser Ser Ser Asn Ile Gly Ala His
            20                  25                  30
```

```
Tyr Asp Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

Leu Ile Tyr Gly Asn Ser Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser
                85                  90                  95

Leu Ser Gly Val Leu Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 478
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 478
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Tyr
            20                  25                  30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Phe Leu Ile
```

```
        35                  40                  45

Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Pro Phe
                85                  90                  95

Thr Phe Gly Pro Gly Thr Lys Val Asp Leu Lys Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Cys
    210

<210> 479
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 479
Asp Ile Gln Met Thr Gln Ser Pro Pro Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

Asp Arg Val Thr Ile Thr Cys Gln Ala Ser Gln Asp Ile Ser Asn Tyr
            20                  25                  30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Thr Pro Lys Leu Leu Ile
        35                  40                  45
```

```
Tyr Ala Ala Ser Thr Leu Glu Thr Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Phe Thr Phe Thr Ile Asn Ser Leu Gln Pro
65                  70                  75                  80

Glu Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Tyr Asp Ser Leu Pro Leu
                85                  90                  95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Cys
    210

<210> 480
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 480
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

His Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Asp Val Ala Ser Thr
            20                  25                  30

Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60
```

```
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

Pro Glu Asp Phe Ala Val Phe Tyr Cys Gln Tyr Tyr Gly Gly Ser Pro
                85                  90                  95

Gly Phe Thr Phe Gly Pro Gly Thr Lys Val Asp Phe Lys Arg Thr Val
            100                 105                 110

Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
        115                 120                 125

Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
    130                 135                 140

Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
145                 150                 155                 160

Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
                165                 170                 175

Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
            180                 185                 190

Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
        195                 200                 205

Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 481
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 481

```
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Thr Ser Asp Val Gly Thr Tyr
            20                  25                  30

Asn Leu Val Ser Trp Tyr Gln Gln Leu Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

Ile Ile Tyr Glu Val Thr Lys Arg Pro Ser Gly Val Ser Asn Arg Phe
    50                  55                  60

Ser Ala Ser Lys Ser Gly Ser Thr Ala Ser Leu Thr Ile Ser Gly Leu
```

65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Cys Ser Tyr Ala Gly Ser
85 90 95

Ser Thr Tyr Val Phe Gly Ser Gly Ala Arg Val Thr Val Leu Gly Gln
100 105 110

Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
115 120 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
130 135 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys
145 150 155 160

Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr
165 170 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
180 185 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
195 200 205

Thr Val Ala Pro Thr Glu Cys Ser
210 215

<210> 482
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 482
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Thr Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ala Asn Asn
20 25 30

Tyr Leu Ala Trp His Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
35 40 45

Ile Tyr Gly Ala Ser Lys Arg Ala Ala Gly Ile Pro Asp Arg Phe Ser
50 55 60

Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Arg Leu Glu
65 70 75 80

```
Pro Glu Asp Cys Ala Val Tyr Tyr Cys Gln Glu Tyr Val Lys Ser Pro
                85                  90                  95

Gly Phe Ala Phe Gly Pro Gly Thr Arg Val Asp Ile Lys Arg Thr Val
            100                 105                 110

Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
        115                 120                 125

Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
    130                 135                 140

Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
145                 150                 155                 160

Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
                165                 170                 175

Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
            180                 185                 190

Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
        195                 200                 205

Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 483
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 483

```
Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Asn
            20                  25                  30

Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

Ile His Gly Ala Ser Ser Arg Ala Thr Gly Phe Pro Asp Arg Phe Ser
    50                  55                  60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Asn Arg Leu Glu
65                  70                  75                  80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Thr Ser Pro
                85                  90                  95
```

```
Gln Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
            100                 105                 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 484
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 484

```
Gln Thr Val Val Thr Gln Glu Pro Ser Phe Ser Val Ser Pro Gly Gly
1               5                   10                  15

Thr Val Thr Phe Thr Cys Ala Trp Ser Ser Gly Ser Val Ser Thr Ser
            20                  25                  30

Phe Tyr Thr Ser Trp Tyr Arg Gln Thr Pro Gly Gln Ala Pro Gln Thr
        35                  40                  45

Leu Ile Tyr Asn Thr Asn Arg Arg Ser Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

Ser Gly Ser Ile Leu Gly Asn Lys Ala Ala Leu Thr Ile Thr Gly Ala
65                  70                  75                  80

Gln Ala Asp Asp Asp Ser Asp Tyr Tyr Cys Met Leu Tyr Met Gly Ser
                85                  90                  95

Gly Ile Ser Leu Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
```

```
            100                 105                 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 485
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 485
Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

Arg Val Thr Ile Ser Cys Thr Gly Ser Ser Ser Asn Ile Gly Ala Gln
            20                  25                  30

Tyr Asp Val His Trp Tyr Lys Val Ile Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

Leu Ile Tyr Gly Asn Asp Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80

Gln Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Asn Asp Ile Ser
                85                  90                  95

Leu Ser Gly Ser Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110
```

```
Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser
        115                 120                 125

Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp
    130                 135                 140

Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro
145                 150                 155                 160

Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn
                165                 170                 175

Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys
            180                 185                 190

Ser His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val
        195                 200                 205

Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 486
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 486

```
Pro Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

Arg Val Thr Ile Ser Cys Thr Gly Ser Ser Ser Asn Ile Gly Ala Gly
            20                  25                  30

Tyr Asp Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

Leu Ile Tyr Ala Asn Thr Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Asn Ser
                85                  90                  95

Leu Ser Gly Gly Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125
```

```
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 487
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 487
Lys Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Ser
            20                  25                  30

Tyr Leu Ala Trp Tyr Gln Gln Arg Pro Gly Gln Ser Pro Arg Leu Leu
        35                  40                  45

Ile Tyr Glu Thr Ser Thr Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Gly Leu Glu
65                  70                  75                  80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Phe Asp Ile Ser Pro
                85                  90                  95

Phe Thr Phe Gly Pro Gly Thr Lys Val Asp Val Lys Arg Thr Val Ala
            100                 105                 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
```

```
    130                 135                 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 488
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 488
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr
            20                  25                  30

Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

Met Ile Tyr Asp Val Ser Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
    50                  55                  60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Thr Ser Ser
                85                  90                  95

Ser Ser Leu Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu Gly Gln
            100                 105                 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140
```

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145 150 155 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
165 170 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
180 185 190

Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
195 200 205

Thr Val Ala Pro Thr Glu Cys Ser
210 215

<210> 489
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 489
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1 5 10 15

Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Ile Gly Gly Tyr
20 25 30

Asp Leu Val Ser Trp Tyr Gln His His Pro Gly Lys Ala Pro Lys Leu
35 40 45

Val Ile Ser Glu Gly Ser Lys Arg Pro Ser Gly Val Ser Asn Arg Phe
50 55 60

Phe Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Cys Ser Phe Thr Gly Thr
85 90 95

Ser Thr Phe Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu
100 105 110

<210> 490
<211> 113
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 490
Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1   5   10   15

Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Val Leu Tyr Ser
            20   25   30

Ser Asn Asn Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
        35   40   45

Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
    50   55   60

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65   70   75   80

Ile Ser Ser Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln
                85   90   95

Tyr Tyr Ser Thr Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile
            100   105   110

Lys

<210> 491
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 491
Gln Ser Val Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Pro Gly Gln
1   5   10   15

Arg Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Ser Asn
            20   25   30

Thr Val Asn Trp Tyr Gln Gln Phe Pro Gly Thr Ala Pro Lys Leu Leu
        35   40   45

Ile Tyr Ser Asn Asn His Arg Pro Leu Gly Val Pro Asp Arg Phe Ser
    50   55   60

Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Glu Val Arg
65   70   75   80

Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Thr Trp Asp Asp Ser Leu
                85   90   95

```
Asn Gly Gly Val Phe Gly Ala Gly Thr Lys Leu Thr Val Val Gly Gln
            100                 105                 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 492
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 492

```
Pro Ala Val Val Thr Gln Glu Pro Ser Leu Thr Val Ser Pro Gly Gly
1               5                   10                  15

Thr Val Thr Leu Thr Cys Gly Ser Ser Thr Gly Val Val Thr Thr Gly
            20                  25                  30

His Tyr Pro Tyr Trp Phe Gln Gln Lys Pro Gly Gln Ala Pro Thr Thr
        35                  40                  45

Leu Ile Phe Asp Thr Ser Asn Lys His Ser Trp Thr Pro Ala Arg Phe
    50                  55                  60

Ser Gly Ser Leu Leu Gly Gly Lys Ala Ala Leu Thr Leu Ser Ala Ala
65                  70                  75                  80

Gln Pro Glu Asp Glu Ala Asp Tyr Tyr Cys Trp Leu Ile Ser Gly Gly
                85                  90                  95

Ala Pro Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro
            100                 105                 110
```

Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu
115 120 125

Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro
130 135 140

Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala
145 150 155 160

Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala
165 170 175

Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg
180 185 190

Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr
195 200 205

Val Ala Pro Thr Glu Cys Ser
210 215

<210> 493
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 493
Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1 5 10 15

Arg Val Thr Ile Ser Cys Ala Gly Ser Tyr Ser Asn Ile Gly Ala Gly
20 25 30

Tyr Asp Val His Trp Tyr Arg Gln Leu Pro Gly Thr Ala Pro Thr Leu
35 40 45

Leu Ile Tyr Ser Asn Asn Asn Arg Pro Ser Gly Val Ser Asp Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Phe Asp Ser Ser
85 90 95

Leu Ser Arg Ser Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu
100 105 110

<210> 494

<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 494
Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Phe Ser Pro Gly
1 5 10 15

Asp Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Asn Ile Asn Arg Phe
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Thr Pro Arg Leu Leu Ile
35 40 45

Tyr Asp Ala Ser Thr Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Ser Leu Ile Ile Ser Ser Leu Glu Pro
65 70 75 80

Glu Asp Phe Ala Ile Tyr Tyr Cys Gln Gln Arg Asn Asn Trp Pro Ile
85 90 95

Thr Phe Gly Pro Gly Thr Lys Val Asp Val Lys
100 105

<210> 495
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 495
Ala Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Gly Ile Arg Asn Asp
20 25 30

Leu Gly Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Leu Gln Asp Tyr Asn Tyr Pro Pro
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 496
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 496
Ser Ser Glu Leu Thr Gln Asp Pro Ala Val Ser Val Ala Leu Gly Gln
1 5 10 15

Thr Val Arg Ile Thr Cys Gln Gly Asp Ser Leu Arg Thr Asp Tyr Ala
20 25 30

Thr Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Ile Leu Val Phe Tyr
35 40 45

Gly Glu Asp Asn Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly Ser
50 55 60

Ser Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala Glu
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Asn Ser Arg Asp Ser Ser Gly His His

```
                85                  90                  95

Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105

<210> 497
<211> 113
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 497
Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1               5                   10                  15

Glu Arg Ala Thr Leu Asn Cys Lys Ser Ser Gln Ser Val Leu Ser Ser
            20                  25                  30

Tyr Asn Asn Lys Asp Tyr Leu Ala Trp Phe Gln Gln Lys Pro Gly Gln
        35                  40                  45

Pro Pro Gln Leu Leu Phe Tyr Trp Ala Ser Thr Arg Lys Thr Gly Val
    50                  55                  60

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65                  70                  75                  80

Ile Ser Ser Leu Gln Thr Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
                85                  90                  95

Tyr Tyr Ser Thr Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile
            100                 105                 110

Lys


<210> 498
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 498
Asp Val Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Leu Gly
1               5                   10                  15

Gln Ala Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Val Tyr Ser
            20                  25                  30
```

```
Asp Gly Asn Thr Tyr Leu Asn Trp Phe Gln Gln Arg Pro Gly Gln Ser
        35                  40                  45

Pro Arg Arg Leu Ile Tyr Lys Val Ser Asn Arg Glu Ser Gly Val Pro
    50                  55                  60

Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Gln Ile
65                  70                  75                  80

Ser Arg Val Glu Ala Glu Asp Val Gly Ile Tyr Tyr Cys Met Gln Gly
                85                  90                  95

Ala His Trp Pro Pro Ile Thr Phe Gly Gln Gly Thr Arg Leu Glu Ile
            100                 105                 110

Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115                 120                 125

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130                 135                 140

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175

Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
            180                 185                 190

Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
        195                 200                 205

Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215                 220

<210> 499
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 499
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                   10                  15

Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Lys Lys Tyr Val
            20                  25                  30

Phe Trp Tyr Gln Gln Arg Ser Gly Gln Ala Pro Val Leu Val Ile Tyr
```

```
        35                  40                  45

Glu Asp Ser Lys Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly Ser
    50                  55                  60

Ser Ser Gly Thr Leu Ala Thr Leu Thr Ile Ser Gly Ala Gln Val Glu
65                  70                  75                  80

Asp Glu Ala Asp Tyr Tyr Cys Tyr Ser Thr Asp Thr Ile Gly Asn Trp
                85                  90                  95

Val Phe Gly Gly Gly Thr Arg Leu Thr Val Leu
            100                 105

<210> 500
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 500
Leu Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Gln
1               5                   10                  15

Thr Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Ser Lys Ser Val
            20                  25                  30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Val Tyr
        35                  40                  45

Asp Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65                  70                  75                  80

Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Ser Asp His
                85                  90                  95

Trp Ile Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
            100                 105                 110

Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
        115                 120                 125

Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
    130                 135                 140

Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145                 150                 155                 160
```

Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
165 170 175

Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser
180 185 190

Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
195 200 205

Ala Pro Thr Glu Cys Ser
210

<210> 501
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 501
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Thr Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Ala Ala Ser Asn Leu Gln Ser Gly Val Pro Ser Thr Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Pro Pro Leu
85 90 95

Thr Phe Gly Gly Gly Thr Thr Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 502
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 502
Glu Ile Val Met Thr Gln Ser Pro Ala Thr Leu Ser Val Ser Gln Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Gly Ser Asp
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
35 40 45

Tyr Asp Ala Ser Ala Arg Ala Thr Asp Ile Pro Ala Arg Phe Ser Gly
50 55 60

Ser Gly Ser Glu Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Ser
65 70 75 80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln His Tyr Ser Asp Trp Arg Ala
85 90 95

Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
100 105 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
115 120 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
130 135 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145 150 155 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
165 170 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val

```
            180                 185                 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 503
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 503

```
Gly Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1               5                   10                  15

Glu Arg Ala Thr Ile Asn Cys Arg Ser Ser Gln Ser Val Leu Tyr Ser
            20                  25                  30

Ser Asn Asn Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
        35                  40                  45

Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
    50                  55                  60

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65                  70                  75                  80

Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
                85                  90                  95

Tyr Tyr Gly Pro Leu Trp Thr Phe Gly Gln Gly Thr Arg Val Glu Ile
            100                 105                 110

Arg Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115                 120                 125

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130                 135                 140

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175

Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
            180                 185                 190
```

Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
195 200 205

Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
210 215 220

<210> 504
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 504
Ser Asp Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1 5 10 15

Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Ala Lys Glu Tyr Ala
20 25 30

Tyr Trp Tyr Gln Gln Lys Ser Gly Gln Ala Pro Val Leu Val Ile Ser
35 40 45

Lys Asp Thr Glu Arg Pro Ser Gly Ile Pro Ala Arg Phe Ser Gly Ser
50 55 60

Ser Ser Gly Thr Thr Val Thr Leu Thr Ile Ser Gly Val Gln Ser Asp
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Ala Asp Ser Ser Leu Thr Tyr
85 90 95

Trp Leu Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Arg Gln Pro Lys
100 105 110

Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
115 120 125

Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
130 135 140

Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145 150 155 160

Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
165 170 175

Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser
180 185 190

Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
195 200 205

Ala Pro Thr Glu Cys Ser
210

<210> 505
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 505
Asp Ile Gln Met Thr Gln Ala Pro Ser Thr Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Ser Ile Thr Cys Arg Ala Ser Gln Asn Ile Arg Asp Phe
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Arg Ala Pro Asp Leu Leu Ile
35 40 45

Tyr Arg Ala Ser Thr Leu Glu Lys Gly Val Ser Ala Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Thr Gly Leu Gln Pro
65 70 75 80

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Ser Asp Tyr Ser Thr
85 90 95

Phe Gly Gly Gly Thr Arg Val Glu Ile Lys
100 105

<210> 506
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 506
Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Thr Cys Lys Ser Ser Gln Thr Ile Leu Tyr Ser
20 25 30

Ser Asn Asn Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
35 40 45

```
Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
    50                  55                  60

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65                  70                  75                  80

Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys His Gln
                85                  90                  95

Tyr Tyr Thr Thr Pro Phe Thr Phe Gly Pro Gly Thr Thr Val Asp Ile
            100                 105                 110

Arg Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115                 120                 125

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130                 135                 140

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175

Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
            180                 185                 190

Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
        195                 200                 205

Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215                 220

<210> 507
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 507
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                   10                  15

Thr Ala Ser Ile Thr Cys Ser Gly Asp Lys Leu Gly Asn Lys Tyr Val
            20                  25                  30

Cys Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45

Gln Asp Thr Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60
```

```
Lys Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Leu
65                  70                  75                  80

Asp Glu Ala Asp Tyr Tyr Cys Gln Ala Trp Asp Ser Ser Thr Ala Glu
                85                  90                  95

Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
            100                 105                 110

Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125

Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130                 135                 140

Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
145                 150                 155                 160

Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175

Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190

Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195                 200                 205

Thr Glu Cys Ser
    210

<210> 508
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 508
Arg Ser Val Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Pro Gly Gln
1               5                   10                  15

Thr Val Thr Ile Ser Cys Ser Gly Ser Arg Ser Asn Ile Gly Ser Asn
            20                  25                  30

Phe Val Tyr Trp Tyr Gln His Leu Pro Gly Ser Ala Pro Lys Thr Thr
        35                  40                  45

Ile His Ser Asn Thr Gln Arg Pro Pro Gly Val Pro Asp Arg Phe Ser
    50                  55                  60

Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Arg
```

65 70 75 80

Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Val Thr Trp Asp Asp Asp Leu
85 90 95

His Gly Trp Val Phe Gly Gly Gly Thr Arg Leu Thr Val Leu Gly Gln
100 105 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
115 120 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
130 135 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145 150 155 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
165 170 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
180 185 190

Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
195 200 205

Thr Val Ala Pro Thr Glu Cys Ser
210 215

<210> 509
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 509
Arg Ser Val Leu Thr Gln Pro Pro Ser Val Ser Ala Ala Pro Gly Gln
1 5 10 15

Lys Val Ile Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Asn Asn
20 25 30

Tyr Val Ser Trp Tyr Gln Gln Phe Leu Gly Thr Ala Pro Lys Leu Leu
35 40 45

Ile Tyr Asp Thr Asp Lys Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser
50 55 60

Gly Ser Lys Ser Gly Thr Ser Ala Thr Leu Gly Ile Thr Gly Leu Gln
65 70 75 80

```
Thr Gly Asp Glu Ala His Tyr Tyr Cys Ala Thr Trp Asp Ser Ser Leu
                85                  90                  95

Arg Ala Gly Pro Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110

Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser
        115                 120                 125

Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp
    130                 135                 140

Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro
145                 150                 155                 160

Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn
                165                 170                 175

Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys
            180                 185                 190

Ser His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val
        195                 200                 205

Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 510
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 510
Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1               5                   10                  15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Val Ser Phe Trp
            20                  25                  30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Asn Leu Leu Ile
        35                  40                  45

Ser Lys Ala Ser Thr Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ala Tyr Pro Val
                85                  90                  95
```

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Arg Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 511
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 511
Gly Ile Val Met Ile Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Val Phe Tyr Ser
20 25 30

Ser Asn Asn Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
35 40 45

Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
50 55 60

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65 70 75 80

Leu Thr Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
85 90 95

Tyr Tyr Ser Thr Pro Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile

```
            100                 105                 110

Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115                 120                 125

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130                 135                 140

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175

Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
            180                 185                 190

Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
        195                 200                 205

Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215                 220

<210> 512
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 512
Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1               5                   10                  15

Glu Arg Ala Ala Ile Asn Cys Lys Ser Ser Gln Ser Val Leu Tyr Ser
            20                  25                  30

Ser Asn Asn Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Arg Pro Gly Gln
        35                  40                  45

Pro Pro Lys Leu Leu Ile His Trp Ala Ser Met Arg Glu Ser Gly Val
    50                  55                  60

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65                  70                  75                  80

Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Ile Tyr Tyr Cys Gln Gln
                85                  90                  95

Tyr Tyr Ser Pro Pro Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile
            100                 105                 110
```

```
Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115                 120                 125

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130                 135                 140

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175

Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
            180                 185                 190

Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
        195                 200                 205

Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215                 220
```

<210> 513
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 513

```
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

Ser Ile Thr Ile Ser Cys Thr Gly Ser Ser Asn Asp Ile Gly Arg Tyr
            20                  25                  30

Lys Tyr Val Ser Trp Phe Gln His His Pro Gly Arg Ala Pro Lys Leu
        35                  40                  45

Ile Ile Tyr Glu Val Asn Asn Arg Pro Ser Gly Leu Ser His Arg Phe
    50                  55                  60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Cys Ser Tyr Thr Ser Ser
                85                  90                  95

Leu Thr Tyr Val Phe Gly Thr Gly Thr Ala Val Thr Val Leu
            100                 105                 110
```

<210> 514
<211> 219

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 514
Asp Val Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Leu Gly
1 5 10 15

Gln Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Val Tyr Ser
20 25 30

Asp Gly Asn Thr Tyr Leu Asn Trp Phe Gln Gln Arg Pro Gly Gln Ser
35 40 45

Pro Arg Arg Leu Ile Tyr Lys Val Ser Asn Arg Asp Ser Gly Val Pro
50 55 60

Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65 70 75 80

Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln Gly
85 90 95

Thr His Trp Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105 110

Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
115 120 125

Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
130 135 140

Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
145 150 155 160

Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
165 170 175

Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
180 185 190

Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
195 200 205

Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
210 215

<210> 515
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 515
Pro Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1 5 10 15

Thr Ala Ser Ile Thr Cys Ser Gly Asp Lys Leu Gly Asp Lys Tyr Ala
20 25 30

Cys Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
35 40 45

Gln Asp Ser Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Gln Ala Trp Asp Ser Ser Thr Tyr Val
85 90 95

Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly Gln Pro Lys Ala Asn
100 105 110

Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
115 120 125

Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
130 135 140

Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys Ala Gly Val Glu
145 150 155 160

Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
165 170 175

Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
180 185 190

Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
195 200 205

Thr Glu Cys Ser
210

<210> 516
<211> 216
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 516
Glu Asn Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Arg Val Asn Ser Asn
20 25 30

Tyr Leu Ala Trp Tyr Gln Gln Lys Ser Gly Gln Ala Pro Arg Leu Leu
35 40 45

Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
50 55 60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65 70 75 80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Gly Ser Pro
85 90 95

Leu Phe Thr Phe Gly Pro Gly Thr Lys Val Asp Ile Lys Arg Thr Val
100 105 110

Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
115 120 125

Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
130 135 140

Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
145 150 155 160

Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
165 170 175

Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
180 185 190

Leu Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
195 200 205

Lys Ser Phe Asn Arg Gly Glu Cys
210 215

<210> 517
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
VL chain

<400> 517
Pro Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1   5   10   15

Thr Ala Ser Ile Ala Cys Ser Gly Asp Asn Leu Gly Asn Lys Tyr Ala
            20   25   30

Trp Trp Tyr Arg Gln Lys Pro Gly Gln Ser Pro Val Leu Val Met Tyr
        35   40   45

Lys Asp Asn Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50   55   60

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65   70   75   80

Asp Glu Ala Asp Tyr Tyr Cys Gln Thr Trp Asp Ser Ser Thr Val Ile
                85   90   95

Phe Gly Gly Gly Thr Lys Leu Thr Val Gln
            100   105

<210> 518
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 518
Asp Ile Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Pro Gly
1   5   10   15

Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu His Ser
            20   25   30

Asn Gly Tyr Asn Tyr Leu Asp Trp Tyr Leu Gln Lys Pro Gly Gln Ser
        35   40   45

Pro Gln Leu Leu Ile Tyr Leu Gly Ser Asn Arg Ala Ser Gly Val Pro
    50   55   60

Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65   70   75   80

Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln Ala
                85   90   95

Leu Gln Thr Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
            100   105   110

```
Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
        115                 120                 125

Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
    130                 135                 140

Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
145                 150                 155                 160

Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
                165                 170                 175

Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
            180                 185                 190

Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
        195                 200                 205

Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 519
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 519

```
Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Ala Ala Pro Gly Gln
1               5                   10                  15

Lys Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Asn Asn
            20                  25                  30

Tyr Val Ser Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
        35                  40                  45

Ile Tyr Asp Asn Asn Lys Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

Gly Ser Lys Ser Gly Thr Ser Ala Thr Leu Gly Ile Thr Gly Leu Gln
65                  70                  75                  80

Thr Gly Asp Glu Ala Asp Tyr Tyr Cys Gly Thr Trp Asp Ser Ser Leu
                85                  90                  95

Ser Ala Gly Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly Gln
            100                 105                 110

Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125
```

```
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 520
<211> 213
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 520
Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1               5                   10                  15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Trp
            20                  25                  30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

Tyr Lys Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Tyr Trp Thr
                85                  90                  95

Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala Pro
            100                 105                 110

Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr
        115                 120                 125

Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys
```

130 135 140

Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu
145 150 155 160

Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser
165 170 175

Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala
180 185 190

Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe
195 200 205

Asn Arg Gly Glu Cys
210

<210> 521
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 521
Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Trp
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Lys Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Tyr Pro Trp
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

```
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Cys
    210
```

<210> 522
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 522

```
Pro Ala Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

Arg Val Thr Ile Ser Cys Thr Gly Ser Ser Ser Asn Ile Gly Ala Gly
            20                  25                  30

Tyr Asp Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

Leu Ile Tyr Gly Asn Ser Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser
                85                  90                  95

Leu Ser Gly Ser Gly Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110

Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser
        115                 120                 125

Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp
    130                 135                 140

Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro
145                 150                 155                 160
```

```
Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn
                165                 170                 175

Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys
            180                 185                 190

Ser His Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val
        195                 200                 205

Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 523
<211> 213
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 523

```
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                   10                  15

Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Lys Gln Tyr Ala
            20                  25                  30

Tyr Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

Lys Asp Ser Glu Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

Ser Ser Gly Thr Thr Val Thr Leu Thr Ile Ser Gly Val Gln Ala Glu
65                  70                  75                  80

Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Ala Asp Ser Ser Gly Thr Tyr
                85                  90                  95

Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly Gln Pro Lys Ala
            100                 105                 110

Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala
        115                 120                 125

Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala
    130                 135                 140

Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys Ala Gly Val
145                 150                 155                 160

Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser
```

```
                165                 170                 175

Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr
            180                 185                 190

Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala
        195                 200                 205

Pro Thr Glu Cys Ser
    210
```

<210> 524
<211> 102
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 524

```
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

Asp Arg Val Thr Phe Thr Cys Arg Ala Ser Gln Asn Ile Arg Asn Asn
            20                  25                  30

Leu Ala Trp Tyr Gln Leu Lys Pro Gly Lys Ala Pro Gln Leu Leu Ile
        35                  40                  45

Tyr Ser Ala Ser Ser Leu Glu Thr Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Ala Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ala His Gly Phe Pro Ile
                85                  90                  95

Thr Phe Gly Gln Gly Ser
            100
```

<210> 525
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 525

```
Glu Ile Val Met Thr Gln Ser Pro Ala Thr Leu Ser Val Ser Pro Gly
1               5                   10                  15
```

```
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Asn
            20                  25                  30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
        35                  40                  45

Tyr Gly Ala Ser Thr Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Ser
65                  70                  75                  80

Glu Asp Phe Ala Ile Tyr Tyr Cys Gln Gln Tyr Asn Ser Trp Pro Ala
                85                  90                  95

Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
            100                 105

<210> 526
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 526
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Tyr
            20                  25                  30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Val Ser Ser Leu Gln Pro
65                  70                  75                  80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Asn Thr Pro Tyr
                85                  90                  95

Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
```

130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 527
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 527
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Thr Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Met Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Ala Ala Ser Thr Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Ala Thr Asp Tyr Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Asn Thr Pro Leu
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Asp Ile Lys Arg Thr Val Ala Ala
100 105 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

```
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Cys
    210
```

<210> 528
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 528

```
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Thr Ser Ser
            20                  25                  30

Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser Pro
                85                  90                  95

Pro Asn Ser Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val
            100                 105                 110

Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
        115                 120                 125

Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
    130                 135                 140

Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
145                 150                 155                 160
```

Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
165 170 175

Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
180 185 190

Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
195 200 205

Lys Ser Phe Asn Arg Gly Glu Cys
210 215

<210> 529
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 529
Ser Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Lys
1 5 10 15

Thr Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Ser Lys Ser Val
20 25 30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
35 40 45

Tyr Asp Arg Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Ser Asp His
85 90 95

Pro Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105

<210> 530
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 530

```
Asn Phe Met Leu Thr Gln Pro His Ser Val Ser Glu Ser Pro Gly Lys
1               5                   10                  15

Thr Val Thr Ile Ser Cys Thr Arg Ser Ser Gly Ser Ile Ala Asp Lys
            20                  25                  30

Tyr Val His Trp Tyr Arg Gln Arg Pro Gly Ser Ser Pro Thr Ile Val
        35                  40                  45

Ile Tyr Glu Asp Lys Gln Arg Pro Ser Gly Val Pro Asp Arg Val Ser
    50                  55                  60

Gly Ala Ile Asp Thr Ser Ser Asn Ser Ala Ser Leu Thr Ile Ser Gly
65                  70                  75                  80

Leu Lys Thr Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser
                85                  90                  95

Asn Thr His Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 531
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 531

```
Asp Ile Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Pro Gly
1               5                   10                  15
```

```
Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu His Ser
            20                  25                  30

Asn Gly Tyr Asn Tyr Leu Asp Trp Tyr Leu Gln Lys Pro Gly Gln Ser
        35                  40                  45

Pro Gln Leu Leu Ile Tyr Leu Gly Ser Asn Arg Ala Ser Gly Val Pro
    50                  55                  60

Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65                  70                  75                  80

Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln Ala
                85                  90                  95

Leu Glu Thr Pro Arg Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
            100                 105                 110

Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
        115                 120                 125

Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
    130                 135                 140

Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
145                 150                 155                 160

Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
                165                 170                 175

Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
            180                 185                 190

Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
        195                 200                 205

Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 532
<211> 213
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 532
Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1               5                   10                  15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Trp
```

```
            20                  25                  30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

Tyr Lys Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Tyr Ser Thr
                85                  90                  95

Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala Pro
            100                 105                 110

Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr
        115                 120                 125

Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys
    130                 135                 140

Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu
145                 150                 155                 160

Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser
                165                 170                 175

Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala
            180                 185                 190

Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe
        195                 200                 205

Asn Arg Gly Glu Cys
    210

<210> 533
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 533
Gly Ile Ala Met Thr Gln Ser Pro Arg Ser Leu Pro Val Thr Pro Gly
1               5                   10                  15

Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu Tyr Arg
            20                  25                  30
```

```
Asp Gly Glu His Tyr Leu Asp Trp Tyr Leu Gln Lys Pro Gly Gln Ser
        35                  40                  45

Pro His Leu Leu Ile Tyr Ser Gly Ser Asn Arg Ala Ser Gly Val Pro
    50                  55                  60

Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Ile Ile
65                  70                  75                  80

Ser Arg Val Glu Ala Glu Asp Ala Gly Val Tyr Tyr Cys Met Gln Ala
                85                  90                  95

Leu Gln Pro Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Thr
            100                 105                 110

Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
        115                 120                 125

Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
    130                 135                 140

Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
145                 150                 155                 160

Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
                165                 170                 175

Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
            180                 185                 190

Lys His Lys Leu Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
        195                 200                 205

Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 534
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 534
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Pro Ala Ser Val Gly
1               5                   10                  15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Tyr
            20                  25                  30

Leu Asn Trp Tyr Gln Lys Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45
```

```
Asp Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Pro Pro
                85                  90                  95

Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
            100                 105                 110

Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 535
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 535
Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ser Leu Ser Leu Gly
1               5                   10                  15

Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Leu Leu Tyr Ser
            20                  25                  30

Ser Asn Tyr Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
        35                  40                  45

Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
```

```
    50                  55                  60

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65                  70                  75                  80

Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
                85                  90                  95

Tyr Tyr Leu Val Pro Val Thr Phe Gly Gln Gly Thr Arg Leu Asp Ile
            100                 105                 110

Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115                 120                 125

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130                 135                 140

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175

Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
            180                 185                 190

Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
        195                 200                 205

Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215                 220

<210> 536
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 536
Ala Ser Val Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Pro Gly Gln
1               5                   10                  15

Arg Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Ser Asn
            20                  25                  30

Tyr Val Tyr Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
        35                  40                  45

Ile Tyr Arg Asn Asn Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
    50                  55                  60
```

```
Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Arg
65                  70                  75                  80

Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ala Trp Asp Asp Ser Leu
                85                  90                  95

Ser Gly Pro Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly
            100                 105                 110

Gln Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val
145                 150                 155                 160

Lys Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 537
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 537

```
Gln Ser Ala Leu Thr Gln Pro Pro Ser Ala Ser Gly Ser Pro Gly Gln
1               5                   10                  15

Ser Val Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr
            20                  25                  30

Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

Met Ile Tyr Glu Val Ser Lys Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Val Ser Gly Leu
65                  70                  75                  80
```

```
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Ala Gly Ser
                85                  90                  95

Asn Asn Phe Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly
            100                 105                 110

Gln Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val
145                 150                 155                 160

Lys Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 538
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 538

```
Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

Arg Val Thr Ile Ser Cys Thr Gly Ser Asn Ser Asn Ile Gly Ala Gly
            20                  25                  30

Tyr Asp Val His Trp Tyr Gln Gln Leu Pro Gly Ala Ala Pro Lys Leu
        35                  40                  45

Leu Ile Tyr Gly Asn Gly Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

Ser Gly Ser Lys Ser Asp Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80

Gln Ala Asp Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser
```

85 90 95

Leu Ser Gly Ser Met Ile Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser
115 120 125

Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp
130 135 140

Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro
145 150 155 160

Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn
165 170 175

Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys
180 185 190

Ser His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val
195 200 205

Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
210 215

<210> 539
<211> 220
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 539
Leu Pro Val Leu Thr Gln Pro Pro Ser Ser Ser Ala Ser Pro Gly Glu
1 5 10 15

Ser Ala Arg Leu Thr Cys Thr Leu Pro Ser Asp Ile Asn Val Thr Asn
20 25 30

Tyr Asn Ile Tyr Trp Tyr Gln Gln Lys Pro Gly Ser Pro Pro Arg Tyr
35 40 45

Leu Leu Tyr Gln Tyr Ser Asp Ser Asp Lys Gly Gln Val Ser Gly Val
50 55 60

Pro Ser Arg Phe Ser Gly Ser Lys Asp Ala Ser Ala Asn Thr Gly Ile
65 70 75 80

Leu Leu Ile Ser Gly Leu Gln Ser Glu Asp Glu Ala Asp Tyr Tyr Cys
85 90 95

```
Met Ile Trp Ser Ser Leu Val Val Phe Gly Gly Gly Thr Lys Leu Thr
            100                 105                 110

Val Leu Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro
        115                 120                 125

Ser Ser Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile
    130                 135                 140

Ser Asp Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser
145                 150                 155                 160

Ser Pro Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser
                165                 170                 175

Asn Asn Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln
            180                 185                 190

Trp Lys Ser His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser
        195                 200                 205

Thr Val Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215                 220

<210> 540
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 540
Asp Ile Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Pro Gly
1               5                   10                  15

Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu His Ser
            20                  25                  30

Asp Gly Tyr Asn Tyr Leu Asp Trp Phe Leu Gln Lys Pro Gly Gln Ser
        35                  40                  45

Pro Gln Leu Leu Ile Tyr Leu Gly Ser Tyr Arg Ala Ser Gly Val Pro
    50                  55                  60

Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65                  70                  75                  80

Thr Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln Ala
                85                  90                  95

Leu Gln Thr Pro Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
            100                 105                 110
```

```
Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
        115                 120                 125

Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
    130                 135                 140

Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
145                 150                 155                 160

Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
                165                 170                 175

Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
            180                 185                 190

Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
        195                 200                 205

Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 541
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody VL chain

<400> 541

```
Val Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

Asp Arg Val Thr Ile Ala Cys Arg Ala Ser Gln Gly Ile Arg Asn Asp
            20                  25                  30

Leu Gly Trp Tyr Gln Gln Lys Pro Gly Arg Ala Pro Lys Leu Leu Ile
        35                  40                  45

Tyr Ala Ala Ser Thr Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Tyr Ser Leu Gln Pro
65                  70                  75                  80

Glu Asp Phe Ala Thr Tyr Tyr Cys Leu Gln Asn Tyr Asn Tyr Pro Trp
                85                  90                  95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Gln Gly Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
```

```
        115                 120                 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Cys
    210

<210> 542
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      VL chain

<400> 542
Asp Ile Val Met Thr Gln Thr Pro Leu Ser Leu Ser Val Thr Pro Gly
1               5                   10                  15

Gln Pro Ala Ser Ile Ser Cys Lys Ser Ser Gln Ser Leu Leu His Ser
            20                  25                  30

Asp Gly Lys Thr Tyr Leu Tyr Trp Tyr Leu Gln Lys Pro Gly Gln Ser
        35                  40                  45

Pro Gln Leu Leu Ile Tyr Glu Val Ser Ser Arg Phe Ser Gly Val Pro
    50                  55                  60

Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65                  70                  75                  80

Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln Gly
                85                  90                  95

Ile His Leu Pro Arg Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
            100                 105                 110

Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
        115                 120                 125
```

Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
130 135 140

Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
145 150 155 160

Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
165 170 175

Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-H1 region

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CDR-L1 region

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CDR-L1 region

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CDR-L1 region

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CDR-L1 region

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CDR-L1 region

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CDR-L1 region

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CDR-L1 region

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CDR-L1 region

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CDR-L1 region

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CDR-L1 region

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CDR-L1 region

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CDR-L1 region

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CDR-L1 region

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CDR-L1 region

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CDR-L1 region

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CDR-L1 region

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CDR-L1 region

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CDR-L1 region

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CDR-L1 region

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CDR-L1 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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<210> 1148

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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<210> 1168
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CDR-H2 region

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1 5

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<220>
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<210> 1173
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CDR-H2 region

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<210> 1174
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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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<210> 1182
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CDR-H2 region

<400> 1182
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<210> 1183
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CDR-H2 region

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<210> 1184
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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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      CDR-H2 region

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      CDR-H2 region

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      CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-H2 region

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CDR-L2 region

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CDR-L2 region

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CDR-L2 region

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CDR-L2 region

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CDR-L2 region

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CDR-L2 region

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CDR-L2 region

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CDR-L2 region

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CDR-L2 region

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CDR-L2 region

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CDR-L2 region

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CDR-L2 region

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CDR-L2 region

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CDR-L2 region

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CDR-L2 region

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CDR-L2 region

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CDR-L2 region

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CDR-L2 region

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CDR-L2 region

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CDR-L2 region

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CDR-L2 region

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CDR-L2 region

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CDR-L2 region

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CDR-H3 region

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CDR-H3 region

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<210> 1630
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CDR-H3 region

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CDR-H3 region

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CDR-H3 region

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CDR-H3 region

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CDR-H3 region

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CDR-H3 region

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CDR-H3 region

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CDR-H3 region

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<220>

<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1641
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1 5 10 15

Ser

<210> 1642
<211> 11
<212> PRT
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<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1642
Ala Arg Pro Arg Leu Gly Trp Tyr Phe Asp Leu
1 5 10

<210> 1643
<211> 13
<212> PRT
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<220>
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CDR-H3 region

<400> 1643
Ala Arg Glu Thr Ala Gly Gln Leu Ile Pro Phe Asp Tyr
1 5 10

<210> 1644
<211> 17
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<220>
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CDR-H3 region

<400> 1644
Ala Arg Asp Tyr Met Gly Val Asp Phe Tyr Tyr Tyr Tyr Gly Met Asp
1 5 10 15

Val

<210> 1645
<211> 14

<212> PRT
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<220>
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CDR-H3 region

<400> 1645
Ala Arg Asp Ile Ala Val Ala Ile Thr Asn Tyr Phe Gly Ser
1 5 10

<210> 1646
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1646
Ala Arg Glu His Arg Ser Gly Tyr Gln Arg Tyr
1 5 10

<210> 1647
<211> 11
<212> PRT
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<220>
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CDR-H3 region

<400> 1647
Ala His Phe Ser Thr Val Ile Asn Phe Gly His
1 5 10

<210> 1648
<211> 11
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<220>
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CDR-H3 region

<400> 1648
Ala Cys Arg Arg Ile Tyr Gln Gly Phe Asp Pro
1 5 10

<210> 1649
<211> 10
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<220>
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CDR-H3 region

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Ala Arg Asp Arg Ala Thr Ser Phe Asp Tyr
1 5 10

<210> 1650
<211> 9
<212> PRT
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CDR-H3 region

<400> 1650
Ala Arg Gly Arg Gly Glu Met Asp Val
1 5

<210> 1651
<211> 14
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<220>
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CDR-H3 region

<400> 1651
Ala Thr Thr Pro Ser Ser Ser Trp Tyr Trp Tyr Phe Asp Pro
1 5 10

<210> 1652
<211> 16
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<220>
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CDR-H3 region

<400> 1652
Ala Arg Asp Leu Glu Leu Ile Ile Ala Ala Gly Ala Pro Leu Asp His
1 5 10 15

<210> 1653
<211> 16
<212> PRT
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<220>

<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1653
Ala Arg Leu Val Thr Ser Pro Glu Glu Gly Gly Pro Trp Phe Asp Pro
1 5 10 15

<210> 1654
<211> 12
<212> PRT
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<220>
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CDR-H3 region

<400> 1654
Ala Arg Asp Thr Glu Val Gly His His Phe Asp Tyr
1 5 10

<210> 1655
<211> 11
<212> PRT
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<220>
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CDR-H3 region

<400> 1655
Ala Lys Pro Trp Arg Ser Asp Gly Phe Asp Val
1 5 10

<210> 1656
<211> 11
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<220>
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CDR-H3 region

<400> 1656
Ala Val Gly Met Val Thr Asp Gly Phe Glu Ile
1 5 10

<210> 1657
<211> 12
<212> PRT
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<220>
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CDR-H3 region

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Ala Arg Leu Asp Leu Arg Thr Val Arg Phe Asp Pro
1   5   10

<210> 1658
<211> 14
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<220>
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      CDR-H3 region

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Ala Arg His Ser Ser Gly Pro Pro Arg Leu Ala Phe Asp Ile
1   5   10

<210> 1659
<211> 13
<212> PRT
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<220>
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      CDR-H3 region

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Ala Lys Asp Phe Ala Met Pro Thr Val Thr Thr Asp Tyr
1   5   10

<210> 1660
<211> 13
<212> PRT
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<220>
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      CDR-H3 region

<400> 1660
Val His Arg Pro Ser Leu Ala Tyr Trp Tyr Phe Asp Val
1   5   10

<210> 1661
<211> 14
<212> PRT
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<220>
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      CDR-H3 region

<400> 1661

Val Arg Glu Gly Asp Ser Arg Lys Tyr Tyr Ser Leu Asp Tyr
1 5 10

<210> 1662
<211> 13
<212> PRT
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<220>
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CDR-H3 region

<400> 1662
Ala Arg Asp Pro Met Trp Val Ser Tyr Ala Phe Asp Ile
1 5 10

<210> 1663
<211> 9
<212> PRT
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<220>
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CDR-H3 region

<400> 1663
Ala Ser Gly Tyr Val Ser Phe Asp Leu
1 5

<210> 1664
<211> 16
<212> PRT
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<220>
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CDR-H3 region

<400> 1664
Ala Arg Glu Gly Ala Tyr Glu Ser Ser Gly Pro Asp Pro Phe Asp Ile
1 5 10 15

<210> 1665
<211> 15
<212> PRT
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<220>
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CDR-H3 region

<400> 1665
Ala Ser Leu Phe Leu Thr Tyr Tyr Gly Ser Gly Thr Tyr Tyr Arg
1 5 10 15

<210> 1666
<211> 11
<212> PRT
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<220>
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CDR-H3 region

<400> 1666
Ala Lys Ser Thr Leu Gly Gly Gly Phe Asp Phe
1 5 10

<210> 1667
<211> 18
<212> PRT
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<220>
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CDR-H3 region

<400> 1667
Ala Arg Val Gly Ser Ser Ser Trp Tyr Ser Ser Gly Arg Ser Pro Phe
1 5 10 15

Asp Tyr

<210> 1668
<211> 16
<212> PRT
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<220>
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CDR-H3 region

<400> 1668
Ala Lys Asp Gln Ile Val Leu Glu Met Ala Thr Ser Pro Phe Asp Tyr
1 5 10 15

<210> 1669
<211> 17
<212> PRT
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<220>
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CDR-H3 region

<400> 1669
Ala Arg Asp Leu Ser Cys Ser Ser Thr Ser Cys His Asp Ala Phe Asp

1 5 10 15

Ile

<210> 1670
<211> 16
<212> PRT
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<220>
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<400> 1670
Ala Arg Gly Pro Asn Phe His Glu Ser Ile Arg Asp Gly Phe Asp Ile
1 5 10 15

<210> 1671
<211> 12
<212> PRT
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<220>
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<400> 1671
Ala Arg Val Asn Trp Asn Ser Asp Thr Phe Asp Ser
1 5 10

<210> 1672
<211> 20
<212> PRT
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<220>
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<400> 1672
Ala Arg Asp Pro Gly Arg Asp Pro Tyr Leu Asp Leu Asp Tyr His Tyr
1 5 10 15

Gly Met Asp Val
20

<210> 1673
<211> 16
<212> PRT
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<220>
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CDR-H3 region

<400> 1673
Ala Arg Asp Lys Arg Ser Gly Met Thr Ser Asp Arg Arg Ile Asp Tyr
1 5 10 15

<210> 1674
<211> 12
<212> PRT
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<220>
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CDR-H3 region

<400> 1674
Ser Gly Gly Tyr Tyr Ser Ser Ser His Met Asp Val
1 5 10

<210> 1675
<211> 13
<212> PRT
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CDR-H3 region

<400> 1675
Ala Arg Val Asn Ile Ala Ala Ala Gly Thr Leu Asp Tyr
1 5 10

<210> 1676
<211> 21
<212> PRT
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<220>
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CDR-H3 region

<400> 1676
Val Lys Asp Met Gly Pro Ala Gly Thr Ala Ser Ala Tyr His Tyr His
1 5 10 15

Asn Gly Met Asp Val
20

<210> 1677
<211> 12
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<220>

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CDR-H3 region

<400> 1677
Ala Arg Leu Thr Thr Ser Thr Ser Ala Leu Ser Tyr
1 5 10

<210> 1678
<211> 16
<212> PRT
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<220>
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CDR-H3 region

<400> 1678
Ala Arg Glu Asn Trp Asn Ser Ala Gly Thr Thr Glu Trp Phe Asp Pro
1 5 10 15

<210> 1679
<211> 10
<212> PRT
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<220>
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CDR-H3 region

<400> 1679
Ala Arg Asp Thr Leu Gln Lys Gly Asp Tyr
1 5 10

<210> 1680
<211> 19
<212> PRT
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<220>
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CDR-H3 region

<400> 1680
Ala Arg Ala Ser Arg Val Leu Glu Ser Lys Ser Trp His Gly Asp Ala
1 5 10 15

Phe Asp Val

<210> 1681
<211> 13
<212> PRT
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<220>
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CDR-H3 region

<400> 1681
Ala Arg Gly Leu Gly Gly Ser Gly Tyr Tyr Phe Asp Tyr
1 5 10

<210> 1682
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1682
Ala Arg Gln Ala Phe Cys Gly Ala Asn Cys Trp Ser Gly Ala Tyr Asp
1 5 10 15

Ile

<210> 1683
<211> 19
<212> PRT
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<220>
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CDR-H3 region

<400> 1683
Val Arg Arg Gly Ala Thr Val Phe Gln Gly Lys Ile Ile Lys Gly Tyr
1 5 10 15

Met Asp Val

<210> 1684
<211> 10
<212> PRT
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<220>
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CDR-H3 region

<400> 1684
Ala Lys Val Lys Gly Gly Ser Asn Asp Tyr
1 5 10

<210> 1685

<211> 13
<212> PRT
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CDR-H3 region

<400> 1685
Ala Arg His Leu Tyr Gly Asp Phe Tyr Tyr Leu Asp Tyr
1 5 10

<210> 1686
<211> 13
<212> PRT
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<220>
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CDR-H3 region

<400> 1686
Ala Arg Asp His Arg Thr Gly Ser Tyr Tyr Pro Asp Tyr
1 5 10

<210> 1687
<211> 15
<212> PRT
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<220>
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CDR-H3 region

<400> 1687
Ala Arg Gly Val Arg Gln Gln Gln Val Arg Lys Trp Phe Asp Pro
1 5 10 15

<210> 1688
<211> 12
<212> PRT
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<220>
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CDR-H3 region

<400> 1688
Ala Met Asp Asn Ser Gly Ser Gly Gly Val Asp Tyr
1 5 10

<210> 1689
<211> 12
<212> PRT

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<220>
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CDR-H3 region

<400> 1689
Ala Arg Asp Ser Tyr His Tyr Tyr Gly Met Asp Val
1 5 10

<210> 1690
<211> 16
<212> PRT
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<220>
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CDR-H3 region

<400> 1690
Ala Arg Glu Thr Val Tyr Ile Ser Thr Tyr Tyr Tyr Gly Leu Asp Val
1 5 10 15

<210> 1691
<211> 13
<212> PRT
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<220>
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CDR-H3 region

<400> 1691
Ala Thr Asp Gly Pro Leu His Thr Ser Gly Leu Asp Tyr
1 5 10

<210> 1692
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1692
Ala Cys Leu Gly Ala Glu Ala Asn Asp Ala Phe Asp Ile
1 5 10

<210> 1693
<211> 7
<212> PRT
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<220>
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CDR-H3 region

<400> 1693
Ala Lys Val Pro Gly Asp Tyr
1 5

<210> 1694
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1694
Ala Arg Ala Gly Leu Ser Thr Ser Trp Pro Ser Trp Phe Asp Pro
1 5 10 15

<210> 1695
<211> 14
<212> PRT
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<220>
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CDR-H3 region

<400> 1695
Ala Arg Asn Asp Ile Ser Phe Lys Gln Ser Ala Ile Asp Val
1 5 10

<210> 1696
<211> 17
<212> PRT
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<220>
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CDR-H3 region

<400> 1696
Ala Lys Thr Lys Thr Met Gly Val Gly Gly Glu Tyr Phe Gly Leu Asp
1 5 10 15

Val

<210> 1697
<211> 16
<212> PRT
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<220>
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CDR-H3 region

<400> 1697
Ala Arg His Lys Ala Leu Trp Phe Gly Glu Ala Gly Ala Phe Asp Ile
1 5 10 15

<210> 1698
<211> 18
<212> PRT
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<220>
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CDR-H3 region

<400> 1698
Ala Lys Asp Leu Leu Gly Phe Arg Asp Gln Arg Asn Tyr Tyr Gly Met
1 5 10 15

Asp Val

<210> 1699
<211> 13
<212> PRT
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CDR-H3 region

<400> 1699
Ala Arg Ser Phe Tyr Asp Thr Leu Phe Tyr Phe Glu Asn
1 5 10

<210> 1700
<211> 12
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<220>
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CDR-H3 region

<400> 1700
Ala Arg Val Tyr Ser Thr Lys Trp Asp Phe Asp Tyr
1 5 10

<210> 1701
<211> 11
<212> PRT

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<220>
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CDR-H3 region

<400> 1701
Ala Lys Gly Gly Pro Leu Arg Pro Phe Asp Ile
1 5 10

<210> 1702
<211> 15
<212> PRT
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<220>
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CDR-H3 region

<400> 1702
Ala Arg Leu Ser Arg Asp Gly Tyr Thr Ile Glu His Phe Asp Tyr
1 5 10 15

<210> 1703
<211> 19
<212> PRT
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<220>
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CDR-H3 region

<400> 1703
Ala Arg Arg Gly Val Ser Gly Gly Ser Ala Trp Thr Tyr Tyr Asn Phe
1 5 10 15

Phe Asp Pro

<210> 1704
<211> 14
<212> PRT
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<220>
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CDR-H3 region

<400> 1704
Ala Arg Glu Leu Pro Val Ile Gly Arg Arg Thr Phe Asp Ile
1 5 10

<210> 1705
<211> 22

<212> PRT
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<220>
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CDR-H3 region

<400> 1705
Ala Arg Asp Ser Glu Val Glu Lys Ser Asp Gly Tyr Met Ala Ser Thr
1 5 10 15

Ala Glu Tyr Phe Gln Leu
20

<210> 1706
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1706
Val Lys Ala Gly Val Pro Trp Glu Val Gln Arg Trp Phe Asp Pro
1 5 10 15

<210> 1707
<211> 12
<212> PRT
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<220>
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CDR-H3 region

<400> 1707
Ala Arg Asp Arg Gln Gly Leu Gly Arg Met Asp Val
1 5 10

<210> 1708
<211> 12
<212> PRT
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<220>
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CDR-H3 region

<400> 1708
Ala Arg Glu Leu Gly Ala Asn Tyr Tyr Phe Ala Tyr
1 5 10

<210> 1709

<211> 15
<212> PRT
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<220>
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CDR-H3 region

<400> 1709
Ala Arg Glu Val Asp Ile Arg Gly Asp Ser Asp Ala Phe Asp Ile
1 5 10 15

<210> 1710
<211> 10
<212> PRT
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<220>
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CDR-H3 region

<400> 1710
Ala Thr Thr Arg Asn Ser Ala Phe Leu Asn
1 5 10

<210> 1711
<211> 14
<212> PRT
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<220>
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CDR-H3 region

<400> 1711
Ala Lys Ser Ala Phe Gly Gly Val Pro Asp Gly Phe Asp Ile
1 5 10

<210> 1712
<211> 7
<212> PRT
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<220>
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CDR-H3 region

<400> 1712
Ala Arg Asp Gly Phe Asp Tyr
1 5

<210> 1713
<211> 13
<212> PRT

<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1713
Ala Lys Ala Gly Tyr Ser Phe Thr Thr Ala Pro Asp Tyr
1 5 10

<210> 1714
<211> 14
<212> PRT
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<220>
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CDR-H3 region

<400> 1714
Ala Arg Glu Arg Gly Gln Val Arg Ser Tyr Gly Met Asp Val
1 5 10

<210> 1715
<211> 19
<212> PRT
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<220>
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CDR-H3 region

<400> 1715
Val Lys Ile Gly Gly Asp Gly Thr Ala Tyr Ala Trp Thr Phe Arg His
1 5 10 15

Phe Asp Ser

<210> 1716
<211> 13
<212> PRT
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<220>
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CDR-H3 region

<400> 1716
Ala Arg Gly Leu Gly Gly Asp Trp Asn Tyr Leu Ala Tyr
1 5 10

<210> 1717
<211> 21

<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1717
Ala Lys Glu Gly Gly Trp Gly Asn Thr Val Thr Thr Ser Tyr Tyr Tyr
1 5 10 15

Tyr Gly Met Asp Val
20

<210> 1718
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1718
Thr Arg Asp Gly Gly Tyr Phe Ala Thr Gly Glu Phe Asp Tyr
1 5 10

<210> 1719
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1719
Ala Arg Glu Arg Phe Gly Gln Gly Ala Leu Asp Tyr
1 5 10

<210> 1720
<211> 15
<212> PRT
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<220>
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CDR-H3 region

<400> 1720
Ala Thr Ile Val Ala Ala Tyr Ser Tyr Gly Phe Glu Phe Asp Pro
1 5 10 15

<210> 1721

<211> 21
<212> PRT
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<220>
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CDR-H3 region

<400> 1721
Ala Lys Glu Gly Gly Trp Gly Asn Thr Val Thr Thr Ser Tyr Tyr Tyr
1 5 10 15

Tyr Gly Met Asp Val
20

<210> 1722
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1722
Ala Arg Gln Gly Phe Glu Ala Leu Val Ile Arg Gly Phe Asp Tyr
1 5 10 15

<210> 1723
<211> 15
<212> PRT
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<220>
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CDR-H3 region

<400> 1723
Ala Arg Arg Ser Thr Ser Ser Pro Ser Phe Ser Thr Leu Asp Val
1 5 10 15

<210> 1724
<211> 10
<212> PRT
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<220>
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CDR-H3 region

<400> 1724
Ala Arg Gln Met Val Thr Thr Arg Gly Tyr
1 5 10

<210> 1725
<211> 16
<212> PRT
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<220>
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CDR-H3 region

<400> 1725
Ala Arg Val Pro Ser Arg Tyr Gly Arg Ser Arg Gly Ala Phe Asp Ile
1 5 10 15

<210> 1726
<211> 12
<212> PRT
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<220>
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CDR-H3 region

<400> 1726
Ala Arg Asn Leu Tyr Arg Leu Gly Trp Phe Asp Pro
1 5 10

<210> 1727
<211> 13
<212> PRT
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<220>
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CDR-H3 region

<400> 1727
Ala Lys Ser Lys Gly Asn Tyr Arg Asp Ala Met Asp Val
1 5 10

<210> 1728
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1728
Ala Thr Ser Tyr Thr Val Thr Thr Phe Tyr Gly Met Asp Val
1 5 10

<210> 1729
<211> 12

<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1729
Ala Arg Gly Ala Ala Phe Tyr Tyr Gly Met Asp Val
1 5 10

<210> 1730
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1730
Ala Arg Asp Thr Tyr Gly Asp Pro Arg Gly Asp Tyr Phe Asp Tyr
1 5 10 15

<210> 1731
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1731
Ala Arg Leu Trp Gly Ser Gly Asp Trp Trp Pro Ser Leu Tyr Phe Asp
1 5 10 15

Ser

<210> 1732
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1732
Ala Arg Ile Arg Arg Ile Ala Ala Thr Ser Phe Asp Tyr
1 5 10

<210> 1733

<211> 16
<212> PRT
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<220>
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CDR-H3 region

<400> 1733
Ala Lys Ile Ala Arg Arg Pro Pro Ser Phe Tyr Asp Tyr Met Asp Val
1 5 10 15

<210> 1734
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1734
Ala Arg Ser Thr Ser Ser Ser Thr Ser Asp Phe His Tyr Met Asp Val
1 5 10 15

<210> 1735
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1735
Thr Arg Gly Trp Ala Phe Thr Ser Ser Asp
1 5 10

<210> 1736
<211> 8
<212> PRT
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CDR-H3 region

<400> 1736
Ala Gly Gly Trp Ala Leu Gly Tyr
1 5

<210> 1737
<211> 10
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1737
Ala Arg His Arg Ile Phe Gly Leu Asp Val
1 5 10

<210> 1738
<211> 19
<212> PRT
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<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1738
Ala Arg Arg Gly Pro Thr Asp Thr Trp Ser Gly Glu Val Gly Tyr Tyr
1 5 10 15

Phe Asp Tyr

<210> 1739
<211> 16
<212> PRT
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<220>
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CDR-H3 region

<400> 1739
Ala Arg Asp Gly Lys Thr Leu Gly Tyr Gly Gly Asn Ser Val Asp Tyr
1 5 10 15

<210> 1740
<211> 15
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<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1740
Ala Arg Thr Glu Thr Lys Trp Glu Asp Arg Gly Leu Trp Asp Tyr
1 5 10 15

<210> 1741
<211> 10

<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1741
Ala Arg Ser Phe Tyr Gly Ser Gly Leu Gln
1 5 10

<210> 1742
<211> 13
<212> PRT
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<220>
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CDR-H3 region

<400> 1742
Ala Arg Ala Met Gly Gly Tyr Thr Tyr Tyr Leu Asp Asp
1 5 10

<210> 1743
<211> 17
<212> PRT
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<220>
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CDR-H3 region

<400> 1743
Ala Arg Ala Gly Lys Asp Gly Tyr Asn Phe Phe Tyr Tyr Gly Met Asp
1 5 10 15

Val

<210> 1744
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<212> PRT
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<220>
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CDR-H3 region

<400> 1744
Ala Arg Gly Ile Met Thr Thr Ala Ile Ser Tyr Tyr Phe Asp Tyr
1 5 10 15

<210> 1745

<211> 18
<212> PRT
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<220>
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CDR-H3 region

<400> 1745
Ala Lys Gly Glu Arg Asp Leu Thr Asp Tyr Gly Asp Pro Glu Tyr Phe
1 5 10 15

Gln His

<210> 1746
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1746
Ala Lys Asp Leu Arg Tyr Cys Ser Ala Arg Ser Ser Cys Phe Gly Ile
1 5 10 15

Asp Phe

<210> 1747
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1747
Ala Arg Arg Ala Tyr Ser Phe Asp Tyr
1 5

<210> 1748
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1748

Ala Arg Glu Gly Ala Pro Asp Asp Tyr Gly Asp Ser Gly Thr Ala Phe
1 5 10 15

Asp Ile

<210> 1749
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1749
Thr Thr Asp His Pro Tyr Gly Asp Tyr Ser Asp Asn
1 5 10

<210> 1750
<211> 10
<212> PRT
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<220>
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CDR-H3 region

<400> 1750
Ala Lys Glu Leu Leu Gly Gly Phe Asp Tyr
1 5 10

<210> 1751
<211> 13
<212> PRT
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<220>
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CDR-H3 region

<400> 1751
Ala Arg Val Phe Gly Ser Ala Ala Gly Ala Phe Asp Ile
1 5 10

<210> 1752
<211> 12
<212> PRT
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<220>
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CDR-H3 region

<400> 1752
Ala Arg His Asp Trp Arg Leu Tyr Ala Phe Asp Tyr
1 5 10

<210> 1753
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1753
Ala Gly Gly Glu Thr Ser Pro Asp Tyr
1 5

<210> 1754
<211> 15
<212> PRT
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<220>
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CDR-H3 region

<400> 1754
Val Ser Arg Gly Pro Leu Gly Gly Ala Ala Ala Gly Pro Asp Tyr
1 5 10 15

<210> 1755
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1755
Ala Arg Asp Val Arg Gly Trp Phe Val Pro
1 5 10

<210> 1756
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1756
Val Arg Asp Arg Asn Ile Val Ser Val Pro Gly Ala Ile Pro Tyr Gly

1 5 10 15

Met Asp Val

<210> 1757
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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<400> 1757
Ala Arg Gly Ser Asp Thr Leu Asp Tyr
1 5

<210> 1758
<211> 12
<212> PRT
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<220>
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<400> 1758
Ala Arg Val Gly Leu Thr Phe Ala Leu Phe Asp Pro
1 5 10

<210> 1759
<211> 17
<212> PRT
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<220>
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<400> 1759
Ala Asn Ser Ala Gly Ile Gln Leu Trp Ser Ser Asp Asn Trp Phe Asp
1 5 10 15

Pro

<210> 1760
<211> 10
<212> PRT
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<220>
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CDR-H3 region

<400> 1760
Ala Lys Glu Gly Ile Glu Leu Met Ile Leu
1 5 10

<210> 1761
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1761
Ala Arg Gly Ile Thr Leu Thr Arg Gly Val Ser Phe Asp Tyr
1 5 10

<210> 1762
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1762
Ala Arg Asp Gly Gly Ala Phe Asp Ile
1 5

<210> 1763
<211> 16
<212> PRT
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<220>
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CDR-H3 region

<400> 1763
Ala Arg Asp Arg Leu Phe Thr Ala Ile Asn Ser Gly Tyr Phe Asp Tyr
1 5 10 15

<210> 1764
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1764
Ala Arg Glu Gly Ser Tyr Tyr Gly Ile Gly Tyr
1   5   10

<210> 1765
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-H3 region

<400> 1765
Ala Arg Asp Thr Asp Ser Gly Trp Leu Asp Ser Phe Asp Tyr
1   5   10

<210> 1766
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-H3 region

<400> 1766
Ala Thr Asp Gln Gly Cys Asp Asp Gly Ser Cys Tyr Val Gly His Tyr
1   5   10   15

Tyr Gly Met Asp Val
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<210> 1767
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-H3 region

<400> 1767
Gly Arg Ile Met Thr Pro Ser Ile Asp Leu
1   5   10

<210> 1768
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-H3 region

<400> 1768
Ala Arg Glu Gly Arg Gly Gly Gly Asp Phe Phe Asp Tyr
1   5   10

<210> 1769
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-H3 region

<400> 1769
Ala Lys Asp Gly Asp Ser Leu Gly Asp Phe Ser Thr Phe Asp Ile
1   5   10   15

<210> 1770
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-H3 region

<400> 1770
Ala Arg Asp Gly Tyr Asp Phe Arg Ala Phe Asp His
1   5   10

<210> 1771
<211> 20
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-H3 region

<400> 1771
Ala Arg Ala Arg Gly Gly Gly Phe Cys Ser Asn Met Asp Cys Pro Ala
1   5   10   15

Met Phe Asp Tyr
            20

<210> 1772
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1772
Thr Thr Ile His Asp Tyr Gly Asp His
1 5

<210> 1773
<211> 10
<212> PRT
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<220>
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CDR-H3 region

<400> 1773
Ala Arg Gly Leu Leu Arg Ser Leu Asp Val
1 5 10

<210> 1774
<211> 14
<212> PRT
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<220>
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CDR-H3 region

<400> 1774
Ala Arg Val Lys Leu Gly Ala Ser Ser Arg Val Phe Asp Val
1 5 10

<210> 1775
<211> 13
<212> PRT
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<220>
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CDR-H3 region

<400> 1775
Ala Thr Thr Val Thr Pro Lys Val Thr Ser Phe Ala Ser
1 5 10

<210> 1776
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1776
Ala Arg Glu Gln Ser Pro Leu Tyr Phe Gly Pro Ser Leu Asp Val
1 5 10 15

<210> 1777
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1777
Ala Arg Glu Pro Tyr Ser Ser Tyr Ala Met Asp Val
1 5 10

<210> 1778
<211> 12
<212> PRT
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<220>
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CDR-H3 region

<400> 1778
Ala Lys Asp Gly Ser Glu Met Leu Leu Cys Asp Tyr
1 5 10

<210> 1779
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1779
Ala Arg Asp Thr Arg Trp Arg Gly Leu Asp Ser
1 5 10

<210> 1780
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1780
Ala Lys Asp Leu Leu Ala Val Pro Gly Leu Leu Asp Asp

1 5 10

<210> 1781
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody CDR-H3 region

<400> 1781
Ala Ser Arg Gly Gly Ser Ser Arg Arg Tyr Gly Met Gly Val
1 5 10

<210> 1782
<211> 16
<212> PRT
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<220>
<223> Synthetic polypeptide representing artificial human antibody CDR-H3 region

<400> 1782
Val Lys Leu Lys Gly Ile Gly Ala Met Trp Thr Tyr Ala Met Asp Val
1 5 10 15

<210> 1783
<211> 18
<212> PRT
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<220>
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<400> 1783
Ala Arg Asp Gln Gly Tyr Gly Asp Tyr Asp Tyr Pro Arg Asp Trp Ile
1 5 10 15

Glu Pro

<210> 1784
<211> 16
<212> PRT
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<220>
<223> Synthetic polypeptide representing artificial human antibody CDR-H3 region

<400> 1784

Ala Ser Val Arg Asp Leu Val Ser Gly Thr Thr Tyr Tyr Tyr His Tyr
1 5 10 15

<210> 1785
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1785
Ala Arg Tyr Gly Asp Tyr Ser Phe Asp Pro
1 5 10

<210> 1786
<211> 13
<212> PRT
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<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1786
Ala Arg Val Val Asp Thr Val Leu Ala Asp Phe Asp Tyr
1 5 10

<210> 1787
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1787
Ala Arg Ser Gly Gly Phe Gly Trp Ser Arg Asp Leu Asp Tyr
1 5 10

<210> 1788
<211> 16
<212> PRT
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<220>
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CDR-H3 region

<400> 1788
Ala Arg His Gly Phe Trp Ser Gly Pro Ile Pro Asp Ala Phe Asp Ile
1 5 10 15

<210> 1789
<211> 12
<212> PRT
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<220>
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CDR-H3 region

<400> 1789
Ala His Glu Asp Tyr Gly Ser Gly Asn Gly Asn Tyr
1 5 10

<210> 1790
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1790
Ala Arg Asp Arg Asp Ser Gly Tyr Glu Arg Asn Cys Leu Asp Pro
1 5 10 15

<210> 1791
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1791
Ala Arg Gly Ala Pro Tyr Gly Ser Arg Ile Tyr Tyr Asp Tyr Asp Ser
1 5 10 15

Tyr His Gly Met Asp Val
20

<210> 1792
<211> 16
<212> PRT
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<220>
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CDR-H3 region

<400> 1792
Ala Arg Gly Lys Phe Asp Trp Phe Pro Arg Val Ser Ser Phe Asp Tyr

1 5 10 15

<210> 1793
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
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<400> 1793
Ala Ala Ala Tyr Tyr Ile Asp Thr Ser Gly Phe Asp Tyr
1 5 10

<210> 1794
<211> 18
<212> PRT
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<220>
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<400> 1794
Ala Lys Gly Arg Thr Tyr Ser Asn Asn Trp Leu Phe His Trp Tyr Phe
1 5 10 15

Asp Leu

<210> 1795
<211> 13
<212> PRT
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<220>
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<400> 1795
Ala Arg Val Phe Ser Thr Ile Phe His Gly Val Asp Pro
1 5 10

<210> 1796
<211> 15
<212> PRT
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<220>
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<400> 1796

Ala Arg His Leu Ser Ser Gly Glu Tyr His Tyr Gly Leu Asp Val
1 5 10 15

<210> 1797
<211> 13
<212> PRT
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<220>
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CDR-H3 region

<400> 1797
Ala Lys Gly Lys Gly Ile Val Gly Ala Thr Phe Asp Tyr
1 5 10

<210> 1798
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1798
Ala Arg Asp Ala Leu Asp Phe Asp Trp Leu Leu Ser Ala Gly Gly Phe
1 5 10 15

Asp Tyr

<210> 1799
<211> 11
<212> PRT
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<220>
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CDR-H3 region

<400> 1799
Ala Arg Leu Leu Val Gly Gly Ala Phe Asp Ile
1 5 10

<210> 1800
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1800
Thr Pro Gly Ser Cys Ser Gly Gly Ser Cys Tyr Ser Gly Asp Ala Phe
1 5 10 15

Asp Ile

<210> 1801
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1801
Ala Arg Glu Ser Leu Asp Ser Ala Ser Tyr Ser Thr Ile Ala His
1 5 10 15

<210> 1802
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1802
Ala Arg Asp Arg Gly Gly Asn Ser Trp Leu Asp Val Phe Asp Met
1 5 10 15

<210> 1803
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1803
Ala Arg Ser Pro Ala Ala Phe Gly Ser Glu Ser Tyr Phe Asp Ser
1 5 10 15

<210> 1804
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1804
Ala Lys Asp Leu Leu Glu Asp Pro Tyr Phe Gly Asp Leu Leu Phe Asp
1   5   10   15

Tyr

<210> 1805
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-H3 region

<400> 1805
Val Arg Thr Pro Ala Val Gly Thr Asp Pro Asp Tyr
1   5   10

<210> 1806
<211> 12
<212> PRT
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<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-H3 region

<400> 1806
Ser Ser Gly Gly Ser Thr Ser Met Val Gly Arg Tyr
1   5   10

<210> 1807
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-H3 region

<400> 1807
Ala Arg Met Thr Pro Phe Lys Phe Gly Leu Cys Pro Asp Tyr
1   5   10

<210> 1808
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1808
Ala Arg Val Val Val Val Gly Thr Asp Tyr Gly Met Asp Val
1 5 10

<210> 1809
<211> 14
<212> PRT
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<220>
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CDR-H3 region

<400> 1809
Ala Arg Asp Gln Gly Leu Glu Arg Ala Asn Trp Phe Asp Pro
1 5 10

<210> 1810
<211> 9
<212> PRT
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<220>
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CDR-H3 region

<400> 1810
Ala Arg Gly Val Arg His Phe Asp Tyr
1 5

<210> 1811
<211> 12
<212> PRT
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<220>
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CDR-H3 region

<400> 1811
Ala Arg Glu Ser Pro Leu Thr Val Val Phe Asp Tyr
1 5 10

<210> 1812
<211> 11
<212> PRT
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<220>
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CDR-H3 region

<400> 1812
Ala Arg Glu Ser Ser Ala Ala Gly Tyr Asp Tyr
1 5 10

<210> 1813
<211> 16
<212> PRT
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<220>
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CDR-H3 region

<400> 1813
Ala Arg Lys Leu Met Ser Gly Ile Val Ser Arg Gly Trp Phe Asp Pro
1 5 10 15

<210> 1814
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1814
Ala Arg Asp Arg Gly Asp Tyr Val Thr His Trp Phe Asp Pro
1 5 10

<210> 1815
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1815
Ala Arg His Arg Val Gly Asp Ser Pro Gly Leu His Tyr
1 5 10

<210> 1816
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1816
Ala Ser Pro Ile Ala Val Ala Ala Pro Phe Ala Tyr

1 5 10

<210> 1817
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody CDR-H3 region

<400> 1817
Val Lys Asp Tyr Leu Ala Val Gly Gly Thr Tyr Tyr Asp Tyr Phe Asp
1 5 10 15

Tyr

<210> 1818
<211> 11
<212> PRT
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<220>
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<400> 1818
Ala Arg His Asp Tyr Arg Asn Tyr Phe Asp Tyr
1 5 10

<210> 1819
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
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<400> 1819
Ala Thr Pro Pro Ser Arg Tyr Gly Gly Asn Tyr Tyr Ala Asp Tyr
1 5 10 15

<210> 1820
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody CDR-H3 region

<400> 1820

Ala Arg Gln Gly Pro Thr Val Ala Ile Asp Phe
1 5 10

<210> 1821
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1821
Ala Arg Arg Gly Arg Glu Phe Asp Tyr
1 5

<210> 1822
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1822
Ala Ile Gln Glu Lys Arg Glu Leu Gln Leu Arg Arg Glu Leu Asp Asn
1 5 10 15

Tyr

<210> 1823
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1823
Ala Arg Val Phe Arg Tyr Gly Met Asp Val
1 5 10

<210> 1824
<211> 10
<212> PRT
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<220>
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CDR-H3 region

<400> 1824
Ala Ile Lys Glu Gly Tyr Gly Leu Ser Asp
1 5 10

<210> 1825
<211> 12
<212> PRT
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<220>
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CDR-H3 region

<400> 1825
Ala Lys Glu Asp Gly Tyr Thr Gln Asn Phe Asp Tyr
1 5 10

<210> 1826
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1826
Ala Arg Val Leu Asp Phe Tyr Gly Ser Ser Val Leu Asp Tyr
1 5 10

<210> 1827
<211> 8
<212> PRT
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<220>
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CDR-H3 region

<400> 1827
Ala Arg Asp Arg Pro Gly Asp Tyr
1 5

<210> 1828
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1828
Ala Arg Asp Leu Gly Val Gly Ser Thr Thr Tyr

1 5 10

<210> 1829
<211> 14
<212> PRT
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<220>
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<400> 1829
Val Lys Asp Leu Glu Val Ser Ile Gly His Asn Phe Asp Phe
1 5 10

<210> 1830
<211> 20
<212> PRT
<213> Artificial Sequence

<220>
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<400> 1830
Ala Arg Asp Arg Gly Val Val Val Val Ala Ala Thr Pro Tyr Tyr Tyr
1 5 10 15

Gly Met Asp Val
20

<210> 1831
<211> 17
<212> PRT
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<220>
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<400> 1831
Val His Ala Arg Asp Asp Tyr Gly Asp Ser Ala Trp Ser Thr Gly Pro
1 5 10 15

Val

<210> 1832
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1832
Gly His Arg Arg Leu Leu Arg Gly Val Thr Thr Thr Val Tyr Phe Asp
1 5 10 15

Pro

<210> 1833
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1833
Ala Arg Gly Gly Glu Leu Leu Gly Gly Phe Gly Tyr Ser Gly Met Asp
1 5 10 15

Val

<210> 1834
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1834
Ala His Tyr Tyr Tyr Asp Ser Ser Gly Tyr Tyr Gln Asn Ala Glu Tyr
1 5 10 15

Phe Gln Tyr

<210> 1835
<211> 21
<212> PRT
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<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1835
Ala Arg Thr Gln Trp Gly Thr Asp Val Glu Ala Thr Asn Pro Tyr Tyr
1 5 10 15

Tyr Phe Met Asp Val
            20

<210> 1836
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-H3 region

<400> 1836
Ala Arg Asp Gln Ser Gly Ala Asp Arg Phe Asp Ser
1   5   10

<210> 1837
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-H3 region

<400> 1837
Ala Arg Ser Ser Lys Trp Thr Asp Trp His Phe Asp Tyr
1   5   10

<210> 1838
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-H3 region

<400> 1838
Ala Arg Asp Leu Asp Glu Ile Asn Ser Ser Trp Leu Asp Pro
1   5   10

<210> 1839
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-H3 region

<400> 1839
Ala Lys Arg Pro Thr Ala Gly Asn Ser Tyr Gly Gly Tyr Tyr Phe Asp
1   5   10   15

His

<210> 1840
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1840
Ala Arg Arg Gly Glu Val Gly Thr Met Val Arg Val Phe Arg Lys Pro
1 5 10 15

Phe Asp Tyr

<210> 1841
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1841
Ala Thr Thr Ser Thr Met Pro Met Pro Thr Arg Gly Arg Asp Trp Phe
1 5 10 15

Asp Pro

<210> 1842
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1842
Ala Gly Ala His Gly Asp Tyr Gly Leu Asp Tyr
1 5 10

<210> 1843
<211> 15
<212> PRT
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<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1843
Ala Arg His Gln Gln Lys Tyr Ser Pro Ile Ser Pro Leu Asp Tyr
1 5 10 15

<210> 1844
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1844
Ala Lys Asp Ala Arg Leu Ala Tyr Tyr Gly Met Asp Val
1 5 10

<210> 1845
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1845
Ala Arg His Ser Ser Gly Tyr Ser Glu Leu Ala Tyr
1 5 10

<210> 1846
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1846
Ala Arg Val His Asn Trp Asp Phe Tyr Tyr Gly Met Asp Val
1 5 10

<210> 1847
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody

CDR-H3 region

<400> 1847
Thr Arg Glu Arg Pro Pro Asn Cys Gly Ser Ser Cys Pro Glu Thr
1 5 10 15

<210> 1848
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1848
Ala Arg Val Gly Thr Ser His Trp Tyr Ser Asp Ser
1 5 10

<210> 1849
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1849
Ala Arg Asp Glu Gly Arg Arg Glu Gly Ala
1 5 10

<210> 1850
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1850
Ala Arg Asp Ile Ala Leu Gly Arg Gly Gly Met Asp Val
1 5 10

<210> 1851
<211> 12
<212> PRT
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<220>
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CDR-H3 region

<400> 1851
Ala Arg His Arg Thr Gly Gln Tyr Tyr Tyr Asn Ser
1   5   10

<210> 1852
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-H3 region

<400> 1852
Ala Ala Ser Gly Tyr Gly Asp His Val Ala Tyr
1   5   10

<210> 1853
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-H3 region

<400> 1853
Ala Arg Gly Asn Gly Pro Lys Ser Gly Lys Tyr Ser Asp Phe Asp Tyr
1   5   10   15

<210> 1854
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-H3 region

<400> 1854
Ala Arg Asp Lys Ser Trp Tyr Phe Asp Tyr
1   5   10

<210> 1855
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-H3 region

<400> 1855
Ala Arg Ser Thr Ala Ser Ser Gly Tyr Tyr Asp Ala Phe Asp Ile

1 5 10 15

<210> 1856
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody CDR-H3 region

<400> 1856
Ala Arg Asp Arg Arg Glu Tyr Ser Ser Ser Ser Arg Pro Ser Tyr His
1 5 10 15

Tyr Tyr Tyr Met Asp Val
20

<210> 1857
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody CDR-H3 region

<400> 1857
Ala Ser Arg Tyr Arg Ser Pro Ser Gly Ala Phe Asp Ile
1 5 10

<210> 1858
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody CDR-H3 region

<400> 1858
Thr Arg Gly Ala Val Ala Asp Tyr
1 5

<210> 1859
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
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<400> 1859

Ala Thr Ser His Gly Gly Leu Val Pro Gly Gly Glu Asn Tyr
1 5 10

<210> 1860
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1860
Val Arg Glu Glu Phe Gly Val Val Arg Gly Pro Asn Pro Phe Asp Val
1 5 10 15

<210> 1861
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1861
Ala Lys Thr Arg Ser Tyr Ser Ser Ala Asp Thr Thr Arg Pro Asn Ala
1 5 10 15

Pro Gly Tyr

<210> 1862
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1862
Ala Lys Asp Gly Gln Thr Gly Thr Thr Thr Pro Tyr Phe Asp Tyr
1 5 10 15

<210> 1863
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1863
Ala Arg Ala Gly Ala Glu Gly Val Asp Tyr
1 5 10

<210> 1864
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1864
Ala Arg Arg Ser Asp Lys Ala Val Pro Gly Thr Phe Asp Gln
1 5 10

<210> 1865
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1865
Ala His Arg Gly Gly Lys Asn Pro Arg Tyr Trp Tyr Phe Asp Leu
1 5 10 15

<210> 1866
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1866
Ala Arg Gly Glu Gly Gly Glu Leu Trp Ala Phe Asp Tyr
1 5 10

<210> 1867
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1867
Ala Arg Glu Gly Leu Arg Leu Ala Arg Gly Trp Phe His Pro

1 5 10

<210> 1868
<211> 12
<212> PRT
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<220>
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<400> 1868
Ala Arg Asp Phe Asp Asp Gly Tyr Asp Ile Arg Tyr
1 5 10

<210> 1869
<211> 13
<212> PRT
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<220>
<223> Synthetic polypeptide representing artificial human antibody CDR-H3 region

<400> 1869
Val Lys Ser Pro Val Ala Ala Asn Asp Ala Phe Asp Ile
1 5 10

<210> 1870
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody CDR-H3 region

<400> 1870
Ala Arg Val Ser Val Ala Ala Pro Thr Cys Leu Asp Tyr
1 5 10

<210> 1871
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
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<400> 1871
Ala Arg His Ser Gly His Asp Gln Leu Pro Leu Asp Phe Asp Asn
1 5 10 15

<210> 1872
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1872
Ala Gly Gly Gly Ser Gln Val Asp Phe
1 5

<210> 1873
<211> 17
<212> PRT
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<220>
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CDR-H3 region

<400> 1873
Ala His Arg Phe Gly Arg Gly Val Ser Tyr Tyr Tyr Tyr Gly Met Asp
1 5 10 15

Val

<210> 1874
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1874
Ala Lys Asp Ser Gly Ser Asn Asp Asp Met Asp Val
1 5 10

<210> 1875
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-H3 region

<400> 1875
Ala Arg Arg Gly Phe Tyr Tyr Tyr Tyr Gly Met Asp Val
1 5 10

<210> 1876
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1876
Ala Ser Leu Leu Gly Gly Asp Pro Asp Tyr
1 5 10

<210> 1877
<211> 20
<212> PRT
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<220>
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CDR-H3 region

<400> 1877
Ala Arg Met Gln Ile Val Ala Thr Thr Gln Thr Tyr Tyr Tyr Tyr Tyr
1 5 10 15

Gly Met Asp Val
20

<210> 1878
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1878
Ala Arg Ala Gly Tyr Asp Leu Phe Gly Trp Phe Asp Pro
1 5 10

<210> 1879
<211> 19
<212> PRT
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<220>
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CDR-H3 region

<400> 1879
Ala Lys Pro Asn Ser Pro Phe Thr Gly Ser Gly Ser Phe His Asn Tyr

1 5 10 15

Phe Asp Tyr

<210> 1880
<211> 6
<212> PRT
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<220>
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<400> 1880
Ala Ser Pro Val Arg Pro
1 5

<210> 1881
<211> 21
<212> PRT
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<220>
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<400> 1881
Ala Arg Gly Phe Cys Asp Leu Pro Ala Cys Tyr Pro Val Pro Gln Tyr
1 5 10 15

Asn Trp Phe Asp Pro
20

<210> 1882
<211> 13
<212> PRT
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<220>
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<400> 1882
Ala Arg Tyr Ser Gly Ser Tyr Pro Leu Gly Phe Asp Tyr
1 5 10

<210> 1883
<211> 9
<212> PRT
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<220>
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CDR-H3 region

<400> 1883
Ala Arg His Glu Gly Ala Phe Asp Ile
1 5

<210> 1884
<211> 12
<212> PRT
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<220>
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CDR-H3 region

<400> 1884
Thr Thr Asp Leu Ala Val Thr Thr Arg Phe Asp Tyr
1 5 10

<210> 1885
<211> 11
<212> PRT
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<220>
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CDR-H3 region

<400> 1885
Ala Arg Ser Thr Arg Thr Asp Ala Leu Asp Val
1 5 10

<210> 1886
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1886
Ala Lys Asn Asp Glu Met Asp Phe Lys Gly Tyr Asp Tyr
1 5 10

<210> 1887
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1887
Ala Arg Gly Glu Leu Leu Phe Asp His
1   5

<210> 1888
<211> 10
<212> PRT
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<220>
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      CDR-H3 region

<400> 1888
Ala Arg Glu Ser Thr Val Val Leu Asp Phe
1   5   10

<210> 1889
<211> 12
<212> PRT
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<220>
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      CDR-H3 region

<400> 1889
Ala Lys Arg Ser Thr Ala Val Gly Asp Phe Asp Pro
1   5   10

<210> 1890
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-H3 region

<400> 1890
Ala Arg Gly Pro Ser Asn Trp Asn Gly Gly Pro Glu His Met Asp Val
1   5   10   15

<210> 1891
<211> 6
<212> PRT
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<220>
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      CDR-H3 region

<400> 1891
Ala Arg Asp Phe Asp Tyr

1 5

<210> 1892
<211> 14
<212> PRT
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<220>
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<400> 1892
Ala Arg Asp Pro Tyr Gly Ser Gly Thr Val Trp Phe Asp Pro
1 5 10

<210> 1893
<211> 20
<212> PRT
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<220>
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<400> 1893
Ala Lys Thr Glu Tyr Thr Phe Leu Ser Gly Ser Asp Tyr Tyr Gln Tyr
1 5 10 15

Gly Met Asp Val
20

<210> 1894
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
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<400> 1894
Ala Arg Arg Gly Leu Leu Arg Gly Ser Asn Glu Gly Arg Phe Asp Tyr
1 5 10 15

<210> 1895
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
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<400> 1895

Thr Arg Arg Gly Ser Ala Trp Thr Asp Pro Tyr Tyr Thr Asp Val
1 5 10 15

<210> 1896
<211> 11
<212> PRT
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<220>
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CDR-H3 region

<400> 1896
Ala Arg Asp Asp Val Pro Arg Gly Tyr Asp Tyr
1 5 10

<210> 1897
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 1897
Ala Arg Glu Tyr Ile Val Pro Phe Tyr Gly Met Asp Val
1 5 10

<210> 1898
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 1898
Gln Gln Thr Asn Thr Phe Pro Leu Thr
1 5

<210> 1899
<211> 9
<212> PRT
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<220>
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CDR-L3 region

<400> 1899
Gln Gln Ser Tyr Ser Thr Pro Pro Arg
1 5

<210> 1900
<211> 9
<212> PRT
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<220>
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CDR-L3 region

<400> 1900
Gln Gln Ser Asn Ser Phe Pro Gly Thr
1 5

<210> 1901
<211> 11
<212> PRT
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<220>
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CDR-L3 region

<400> 1901
Ala Ala Trp Glu Asp Ser Leu Ser Gly Pro Val
1 5 10

<210> 1902
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 1902
Asn Ser Arg Asp Arg Ser Gly Tyr Val
1 5

<210> 1903
<211> 11
<212> PRT
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<220>
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CDR-L3 region

<400> 1903
Gln Val Trp Asp Asn Gly His Ser His Trp Val
1 5 10

<210> 1904

<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 1904
Gln Gln Ser Tyr Arg Met Pro Cys Ser
1 5

<210> 1905
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 1905
Gln Gln Tyr Gly Ser Ser Pro Pro Ile Thr
1 5 10

<210> 1906
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 1906
Gln Ser Tyr Asp Thr Thr Asn Val Ile
1 5

<210> 1907
<211> 9
<212> PRT
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<220>
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CDR-L3 region

<400> 1907
Gln Gln Tyr Asp Ser Ser Pro Phe Thr
1 5

<210> 1908
<211> 10
<212> PRT

<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 1908
Gly Thr Trp Asp Asp Asn Leu Ser Ala Val
1 5 10

<210> 1909
<211> 9
<212> PRT
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<220>
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CDR-L3 region

<400> 1909
Leu Gln Gly Thr His Trp Pro Pro Thr
1 5

<210> 1910
<211> 11
<212> PRT
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<220>
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CDR-L3 region

<400> 1910
Ala Ala Trp Asp Asp Asn Val Ser Gly Pro Gly
1 5 10

<210> 1911
<211> 11
<212> PRT
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<220>
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CDR-L3 region

<400> 1911
Ala Thr Trp Asp Asp Ser Leu Asn Gly Pro Val
1 5 10

<210> 1912
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 1912
Gln Gln Tyr Asn Asn Trp Trp Thr
1 5

<210> 1913
<211> 9
<212> PRT
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<220>
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CDR-L3 region

<400> 1913
Gln Gln Tyr Gly Ser Phe Arg Tyr Thr
1 5

<210> 1914
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 1914
Gln Ser Ala Asp Ser Ser Asp Thr Tyr Val
1 5 10

<210> 1915
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 1915
Gln Gln Arg Ser Asn Trp Pro Leu Thr
1 5

<210> 1916
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 1916
Gln Gln Gly Ser Asn Trp Leu Ala Leu Thr
1 5 10

<210> 1917
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 1917
Gln Gln Tyr Tyr Ile Asn Pro Arg Thr
1 5

<210> 1918
<211> 9
<212> PRT
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<220>
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CDR-L3 region

<400> 1918
Gln Gln Tyr Tyr Ser Thr Pro Tyr Thr
1 5

<210> 1919
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 1919
Gln Gln Ser Phe Asn Thr Val Leu Thr
1 5

<210> 1920
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 1920
Ser Ser Tyr Thr Ile Thr Ser Thr Leu Trp Val
1   5   10

<210> 1921
<211> 11
<212> PRT
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<220>
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      CDR-L3 region

<400> 1921
Ala Ala Trp Asp Asp Ser Leu Ser Gly Pro Val
1   5   10

<210> 1922
<211> 9
<212> PRT
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<220>
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      CDR-L3 region

<400> 1922
Gln Gln Thr Tyr Ser Asn Pro Trp Thr
1   5

<210> 1923
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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      CDR-L3 region

<400> 1923
Gln Gln Thr Tyr Ser His Pro Arg Thr
1   5

<210> 1924
<211> 11
<212> PRT
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<220>
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      CDR-L3 region

<400> 1924
Gln Ser Tyr Asp Ser Ser Leu Ser Gly Tyr Val

1 5 10

<210> 1925
<211> 11
<212> PRT
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<220>
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<400> 1925
Gln Val Trp Asp Ser Ser Ser Asp His Tyr Val
1 5 10

<210> 1926
<211> 9
<212> PRT
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<220>
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<400> 1926
Gln Gln Thr Ser Ser Phe Pro Arg Thr
1 5

<210> 1927
<211> 10
<212> PRT
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<220>
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<400> 1927
Gln Ser Val Asp Ile Thr Ser Thr Trp Val
1 5 10

<210> 1928
<211> 11
<212> PRT
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<220>
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<400> 1928
Ser Ser Tyr Ile Ser Ser Leu Thr Tyr Val Leu
1 5 10

<210> 1929
<211> 11
<212> PRT
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<220>
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CDR-L3 region

<400> 1929
Gly Thr Trp Asp Ser Ser Leu Ser Val Gly Val
1 5 10

<210> 1930
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<212> PRT
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<220>
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CDR-L3 region

<400> 1930
Met Gln Gly Thr His Trp Pro Ile Thr
1 5

<210> 1931
<211> 9
<212> PRT
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<220>
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CDR-L3 region

<400> 1931
Gln Gln Tyr Asp Ser Ser Ser Trp Thr
1 5

<210> 1932
<211> 11
<212> PRT
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<220>
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CDR-L3 region

<400> 1932
Gln Ser Tyr Asp Ser Ser Leu Arg Gly Val Val
1 5 10

<210> 1933
<211> 9

<212> PRT
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<220>
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CDR-L3 region

<400> 1933
Gln Gln Ser Tyr Ser Thr Pro Arg Thr
1 5

<210> 1934
<211> 9
<212> PRT
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<220>
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CDR-L3 region

<400> 1934
Gln Gln Tyr Tyr Ser Thr Pro Trp Thr
1 5

<210> 1935
<211> 13
<212> PRT
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<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

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Gln Ser Tyr Asp Ser Gly Leu Ser Gly Ser Lys Val Val
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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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1 5

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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CDR-L3 region

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<400> 2143
Gln Thr Trp Asp Ser Ser Thr Val Ile
1 5

<210> 2144
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody CDR-L3 region

<400> 2144
Met Gln Ala Leu Gln Thr Pro Tyr Thr
1 5

<210> 2145
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 2145
Gly Thr Trp Asp Ser Ser Leu Ser Ala Gly Val
1 5 10

<210> 2146
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 2146
Gln Gln Tyr Asn Ser Tyr Trp Thr
1 5

<210> 2147
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 2147
Gln Gln Tyr Asn Ser Tyr Pro Trp Thr
1 5

<210> 2148
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 2148
Gln Ser Tyr Asp Ser Ser Leu Ser Gly Ser Gly Val
1 5 10

<210> 2149
<211> 10

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 2149
Gln Ser Ala Asp Ser Ser Gly Thr Tyr Val
1 5 10

<210> 2150
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 2150
Gln Gln Ala His Gly Phe Pro Ile Thr
1 5

<210> 2151
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 2151
Gln Gln Tyr Asn Ser Trp Pro Ala
1 5

<210> 2152
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 2152
Gln Gln Ser Tyr Asn Thr Pro Tyr Thr
1 5

<210> 2153
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 2153
Gln Gln Ser Tyr Asn Thr Pro Leu Thr
1 5

<210> 2154
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 2154
Gln Gln Tyr Gly Ser Ser Pro Pro Asn Ser
1 5 10

<210> 2155
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 2155
Gln Val Trp Asp Ser Ser Ser Asp His Pro Val
1 5 10

<210> 2156
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 2156
Gln Ser Tyr Asp Ser Asn Thr His Trp Val
1 5 10

<210> 2157
<211> 9
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 2157
Met Gln Ala Leu Glu Thr Pro Arg Thr
1 5

<210> 2158
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 2158
Gln Gln Tyr Asn Ser Tyr Ser Thr
1 5

<210> 2159
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 2159
Met Gln Ala Leu Gln Pro Pro Tyr Thr
1 5

<210> 2160
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 2160
Gln Gln Ser Tyr Ser Thr Pro Pro Trp Thr
1 5 10

<210> 2161
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 2161
Gln Gln Tyr Tyr Leu Val Pro Val Thr
1 5

<210> 2162
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 2162
Ala Ala Trp Asp Asp Ser Leu Ser Gly Pro Tyr Val
1 5 10

<210> 2163
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 2163
Ser Ser Tyr Ala Gly Ser Asn Asn Phe Tyr Val
1 5 10

<210> 2164
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 2164
Gln Ser Tyr Asp Ser Ser Leu Ser Gly Ser Met Ile
1 5 10

<210> 2165
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
CDR-L3 region

<400> 2165

Met Ile Trp Ser Ser Leu Val Val
1   5

<210> 2166
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-L3 region

<400> 2166
Met Gln Ala Leu Gln Thr Pro Trp Thr
1   5

<210> 2167
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-L3 region

<400> 2167
Leu Gln Asn Tyr Asn Tyr Pro Trp Thr
1   5

<210> 2168
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide representing artificial human antibody
      CDR-L3 region

<400> 2168
Met Gln Gly Ile His Leu Pro Arg Thr
1   5

<210> 2169
<211> 662
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2169
ga tgt gag atg caa ctg ttg cag tct ggg gga ggc ctg gta cag cct   47
   Cys Glu Met Gln Leu Leu Gln Ser Gly Gly Gly Leu Val Gln Pro

```
   1               5                  10                  15

ggg ggg tcc ctg aga ctc tcc tgt gta gcc tct gaa gtg acg ttc aac        95
Gly Gly Ser Leu Arg Leu Ser Cys Val Ala Ser Glu Val Thr Phe Asn
                20                  25                  30

act tat ggc atg agc tgg gtc cgc cag gct cca ggg aag ggg ctg gag       143
Thr Tyr Gly Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu
            35                  40                  45

tgg gtc tca tac atg agt ggg ggt ggt ggt agt ata ttc tac gca gac       191
Trp Val Ser Tyr Met Ser Gly Gly Gly Gly Ser Ile Phe Tyr Ala Asp
        50                  55                  60

tcc gtg aag ggc cgg ttc acc atc tcc aga gac aat tcc aag aac acg       239
Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr
    65                  70                  75

ctg tat ctg caa atg aac agc ctg aga ggc gag gac acg gcc gtt tat       287
Leu Tyr Leu Gln Met Asn Ser Leu Arg Gly Glu Asp Thr Ala Val Tyr
80                  85                  90                  95

ttc tgt gcg agg gtt acc ctt ggg agt tac ttt tac ggc atg gac gtc       335
Phe Cys Ala Arg Val Thr Leu Gly Ser Tyr Phe Tyr Gly Met Asp Val
                100                 105                 110

tgg ggc caa ggg acc acg gtc acc gtc tcc tca gcc tcc acc aag ggc       383
Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly
            115                 120                 125

cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc       431
Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
        130                 135                 140

aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg       479
Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
    145                 150                 155

acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc       527
Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
160                 165                 170                 175

ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg       575
Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
                180                 185                 190

acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg       623
Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
            195                 200                 205

aat cac aag ccc agc aac acc aag gtg gac aag aag gtg                   662
Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
        210                 215                 220
```

<210> 2170
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2170
```
gtg gtg cag ctg gtg gag tct ggg gga ggc ttg gtc cag cct ggg ggg        48
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt agt agc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

tgg atg agc tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtg       144
Trp Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gcc aac ata aag caa gat gga agt gag aaa tac tat gtg gac tct gtg       192
Ala Asn Ile Lys Gln Asp Gly Ser Glu Lys Tyr Tyr Val Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aag tca ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Lys Ser Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gcc gag gac acg gct gtc tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gat ggg gga tca ggg agt tac ttc gac tgc ttt gac tac tgg       336
Ala Arg Asp Gly Gly Ser Gly Ser Tyr Phe Asp Cys Phe Asp Tyr Trp
            100                 105                 110

ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca       384
Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca       432
Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
    130                 135                 140

gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg       480
Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg       528
Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175
```

```
gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc       576
Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat       624
Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
        195                 200                 205

cac aag ccc agc aac acc aag gtg gac aag agt gag                       660
His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215                 220
```

<210> 2171
<211> 669
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2171

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gaa gtg cag ttg gtg gag tct ggg gga ggc ctg ata cag cct ggc agg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Ile Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt gaa gat tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Glu Asp Tyr
            20                  25                  30

gcc atg cac tgg gtc cgg caa gct cca ggg aag ggc ctg gag tgg gtc       144
Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca ggt att agt tgg aac agt ggg aac ata ggc tat gcg gac tct gtg       192
Ser Gly Ile Ser Trp Asn Ser Gly Asn Ile Gly Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tcc ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg cac agt ctg aga cct gag gac acg gcc tta tat tac tgt       288
Leu Gln Met His Ser Leu Arg Pro Glu Asp Thr Ala Leu Tyr Tyr Cys
                85                  90                  95

gca aaa gat ata aac ttt ttt ggg tta ggg aca ggg gga ggt gct atg       336
Ala Lys Asp Ile Asn Phe Phe Gly Leu Gly Thr Gly Gly Gly Ala Met
            100                 105                 110

gac gtc tgg ggc caa ggg acc acg gtc acc gtc tcc tca gcc tcc acc       384
Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr
        115                 120                 125
```

```
aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct       432
Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
    130                 135                 140

ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa       480
Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145                 150                 155                 160

ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac       528
Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
                165                 170                 175

acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc       576
Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
            180                 185                 190

gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc       624
Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
        195                 200                 205

aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aga gag           669
Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Glu
    210                 215                 220
```

<210> 2172
<211> 360
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2172

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cc cag atc acc ttg aag gag tct ggt cct acg ctg gtg aaa ccc aca         47
   Gln Ile Thr Leu Lys Glu Ser Gly Pro Thr Leu Val Lys Pro Thr
   1               5                   10                  15

cag acc ctc acg ctg acc tgc acc ttc tct ggg ttc tca ctc agc act        95
Gln Thr Leu Thr Leu Thr Cys Thr Phe Ser Gly Phe Ser Leu Ser Thr
                20                  25                  30

agt gga gtg ggt gtg ggc tgg atc cgt cag ccc cca gga aag gcc ctg       143
Ser Gly Val Gly Val Gly Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu
            35                  40                  45

gag tgg ctt gca ctc att tat tgg gat gat gat aag cgc tac agc cca       191
Glu Trp Leu Ala Leu Ile Tyr Trp Asp Asp Asp Lys Arg Tyr Ser Pro
        50                  55                  60

tct ctg aag agc agg ctc acc atc acc aag gac acc tcc aaa aac cag       239
Ser Leu Lys Ser Arg Leu Thr Ile Thr Lys Asp Thr Ser Lys Asn Gln
    65                  70                  75
```

```
gtg gtc ctt aca atg acc aac atg gac cct gtg gac aca gcc aca tat       287
Val Val Leu Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr
80                  85                  90                  95

tac tgt gca cac aga gca ata gta gga ctc ttt gac tac tgg ggc cag       335
Tyr Cys Ala His Arg Ala Ile Val Gly Leu Phe Asp Tyr Trp Gly Gln
                100                 105                 110

gga acc ctg gtc acc gtc tcc tca g                                     360
Gly Thr Leu Val Thr Val Ser Ser
            115

<210> 2173
<211> 669
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2173
cag gtg cag ctg gtg cag tct ggg gct gag gtt aag aag cct ggg gcc        48
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

tca gtg aag att tcc tgc aag aca tct gga tat acc ttc acc acc tac        96
Ser Val Lys Ile Ser Cys Lys Thr Ser Gly Tyr Thr Phe Thr Thr Tyr
            20                  25                  30

tat atg cac tgg gtg cga cag gcc cct gga cag ggg ctt gag tgg atg       144
Tyr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

gga ata atc aac act agt ggt gga agc aca agc tac gca cag aag ttc       192
Gly Ile Ile Asn Thr Ser Gly Gly Ser Thr Ser Tyr Ala Gln Lys Phe
    50                  55                  60

cag ggc aga gtc acc atg acc agg gac acg tcc acg aac aca gtc tac       240
Gln Gly Arg Val Thr Met Thr Arg Asp Thr Ser Thr Asn Thr Val Tyr
65                  70                  75                  80

atg gag ctg agc agc ctg aga tat gaa gac acg gcc atg tat tac tgt       288
Met Glu Leu Ser Ser Leu Arg Tyr Glu Asp Thr Ala Met Tyr Tyr Cys
                85                  90                  95

gcg cga gga ggg gat ggg gga ccc caa gat gct ttt gat atc tgg ggc       336
Ala Arg Gly Gly Asp Gly Gly Pro Gln Asp Ala Phe Asp Ile Trp Gly
            100                 105                 110

caa ggg aca aag gtc acc gtc tcc tca gca tcc ccg acc agc ccc aag       384
Gln Gly Thr Lys Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro Lys
        115                 120                 125
```

```
gtc ttc ccg ctg agc ctc tgc agc acc cag cca gat ggg aac gtg gtc       432
Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val
    130                 135                 140

atc gcc tgc ctg gtc cag ggc ttc ttc ccc cag gag cca ctc agt gtg       480
Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val
145                 150                 155                 160

acc tgg agc gaa agc gga cag ggc gtg acc gcc aga aac ttc cca ccc       528
Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro
                165                 170                 175

agc cag gat gcc tcc ggg gac ctg tac acc acg agc agc cag ctg acc       576
Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr
            180                 185                 190

ctg ccg gcc aca cag tgc cta gcc ggc aag tcc gtg aca tgc cac gtg       624
Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val
        195                 200                 205

aag cac tac acg aat ccc agc cag gat gtg act gtg ccc tgc cca          669
Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
    210                 215                 220

<210> 2174
<211> 666
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2174
tga gtg cag ctg gtg gac tct ggg gga ggc ttg gta cag cct ggc agg        48
    Val Gln Leu Val Asp Ser Gly Gly Gly Leu Val Gln Pro Gly Arg
    1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc gtc ttt gat gat tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Val Phe Asp Asp Tyr
                20                  25                  30

gcc atg cac tgg gtc cgg caa gtt cca ggg aag ggc ctg gag tgg gtc       144
Ala Met His Trp Val Arg Gln Val Pro Gly Lys Gly Leu Glu Trp Val
            35                  40                  45

tca ggc att agt tgg aat agt gtt agt ata ggc tat gcg gac tct gtg       192
Ser Gly Ile Ser Trp Asn Ser Val Ser Ile Gly Tyr Ala Asp Ser Val
        50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aat tcc ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
    65                  70                  75
```

```
cta caa atg aac agt ctg aga cct gag gac gcg gcc ttg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Pro Glu Asp Ala Ala Leu Tyr Tyr Cys
80                  85                  90                  95

gtg aag tca ttt tcg gct gaa tat tac tac tat tac tac ggt atg gac       336
Val Lys Ser Phe Ser Ala Glu Tyr Tyr Tyr Tyr Tyr Tyr Gly Met Asp
                100                 105                 110

gtc tgg ggc caa ggg acc acg gtc acc gtc tcc tca gcc tcc acc aag       384
Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys
            115                 120                 125

ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg       432
Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
        130                 135                 140

ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg       480
Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
    145                 150                 155

gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc       528
Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
160                 165                 170                 175

ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg       576
Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
                180                 185                 190

gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac       624
Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
            195                 200                 205

gtg aat cac aag ccc agc aac acc aag gtg gac aag agt gag               666
Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
        210                 215                 220
```

<210> 2175
<211> 367
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2175

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cag gtt caa ctg gtg cag tct gga gct gag gtg aag aag cct ggg gcc        48
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

tca gtg aag gtc tcc tgc aag gct tct ggt tac acc ttt acc aac tat        96
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asn Tyr
            20                  25                  30
```

```
ggt ttc agc tgg gtg cga cag gcc cca gga caa ggg ctt gag tgg atg       144
Gly Phe Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

gga cgg atc acc act tac aat cgt gac aca atc tat gca cag aaa ttc       192
Gly Arg Ile Thr Thr Tyr Asn Arg Asp Thr Ile Tyr Ala Gln Lys Phe
    50                  55                  60

cag ggc aga gtc acc atg acc aca gat aca tcc acg agc aca gcc tat       240
Gln Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80

atg gaa ctg agg agc ctg aga tct gac gac acg gcc gtg tac ttc tgt       288
Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Phe Cys
                85                  90                  95

gcg aga gtt gtt cca ggt gac tcc gtc tat ggt gct ttt gat atc tgg       336
Ala Arg Val Val Pro Gly Asp Ser Val Tyr Gly Ala Phe Asp Ile Trp
            100                 105                 110

ggc cag ggg aca atg gtc acc gtc tct tca g                            367
Gly Gln Gly Thr Met Val Thr Val Ser Ser
        115                 120
```

<210> 2176
<211> 668
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2176

```
gt gaa gta caa ctg gtg gag tct ggg gga ggc gtg gta cag cct ggg         47
   Glu Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly
   1               5                   10                  15

ggg tcc ctg aga ctc tcc tgt aca gcc tct gga ttc acc ttt gat gat        95
Gly Ser Leu Arg Leu Ser Cys Thr Ala Ser Gly Phe Thr Phe Asp Asp
                20                  25                  30

tat gcc atg cac tgg gtc cgt caa gct cca ggg aag ggt ctg gag tgg       143
Tyr Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
            35                  40                  45

gtc tct ctt att agt ggg gat ggt ggt ggc aca tac tat gca gac tct       191
Val Ser Leu Ile Ser Gly Asp Gly Gly Gly Thr Tyr Tyr Ala Asp Ser
        50                  55                  60

gtg aag ggc cga ttc acc atc tcc aga gac aac agc aaa aac tcc ctg       239
Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Ser Leu
    65                  70                  75
```

```
tat ctg caa atg aac agt ctg aga act gag gac acc gcc ttg tat tac       287
Tyr Leu Gln Met Asn Ser Leu Arg Thr Glu Asp Thr Ala Leu Tyr Tyr
80                  85                  90                  95

tgt gca aag cgg acc ccg ttc ggg gag tgg gca ttt gac tac tgg ggc       335
Cys Ala Lys Arg Thr Pro Phe Gly Glu Trp Ala Phe Asp Tyr Trp Gly
                100                 105                 110

cag gga acc ctg gtc acc gtc tcc tca gca tcc ccg acc agc ccc aag       383
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro Lys
            115                 120                 125

gtc ttc ccg ctg agc ctc tgc agc acc cag cca gat ggg aac gtg gtc       431
Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val
        130                 135                 140

atc gcc tgc ctg gtc cag ggc ttc ttc ccc cag gag cca ctc agt gtg       479
Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val
    145                 150                 155

acc tgg agc gaa agc gga cag ggc gtg acc gcc aga aac ttc cca ccc       527
Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro
160                 165                 170                 175

agc cag gat gcc tcc ggg gac ctg tac acc acg agc agc cag ctg acc       575
Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr
                180                 185                 190

ctg ccg gcc aca cag tgc cta gcc ggc aag tcc gtg aca tgc cac gtg       623
Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val
            195                 200                 205

aag cac tac acg aat ccc agc cag gat gtg act gtg ccc tgc ccg           668
Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
        210                 215                 220

<210> 2177
<211> 373
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2177
gag gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg ggg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcg tct gga ttc act ttt agt tac tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Tyr Tyr
            20                  25                  30
```

```
ggc atg tat tgg gtc cgc cag gct cca ggc aag ggg ctt gag tgg gtg       144
Gly Met Tyr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

aca ttt ata cgg tat gat gga aga aat aaa tac tat gcc gac tcc gtg       192
Thr Phe Ile Arg Tyr Asp Gly Arg Asn Lys Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aat tcc aag aat acg ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

ctg gaa atg aat acc ctg aga act gag gac acg gct atg tat ttc tgt       288
Leu Glu Met Asn Thr Leu Arg Thr Glu Asp Thr Ala Met Tyr Phe Cys
                85                  90                  95

gcg aaa gat ccg ggg acc ttt agg gac cat ctt tgg agt ggt gtt gac       336
Ala Lys Asp Pro Gly Thr Phe Arg Asp His Leu Trp Ser Gly Val Asp
            100                 105                 110

tac tgg ggc cag gga acc ctg gtc acc gtc tcc tcc g                    373
Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120

<210> 2178
<211> 663
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2178
gaa gtg caa ctg gtg gag tct ggg gga ggc ttg gta cag cct ggc agg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctt tct tgt gca gcc tct gga ttc ccc ttt ggt gat tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Pro Phe Gly Asp Tyr
            20                  25                  30

gcc atg cac tgg gtc cgg caa gct cca ggg aag ggc ctg gag tgg gtc       144
Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca ggt att gga tgg gac agt ggt ggc atc ggc tat gcg gac tct gtg       192
Ser Gly Ile Gly Trp Asp Ser Gly Gly Ile Gly Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac atc gcc aag aac tcg ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Ile Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80
```

```
ctg gaa ata aac agt ctg aga cct gac gac acg gcc ttg tat tac tgt       288
Leu Glu Ile Asn Ser Leu Arg Pro Asp Asp Thr Ala Leu Tyr Tyr Cys
                85                  90                  95

gca aaa gcg gcg gct aca ctc ccc tac ttc cgc ttc gct atg gac gtc       336
Ala Lys Ala Ala Ala Thr Leu Pro Tyr Phe Arg Phe Ala Met Asp Val
            100                 105                 110

tgg ggc cag ggg acc ccg gtc acc gtc tcc tca gcc tcc acc aag ggc       384
Trp Gly Gln Gly Thr Pro Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125

cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc       432
Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
    130                 135                 140

aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg       480
Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc       528
Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165                 170                 175

ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg       576
Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg       624
Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

aat cac aag ccc agc aac acc aag gtg gac aag aat gtg                   663
Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Asn Val
    210                 215                 220
```

<210> 2179
<211> 666
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2179

```
cca ggt ctc ctg gtg cag tct gga ggt gag gtg aag aag cct ggg gcc        48
Pro Gly Leu Leu Val Gln Ser Gly Gly Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

tca gtg agg gtc tcc tgc aag gcc tct ggt tac atc gat atc aac aac        96
Ser Val Arg Val Ser Cys Lys Ala Ser Gly Tyr Ile Asp Ile Asn Asn
            20                  25                  30
```

```
ggc atc agc tgg gtg cga cag gcc cca gga cac ggt ctt gag tgg atg       144
Gly Ile Ser Trp Val Arg Gln Ala Pro Gly His Gly Leu Glu Trp Met
        35                  40                  45

gga tgg atc agc att tac agt ggt aac aca aag tat gca cag aag ttc       192
Gly Trp Ile Ser Ile Tyr Ser Gly Asn Thr Lys Tyr Ala Gln Lys Phe
    50                  55                  60

cag ggc aga gtc acc atg acc aca gcg aca tcc acg agc aca gtc tac       240
Gln Gly Arg Val Thr Met Thr Thr Ala Thr Ser Thr Ser Thr Val Tyr
65                  70                  75                  80

atg gag ctg agg agc ctg aca tct gac gac acg gcc gtg tat tac tgt       288
Met Glu Leu Arg Ser Leu Thr Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gtg gga gtc ttt aag ggc ctg gct cct ttc ggg ggg ttc gac       336
Ala Arg Val Gly Val Phe Lys Gly Leu Ala Pro Phe Gly Gly Phe Asp
            100                 105                 110

ccc tgg ggc cag ggg acc ctg gtc acc gtc tct tca gcc tcc acc aag       384
Pro Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys
        115                 120                 125

ggc cca tcg gtc ttc ccc ctg gcg ccc tgc tcc agg agc acc tcc gag       432
Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu
    130                 135                 140

agc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg       480
Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145                 150                 155                 160

gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc       528
Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
                165                 170                 175

ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg       576
Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
            180                 185                 190

gtg acc gtg ccc tcc agc agc ttg ggc acg aag acc tac acc tgc aat       624
Val Thr Val Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn
        195                 200                 205

gta gat cac aag ccc agc aac acc aag gtg gac aag aga gtt                666
Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220
```

<210> 2180
<211> 355
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2180
ttg ttg cag ttg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg 48
Leu Leu Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 5 10 15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc act cgc cat 96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Thr Arg His
20 25 30

ggt ttc cac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg 144
Gly Phe His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

gca gtt ata tca tct gat gga agg aag ata cac tac aca gac tca gtg 192
Ala Val Ile Ser Ser Asp Gly Arg Lys Ile His Tyr Thr Asp Ser Val
50 55 60

aag ggc cga ttc gtc atc tcc aga gac gat tcc gac aac aca gtg tat 240
Lys Gly Arg Phe Val Ile Ser Arg Asp Asp Ser Asp Asn Thr Val Tyr
65 70 75 80

ctc cac atg aac agc ctg aga ctt ggg gac acg gct ctg tat tac tgt 288
Leu His Met Asn Ser Leu Arg Leu Gly Asp Thr Ala Leu Tyr Tyr Cys
85 90 95

gcg aga gac agt ggt ggc act ccg ggg ccc tac tgg ggc cag gga acc 336
Ala Arg Asp Ser Gly Gly Thr Pro Gly Pro Tyr Trp Gly Gln Gly Thr
100 105 110

ctg gtc acc gtc tcc tca g 355
Leu Val Thr Val Ser Ser
115

<210> 2181
<211> 667
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2181
g tgt gag gtg caa ctg ttg gag tct ggg gga ggc ttg gta cag cct ggg 49
Cys Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
1 5 10 15

ggg tcc ctg aca ctc tcc tgt gta ggc tct cga ttc acc ttt agc agc 97
Gly Ser Leu Thr Leu Ser Cys Val Gly Ser Arg Phe Thr Phe Ser Ser
20 25 30

```
tat gcc atg aat tgg gtc cgc cag agt cca ggg agg ggc ctg gag tgg       145
Tyr Ala Met Asn Trp Val Arg Gln Ser Pro Gly Arg Gly Leu Glu Trp
        35                  40                  45

gtc gca tct atc agt gct act act ggt agc act tac tac aca gac tcc       193
Val Ala Ser Ile Ser Ala Thr Thr Gly Ser Thr Tyr Tyr Thr Asp Ser
    50                  55                  60

gtg gag ggc cgg ttc acc atc tcc aga gac aat tcc aga gac act cta       241
Val Glu Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Arg Asp Thr Leu
65                  70                  75                  80

tat ctg caa atg aac agc ctg aga gcc gat gac acg gcc tta tat tac       289
Tyr Leu Gln Met Asn Ser Leu Arg Ala Asp Asp Thr Ala Leu Tyr Tyr
                85                  90                  95

tgt gtg agg tcg ttc gtc ggc gca gtt ccc gct tat ccc aac ttt gac       337
Cys Val Arg Ser Phe Val Gly Ala Val Pro Ala Tyr Pro Asn Phe Asp
            100                 105                 110

ttc tgg ggc ccg ggg acc ctg gtc acc gtc tcc tca gcc tcc acc aag       385
Phe Trp Gly Pro Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys
        115                 120                 125

ggc cca tcg gtc ttc ccc ctg gcg ccc tgc tcc agg agc acc tcc gag       433
Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu
    130                 135                 140

agc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg       481
Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145                 150                 155                 160

gtg acg gtg tcg tgg aac tca ggc gct ctg acc agc ggc gtg cac acc       529
Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
                165                 170                 175

ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg       577
Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
            180                 185                 190

gtg acc gtg acc tcc agc aac ttc ggc acc cag acc tac acc tgc aac       625
Val Thr Val Thr Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn
        195                 200                 205

gta gat cac aag ccc agc aac acc aag gtg gac aag aca gtg               667
Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val
    210                 215                 220
```

<210> 2182
<211> 677
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2182

```
ca cag gta cag ctg cag cag tca ggt ccg gga ctg gtg aag ccc tcg         47
   Gln Val Gln Leu Gln Gln Ser Gly Pro Gly Leu Val Lys Pro Ser
   1               5                  10                  15

cag acc ctc tca ctc acc tgt gcc atc tcc ggg gac ggt gtc tct agc        95
Gln Thr Leu Ser Leu Thr Cys Ala Ile Ser Gly Asp Gly Val Ser Ser
                20                  25                  30

aac agt gct agt tgg aac tgg gtc agg cag tcc cca tcg aga ggc ctt       143
Asn Ser Ala Ser Trp Asn Trp Val Arg Gln Ser Pro Ser Arg Gly Leu
            35                  40                  45

gag tgg ctg gga agg aca tac tac agg tcc aag tgg tat aat gat tat       191
Glu Trp Leu Gly Arg Thr Tyr Tyr Arg Ser Lys Trp Tyr Asn Asp Tyr
        50                  55                  60

gca gta tct gtg aaa agt cga atg acc atc aaa tca gac aca tcc aag       239
Ala Val Ser Val Lys Ser Arg Met Thr Ile Lys Ser Asp Thr Ser Lys
    65                  70                  75

aac caa ttc tcc ctg cag ttg aac tct gtg act ccc gaa gac acg gct       287
Asn Gln Phe Ser Leu Gln Leu Asn Ser Val Thr Pro Glu Asp Thr Ala
80                  85                  90                  95

gtt tat tac tgt gta aga ggg gta gtg ggg gct act ctc gac aac tgg       335
Val Tyr Tyr Cys Val Arg Gly Val Val Gly Ala Thr Leu Asp Asn Trp
                100                 105                 110

ggc cag gga acc ctg gtc acc gtc tcc tca ggg agt gca tcc gcc cca       383
Gly Gln Gly Thr Leu Val Thr Val Ser Ser Gly Ser Ala Ser Ala Pro
            115                 120                 125

acc ctt ttc ccc ctc gtc tcc tgt gag aat tcc ccg tcg gat acg agc       431
Thr Leu Phe Pro Leu Val Ser Cys Glu Asn Ser Pro Ser Asp Thr Ser
        130                 135                 140

agc gtg gcc gtt ggc tgc ctc gca cag gac ttc ctt ccc gac tcc atc       479
Ser Val Ala Val Gly Cys Leu Ala Gln Asp Phe Leu Pro Asp Ser Ile
    145                 150                 155

act ttc tcc tgg aaa tac aag aac aac tct gac atc agc agc acc cgg       527
Thr Phe Ser Trp Lys Tyr Lys Asn Asn Ser Asp Ile Ser Ser Thr Arg
160                 165                 170                 175

ggc ttc cca tca gtc ctg aga ggg ggc aag tac gca gcc acc tca cag       575
Gly Phe Pro Ser Val Leu Arg Gly Gly Lys Tyr Ala Ala Thr Ser Gln
                180                 185                 190

gtg ctg ctg cct tcc aag gac gtc atg cag ggc aca gac gaa cac gtg       623
Val Leu Leu Pro Ser Lys Asp Val Met Gln Gly Thr Asp Glu His Val
```

```
            195                 200                 205

gtg tgc aaa gtc cag cac ccc aac ggc aac aaa gaa aag aac gtg cct       671
Val Cys Lys Val Gln His Pro Asn Gly Asn Lys Glu Lys Asn Val Pro
        210                 215                 220

ctt ccg                                                               677
Leu Pro
    225
```

<210> 2183
<211> 666
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2183

```
cag gtg caa ttg gtg gaa tct ggg gga ggc gtg gtc cag cct ggg ggg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gga gcg tct gga ttc gcc ttc agt agt aat        96
Ser Leu Arg Leu Ser Cys Gly Ala Ser Gly Phe Ala Phe Ser Ser Asn
            20                  25                  30

ggc atg cac tgg gtc cgc cag gct cca ggc aag gga ctg gag tgg gtg       144
Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gct ttt att cac tat gat gga agg aat aaa cac tat aca gat tcc gtg       192
Ala Phe Ile His Tyr Asp Gly Arg Asn Lys His Tyr Thr Asp Ser Val
    50                  55                  60

aag ggc cga ttc gcc atc tcc gta gac gat tcc aag acc acg ttg tat       240
Lys Gly Arg Phe Ala Ile Ser Val Asp Asp Ser Lys Thr Thr Leu Tyr
65                  70                  75                  80

ctg caa atg agc agc ctg aaa act gag gac acg gct gtt tat tac tgt       288
Leu Gln Met Ser Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gtg aaa gat tcc cgg gtt acg ggg caa agc agt ggt tat atc ttt gac       336
Val Lys Asp Ser Arg Val Thr Gly Gln Ser Ser Gly Tyr Ile Phe Asp
            100                 105                 110

tct tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag       384
Ser Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys
        115                 120                 125

ggc cca tcg gtc ttc ccc ctg gcg ccc tgc tcc agg agc acc tcc gag       432
Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu
```

```
    130                 135                 140

agc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg       480
Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145                 150                 155                 160

gtg acg gtg tcg tgg aac tca ggc gct ctg acc agc ggc gtg cac acc       528
Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
                165                 170                 175

ttc cca gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg       576
Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
            180                 185                 190

gtg acc gtg ccc tcc agc aac ttc ggc acc cag acc tac acc tgc aac       624
Val Thr Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn
        195                 200                 205

gta gat cac aag ccc agc aac acc aag gtg gac aag act gag               666
Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Glu
    210                 215                 220

<210> 2184
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2184
gtg gtg cag ctg gtg gag tct ggg gga ggc ctg gtc aag cct ggg ggg        48
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga atc acc ttc agt agc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Ile Thr Phe Ser Ser Tyr
            20                  25                  30

gac atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtc       144
Asp Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca tcc att agt agt agt agt agt tcc ata tac ttc gca gac tca gtg       192
Ser Ser Ile Ser Ser Ser Ser Ser Ser Ile Tyr Phe Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tca ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg cac atg aac agc ctg aga gcc gag gac acg gct gtt tat tat tgt       288
Leu His Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
```

```
                85                  90                  95

gcg aga ccc cgt tta ggc tgg tac ttc gat ctc tgg ggc cgt ggc acc       336
Ala Arg Pro Arg Leu Gly Trp Tyr Phe Asp Leu Trp Gly Arg Gly Thr
            100                 105                 110

cta gtc act gtc gcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc       384
Leu Val Thr Val Ala Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
        115                 120                 125

ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc       432
Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
    130                 135                 140

tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac       480
Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160

tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag       528
Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175

tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc       576
Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc agc       624
Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
        195                 200                 205

aac acc aag gtg gac aag aga gtt                                      648
Asn Thr Lys Val Asp Lys Arg Val
    210                 215

<210> 2185
<211> 656
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2185
cc cag gtt cag ctg gtg cag tct gga ggt gag gtg aag aag cct ggg         47
   Gln Val Gln Leu Val Gln Ser Gly Gly Glu Val Lys Lys Pro Gly
   1               5                   10                  15

gcc tca gtg aag gtc tcc tgc aag gct tct ggt tac aac ttt acc aac        95
Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Asn Phe Thr Asn
                20                  25                  30

tat ggt atc agc tgg gtg cga cag gcc cct ggc caa ggg ctt gag tgg       143
Tyr Gly Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp
```

```
            35                  40                  45

atg gga tgg atc agc gct tac aat ggt aac acg aac tat gca cag aag       191
Met Gly Trp Ile Ser Ala Tyr Asn Gly Asn Thr Asn Tyr Ala Gln Lys
        50                  55                  60

ctc cag ggc aga gtc acc atg acc aca gac aca ccc acg agc aca gcc       239
Leu Gln Gly Arg Val Thr Met Thr Thr Asp Thr Pro Thr Ser Thr Ala
    65                  70                  75

tac atg gag ctg agg agc ctg aga tct gac gac acg gcc gtg tat tac       287
Tyr Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr
80                  85                  90                  95

tgt gcg aga gaa acc gcc ggg cag ctc atc ccc ttt gac tac tgg ggc       335
Cys Ala Arg Glu Thr Ala Gly Gln Leu Ile Pro Phe Asp Tyr Trp Gly
                100                 105                 110

cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg       383
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
            115                 120                 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg       431
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
        130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       479
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
    145                 150                 155

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       527
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
160                 165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       575
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
                180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac       623
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
            195                 200                 205

aag ccc agc aac acc aag gtg gac aag agt gag                           656
Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
        210                 215
```

<210> 2186
<211> 666
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2186

```
gtg gag caa ctg gtg gag tct ggg gga ggc ttg gta cag cct gga ggg        48
Val Glu Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                  10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc agc ttc agg agt tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Ser Phe Arg Ser Tyr
            20                  25                  30

gaa atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtt       144
Glu Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca tac att ggt att ggt ggc aat acc ata tat tat gca gac tct gtg       192
Ser Tyr Ile Gly Ile Gly Gly Asn Thr Ile Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tca ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gcc gag gac acg gct gtt tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gat tat atg ggt gtg gat ttc tac tac tac tac ggt atg gac       336
Ala Arg Asp Tyr Met Gly Val Asp Phe Tyr Tyr Tyr Tyr Gly Met Asp
            100                 105                 110

gtc tgg ggc caa ggg acc acg gtc acc gtc tcc tca gcc tcc acc aag       384
Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys
        115                 120                 125

ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg       432
Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
    130                 135                 140

ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg       480
Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145                 150                 155                 160

gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc       528
Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
                165                 170                 175

ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg       576
Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
            180                 185                 190

gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac       624
Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
        195                 200                 205
```

```
gtg aat cac aag ccc agc aac acc aag gtg gac aag aga gtt              666
Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220

<210> 2187
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2187
cag gtc cag ctt gtg cag tct ggg gct gag gtg aag aag cct ggg gcc       48
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

tca gtg aag gtt tcc tgc aag gct tct gga tac atc ttc act agc tat       96
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Ile Phe Thr Ser Tyr
            20                  25                  30

gct ata cat tgg gtg cgc cag gcc ccc gga caa agg ctt gag tgg atg      144
Ala Ile His Trp Val Arg Gln Ala Pro Gly Gln Arg Leu Glu Trp Met
        35                  40                  45

gga tgg atc aac gct ggc aat ggt aac aca aag tat tca cag aag ttc      192
Gly Trp Ile Asn Ala Gly Asn Gly Asn Thr Lys Tyr Ser Gln Lys Phe
    50                  55                  60

cag ggc aga gtc acc att acc cgg gac aca tcc gcg aat aca gcc tac      240
Gln Gly Arg Val Thr Ile Thr Arg Asp Thr Ser Ala Asn Thr Ala Tyr
65                  70                  75                  80

atg gag ctg agc agc ctg aga tct gaa gac acg gct ata tat tac tgt      288
Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Ile Tyr Tyr Cys
                85                  90                  95

gcg aga gat ata gca gtg gct att act aac tac ttt ggc tcc tgg ggc      336
Ala Arg Asp Ile Ala Val Ala Ile Thr Asn Tyr Phe Gly Ser Trp Gly
            100                 105                 110

cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg      384
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg      432
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg      480
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160
```

```
tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       528
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       576
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac       624
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

aag ccc agc aac acc aag gtg gac aag aag gtg                           657
Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215

<210> 2188
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2188
cag gtg cag ctg cag gag tcg ggc cca gga ctg gtg agg ccc tcg gag        48
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Arg Pro Ser Glu
1               5                   10                  15

acc ctg tcc ctc acc tgc gat gtc tct ggt tac tta atc agt agt ggc        96
Thr Leu Ser Leu Thr Cys Asp Val Ser Gly Tyr Leu Ile Ser Ser Gly
            20                  25                  30

tac tac tgg ggc tgg gtc cgg cag ccc ccc gga aag ggt ctg gag tgg       144
Tyr Tyr Trp Gly Trp Val Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp
        35                  40                  45

att ggg agc gtc tat cat agt ggg aat gcc tac tac aat ccg tcc ctc       192
Ile Gly Ser Val Tyr His Ser Gly Asn Ala Tyr Tyr Asn Pro Ser Leu
    50                  55                  60

aag ggt cga gtc aca atg tca gta gat acg tcg aaa aat cag ttc tcc       240
Lys Gly Arg Val Thr Met Ser Val Asp Thr Ser Lys Asn Gln Phe Ser
65                  70                  75                  80

ctg aag ttg acc tct gtg gcc gcc gaa gac acg gcc gtc tat tat tgt       288
Leu Lys Leu Thr Ser Val Ala Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gaa cat cgt agt ggg tat cag cga tac tgg ggc cag gga acc       336
Ala Arg Glu His Arg Ser Gly Tyr Gln Arg Tyr Trp Gly Gln Gly Thr
            100                 105                 110
```

```
ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc       384
Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
        115                 120                 125

ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc       432
Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
    130                 135                 140

tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac       480
Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160

tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag       528
Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175

tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc       576
Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc agc       624
Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
        195                 200                 205

aac acc aag gtg gac aag aaa gtg                                      648
Asn Thr Lys Val Asp Lys Lys Val
    210                 215
```

<210> 2189
<211> 671
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2189

```
cc cag atc acc ttg aag gag tct ggt cct acg ctg gtg aaa ccc aca         47
   Gln Ile Thr Leu Lys Glu Ser Gly Pro Thr Leu Val Lys Pro Thr
   1               5                  10                  15

cag acc ctc acg ctg acc tgc acc ttc tct ggg ttc tca ctc aac act        95
Gln Thr Leu Thr Leu Thr Cys Thr Phe Ser Gly Phe Ser Leu Asn Thr
                20                  25                  30

agt gga gtg ggt gtg ggc tgg atc cgt cag ccc ccg gga aag gcc ctg       143
Ser Gly Val Gly Val Gly Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu
            35                  40                  45

gag tgg ctt gca ctc att tat tgg gat gat gat gag cgc tac agg cca       191
Glu Trp Leu Ala Leu Ile Tyr Trp Asp Asp Asp Glu Arg Tyr Arg Pro
        50                  55                  60
```

```
tct ctg aag aac aga ctc acc atc acc agg gac acc tcc aaa aac cag       239
Ser Leu Lys Asn Arg Leu Thr Ile Thr Arg Asp Thr Ser Lys Asn Gln
    65                  70                  75

gtg gtc ctt acg atg acc aac atg gac cct gtg gac aca gcc aca tat       287
Val Val Leu Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr
80                  85                  90                  95

tac tgt gca cac ttc tct acg gtg att aac ttt ggc cac tgg ggc cag       335
Tyr Cys Ala His Phe Ser Thr Val Ile Asn Phe Gly His Trp Gly Gln
                100                 105                 110

gga acc ctg gtc acc gtc tcc tca ggg agt gca tcc gcc cca acc ctt       383
Gly Thr Leu Val Thr Val Ser Ser Gly Ser Ala Ser Ala Pro Thr Leu
            115                 120                 125

ttc ccc ctc gtc tcc tgt gag aat tcc ccg tcg gat acg agc agc gtg       431
Phe Pro Leu Val Ser Cys Glu Asn Ser Pro Ser Asp Thr Ser Ser Val
        130                 135                 140

gcc gtt ggc tgc ctc gca cag gac ttc ctt ccc gac tcc atc act ttc       479
Ala Val Gly Cys Leu Ala Gln Asp Phe Leu Pro Asp Ser Ile Thr Phe
    145                 150                 155

tcc tgg aaa tac aag aac aac tct gac atc agc agc acc cgg ggc ttc       527
Ser Trp Lys Tyr Lys Asn Asn Ser Asp Ile Ser Ser Thr Arg Gly Phe
160                 165                 170                 175

cca tca gtc ctg aga ggg ggc aag tac gca gcc acc tca cag gtg ctg       575
Pro Ser Val Leu Arg Gly Gly Lys Tyr Ala Ala Thr Ser Gln Val Leu
                180                 185                 190

ctg cct tcc aag gac gtc atg cag ggc aca gac gaa cac gtg gtg tgc       623
Leu Pro Ser Lys Asp Val Met Gln Gly Thr Asp Glu His Val Val Cys
            195                 200                 205

aaa gtc cag cac ccc aac ggc aac aaa gaa aag aac gtg cct ctt cca       671
Lys Val Gln His Pro Asn Gly Asn Lys Glu Lys Asn Val Pro Leu Pro
        210                 215                 220
```

<210> 2190
<211> 346
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2190

```
gag gtg cag ctg gtg gag tct ggg gga ggc ctg gtc aag ccg ggg ggg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1               5                   10                  15
```

```
tcc ctc aga ctg tcc tgt gtc ggc tct gga ttc acc ttc agc aac tat        96
Ser Leu Arg Leu Ser Cys Val Gly Ser Gly Phe Thr Phe Ser Asn Tyr
            20                  25                  30

agc atg aac tgg gtc cgc cag gct cca ggg agg ggg ctt gag tgg gtc       144
Ser Met Asn Trp Val Arg Gln Ala Pro Gly Arg Gly Leu Glu Trp Val
        35                  40                  45

tct tca att agt tgg ggt agt tct tac ata aac tac gca gac tca gtg       192
Ser Ser Ile Ser Trp Gly Ser Ser Tyr Ile Asn Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tca cta tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg cag atg acc agc ctg acc gcc gag gac acg gct gtc tat tac tgt       288
Leu Gln Met Thr Ser Leu Thr Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg tgc cga cgg ata tat cag ggg ttc gac ccc tgg ggc cag gga acc       336
Ala Cys Arg Arg Ile Tyr Gln Gly Phe Asp Pro Trp Gly Gln Gly Thr
            100                 105                 110

ctg gtc acc g                                                        346
Leu Val Thr
        115

<210> 2191
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2191
gag gtg cag ctg gtg gag tct ggg gga ggc ctg gtc aag cct ggg ggg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt agc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

agc atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtc       144
Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca tcg att agt agc agt agt agg tac ata tac tac gca gac tca gtg       192
Ser Ser Ile Ser Ser Ser Ser Arg Tyr Ile Tyr Tyr Ala Asp Ser Val
    50                  55                  60
```

```
aag ggc cga ttc acc agc tcc aga gac aac gcc aag aac tca ctg tat       240
Lys Gly Arg Phe Thr Ser Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gcc gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gat cga gct acc tcg ttt gat tac tgg ggc cag gga acc ctg       336
Ala Arg Asp Arg Ala Thr Ser Phe Asp Tyr Trp Gly Gln Gly Thr Leu
            100                 105                 110

gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg       384
Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu
        115                 120                 125

gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc tgc       432
Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys
    130                 135                 140

ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca       480
Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
145                 150                 155                 160

ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag tcc       528
Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser
                165                 170                 175

tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc agc       576
Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser
            180                 185                 190

ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc agc aac       624
Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn
        195                 200                 205

acc aag gtg gac aag aag gtg                                           645
Thr Lys Val Asp Lys Lys Val
    210                 215
```

<210> 2192
<211> 639
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2192

```
ccg gtg ctt ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg gag        48
Pro Val Leu Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15
```

```
acc ctg tcc ctc acc tgc act gtc tct ggt gac tcc atg agt ttt tac        96
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Asp Ser Met Ser Phe Tyr
            20                  25                  30

tat tgg acc tgg atc cgg cag ccc cca ggg aag gga ctg gaa tgg att       144
Tyr Trp Thr Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Ile
        35                  40                  45

gga tat atc tat tac agt ggg aac agg aac tac aat ccc tcc ctc aac       192
Gly Tyr Ile Tyr Tyr Ser Gly Asn Arg Asn Tyr Asn Pro Ser Leu Asn
    50                  55                  60

agt cga gtc acc ata tct gta gac acg tcc aag aac gag gtc tcc ctg       240
Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Glu Val Ser Leu
65                  70                  75                  80

aag ctg acg tct gtg aca gct gcg gac acg gcc gcg tat tac tgt gcg       288
Lys Leu Thr Ser Val Thr Ala Ala Asp Thr Ala Ala Tyr Tyr Cys Ala
                85                  90                  95

aga ggt cgg ggg gaa atg gac gtc tgg ggc caa ggg acc acg gtc acc       336
Arg Gly Arg Gly Glu Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr
            100                 105                 110

gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg gca ccc       384
Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro
        115                 120                 125

tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc       432
Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val
    130                 135                 140

aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc       480
Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala
145                 150                 155                 160

ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag tcc tca gga       528
Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly
                165                 170                 175

ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc agc ttg ggc       576
Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly
            180                 185                 190

acc cag acc tac atc tgc aac gtg aat cac aag ccc agc aac acc aag       624
Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys
        195                 200                 205

gtg gac aag aga gtt                                                   639
Val Asp Lys Arg Val
    210
```

<210> 2193
<211> 660

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2193
```
cag gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag ccc aca cag        48
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Thr Gln
1               5                   10                  15

acc ctg tcc ctc acc tgc act gtc tct ggt ggc tcc atc agc agt ggt        96
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Gly
            20                  25                  30

agt tac tac tgg aac tgg atc cgg cag ccc gcc ggg aag gga ctg gag       144
Ser Tyr Tyr Trp Asn Trp Ile Arg Gln Pro Ala Gly Lys Gly Leu Glu
        35                  40                  45

tgg att ggg aac atc tat acc agt ggg aat acc gac tac aac ccc tcc       192
Trp Ile Gly Asn Ile Tyr Thr Ser Gly Asn Thr Asp Tyr Asn Pro Ser
    50                  55                  60

ctc aag agt cga gtc acc ata tct cta gac acg tcc aag aac cag gtc       240
Leu Lys Ser Arg Val Thr Ile Ser Leu Asp Thr Ser Lys Asn Gln Val
65                  70                  75                  80

tcc ctg aat ttg act tct gtg acc gcc gca gac acg gcc gtg tat tac       288
Ser Leu Asn Leu Thr Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95

tgt gcg act acc cct agc agc agc tgg tac tgg tac ttc gac ccc tgg       336
Cys Ala Thr Thr Pro Ser Ser Ser Trp Tyr Trp Tyr Phe Asp Pro Trp
            100                 105                 110

ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca       384
Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca       432
Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
    130                 135                 140

gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg       480
Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg       528
Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc       576
Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
```

```
            180                 185                 190

gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat       624
Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
        195                 200                 205

cac aag ccc agc aac acc aag gtg gac aag agt gag                       660
His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215                 220
```

<210> 2194
<211> 663
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2194

```
gag gtg cag ttg gtg gag tct ggg gga ggc ctg gtc aag ccg ggg ggg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca ggc tct gga ttt agt ttc agt agt tat        96
Ser Leu Arg Leu Ser Cys Ala Gly Ser Gly Phe Ser Phe Ser Ser Tyr
            20                  25                  30

agc atg aac tgg gtc cgg cag gct cca ggg aag ggg ctg gag tgg gtc       144
Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca tcc att agt agt aaa agt agt tcc aaa aac tac ata gac tct gtg       192
Ser Ser Ile Ser Ser Lys Ser Ser Ser Lys Asn Tyr Ile Asp Ser Val
    50                  55                  60

aag aac cga ttc atc atc tcc aga gac aac gcc aag aac tcg ctg tat       240
Lys Asn Arg Phe Ile Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg cag atg aac agc ctg aga gcc gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gat ctt gaa ctt att att gca gca ggt gct ccc ctt gac cac       336
Ala Arg Asp Leu Glu Leu Ile Ile Ala Ala Gly Ala Pro Leu Asp His
            100                 105                 110

tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc       384
Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125

cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc       432
Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
```

```
    130                 135                 140

aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg       480
Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc       528
Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165                 170                 175

ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg       576
Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg       624
Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

aat cac aag ccc agc aac acc aag gtg gac aag aga gag                   663
Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Glu
    210                 215                 220

<210> 2195
<211> 666
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2195
ccc ctg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg gag        48
Pro Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15

acc ctg tcc ctc acc tgc act gtc tct ggt ggc tcc atc agc aga agt        96
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Arg Ser
            20                  25                  30

cct tac ttc tgg ggc tgg atc cgc cag ccc cca ggg agg ggc ctg gag       144
Pro Tyr Phe Trp Gly Trp Ile Arg Gln Pro Pro Gly Arg Gly Leu Glu
        35                  40                  45

tgg atc gcg agt atc tat tat aga ggg acc acc tct tac aac ccg tcc       192
Trp Ile Ala Ser Ile Tyr Tyr Arg Gly Thr Thr Ser Tyr Asn Pro Ser
    50                  55                  60

ctc aag agt cga gtg acc atc tca gta gac acg tct aag aac cag ttc       240
Leu Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

tcc ctg aaa ctg agg tct gtg acc gcc gcg gac acg gcc gtg ttt tat       288
Ser Leu Lys Leu Arg Ser Val Thr Ala Ala Asp Thr Ala Val Phe Tyr
```

```
                85                  90                  95

tgt gcg aga ctg gta aca tca cct gaa gaa ggg ggt ccc tgg ttc gac       336
Cys Ala Arg Leu Val Thr Ser Pro Glu Glu Gly Gly Pro Trp Phe Asp
            100                 105                 110

ccc tgg ggc cgg gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag       384
Pro Trp Gly Arg Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys
        115                 120                 125

ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg       432
Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
    130                 135                 140

ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg       480
Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145                 150                 155                 160

gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc       528
Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
                165                 170                 175

ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg       576
Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
            180                 185                 190

gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac       624
Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
        195                 200                 205

gtg aat cac aag ccc agc aac acc aag gtg gac aag aaa gtg              666
Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220

<210> 2196
<211> 358
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2196
cag gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcg tct gga ttc acc ttc act agt tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Thr Ser Tyr
            20                  25                  30

ggc atg cac tgg gtc cgc cag gct cct ggc aag ggg ctg gag tgg gtg       144
Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
```

```
        35                  40                  45

gca ctt atc tgg tat gat gga agt aat aaa tac tat gca gac tcc gtg       192
Ala Leu Ile Trp Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aat tcc aag aac acg ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

cta caa atg aac agc ctg aga gcc gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gat acg gaa gtg ggg cat cac ttt gac tac tgg ggc cag gga       336
Ala Arg Asp Thr Glu Val Gly His His Phe Asp Tyr Trp Gly Gln Gly
            100                 105                 110

acc ctg atc acc gtc tcc tca g                                        358
Thr Leu Ile Thr Val Ser Ser
        115

<210> 2197
<211> 659
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2197
cc cag gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg         47
   Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser
   1               5                   10                  15

gag acc ctg tcc ctc acc tgc act gtc tct agt ggc tcc agt ggt agt        95
Glu Thr Leu Ser Leu Thr Cys Thr Val Ser Ser Gly Ser Ser Gly Ser
                20                  25                  30

tat tac ttg agc tgg atc cgg cag ccc gcc ggg aag gga ctg gag tgg       143
Tyr Tyr Leu Ser Trp Ile Arg Gln Pro Ala Gly Lys Gly Leu Glu Trp
            35                  40                  45

atc ggg cgt atg tac acc agt ggg agc acc cac tac aac ccc tcc ctc       191
Ile Gly Arg Met Tyr Thr Ser Gly Ser Thr His Tyr Asn Pro Ser Leu
        50                  55                  60

aag agt cga gtc acc atg tca gta gac acg tcc aag aac cag ttc tcc       239
Lys Ser Arg Val Thr Met Ser Val Asp Thr Ser Lys Asn Gln Phe Ser
    65                  70                  75

ctg aag ttg agt tct gtg acg gcc gcg gac acg gcc gtc tat tac tgt       287
Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys
```

```
80                  85                  90                  95

gcg aag ccc tgg aga agt gat ggt ttt gat gtc tgg ggc caa ggg acg       335
Ala Lys Pro Trp Arg Ser Asp Gly Phe Asp Val Trp Gly Gln Gly Thr
                100                 105                 110

gtg gtc acc gtc tct tca gca tcc ccg acc agc ccc aag gtc ttc ccg       383
Val Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro Lys Val Phe Pro
            115                 120                 125

ctg agc ctc tgc agc acc cag cca gat ggg aac gtg gtc atc gcc tgc       431
Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val Ile Ala Cys
        130                 135                 140

ctg gtc cag ggc ttc ttc ccc cag gag cca ctc agt gtg acc tgg agc       479
Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val Thr Trp Ser
    145                 150                 155

gaa agc gga cag ggc gtg acc gcc aga aac ttc cca ccc agc cag gat       527
Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro Ser Gln Asp
160                 165                 170                 175

gcc tcc ggg gac ctg tac acc acg agc agc cag ctg acc ctg ccg gcc       575
Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr Leu Pro Ala
                180                 185                 190

aca cag tgc cta gcc ggc aag tcc gtg aca tgc cac gtg aag cac tac       623
Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val Lys His Tyr
            195                 200                 205

acg aat ccc agc cag gat gtg act gtg ccc tgc cct                      659
Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
        210                 215
```

<210> 2198
<211> 650
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2198

```
cc cag gtg cag ctg gtg cag tct ggg gct gag gtg aag aag cct ggg         47
   Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly
   1               5                   10                  15

gcc tca gtg aag gtc tcc tgc aag gct tct gga tac aac ttc agg gac        95
Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Asn Phe Arg Asp
                20                  25                  30

tac tat atg cac tgg gtg cgg cag gcc cct gga caa ggc ctt gag tgg       143
Tyr Tyr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp
```

```
            35                  40                  45

atg gga tgg atc aac cct aat agt ggt ggc aca atc tct gca cag aac       191
Met Gly Trp Ile Asn Pro Asn Ser Gly Gly Thr Ile Ser Ala Gln Asn
        50                  55                  60

ttt cag ggc cgg gtc acc atg acc agg gac acc tcc atc agc aca gcc       239
Phe Gln Gly Arg Val Thr Met Thr Arg Asp Thr Ser Ile Ser Thr Ala
    65                  70                  75

tac atg gag gta aac agc ctg aga tct gac gac acg gcc gta tat tat       287
Tyr Met Glu Val Asn Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr
80                  85                  90                  95

tgt gca gtg ggc atg gtt aca gat ggt ttt gaa atc tgg ggc caa ggg       335
Cys Ala Val Gly Met Val Thr Asp Gly Phe Glu Ile Trp Gly Gln Gly
                100                 105                 110

aca ttg gtc acc gtc tct tca gcc tcc acc aag ggc cca tcg gtc ttc       383
Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
            115                 120                 125

ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg       431
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
        130                 135                 140

ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg       479
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
    145                 150                 155

aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta       527
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
160                 165                 170                 175

cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc       575
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
                180                 185                 190

agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc       623
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
            195                 200                 205

agc aac acc aag gtg gac aag aga gtt                                   650
Ser Asn Thr Lys Val Asp Lys Arg Val
        210                 215
```

<210> 2199
<211> 668
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2199
cc cag gtg cag ctg cag gag tcg ggc tca gga ctg gtg agg cct tca 47
Gln Val Gln Leu Gln Glu Ser Gly Ser Gly Leu Val Arg Pro Ser
1 5 10 15

cag acc ctg tcc ctc acc tgc act gtc tct ggt ggc tcc atc aac agt 95
Gln Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Asn Ser
20 25 30

ggt gat tac cac tgg agt tgg atc cgc cag ccc ccc ggg aag gac ctg 143
Gly Asp Tyr His Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Asp Leu
35 40 45

gag tat att gga tat atc cat cac act ggg agc gcc tac tac aac ccg 191
Glu Tyr Ile Gly Tyr Ile His His Thr Gly Ser Ala Tyr Tyr Asn Pro
50 55 60

tcc ctc aag agt cga gtt acc ata tca gta gac acg tcc aag aac caa 239
Ser Leu Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln
65 70 75

cac tct ctg agg ctg act tct gtg act gcc gca gac acg gcc gtg tat 287
His Ser Leu Arg Leu Thr Ser Val Thr Ala Ala Asp Thr Ala Val Tyr
80 85 90 95

tat tgt gcc agg ctg gat ttg cgg acc gtg agg ttc gac ccc tgg ggc 335
Tyr Cys Ala Arg Leu Asp Leu Arg Thr Val Arg Phe Asp Pro Trp Gly
100 105 110

cag ggg acc ctg gtc acc gtc tcc tca gca tcc ccg acc agc ccc aag 383
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro Lys
115 120 125

gtc ttc ccg ctg agc ctc tgc agc acc cag cca gat ggg aac gtg gtc 431
Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val
130 135 140

atc gcc tgc ctg gtc cag ggc ttc ttc ccc cag gag cca ctc agt gtg 479
Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val
145 150 155

acc tgg agc gaa agc gga cag ggc gtg acc gcc aga aac ttc cca ccc 527
Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro
160 165 170 175

agc cag gat gcc tcc ggg gac ctg tac acc acg agc agc cag ctg acc 575
Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr
180 185 190

ctg ccg gcc aca cag tgc cta gcc ggc aag tcc gtg aca tgc cac gtg 623
Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val
195 200 205

```
aag cac tac acg aat ccc agc cag gat gtg act gtg ccc tgc cca          668
Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
        210                 215                 220

<210> 2200
<211> 678
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2200
ccc ctg cag ctg cag gag tcg ggc cca gga ctg gcg aag cct tcg gag        48
Pro Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Ala Lys Pro Ser Glu
1               5                   10                  15

acc ctg tcc ctc acc tgc act gcc tct ggt ggc tcc atc agc agt agt        96
Thr Leu Ser Leu Thr Cys Thr Ala Ser Gly Gly Ser Ile Ser Ser Ser
            20                  25                  30

ggt tac tac tgg ggc tgg atc cgc cag ccc cca ggg aag ggg ctg gag       144
Gly Tyr Tyr Trp Gly Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu
        35                  40                  45

tgg att ggg agt atc tat tat agt ggg gac acc tac tac aac ccg tcc       192
Trp Ile Gly Ser Ile Tyr Tyr Ser Gly Asp Thr Tyr Tyr Asn Pro Ser
    50                  55                  60

ctg aag agt cga gtc aac ata gcc gta gac acg tcc cag aac cag ttc       240
Leu Lys Ser Arg Val Asn Ile Ala Val Asp Thr Ser Gln Asn Gln Phe
65                  70                  75                  80

tcc ctg aag ttg aac tct gtg acc gcc gct gat acg gct gta tat tac       288
Ser Leu Lys Leu Asn Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95

tgt gcg aga cat agc agt ggc ccc ccc cgg ctc gct ttt gat atc tgg       336
Cys Ala Arg His Ser Ser Gly Pro Pro Arg Leu Ala Phe Asp Ile Trp
            100                 105                 110

ggc caa ggg aca atg gtc acc gtc tct tca ggg agt gca tcc gcc cca       384
Gly Gln Gly Thr Met Val Thr Val Ser Ser Gly Ser Ala Ser Ala Pro
        115                 120                 125

acc ctt ttc ccc ctc gtc tcc tgt gag aat tcc ccg tcg gat acg agc       432
Thr Leu Phe Pro Leu Val Ser Cys Glu Asn Ser Pro Ser Asp Thr Ser
    130                 135                 140

agc gtg gcc gtt ggc tgc ctc gca cag gac ttc ctt ccc gac tcc atc       480
Ser Val Ala Val Gly Cys Leu Ala Gln Asp Phe Leu Pro Asp Ser Ile
145                 150                 155                 160
```

```
act ttc tcc tgg aaa tac aag aac aac tct gac atc agc agc acc cgg       528
Thr Phe Ser Trp Lys Tyr Lys Asn Asn Ser Asp Ile Ser Ser Thr Arg
                165                 170                 175

ggc ttc cca tca gtc ctg aga ggg ggc aag tac gca gcc acc tca cag       576
Gly Phe Pro Ser Val Leu Arg Gly Gly Lys Tyr Ala Ala Thr Ser Gln
            180                 185                 190

gtg ctg ctg cct tcc aag gac gtc atg cag ggc aca gac gaa cac gtg       624
Val Leu Leu Pro Ser Lys Asp Val Met Gln Gly Thr Asp Glu His Val
        195                 200                 205

gtg tgc aaa gtc cag cac ccc aac ggc aac aaa gaa aag aac gtg cct       672
Val Cys Lys Val Gln His Pro Asn Gly Asn Lys Glu Lys Asn Val Pro
    210                 215                 220

ctt ccg                                                              678
Leu Pro
225
```

<210> 2201
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2201

```
cag gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt agc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

ggc atg cac tgg gtc cgc cag gtt cca ggc aag ggg ctg gag ggg gtg       144
Gly Met His Trp Val Arg Gln Val Pro Gly Lys Gly Leu Glu Gly Val
        35                  40                  45

gca gtt ata tca cat gat gga agt aat aaa tat tat gca gac tcc gtg       192
Ala Val Ile Ser His Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aat tcc aag aat acg ctg tac       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gtt gag gac acg gct gtg tat tat tgt       288
Leu Gln Met Asn Ser Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
```

```
gcg aaa gat ttc gct atg cct aca gta act acg gac tac tgg ggc cag       336
Ala Lys Asp Phe Ala Met Pro Thr Val Thr Thr Asp Tyr Trp Gly Gln
            100                 105                 110

gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc       384
Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       432
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       624
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

ccc agc aac acc aag gtg gac aag aat gag                               654
Pro Ser Asn Thr Lys Val Asp Lys Asn Glu
    210                 215
```

<210> 2202
<211> 364
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2202

```
cag atc acc ttg aag gag tct ggt cct acg ctg gtg aaa ccc aca cag        48
Gln Ile Thr Leu Lys Glu Ser Gly Pro Thr Leu Val Lys Pro Thr Gln
1               5                   10                  15

acc ctc acg ctg acc tgc acc ttc tct ggg ttc tca ctc acc act agt        96
Thr Leu Thr Leu Thr Cys Thr Phe Ser Gly Phe Ser Leu Thr Thr Ser
            20                  25                  30

gga gtg ggt gtg ggc tgg atc cgt cag ccc cca gga aag gcc ctg gag       144
Gly Val Gly Val Gly Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu
        35                  40                  45
```

```
tgg ctt gca ctc att tat tgg gat gat gat aag cgc tac agt cca tct       192
Trp Leu Ala Leu Ile Tyr Trp Asp Asp Asp Lys Arg Tyr Ser Pro Ser
    50                  55                  60

ctg agg agt aga ctc acc atc acc aag gac acc tcc aaa aac cag gtg       240
Leu Arg Ser Arg Leu Thr Ile Thr Lys Asp Thr Ser Lys Asn Gln Val
65                  70                  75                  80

gtc ctt aca atg acc aac atg gac cct gtg gac aca gcc aca tat tat       288
Val Leu Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr
                85                  90                  95

tgt gta cac aga cca tcc ctg gcc tat tgg tac ttc gat gtc tgg ggc       336
Cys Val His Arg Pro Ser Leu Ala Tyr Trp Tyr Phe Asp Val Trp Gly
            100                 105                 110

cgt ggc acc ctg ctc act gtc tcc tca g                                 364
Arg Gly Thr Leu Leu Thr Val Ser Ser
        115                 120

<210> 2203
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2203
gtg gta cag ttg gtg gag tct ggg gga ggc ttg gtc cag cct gga ggg        48
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt aca tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Thr Tyr
            20                  25                  30

gaa cta aac tgg gtc cgg cag gct cca ggg aag ggg ctg gag tgg att       144
Glu Leu Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Ile
        35                  40                  45

tca tac att aat act act agt gat ccc ata tac tac gca gac tct gtg       192
Ser Tyr Ile Asn Thr Thr Ser Asp Pro Ile Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aat tca gtg ttt       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Val Phe
65                  70                  75                  80

ctg caa atg aac agc ctg aga gcc gag gac acg gct gtt tac tac tgc       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
```

```
gtg aga gag ggt gat tca cgg aaa tat tat agt ctt gac tat tgg ggc       336
Val Arg Glu Gly Asp Ser Arg Lys Tyr Tyr Ser Leu Asp Tyr Trp Gly
            100                 105                 110

cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg       384
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg       432
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       480
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       528
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       576
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac       624
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

aag ccc agc aac acc aag gtg gac aag aga gtt                           657
Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215
```

<210> 2204
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2204

```
ccg gtg cag ctg gtg cag tct ggg gct gag gtg aag aag cct ggg tcc        48
Pro Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1               5                   10                  15

tcg gtg aag gtc tcc tgc aag gct tct gga ggc acc ttc agc agc tat        96
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Thr Phe Ser Ser Tyr
            20                  25                  30

gct atc agc tgg gtg cga cag gcc cct gga caa ggg ctt gag tgg atg       144
Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45
```

```
gga ggg atc atc cct atc ttt ggt aca gca aac tac gca cag aag ttc       192
Gly Gly Ile Ile Pro Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
    50                  55                  60

cag ggc aga gtc acg att acc gcg gac gaa tcc acg agc aca gcc tac       240
Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80

atg gag ctg agc agc ctg aga tct gag gac acg gcc gtg tat tac tgt       288
Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gat cca atg tgg gtc tct tat gct ttt gat atc tgg ggc caa       336
Ala Arg Asp Pro Met Trp Val Ser Tyr Ala Phe Asp Ile Trp Gly Gln
            100                 105                 110

ggg aca atg gtc acc gtc tct tca gcc tcc acc aag ggc cca tcg gtc       384
Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       432
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       624
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

ccc agc aac acc aag gtg gac aag aat gag                               654
Pro Ser Asn Thr Lys Val Asp Lys Asn Glu
    210                 215
```

<210> 2205
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2205

```
ccc gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg gag        48
Pro Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                  10                  15

acc ctg tcc ctc acc tgc act gtc tct ggt ggc tcc atc agc agt gat        96
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Asp
            20                  25                  30

aat tac tac tgg agc tgg ctc cgc cag cac cca ggg aag ggc ctg gag       144
Asn Tyr Tyr Trp Ser Trp Leu Arg Gln His Pro Gly Lys Gly Leu Glu
        35                  40                  45

tgg att ggg tac atc tat ttc agt gtg acc acc tac tac aac ccg tcc       192
Trp Ile Gly Tyr Ile Tyr Phe Ser Val Thr Thr Tyr Tyr Asn Pro Ser
    50                  55                  60

ctc aag agt cga gtt acc ata tca cta gac acg tct aag aac cag ttc       240
Leu Lys Ser Arg Val Thr Ile Ser Leu Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

tcc ctg aag ctg agc tct gtg act gcc gcg gac acg gcc gtg tat tac       288
Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95

tgt gcg agt ggt tat gtt tct ttc gat ctc tgg ggc cag gga acc ctg       336
Cys Ala Ser Gly Tyr Val Ser Phe Asp Leu Trp Gly Gln Gly Thr Leu
            100                 105                 110

gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg       384
Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu
        115                 120                 125

gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc tgc       432
Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys
    130                 135                 140

ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca       480
Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
145                 150                 155                 160

ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag tcc       528
Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser
                165                 170                 175

tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc agc       576
Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser
            180                 185                 190

ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc agc aac       624
Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn
        195                 200                 205

acc aag gtg gac aag aga gtt                                           645
Thr Lys Val Asp Lys Arg Val
```

210 215

<210> 2206
<211> 662
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2206
cc cag gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg 47
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser
1 5 10 15

gag acc ctg tcc ctc acc tgc aat gtc tct ggt gcc tcc atc agt agt 95
Glu Thr Leu Ser Leu Thr Cys Asn Val Ser Gly Ala Ser Ile Ser Ser
20 25 30

tac tac tgg agt tgg atc cgg cag ccc cca ggg aag gga ctg gag tgg 143
Tyr Tyr Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp
35 40 45

att ggt tat ctc tct tac agt ggg aac acc aac tcc aaa ccc tcc ctc 191
Ile Gly Tyr Leu Ser Tyr Ser Gly Asn Thr Asn Ser Lys Pro Ser Leu
50 55 60

aag agt cga gtc acc ata tca gta gac acg tcc aag aac cag ttc tcc 239
Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe Ser
65 70 75

ctg aaa ctg agc tct gtg acc gct gcg gac acg gcc gtg tat tac tgt 287
Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys
80 85 90 95

gcg aga gag ggg gcc tat gag agt agt gga cct gat cct ttt gat atc 335
Ala Arg Glu Gly Ala Tyr Glu Ser Ser Gly Pro Asp Pro Phe Asp Ile
100 105 110

tgg ggc caa ggg aca atg gtc acc gtc tct tca gcc tcc acc aag ggc 383
Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly
115 120 125

cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc 431
Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
130 135 140

aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg 479
Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145 150 155

acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc 527
Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe

```
160                 165                 170                 175

ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg       575
Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
                180                 185                 190

acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg       623
Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
            195                 200                 205

aat cac aag ccc agc aac acc aag gtg gac aag aga gtt                   662
Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
        210                 215                 220
```

<210> 2207
<211> 662
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2207

```
cc cag gtc cag gtt gtg cag tct ggg gct gag gtg aag aag cct ggg         47
   Gln Val Gln Val Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly
   1               5                   10                  15

gcc tca gtg aag att tcc tgc aag gct tct gga aac acc ttc act acc        95
Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Asn Thr Phe Thr Thr
                20                  25                  30

tat act ata cag tgg gtg cgc cag gtc ccc gga caa agg ctt gag tgg       143
Tyr Thr Ile Gln Trp Val Arg Gln Val Pro Gly Gln Arg Leu Glu Trp
            35                  40                  45

atg gga tgg atc aac gct ggc aat ggt gac ata aaa tat tca cag aag       191
Met Gly Trp Ile Asn Ala Gly Asn Gly Asp Ile Lys Tyr Ser Gln Lys
        50                  55                  60

ttc caa gac aga gtc acc att acc agg gac aca tcc gcg aac aca gcc       239
Phe Gln Asp Arg Val Thr Ile Thr Arg Asp Thr Ser Ala Asn Thr Ala
    65                  70                  75

tac atg gag ctg agc agc ctg aga tat gaa gac acg gct gta tat ttc       287
Tyr Met Glu Leu Ser Ser Leu Arg Tyr Glu Asp Thr Ala Val Tyr Phe
80                  85                  90                  95

tgt gcg agc ctc ttt cta aca tac tat ggt tcg ggg act tat tat cgc       335
Cys Ala Ser Leu Phe Leu Thr Tyr Tyr Gly Ser Gly Thr Tyr Tyr Arg
                100                 105                 110

tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc       383
Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
```

```
            115                 120                 125

cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc       431
Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
        130                 135                 140

aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg       479
Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
    145                 150                 155

acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc       527
Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
160                 165                 170                 175

ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg       575
Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
                180                 185                 190

acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg       623
Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
            195                 200                 205

aat cac aag ccc agc aac acc aag gtg gac aag agt gag                   662
Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
        210                 215                 220

<210> 2208
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2208
gag gtg cag ctg ttg gag tct ggg gga ggc ttg gta cag cct ggg ggg        48
Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt agc agc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

gcc atg agc tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtc       144
Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca act att agt ggt agt ggt cat agc aca tac tac gca gac tcc gtg       192
Ser Thr Ile Ser Gly Ser Gly His Ser Thr Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cgg ttc acc atc tcc aga gac aat tcc aag aac acg ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
```

```
65                  70                  75                  80

ctg caa atg aac agc ctg aga gcc gag gac acg gcc gta tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aaa tcg acc ctc ggt ggt ggt ttt gac ttc tgg ggc cag gga acc       336
Ala Lys Ser Thr Leu Gly Gly Gly Phe Asp Phe Trp Gly Gln Gly Thr
            100                 105                 110

ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc       384
Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
        115                 120                 125

ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gca gcc ctg ggc       432
Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
    130                 135                 140

tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac       480
Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160

tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag       528
Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175

tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc       576
Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc agc       624
Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
        195                 200                 205

aac acc aag gtg gac aag aaa gtt                                      648
Asn Thr Lys Val Asp Lys Lys Val
    210                 215
```

<210> 2209
<211> 669
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

```
<400> 2209
gtg gtg cag ctg gtg gag tct ggg gga ggt gtg gta cgg cct ggg ggg        48
Val Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Arg Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt gat gat tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asp Asp Tyr
```

```
            20                  25                  30

ggc atg agc tgg gtc cgc caa gct cca ggg aag ggg ctg gag tgg gtc       144
Gly Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tct ggt att aat tgg aat ggt ggt agc aca ggt tat gca gac tct gtg       192
Ser Gly Ile Asn Trp Asn Gly Gly Ser Thr Gly Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tcc ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg aac agt ctg aga gcc gag gac acg gcc ttg tat cac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Leu Tyr His Cys
                85                  90                  95

gcg aga gtt ggt agc agc agc tgg tac agc tcc ggg cga tcc cct ttt       336
Ala Arg Val Gly Ser Ser Ser Trp Tyr Ser Ser Gly Arg Ser Pro Phe
            100                 105                 110

gac tac tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc       384
Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr
        115                 120                 125

aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct       432
Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
    130                 135                 140

ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa       480
Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145                 150                 155                 160

ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac       528
Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
                165                 170                 175

acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc       576
Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
            180                 185                 190

gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc       624
Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
        195                 200                 205

aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aga gtt           669
Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220
```

<210> 2210
<211> 663
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2210
```
cag gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt agc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

ggc atg cac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg       144
Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gca gtt ata tca tat gat gga agt aat aaa tac tat gca gac tcc gtg       192
Ala Val Ile Ser Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aat tcc aag aac acg ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gct gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aaa gat caa atc gtc cta gag atg gct aca agc ccc ttt gac tac       336
Ala Lys Asp Gln Ile Val Leu Glu Met Ala Thr Ser Pro Phe Asp Tyr
            100                 105                 110

tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc       384
Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125

cca tcg gtc ttc ccc ctg gcg ccc tgc tcc agg agc acc tcc gag agc       432
Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser
    130                 135                 140

aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg       480
Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

acg gtg tcg tgg aac tca ggc gct ctg acc agc ggc gtg cac acc ttc       528
Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165                 170                 175

cca gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg       576
Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190
```

```
acc gtg ccc tcc agc aac ttc ggc acc cag acc tac acc tgc aac gta       624
Thr Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val
        195                 200                 205

gat cac aag ccc agc aac acc aag gtg gac aag aca gtg                   663
Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val
    210                 215                 220
```

<210> 2211
<211> 671
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2211

```
cc cag gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tca         47
   Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser
   1               5                   10                  15

cag acc ctg tcc ctc acc tgc act gtc tct ggt ggc tcc atc agc agt        95
Gln Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser
                20                  25                  30

ggt ggt tac tac tgg agc tgg atc cgc cag cac cca ggg aag ggc ctg       143
Gly Gly Tyr Tyr Trp Ser Trp Ile Arg Gln His Pro Gly Lys Gly Leu
            35                  40                  45

gag tgg att ggg tac atc tat tac agt ggg agc acc tac tac aac ccg       191
Glu Trp Ile Gly Tyr Ile Tyr Tyr Ser Gly Ser Thr Tyr Tyr Asn Pro
        50                  55                  60

tcc ctc aag agt cga gtt acc ata tca gta gac acg tct aag aac cag       239
Ser Leu Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln
    65                  70                  75

ttc tcc ctg aag ctg agc tct gtg act gcc gcg gac acg gcc gtg tat       287
Phe Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr
80                  85                  90                  95

tac tgt gcg aga gat ctc agt tgt agt agt acc agc tgc cat gat gct       335
Tyr Cys Ala Arg Asp Leu Ser Cys Ser Ser Thr Ser Cys His Asp Ala
                100                 105                 110

ttt gat atc tgg ggc caa ggg aca atg gtc acc gtc tct tca gcc tcc       383
Phe Asp Ile Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser Ala Ser
            115                 120                 125

acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc       431
Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
        130                 135                 140
```

```
tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc       479
Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
    145                 150                 155

gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg       527
Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
160                 165                 170                 175

cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc       575
His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
                180                 185                 190

agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc       623
Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile
            195                 200                 205

tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag agt gag       671
Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
        210                 215                 220
```

<210> 2212
<211> 370
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2212

```
cag gtg cag ctg gtg cag tct ggg gct gag gtg aag aag cct ggg gcc        48
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

tca gtg aag gtc tcc tgc aag gct tct gga tac acc ttc acc ggc tac        96
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Gly Tyr
            20                  25                  30

tat tta cac tgg gtg cga cag gcc cct gga caa ggg ctt gag tgg atg       144
Tyr Leu His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

gga cgg atc aac cct aac agt ggt ggc aca aac tat gca cag aac ttt       192
Gly Arg Ile Asn Pro Asn Ser Gly Gly Thr Asn Tyr Ala Gln Asn Phe
    50                  55                  60

cag ggc agg gtc acc atg acc agg gac acg tcc atc agc aca gcc tac       240
Gln Gly Arg Val Thr Met Thr Arg Asp Thr Ser Ile Ser Thr Ala Tyr
65                  70                  75                  80

atg gag ctg agc agt cta aaa tct gac gac acg gcc gtg ttt ttt tgt       288
Met Glu Leu Ser Ser Leu Lys Ser Asp Asp Thr Ala Val Phe Phe Cys
                85                  90                  95
```

```
gcg aga gga ccc aat ttc cat gag agt ata cgt gat ggc ttt gat atc       336
Ala Arg Gly Pro Asn Phe His Glu Ser Ile Arg Asp Gly Phe Asp Ile
            100                 105                 110

tgg ggc caa ggg aca atg gtc acc gtc tct tca g                         370
Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser
        115                 120
```

<210> 2213
<211> 355
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2213

```
gag gtg cag ctg gtg gag tct ggg gga ggc ttg gta cag cct ggg ggg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt agc tac        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

gac ttt cac tgg gtc cgc caa cct aca ggg aaa ggt ctg gag tgg gtc       144
Asp Phe His Trp Val Arg Gln Pro Thr Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca gct att ggt act gct ggt gac aca ctc tat cta gac tcc gtg aag       192
Ser Ala Ile Gly Thr Ala Gly Asp Thr Leu Tyr Leu Asp Ser Val Lys
    50                  55                  60

ggc cga ttc acc atc tcc aga gaa aat gcc aag aac tcc ttg tat ctt       240
Gly Arg Phe Thr Ile Ser Arg Glu Asn Ala Lys Asn Ser Leu Tyr Leu
65                  70                  75                  80

caa atg aac agc ctg aga gcc ggg gac acg gct gtc tat tac tgt gca       288
Gln Met Asn Ser Leu Arg Ala Gly Asp Thr Ala Val Tyr Tyr Cys Ala
                85                  90                  95

aga gtt aac tgg aat tcc gat acc ttt gac tcc tgg ggc cag gga acc       336
Arg Val Asn Trp Asn Ser Asp Thr Phe Asp Ser Trp Gly Gln Gly Thr
            100                 105                 110

ctg gtc acc gtc tcc tca g                                             355
Leu Val Thr Val Ser Ser
        115
```

<210> 2214
<211> 687
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2214

```
cag gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agg agt tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Ser Tyr
            20                  25                  30

ggc atg cac tgg gcc cgc cag gct cca ggc agg ggg ctg gag tgg gtg       144
Gly Met His Trp Ala Arg Gln Ala Pro Gly Arg Gly Leu Glu Trp Val
        35                  40                  45

gca gtt ata tca tat gat gga agt aat agt tac tat gca gac tcc gtg       192
Ala Val Ile Ser Tyr Asp Gly Ser Asn Ser Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aat tcc aag aac acg ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

cta gaa atg aac agc ctg aga gct gac gac acg gct gtc tat tac tgt       288
Leu Glu Met Asn Ser Leu Arg Ala Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gat ccg ggg aga gat ccg tat ttg gac ttg gac tat cac tac       336
Ala Arg Asp Pro Gly Arg Asp Pro Tyr Leu Asp Leu Asp Tyr His Tyr
            100                 105                 110

ggc atg gac gtc tgg ggc caa ggg acc acg gtc acc gtc tcc tca gca       384
Gly Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala
        115                 120                 125

tcc ccg acc agc ccc aag gtc ttc ccg ctg agc ctc tgc agc acc cag       432
Ser Pro Thr Ser Pro Lys Val Phe Pro Leu Ser Leu Cys Ser Thr Gln
    130                 135                 140

cca gat ggg aac gtg gtc atc gcc tgc ctg gtc cag ggc ttc ttc ccc       480
Pro Asp Gly Asn Val Val Ile Ala Cys Leu Val Gln Gly Phe Phe Pro
145                 150                 155                 160

cag gag cca ctc agt gtg acc tgg agc gaa agc gga cag ggc gtg acc       528
Gln Glu Pro Leu Ser Val Thr Trp Ser Glu Ser Gly Gln Gly Val Thr
                165                 170                 175

gcc aga aac ttc cca ccc agc cag gat gcc tcc ggg gac ctg tac acc       576
Ala Arg Asn Phe Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr
            180                 185                 190
```

```
acg agc agc cag ctg acc ctg ccg gcc aca cag tgc cta gcc ggc aag       624
Thr Ser Ser Gln Leu Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys
        195                 200                 205

tcc gtg aca tgc cac gtg aag cac tac acg aat ccc agc cag gat gtg       672
Ser Val Thr Cys His Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val
    210                 215                 220

act gtg ccc tgc ccg                                                  687
Thr Val Pro Cys Pro
225
```

<210> 2215
<211> 663
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2215

```
cag gtg cag ttg gtg gaa tct ggg gga ggc ttg gtc gag cct gga ggg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Glu Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt gac tac        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asp Tyr
            20                  25                  30

tac atg agc tgg atc cgc cag gct cca ggg aag cgg ctg gag tgg att       144
Tyr Met Ser Trp Ile Arg Gln Ala Pro Gly Lys Arg Leu Glu Trp Ile
        35                  40                  45

tca cac atg agt agt ggc ggt aat cgc aga cac tac gca gac tct gtg       192
Ser His Met Ser Ser Gly Gly Asn Arg Arg His Tyr Ala Asp Ser Val
    50                  55                  60

agg ggc cga ttc acc att tcc aga gac aac gcc aag aac tca ctg tat       240
Arg Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc atg aga gcc gac gac acg gct gtg tat tat tgt       288
Leu Gln Met Asn Ser Met Arg Ala Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gat aag agg agc ggt atg act tcc gac aga cga att gac tac       336
Ala Arg Asp Lys Arg Ser Gly Met Thr Ser Asp Arg Arg Ile Asp Tyr
            100                 105                 110

tgg ggc cag ggc acc cgg gtc acc gtc tcc tca gcc tcc acc aag ggc       384
Trp Gly Gln Gly Thr Arg Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125
```

```
cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc       432
Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
    130                 135                 140

aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg       480
Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc       528
Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165                 170                 175

ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg       576
Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg       624
Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

aat cac aag ccc agc aac acc aag gtg gac aag aga gtt                   663
Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220

<210> 2216
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2216
gtg gtg caa ctg ggg gag tct ggg gga ggc ctg gtc aag ccg ggg ggg        48
Val Val Gln Leu Gly Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt agt tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

cac atg aac tgg gtc cgc cag tct cca gag aag ggg ctg gag tgg gtc       144
His Met Asn Trp Val Arg Gln Ser Pro Glu Lys Gly Leu Glu Trp Val
        35                  40                  45

tca tac att agt agt agt ggt act tac ata gac tat gca gac tca gtg       192
Ser Tyr Ile Ser Ser Ser Gly Thr Tyr Ile Asp Tyr Ala Asp Ser Val
    50                  55                  60

agg ggc cga ttc acc atc tcc aga gac aac gcc aag aac tca ctg tat       240
Arg Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80
```

```
ctg caa atg aac atc ctg aga ccc gac gac acg gct gtt tat tac tgt       288
Leu Gln Met Asn Ile Leu Arg Pro Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

tcg ggg ggc tat tac tcc tcc tcc cac atg gac gtc tgg ggc aaa ggg       336
Ser Gly Gly Tyr Tyr Ser Ser Ser His Met Asp Val Trp Gly Lys Gly
            100                 105                 110

acc acg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc       384
Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125

ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg       432
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140

ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg       480
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160

aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta       528
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc       576
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190

agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc       624
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205

agc aac acc aag gtg gac aag aga gtt                                   651
Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215
```

<210> 2217
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2217

```
cag gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt agc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30
```

```
gct atg cac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg       144
Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gca gtg ata tca tat gat gga agc aat aaa tac tac gca gac tcc ttg       192
Ala Val Ile Ser Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Leu
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aat tcc aag gac acg ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asp Thr Leu Tyr
65                  70                  75                  80

ctg caa gtg aac agc ctg aga cct gag gac acg gct gtg tat tac tgt       288
Leu Gln Val Asn Ser Leu Arg Pro Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gtg aat ata gca gca gct ggt act ctt gac tac tgg ggc cag       336
Ala Arg Val Asn Ile Ala Ala Ala Gly Thr Leu Asp Tyr Trp Gly Gln
            100                 105                 110

gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc       384
Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       432
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       624
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

ccc agc aac acc aag gtg gac aag aat gag                               654
Pro Ser Asn Thr Lys Val Asp Lys Asn Glu
    210                 215
```

<210> 2218
<211> 678
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2218

```
gaa gtg cag ctg gtg gaa tct ggg gga ggc ttg gta gag cct ggc agg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Glu Pro Gly Arg
1               5                  10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ctt gaa gag ttt        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Leu Glu Glu Phe
            20                  25                  30

gcc atg cac tgg gtc cgg caa gtt cca ggg aag ggc ctg gag tgg gtc       144
Ala Met His Trp Val Arg Gln Val Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca gct atc agt tgg aat agt ggt tcg ata gcc tat gcg gac tct gtg       192
Ser Ala Ile Ser Trp Asn Ser Gly Ser Ile Ala Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttt acc atc tcc aga gac aac gcc aag aac tcc ctc tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg gac agt ctg aga gct gag gac acg gcc ttg tat tac tgt       288
Leu Gln Met Asp Ser Leu Arg Ala Glu Asp Thr Ala Leu Tyr Tyr Cys
                85                  90                  95

gta aaa gat atg ggg cct gct gga act gct tcg gct tat cac tac cac       336
Val Lys Asp Met Gly Pro Ala Gly Thr Ala Ser Ala Tyr His Tyr His
            100                 105                 110

aat gga atg gac gtc tgg ggc caa ggg acc acg gtc acc gtc tcc tca       384
Asn Gly Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
        115                 120                 125

gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag       432
Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
    130                 135                 140

agc acc tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac       480
Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
145                 150                 155                 160

ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc       528
Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
                165                 170                 175

ggc gtg cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc       576
Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
            180                 185                 190

ctc agc agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc       624
Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
```

```
        195                 200                 205

tac atc tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag       672
Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
    210                 215                 220

aga gag                                                               678
Arg Glu
225

<210> 2219
<211> 650
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2219
cc cag gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg         47
   Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser
   1               5                  10                  15

gag acc ctg tcc ctc acc tgc act gtc tct ggt ggc tcc atc agt gat        95
Glu Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Asp
                20                  25                  30

tac tac tgg agc tgg atc cgg cag ccc cca ggg aag gaa cta gag tgg       143
Tyr Tyr Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Glu Leu Glu Trp
            35                  40                  45

att ggg tat atc tat tat agt ggg agc acc aac tac aac ccc tcc ctc       191
Ile Gly Tyr Ile Tyr Tyr Ser Gly Ser Thr Asn Tyr Asn Pro Ser Leu
        50                  55                  60

aag agt cga gtc acc atc tca gta gac acg tcc aag aac cag ttc tcc       239
Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe Ser
    65                  70                  75

ctg aaa ctg agc tct gtg acc gcc gca gac acg gcc gta tac tac tgt       287
Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys
80                  85                  90                  95

gcg aga cta act act agt acc agc gcg ctg agc tac tgg ggc cag gga       335
Ala Arg Leu Thr Thr Ser Thr Ser Ala Leu Ser Tyr Trp Gly Gln Gly
                100                 105                 110

acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc       383
Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
            115                 120                 125

ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg       431
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
```

```
        130                 135                 140

ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg       479
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
    145                 150                 155

aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta       527
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
160                 165                 170                 175

cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc       575
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
                180                 185                 190

agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc       623
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
            195                 200                 205

agc aac acc aag gtg gac aag agt gag                                  650
Ser Asn Thr Lys Val Asp Lys Ser Glu
        210                 215

<210> 2220
<211> 663
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2220
ccc gtg cag ctg gtg cag tct ggg gct gag gtg aag aag cct ggg tcc        48
Pro Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1               5                   10                  15

tcg gtg aag gtc tcc tgc aag gct tct gga ggc acc ttc agc agc tat        96
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Thr Phe Ser Ser Tyr
            20                  25                  30

gct atc agc tgg gtg cga cag gcc cct gga caa ggg ctt gag tgg atg       144
Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

gga ggg atc atc cct atc ttt ggt aca gca aac tac gca cag aag ttc       192
Gly Gly Ile Ile Pro Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
    50                  55                  60

cag ggc aga gtc acg att acc gcg gac gaa tcc acg agc aca gcc tac       240
Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80

atg gag ctg agc agc ctg aga tct gag gac acg gcc gtg tat tac tgt       288
Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
```

```
                85                  90                  95

gcg aga gag aac tgg aac tcc gct gga act acg gag tgg ttc gac ccc       336
Ala Arg Glu Asn Trp Asn Ser Ala Gly Thr Thr Glu Trp Phe Asp Pro
            100                 105                 110

tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc       384
Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125

cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc       432
Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
    130                 135                 140

aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg       480
Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc       528
Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165                 170                 175

ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg       576
Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg       624
Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

aat cac aag ccc agc aac acc aag gtg gac aag aga gtt                   663
Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220

<210> 2221
<211> 354
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2221
cc cag gtt cag ctg gtg cag tct gga gct gag gtg aag aag cct ggg         47
   Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly
   1               5                  10                  15

gcc tca gtg aag gtc tcc tgc aag gct tct ggt tac acc ttt agc agc        95
Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Ser Ser
                20                  25                  30

tac ggt atc agc tgg gtg cga cag gcc cct gga cag ggg ctt gag tgg       143
Tyr Gly Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp
```

```
            35                  40                  45

atg gga tgg atc aac ggt tac aat ggt aac aca aac tat gca cag aag       191
Met Gly Trp Ile Asn Gly Tyr Asn Gly Asn Thr Asn Tyr Ala Gln Lys
        50                  55                  60

ctc cag ggc aga gtc acc atg acc aca gac aca tcc acg agc aca gcc       239
Leu Gln Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Ser Thr Ala
    65                  70                  75

tac atg gac ctg agg agc ctg aga tct gac gac acg gcc gtg tat tac       287
Tyr Met Asp Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr
80                  85                  90                  95

tgt gcg aga gat act cta caa aag ggg gac tac tgg ggc cag gga acc       335
Cys Ala Arg Asp Thr Leu Gln Lys Gly Asp Tyr Trp Gly Gln Gly Thr
                100                 105                 110

ctg gtc acc gtc tcc tcc g                                            354
Leu Val Thr Val Ser Ser
            115

<210> 2222
<211> 672
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2222
gtg gtg cag ctg gtg gag tct ggg gga ggc ttg gta cag cct gga ggg        48
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc cgg agt tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Ser Tyr
            20                  25                  30

gaa atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtt       144
Glu Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca tac att act agt agt ggt gat acc ata tac cac gca gac tct gtg       192
Ser Tyr Ile Thr Ser Ser Gly Asp Thr Ile Tyr His Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac act aag aac tca cta tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Thr Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg acc ggc ctg aga acc gag gac acg gct gtt tat tac tgt       288
Leu Gln Met Thr Gly Leu Arg Thr Glu Asp Thr Ala Val Tyr Tyr Cys
```

```
                85                  90                  95

gcg aga gcc tcc cgc gtt cta gaa agt aag agc tgg cac ggg gat gct       336
Ala Arg Ala Ser Arg Val Leu Glu Ser Lys Ser Trp His Gly Asp Ala
            100                 105                 110

ttt gat gtc tgg ggc cga ggg aca agg gtc atc gtc tct tca gcc tcc       384
Phe Asp Val Trp Gly Arg Gly Thr Arg Val Ile Val Ser Ser Ala Ser
        115                 120                 125

acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc       432
Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
    130                 135                 140

tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc       480
Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145                 150                 155                 160

gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg       528
Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
                165                 170                 175

cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc       576
His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
            180                 185                 190

agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc       624
Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile
        195                 200                 205

tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aaa gtg       672
Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220
```

<210> 2223
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2223

```
cag gtg cag ctg gtg cag tct ggg gct gag gtg aag aag cct ggg tcc        48
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1               5                   10                  15

tcg gtg aag gtc tcc tgc aag gct tct gga ggc acc ttc agc agc tat        96
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Thr Phe Ser Ser Tyr
            20                  25                  30

gct atc agc tgg gtg cga cag gcc cct gga caa ggg ctt gag tgg atg       144
Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
```

```
        35                  40                  45

gga ggg atc atc cct atc ttt ggt aca aca aac tac gca cag aag ttc       192
Gly Gly Ile Ile Pro Ile Phe Gly Thr Thr Asn Tyr Ala Gln Lys Phe
    50                  55                  60

cag ggc aga gtc acg att acc gcg gac gaa tcc acg agc aca gcc tac       240
Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80

atg gag ctg agc agc ctg aga tct gag gac acg gcc gtg tat tac tgt       288
Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg agg ggt ctt ggc ggt agt ggt tat tat ttt gac tac tgg ggc cag       336
Ala Arg Gly Leu Gly Gly Ser Gly Tyr Tyr Phe Asp Tyr Trp Gly Gln
            100                 105                 110

gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc       384
Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       432
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       624
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

ccc agc aac acc aag gtg gac aag aat gag                               654
Pro Ser Asn Thr Lys Val Asp Lys Asn Glu
    210                 215
```

<210> 2224
<211> 373
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2224
gag gtg cag ctg gtg cag tct gga gca gag gtg aaa aag ccc ggg gag 48
Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1 5 10 15

tct ctg aag atc tcc tgt agg ggt tct gga gac agc ttc aac aag tac 96
Ser Leu Lys Ile Ser Cys Arg Gly Ser Gly Asp Ser Phe Asn Lys Tyr
20 25 30

ttt atc ggc tgg gtg cgc cag gtg ccc ggg aaa gcc ctg gag tgg atg 144
Phe Ile Gly Trp Val Arg Gln Val Pro Gly Lys Ala Leu Glu Trp Met
35 40 45

ggg atc atc tat cct ggt gac tct gat acc aga tac agt ccg tct ttc 192
Gly Ile Ile Tyr Pro Gly Asp Ser Asp Thr Arg Tyr Ser Pro Ser Phe
50 55 60

caa ggc cag gtc acc atc tca gcc gac aag tcc atc aac atc gcc tac 240
Gln Gly Gln Val Thr Ile Ser Ala Asp Lys Ser Ile Asn Ile Ala Tyr
65 70 75 80

ctg cag tgg acc agc ctg aag gcc tcg gac acc gcc atg tat tac tgt 288
Leu Gln Trp Thr Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr Tyr Cys
85 90 95

gcg aga cag gca ttt tgt ggt gct aat tgc tgg tcg ggc gct tat gat 336
Ala Arg Gln Ala Phe Cys Gly Ala Asn Cys Trp Ser Gly Ala Tyr Asp
100 105 110

atc tgg ggc caa ggg aca atg gtc acc gtc tct tca g 373
Ile Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser
115 120

<210> 2225
<211> 672
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2225
cag gta cag ctt gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg 48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 5 10 15

tcc ctg aga ctc tcc tgt gca gcg tct ggt ttc aca ttc agt acc tat 96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Thr Tyr
20 25 30

ggc atg aac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg 144
Gly Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val

```
        35                  40                  45

gca gtt aca tgg tat gag ggg act aac gaa gag tat gca gac tcc gtg       192
Ala Val Thr Trp Tyr Glu Gly Thr Asn Glu Glu Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac tcc aag aac acg gtg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Val Tyr
65                  70                  75                  80

ttg caa atg aat agt ttg aga gtc gac gat acg gct gtg tat tat tgt       288
Leu Gln Met Asn Ser Leu Arg Val Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gtg aga agg ggg gcg act gta ttt cag gga aag ata att aaa ggc tac       336
Val Arg Arg Gly Ala Thr Val Phe Gln Gly Lys Ile Ile Lys Gly Tyr
            100                 105                 110

atg gac gtc tgg ggc aaa ggg acc acg gtc acc gtc tcc tca gcc tcc       384
Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser Ala Ser
        115                 120                 125

acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc       432
Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
    130                 135                 140

tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc       480
Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145                 150                 155                 160

gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg       528
Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
                165                 170                 175

cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc       576
His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
            180                 185                 190

agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc       624
Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile
        195                 200                 205

tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aga gag       672
Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Glu
    210                 215                 220

<210> 2226
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain
```

<400> 2226

```
gtg gtg cag ttg ttg gag tct ggg gga ggc ttg gta cag cct ggg ggg        48
Val Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                  10                  15

tcc ctg aga ctc tcc tgt aca gcc tct gga ttc gcc ttt agc agc tat        96
Ser Leu Arg Leu Ser Cys Thr Ala Ser Gly Phe Ala Phe Ser Ser Tyr
            20                  25                  30

gcc atg acc tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtc       144
Ala Met Thr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca gtt atg agt ggt agt ggt gct ggc aca tac tac gca gac gcc gtg       192
Ser Val Met Ser Gly Ser Gly Ala Gly Thr Tyr Tyr Ala Asp Ala Val
    50                  55                  60

aag ggc cgg ttc acc atc tcc aga gac aat tcc aag aac acg ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

ctg caa atg gaa agc ctg aga gtc gaa gac acg gcc gta tat tac tgt       288
Leu Gln Met Glu Ser Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aaa gtg aag ggg ggg tcc aat gac tac tgg ggc cag gga acc ctg       336
Ala Lys Val Lys Gly Gly Ser Asn Asp Tyr Trp Gly Gln Gly Thr Leu
            100                 105                 110

gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg       384
Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu
        115                 120                 125

gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc tgc       432
Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys
    130                 135                 140

ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca       480
Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
145                 150                 155                 160

ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag tcc       528
Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser
                165                 170                 175

tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc agc       576
Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser
            180                 185                 190

ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc agc aac       624
Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn
        195                 200                 205
```

```
acc aag gtg gac aag aat gag                                             645
Thr Lys Val Asp Lys Asn Glu
    210                 215

<210> 2227
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2227
cag gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt aat cat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn His
            20                  25                  30

gct atg cac tgg gtc cgc cag gct cca ggc aaa ggg ctg gag tgg gtg       144
Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gca gtt ata tca tat gat gga ggc act aaa tac tac gca gac tcc gtg       192
Ala Val Ile Ser Tyr Asp Gly Gly Thr Lys Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aag tcc aag aac aca ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Lys Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga cct gag gac acg gct cta tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Pro Glu Asp Thr Ala Leu Tyr Tyr Cys
                85                  90                  95

gcg aga cac ctc tac ggt gac ttt tac tac tta gac tac tgg ggc cag       336
Ala Arg His Leu Tyr Gly Asp Phe Tyr Tyr Leu Asp Tyr Trp Gly Gln
            100                 105                 110

gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc       384
Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       432
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160
```

```
tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       624
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

ccc agc aac acc aag gtg gac aag aga ggt                               654
Pro Ser Asn Thr Lys Val Asp Lys Arg Gly
    210                 215
```

<210> 2228
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2228

```
cag gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cgg cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Arg Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcg tct gga ttc acc ttc agt agt cat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser His
            20                  25                  30

ggc atg cac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg       144
Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gca gtt ata tgg tat gat gga agt act aaa tac tat aca gac tcc gtg       192
Ala Val Ile Trp Tyr Asp Gly Ser Thr Lys Tyr Tyr Thr Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aat tcc aag aac acg ttg ttc       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Phe
65                  70                  75                  80

ctg caa ttg aac agc ctg aga gcc gag gac acg gct gtg tat tac tgt       288
Leu Gln Leu Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gac cat cgt acg ggg agt tat tat ccc gac tac tgg ggc cag       336
Ala Arg Asp His Arg Thr Gly Ser Tyr Tyr Pro Asp Tyr Trp Gly Gln
            100                 105                 110
```

```
gga acc ctg gtc acc gtc tcc tca acc tcc acc aag ggc cca tcg gtc       384
Gly Thr Leu Val Thr Val Ser Ser Thr Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       432
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       624
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

ccc agc aac acc aag gtg gac aag aga gtt                               654
Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215

<210> 2229
<211> 663
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2229
cag gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg gag        48
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15

acc ctg tcc ctc acc tgc act gtc tct ggt ggc tcc gtc gac aat gtt        96
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Val Asp Asn Val
            20                  25                  30

gat tcc tac tgg agc tgg atc cgg cag ccc cca ggg aag gga ctg gag       144
Asp Ser Tyr Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu
        35                  40                  45

tgg att gca tat atc tat ttc act ggg agc acc aac tac aac ccc tcc       192
Trp Ile Ala Tyr Ile Tyr Phe Thr Gly Ser Thr Asn Tyr Asn Pro Ser
    50                  55                  60
```

```
ctc aag agt cga gtc acc ata tca ata gac acg tcc aag aac cag ttc       240
Leu Lys Ser Arg Val Thr Ile Ser Ile Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

tcc ctg aag gtg aac gct gtg acc gct gcg gac acg gcc gtg tat tat       288
Ser Leu Lys Val Asn Ala Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95

tgt gcg aga ggg gtg agg cag cag cag gtt cgg aag tgg ttc gac ccc       336
Cys Ala Arg Gly Val Arg Gln Gln Gln Val Arg Lys Trp Phe Asp Pro
            100                 105                 110

tgg ggc cgg gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc       384
Trp Gly Arg Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125

cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc       432
Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
    130                 135                 140

aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg       480
Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc       528
Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165                 170                 175

ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg       576
Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg       624
Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

aat cac aag ccc agc aac acc aag gtg gac aag aat gag                   663
Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Asn Glu
    210                 215                 220
```

<210> 2230
<211> 669
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2230

```
ccg gtg cag ctg gtg cag tct gga gca gag gtg aaa aag ccg ggg gag        48
Pro Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1               5                   10                  15
```

```
tct ctg aag atc tcc tgt aag ggt tct gga tac agc ttt acc acc tac        96
Ser Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Thr Thr Tyr
            20                  25                  30

tgg atc ggc tgg gtg cgc cag atg ccc ggg aaa ggc ctg gag tgg atg       144
Trp Ile Gly Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp Met
        35                  40                  45

ggg atc atc tat cct ggt gac tct gat acc aga tac agc ccg tcc ttc       192
Gly Ile Ile Tyr Pro Gly Asp Ser Asp Thr Arg Tyr Ser Pro Ser Phe
    50                  55                  60

caa ggc cag gtc acc atc tca gcc gac aag tcc atc agc acc gcc tac       240
Gln Gly Gln Val Thr Ile Ser Ala Asp Lys Ser Ile Ser Thr Ala Tyr
65                  70                  75                  80

ctg cag tgg aac agc ctg aag gcc tcg gac acc gcc atg tat tac tgt       288
Leu Gln Trp Asn Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr Tyr Cys
                85                  90                  95

gcg atg gat aat tcg ggg agc ggg ggc gtt gac tac tgg ggc cag gga       336
Ala Met Asp Asn Ser Gly Ser Gly Gly Val Asp Tyr Trp Gly Gln Gly
            100                 105                 110

acc ctg gtc acc gtc tcc tca ggg agt gca tcc gcc cca acc ctt ttc       384
Thr Leu Val Thr Val Ser Ser Gly Ser Ala Ser Ala Pro Thr Leu Phe
        115                 120                 125

ccc ctc gtc tcc tgt gag aat tcc ccg tcg gat acg agc agc gtg gcc       432
Pro Leu Val Ser Cys Glu Asn Ser Pro Ser Asp Thr Ser Ser Val Ala
    130                 135                 140

gtt ggc tgc ctc gca cag gac ttc ctt ccc gac tcc atc act ttc tcc       480
Val Gly Cys Leu Ala Gln Asp Phe Leu Pro Asp Ser Ile Thr Phe Ser
145                 150                 155                 160

tgg aaa tac aag aac aac tct gac atc agc agc acc cgg ggc ttc cca       528
Trp Lys Tyr Lys Asn Asn Ser Asp Ile Ser Ser Thr Arg Gly Phe Pro
                165                 170                 175

tca gtc ctg aga ggg ggc aag tac gca gcc acc tca cag gtg ctg ctg       576
Ser Val Leu Arg Gly Gly Lys Tyr Ala Ala Thr Ser Gln Val Leu Leu
            180                 185                 190

cct tcc aag gac gtc atg cag ggc aca gac gaa cac gtg gtg tgc aaa       624
Pro Ser Lys Asp Val Met Gln Gly Thr Asp Glu His Val Val Cys Lys
        195                 200                 205

gtc cag cac ccc aac ggc aac aaa gaa aag aac gtg cct ctt cca           669
Val Gln His Pro Asn Gly Asn Lys Glu Lys Asn Val Pro Leu Pro
    210                 215                 220
```

<210> 2231
<211> 654

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2231
```
cag gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tca cag        48
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gln
1               5                   10                  15

acc ctg ccc ctc acc tgc act gtc tct ggt gac tcc atc agc agt ggg        96
Thr Leu Pro Leu Thr Cys Thr Val Ser Gly Asp Ser Ile Ser Ser Gly
            20                  25                  30

agt tac tat tgg agc tgg atc cgg cag ccc gcc ggg aag gga ctg gag       144
Ser Tyr Tyr Trp Ser Trp Ile Arg Gln Pro Ala Gly Lys Gly Leu Glu
        35                  40                  45

tgg att ggg cgt atc tat acc agt ggg agc acc aag tac aac ccc tcc       192
Trp Ile Gly Arg Ile Tyr Thr Ser Gly Ser Thr Lys Tyr Asn Pro Ser
    50                  55                  60

ctc aag agt cga gcc acc ata tca ata gac acg tcc aag aac cag ttc       240
Leu Lys Ser Arg Ala Thr Ile Ser Ile Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

tcc ctg aaa ctg agc tct gtg acc gcc gca gac acg gcc gtg tat tac       288
Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95

tgt gcg aga gat agt tat cac tac tac ggt atg gac gtc tgg ggc caa       336
Cys Ala Arg Asp Ser Tyr His Tyr Tyr Gly Met Asp Val Trp Gly Gln
            100                 105                 110

ggg acc acg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc       384
Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       432
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
```

```
            180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       624
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

ccc agc aac acc aag gtg gac aag agt gag                               654
Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215
```

<210> 2232
<211> 672
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2232

```
cag gta caa ctg cag cag tca ggt cca gga ctg gtg aag ccc tcg cag        48
Gln Val Gln Leu Gln Gln Ser Gly Pro Gly Leu Val Lys Pro Ser Gln
1               5                   10                  15

acc ctc tca ctc acc tgt gcc atc tcc ggg gac agt gtc tct agc aac        96
Thr Leu Ser Leu Thr Cys Ala Ile Ser Gly Asp Ser Val Ser Ser Asn
            20                  25                  30

agt gct gct tgg cac tgg atc agg cag tcc cca tcg aga ggc ctt gag       144
Ser Ala Ala Trp His Trp Ile Arg Gln Ser Pro Ser Arg Gly Leu Glu
        35                  40                  45

tgg ctg gga agg aca cac tac agg tcc aag tgg tat aat gag tat gca       192
Trp Leu Gly Arg Thr His Tyr Arg Ser Lys Trp Tyr Asn Glu Tyr Ala
    50                  55                  60

gta tct gtg aag agt cga ata acc atc aac cca gac ata tcc aaa aac       240
Val Ser Val Lys Ser Arg Ile Thr Ile Asn Pro Asp Ile Ser Lys Asn
65                  70                  75                  80

cag ttc tcc ctg cag ttg agc tct gtg act ccc gag gac acg gct gtg       288
Gln Phe Ser Leu Gln Leu Ser Ser Val Thr Pro Glu Asp Thr Ala Val
                85                  90                  95

tat tac tgt gca aga gag acc gtt tac atc tct act tac tac tac ggt       336
Tyr Tyr Cys Ala Arg Glu Thr Val Tyr Ile Ser Thr Tyr Tyr Tyr Gly
            100                 105                 110

ttg gac gtc tgg ggc caa ggg acc acg gtc acc gtc tcc tca gcc tcc       384
Leu Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser
        115                 120                 125

acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc       432
Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
```

```
    130                 135                 140

tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc       480
Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145                 150                 155                 160

gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg       528
Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
                165                 170                 175

cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc       576
His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
            180                 185                 190

agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc       624
Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile
        195                 200                 205

tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aag gtg       672
Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220

<210> 2233
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2233
ccc gtc cag ctg ata cag tct ggg gct gag gtg agg aag cct ggg gcc        48
Pro Val Gln Leu Ile Gln Ser Gly Ala Glu Val Arg Lys Pro Gly Ala
1               5                   10                  15

tca gtg aag gtc tct tgc aag gtc tcc gga tac acc ctc agt gaa tta        96
Ser Val Lys Val Ser Cys Lys Val Ser Gly Tyr Thr Leu Ser Glu Leu
            20                  25                  30

tcc ctg cac tgg gtg cga cag gct cct gga aaa ggg ctt gag tgg atg       144
Ser Leu His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Met
        35                  40                  45

gga act ttt gat cct gaa gat ggt gaa aca gtc tac gca cag aag ttc       192
Gly Thr Phe Asp Pro Glu Asp Gly Glu Thr Val Tyr Ala Gln Lys Phe
    50                  55                  60

cag ggc aga gtc acc gtg acc gag gac aca tct aca gac aca gcc tac       240
Gln Gly Arg Val Thr Val Thr Glu Asp Thr Ser Thr Asp Thr Ala Tyr
65                  70                  75                  80

att gac ctg agc agc ctg aaa tct gag gac acg gcc gtc tat tac tgt       288
Ile Asp Leu Ser Ser Leu Lys Ser Glu Asp Thr Ala Val Tyr Tyr Cys
```

```
                85                  90                  95

gca aca gat ggg ccc tta cat acg tcg gga ctt gac tac tgg ggc cag       336
Ala Thr Asp Gly Pro Leu His Thr Ser Gly Leu Asp Tyr Trp Gly Gln
            100                 105                 110

gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc       384
Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

ttc ccc ctg gcg ccc tgc tcc agg agc acc tcc gag agc aca gcg gcc       432
Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       624
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

ccc agc aac acc aag gtg gac aag aga gtg                               654
Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215

<210> 2234
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2234
gtg gtg cag ctg gtg gag tct ggg gga ggc ctg gtc aag cct ggg ggg        48
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt agc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

agc atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtc       144
Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
```

```
        35                  40                  45

tca tcc att agt agt agt agt tac ata tac tac gca gac tca gtg       192
Ser Ser Ile Ser Ser Ser Ser Tyr Ile Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tca ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gcc gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg tgc ttg ggg gct gag gcg aac gat gct ttt gat atc tgg ggc caa       336
Ala Cys Leu Gly Ala Glu Ala Asn Asp Ala Phe Asp Ile Trp Gly Gln
            100                 105                 110

ggg aca atg gtc acc gtc tct tca gcc tcc acc aag ggc cca tcg gtc       384
Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       432
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       624
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

ccc agc aac acc aag gtg gac aag aga gtg                            654
Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215
```

<210> 2235
<211> 638
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2235
ga gag gtg cag ctc ttg gag tct ggg gga ggc ttg gta cag cct ggg 47
Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
1 5 10 15

ggg tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt agc aac 95
Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn
20 25 30

tat gcc atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg gac tgg 143
Tyr Ala Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Asp Trp
35 40 45

gtc tca gct att agt ggt agt ggt ggt agt aca tac tac gca gac tcc 191
Val Ser Ala Ile Ser Gly Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser
50 55 60

gtg aag ggc cgc ttc acc atc tcc aga gac att tcc aag aac acg ctg 239
Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Ile Ser Lys Asn Thr Leu
65 70 75

tat ctg caa atg aac agc ctg aga gcc gag gac acg gcc gtc tat tac 287
Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr
80 85 90 95

tgt gcg aaa gtc cct ggg gac tac tgg ggc cag gga acc ctg gtc acc 335
Cys Ala Lys Val Pro Gly Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr
100 105 110

gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg gca ccc 383
Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro
115 120 125

tcc tcc aag agc acc tct ggg ggc aca gca gcc ctg ggc tgc ctg gtc 431
Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val
130 135 140

aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc 479
Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala
145 150 155

ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag tcc tca gga 527
Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly
160 165 170 175

ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc agc ttg ggc 575
Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly
180 185 190

acc cag acc tac atc tgc aac gtg aat cac aag ccc agc aac acc aag 623
Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys
195 200 205

```
gtg gac aag aat gag                                                    638
Val Asp Lys Asn Glu
        210

<210> 2236
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2236
cag gtc aag ctg gtg caa tct ggg gct gag gtg aag aag cct ggg tcc        48
Gln Val Lys Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1               5                   10                  15

tcg gta aag gtc tcc tgc aag act tct gga ggc ccc ttc agc agc tat        96
Ser Val Lys Val Ser Cys Lys Thr Ser Gly Gly Pro Phe Ser Ser Tyr
            20                  25                  30

act atc acc tgg gtg cga cag gcc cct gga caa ggg cct gag tgg atg       144
Thr Ile Thr Trp Val Arg Gln Ala Pro Gly Gln Gly Pro Glu Trp Met
        35                  40                  45

gga agg atc acc cct att ttt aat ata acg aac tac gca cag aac ttc       192
Gly Arg Ile Thr Pro Ile Phe Asn Ile Thr Asn Tyr Ala Gln Asn Phe
    50                  55                  60

cag ggc aga atg acg atg acc gcg gac aaa tcc acg acc acg gcc tac       240
Gln Gly Arg Met Thr Met Thr Ala Asp Lys Ser Thr Thr Thr Ala Tyr
65                  70                  75                  80

atg gaa ttg agc ggc ctg aaa tct gag gac acg gcc gtc tat tac tgt       288
Met Glu Leu Ser Gly Leu Lys Ser Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gcg ggc ctt agt acc agt tgg ccg agc tgg ttc gac ccc tgg       336
Ala Arg Ala Gly Leu Ser Thr Ser Trp Pro Ser Trp Phe Asp Pro Trp
            100                 105                 110

ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca       384
Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca       432
Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
    130                 135                 140

gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg       480
Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160
```

```
gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg       528
Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc       576
Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat       624
Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
        195                 200                 205

cac aag ccc agc aac acc aag gtg gac aag aaa gtg                       660
His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220
```

<210> 2237
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2237

```
cag gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag ccg tca cag        48
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gln
1               5                   10                  15

acc ctg tcg ctc acc tgc acg gtg tct ggt ggc tcc gtc aac act ggt        96
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Val Asn Thr Gly
            20                  25                  30

act tcc tac tgg acc tgg gtc cgc cag cgc cca ggg aag ggc ctg gag       144
Thr Ser Tyr Trp Thr Trp Val Arg Gln Arg Pro Gly Lys Gly Leu Glu
        35                  40                  45

tgg att ggg ttc atc tat tat agt ggg agc acc tac tac aat cca gcc       192
Trp Ile Gly Phe Ile Tyr Tyr Ser Gly Ser Thr Tyr Tyr Asn Pro Ala
    50                  55                  60

ctc gag agt cga ctt acc ata tca cta gac acc tct cag aat cag ttc       240
Leu Glu Ser Arg Leu Thr Ile Ser Leu Asp Thr Ser Gln Asn Gln Phe
65                  70                  75                  80

tcc ctg aaa ttg acc tct gtg act gcc gcg gac acg gcc gtg tat ttc       288
Ser Leu Lys Leu Thr Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Phe
                85                  90                  95

tgt gcg aga aac gat att tcc ttc aaa cag agt gct atc gac gtc tgg       336
Cys Ala Arg Asn Asp Ile Ser Phe Lys Gln Ser Ala Ile Asp Val Trp
            100                 105                 110
```

```
ggc caa ggg acc acg gtc acc gtc tcc tca gcc tcc acc aag ggc cca       384
Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca       432
Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
    130                 135                 140

gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg       480
Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg       528
Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc       576
Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat       624
Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
        195                 200                 205

cac aag ccc agc aac acc aag gtg gac aag aga gtg                       660
His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220

<210> 2238
<211> 666
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2238
cag gtg cac ctg gca gag tcg ggg gga ggc gtg gtc cag acg ggg ggg        48
Gln Val His Leu Ala Glu Ser Gly Gly Gly Val Val Gln Thr Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gtg tct gga ttc cat ttc ggc agt cac        96
Ser Leu Arg Leu Ser Cys Ala Val Ser Gly Phe His Phe Gly Ser His
            20                  25                  30

ggc atg acc tgg gtc cgc cag gcc cca ggc aag ggc ctg gag tgg ctg       144
Gly Met Thr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Leu
        35                  40                  45

tca ttt ata act tat gat gga caa atc aaa tat tat gga ggg tcc gtg       192
Ser Phe Ile Thr Tyr Asp Gly Gln Ile Lys Tyr Tyr Gly Gly Ser Val
    50                  55                  60
```

```
aag ggc cga ttc aac atc tcc aga gac aat tcc aag aac act ctc cac       240
Lys Gly Arg Phe Asn Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu His
65                  70                  75                  80

ctg cac atg aac ggc ctg aga gtt gag gac acg gct gtt tac tac tgt       288
Leu His Met Asn Gly Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aaa acg aag act atg ggt gtg ggg gga gag tat ttc ggc ttg gac       336
Ala Lys Thr Lys Thr Met Gly Val Gly Gly Glu Tyr Phe Gly Leu Asp
            100                 105                 110

gtc tgg ggc cta ggg acg acg gtc atc gtc tcc tca gcc tcc acc aag       384
Val Trp Gly Leu Gly Thr Thr Val Ile Val Ser Ser Ala Ser Thr Lys
        115                 120                 125

ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg       432
Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
    130                 135                 140

ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa tcg       480
Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Ser
145                 150                 155                 160

gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc       528
Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
                165                 170                 175

ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg       576
Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
            180                 185                 190

gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac       624
Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
        195                 200                 205

gtg aat cac aag ccc agc aac acc aag gtg gac aag aaa gtg                666
Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220
```

<210> 2239
<211> 666
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2239

```
ccc ctg cag ctg cat gag tcg ggc cca gga ctg gcg aag cct tcg gag        48
Pro Leu Gln Leu His Glu Ser Gly Pro Gly Leu Ala Lys Pro Ser Glu
1               5                   10                  15
```

```
acc ctg tcc ctc acc tgc act ctc tct ggt ggc tcc atc acc act ggt        96
Thr Leu Ser Leu Thr Cys Thr Leu Ser Gly Gly Ser Ile Thr Thr Gly
            20                  25                  30

agt tat tac tgg gcc tgg atc cgc cag gct cca ggg aag gct ctg gag       144
Ser Tyr Tyr Trp Ala Trp Ile Arg Gln Ala Pro Gly Lys Ala Leu Glu
        35                  40                  45

tgg att ggg acc att tat tat agt ggg acc acc tac tat aat tcg tcc       192
Trp Ile Gly Thr Ile Tyr Tyr Ser Gly Thr Thr Tyr Tyr Asn Ser Ser
    50                  55                  60

ctc aac aat cga ctc acc att tcc gtg gac acg tcc aag aac cag ctc       240
Leu Asn Asn Arg Leu Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Leu
65                  70                  75                  80

tcc ttg aag ctg gtt tct gtg gcc gcc gca gac acg gct ata tat tac       288
Ser Leu Lys Leu Val Ser Val Ala Ala Ala Asp Thr Ala Ile Tyr Tyr
                85                  90                  95

tgt gcg aga cac aag gcc ctc tgg ttc ggg gag gca ggg gct ttt gat       336
Cys Ala Arg His Lys Ala Leu Trp Phe Gly Glu Ala Gly Ala Phe Asp
            100                 105                 110

atc tgg ggt caa ggg aca atg gtc acg gtc tct tca gcc tcc acc aag       384
Ile Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys
        115                 120                 125

ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg       432
Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
    130                 135                 140

ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg       480
Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145                 150                 155                 160

gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc       528
Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
                165                 170                 175

ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg       576
Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
            180                 185                 190

gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac       624
Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
        195                 200                 205

gtg aat cac aag ccc agc aac acc aag gtg gac aag aag gtg                666
Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220
```

<210> 2240
<211> 669

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2240
gaa gtg cag ctg gtg gag tct ggg gga ggc ttg gta cag cct ggc agg 48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Arg
1 5 10 15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt gat gat tat 96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asp Asp Tyr
20 25 30

gcc atg cac tgg gtc cgg caa gct cca ggg aag ggc ctg gag tgg gtc 144
Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

tca ggt att agt tgg aat agt ggt agc ata ggc tat gcg gac tct gtg 192
Ser Gly Ile Ser Trp Asn Ser Gly Ser Ile Gly Tyr Ala Asp Ser Val
50 55 60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tcc ctg tat 240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65 70 75 80

ctg caa atg aac agt ctg aga gct gag gac acg gcc ttg tat tac tgt 288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Leu Tyr Tyr Cys
85 90 95

gca aaa gat ttg tta ggg ttc agg gac caa agg aac tac tac ggt atg 336
Ala Lys Asp Leu Leu Gly Phe Arg Asp Gln Arg Asn Tyr Tyr Gly Met
100 105 110

gac gtc tgg ggc caa ggg acc acg gtc acc gtc tcc tca gcc tcc acc 384
Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr
115 120 125

aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct 432
Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
130 135 140

ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa 480
Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145 150 155 160

ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac 528
Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
165 170 175

acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc 576
Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser

```
            180                 185                 190

gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc       624
Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
        195                 200                 205

aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aga gtt           669
Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220

<210> 2241
<211> 358
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2241
cag gtg caa ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg gag        48
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15

acc ctg tcc ctc agt tgc act gtc tca ggt gcc tcc atg aat aat tac        96
Thr Leu Ser Leu Ser Cys Thr Val Ser Gly Ala Ser Met Asn Asn Tyr
            20                  25                  30

tac tgg agt tgg atc agg cag tcc gcc ggg aag ggt ctg gaa tgg att       144
Tyr Trp Ser Trp Ile Arg Gln Ser Ala Gly Lys Gly Leu Glu Trp Ile
        35                  40                  45

ggg cgt ata tat agt agt gga gac acc gac tac aac ccc tcc ctg aag       192
Gly Arg Ile Tyr Ser Ser Gly Asp Thr Asp Tyr Asn Pro Ser Leu Lys
    50                  55                  60

act cga gtc acc atg tca ata gac acg tcc aag aac cag ttc tcc ctg       240
Thr Arg Val Thr Met Ser Ile Asp Thr Ser Lys Asn Gln Phe Ser Leu
65                  70                  75                  80

aac cta gac tct gtg acc gcc gcg gac acg gcc aca tat tac tgt gcg       288
Asn Leu Asp Ser Val Thr Ala Ala Asp Thr Ala Thr Tyr Tyr Cys Ala
                85                  90                  95

aga agc ttc tac gac acc ctt ttc tac ttt gag aac tgg ggc cag gga       336
Arg Ser Phe Tyr Asp Thr Leu Phe Tyr Phe Glu Asn Trp Gly Gln Gly
            100                 105                 110

acc ctc gtc acc gtc tcc tca g                                        358
Thr Leu Val Thr Val Ser Ser
        115

<210> 2242
<211> 656
```

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2242
```
cc cag atc acc ttg aag gag tct ggt cct acg ctg gtg aaa ccc aca         47
   Gln Ile Thr Leu Lys Glu Ser Gly Pro Thr Leu Val Lys Pro Thr
   1               5                  10                  15

cag acc ctc acg ctg acc tgc acc ttc tct ggg ttc tca ctc acc act        95
Gln Thr Leu Thr Leu Thr Cys Thr Phe Ser Gly Phe Ser Leu Thr Thr
                20                  25                  30

act gac gtg ggt gtg ggc tgg atc cgt cag ccc cca gga aag gcc ctg       143
Thr Asp Val Gly Val Gly Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu
            35                  40                  45

gaa tgg ctt aca atc att tat tgg gat gat gat gag cgc tac agt cca       191
Glu Trp Leu Thr Ile Ile Tyr Trp Asp Asp Asp Glu Arg Tyr Ser Pro
        50                  55                  60

tcc ctg aag agc agg ctc acc atc acc aag gac acc tcc aaa aac cag       239
Ser Leu Lys Ser Arg Leu Thr Ile Thr Lys Asp Thr Ser Lys Asn Gln
    65                  70                  75

gtg gtc ctc tca atg acc aac atg gac cct gtg gac aca gcc aca tat       287
Val Val Leu Ser Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr
80                  85                  90                  95

tac tgt gca cgc gtt tat agt acc aag tgg gac ttt gac tac tgg ggc       335
Tyr Cys Ala Arg Val Tyr Ser Thr Lys Trp Asp Phe Asp Tyr Trp Gly
                100                 105                 110

cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg       383
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
            115                 120                 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg       431
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
        130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       479
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
    145                 150                 155

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       527
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
160                 165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       575
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
```

```
                180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac       623
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
            195                 200                 205

aag ccc agc aac acc aag gtg gac aag aga gtg                           656
Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
        210                 215
```

<210> 2243
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2243

```
gtg gtg cag ctg gtg gag tct ggg gga ggc ttg gtt cag cct ggg ggg        48
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt agc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

tcc atg aac tgg gtc cgc cag gct cca ggg aag ggt ctg gag tgg ctt       144
Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Leu
        35                  40                  45

tca tac gtt agc agt agt ggt agt acc atg tac tat gca gac tct gtg       192
Ser Tyr Val Ser Ser Ser Gly Ser Thr Met Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac act gcc aag aac tca ctg ttt       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Thr Ala Lys Asn Ser Leu Phe
65                  70                  75                  80

ctg caa atg aac agc ctg aga gcc gag gac acg gct gtt tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aaa ggg ggc cct tta cgt cct ttt gat atc tgg ggc caa ggg aca       336
Ala Lys Gly Gly Pro Leu Arg Pro Phe Asp Ile Trp Gly Gln Gly Thr
            100                 105                 110

ctg gtc acc gtc tct tca gcc tcc acc aag ggc cca tcg gtc ttc ccc       384
Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
        115                 120                 125

ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc       432
Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
```

```
    130                 135                 140

tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac       480
Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160

tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag       528
Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175

tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc       576
Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc agc       624
Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
        195                 200                 205

aac acc aag gtg gac aag aaa gtg                                       648
Asn Thr Lys Val Asp Lys Lys Val
    210                 215

<210> 2244
<211> 678
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2244
gcc gtg cag ctg gtg cag tct gga gca gag gtg aaa aag ccc ggg gag        48
Ala Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1               5                   10                  15

tct ctg aag atc tcc tgt agg ggt tct gga tac aac ttt atc agc cac        96
Ser Leu Lys Ile Ser Cys Arg Gly Ser Gly Tyr Asn Phe Ile Ser His
            20                  25                  30

tgg atc agc tgg gtg cgc cag atg ccc ggg aaa ggc ctg gag tgg cag       144
Trp Ile Ser Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp Gln
        35                  40                  45

tgg ctg ggg agg att gat cct agt gac tct tat acc aat tac agc ccg       192
Trp Leu Gly Arg Ile Asp Pro Ser Asp Ser Tyr Thr Asn Tyr Ser Pro
    50                  55                  60

tcc ttc cga ggc cac gtc acc atc tca gtt gac aag tcc gtc aac act       240
Ser Phe Arg Gly His Val Thr Ile Ser Val Asp Lys Ser Val Asn Thr
65                  70                  75                  80

gcc tac ctg caa tgg aac agc ctg aag gcc tcg gac acc gcc atg tat       288
Ala Tyr Leu Gln Trp Asn Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr
```

```
                85                  90                  95

tac tgt gcg aga ctt agt aga gac ggc tac acc att gag cac ttt gac       336
Tyr Cys Ala Arg Leu Ser Arg Asp Gly Tyr Thr Ile Glu His Phe Asp
            100                 105                 110

tac tgg ggc cag gga acc ctg gtc acc gtc tcc tca gca tcc ccg acc       384
Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Pro Thr
        115                 120                 125

agc ccc aag gtc ttc ccg ctg agc ctc gac agc acc ccc caa gat ggg       432
Ser Pro Lys Val Phe Pro Leu Ser Leu Asp Ser Thr Pro Gln Asp Gly
    130                 135                 140

aac gtg gtc gtc gca tgc ctg gtc cag ggc ttc ttc ccc cag gag cca       480
Asn Val Val Val Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro
145                 150                 155                 160

ctc agt gtg acc tgg agc gaa agc gga cag aac gtg acc gcc aga aac       528
Leu Ser Val Thr Trp Ser Glu Ser Gly Gln Asn Val Thr Ala Arg Asn
                165                 170                 175

ttc cca cct agc cag gat gcc tcc ggg gac ctg tac acc acg agc agc       576
Phe Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser
            180                 185                 190

cag ctg acc ctg ccg gcc aca cag tgc cca gac ggc aag tcc gtg aca       624
Gln Leu Thr Leu Pro Ala Thr Gln Cys Pro Asp Gly Lys Ser Val Thr
        195                 200                 205

tgc cac gtg aag cac tac acg aat ccc agc cag gat gtg act gtg ccc       672
Cys His Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro
    210                 215                 220

tgc ccg                                                              678
Cys Pro
225
```

<210> 2245
<211> 674
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

```
<400> 2245
cc gag gtg cag ctg gtg cag tct gga gca gag gtg aaa aag ccc ggg         47
   Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly
   1               5                  10                  15

gag tct ctg aag atc tcc tgt aag ggt tct gga tac agc ttt acc agc        95
Glu Ser Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Thr Ser
```

```
                20                  25                  30

ttc tgg atc ggc tgg gtg cgc cag atg ccc ggg aaa ggc ctg gag tgg       143
Phe Trp Ile Gly Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp
            35                  40                  45

atg ggg atc atc ttt cct gct gac tct gat acc aga tac agc ccg tca       191
Met Gly Ile Ile Phe Pro Ala Asp Ser Asp Thr Arg Tyr Ser Pro Ser
        50                  55                  60

ttc caa ggc cag gtc atc atc tca gtc gac aag tcc atc agc acc gcc       239
Phe Gln Gly Gln Val Ile Ile Ser Val Asp Lys Ser Ile Ser Thr Ala
    65                  70                  75

tac ctg cag tgg agc agc ctg aag gcc tcg gac acc gcc atg tat tac       287
Tyr Leu Gln Trp Ser Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr Tyr
80                  85                  90                  95

tgt gcg aga cgc ggg gtt agt ggt ggg agc gcc tgg acg tat tac aac       335
Cys Ala Arg Arg Gly Val Ser Gly Gly Ser Ala Trp Thr Tyr Tyr Asn
                100                 105                 110

ttt ttc gac ccc tgg ggc cag gga acc ctg gtc acc gtc gcc tca gcc       383
Phe Phe Asp Pro Trp Gly Gln Gly Thr Leu Val Thr Val Ala Ser Ala
            115                 120                 125

tcc acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc       431
Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser
        130                 135                 140

acc tct ggg ggc aca gca gcc ctg ggc tgc ctg gtc aag gac tac ttc       479
Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe
    145                 150                 155

ccc gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc       527
Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly
160                 165                 170                 175

gtg cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc       575
Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu
                180                 185                 190

agc agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac       623
Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr
            195                 200                 205

atc tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aag       671
Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys
        210                 215                 220

gtg                                                                   674
Val
```

<210> 2246
<211> 666
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2246
```
ccc gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg gag        48
Pro Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                  10                  15

acc ctg tcc ctc acc tgc act gtc tct ggt ggc tcc atc gat agt tat        96
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Asp Ser Tyr
            20                  25                  30

tac tgg agc tgg ctc cgg cag ccc cca ggg agg gga cta gag tgg att       144
Tyr Trp Ser Trp Leu Arg Gln Pro Pro Gly Arg Gly Leu Glu Trp Ile
        35                  40                  45

ggg tat atc ttt tac agt gga att acc aac tac agc cct tcc ctc aag       192
Gly Tyr Ile Phe Tyr Ser Gly Ile Thr Asn Tyr Ser Pro Ser Leu Lys
    50                  55                  60

agt cga gtc acc ata tcg gtc gac acg tcc aag aac cag ttc tcc ctg       240
Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe Ser Leu
65                  70                  75                  80

aaa ctg aac tct gtg acc gct gcg gac acg gcc gtg tat tac tgt gcg       288
Lys Leu Asn Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala
                85                  90                  95

aga gaa ctt ccc gtg att ggt aga cgt act ttt gat atc tgg ggc caa       336
Arg Glu Leu Pro Val Ile Gly Arg Arg Thr Phe Asp Ile Trp Gly Gln
            100                 105                 110

ggg aca atg gtc acc gtc tct tca gca tcc ccg acc agc ccc aag gtc       384
Gly Thr Met Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro Lys Val
        115                 120                 125

ttc ccg ctg agc ctc tgc agc acc cag cca gat ggg aac gtg gtc atc       432
Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val Ile
    130                 135                 140

gcc tgc ctg gtc cag ggc ttc ttc ccc cag gag cca ctc agt gtg acc       480
Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val Thr
145                 150                 155                 160

tgg agc gaa agc gga cag ggc gtg acc gcc aga aac ttc cca ccc agc       528
Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro Ser
                165                 170                 175
```

```
cag gat gcc tcc ggg gac ctg tac acc acg agc agc cag ctg acc ctg       576
Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr Leu
            180                 185                 190

ccg gcc aca cag tgc cta gcc ggc aag tcc gtg aca tgc cac gtg aag       624
Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val Lys
        195                 200                 205

cac tac acg aat ccc agc cag gat gtg act gtg ccc tgc ccg               666
His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
    210                 215                 220

<210> 2247
<211> 681
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2247
ccc gtg cat ctg gtg cag tct ggg gct gag gtg aag aag cct ggg tcc        48
Pro Val His Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1               5                   10                  15

tcg gtg aag gtc tcc tgc aaa ctt tct gga ggc atc ttc agt tac ttt        96
Ser Val Lys Val Ser Cys Lys Leu Ser Gly Gly Ile Phe Ser Tyr Phe
            20                  25                  30

gct atc atc tgg gtg cga cag gcc cct gga caa ggc ctt gag tgg atg       144
Ala Ile Ile Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

gga acg atc atc cct att ttt gga aca tca aac tac gca gag aaa ttc       192
Gly Thr Ile Ile Pro Ile Phe Gly Thr Ser Asn Tyr Ala Glu Lys Phe
    50                  55                  60

cag gac aga gtc gcg att gtc gcg gac gag gcc acg agt aca gtt tac       240
Gln Asp Arg Val Ala Ile Val Ala Asp Glu Ala Thr Ser Thr Val Tyr
65                  70                  75                  80

atg gag gtg aac agc ctg aga tct gag gac acg gcc ata tat ttc tgt       288
Met Glu Val Asn Ser Leu Arg Ser Glu Asp Thr Ala Ile Tyr Phe Cys
                85                  90                  95

gcg aga gat tcc gag gtg gaa aag agt gat ggg tac atg gcc tcg acc       336
Ala Arg Asp Ser Glu Val Glu Lys Ser Asp Gly Tyr Met Ala Ser Thr
            100                 105                 110

gct gaa tac ttc caa ctc tgg ggc cag ggc acc ctg gtc acc gtc tct       384
Ala Glu Tyr Phe Gln Leu Trp Gly Gln Gly Thr Leu Val Thr Val Ser
        115                 120                 125
```

```
tca gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc       432
Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser
    130                 135                 140

aag agc acc tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac       480
Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp
145                 150                 155                 160

tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc       528
Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr
                165                 170                 175

agc ggc gtg cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac       576
Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr
            180                 185                 190

tcc ctc agc agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag       624
Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln
        195                 200                 205

acc tac atc tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac       672
Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp
    210                 215                 220

aag aag gtg                                                          681
Lys Lys Val
225
```

<210> 2248
<211> 665
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2248

```
ga agt gcg atg cac ctg gtg gag tct ggg gga gcc gtg gtc cag ccg         47
   Ser Ala Met His Leu Val Glu Ser Gly Gly Ala Val Val Gln Pro
   1               5                  10                  15

ggg gag tcc ctg agg ctc tcc tgt tca gcc ttt gaa ttc agc ttt caa        95
Gly Glu Ser Leu Arg Leu Ser Cys Ser Ala Phe Glu Phe Ser Phe Gln
                20                  25                  30

tat ttt tcc atg ttc tgg gtc cgt caa gct ccg acg aag ggt ctt gag       143
Tyr Phe Ser Met Phe Trp Val Arg Gln Ala Pro Thr Lys Gly Leu Glu
            35                  40                  45

ttg gtc gct caa atc act tgg gat ggt tct ata ata aac tac gca gac       191
Leu Val Ala Gln Ile Thr Trp Asp Gly Ser Ile Ile Asn Tyr Ala Asp
        50                  55                  60
```

```
tct gtg aag ggc cga ttc acc atc tcc aga gac aac agc aaa aac tcc       239
Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Ser
    65                  70                  75

ctg tat ctt caa atg acc agt cta aga agt gac gac acc gcc gtg tat       287
Leu Tyr Leu Gln Met Thr Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr
80                  85                  90                  95

tac tgt gta aaa gca ggt gtc ccg tgg gag gtc cag cga tgg ttc gac       335
Tyr Cys Val Lys Ala Gly Val Pro Trp Glu Val Gln Arg Trp Phe Asp
                100                 105                 110

ccc tgg ggc cag gga acc ccg gtc acc gtc tcc tca gcc tcc acc aag       383
Pro Trp Gly Gln Gly Thr Pro Val Thr Val Ser Ser Ala Ser Thr Lys
            115                 120                 125

ggc cca tcg gtc ttc ccc ctg gcg ccc tgc tcc agg agc acc tcc gag       431
Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu
        130                 135                 140

agc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg       479
Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
    145                 150                 155

gtg acg gtg tcg tgg aac tca ggc gct ctg acc agc ggc gtg cac acc       527
Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
160                 165                 170                 175

ttc cca gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg       575
Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
                180                 185                 190

gtg acc gtg ccc tcc agc aac ttc ggc acc cag acc tac acc tgc aac       623
Val Thr Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn
            195                 200                 205

gta gat cac aag ccc agc aac acc aag gtg gac aag aca gtg               665
Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val
        210                 215                 220

<210> 2249
<211> 666
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2249
cag gtt cac ctg gtg cag tct gga gct gaa gtg aag agg cct ggg gcc        48
Gln Val His Leu Val Gln Ser Gly Ala Glu Val Lys Arg Pro Gly Ala
1               5                   10                  15
```

```
tca gtg aag gtc tcc tgc aag ggt tct ggt tac acc ctt aac aat gat        96
Ser Val Lys Val Ser Cys Lys Gly Ser Gly Tyr Thr Leu Asn Asn Asp
            20                  25                  30

gtc gct ttc agt tgg gtg cga cag gcc cct gga caa ggg cct gag tgg       144
Val Ala Phe Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Pro Glu Trp
        35                  40                  45

ctg gga tgg atc aat gct tac cag ggc gtc aca aat att tcc ccg aat       192
Leu Gly Trp Ile Asn Ala Tyr Gln Gly Val Thr Asn Ile Ser Pro Asn
    50                  55                  60

ttc cgg gcc aga gtc acc atg acc aca gac aca tcc acg aac aca att       240
Phe Arg Ala Arg Val Thr Met Thr Thr Asp Thr Ser Thr Asn Thr Ile
65                  70                  75                  80

tac atg gac ctc cag aac ctg agg tcc gac gac acg gcc atc tat tac       288
Tyr Met Asp Leu Gln Asn Leu Arg Ser Asp Asp Thr Ala Ile Tyr Tyr
                85                  90                  95

tgt gcg aga gat cgt cag ggc cta ggc cgt atg gac gtc tgg ggc cag       336
Cys Ala Arg Asp Arg Gln Gly Leu Gly Arg Met Asp Val Trp Gly Gln
            100                 105                 110

ggg acc acg gtc atc gtc tcc tca gca tcc ccg acc agc ccc aag gtc       384
Gly Thr Thr Val Ile Val Ser Ser Ala Ser Pro Thr Ser Pro Lys Val
        115                 120                 125

ttc ccg ctg agc ctc tgc agc acc cag cca gat ggg aac gtg gtc atc       432
Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val Ile
    130                 135                 140

gcc tgc ctg gtc cag ggc ttc ttc ccc cag gag cca ctc agt gtg acc       480
Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val Thr
145                 150                 155                 160

tgg agc gaa agc gga cag ggc gtg acc gcc aga aac ttc cca ccc agc       528
Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro Ser
                165                 170                 175

cag gat gcc tcc ggg gac ctg tac acc acg agc agc cag ctg acc ctg       576
Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr Leu
            180                 185                 190

ccg gcc aca cag tgc cta gcc ggc aag tcc gtg aca tgc cac gtg aag       624
Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val Lys
        195                 200                 205

cac tac acg aat ccc agc cag gat gtg act gtg ccc tgc ccg               666
His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
    210                 215                 220
```

<210> 2250
<211> 651

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2250
```
gtg gtg cag ctg gtg gag tct ggg gga ggc ttg gtc cag cct ggg ggg        48
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctc aga ctc tcc tgt gca gcc tct gga ttc agg ttt aat tac tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Arg Phe Asn Tyr Tyr
            20                  25                  30

tgg atg agc tgg gtc cgc cag gct cca ggg aaa ggc ctg gag tgg gtg       144
Trp Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gcc aac ata aag gaa gat gga agt gag aaa tac tat gtg gac tct gtg       192
Ala Asn Ile Lys Glu Asp Gly Ser Glu Lys Tyr Tyr Val Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tca ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg gaa atg aac agc ctg aga gtc gag gac acg gct gtc tat tac tgt       288
Leu Glu Met Asn Ser Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg agg gaa ctg ggt gcg aac tac tac ttt gcc tat tgg ggc cag gga       336
Ala Arg Glu Leu Gly Ala Asn Tyr Tyr Phe Ala Tyr Trp Gly Gln Gly
            100                 105                 110

gcc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc       384
Ala Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125

ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg       432
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140

ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg       480
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160

aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta       528
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc       576
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
```

```
            180                 185                 190

agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc       624
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205

agc aac acc aag gtg gac aag aga gtg                                   651
Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215
```

<210> 2251
<211> 665
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2251

```
cc cag gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tca         47
   Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser
   1               5                   10                  15

cag acc ctg tcc ctc acc tgc att gtc tct ggt ggc tcc atc agt ggt        95
Gln Thr Leu Ser Leu Thr Cys Ile Val Ser Gly Gly Ser Ile Ser Gly
                20                  25                  30

gat aaa aac ttc tgg agt tgg gtc cgc cag cac cca gag aag ggc ctg       143
Asp Lys Asn Phe Trp Ser Trp Val Arg Gln His Pro Glu Lys Gly Leu
            35                  40                  45

gag tgg ctt ggg tac atc tct tac aat ggg aac acc tac tac aat ccg       191
Glu Trp Leu Gly Tyr Ile Ser Tyr Asn Gly Asn Thr Tyr Tyr Asn Pro
        50                  55                  60

tcg ctc atc agt cga att atc ata tca cta gac acc cca aag aac ctg       239
Ser Leu Ile Ser Arg Ile Ile Ile Ser Leu Asp Thr Pro Lys Asn Leu
    65                  70                  75

ttc tcc ctg agg ttg agc tct gtg act gtc gcg gac acg gcc att tat       287
Phe Ser Leu Arg Leu Ser Ser Val Thr Val Ala Asp Thr Ala Ile Tyr
80                  85                  90                  95

tac tgt gcg agg gaa gtc gat ata cgt gga gac agc gat gct ttt gat       335
Tyr Cys Ala Arg Glu Val Asp Ile Arg Gly Asp Ser Asp Ala Phe Asp
                100                 105                 110

att tgg ggc cga ggg aca gtg gtc acc gtt tct tca gcc tcc acc aag       383
Ile Trp Gly Arg Gly Thr Val Val Thr Val Ser Ser Ala Ser Thr Lys
            115                 120                 125

ggc cca tcg gtc ttc ccc ctg gcg ccc tgc tcc agg agc acc tcc gag       431
Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu
```

```
        130                 135                 140

agc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg       479
Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
    145                 150                 155

gtg acg gtg tcg tgg aac tca ggc gct ctg acc agc ggc gtg cac acc       527
Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
160                 165                 170                 175

ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg       575
Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
                180                 185                 190

gtg acc gtg acc tcc agc aac ttc ggc acc cag acc tac acc tgc aac       623
Val Thr Val Thr Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn
            195                 200                 205

gta gat cac aag ccc agc aac acc aag gtg gac aag aca gtg               665
Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val
        210                 215                 220

<210> 2252
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2252
cag gtg cgg ctg gtg gag tct ggg gga ggc ttg gta cag cct gga ggg        48
Gln Val Arg Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

ttc cta aga ctc tcc tgt gca gcc tct gga ttc aca ttc agt gat tat        96
Phe Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asp Tyr
            20                  25                  30

gaa atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg att       144
Glu Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Ile
        35                  40                  45

tca cac att ggt agt agt ggg aca tac gca gac tct gtg aag ggc cga       192
Ser His Ile Gly Ser Ser Gly Thr Tyr Ala Asp Ser Val Lys Gly Arg
    50                  55                  60

ttc acc atc tcc aga gac aac gcc aag aac tca ctc tat ctg caa atg       240
Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr Leu Gln Met
65                  70                  75                  80

agc agc ctg cga gcc gag gac gcg ggc gtt tat tac tgt gcg act acc       288
Ser Ser Leu Arg Ala Glu Asp Ala Gly Val Tyr Tyr Cys Ala Thr Thr
```

```
                85                  90                  95

cga aac tca gct ttc ctc aac tgg ggc cag gga acc ctg gtc acc gtc       336
Arg Asn Ser Ala Phe Leu Asn Trp Gly Gln Gly Thr Leu Val Thr Val
            100                 105                 110

tcc tca ggg agt gca tcc gcc cca acc ctt ttc ccc ctc gtc tcc tgt       384
Ser Ser Gly Ser Ala Ser Ala Pro Thr Leu Phe Pro Leu Val Ser Cys
        115                 120                 125

gag aat tcc ccg tcg gat acg agc agc gtg gcc gtt ggc tgc ctc gca       432
Glu Asn Ser Pro Ser Asp Thr Ser Ser Val Ala Val Gly Cys Leu Ala
    130                 135                 140

cag gac ttc ctt ccc gac tcc atc act ttc tcc tgg aaa tac aag aac       480
Gln Asp Phe Leu Pro Asp Ser Ile Thr Phe Ser Trp Lys Tyr Lys Asn
145                 150                 155                 160

aac tct gac atc agc agc acc cgg ggc ttc cca tca gtc ctg aga ggg       528
Asn Ser Asp Ile Ser Ser Thr Arg Gly Phe Pro Ser Val Leu Arg Gly
                165                 170                 175

ggc aag tac gca gcc acc tca cag gtg ctg ctg cct tcc aag gac gtc       576
Gly Lys Tyr Ala Ala Thr Ser Gln Val Leu Leu Pro Ser Lys Asp Val
            180                 185                 190

atg cag ggc aca gac gaa cac gtg gtg tgc aaa gtc cag cac ccc aac       624
Met Gln Gly Thr Asp Glu His Val Val Cys Lys Val Gln His Pro Asn
        195                 200                 205

ggc aac aaa gaa aag aac gtg cct ctt cca                               654
Gly Asn Lys Glu Lys Asn Val Pro Leu Pro
    210                 215

<210> 2253
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2253
gag gtg cag ctg gtg gag tct ggg gga ggc ttg gta cag ccg ggg ggg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc ccc cct agg agt ttt        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Pro Pro Arg Ser Phe
            20                  25                  30

gcc atg agt tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtc       144
Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
```

```
        35                  40                  45

tca agt att agt ggt ctt gga aat agt ata tat tat gcg gag tcc gtg       192
Ser Ser Ile Ser Gly Leu Gly Asn Ser Ile Tyr Tyr Ala Glu Ser Val
    50                  55                  60

aag ggc cga ttc atc acc tcc aga gac aat tcc aag agc aca gtg ttt       240
Lys Gly Arg Phe Ile Thr Ser Arg Asp Asn Ser Lys Ser Thr Val Phe
65                  70                  75                  80

ctg cta atg aac agc ctg aga gcc gag gac acg gcc gta tat tat tgt       288
Leu Leu Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aag tcc gca ttt ggg gga gtt cct gat ggt ttt gat atc tgg ggc       336
Ala Lys Ser Ala Phe Gly Gly Val Pro Asp Gly Phe Asp Ile Trp Gly
            100                 105                 110

caa ggg aca atg gtc acc gtc tct tca gcc tcc acc aag ggc cca tcg       384
Gln Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

gtc ttc ccc ctg gcg ccc tgc tcc agg agc acc tcc gag agc aca gcg       432
Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala
    130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       480
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       528
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       576
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gta gat cac       624
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asp His
        195                 200                 205

aag ccc agc aac acc aag gtg gac aag aca gtg                           657
Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val
    210                 215

<210> 2254
<211> 636
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain
```

<400> 2254

```
ccg gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg        48
Pro Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                  10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agc aac tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Tyr
            20                  25                  30

ggg atg cac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg       144
Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gca gtt ata tca gat gat ggg aat gat aaa gac aac gca gac tcc gtg       192
Ala Val Ile Ser Asp Asp Gly Asn Asp Lys Asp Asn Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aat tcc aag aat acg ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

ctg cga atg aac agc ctg aga cga gag gac acg gct gtg tat tat tgt       288
Leu Arg Met Asn Ser Leu Arg Arg Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gat ggg ttt gac tac tgg ggc cag gga acc ctg gtc acc gtc       336
Ala Arg Asp Gly Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val
            100                 105                 110

tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc       384
Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser
        115                 120                 125

tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag       432
Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys
    130                 135                 140

gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg       480
Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu
145                 150                 155                 160

acc agc ggc gtg cac acc ttc ccg gct gtc cta cag tcc tca gga ctc       528
Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu
                165                 170                 175

tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc       576
Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr
            180                 185                 190

cag acc tac atc tgc aac gtg aat cac aag ccc agc aac acc aag gtg       624
Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val
        195                 200                 205
```

```
gac aag aat gtg                                                         636
Asp Lys Asn Val
    210

<210> 2255
<211> 361
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2255
gaa gtg cag ctg gtg gag tct ggg gga gtc gtg gta cag ccg ggg ggg          48
Glu Val Gln Leu Val Glu Ser Gly Gly Val Val Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt gat gat tat          96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asp Asp Tyr
            20                  25                  30

acc atg cac tgg gtc cgt caa gct ccg ggg aag ggt ctg gaa tgg gtc         144
Thr Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tct ctt att agt tgg gat ggt ggt agc aca tac tat gca gac tct gtg         192
Ser Leu Ile Ser Trp Asp Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac agc aaa aac tcc ctg tat         240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg aac agt ctg aga act gaa gac acc gcc ttg tat tac tgt         288
Leu Gln Met Asn Ser Leu Arg Thr Glu Asp Thr Ala Leu Tyr Tyr Cys
                85                  90                  95

gca aaa gcg gga tac agc ttt act acc gct cct gac tac tgg ggc cag         336
Ala Lys Ala Gly Tyr Ser Phe Thr Thr Ala Pro Asp Tyr Trp Gly Gln
            100                 105                 110

gga acc ctg gtc acc gtc tcc tca g                                      361
Gly Thr Leu Val Thr Val Ser Ser
        115                 120

<210> 2256
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain
```

<400> 2256
ccc gtt caa ttg gtg cag tct gga gct gag gtg aag aag cct ggg gcc 48
Pro Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

tca gtg aag gtc tcc tgc aag gcc tct ggt gac acc ttt ccc aac tat 96
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Asp Thr Phe Pro Asn Tyr
20 25 30

gtt atc agc tgg gtg cga cag gcc cct gga caa ggg ctt gag tgg gtg 144
Val Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Val
35 40 45

gga tgt atc aac acg aac aat ggt aaa aca aat tat gtg cag aag ctc 192
Gly Cys Ile Asn Thr Asn Asn Gly Lys Thr Asn Tyr Val Gln Lys Leu
50 55 60

cag ggc aga gtc atc ttg acc aca gac aca tcc aca aac aca gcc aac 240
Gln Gly Arg Val Ile Leu Thr Thr Asp Thr Ser Thr Asn Thr Ala Asn
65 70 75 80

atg gag ctg agg agt ctg aga ttt gac gac acg gcc gtt tat tac tgt 288
Met Glu Leu Arg Ser Leu Arg Phe Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

gcg cga gag aga ggc cag gtc cgt tcc tac ggc atg gac gtc tgg ggc 336
Ala Arg Glu Arg Gly Gln Val Arg Ser Tyr Gly Met Asp Val Trp Gly
100 105 110

caa ggg acc gcg gtc acc gtc tcc tca gct tcc acc aag ggc cca tcc 384
Gln Gly Thr Ala Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
115 120 125

gtc ttc ccc ctg gcg ccc tgc tcc agg agc acc tcc gag agc aca gcc 432
Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala
130 135 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg 480
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145 150 155 160

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct 528
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
165 170 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg 576
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
180 185 190

ccc tcc agc agc ttg ggc acg aag acc tac acc tgc aac gta gat cac 624
Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn Val Asp His
195 200 205

```
aag ccc agc aac acc aag gtg gac aag aga gtg                              657
Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215

<210> 2257
<211> 684
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2257
gag gtt cag ttg gtg gag tct ggg gga ggc ttg gta cag cct ggc agg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc aca ttt gat gat tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asp Asp Tyr
            20                  25                  30

gcc atg cac tgg gtc cga caa cct cca ggg agg ggc ctg gag tgg gtc       144
Ala Met His Trp Val Arg Gln Pro Pro Gly Arg Gly Leu Glu Trp Val
        35                  40                  45

tca ggt atc gat tgg agt gga aag acc aca gag tat gca cag tct gtg       192
Ser Gly Ile Asp Trp Ser Gly Lys Thr Thr Glu Tyr Ala Gln Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tcc cta tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg aac agt ctg aga gtt gaa gac acg gcc ttg tat ttc tgt       288
Leu Gln Met Asn Ser Leu Arg Val Glu Asp Thr Ala Leu Tyr Phe Cys
                85                  90                  95

gta aaa att ggc ggg gat ggg aca gcc tac gct tgg acc ttt agg cac       336
Val Lys Ile Gly Gly Asp Gly Thr Ala Tyr Ala Trp Thr Phe Arg His
            100                 105                 110

ttt gac tcc tgg ggc cag ggt acc cgg gtc acc gtc tcg tca gca tcc       384
Phe Asp Ser Trp Gly Gln Gly Thr Arg Val Thr Val Ser Ser Ala Ser
        115                 120                 125

ccg acc agc ccc aag gtc ttc ccg ctg agc ctc tgc agc acc cag cca       432
Pro Thr Ser Pro Lys Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro
    130                 135                 140

gat ggg aac gtg gtc atc gcc tgc ctg gtc cag ggc ttc ttc ccc cag       480
Asp Gly Asn Val Val Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln
145                 150                 155                 160
```

```
gag cca ctc agt gtg acc tgg agc gaa agc gga cag ggc gtg acc gcc       528
Glu Pro Leu Ser Val Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala
                165                 170                 175

aga aac ttc cca ccc agc cag gat gcc tcc ggg gac ctg tac acc acg       576
Arg Asn Phe Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr
            180                 185                 190

agc agc cag ctg acc ctg ccg gcc aca cag tgc cta gcc ggc aag tcc       624
Ser Ser Gln Leu Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser
        195                 200                 205

gtg aca tgc cac gtg aag cac tac acg aat ccc agc cag gat gtg act       672
Val Thr Cys His Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr
    210                 215                 220

gtg ccc tgc cca                                                      684
Val Pro Cys Pro
225
```

<210> 2258
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2258

```
gag gtg cag ctg ttg gag tct ggg gga ggc ttg gta cag cct ggg ggg        48
Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt agc agc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

gcc atg agc tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtc       144
Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca gct att agt ggt agt ggt ggt agc aca tac tac gca gac tcc gtg       192
Ser Ala Ile Ser Gly Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cgg ttc acc atc tcc aga gac aat tcc aag aac acg ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gcc gag gac acg gcc gta tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
```

```
gcg aga ggg ttg ggt gga gat tgg aac tac ctt gcc tac tgg ggc cag       336
Ala Arg Gly Leu Gly Gly Asp Trp Asn Tyr Leu Ala Tyr Trp Gly Gln
            100                 105                 110

gga acc ctg gtc acc gtc tcc tca gct tcc acc aag ggc cca tcg gtc       384
Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

ttc ccc ctg gcg ccc tgc tcc agg agc acc tct ggg ggc aca gcg gcc       432
Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

tcc agc agc ttg ggc acc cag acc tac acc tgc aac gtg aat cac aag       624
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Thr Cys Asn Val Asn His Lys
        195                 200                 205

ccc agc aac acc aag gtg gac aag aga gtt                               654
Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215
```

<210> 2259
<211> 678
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2259

```
cag gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt aac tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Tyr
            20                  25                  30

gac atg cac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg       144
Asp Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45
```

```
aca gtt gta tca tat gat gga act aat aaa tat tat gca gag tcc gtg       192
Thr Val Val Ser Tyr Asp Gly Thr Asn Lys Tyr Tyr Ala Glu Ser Val
    50                  55                  60

cag ggc cga ttc acc atc tcc aga gac aat tcc aag aac acg ctg tat       240
Gln Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga act gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Thr Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aaa gaa ggt gga tgg ggg aat aca gta act acg tcc tac tac tac       336
Ala Lys Glu Gly Gly Trp Gly Asn Thr Val Thr Thr Ser Tyr Tyr Tyr
            100                 105                 110

tac ggt atg gat gtc tgg ggc caa ggg acc acg gtc acc gtc tcc tca       384
Tyr Gly Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
        115                 120                 125

gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag       432
Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
    130                 135                 140

agc acc tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac       480
Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
145                 150                 155                 160

ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc       528
Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
                165                 170                 175

ggc gtg cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc       576
Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
            180                 185                 190

ctc agc agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc       624
Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
        195                 200                 205

tac atc tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag       672
Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
    210                 215                 220

aga gtc                                                               678
Arg Val
225
```

<210> 2260
<211> 657
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2260

```
gag gtg cag ttg gtg gag tct ggg gga ggc ctg gtc agg ccg ggg ggg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Arg Pro Gly Gly
1               5                  10                  15

tcc ctg aga ctc tcc tgt gtt ggc tct gga ttc acc ttc agt ccc tat        96
Ser Leu Arg Leu Ser Cys Val Gly Ser Gly Phe Thr Phe Ser Pro Tyr
            20                  25                  30

agt ata aac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtc       144
Ser Ile Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca tcg att act agt acc agt agt tac tta gac tac gca gac tca gta       192
Ser Ser Ile Thr Ser Thr Ser Ser Tyr Leu Asp Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tca gtg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Val Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gtc gag gac acg gct gtc tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

acg agg gat ggg gga tac ttc gca act ggc gag ttt gac tac tgg ggc       336
Thr Arg Asp Gly Gly Tyr Phe Ala Thr Gly Glu Phe Asp Tyr Trp Gly
            100                 105                 110

cag gga acc atg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg       384
Gln Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg       432
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       480
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       528
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       576
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac       624
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
```

```
        195                 200                 205

aag ccc agc aac acc aag gtg gac aag aga gct                              657
Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Ala
    210                 215

<210> 2261
<211> 666
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2261
ccg gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tca cag        48
Pro Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gln
1               5                   10                  15

acc ctg tcc ctc acc tgc act gtc tct ggt ggc tcc atc acc agt ggt        96
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Thr Ser Gly
            20                  25                  30

agt tac ttc tgg agt tgg atc cgg cag ccc gcc ggg gag ggg ctg gag       144
Ser Tyr Phe Trp Ser Trp Ile Arg Gln Pro Ala Gly Glu Gly Leu Glu
        35                  40                  45

tgg att ggg cgt ata tat acc agt ggg agc acc aac tac aac ccc tcc       192
Trp Ile Gly Arg Ile Tyr Thr Ser Gly Ser Thr Asn Tyr Asn Pro Ser
    50                  55                  60

ctc aag agt cga gtc acc ata tca gca gac acg tcc aag aac cac ttc       240
Leu Lys Ser Arg Val Thr Ile Ser Ala Asp Thr Ser Lys Asn His Phe
65                  70                  75                  80

tcc ctg gag ctg agc tct gtg acc gcc gca gac acg gcc atg tat ttc       288
Ser Leu Glu Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Met Tyr Phe
                85                  90                  95

tgt gcg aga gag cgc ttt ggc caa ggt gcc ctt gac tac tgg ggc cag       336
Cys Ala Arg Glu Arg Phe Gly Gln Gly Ala Leu Asp Tyr Trp Gly Gln
            100                 105                 110

gga acc ctg gtc acc gtc tcc tca gca tcc ccg acc agc ccc aag gtc       384
Gly Thr Leu Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro Lys Val
        115                 120                 125

ttc ccg ctg agc ctc gac agc acc ccc caa gat ggg aac gtg gtc gtc       432
Phe Pro Leu Ser Leu Asp Ser Thr Pro Gln Asp Gly Asn Val Val Val
    130                 135                 140

gca tgc ctg gtc cag ggc ttc ttc ccc cag gag cca ctc agt gtg acc       480
Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val Thr
```

```
145                 150                 155                 160

tgg agc gaa agc gga cag aac gtg acc gcc aga aac ttc cca cct agc       528
Trp Ser Glu Ser Gly Gln Asn Val Thr Ala Arg Asn Phe Pro Pro Ser
                165                 170                 175

cag gat gcc tcc ggg gac ctg tac acc acg agc agc cag ctg acc ctg       576
Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr Leu
            180                 185                 190

ccg gcc aca cag tgc cca gac ggc aag tcc gtg aca tgc cac gtg aag       624
Pro Ala Thr Gln Cys Pro Asp Gly Lys Ser Val Thr Cys His Val Lys
        195                 200                 205

cac tac acg aat tcc agc cag gat gtg act gtg ccc tgc ccc               666
His Tyr Thr Asn Ser Ser Gln Asp Val Thr Val Pro Cys Pro
    210                 215                 220

<210> 2262
<211> 663
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2262
cag ctg cat ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg gag        48
Gln Leu His Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15

aca ctg tcc ctc acc tgc act gtc tct ggt ggc tcc gtc agc agt agt        96
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Val Ser Ser Ser
            20                  25                  30

agt tac tac tgg ggc tgg gtc cgc cag ccc cca ggg aag ggg ctg gag       144
Ser Tyr Tyr Trp Gly Trp Val Arg Gln Pro Pro Gly Lys Gly Leu Glu
        35                  40                  45

tgg att ggc cat gtc tat tac agt ggg agg acc tac tac aac ccg tcc       192
Trp Ile Gly His Val Tyr Tyr Ser Gly Arg Thr Tyr Tyr Asn Pro Ser
    50                  55                  60

ctc aag agt cga gcc acc ata tcc tta gat acg tcc aag aat cag ttt       240
Leu Lys Ser Arg Ala Thr Ile Ser Leu Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

tcc ctg aag ctg agc tct ctc acc gcc aca gac acg gct gtc tat tac       288
Ser Leu Lys Leu Ser Ser Leu Thr Ala Thr Asp Thr Ala Val Tyr Tyr
                85                  90                  95

tgt gcg acc atc gtc gct gcc tac agc tat ggt ttc gag ttc gac ccc       336
Cys Ala Thr Ile Val Ala Ala Tyr Ser Tyr Gly Phe Glu Phe Asp Pro
```

```
            100                 105                 110

tgg ggc cag gga atc ctg gtc atc gtc tcc tca gcc tcc acc aag ggc       384
Trp Gly Gln Gly Ile Leu Val Ile Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125

cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc       432
Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
    130                 135                 140

aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg       480
Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc       528
Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165                 170                 175

ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg       576
Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg       624
Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

aat cac aag ccc agc aac acc aag gtg gac aag aga gcc                   663
Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Ala
    210                 215                 220

<210> 2263
<211> 678
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2263
cag gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt aac tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Tyr
            20                  25                  30

gac atg cac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg       144
Asp Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

aca gtt gta tca tat gat gga act aat aaa tat tat gca gag tcc gtg       192
Thr Val Val Ser Tyr Asp Gly Thr Asn Lys Tyr Tyr Ala Glu Ser Val
```

```
    50                  55                  60

cag ggc cga ttc acc atc tcc aga gac aat tcc aag aac acg ctg tat       240
Gln Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga act gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Thr Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aaa gaa ggt gga tgg ggg aat aca gta act acg tcc tac tac tac       336
Ala Lys Glu Gly Gly Trp Gly Asn Thr Val Thr Thr Ser Tyr Tyr Tyr
            100                 105                 110

tac ggt atg gat gtc tgg ggc caa ggg acc acg gtc acc gtc tcc tca       384
Tyr Gly Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
        115                 120                 125

gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag       432
Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
    130                 135                 140

agc acc tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac       480
Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
145                 150                 155                 160

ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc       528
Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
                165                 170                 175

ggc gtg cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc       576
Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
            180                 185                 190

ctc agc agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc       624
Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
        195                 200                 205

tac atc tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag       672
Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
    210                 215                 220

aga gtt                                                               678
Arg Val
225
```

<210> 2264
<211> 365
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2264
g gtt cag ctg gtg cag tct gga gca gag gtg aga aag ccg ggg gag tct 49
Val Gln Leu Val Gln Ser Gly Ala Glu Val Arg Lys Pro Gly Glu Ser
1 5 10 15

ctg acg atc tcc tgt aag act tct ggc tac gcc ttt atc ggt aac tgg 97
Leu Thr Ile Ser Cys Lys Thr Ser Gly Tyr Ala Phe Ile Gly Asn Trp
20 25 30

atc ggc tgg gtg cgc cag agg ccc ggg aaa ggc ctg gag tgg atc gga 145
Ile Gly Trp Val Arg Gln Arg Pro Gly Lys Gly Leu Glu Trp Ile Gly
35 40 45

atg att tat cct gtt gac tct gat acc aga tat agt ccg tcc ttc caa 193
Met Ile Tyr Pro Val Asp Ser Asp Thr Arg Tyr Ser Pro Ser Phe Gln
50 55 60

ggc cag gtc acc atc tca gtc gac aag tcc atc agg acc gcc tat ctg 241
Gly Gln Val Thr Ile Ser Val Asp Lys Ser Ile Arg Thr Ala Tyr Leu
65 70 75 80

cag tgg aac agt ctg cgg gcc tca gac acc gcc acc tat tat tgt gcg 289
Gln Trp Asn Ser Leu Arg Ala Ser Asp Thr Ala Thr Tyr Tyr Cys Ala
85 90 95

cga cag gga ttt gag gct ctg gtt att cga ggc ttt gac tac tgg ggc 337
Arg Gln Gly Phe Glu Ala Leu Val Ile Arg Gly Phe Asp Tyr Trp Gly
100 105 110

cag gga acc gtt gtc act gtc tcc tca g 365
Gln Gly Thr Val Val Thr Val Ser Ser
115 120

<210> 2265
<211> 668
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2265
gt gag ggg cag ctg ttg gag tct ggg gga ggc ttg gtt cag ccg ggg 47
Glu Gly Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
1 5 10 15

ggg tcc ctg aga ctc tcc tgt gaa gcc tct gga ttc acc ttt tcc ttt 95
Gly Ser Leu Arg Leu Ser Cys Glu Ala Ser Gly Phe Thr Phe Ser Phe
20 25 30

agc agt tat gcc atg agt tgg gtc cgc cag gct cca ggg agg gga ctg 143
Ser Ser Tyr Ala Met Ser Trp Val Arg Gln Ala Pro Gly Arg Gly Leu

```
            35                  40                  45

gag tgg gtc tca gtt acc ggt ggt agt ggt tat acc aaa tac tac gca       191
Glu Trp Val Ser Val Thr Gly Gly Ser Gly Tyr Thr Lys Tyr Tyr Ala
        50                  55                  60

gac tcc gtg aag ggc cgg ttc acc gtc tcc aga gac aat tcc aag aac       239
Asp Ser Val Lys Gly Arg Phe Thr Val Ser Arg Asp Asn Ser Lys Asn
    65                  70                  75

acc ctc tat ctg caa atg aac agc ctg cga gcc gag gac acg gcc cta       287
Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Leu
80                  85                  90                  95

tat tac tgt gcg agg aga tct acc agt agc ccc tct ttc agc act ctg       335
Tyr Tyr Cys Ala Arg Arg Ser Thr Ser Ser Pro Ser Phe Ser Thr Leu
                100                 105                 110

gac gtc tgg ggc cga ggg gcc acg gtc atc gtc tcc tca gcc tcc acc       383
Asp Val Trp Gly Arg Gly Ala Thr Val Ile Val Ser Ser Ala Ser Thr
            115                 120                 125

aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct       431
Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
        130                 135                 140

ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa       479
Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
    145                 150                 155

ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac       527
Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
160                 165                 170                 175

acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc       575
Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
                180                 185                 190

gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc       623
Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
            195                 200                 205

aac gtg aat cac aag ccc agc aac acc aag gtg gac aag agt gag           668
Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
        210                 215                 220
```

<210> 2266
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2266

```
gtg gtg cag ctg gtg gag tct ggg gga ggc ttg gta cag cct gga ggg        48
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                  10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc aat aat tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asn Asn Tyr
            20                  25                  30

gaa atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtt       144
Glu Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca tac att agt agt agt ggt agt acc ata tac tat gca gac tct gtg       192
Ser Tyr Ile Ser Ser Ser Gly Ser Thr Ile Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tca ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gcc gag gac acg gct gtt tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga caa atg gtg act acg agg ggc tac tgg ggc cag gga acc ctg       336
Ala Arg Gln Met Val Thr Thr Arg Gly Tyr Trp Gly Gln Gly Thr Leu
            100                 105                 110

gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg       384
Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu
        115                 120                 125

gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc tgc       432
Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys
    130                 135                 140

ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca       480
Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
145                 150                 155                 160

ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag tcc       528
Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser
                165                 170                 175

tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc agc       576
Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser
            180                 185                 190

ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc agc aac       624
Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn
        195                 200                 205
```

```
acc aag gtg gac aag aat gtg                                             645
Thr Lys Val Asp Lys Asn Val
    210                 215

<210> 2267
<211> 663
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2267
gag gtg cag ctg gtg gag tct ggg gga ggc ttg gtc cag cct ggg ggg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt agt agc aat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Asn
            20                  25                  30

tgg atg agc tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtg       144
Trp Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gcc aac ata aag gaa gat gga agt gag aaa tac tac gtg gac tct gtg       192
Ala Asn Ile Lys Glu Asp Gly Ser Glu Lys Tyr Tyr Val Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc att ttt aga gac aac gcc aag aac tca ctg tat       240
Lys Gly Arg Phe Thr Ile Phe Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gcc gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gtc cca tct cgc tat ggc cgt tcc agg ggc gct ttt gat atc       336
Ala Arg Val Pro Ser Arg Tyr Gly Arg Ser Arg Gly Ala Phe Asp Ile
            100                 105                 110

tgg ggc caa ggg aca atg gtc acc gtc tct tca gcc tcc acc aag ggc       384
Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125

cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc       432
Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
    130                 135                 140

aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg       480
Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160
```

```
acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc       528
Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165                 170                 175

ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg       576
Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg       624
Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

aat cac aag ccc agc aac acc aag gtg gac aag aga gtg                   663
Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220

<210> 2268
<211> 656
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2268
cc cag gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tca         47
   Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser
   1               5                  10                  15

cag acc ctg tcc ctc acc tgc act gtc tct ggt ggc tcc atc agc agt        95
Gln Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser
                20                  25                  30

ggt ggt tac tac tgg agc tgg atc cgc cag cac cca ggg aag ggc ctg       143
Gly Gly Tyr Tyr Trp Ser Trp Ile Arg Gln His Pro Gly Lys Gly Leu
            35                  40                  45

gag tgg att ggg tac atc tat tac agt ggg agc acc tac tac aac ccg       191
Glu Trp Ile Gly Tyr Ile Tyr Tyr Ser Gly Ser Thr Tyr Tyr Asn Pro
        50                  55                  60

tcc ctc aag agt cta gtt acc ata tca gta gac acg tct aag aac cag       239
Ser Leu Lys Ser Leu Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln
    65                  70                  75

ttc tcc ctg aag ctg agc tct gtg act gcc gcg gac acg gcc gtg tat       287
Phe Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr
80                  85                  90                  95

tac tgt gcg aga aat ctt tat cgt ctg ggc tgg ttc gac ccc tgg ggc       335
Tyr Cys Ala Arg Asn Leu Tyr Arg Leu Gly Trp Phe Asp Pro Trp Gly
                100                 105                 110
```

```
cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg       383
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
            115                 120                 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg       431
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
        130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       479
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
    145                 150                 155

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       527
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
160                 165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       575
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
                180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac       623
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
            195                 200                 205

aag ccc agc aac acc aag gtg gac aag aaa gtg                           656
Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
        210                 215

<210> 2269
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2269
cag gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acg ttc agt agc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

ggc atg cac tgg gtc cgt cag gct cca ggc aag ggg ctg gag tgg gtg       144
Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gca att ata tca tat gat gga agt aat aaa tat tat gca gac tcc gtg       192
Ala Ile Ile Ser Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val
    50                  55                  60
```

```
aag ggc cga ttc acc atc tcc aga gac aaa tcc aag aac acg ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Lys Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gct gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aaa tcg aaa ggt aac tac cgg gac gct atg gac gtc tgg ggc caa       336
Ala Lys Ser Lys Gly Asn Tyr Arg Asp Ala Met Asp Val Trp Gly Gln
            100                 105                 110

ggg acc acg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc       384
Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       432
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       624
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

ccc agc aac acc aag gtg gac aag aga gtt                               654
Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215
```

<210> 2270
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2270

```
cag gtg ctt ctg gtg gag tct ggg ggc ggc ttg gtc aag cct gga ggg        48
Gln Val Leu Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1               5                   10                  15
```

```
tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt gac tac        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asp Tyr
            20                  25                  30

tac atg agc tgg atc cgc cag gct cca ggg aag ggg ctg gag tgg gtt       144
Tyr Met Ser Trp Ile Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca tac att ggt agt agt act act gcc ata tac tac gca gac tct gtg       192
Ser Tyr Ile Gly Ser Ser Thr Thr Ala Ile Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc cgg gac aac gcc agg aac tcg ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Arg Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg cga gcc gag gac acg gcc gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg acc tca tat aca gta acg act ttc tac ggt atg gac gtc tgg ggc       336
Ala Thr Ser Tyr Thr Val Thr Thr Phe Tyr Gly Met Asp Val Trp Gly
            100                 105                 110

caa ggg acc acg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg       384
Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg       432
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       480
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       528
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       576
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac       624
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

aag ccc agc aac acc aag gtg gac aag aga gtg                           657
Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215
```

<210> 2271
<211> 656

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2271
```
cc cag gtg cag ctg cag gag tcg ggc cca ggg ctg gtg aag cct tca         47
   Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser
   1               5                  10                  15

cag acc ctg tcc ctc acc tgc gct gtc tct ggt ggc tcc atc agc agt        95
Gln Thr Leu Ser Leu Thr Cys Ala Val Ser Gly Gly Ser Ile Ser Ser
                20                  25                  30

ggt ggt tac ccc tgg agc tgg atc cgg cag cca cca ggg aag gga ctg       143
Gly Gly Tyr Pro Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu
            35                  40                  45

gag tgg att ggg tat atc tct tac agt ggg agc acc gac tac aac ccg       191
Glu Trp Ile Gly Tyr Ile Ser Tyr Ser Gly Ser Thr Asp Tyr Asn Pro
        50                  55                  60

tcc ctc aag agt cga gtt acc ata tcg ctg gac acg tcc agt aac cag       239
Ser Leu Lys Ser Arg Val Thr Ile Ser Leu Asp Thr Ser Ser Asn Gln
    65                  70                  75

ttc tcc ctg aac ctg tcc tct ctg acc gcc gcg gac acg gcc gtg tat       287
Phe Ser Leu Asn Leu Ser Ser Leu Thr Ala Ala Asp Thr Ala Val Tyr
80                  85                  90                  95

tac tgt gcc aga ggg gcg gcc ttc tac tac ggt atg gac gtc tgg ggc       335
Tyr Cys Ala Arg Gly Ala Ala Phe Tyr Tyr Gly Met Asp Val Trp Gly
                100                 105                 110

caa ggg acc acg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg       383
Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
            115                 120                 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg       431
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
        130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       479
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
    145                 150                 155

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       527
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
160                 165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       575
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
```

```
                180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac       623
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
            195                 200                 205

aag ccc agc aac acc aag gtg gac aag aga gtg                           656
Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
        210                 215
```

<210> 2272
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2272

```
cag gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg gag        48
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15

acc ctg tcc ctc acc tgc act gtc tct ggt ggc tcc atc agt att tac        96
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ile Tyr
            20                  25                  30

tac tgg agc tgg atc cgg cag ccc cca ggg aag gga ctg gag tgg att       144
Tyr Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Ile
        35                  40                  45

gga tat atc tat tat agt ggg agc acc aac tac aac ccc tcc ctc aag       192
Gly Tyr Ile Tyr Tyr Ser Gly Ser Thr Asn Tyr Asn Pro Ser Leu Lys
    50                  55                  60

agt cga gtc acc ata tca gta gac acg tcc aag aac cag ttc tcc ctg       240
Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe Ser Leu
65                  70                  75                  80

aag ctg agg tct gtg acc gct gcg gac acg gcc gtg tat tac tgt gcg       288
Lys Leu Arg Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala
                85                  90                  95

aga gat acc tac ggt gac ccg agg ggt gac tac ttt gac tac tgg ggc       336
Arg Asp Thr Tyr Gly Asp Pro Arg Gly Asp Tyr Phe Asp Tyr Trp Gly
            100                 105                 110

cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg       384
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg       432
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
```

```
    130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       480
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       528
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       576
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac       624
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

aag ccc agc aac acc aag gtg gac aag aaa gtg                           657
Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215

<210> 2273
<211> 370
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2273
cag gtg cag cta cag gag tcg ggc cca gga ctg gtg aag cct tcg gag        48
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15

acc ctg tcc ctc acc tgc act gtc gct aat agc tcc atc agt agt tac        96
Thr Leu Ser Leu Thr Cys Thr Val Ala Asn Ser Ser Ile Ser Ser Tyr
            20                  25                  30

tac tgg agc tgg gtc cgg cag ccc cca ggg aag gca ctg gag tgg att       144
Tyr Trp Ser Trp Val Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Ile
        35                  40                  45

gga tat atc tct tat tct ggg agc acc aac tac aac ccc tcc ctc aag       192
Gly Tyr Ile Ser Tyr Ser Gly Ser Thr Asn Tyr Asn Pro Ser Leu Lys
    50                  55                  60

agt cga gtc acc atg tca cta gac acg ccc aag agc cag ttc tcc cta       240
Ser Arg Val Thr Met Ser Leu Asp Thr Pro Lys Ser Gln Phe Ser Leu
65                  70                  75                  80

aac ctg agc tct gtg acc ggc gca gac acg gcc ata tat tac tgt gcg       288
Asn Leu Ser Ser Val Thr Gly Ala Asp Thr Ala Ile Tyr Tyr Cys Ala
```

```
                85                  90                  95

aga ctg tgg ggt agc ggt gac tgg tgg ccc tcc ctg tat ttt gac tcc       336
Arg Leu Trp Gly Ser Gly Asp Trp Trp Pro Ser Leu Tyr Phe Asp Ser
            100                 105                 110

tgg ggc cag gga acc ctg gtc acc gtc tcc tca g                         370
Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 2274
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2274

```
gtg gtg cag ctg gtg gag tct ggg gga ggc ttg gtc cag cct ggg ggg        48
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt aat agc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asn Ser Tyr
            20                  25                  30

tgg atg agc tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtg       144
Trp Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gcc aac ata aag caa gat gga agt gag aaa tac tat gtg gac tct gtg       192
Ala Asn Ile Lys Gln Asp Gly Ser Glu Lys Tyr Tyr Val Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tca ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gcc gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga atc cgg cgt ata gca gca act agt ttt gac tac tgg ggc cag       336
Ala Arg Ile Arg Arg Ile Ala Ala Thr Ser Phe Asp Tyr Trp Gly Gln
            100                 105                 110

gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc       384
Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       432
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
```

```
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       624
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

ccc agc aac acc aag gtg gac aag aat gtg                               654
Pro Ser Asn Thr Lys Val Asp Lys Asn Val
    210                 215

<210> 2275
<211> 675
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2275
gaa gtg cag ctg gtg gag tct ggg gga ggc ttg gta cag cct ggc agg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt gat gat tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asp Asp Tyr
            20                  25                  30

gcc atg cac tgg gtc cgg caa gct cca ggg aag ggc ctg gag tgg gtc       144
Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca ggt att agt tgg aat agt ggt agt ata ggc tat gcg gac tct gtg       192
Ser Gly Ile Ser Trp Asn Ser Gly Ser Ile Gly Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tcc ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg aac agt ctg aga gct gag gac acg gcc ttg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Leu Tyr Tyr Cys
```

```
                85                  90                  95

gca aaa ata gca cgt cgt cct ccc agt ttt tac gac tac atg gac gtc       336
Ala Lys Ile Ala Arg Arg Pro Pro Ser Phe Tyr Asp Tyr Met Asp Val
            100                 105                 110

tgg ggc aaa ggg acc acg gtc acc gtc tcc tca gca tcc ccg acc agc       384
Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser Ala Ser Pro Thr Ser
        115                 120                 125

ccc aag gtc ttc ccg ctg agc ctc tgc agc acc cag cca gat ggg aac       432
Pro Lys Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn
    130                 135                 140

gtg gtc atc gcc tgc ctg gtc cag ggc ttc ttc ccc cag gag cca ctc       480
Val Val Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu
145                 150                 155                 160

agt gtg acc tgg agc gaa agc gga cag ggc gtg acc gcc aga aac ttc       528
Ser Val Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe
                165                 170                 175

cca ccc agc cag gat gcc tcc ggg gac ctg tac acc acg agc agc cag       576
Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln
            180                 185                 190

ctg acc ctg ccg gcc aca cag tgc cta gcc ggc aag tcc gtg aca tgc       624
Leu Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys
        195                 200                 205

cac gtg aag cac tac acg aat ccc agc cag gat gtg act gtg ccc tgc       672
His Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys
    210                 215                 220

cca                                                                   675
Pro
225
```

<210> 2276
<211> 675
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2276

```
gag gtg cag ctg gtg cag tct gga gca gag gtg aaa aag ccg ggg gag        48
Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1               5                   10                  15

tct ctg aag atc tcc tgt cag ggt tct ggt tac agg ttt aac gcc tac        96
Ser Leu Lys Ile Ser Cys Gln Gly Ser Gly Tyr Arg Phe Asn Ala Tyr
```

```
            20                  25                  30

tgg atc ggc tgg gtg cgc cag atc ccc ggg aaa ggc ctg gag tgg atg       144
Trp Ile Gly Trp Val Arg Gln Ile Pro Gly Lys Gly Leu Glu Trp Met
        35                  40                  45

ggg atc atc tat cct ggt gac tct gat acc aaa tac agc cca tcc ttc       192
Gly Ile Ile Tyr Pro Gly Asp Ser Asp Thr Lys Tyr Ser Pro Ser Phe
    50                  55                  60

caa ggc cag gtc acc atc tca gcc gac aag tcc atc agc acc gcc tac       240
Gln Gly Gln Val Thr Ile Ser Ala Asp Lys Ser Ile Ser Thr Ala Tyr
65                  70                  75                  80

ctg cag tgg aac ggc ctg gag gcc tcg gac acc gcc gtc tat tac tgt       288
Leu Gln Trp Asn Gly Leu Glu Ala Ser Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg agg tcg aca agt agt tcc acc tcc gac ttc cac tac atg gac gta       336
Ala Arg Ser Thr Ser Ser Ser Thr Ser Asp Phe His Tyr Met Asp Val
            100                 105                 110

tgg ggc aag ggg acc acg gtc acc atc tcc tca gca tcc ccg acc agc       384
Trp Gly Lys Gly Thr Thr Val Thr Ile Ser Ser Ala Ser Pro Thr Ser
        115                 120                 125

ccc aag gtc ttc ccg ctg agc ctc tgc agc acc cag cca gat ggg aac       432
Pro Lys Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn
    130                 135                 140

gtg gtc atc gcc tgc ctg gtc cag ggc ttc ttc ccc cag gag cca ctc       480
Val Val Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu
145                 150                 155                 160

agt gtg acc tgg agc gaa agc gga cag ggc gtg acc gcc aga aac ttc       528
Ser Val Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe
                165                 170                 175

cca ccc agc cag gat gcc tcc ggg gac ctg tac acc acg agc agc cag       576
Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln
            180                 185                 190

ctg acc ctg ccg gcc aca cag tgc cta gcc ggc aag tcc gtg aca tgc       624
Leu Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys
        195                 200                 205

cac gtg aag cac tac acg aat ccc agc cag gat gtg act gtg ccc tgc       672
His Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys
    210                 215                 220

cca                                                                   675
Pro
225
```

<210> 2277
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2277
```
cac gta caa ctg cta cag tcc ggt cca gga ctg gtg aag ccc tcg cag        48
His Val Gln Leu Leu Gln Ser Gly Pro Gly Leu Val Lys Pro Ser Gln
1               5                   10                  15

acc ctc tca ctc acc tgt gcc atc tcc ggg gac agt gtc tct agt acc        96
Thr Leu Ser Leu Thr Cys Ala Ile Ser Gly Asp Ser Val Ser Ser Thr
            20                  25                  30

agt ggt gct tgg aac tgg atc agg cag tcc cca tcg aga ggc ctt gag       144
Ser Gly Ala Trp Asn Trp Ile Arg Gln Ser Pro Ser Arg Gly Leu Glu
        35                  40                  45

tgg ctg gga agg aca tac tac agg tcc cag tgg atg aat gat tat gca       192
Trp Leu Gly Arg Thr Tyr Tyr Arg Ser Gln Trp Met Asn Asp Tyr Ala
    50                  55                  60

gaa tct gtg aga agt cga ata acc atc aac cct gac aca tcc aag aac       240
Glu Ser Val Arg Ser Arg Ile Thr Ile Asn Pro Asp Thr Ser Lys Asn
65                  70                  75                  80

caa ttc tcc ctg cag ttg aaa tct gtg act ccc gag gac acg gct gtt       288
Gln Phe Ser Leu Gln Leu Lys Ser Val Thr Pro Glu Asp Thr Ala Val
                85                  90                  95

tat tac tgt aca aga gga tgg gca ttc acc agc tcc gac tgg ggc cag       336
Tyr Tyr Cys Thr Arg Gly Trp Ala Phe Thr Ser Ser Asp Trp Gly Gln
            100                 105                 110

gga acc cag gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc       384
Gly Thr Gln Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

ttc ccc ctg gcg ccc tgc tcc agg agc acc tcc gag agc aca gcg gcc       432
Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

tgg aac tca ggc gct ctg acc agc ggc gtg cac acc ttc cca gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175
```

```
cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

tcc agc aac ttc ggc acc cag acc tac acc tgc aac gta gat cac aag       624
Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His Lys
        195                 200                 205

ccc agc aac acc aag gtg gac aag aca gtg                               654
Pro Ser Asn Thr Lys Val Asp Lys Thr Val
    210                 215
```

<210> 2278
<211> 666
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2278

```
cac gta cac ctg cag cag tca ggt cca gga ctg gtg acg ccc tcg cag        48
His Val His Leu Gln Gln Ser Gly Pro Gly Leu Val Thr Pro Ser Gln
1               5                   10                  15

acc ctc tca ctc acc tgt gcc atc tcc ggg gac agt gtc tct agc aac        96
Thr Leu Ser Leu Thr Cys Ala Ile Ser Gly Asp Ser Val Ser Ser Asn
            20                  25                  30

agt gct gct tgg aac tgg atc agg cag tcc cca tcg aga ggc ctt gag       144
Ser Ala Ala Trp Asn Trp Ile Arg Gln Ser Pro Ser Arg Gly Leu Glu
        35                  40                  45

tgg ctg gga agg aca tac tac agg tcc aag tgg tat aat gac tat gca       192
Trp Leu Gly Arg Thr Tyr Tyr Arg Ser Lys Trp Tyr Asn Asp Tyr Ala
    50                  55                  60

gta tct gtg aaa agt cga ata acc ttc aag gca gac acg tcc aag aac       240
Val Ser Val Lys Ser Arg Ile Thr Phe Lys Ala Asp Thr Ser Lys Asn
65                  70                  75                  80

cag ttc tcc ctg cag ctg gac tct gtg act ccc gac gac acg gct gtg       288
Gln Phe Ser Leu Gln Leu Asp Ser Val Thr Pro Asp Asp Thr Ala Val
                85                  90                  95

tat tac tgt gca gga gga tgg gcc ctt ggc tac tgg ggc cag gga acc       336
Tyr Tyr Cys Ala Gly Gly Trp Ala Leu Gly Tyr Trp Gly Gln Gly Thr
            100                 105                 110

ctg gtc acc gtc tcc tca ggg agt gca tcc gcc cca acc ctt ttc ccc       384
Leu Val Thr Val Ser Ser Gly Ser Ala Ser Ala Pro Thr Leu Phe Pro
        115                 120                 125
```

```
ctc gtc tcc tgt gag aat tcc ccg tcg gat acg agc agc gtg gcc gtt       432
Leu Val Ser Cys Glu Asn Ser Pro Ser Asp Thr Ser Ser Val Ala Val
    130                 135                 140

ggc tgc ctc gca cag gac ttc ctt ccc gac tcc atc act ttc tcc tgg       480
Gly Cys Leu Ala Gln Asp Phe Leu Pro Asp Ser Ile Thr Phe Ser Trp
145                 150                 155                 160

aaa tac aag aac aac tct gac atc agc agc acc cgg ggc ttc cca tca       528
Lys Tyr Lys Asn Asn Ser Asp Ile Ser Ser Thr Arg Gly Phe Pro Ser
                165                 170                 175

gtc ctg aga ggg ggc aag tac gca gcc acc tca cag gtg ctg ctg cct       576
Val Leu Arg Gly Gly Lys Tyr Ala Ala Thr Ser Gln Val Leu Leu Pro
            180                 185                 190

tcc aag gag gtc atg cag ggc aca gac gaa cac gtg gtg tgc aaa gtc       624
Ser Lys Glu Val Met Gln Gly Thr Asp Glu His Val Val Cys Lys Val
        195                 200                 205

cag cac ccc aac ggc aac aaa gaa aag aac gtg cct ctt cca               666
Gln His Pro Asn Gly Asn Lys Glu Lys Asn Val Pro Leu Pro
    210                 215                 220

<210> 2279
<211> 349
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2279
ccc gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg gag        48
Pro Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15

acc ctg tcc ctc acc tgc act gtc tct ggt ggc tcc atc agt agt tac        96
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Tyr
            20                  25                  30

tac tgg agc tgg atc cgg cag ccc cca ggg aag gga ctg gag tgg att       144
Tyr Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Ile
        35                  40                  45

ggg tat ctc ttt tac agt ggg agc acc aac tac aac ccc tcc ctc aag       192
Gly Tyr Leu Phe Tyr Ser Gly Ser Thr Asn Tyr Asn Pro Ser Leu Lys
    50                  55                  60

agt cga gtc acc ata tca gta gac acg tcc aag aac cag ttc tcc ctg       240
Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe Ser Leu
65                  70                  75                  80
```

```
aag ttg ggc tct gtg acc gcc gca gac acg gcc gtg tat tac tgt gcg       288
Lys Leu Gly Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala
                85                  90                  95

aga cac cga att ttc ggt ttg gac gtc tgg ggc caa ggg acc acg gtc       336
Arg His Arg Ile Phe Gly Leu Asp Val Trp Gly Gln Gly Thr Thr Val
            100                 105                 110

acc gtc tcc tca g                                                    349
Thr Val Ser Ser
        115
```

<210> 2280
<211> 691
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2280

```
c tgt gcc gag gtg cag ctg gtg cag tct gga gca gag gtg aaa aag ccc      49
  Cys Ala Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro
  1               5                  10                  15

ggg gag tct ctg aag atc tcc tgt aag ggt tct gga tac agc ttt acc        97
Gly Glu Ser Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Thr
            20                  25                  30

agc tac tgg atc ggc tgg gtg cgc cag atg ccc ggg aaa ggc ctg gag       145
Ser Tyr Trp Ile Gly Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu
        35                  40                  45

tgg atg ggg atc atc tat cct ggt gac tct gat acc aga tac agc ccg       193
Trp Met Gly Ile Ile Tyr Pro Gly Asp Ser Asp Thr Arg Tyr Ser Pro
    50                  55                  60

tcc ttc caa ggc cag gtc acc atc tca gcc gac aag tcc atc agc acc       241
Ser Phe Gln Gly Gln Val Thr Ile Ser Ala Asp Lys Ser Ile Ser Thr
65                  70                  75                  80

gcc tac ctg cag tgg agc agc ctg aag gcc tcg gac acc gcc atg tat       289
Ala Tyr Leu Gln Trp Ser Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr
                85                  90                  95

tac tgt gcg aga cgc gga ccg acc gat aca tgg tca ggg gaa gtt ggc       337
Tyr Cys Ala Arg Arg Gly Pro Thr Asp Thr Trp Ser Gly Glu Val Gly
            100                 105                 110

tac tac ttt gac tac tgg ggc cag gga acc ctg gtc acc gtc tcc tca       385
Tyr Tyr Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125
```

```
gca tcc ccg acc agc ccc aag gtc ttc ccg ctg agc ctc tgc agc acc       433
Ala Ser Pro Thr Ser Pro Lys Val Phe Pro Leu Ser Leu Cys Ser Thr
    130                 135                 140

cag cca gat ggg aac gtg gtc atc gcc tgc ctg gtc cag ggc ttc ttc       481
Gln Pro Asp Gly Asn Val Val Ile Ala Cys Leu Val Gln Gly Phe Phe
145                 150                 155                 160

ccc cag gag cca ctc agt gtg acc tgg agc gaa agc gga cag ggc gtg       529
Pro Gln Glu Pro Leu Ser Val Thr Trp Ser Glu Ser Gly Gln Gly Val
                165                 170                 175

acc gcc aga aac ttc cca ccc agc cag gat gcc tcc ggg gac ctg tac       577
Thr Ala Arg Asn Phe Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr
            180                 185                 190

acc acg agc agc cag ctg acc ctg ccg gcc aca cag tgc cta gcc ggc       625
Thr Thr Ser Ser Gln Leu Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly
        195                 200                 205

aag tcc gtg aca tgc cac gtg aag cac tac acg aat ccc agc cag gat       673
Lys Ser Val Thr Cys His Val Lys His Tyr Thr Asn Pro Ser Gln Asp
    210                 215                 220

gtg act gtg ccc tgc ccg                                              691
Val Thr Val Pro Cys Pro
225                 230
```

<210> 2281
<211> 669
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2281

```
cag tgt cag gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct        48
Gln Cys Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro
1               5                   10                  15

ggg agg tcc ctg aga ctc tcc tgt gca gcg tct gga ttc acc ttc agt        96
Gly Arg Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser
            20                  25                  30

agc tat ggc atg cac tgg gtc cgc cag gct cca ggc aag ggg ctg gag       144
Ser Tyr Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu
        35                  40                  45

tgg gtg gca gtt ata tgg tat gat gga agt aat aaa tac tat gca gac       192
Trp Val Ala Val Ile Trp Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp
    50                  55                  60
```

```
tcc gtg aag ggc cga ttc acc atc tcc aga gac aat tcc aag aac acg       240
Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr
65                  70                  75                  80

ctg tat ctg caa atg aac agc ctg aga gcc gag gac acg gct gtg tat       288
Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr
                85                  90                  95

tac tgt gcg aga gat gga aaa aca tta ggg tac ggt ggt aac tcc gtt       336
Tyr Cys Ala Arg Asp Gly Lys Thr Leu Gly Tyr Gly Gly Asn Ser Val
            100                 105                 110

gac tac tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc       384
Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr
        115                 120                 125

aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct       432
Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
    130                 135                 140

ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa       480
Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145                 150                 155                 160

ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac       528
Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
                165                 170                 175

acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc       576
Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
            180                 185                 190

gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc       624
Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
        195                 200                 205

aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aag gtg           669
Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220
```

<210> 2282
<211> 672
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2282

```
gag gtg cag ctg gtg gag tct ggg gga ggc ctg gtc aag ccg ggg ggg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1               5                   10                  15
```

```
tcc ctg aga ctc tcc tgt gca gtc tct ggg ttc act ttc aga tcc tac        96
Ser Leu Arg Leu Ser Cys Ala Val Ser Gly Phe Thr Phe Arg Ser Tyr
            20                  25                  30

agc atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtc       144
Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca tcc att agt agc agt agt cgt tac gtg gac tac gca gac tca gtg       192
Ser Ser Ile Ser Ser Ser Ser Arg Tyr Val Asp Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tct aga gac aac gcc aag aac tta ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Leu Leu Tyr
65                  70                  75                  80

ctg caa atg aac ttc ctg aga gtc gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Phe Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gct cgg aca gaa act aaa tgg gag gac agg ggg ctt tgg gac tac tgg       336
Ala Arg Thr Glu Thr Lys Trp Glu Asp Arg Gly Leu Trp Asp Tyr Trp
            100                 105                 110

ggc cag gga acc ctg gtc acc gtc tcc tca gca tcc ccg acc agc ccc       384
Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro
        115                 120                 125

aag gtc ttc ccg ctg agc ctc tgc agc acc cag cca gat ggg aac gtg       432
Lys Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val
    130                 135                 140

gtc atc gcc tgc ctg gtc cag ggc ttc ttc ccc cag gag cca ctc agt       480
Val Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser
145                 150                 155                 160

gtg acc tgg agc gaa agc gga cag ggc gtg acc gcc aga aac ttc cca       528
Val Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro
                165                 170                 175

ccc agc cag gat gcc tcc ggg gac ctg tac acc acg agc agc cag ctg       576
Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu
            180                 185                 190

acc ctg ccg gcc aca cag tgc cta gcc ggc aag tcc gtg aca tgc cac       624
Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His
        195                 200                 205

gtg aag cac tac acg aat ccc agc cag gat gtg act gtg ccc tgc cca       672
Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
    210                 215                 220
```

<210> 2283
<211> 645

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2283
```
cag gtc cag ctg gtg caa tct ggg gct gag gtg aag aag cct ggg tcc        48
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1               5                   10                  15

tcg gtg aag gtc tcc tgc aag act tct gga ggc acc ttc agc agt tat        96
Ser Val Lys Val Ser Cys Lys Thr Ser Gly Gly Thr Phe Ser Ser Tyr
            20                  25                  30

act atc agc tgg gtg cga cag gcc cct gga caa ggg cct gag tgg atg       144
Thr Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Pro Glu Trp Met
        35                  40                  45

gga agg atc atc cct ata ctt aat ata aca aac tac gcg cag aag ttc       192
Gly Arg Ile Ile Pro Ile Leu Asn Ile Thr Asn Tyr Ala Gln Lys Phe
    50                  55                  60

cag ggc aga gtc acg att acc gcg gac aaa tcc acg agc aca acc tac       240
Gln Gly Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser Thr Thr Tyr
65                  70                  75                  80

atg gag atg ggc agc ctg aga tct gag gac acg gcc gtg tat ttc tgt       288
Met Glu Met Gly Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Phe Cys
                85                  90                  95

gcg aga tcg ttt tat ggt tca ggt ttg cag tgg ggc cag gga acc ctg       336
Ala Arg Ser Phe Tyr Gly Ser Gly Leu Gln Trp Gly Gln Gly Thr Leu
            100                 105                 110

gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg       384
Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu
        115                 120                 125

gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc tgc       432
Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys
    130                 135                 140

ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca       480
Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
145                 150                 155                 160

ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag tcc       528
Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser
                165                 170                 175

tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc agc       576
Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser
```

```
            180                 185                 190

ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc agc aac       624
Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn
        195                 200                 205

acc aag gtg gac aag aga gtg                                           645
Thr Lys Val Asp Lys Arg Val
    210                 215
```

<210> 2284
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2284

```
ggg gtg gac ctg gtg gag tct ggg gga ggc ctg gtc aag cct ggg ggg        48
Gly Val Asp Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc agc ttc agc aga tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Ser Phe Ser Arg Tyr
            20                  25                  30

aat ata aac tgg gtt cgg cag gct cca ggg aag ggg ctg gag tgg gtc       144
Asn Ile Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca tcc att agt agt act agc aat tac ata tac tac gcg gac tct gtg       192
Ser Ser Ile Ser Ser Thr Ser Asn Tyr Ile Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cgg ttc acc atc tcc aga gac aac gcc aag aac tca ctc tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gcc gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg agg gcc atg ggt ggc tac act tac tac ctt gac gac tgg ggc cag       336
Ala Arg Ala Met Gly Gly Tyr Thr Tyr Tyr Leu Asp Asp Trp Gly Gln
            100                 105                 110

gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc       384
Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       432
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
```

```
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       624
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

ccc agc aac acc aag gtg gac aag aag gtg                               654
Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215

<210> 2285
<211> 666
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2285
cag gtg cag ttg gtg gaa tct ggg gga ggc gtg gtc cag cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc act aat tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Thr Asn Tyr
            20                  25                  30

gcc ata cac tgg gtc cgc cag gct cca gac aag ggg ctg gag tgg gtg       144
Ala Ile His Trp Val Arg Gln Ala Pro Asp Lys Gly Leu Glu Trp Val
        35                  40                  45

tca gtt att tca tat gat gga agt gat gaa tac tac gca gac tcc gtg       192
Ser Val Ile Ser Tyr Asp Gly Ser Asp Glu Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aat tcc aag aac acg gtt tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Val Tyr
65                  70                  75                  80

ctg caa atg agc agc ctg aga gct gag gac acg gct gtc tat cgc tgt       288
Leu Gln Met Ser Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Arg Cys
```

```
                85                  90                  95

gcg agg gcg ggg aaa gac ggc tac aat ttt ttc tac tac ggt atg gac       336
Ala Arg Ala Gly Lys Asp Gly Tyr Asn Phe Phe Tyr Tyr Gly Met Asp
            100                 105                 110

gtc tgg ggc caa ggg acc acg gtc agc gtc tcc tca ccc tcc acc aag       384
Val Trp Gly Gln Gly Thr Thr Val Ser Val Ser Ser Pro Ser Thr Lys
        115                 120                 125

ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg       432
Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
    130                 135                 140

ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg       480
Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145                 150                 155                 160

gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc       528
Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
                165                 170                 175

ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg       576
Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
            180                 185                 190

gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac       624
Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
        195                 200                 205

gtg aat cac aag ccc agc aac acc aag gtg gac aag aag ttg               666
Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Leu
    210                 215                 220
```

<210> 2286
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2286

```
cag gtg cag ttg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcg tgt gca gcg tct gga ttc tcc ttc agt agt ttt        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Ser Phe Ser Ser Phe
            20                  25                  30

ggc atg cac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg       144
Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
```

```
        35                  40                  45

gca gtt ata tgg cat gat gga agt cat aaa tct cat gca gac tcc gtg       192
Ala Val Ile Trp His Asp Gly Ser His Lys Ser His Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aat tcc aag aac acg gtg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Val Tyr
65                  70                  75                  80

cta caa atg aac agc ctg gga gcc gag gac acg gct gta tat tac tgt       288
Leu Gln Met Asn Ser Leu Gly Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga ggg atc atg act aca gca att tcc tac tac ttt gac tac tgg       336
Ala Arg Gly Ile Met Thr Thr Ala Ile Ser Tyr Tyr Phe Asp Tyr Trp
            100                 105                 110

ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca       384
Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca       432
Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
    130                 135                 140

gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg       480
Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg       528
Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc       576
Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat       624
Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
        195                 200                 205

cac aag ccc agc aac acc aag gtg gac aag aga gtt                       660
His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220
```

<210> 2287
<211> 376
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2287
gag gtg cag ctg ttg cag tct ggg gga ggc ttg gtc cag cct ggg ggg 48
Glu Val Gln Leu Leu Gln Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc aca ttt agc tcg tat 96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
20 25 30

gcc gtg acc tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtc 144
Ala Val Thr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

tca acg att agt ggt gat ggt cgt agc aca tat ttc gca gac tcc gtg 192
Ser Thr Ile Ser Gly Asp Gly Arg Ser Thr Tyr Phe Ala Asp Ser Val
50 55 60

aag ggc cgt ttc gcc atc tac aga gac aat tcc aag aac acg ctg tct 240
Lys Gly Arg Phe Ala Ile Tyr Arg Asp Asn Ser Lys Asn Thr Leu Ser
65 70 75 80

ctg cta ttg aac agc ctg aga gcc gag gac acg gcc gta tat tac tgt 288
Leu Leu Leu Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

gcg aaa gga gaa agg gac ctg aca gac tac ggt gac ccc gaa tat ttc 336
Ala Lys Gly Glu Arg Asp Leu Thr Asp Tyr Gly Asp Pro Glu Tyr Phe
100 105 110

cag cac tgg ggc cag ggc acc ctg gtc acc gtc tcc tca g 376
Gln His Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120 125

<210> 2288
<211> 376
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2288
cag gtg caa gtg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg 48
Gln Val Gln Val Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 5 10 15

tcc ctg aga ctc tcc tgt gta gcc tct gga ttc acc ttc agt agt cat 96
Ser Leu Arg Leu Ser Cys Val Ala Ser Gly Phe Thr Phe Ser Ser His
20 25 30

ggc atg cac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg 144
Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val

```
        35                  40                  45

gcg gtt ata tca gat gat gga aaa aat aaa tac tat gga gac tcc gtg       192
Ala Val Ile Ser Asp Asp Gly Lys Asn Lys Tyr Tyr Gly Asp Ser Val
    50                  55                  60

cag ggc cga ttt gtc atc tcc aga gac aat tcc aag aac acg ata tat       240
Gln Gly Arg Phe Val Ile Ser Arg Asp Asn Ser Lys Asn Thr Ile Tyr
65                  70                  75                  80

cta cag atg tac gac ctg agg gct gag gac acg gct gtc tat tac tgt       288
Leu Gln Met Tyr Asp Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aaa gat ctg cga tat tgt agc gct cgt agt agt tgt ttt ggc att       336
Ala Lys Asp Leu Arg Tyr Cys Ser Ala Arg Ser Ser Cys Phe Gly Ile
            100                 105                 110

gac ttc tgg ggc cag gga acc cta gtc acc gtc tcc tca g                376
Asp Phe Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125

<210> 2289
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2289
gtg gtg caa ctg gtg gag tct ggg gga ggc ttg gtc cag cct ggg ggg        48
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc agc ttt agt acc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Ser Phe Ser Thr Tyr
            20                  25                  30

tgg atg agc tgg gtc cgc cag gct cca ggg aag ggg cta gag tgg gtg       144
Trp Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gcc aac ata aag caa gat ggg agt gag aaa cac tat gtg gac tct gtg       192
Ala Asn Ile Lys Gln Asp Gly Ser Glu Lys His Tyr Val Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tca ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg aat agc ctg aga gcc gag gac acg gct atg tat tat tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Met Tyr Tyr Cys
```

```
                85                  90                  95

gcg aga aga gca tac agc ttt gac tac tgg ggc cag gga acc ttg gtc       336
Ala Arg Arg Ala Tyr Ser Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
            100                 105                 110

acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg gca       384
Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala
        115                 120                 125

ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc tgc ctg       432
Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu
    130                 135                 140

gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca ggc       480
Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly
145                 150                 155                 160

gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag tcc tca       528
Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser
                165                 170                 175

gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc agc ttg       576
Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu
            180                 185                 190

ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc agc aac acc       624
Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr
        195                 200                 205

aag gtg gac aag agt gag                                              642
Lys Val Asp Lys Ser Glu
    210

<210> 2290
<211> 669
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2290
gag gtg cag ctg gtg gag tcc ggg gga ggc tta gtt cag cct ggg ggg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc aat aac tac        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asn Asn Tyr
            20                  25                  30

tgg atg cac tgg gtc cgc caa gct cca ggg aag gga ctg gtg tgg gtc       144
Trp Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Val Trp Val
```

```
        35                  40                  45

tca cgt att tcc agt gat ggg agt acc aca gcc tcc gcg gac tcc gtg       192
Ser Arg Ile Ser Ser Asp Gly Ser Thr Thr Ala Ser Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac aca cta ttt       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Leu Phe
65                  70                  75                  80

ctc caa atg aac agt ctg aga gcc gag gac acg gct gtg tat tat tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gca aga gag ggg gcc cca gat gac tac ggt gac tcc ggg act gct ttt       336
Ala Arg Glu Gly Ala Pro Asp Asp Tyr Gly Asp Ser Gly Thr Ala Phe
            100                 105                 110

gat att tgg ggc caa ggg aca acg gtc acc gtc tct tca gcc tcc acc       384
Asp Ile Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr
        115                 120                 125

aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct       432
Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
    130                 135                 140

ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa       480
Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145                 150                 155                 160

ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac       528
Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
                165                 170                 175

acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc       576
Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
            180                 185                 190

gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc       624
Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
        195                 200                 205

aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aag gtg           669
Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220

<210> 2291
<211> 659
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain
```

<400> 2291
gc gag gtg cac ctg gtg cag tct ggg gga ggc ttg gta aag cct ggg 47
Glu Val His Leu Val Gln Ser Gly Gly Gly Leu Val Lys Pro Gly
1 5 10 15

ggg tcc ctt aga ctc tcc tgt gca gcc tct gga ttt act ttc agt cac 95
Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser His
20 25 30

ggc tgg atg agc tgg gtc cgc cag gct cca ggg aag gga ctg gag tgg 143
Gly Trp Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
35 40 45

gtt gcc cgt att agg agc aaa acc gat ggt ggg act aca gac tac gct 191
Val Ala Arg Ile Arg Ser Lys Thr Asp Gly Gly Thr Thr Asp Tyr Ala
50 55 60

gct ccc gtg aat ggc aga ttc acc atc tcc aga gac att tct att gag 239
Ala Pro Val Asn Gly Arg Phe Thr Ile Ser Arg Asp Ile Ser Ile Glu
65 70 75

act ctg tat ttg caa atg gac agc ctg aaa acc gag gac aca gcc gtc 287
Thr Leu Tyr Leu Gln Met Asp Ser Leu Lys Thr Glu Asp Thr Ala Val
80 85 90 95

tat tac tgt acc acc gat cac ccc tat ggt gac tac tct gac aac tgg 335
Tyr Tyr Cys Thr Thr Asp His Pro Tyr Gly Asp Tyr Ser Asp Asn Trp
100 105 110

ggc cag gga gtc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca 383
Gly Gln Gly Val Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
115 120 125

tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca 431
Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
130 135 140

gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg 479
Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145 150 155

gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg 527
Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
160 165 170 175

gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc 575
Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
180 185 190

gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat 623
Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
195 200 205

```
cac aag ccc agc aac acc aag gtg gac aag agt gag                        659
His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
        210                 215

<210> 2292
<211> 656
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2292
cc cag gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg          47
   Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser
   1               5                   10                  15

gag acc ctg tcc ctc acc tgc act gtc tcc ggt ggc tcc atc aga aat         95
Glu Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Arg Asn
                20                  25                  30

gac tac tgg agt tgg atc cgg cag tcc ccg ggg aag gga ctg gag tgg        143
Asp Tyr Trp Ser Trp Ile Arg Gln Ser Pro Gly Lys Gly Leu Glu Trp
            35                  40                  45

att ggg tac atc tct gac att ggg gac acc aac tac aac ccc tct ttc        191
Ile Gly Tyr Ile Ser Asp Ile Gly Asp Thr Asn Tyr Asn Pro Ser Phe
        50                  55                  60

aag agt cga atc tcc ata tca ctg gac acg tcc aag aac cag ttc tcc        239
Lys Ser Arg Ile Ser Ile Ser Leu Asp Thr Ser Lys Asn Gln Phe Ser
    65                  70                  75

ctg aag ctg aac tct gtg acc gct gcg gac acg gcc gtc tat tac tgt        287
Leu Lys Leu Asn Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys
80                  85                  90                  95

gcg aag gaa tta tta ggg ggt ttt gac tat tgg ggc cag gga acc ctt        335
Ala Lys Glu Leu Leu Gly Gly Phe Asp Tyr Trp Gly Gln Gly Thr Leu
                100                 105                 110

gtc gcc gtc tcc aca gca tcc ccg acc agc ccc aag gtc ttc ccg ctg        383
Val Ala Val Ser Thr Ala Ser Pro Thr Ser Pro Lys Val Phe Pro Leu
            115                 120                 125

agc ctc tgc agc acc cag cca gat ggg aac gtg gtc atc gcc tgc ctg        431
Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val Ile Ala Cys Leu
        130                 135                 140

gtc cag ggc ttc ttc ccc cag gag cca ctc agt gtg acc tgg agc gaa        479
Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val Thr Trp Ser Glu
    145                 150                 155
```

```
agc gga cag ggc gtg acc gcc aga aac ttc cca ccc agc cag gat gcc       527
Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro Ser Gln Asp Ala
160                 165                 170                 175

tcc ggg gac ctg tac acc acg agc agc cag ctg acc ctg ccg gcc aca       575
Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr Leu Pro Ala Thr
                180                 185                 190

cag tgc cta gcc ggc aag tcc gtg aca tgc cac gtg aag cac tac acg       623
Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val Lys His Tyr Thr
            195                 200                 205

aat ccc agc cag gat gtg act gtg ccc tgc ccg                           656
Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
        210                 215

<210> 2293
<211> 656
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2293
cc cag gtg cag ctg gtg cag tct ggg gct gag gtg aag aag cct ggg         47
   Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly
   1               5                   10                  15

tcc tcg gtg aag gtc tcc tgc aag gct tct gga ggc acc ttc agc agc        95
Ser Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Thr Phe Ser Ser
                20                  25                  30

tat gct atc agc tgg gtg cga cag gcc cct gga caa ggg ctt gag tgg       143
Tyr Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp
            35                  40                  45

atg gga ggg atc atc ccc atc ttt ggt aca gca aac tac gca cag aag       191
Met Gly Gly Ile Ile Pro Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys
        50                  55                  60

ttc cag ggc aga gtc acg att acc gcg gac gaa tcc acg agc aca gcc       239
Phe Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Ser Thr Ala
    65                  70                  75

tac atg gag ctg agc agc ctg aga tct gag gac acg gcc gtg tat tac       287
Tyr Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr
80                  85                  90                  95

tgt gcg aga gtt ttt gga tca gca gct ggt gct ttt gat atc tgg ggc       335
Cys Ala Arg Val Phe Gly Ser Ala Ala Gly Ala Phe Asp Ile Trp Gly
                100                 105                 110
```

```
caa ggg aca atg gtc acc gtc tct tca gcc tcc acc aag ggc cca tcg       383
Gln Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
            115                 120                 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg       431
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
        130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       479
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
    145                 150                 155

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       527
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
160                 165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       575
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
                180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac       623
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
            195                 200                 205

aag ccc agc aac acc aag gtg gac aag agt gag                           656
Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
        210                 215

<210> 2294
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2294
ccc ctg cag ctg cat gag tcg ggc cca gga ctg gtg aag cct tcg gag        48
Pro Leu Gln Leu His Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15

acc ctg tcc ctc acc tgc tct gtc tct ggt ggc tcc atc agc agt agt        96
Thr Leu Ser Leu Thr Cys Ser Val Ser Gly Gly Ser Ile Ser Ser Ser
            20                  25                  30

aat tac ttc tgg ggc tgg atc cgc cag tcc cca ggg atg ggg ctg gag       144
Asn Tyr Phe Trp Gly Trp Ile Arg Gln Ser Pro Gly Met Gly Leu Glu
        35                  40                  45

tgg att ggg agt atc tat ttt agt ggg aaa act cac tac aac ccg tcg       192
Trp Ile Gly Ser Ile Tyr Phe Ser Gly Lys Thr His Tyr Asn Pro Ser
    50                  55                  60
```

```
ctc aag agt cga gtc acc ata tcc gta gat acg tcc aag aat cac ttc       240
Leu Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn His Phe
65                  70                  75                  80

tcc ctg aag ctg agc tct gtg acc gcc gca gac acg gct gtt ttc ttc       288
Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Phe Phe
                85                  90                  95

tgt gcg aga cac gat tgg cgc tta tac gca ttt gac tac tgg ggc ctc       336
Cys Ala Arg His Asp Trp Arg Leu Tyr Ala Phe Asp Tyr Trp Gly Leu
            100                 105                 110

gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc       384
Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       432
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       624
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

ccc agc aac acc aag gtg gac aag agt gag                               654
Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215
```

<210> 2295
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2295

```
gtg gtg cag ctg gtg gag tcc ggg gga ggc tta gtt cag cct ggg ggg        48
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15
```

```
tcc ctg aga ctc tcc tgt gca ggc tct gga ttt acc ttc agt gac tac        96
Ser Leu Arg Leu Ser Cys Ala Gly Ser Gly Phe Thr Phe Ser Asp Tyr
            20                  25                  30

tgg atg cac tgg gtc cgc caa gct cca ggg aag ggg ctg gtg tgg gtc       144
Trp Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Val Trp Val
        35                  40                  45

tca act att aat cgt gat ggg agt tac aca aac cac gcg gac tcc gtg       192
Ser Thr Ile Asn Arg Asp Gly Ser Tyr Thr Asn His Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc agg agc acg ctg ttt       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Arg Ser Thr Leu Phe
65                  70                  75                  80

ctg caa atg agc agt ctc aga gtc gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Ser Ser Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gca gga ggg gaa acc agt cct gac tac tgg ggc cag gga acc ctg gtc       336
Ala Gly Gly Glu Thr Ser Pro Asp Tyr Trp Gly Gln Gly Thr Leu Val
            100                 105                 110

acc gtc tcc tca ggg agt gca tcc gcc cca acc ctt ttc ccc ctc gtc       384
Thr Val Ser Ser Gly Ser Ala Ser Ala Pro Thr Leu Phe Pro Leu Val
        115                 120                 125

tcc tgt gag aat tcc ccg tcg gat acg agc agc gtg gcc gtt ggc tgc       432
Ser Cys Glu Asn Ser Pro Ser Asp Thr Ser Ser Val Ala Val Gly Cys
    130                 135                 140

ctc gca cag gac ttc ctt ccc gac tcc atc act ttc tcc tgg aaa tac       480
Leu Ala Gln Asp Phe Leu Pro Asp Ser Ile Thr Phe Ser Trp Lys Tyr
145                 150                 155                 160

aag aac aac tct gac atc agc agc acc cgg ggc ttc cca tca gtc ctg       528
Lys Asn Asn Ser Asp Ile Ser Ser Thr Arg Gly Phe Pro Ser Val Leu
                165                 170                 175

aga ggg ggc aag tac gca gcc acc tca cag gtg ctg ctg cct tcc aag       576
Arg Gly Gly Lys Tyr Ala Ala Thr Ser Gln Val Leu Leu Pro Ser Lys
            180                 185                 190

gac gtc atg cag ggc aca gac gaa cac gtg gtg tgc aaa gtc cag cac       624
Asp Val Met Gln Gly Thr Asp Glu His Val Val Cys Lys Val Gln His
        195                 200                 205

ccc aac ggc aac aaa gaa aag aac gtg cct ctt cca                       660
Pro Asn Gly Asn Lys Glu Lys Asn Val Pro Leu Pro
    210                 215                 220
```

<210> 2296
<211> 665

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2296
```
cc caa ctg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg         47
   Gln Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser
   1               5                   10                  15

gag acc ctg tcc ctc acc tgc act gtc tct gat gtc tcc atc atc agt        95
Glu Thr Leu Ser Leu Thr Cys Thr Val Ser Asp Val Ser Ile Ile Ser
                20                  25                  30

agt ttc tat tac tgg ggc tgg atc cgc cag ccc ccc ggg aag ggg cta       143
Ser Phe Tyr Tyr Trp Gly Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu
            35                  40                  45

gag tgg att ggg agt gtc tat tat agt ggg agc acc tcc tac aac ccg       191
Glu Trp Ile Gly Ser Val Tyr Tyr Ser Gly Ser Thr Ser Tyr Asn Pro
        50                  55                  60

tcc ctg aag agc cgc gtc acc ata tcc gca gac acg tcc aag gca cat       239
Ser Leu Lys Ser Arg Val Thr Ile Ser Ala Asp Thr Ser Lys Ala His
    65                  70                  75

ttc tcc ctg aac ctg agg tct gtg acc gcc gca gac acg gct gtt tat       287
Phe Ser Leu Asn Leu Arg Ser Val Thr Ala Ala Asp Thr Ala Val Tyr
80                  85                  90                  95

tat tgt gtg agt agg ggg ccc cta ggg gga gca gca gct gga ccg gac       335
Tyr Cys Val Ser Arg Gly Pro Leu Gly Gly Ala Ala Ala Gly Pro Asp
                100                 105                 110

tac tgg ggc cag gga gcc ctt gtc atc gtc tcc tca gcc tcc acc aag       383
Tyr Trp Gly Gln Gly Ala Leu Val Ile Val Ser Ser Ala Ser Thr Lys
            115                 120                 125

ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg       431
Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
        130                 135                 140

ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg       479
Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
    145                 150                 155

gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc       527
Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
160                 165                 170                 175

ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg       575
Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
```

```
                180                 185                 190

gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac       623
Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
            195                 200                 205

gtg aat cac aag ccc agc aac acc aag gtg gac aag aga gtt               665
Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
        210                 215                 220
```

<210> 2297
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2297

```
cag gtg cgg ctg cag gag tcg ggc cca gga ctg gtg aag cct tca cag        48
Gln Val Arg Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gln
1               5                   10                  15

acc ctg tcc ctc acc tgc act gtc tct ggt gcc tcc gtt tcc agt ggt        96
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Ala Ser Val Ser Ser Gly
            20                  25                  30

tct tac tac tgg gct tgg gtc cgg cag tcc gcc gcg aag gga ctg gag       144
Ser Tyr Tyr Trp Ala Trp Val Arg Gln Ser Ala Ala Lys Gly Leu Glu
        35                  40                  45

tgg att ggg cgt gtg tct ccc agc ggg act aac aac tac aac acc gcg       192
Trp Ile Gly Arg Val Ser Pro Ser Gly Thr Asn Asn Tyr Asn Thr Ala
    50                  55                  60

ctg aag agc cgg gtc acc ata tcc ctg gac acg gcg agg aac cag ttc       240
Leu Lys Ser Arg Val Thr Ile Ser Leu Asp Thr Ala Arg Asn Gln Phe
65                  70                  75                  80

tcc ctg aca gtg acc tct gtg acc gcc gaa gac acg gcc atc tat tac       288
Ser Leu Thr Val Thr Ser Val Thr Ala Glu Asp Thr Ala Ile Tyr Tyr
                85                  90                  95

tgt gcg cga gat gtc cga ggg tgg ttc gtc ccc tgg ggc cag ggt agc       336
Cys Ala Arg Asp Val Arg Gly Trp Phe Val Pro Trp Gly Gln Gly Ser
            100                 105                 110

ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc       384
Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
        115                 120                 125

ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc       432
Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
```

```
    130                 135                 140

tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac       480
Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160

tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag       528
Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175

tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc       576
Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc agc       624
Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
        195                 200                 205

aac acc aag gtg gac aag agt gag                                      648
Asn Thr Lys Val Asp Lys Ser Glu
    210                 215

<210> 2298
<211> 672
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2298
ccc gtc cag ttg gtg cag tct ggg gct gtg gtg aag aag cct ggg tcc        48
Pro Val Gln Leu Val Gln Ser Gly Ala Val Val Lys Lys Pro Gly Ser
1               5                   10                  15

tcg gtg aaa gtc tcc tgc aaa gct tct gga ggc acc ttc agc ggc tat        96
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Thr Phe Ser Gly Tyr
            20                  25                  30

ggc atc aat tgg gtg cga cag gcc cct gga caa ggg ctt gag tgg atg       144
Gly Ile Asn Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

gga agg atc atc cct att gtt gga gaa gca aac tac gca cag aag ttc       192
Gly Arg Ile Ile Pro Ile Val Gly Glu Ala Asn Tyr Ala Gln Lys Phe
    50                  55                  60

cag ggc aga gtc aca att aac gcg gac aag tcc acg agc aca gcc aca       240
Gln Gly Arg Val Thr Ile Asn Ala Asp Lys Ser Thr Ser Thr Ala Thr
65                  70                  75                  80

ttg gaa gtg agg agc ctg aga tct gag gac acg gcc gtc tat tac tgt       288
Leu Glu Val Arg Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
```

```
                85                  90                  95

gtg aga gat cgc aac att gta tct gtg cca ggt gct atc ccc tac gga       336
Val Arg Asp Arg Asn Ile Val Ser Val Pro Gly Ala Ile Pro Tyr Gly
            100                 105                 110

atg gac gtc tgg ggc cag ggg acc acg gtc acc gtc tcc tca gct tcc       384
Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser
        115                 120                 125

acc aag ggc cca tcg gtc ttc ccc ctg gcg ccc tgc tcc agg agc acc       432
Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr
    130                 135                 140

tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc       480
Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145                 150                 155                 160

gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg       528
Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
                165                 170                 175

cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc       576
His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
            180                 185                 190

agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac acc       624
Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Thr
        195                 200                 205

tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aga gtt       672
Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220
```

<210> 2299
<211> 349
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2299

```
gtg gtg cag ctg gtg gag tcc ggg gga ggc tta gtt cag cct ggg ggg        48
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt agc tac        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

tgg atg cac tgg gtc cgc caa gct cca ggg aag ggg ctg gtg tgg gtc       144
Trp Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Val Trp Val
```

```
        35                  40                  45

tca cgt att aat agt gat ggg agt agc aca agc tac gcg gac tcc gtg       192
Ser Arg Ile Asn Ser Asp Gly Ser Ser Thr Ser Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac acg ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Leu Tyr
65                  70                  75                  80

ctg caa atg aac agt ctg aga gcc gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gca aga ggg agt gac acc ctt gac tac tgg ggc cag gga acc ctg gtc       336
Ala Arg Gly Ser Asp Thr Leu Asp Tyr Trp Gly Gln Gly Thr Leu Val
            100                 105                 110

acc gtc tcc tca g                                                    349
Thr Val Ser Ser
        115

<210> 2300
<211> 656
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2300
cc cag gtg cag ctg cag gag tcg ggc cca gga ctg ctg aag cct tca         47
   Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Leu Lys Pro Ser
   1               5                   10                  15

cag acc ctg tcc ctc agc tgc act gtc tct ggt ggc tcc atc agc agt        95
Gln Thr Leu Ser Leu Ser Cys Thr Val Ser Gly Gly Ser Ile Ser Ser
                20                  25                  30

gga gat tac tac tgg agt tgg atc cgc cag ccc cca ggg aag ggc ctg       143
Gly Asp Tyr Tyr Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu
            35                  40                  45

gaa tgg att ggg tac atc tat tac aat ggg agc acc tac tac agt tcg       191
Glu Trp Ile Gly Tyr Ile Tyr Tyr Asn Gly Ser Thr Tyr Tyr Ser Ser
        50                  55                  60

tcc ctc agg agt cga ctt acc ata tca gtg gac acg tcc aag aac cag       239
Ser Leu Arg Ser Arg Leu Thr Ile Ser Val Asp Thr Ser Lys Asn Gln
    65                  70                  75

ttc tcc ctg aag ctg agc tct gtg act gcc gca gac acg gcc gcg tat       287
Phe Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Ala Tyr
```

```
80                  85                  90                  95

tac tgt gcc aga gtg ggg cta act ttt gcc ttg ttc gac ccc tgg ggc       335
Tyr Cys Ala Arg Val Gly Leu Thr Phe Ala Leu Phe Asp Pro Trp Gly
                100                 105                 110

cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg       383
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
            115                 120                 125

gtc ttc ccc ctg gcg ccc tgc tcc agg agc acc tcc gag agc aca gcg       431
Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala
        130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       479
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
    145                 150                 155

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       527
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
160                 165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       575
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
                180                 185                 190

ccc tcc agc agc ttg ggc acg aag acc tac acc tgc aat gta gat cac       623
Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn Val Asp His
            195                 200                 205

aag ccc agc aac acc aag gtg gac aag aga gtt                           656
Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
        210                 215

<210> 2301
<211> 666
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2301
gtg gtg cag ctg ttg gag tct ggg gga ggc ttg gta cag cct ggg ggg        48
Val Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt agc agc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

gcc ata aac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtc       144
Ala Ile Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
```

```
        35                  40                  45

tca gct att agt ggt agt ggt ggt agc aca tac tac gca gac tcc gtg       192
Ser Ala Ile Ser Gly Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cgg ttc acc atc tcc aga gac aat tcc aag aac acg ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gcc gag gac acg gcc gta tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aac agt gcg ggg ata cag cta tgg tcc tca gac aac tgg ttc gac       336
Ala Asn Ser Ala Gly Ile Gln Leu Trp Ser Ser Asp Asn Trp Phe Asp
            100                 105                 110

ccc tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag       384
Pro Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys
        115                 120                 125

ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg       432
Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
    130                 135                 140

ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg       480
Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145                 150                 155                 160

gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc       528
Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
                165                 170                 175

ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg       576
Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
            180                 185                 190

gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac       624
Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
        195                 200                 205

gtg aat cac aag ccc agc aac acc aag gtg gac aag agt gag                666
Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215                 220
```

<210> 2302
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2302

```
gag gtg cag ctg ttg gag tct ggg gga ggc ttg gtg cag cct ggg ggg        48
Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                  10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt agc agc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

gcc atg agc tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtc       144
Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca gcc att agt gcc agt ggt cgt acc aca tac tac gca gac tct ttc       192
Ser Ala Ile Ser Ala Ser Gly Arg Thr Thr Tyr Tyr Ala Asp Ser Phe
    50                  55                  60

aag ggc cgg ttc acc atc tcc aga gac aat tcc aag aac acg cta tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

ttg caa atg agc aga ctg aga ggc gac gac gcg gcc gtt tat tac tgt       288
Leu Gln Met Ser Arg Leu Arg Gly Asp Asp Ala Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aaa gag ggc ata gaa ctc atg atc ctc tgg ggc cag gga acc ctg       336
Ala Lys Glu Gly Ile Glu Leu Met Ile Leu Trp Gly Gln Gly Thr Leu
            100                 105                 110

gtc acc gtc tcc tca aca tcc ccg acc agc ccc aag gtc ttc ccg ctg       384
Val Thr Val Ser Ser Thr Ser Pro Thr Ser Pro Lys Val Phe Pro Leu
        115                 120                 125

agc ctc tgc agc acc cag cca gat ggg aac gtg gtc atc gcc tgc ctg       432
Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val Ile Ala Cys Leu
    130                 135                 140

gtc cag ggc ttc ttc ccc cag gag cca ctc agt gtg acc tgg agc gaa       480
Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val Thr Trp Ser Glu
145                 150                 155                 160

agc gga cag ggc gtg acc gcc aga aac ttc cca ccc agc cag gat gcc       528
Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro Ser Gln Asp Ala
                165                 170                 175

tcc ggg gac ctg tac acc acg agc agc cag ctg acc ctg ccg gcc aca       576
Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr Leu Pro Ala Thr
            180                 185                 190

cag tgc cta gcc ggc aag tcc gtg aca tgc cac gtg aag cac tac acg       624
Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val Lys His Tyr Thr
        195                 200                 205
```

```
aat ccc agc cag gat gtg act gtg ccc tgc ccg                             657
Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
    210                 215

<210> 2303
<211> 669
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2303
gtg gtc cag ttg gtg gag tct ggg gga gcc ttg gtc cag cct ggg ggg          48
Val Val Gln Leu Val Glu Ser Gly Gly Ala Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttg agc agc tat          96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Leu Ser Ser Tyr
            20                  25                  30

gct atg tac tgg gtc cgc cag gct cca ggg aag gga ctt gaa tat gtt         144
Ala Met Tyr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Tyr Val
        35                  40                  45

tca gct att act gct aat ggg ggt agc aca tat tat gca aat tct gtg         192
Ser Ala Ile Thr Ala Asn Gly Gly Ser Thr Tyr Tyr Ala Asn Ser Val
    50                  55                  60

aag ggc aga ttc acc gtc tcc aga gac aat tcc aag aaa acg gtt tat         240
Lys Gly Arg Phe Thr Val Ser Arg Asp Asn Ser Lys Lys Thr Val Tyr
65                  70                  75                  80

ctt caa ttg ggc agc ctg aga gct gag gac acg gct gtc tat tac tgt         288
Leu Gln Leu Gly Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga ggc att acc ctg act cgg gga gtc tcc ttt gac tac tgg ggc         336
Ala Arg Gly Ile Thr Leu Thr Arg Gly Val Ser Phe Asp Tyr Trp Gly
            100                 105                 110

cag gga acc ctg gtc acc gtc tcc cca gca tcc ccg acc agc ccc aag         384
Gln Gly Thr Leu Val Thr Val Ser Pro Ala Ser Pro Thr Ser Pro Lys
        115                 120                 125

gtc ttc ccg ctg agc ctc tgc agc acc cag cca gat ggg aac gtg gtc         432
Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val
    130                 135                 140

atc gcc tgc ctg gtc cag ggc ttc ttc ccc cag gag cca ctc agt gtg         480
Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val
145                 150                 155                 160
```

```
acc tgg agc gaa agc gga cag ggc gtg acc gcc aga aac ttc cca ccc       528
Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro
                165                 170                 175

agc cag gat gcc tcc ggg gac ctg tac acc acg agc agc cag ctg acc       576
Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr
            180                 185                 190

ctg ccg gcc aca cag tgc cta gcc ggc aag tcc gtg aca tgc cac gtg       624
Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val
        195                 200                 205

aag cac tac acg aat ccc agc cag gat gtg act gtg ccc tgc ccg           669
Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
    210                 215                 220

<210> 2304
<211> 352
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2304
ccc ctg cag ctg cag gag tcc ggc tca gga ctg gtg aag cct tca cag        48
Pro Leu Gln Leu Gln Glu Ser Gly Ser Gly Leu Val Lys Pro Ser Gln
1               5                   10                  15

acc ctg tcc ctc acc tgc gct gtt tca ggt ggc tcc atc agc agt ggt        96
Thr Leu Ser Leu Thr Cys Ala Val Ser Gly Gly Ser Ile Ser Ser Gly
            20                  25                  30

ggt tac tcc tgg agc tgg atc cgg cag cca cca ggg aag ggc ctg gag       144
Gly Tyr Ser Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu
        35                  40                  45

tgg ctt ggg tac atc tat cat agg ggg acc tcc tac tac aac ccg tcc       192
Trp Leu Gly Tyr Ile Tyr His Arg Gly Thr Ser Tyr Tyr Asn Pro Ser
    50                  55                  60

ctc aag agt cga gtc acc ata tca cta gac atg tcc aag aac cag ctc       240
Leu Lys Ser Arg Val Thr Ile Ser Leu Asp Met Ser Lys Asn Gln Leu
65                  70                  75                  80

tcc ctg aag ctg acc tct gtg acc gcc gcg gac acg gcc gtg tat tac       288
Ser Leu Lys Leu Thr Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95

tgt gcc aga gat ggg gga gct ttt gat atc tgg ggc caa ggg aca ttg       336
Cys Ala Arg Asp Gly Gly Ala Phe Asp Ile Trp Gly Gln Gly Thr Leu
            100                 105                 110
```

```
gtc acc gtc tct tca g                                                  352
Val Thr Val Ser Ser
        115

<210> 2305
<211> 663
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2305
cag gtg cac ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg        48
Gln Val His Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                  10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt aac tct        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Ser
            20                  25                  30

gct atg cac tgg gtc cgc cag gct cca ggc aag ggg ctg gat tgg gtg       144
Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Asp Trp Val
        35                  40                  45

tca gtt atc tca ttt gat gga agc aat caa tat tat gca gac tcc gtg       192
Ser Val Ile Ser Phe Asp Gly Ser Asn Gln Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aat tcc aag aac acg ctg ttt       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Phe
65                  70                  75                  80

ctg caa atg aac agc ctg aga gct gag gac acg gct gta tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gat cgg ctt ttc aca gct att aac agt ggg tac ttt gac tac       336
Ala Arg Asp Arg Leu Phe Thr Ala Ile Asn Ser Gly Tyr Phe Asp Tyr
            100                 105                 110

tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc       384
Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125

cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc       432
Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
    130                 135                 140

aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg       480
Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160
```

```
acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc       528
Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165                 170                 175

ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg       576
Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg       624
Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

aat cac aag ccc agc aac acc aag gtg gac aag agt gag                   663
Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215                 220

<210> 2306
<211> 355
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2306
cag gtg cag ctg gtg cag cct ggg ggt gag gtg aag aag cct ggg gcc        48
Gln Val Gln Leu Val Gln Pro Gly Gly Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

tca gtg aag att tcc tgc aag gca tct gga tac acc ttc acc agt cac        96
Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser His
            20                  25                  30

tat atg cac tgg gta cga cag gcc cct gga caa ggg cta gag tgg atg       144
Tyr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

gga atg atc gac cct agt ggc ggc agc aga acc tac gca cag aag ttc       192
Gly Met Ile Asp Pro Ser Gly Gly Ser Arg Thr Tyr Ala Gln Lys Phe
    50                  55                  60

cag ggc aga gtc acc atg acc agg gac acg tcc acg agc aca gtc tac       240
Gln Gly Arg Val Thr Met Thr Arg Asp Thr Ser Thr Ser Thr Val Tyr
65                  70                  75                  80

atg gag ctg agc agc ctg aga tct gac gac acg gcc gtt tat tac tgt       288
Met Glu Leu Ser Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gag ggg agc tac tac ggg att ggc tac tgg ggc cag gga acc       336
Ala Arg Glu Gly Ser Tyr Tyr Gly Ile Gly Tyr Trp Gly Gln Gly Thr
            100                 105                 110
```

```
ctg gtc acc gtc tcc tca g                                              355
Leu Val Thr Val Ser Ser
        115

<210> 2307
<211> 364
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2307
gag gtg caa ttg gtg gag tct ggg gga gtc gtg gtg cag cct ggg ggg         48
Glu Val Gln Leu Val Glu Ser Gly Gly Val Val Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agc gcc tac         96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ala Tyr
            20                  25                  30

tgg atg cac tgg gtc cgc caa gct cca ggg aag ggg ctg gtg tgg gtc        144
Trp Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Val Trp Val
        35                  40                  45

tca cgt att aat act gat ggg agt agc aca agc tac gcg gac tcc gtg        192
Ser Arg Ile Asn Thr Asp Gly Ser Ser Thr Ser Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tca ctg tat        240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gcc gag gac acg gcc gtg tat tac tgt        288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gat acg gac agt ggc tgg ttg gat tcg ttt gac tac tgg ggc        336
Ala Arg Asp Thr Asp Ser Gly Trp Leu Asp Ser Phe Asp Tyr Trp Gly
            100                 105                 110

cag gga acc ctg gtc acc gtc tcc tca g                                  364
Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120

<210> 2308
<211> 385
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain
```

<400> 2308
cag ggc caa ctg gtt cag tct ggg gct gag gtg aag aag gct ggg gcc 48
Gln Gly Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Ala Gly Ala
1 5 10 15

tca gtg aag gtc tcc tgc aag gtt tcc gga tac tcc ctc act gaa atc 96
Ser Val Lys Val Ser Cys Lys Val Ser Gly Tyr Ser Leu Thr Glu Ile
20 25 30

tcc atg cac tgg gtg cga cag gct cct gga aaa ggg ctt gag tgg gtg 144
Ser Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

gga ggt ttt gat cct gaa ggt ggt gaa aca atc tac gca cag aag ttc 192
Gly Gly Phe Asp Pro Glu Gly Gly Glu Thr Ile Tyr Ala Gln Lys Phe
50 55 60

cag ggc aga gtc tcc atg acc tgg gac acg tct ata gac ctt gcc tac 240
Gln Gly Arg Val Ser Met Thr Trp Asp Thr Ser Ile Asp Leu Ala Tyr
65 70 75 80

atg gag ctg aga agt ctg agt tct gac gac acg gcc ctg tat tac tgt 288
Met Glu Leu Arg Ser Leu Ser Ser Asp Asp Thr Ala Leu Tyr Tyr Cys
85 90 95

gcg aca gat cag ggg tgt gat gat ggc agc tgc tat gta ggc cac tac 336
Ala Thr Asp Gln Gly Cys Asp Asp Gly Ser Cys Tyr Val Gly His Tyr
100 105 110

tac gga atg gac gtc tgg ggc caa ggg acc aag gtc acc gtc tct tca 384
Tyr Gly Met Asp Val Trp Gly Gln Gly Thr Lys Val Thr Val Ser Ser
115 120 125

g 385

<210> 2309
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2309
ccc ctg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg gag 48
Pro Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

acc ctg tcc ctc acc tgc agt gtc tct ggt ggc tcc atc agg agc agt 96
Thr Leu Ser Leu Thr Cys Ser Val Ser Gly Gly Ser Ile Arg Ser Ser

```
            20                  25                  30

gct ccc ttc tgg ggc tgg atc cgc cag ccc cca ggg aag ggg ctg gag       144
Ala Pro Phe Trp Gly Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu
        35                  40                  45

tgg att gga aac atc tat tat aat gga gac acc tcc tac agc ccg tcc       192
Trp Ile Gly Asn Ile Tyr Tyr Asn Gly Asp Thr Ser Tyr Ser Pro Ser
    50                  55                  60

ctc gag aat cga gtc acc tta ttc gta gac acg tcc aag aac cag ttc       240
Leu Glu Asn Arg Val Thr Leu Phe Val Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

tcc ctc aac ctg acc tct gtg acc gcc gcg gac acg gcc gta tat tac       288
Ser Leu Asn Leu Thr Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95

tgt ggg agg att atg act ccc tcg att gac ctc tgg ggc cag gga aag       336
Cys Gly Arg Ile Met Thr Pro Ser Ile Asp Leu Trp Gly Gln Gly Lys
            100                 105                 110

ttg gtc acc gtc tcc tca gca tcc ccg acc agc ccc aag gtc ttc ccc       384
Leu Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro Lys Val Phe Pro
        115                 120                 125

ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc       432
Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
    130                 135                 140

tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac       480
Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160

tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag       528
Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175

tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc       576
Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc agc       624
Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
        195                 200                 205

aac acc aag gtg gac aag aat gag                                      648
Asn Thr Lys Val Asp Lys Asn Glu
    210                 215
```

<210> 2310
<211> 656
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2310
cc cag gtt cag ctg gtg cag tct gga gct gag gtg aag aag cct ggg 47
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly
1 5 10 15

gcc tca gtg aag gtc tcc tgc aag gct tct ggt tac atc ttt acc acc 95
Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Ile Phe Thr Thr
20 25 30

tat gtt atc agc tgg gtg cga cag gcc cct gga caa ggg ctt gag tgg 143
Tyr Val Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp
35 40 45

atg gga tgg atc agc gct tac act ggt aac aca aac tat cca cag aaa 191
Met Gly Trp Ile Ser Ala Tyr Thr Gly Asn Thr Asn Tyr Pro Gln Lys
50 55 60

ttc cag ggc aga gtc acc atg acc aca gac aca gcc acg agc aca gcc 239
Phe Gln Gly Arg Val Thr Met Thr Thr Asp Thr Ala Thr Ser Thr Ala
65 70 75

tac atg gag ctg aag agc ctg aga tct gac gac acg gcc gtg tat tac 287
Tyr Met Glu Leu Lys Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr
80 85 90 95

tgt gcg aga gaa gga cgg ggg gga gga gac ttc ttt gac tac tgg ggc 335
Cys Ala Arg Glu Gly Arg Gly Gly Gly Asp Phe Phe Asp Tyr Trp Gly
100 105 110

cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg 383
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
115 120 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg 431
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
130 135 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg 479
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145 150 155

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct 527
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
160 165 170 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg 575
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
180 185 190

```
ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac       623
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
            195                 200                 205

aag ccc agc aac acc aag gtg gac aag aat gtg                           656
Lys Pro Ser Asn Thr Lys Val Asp Lys Asn Val
        210                 215
```

<210> 2311
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2311

```
taa gtg cag ctg gtg gag tct ggg gga ggc ttg gta cag cct ggc agg        48
    Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Arg
    1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acg ttt gat gat tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asp Asp Tyr
                20                  25                  30

gcc atg cac tgg gtc cgg caa gct cca ggg aag ggc ctg gag tgg gtc       144
Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
            35                  40                  45

tca ggt att att tgg aat agt ggt acg aca ggc tat gcg gac tct gtg       192
Ser Gly Ile Ile Trp Asn Ser Gly Thr Thr Gly Tyr Ala Asp Ser Val
        50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aaa tcc ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Lys Ser Leu Tyr
    65                  70                  75

ctg caa atg aac agt ctg aga act gag gac acg gcc ctg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Thr Glu Asp Thr Ala Leu Tyr Tyr Cys
80                  85                  90                  95

gca aaa gat ggg gac agt ttg ggg gat ttc tct act ttt gat atc tgg       336
Ala Lys Asp Gly Asp Ser Leu Gly Asp Phe Ser Thr Phe Asp Ile Trp
                100                 105                 110

ggc cat ggg acc atg gtc acc gtc tcc tca gcc tcc acc aag ggc cca       384
Gly His Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
            115                 120                 125

tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca       432
Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
        130                 135                 140
```

```
gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg       480
Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
    145                 150                 155

gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg       528
Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
160                 165                 170                 175

gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc       576
Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
                180                 185                 190

gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat       624
Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
            195                 200                 205

cac aag ccc agc aac acc aag gtg gac aag aat gtg                       660
His Lys Pro Ser Asn Thr Lys Val Asp Lys Asn Val
        210                 215
```

<210> 2312
<211> 653
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2312

```
gc gag gtg cag ttg gtg gag tcc ggg gga ggc tta gtt cag acg ggg         47
   Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Thr Gly
   1               5                   10                  15

ggg tcc ctg aga ctc tcc tgt tca gcc tct gga ttc acc ttc aat aat        95
Gly Ser Leu Arg Leu Ser Cys Ser Ala Ser Gly Phe Thr Phe Asn Asn
                20                  25                  30

tac tgg atg cac tgg gtc cgc caa gct ccg gga aag ggg ctg ctg tgg       143
Tyr Trp Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Leu Trp
            35                  40                  45

ctc tcg cga ata aat act gat ggt agt cga gga cac tac gac gac tcc       191
Leu Ser Arg Ile Asn Thr Asp Gly Ser Arg Gly His Tyr Asp Asp Ser
        50                  55                  60

gtg cag ggc cga ttt acc atc tcc aga gac aac gcc aag caa acg gtc       239
Val Gln Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Gln Thr Val
    65                  70                  75

tat ctg caa atg gac ggg ctg aga gcc gag gac acg gct gtc tat ttt       287
Tyr Leu Gln Met Asp Gly Leu Arg Ala Glu Asp Thr Ala Val Tyr Phe
80                  85                  90                  95
```

```
tgt gca aga gac ggc tat gac ttt cgg gct ttt gac cac tgg ggc cag       335
Cys Ala Arg Asp Gly Tyr Asp Phe Arg Ala Phe Asp His Trp Gly Gln
                100                 105                 110

gga gtc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc       383
Gly Val Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
            115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       431
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
        130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       479
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
    145                 150                 155

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       527
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
160                 165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       575
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
                180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       623
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
            195                 200                 205

ccc agc aac acc aag gtg gac aag aag gtg                               653
Pro Ser Asn Thr Lys Val Asp Lys Lys Val
        210                 215
```

<210> 2313
<211> 674
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2313

```
cc cag gtg cag ctg ctg gag tcg ggc cca gga gtg gtg aag cct tcg         47
   Gln Val Gln Leu Leu Glu Ser Gly Pro Gly Val Val Lys Pro Ser
   1               5                  10                  15

gag acc ctg tct ctc acc tgc tct gtc tcc ggt gac tcc gtc agt agt        95
Glu Thr Leu Ser Leu Thr Cys Ser Val Ser Gly Asp Ser Val Ser Ser
                20                  25                  30

ttc tac tgg acg tgg atc cgg caa ccc cca ggg aag gga ccg gag tgg       143
Phe Tyr Trp Thr Trp Ile Arg Gln Pro Pro Gly Lys Gly Pro Glu Trp
            35                  40                  45
```

```
att ggt aat att tat cac agt ggc agc acc aac ttc aat ccc tcc ctc       191
Ile Gly Asn Ile Tyr His Ser Gly Ser Thr Asn Phe Asn Pro Ser Leu
        50                  55                  60

aag agt cga gtc acc ata tca ctc gac atg tcc aag aac cag ttc tcc       239
Lys Ser Arg Val Thr Ile Ser Leu Asp Met Ser Lys Asn Gln Phe Ser
    65                  70                  75

ctg cac cta aag tct gtg acc gct gcg gac act gcc gtc tat tac tgt       287
Leu His Leu Lys Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys
80                  85                  90                  95

gcg cga gct cgc ggt ggg ggt ttt tgt agt aat atg gac tgc ccg gca       335
Ala Arg Ala Arg Gly Gly Gly Phe Cys Ser Asn Met Asp Cys Pro Ala
                100                 105                 110

atg ttt gac tac tgg ggc cgg gga acc ctg gtc acc gtc tcc gca gcc       383
Met Phe Asp Tyr Trp Gly Arg Gly Thr Leu Val Thr Val Ser Ala Ala
            115                 120                 125

tcc acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc       431
Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser
        130                 135                 140

acc tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc       479
Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe
    145                 150                 155

ccc gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc       527
Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly
160                 165                 170                 175

gtg cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc       575
Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu
                180                 185                 190

agc agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac       623
Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr
            195                 200                 205

atc tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag agt       671
Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser
        210                 215                 220

gag                                                                   674
Glu
```

<210> 2314
<211> 364
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2314
gag gtg cag ttg gtg gag tcc ggg gga ggc tcg gta aag cct ggg ggg 48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Ser Val Lys Pro Gly Gly
1 5 10 15

tcc ctt aga ctc tcc tgt gta gcc ggt gga tat aat ttt aat gat gat 96
Ser Leu Arg Leu Ser Cys Val Ala Gly Gly Tyr Asn Phe Asn Asp Asp
20 25 30

cgg atg agc tcg atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg 144
Arg Met Ser Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
35 40 45

gag tgg gtt ggc cgt att aaa agt aaa agt gat ggt ggg tca aca aac 192
Glu Trp Val Gly Arg Ile Lys Ser Lys Ser Asp Gly Gly Ser Thr Asn
50 55 60

tac gct gca ccc gtg caa ggc aga ttc acc atc tca aga gat gat tcg 240
Tyr Ala Ala Pro Val Gln Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser
65 70 75 80

aaa aac act ctg tat ctc caa atg aac agc ctg aaa atc gag gac aca 288
Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Lys Ile Glu Asp Thr
85 90 95

gcc gtg tat tat tgt acc acg att cat gac tac ggt gac cac tgg ggc 336
Ala Val Tyr Tyr Cys Thr Thr Ile His Asp Tyr Gly Asp His Trp Gly
100 105 110

cag gga acc ctg gtc acc gtc tcc tca g 364
Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 2315
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2315
gag gtg caa ctg gtg gag tct ggg gga gcc ttg gtc cag cct ggg ggg 48
Glu Val Gln Leu Val Glu Ser Gly Gly Ala Leu Val Gln Pro Gly Gly
1 5 10 15

tcc ctg aga att tcc tgt gca gcc tct gga ttc acc gtc agt acc aac 96
Ser Leu Arg Ile Ser Cys Ala Ala Ser Gly Phe Thr Val Ser Thr Asn
20 25 30

```
tac atg agc tgg gtc cgc cag gct cca ggg aag gaa ctg gag tgg atc       144
Tyr Met Ser Trp Val Arg Gln Ala Pro Gly Lys Glu Leu Glu Trp Ile
        35                  40                  45

tca gtt att tat agc ggt ggt acc aca tac tac gca gcc ccc gtg aag       192
Ser Val Ile Tyr Ser Gly Gly Thr Thr Tyr Tyr Ala Ala Pro Val Lys
    50                  55                  60

ggc aga ttc acc atc tcc aga gac gat tcc aag aac aca ctg tat ctt       240
Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser Lys Asn Thr Leu Tyr Leu
65                  70                  75                  80

caa atg aac agt ctg aga gtc gag gac acg gct gta tat cac tgt gcg       288
Gln Met Asn Ser Leu Arg Val Glu Asp Thr Ala Val Tyr His Cys Ala
                85                  90                  95

agg ggc ctt tta cga tcc ctg gac gtc tgg ggc caa ggg acc acg gtc       336
Arg Gly Leu Leu Arg Ser Leu Asp Val Trp Gly Gln Gly Thr Thr Val
            100                 105                 110

acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg gcg       384
Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala
        115                 120                 125

ccc tgc tcc agg agc acc tcc gag agc aca gcg gcc ctg ggc tgc ctg       432
Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala Leu Gly Cys Leu
    130                 135                 140

gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca ggc       480
Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly
145                 150                 155                 160

gct ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag tcc tca       528
Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser
                165                 170                 175

gga ctc tac tcc ctc agc agc gtg gtg acc gtg acc tcc agc aac ttc       576
Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Thr Ser Ser Asn Phe
            180                 185                 190

ggc acc cag acc tac acc tgc aac gta gat cac aag ccc agc aac acc       624
Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His Lys Pro Ser Asn Thr
        195                 200                 205

aag gtg gac aag aca gtg                                               642
Lys Val Asp Lys Thr Val
    210
```

<210> 2316
<211> 677
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2316

```
gt gag gtg cac ctg gtg gag tct ggg gga ggc ttc gtc cag cct gga         47
   Glu Val His Leu Val Glu Ser Gly Gly Gly Phe Val Gln Pro Gly
   1               5                  10                  15

ggg tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acg ttc agt gac        95
Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asp
                20                  25                  30

cac tac atg gac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg       143
His Tyr Met Asp Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
            35                  40                  45

gtt ggc cgt att aaa aac aga gct aac agt tac aac aca gag tac gcc       191
Val Gly Arg Ile Lys Asn Arg Ala Asn Ser Tyr Asn Thr Glu Tyr Ala
        50                  55                  60

gcg tct gtg aga ggc aga ttc acc atc tca aga gat gat tca aac aac       239
Ala Ser Val Arg Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser Asn Asn
    65                  70                  75

tca ctg ttt ctg caa atg aac agc ctg aca gcc gag gac acg gcc gta       287
Ser Leu Phe Leu Gln Met Asn Ser Leu Thr Ala Glu Asp Thr Ala Val
80                  85                  90                  95

tat tac tgt gct aga gtg aaa ctg ggg gca tcg agc cgt gtt ttt gat       335
Tyr Tyr Cys Ala Arg Val Lys Leu Gly Ala Ser Ser Arg Val Phe Asp
                100                 105                 110

gtc tgg ggc caa ggg aca atg gtc acc gtc tct tca gca tcc ccg acc       383
Val Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser Ala Ser Pro Thr
            115                 120                 125

agc ccc aag gtc ttc ccg ctg agc ctc tgc agc acc cag cca gat ggg       431
Ser Pro Lys Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly
        130                 135                 140

aac gtg gtc atc gcc tgc ctg gtc cag ggc ttc ttc ccc cag gag cca       479
Asn Val Val Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro
    145                 150                 155

ctc agt gtg acc tgg agc gaa agc gga cag ggc gtg acc gcc aga aac       527
Leu Ser Val Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn
160                 165                 170                 175

ttc cca ccc agc cag gat gcc tcc ggg gac ctg tac acc acg agc agc       575
Phe Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser
                180                 185                 190

cag ctg acc ctg ccg gcc aca cag tgc cta gcc ggc aag tcc gtg aca       623
Gln Leu Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr
```

```
            195                 200                 205

tgc cac gtg aag cac tac acg aat ccc agc cag gat gtg act gtg ccc       671
Cys His Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro
        210                 215                 220

tgc cca                                                               677
Cys Pro
    225

<210> 2317
<211> 361
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2317
cag gtc cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc cgt gat tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Asp Tyr
            20                  25                  30

ggc atg cac tgg gtc cgc cag gcc cca ggc cag ggg cta cag tgg gtg       144
Gly Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Gln Trp Val
        35                  40                  45

gca gtt ata tct ttt gat gga agt gat aaa ttc tat gca gac tcc gtg       192
Ala Val Ile Ser Phe Asp Gly Ser Asp Lys Phe Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cgg ttc agc atc tcc aga gac aat tcc agg gac acg gtg tat       240
Lys Gly Arg Phe Ser Ile Ser Arg Asp Asn Ser Arg Asp Thr Val Tyr
65                  70                  75                  80

ctg caa atg aac cgc cta aga cct gaa gac acg gct gta tat tac tgt       288
Leu Gln Met Asn Arg Leu Arg Pro Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aca acc gtt aca cct aag gtg acc agt ttt gct tcc tgg ggc cag       336
Ala Thr Thr Val Thr Pro Lys Val Thr Ser Phe Ala Ser Trp Gly Gln
            100                 105                 110

gga agc ctg gtc acc gtc tcc gca t                                     361
Gly Ser Leu Val Thr Val Ser Ala
        115                 120

<210> 2318
<211> 664
```

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2318
g tgt gag gtg cag ctg gtg gag tcg ggg gga ggc ctg gtc aag ccc ggg 49
Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly
1 5 10 15

ggg tcc ctc aga ctc tcc tgt gca gcc tct gga ttc gac atc agg agt 97
Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Asp Ile Arg Ser
20 25 30

tat acc ata cac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg 145
Tyr Thr Ile His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
35 40 45

gtc tca tcc att act gct ggt gga agt ttc ata aac tac gca gac tcg 193
Val Ser Ser Ile Thr Ala Gly Gly Ser Phe Ile Asn Tyr Ala Asp Ser
50 55 60

gta aag ggc cga ttc acc atc tcc aga gac aac gcc cag aac tca ctt 241
Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Gln Asn Ser Leu
65 70 75 80

ttt ctg caa gtg gac cgc ctg aga gcc gag gac acg gct ctt tat ttt 289
Phe Leu Gln Val Asp Arg Leu Arg Ala Glu Asp Thr Ala Leu Tyr Phe
85 90 95

tgt gcg aga gaa cag agc ccc ctt tat ttc ggt cca tct ttg gac gtc 337
Cys Ala Arg Glu Gln Ser Pro Leu Tyr Phe Gly Pro Ser Leu Asp Val
100 105 110

tgg ggc caa ggg acc tcg gtc atc gtc tcc tta gcc tcc acc aag ggc 385
Trp Gly Gln Gly Thr Ser Val Ile Val Ser Leu Ala Ser Thr Lys Gly
115 120 125

cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc 433
Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
130 135 140

aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg 481
Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145 150 155 160

acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc 529
Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
165 170 175

ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg 577
Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val

```
            180                 185                 190

acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg       625
Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

aat cac aag ccc agc aac acc aag gtg gac aag agt gag                   664
Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215                 220
```

<210> 2319
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2319

```
cag gtg cag ctg gtg cag tct ggg gct gag gtg aag aac cct ggg gcc        48
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Asn Pro Gly Ala
1               5                   10                  15

tca gtg aag gtc tcc tgc aag gct tct gga tac acc ttc acc gac tac        96
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
            20                  25                  30

tat atc cac tgg gtg cga cag gcc cct gga caa ggg ctt gag tgg atg       144
Tyr Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

gga tgg atc aac cct aat agt ggt ggc aca aat cat gca cag aag ttt       192
Gly Trp Ile Asn Pro Asn Ser Gly Gly Thr Asn His Ala Gln Lys Phe
    50                  55                  60

cag ggc agg gtc acc atg acc agg gac atg tcc atc aac aca gcc tac       240
Gln Gly Arg Val Thr Met Thr Arg Asp Met Ser Ile Asn Thr Ala Tyr
65                  70                  75                  80

atg gag gtg agc ggg ctg aga tct gac gac acg gcc atc tat tac tgt       288
Met Glu Val Ser Gly Leu Arg Ser Asp Asp Thr Ala Ile Tyr Tyr Cys
                85                  90                  95

gcg aga gag cct tac tcc tcc tac gct atg gac gtc tgg ggc caa ggg       336
Ala Arg Glu Pro Tyr Ser Ser Tyr Ala Met Asp Val Trp Gly Gln Gly
            100                 105                 110

acc acg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc       384
Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125

ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gca gcc ctg       432
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
```

```
    130                 135                 140

ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg       480
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160

aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta       528
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc       576
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190

agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc       624
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205

agc aac acc aag gtg gac aag aag gtg                                   651
Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215

<210> 2320
<211> 655
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2320
g tgt gag gtg cag ctg ttg gag tcg ggg gga ggc ttg gta cag cct ggg      49
  Cys Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
  1               5                  10                  15

ggg tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt agc aac        97
Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn
            20                  25                  30

tat gcc atg agt tgg gtc cgc cag gct cca ggg aag ggg ctg aag tgg       145
Tyr Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Lys Trp
        35                  40                  45

gtc tca agt att agt tat agt ggt ggt agc aca tac tac gca gac tcc       193
Val Ser Ser Ile Ser Tyr Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser
    50                  55                  60

gtg aag ggc cgg gtc acc atc tcc aga gac aat tcc aag aac acg ctg       241
Val Lys Gly Arg Val Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu
65                  70                  75                  80

tat ctg caa atg aac agc ctg aga gcc gag gac acg gcc gta tat tac       289
Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr
```

```
                85                  90                  95

tgt gcg aaa gat gga tcc gag atg tta ttg tgt gac tac tgg ggc cag       337
Cys Ala Lys Asp Gly Ser Glu Met Leu Leu Cys Asp Tyr Trp Gly Gln
            100                 105                 110

gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc       385
Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       433
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       481
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       529
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       577
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       625
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

ccc agc aac acc aag gtg gac aag ata gtg                               655
Pro Ser Asn Thr Lys Val Asp Lys Ile Val
    210                 215

<210> 2321
<211> 653
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2321
ag tgt gat gtg cat ctg gtg cag tct ggg gga ggc ctg gtc aag ccg         47
   Cys Asp Val His Leu Val Gln Ser Gly Gly Gly Leu Val Lys Pro
   1               5                   10                  15

ggg ggg tcc ctg aga ctc tcc tgt gca gcc tct gga ttc aac ttc aat        95
Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Asn Phe Asn
                20                  25                  30

tct tat aca atg acc tgg gtc cgc cag gct cca ggg aag ggg ctg cag       143
Ser Tyr Thr Met Thr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Gln
```

```
            35                  40                  45

tgg gtc tca tcc att agt agt agt ggt ggt gac atc aac tac gct gac       191
Trp Val Ser Ser Ile Ser Ser Ser Gly Gly Asp Ile Asn Tyr Ala Asp
        50                  55                  60

tca ctg aag ggc cgg ttc tcc atc tcc aga gac aac gcc aag aac tca       239
Ser Leu Lys Gly Arg Phe Ser Ile Ser Arg Asp Asn Ala Lys Asn Ser
    65                  70                  75

gtc ttt ttg caa ctg aac agc ctg aga gcc gag gac acg gct gtc tat       287
Val Phe Leu Gln Leu Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr
80                  85                  90                  95

tac tgt gcg aga gac act agg tgg cga ggg ttg gac agc tgg ggc cag       335
Tyr Cys Ala Arg Asp Thr Arg Trp Arg Gly Leu Asp Ser Trp Gly Gln
                100                 105                 110

gga atc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc       383
Gly Ile Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
            115                 120                 125

ttc ccc ctg gcg ccc tgc tcc agg agc acc tcc gag agc aca gcg gcc       431
Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala
        130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       479
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
    145                 150                 155

tgg aac tca ggc gct ctg acc agc ggc gtg cac acc ttc ccg gct gtc       527
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
160                 165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg acc       575
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Thr
                180                 185                 190

tcc agc aac ttc ggc acc cag acc tac acc tgc aac gta gat cac aag       623
Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His Lys
            195                 200                 205

ccc agc aac acc aag gtg gac aag aca gtg                               653
Pro Ser Asn Thr Lys Val Asp Lys Thr Val
        210                 215
```

<210> 2322
<211> 666
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2322

```
gga gtg cag ctg gtg gag tct ggg gga gac ttg gta cag ccc ggc agg        48
Gly Val Gln Leu Val Glu Ser Gly Gly Asp Leu Val Gln Pro Gly Arg
1               5                  10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc aca ttt gat gat tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asp Asp Tyr
            20                  25                  30

gcc atg cac tgg gtc cgg caa tct cca ggg aag ggc ctg gag tgg gtc       144
Ala Met His Trp Val Arg Gln Ser Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca agt att agt tgg aat agt ggt gac ata gca tat ggg gac tct gtg       192
Ser Ser Ile Ser Trp Asn Ser Gly Asp Ile Ala Tyr Gly Asp Ser Val
    50                  55                  60

aag ggg cga ttc acc gtc tcc aga gac aac gcc aag aac tcc ctg cat       240
Lys Gly Arg Phe Thr Val Ser Arg Asp Asn Ala Lys Asn Ser Leu His
65                  70                  75                  80

ctg caa ctg aac agt ctg aga gtt gag gac tcg gcc ctc tat tac tgt       288
Leu Gln Leu Asn Ser Leu Arg Val Glu Asp Ser Ala Leu Tyr Tyr Cys
                85                  90                  95

gca aaa gat ctg tta gca gtg cct ggc cta ctt gac gac tgg ggc cag       336
Ala Lys Asp Leu Leu Ala Val Pro Gly Leu Leu Asp Asp Trp Gly Gln
            100                 105                 110

gga acc ctg gtc acc gtc tcc aca gca tcc ccg acc agc ccc aag gtc       384
Gly Thr Leu Val Thr Val Ser Thr Ala Ser Pro Thr Ser Pro Lys Val
        115                 120                 125

ttc ccg ctg agc ctc tgc agc acc cag cca gat ggg aac gtg gtc atc       432
Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val Ile
    130                 135                 140

gcc tgc ctg gtc cag ggc ttc ttc ccc cag gag cca ctc agt gtg acc       480
Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val Thr
145                 150                 155                 160

tgg agc gaa agc gga cag ggc gtg acc gcc aga aac ttc cca ccc agc       528
Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro Ser
                165                 170                 175

cag gat gcc tcc ggg gac ctg tac acc acg agc agc cag ctg acc ctg       576
Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr Leu
            180                 185                 190

ccg gcc aca cag tgc cta gcc ggc aag tcc gtg aca tgc cac gtg aag       624
Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val Lys
        195                 200                 205
```

```
cac tac acg aat ccc agc cag gat gtg act gtg ccc tgc cca              666
His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
    210                 215                 220

<210> 2323
<211> 639
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2323
cag gtg cta ctg gtg cag tct ggg gct gag gtg aag aag cct ggg tcc        48
Gln Val Leu Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1               5                   10                  15

tcg gtg aag gtc tcc tgc aag gct tct gga ggc acc ttc agc agc tat        96
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Thr Phe Ser Ser Tyr
            20                  25                  30

ggt atc agc tgg gtg cga cag gcc cct gga caa ggg ctt gag tgg atg       144
Gly Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

gga ggg atg gca aac tac gca cag aag ttc cag ggc aga gtc acg att       192
Gly Gly Met Ala Asn Tyr Ala Gln Lys Phe Gln Gly Arg Val Thr Ile
    50                  55                  60

agc ggg gac gaa tca acg agc aca gcc tac atg gag ctg agc aac ctg       240
Ser Gly Asp Glu Ser Thr Ser Thr Ala Tyr Met Glu Leu Ser Asn Leu
65                  70                  75                  80

aca tct gag gac acg gcc gtg tat tac tgt gcg agt cgg ggt gga tct       288
Thr Ser Glu Asp Thr Ala Val Tyr Tyr Cys Ala Ser Arg Gly Gly Ser
                85                  90                  95

tct cgc cgg tac ggt atg ggc gtc tgg ggc caa ggg acc acg gtc acc       336
Ser Arg Arg Tyr Gly Met Gly Val Trp Gly Gln Gly Thr Thr Val Thr
            100                 105                 110

gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg gca ccc       384
Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro
        115                 120                 125

tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc       432
Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val
    130                 135                 140

aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc       480
Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala
145                 150                 155                 160
```

```
ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag tcc tca gga       528
Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly
                165                 170                 175

ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc agc ttg ggc       576
Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly
            180                 185                 190

acc cag acc tac atc tgc aac gtg aat cac aag ccc agc aac acc aag       624
Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys
        195                 200                 205

gtg gac aag aga gtg                                                   639
Val Asp Lys Arg Val
    210

<210> 2324
<211> 667
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2324
g tgt gag gtg cag ttg ttg gag tct ggg gga gcc ttg gta cag ccg ggg      49
  Cys Glu Val Gln Leu Leu Glu Ser Gly Gly Ala Leu Val Gln Pro Gly
  1               5                   10                  15

ggg tcc ctg aga ctc tcc tgt gca gtc tct gga tta acc ttt aac aga        97
Gly Ser Leu Arg Leu Ser Cys Ala Val Ser Gly Leu Thr Phe Asn Arg
            20                  25                  30

ttt gcc atg acc tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg       145
Phe Ala Met Thr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
        35                  40                  45

gtc tca cac att ggt ggt agt ggt ggt tac aca tac tac gca gac tcc       193
Val Ser His Ile Gly Gly Ser Gly Gly Tyr Thr Tyr Tyr Ala Asp Ser
    50                  55                  60

gtg aag ggc cgg ttc acc atc tct aga gac aat tcc aag aac acg ttg       241
Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu
65                  70                  75                  80

tat ctg caa atg aac agc ctg cga gcc gag gac acg gcc gta tat cac       289
Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr His
                85                  90                  95

tgt gtg aaa ttg aag ggc att ggc gct atg tgg acg tac gct atg gac       337
Cys Val Lys Leu Lys Gly Ile Gly Ala Met Trp Thr Tyr Ala Met Asp
            100                 105                 110
```

```
gtc tgg ggc caa ggg acc acg gtc acc gtc tcc tca gcc tcc acc aag       385
Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys
        115                 120                 125

ggc cca tcg gtc ttc ccc ctg gcg ccc tgc tcc agg agc acc tcc gag       433
Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu
    130                 135                 140

agc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg       481
Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145                 150                 155                 160

gtg acg gtg tcg tgg aac tca ggc gct ctg acc agc ggc gtg cac acc       529
Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
                165                 170                 175

ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg       577
Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
            180                 185                 190

gtg acc gtg acc tcc agc aac ttc ggc acc cag acc tac acc tgc aac       625
Val Thr Val Thr Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn
        195                 200                 205

gta gat cac aag ccc agc aac acc aag gtg gac aag aca gtg               667
Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val
    210                 215                 220

<210> 2325
<211> 681
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2325
cag ctg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg gac        48
Gln Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Asp
1               5                   10                  15

acc ctg tcc ctc acc tgc act gtc tcg ggc tac tcc att agc act gct        96
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Tyr Ser Ile Ser Thr Ala
            20                  25                  30

tac tac tgg ggc tgg atc cga cag ccc cca ggg aag gga ctg gaa tgg       144
Tyr Tyr Trp Gly Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp
        35                  40                  45

att ggg agt atc ttt cac agt ggg agc gcc tac tac aat ccg tcc ctc       192
Ile Gly Ser Ile Phe His Ser Gly Ser Ala Tyr Tyr Asn Pro Ser Leu
    50                  55                  60
```

```
gac ggt cga gtc agc ctt tca gtg gac acg tcc aag aac cag ttc tcc       240
Asp Gly Arg Val Ser Leu Ser Val Asp Thr Ser Lys Asn Gln Phe Ser
65                  70                  75                  80

ctg agg ctg aag tct gtt acc gcc gca gac acg gcc gtt tat tac tgt       288
Leu Arg Leu Lys Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gat cag ggc tac ggt gat tac gac tat ccc aga gac tgg atc       336
Ala Arg Asp Gln Gly Tyr Gly Asp Tyr Asp Tyr Pro Arg Asp Trp Ile
            100                 105                 110

gaa ccc tgg ggc caa gga acc ctg gtc acc gtc tct tca gca tcc ccg       384
Glu Pro Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Pro
        115                 120                 125

acc agc ccc aag gtc ttc ccg ctg agc ctc gac agc acc ccc caa gat       432
Thr Ser Pro Lys Val Phe Pro Leu Ser Leu Asp Ser Thr Pro Gln Asp
    130                 135                 140

ggg aac gtg gtc gtc gca tgc ctg gtc cag ggc ttc ttc ccc cag gag       480
Gly Asn Val Val Val Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu
145                 150                 155                 160

cca ctc agt gtg acc tgg agc gaa agc gga cag aac gtg acc gcc aga       528
Pro Leu Ser Val Thr Trp Ser Glu Ser Gly Gln Asn Val Thr Ala Arg
                165                 170                 175

aac ttc cca cct agc cag gat gcc tcc ggg gac ctg tac acc acg agc       576
Asn Phe Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser
            180                 185                 190

agc cag ctg acc ctg ccg gcc aca cag tgc cca gac ggc aag tcc gtg       624
Ser Gln Leu Thr Leu Pro Ala Thr Gln Cys Pro Asp Gly Lys Ser Val
        195                 200                 205

aca tgc cac gtg aag cac tac acg aat ccc agc cag gat gtg act gtg       672
Thr Cys His Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val
    210                 215                 220

ccc tgc cca                                                          681
Pro Cys Pro
225
```

<210> 2326
<211> 370
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2326

```
cag gtg cag ctg gtg cag tct ggg gct gag gtg aag aag cct ggg tcc        48
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1               5                   10                  15

tcg gtg aag gtc tcc tgc aag gct tct gga ggc aac gtc aga agt tat        96
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Asn Val Arg Ser Tyr
            20                  25                  30

agc atc agc tgg gtg cga cag gcc ccc gga caa ggg ctt gag tgg atg       144
Ser Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

gga ggg atg atc acc act ttt gga aaa gcg gac tac gca ctg aag ttc       192
Gly Gly Met Ile Thr Thr Phe Gly Lys Ala Asp Tyr Ala Leu Lys Phe
    50                  55                  60

cgt gac aga gtc aca ata acc gcg gac aga tcc acg aac aca gtc tac       240
Arg Asp Arg Val Thr Ile Thr Ala Asp Arg Ser Thr Asn Thr Val Tyr
65                  70                  75                  80

atg gaa ctg agc agc ctc aca tca cag gac acg gcc gtc tat tac tgt       288
Met Glu Leu Ser Ser Leu Thr Ser Gln Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg agc gtc cga gac ctc gtc agt ggc acc act tac tac tat cac tac       336
Ala Ser Val Arg Asp Leu Val Ser Gly Thr Thr Tyr Tyr Tyr His Tyr
            100                 105                 110

tgg ggc cag gga acc ctg atc tcc gtc tcc tca g                        370
Trp Gly Gln Gly Thr Leu Ile Ser Val Ser Ser
        115                 120

<210> 2327
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2327
cc cag gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg         47
   Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser
   1               5                   10                  15

gag acc ctg tcc ctc acc tgc act gtc tct ggt gac tcc atc agt agt        95
Glu Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Asp Ser Ile Ser Ser
                20                  25                  30

aac tac tgg agc tgg atc cgg cag ccc cca ggg aag gga ctg gag tgg       143
Asn Tyr Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp
            35                  40                  45
```

```
att ggg tat atc tat tac agt ggg agc acc aac tac aac ccc tcc ctc       191
Ile Gly Tyr Ile Tyr Tyr Ser Gly Ser Thr Asn Tyr Asn Pro Ser Leu
        50                  55                  60

aag agt cga gtc acc ata tca gta gac acg tcc aag aac cag ttc tcc       239
Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe Ser
    65                  70                  75

gtg aag ctg agc tct gtg acc gct gcg gac acg gcc gtg tat tac tgt       287
Val Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys
80                  85                  90                  95

gcg aga tac ggt gac tac tcc ttt gac ccc tgg ggc cag gga acc ctg       335
Ala Arg Tyr Gly Asp Tyr Ser Phe Asp Pro Trp Gly Gln Gly Thr Leu
                100                 105                 110

gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg       383
Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu
            115                 120                 125

gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc tgc       431
Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys
        130                 135                 140

ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca       479
Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
    145                 150                 155

ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag tcc       527
Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser
160                 165                 170                 175

tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc agc       575
Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser
                180                 185                 190

ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc agc aac       623
Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn
            195                 200                 205

acc aag gtg gac aag agt gag                                           644
Thr Lys Val Asp Lys Ser Glu
        210
```

<210> 2328
<211> 656
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2328

```
cc cag gtt cag ttg gtg cag tct gga gct gag gtg aag aag cct ggg         47
   Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly
   1               5                  10                  15

gcc tca gtg aag gtc tcc tgc aag gct ttt ggt tac agg ttt tcc aac        95
Ala Ser Val Lys Val Ser Cys Lys Ala Phe Gly Tyr Arg Phe Ser Asn
                20                  25                  30

ttt ggg atc agt tgg gtg cga cag gcc cct gga caa ggg ctt gag tgg       143
Phe Gly Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp
            35                  40                  45

atg gga tgg atc agc gct tac aat ggg aac aca aac tat gca cag aag       191
Met Gly Trp Ile Ser Ala Tyr Asn Gly Asn Thr Asn Tyr Ala Gln Lys
        50                  55                  60

ctc cag ggc aga gtc acc atg acc aca gac aca tcc acg agc aca gcc       239
Leu Gln Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Ser Thr Ala
    65                  70                  75

tac atg gag ctg agg agc ctg aga tct gac gac acg gcc gtg tat tac       287
Tyr Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr
80                  85                  90                  95

tgt gcg aga gtc gta gac aca gtt ttg gca gac ttt gac tac tgg ggc       335
Cys Ala Arg Val Val Asp Thr Val Leu Ala Asp Phe Asp Tyr Trp Gly
                100                 105                 110

cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg       383
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
            115                 120                 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg       431
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
        130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       479
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
    145                 150                 155

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       527
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
160                 165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       575
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
                180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac       623
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
            195                 200                 205

aag ccc agc aac acc aag gtg gac aag agt gag                           656
Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
```

210 215

<210> 2329
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2329

```
cag gtg cac ctg gtg caa tct ggg tct gaa ttt aag aag cct ggg gcc        48
Gln Val His Leu Val Gln Ser Gly Ser Glu Phe Lys Lys Pro Gly Ala
1               5                   10                  15

tca gtg aag att tcc tgc aag act tct gga tac acg ttc act aat tat        96
Ser Val Lys Ile Ser Cys Lys Thr Ser Gly Tyr Thr Phe Thr Asn Tyr
            20                  25                  30

gct atg aat tgg gtg cgg cag gcc cct gga caa gga ctt gaa tgg gtg       144
Ala Met Asn Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Val
        35                  40                  45

gga tgg atc aac acc gtc act ggg atc cca ggt tat gcc cag ggc ttc       192
Gly Trp Ile Asn Thr Val Thr Gly Ile Pro Gly Tyr Ala Gln Gly Phe
    50                  55                  60

aca gga cgc ttt atc atc tcc ttg gac acc tct ggc cgc acg tct tat       240
Thr Gly Arg Phe Ile Ile Ser Leu Asp Thr Ser Gly Arg Thr Ser Tyr
65                  70                  75                  80

ctg cag atc aac agc cta cag gct gag gac act gcc gta tat tac tgt       288
Leu Gln Ile Asn Ser Leu Gln Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg cga tca ggg ggc ttt ggc tgg tca agg gac ctt gac tac tgg ggc       336
Ala Arg Ser Gly Gly Phe Gly Trp Ser Arg Asp Leu Asp Tyr Trp Gly
            100                 105                 110

cag gga acc ctg gtc acc gtc tcc tct gcc tcc acc aag ggc cca tcg       384
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

gtc ttc ccc ctg gcg ccc tgc tcc agg agc acc tct ggg ggc aca gcg       432
Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       480
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       528
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
```

```
                165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       576
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac acc tgc aac gtg aat cac       624
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Thr Cys Asn Val Asn His
        195                 200                 205

aag ccc agc aac acc aag gtg gac aag aga gtt                           657
Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215

<210> 2330
<211> 669
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2330
ccg cag ctg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg        48
Pro Gln Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser
1               5                   10                  15

gag acc ctg tcc ctc acc tgc agt gtc tct ggt gac tcc atc agc agc        96
Glu Thr Leu Ser Leu Thr Cys Ser Val Ser Gly Asp Ser Ile Ser Ser
            20                  25                  30

agt agc tac ttc tgg ggc tgg atc cgc cag ccc ccc ggg aag ggg ctg       144
Ser Ser Tyr Phe Trp Gly Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu
        35                  40                  45

gag tgg att ggg agt gtc tat tat agt ggg agc acc tac tac aag ccg       192
Glu Trp Ile Gly Ser Val Tyr Tyr Ser Gly Ser Thr Tyr Tyr Lys Pro
    50                  55                  60

tcc ctc aag agt cga ctc acc ata tcc gta gac acg tcc aag aag cag       240
Ser Leu Lys Ser Arg Leu Thr Ile Ser Val Asp Thr Ser Lys Lys Gln
65                  70                  75                  80

ttc tcc ctg aat ctg agc tct atg acc gcc gca gac acg gct gtt tat       288
Phe Ser Leu Asn Leu Ser Ser Met Thr Ala Ala Asp Thr Ala Val Tyr
                85                  90                  95

tac tgt gcg aga cat gga ttt tgg agt ggc ccc ata ccc gac gct ttt       336
Tyr Cys Ala Arg His Gly Phe Trp Ser Gly Pro Ile Pro Asp Ala Phe
            100                 105                 110

gat atc tgg ggc caa ggg aca atg gtc acc gtc tcc tca gcc tcc acc       384
Asp Ile Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr
```

```
        115                 120                 125

aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct       432
Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
    130                 135                 140

ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa       480
Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145                 150                 155                 160

ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac       528
Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
                165                 170                 175

acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc       576
Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
            180                 185                 190

gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc       624
Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
        195                 200                 205

aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aat gag           669
Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Asn Glu
    210                 215                 220

<210> 2331
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2331
cag gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cac cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val His Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt aac tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Tyr
            20                  25                  30

ggc atg cac tgg ctc cgg cag gct cca ggc aag ggg ctg gag tgg gtg       144
Gly Met His Trp Leu Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gca att ata gcc tat gat gga agt cag aaa aag tat gca gac tcc gtg       192
Ala Ile Ile Ala Tyr Asp Gly Ser Gln Lys Lys Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc att tcc aga gac aat tcc aag gac acg atg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asp Thr Met Tyr
```

```
65                  70                  75                  80

ctg caa atg aac aac ctg aga act gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Asn Leu Arg Thr Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg cac gaa gac tat ggt tcg ggg aat ggt aat tac tgg ggc cag gga       336
Ala His Glu Asp Tyr Gly Ser Gly Asn Gly Asn Tyr Trp Gly Gln Gly
            100                 105                 110

acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc       384
Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125

ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg       432
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140

ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg       480
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160

aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta       528
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc       576
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190

agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc       624
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205

agc aac acc aag gtg gac aag agt gag                                   651
Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215

<210> 2332
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2332
ccc gtg cac ctg gtg cag tct ggg gct gag gtg agg aag cct ggg tcc        48
Pro Val His Leu Val Gln Ser Gly Ala Glu Val Arg Lys Pro Gly Ser
1               5                   10                  15

tcg gtg aag gtc tcc tgc atg gcc tct gga ggc tcc ttc aac acc tat        96
Ser Val Lys Val Ser Cys Met Ala Ser Gly Gly Ser Phe Asn Thr Tyr
```

```
            20                  25                  30

gca gtc aac tgg gtg cga cag gcc ccc gga cag ggg ctt gag tgg atg       144
Ala Val Asn Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

gga ggg atc atc cct gtt ttt gga aca aac tac gca ccg agg ttc       192
Gly Gly Ile Ile Pro Val Phe Gly Thr Thr Asn Tyr Ala Pro Arg Phe
    50                  55                  60

cag ggc aga gtc acc att acc gcg gac gaa tcc acg agc aca gtc tac       240
Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Ser Thr Val Tyr
65                  70                  75                  80

atg gaa ctg acc agc ctg aca tct gag gac acg gcc gtg tat tac tgt       288
Met Glu Leu Thr Ser Leu Thr Ser Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gac cgc gac agt ggc tac gag agg aat tgt ctc gac ccc tgg       336
Ala Arg Asp Arg Asp Ser Gly Tyr Glu Arg Asn Cys Leu Asp Pro Trp
            100                 105                 110

ggc cag gga acc ctg gtc acc gtc tcc tcc gct tcc acc aag ggc cca       384
Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

tcc gtc ttc ccc ctg gcg ccc tgc tcc agg agc acc tcc gag agc aca       432
Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr
    130                 135                 140

gcc gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg       480
Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg       528
Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc       576
Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

gtg ccc tcc agc agc ttg ggc acg aag acc tac acc tgc aac gta gat       624
Val Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn Val Asp
        195                 200                 205

cac aag ccc agc aac acc aag gtg gac aag aga gtg                       660
His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220
```

<210> 2333
<211> 695
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2333
cc cag gtc caa ctt atg cag tct ggg gct gag gtg aag cag cct ggg 47
Gln Val Gln Leu Met Gln Ser Gly Ala Glu Val Lys Gln Pro Gly
1 5 10 15

gcc tca gtg aag gtt tcc tgc aag gct tct gga gac acc ttc acc tct 95
Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Asp Thr Phe Thr Ser
20 25 30

ttt gcc atc cat tgg gtg cgc cag gtc tcc gga caa ggg ctt gag tgg 143
Phe Ala Ile His Trp Val Arg Gln Val Ser Gly Gln Gly Leu Glu Trp
35 40 45

atg gga tgg atc aac gct ggc aat ggt gac acg aaa tat tca cag aag 191
Met Gly Trp Ile Asn Ala Gly Asn Gly Asp Thr Lys Tyr Ser Gln Lys
50 55 60

atc cag ggc aga atc acc ata acc agg gac aca tcc gcg aga aca gcc 239
Ile Gln Gly Arg Ile Thr Ile Thr Arg Asp Thr Ser Ala Arg Thr Ala
65 70 75

tac atg gag ttg agc agc ctg aga tct gaa gac acg gct gtg tat tat 287
Tyr Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr
80 85 90 95

tgt gcg agg ggg gcc cct tat ggt tcg cga att tat tat gat tac gac 335
Cys Ala Arg Gly Ala Pro Tyr Gly Ser Arg Ile Tyr Tyr Asp Tyr Asp
100 105 110

tcc tac cat ggt atg gac gtc tgg ggc caa ggg acc acg gtc acc gtc 383
Ser Tyr His Gly Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val
115 120 125

tcc tca gca tcc ccg acc agc ccc aag gtc ttc ccg ctg agc ctc tgc 431
Ser Ser Ala Ser Pro Thr Ser Pro Lys Val Phe Pro Leu Ser Leu Cys
130 135 140

agc acc cag cca gat ggg aac gtg gtc atc gcc tgc ctg gtc cag ggc 479
Ser Thr Gln Pro Asp Gly Asn Val Val Ile Ala Cys Leu Val Gln Gly
145 150 155

ttc ttc ccc cag gag cca ctc agt gtg acc tgg agc gaa agc gga cag 527
Phe Phe Pro Gln Glu Pro Leu Ser Val Thr Trp Ser Glu Ser Gly Gln
160 165 170 175

ggc gtg acc gcc aga aac ttc cca ccc agc cag gat gcc tcc ggg gac 575
Gly Val Thr Ala Arg Asn Phe Pro Pro Ser Gln Asp Ala Ser Gly Asp
180 185 190

```
ctg tac acc acg agc agc cag ctg acc ctg ccg gcc aca cag tgc cta       623
Leu Tyr Thr Thr Ser Ser Gln Leu Thr Leu Pro Ala Thr Gln Cys Leu
            195                 200                 205

gcc ggc aag tcc gtg aca tgc cac gtg aag cac tac acg aat ccc agc       671
Ala Gly Lys Ser Val Thr Cys His Val Lys His Tyr Thr Asn Pro Ser
        210                 215                 220

cag gat gtg act gtg ccc tgc ccg                                      695
Gln Asp Val Thr Val Pro Cys Pro
    225                 230

<210> 2334
<211> 666
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2334
cag gtg cac ctg cag gag tcg ggc cca gga ctg gtg aag cct tca cag        48
Gln Val His Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gln
1               5                   10                  15

acc ctg tcc ctc acc tgc act gtc tct ggt gac tcc atc agt aac ggt        96
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Asp Ser Ile Ser Asn Gly
            20                  25                  30

gat tat tgc tgg aac tgg atc cgc cag cgc cca ggg aag ggc ctg gag       144
Asp Tyr Cys Trp Asn Trp Ile Arg Gln Arg Pro Gly Lys Gly Leu Glu
        35                  40                  45

tgg att ggg tac atc tat cat agt ggg agc acc tac gag aac ccg tcc       192
Trp Ile Gly Tyr Ile Tyr His Ser Gly Ser Thr Tyr Glu Asn Pro Ser
    50                  55                  60

ctc agg agt cga gtt acc atg tca gta gac acg tct aag aac cag ttc       240
Leu Arg Ser Arg Val Thr Met Ser Val Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

tcc atg gag ttg acc tct gtg act gcc gcg gac acg gcc gtg tat tac       288
Ser Met Glu Leu Thr Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95

tgt gcg aga gga aag ttt gac tgg ttc cct cgt gtg tcc tcc ttt gac       336
Cys Ala Arg Gly Lys Phe Asp Trp Phe Pro Arg Val Ser Ser Phe Asp
            100                 105                 110

tac tgg ggc cgg gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag       384
Tyr Trp Gly Arg Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys
        115                 120                 125
```

```
ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg       432
Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
    130                 135                 140

ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg       480
Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145                 150                 155                 160

gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc       528
Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
                165                 170                 175

ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg       576
Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
            180                 185                 190

gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac       624
Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
        195                 200                 205

gtg aat cac aag ccc agc aac acc aag gtg gac aag agt gag               666
Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215                 220

<210> 2335
<211> 666
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2335
gtg gtg caa ctg gtg gag tct ggg gga gac tgg gtc cag cct ggg ggg        48
Val Val Gln Leu Val Glu Ser Gly Gly Asp Trp Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgc gca gcc tct gga ttc acc ttt aga agc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Ser Tyr
            20                  25                  30

tgg atg agt tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtg       144
Trp Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gcc agt gta gag gga tac cga agt gaa gaa tac tac gtg gac tct gtg       192
Ala Ser Val Glu Gly Tyr Arg Ser Glu Glu Tyr Tyr Val Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aat tca gtg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Val Tyr
65                  70                  75                  80
```

```
ctg cag atg aac agc cta aga gcc gag gac acg gct gtt tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg gcc gcc tat tat att gat act agc ggc ttt gac tac tgg ggc cag       336
Ala Ala Ala Tyr Tyr Ile Asp Thr Ser Gly Phe Asp Tyr Trp Gly Gln
            100                 105                 110

gga acc cag gtc act gtc tcc tca gca tcc ccg acc agc ccc aag gtc       384
Gly Thr Gln Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro Lys Val
        115                 120                 125

ttc ccg ctg agc ctc tgc agc acc cag cca gat ggg aac gtg gtc atc       432
Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val Ile
    130                 135                 140

gcc tgc ctg gtc cag ggc ttc ttc ccc cag gag cca ctc agt gtg acc       480
Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val Thr
145                 150                 155                 160

tgg agc gaa agc gga cag ggc gtg acc gcc aga aac ttc cca ccc agc       528
Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro Ser
                165                 170                 175

cag gat gcc tcc ggg gac ctg tac acc acg agc agc cag ctg acc ctg       576
Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr Leu
            180                 185                 190

ccg gcc aca cag tgc cta gcc ggc aag tcc gtg aca tgc cac gtg aag       624
Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val Lys
        195                 200                 205

cac tac acg aat ccc agc cag gat gtg act gtg ccc tgc cca               666
His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
    210                 215                 220
```

<210> 2336
<211> 673
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2336

```
g tgt gag gtg caa ctg ttg gag tct ggg gga aag ttg gta cag cct ggg      49
  Cys Glu Val Gln Leu Leu Glu Ser Gly Gly Lys Leu Val Gln Pro Gly
  1               5                  10                  15

ggg tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc tac gac agt        97
Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Tyr Asp Ser
            20                  25                  30
```

```
tat gtc atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg       145
Tyr Val Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
        35                  40                  45

gtc tca ggt att agt gcc agt ggc ggt ggc acc tac tac gca gac tcc       193
Val Ser Gly Ile Ser Ala Ser Gly Gly Gly Thr Tyr Tyr Ala Asp Ser
    50                  55                  60

gtg aag ggc cgg ttc acc atc tcc aga gac aat tcc aag aac acg ctg       241
Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu
65                  70                  75                  80

tac ctg gaa atg aac agc ctg aga gcc gac gac acg gcc gta tat tac       289
Tyr Leu Glu Met Asn Ser Leu Arg Ala Asp Asp Thr Ala Val Tyr Tyr
                85                  90                  95

tgt gcg aaa gga cgg acg tat agc aat aac tgg tta ttt cac tgg tac       337
Cys Ala Lys Gly Arg Thr Tyr Ser Asn Asn Trp Leu Phe His Trp Tyr
            100                 105                 110

ttc gat ctc tgg ggc cgt ggc acc ctg gtc act gtc tcc tca gcc tcc       385
Phe Asp Leu Trp Gly Arg Gly Thr Leu Val Thr Val Ser Ser Ala Ser
        115                 120                 125

acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc       433
Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
    130                 135                 140

tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc       481
Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145                 150                 155                 160

gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg       529
Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
                165                 170                 175

cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc       577
His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
            180                 185                 190

agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc       625
Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile
        195                 200                 205

tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aat gag       673
Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Asn Glu
    210                 215                 220
```

<210> 2337
<211> 657
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2337

```
ccc gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg gag        48
Pro Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                  10                  15

acc ctg tcc ctc act tgc act gtc tct agt ggc tcc gtc agc agt ggt        96
Thr Leu Ser Leu Thr Cys Thr Val Ser Ser Gly Ser Val Ser Ser Gly
            20                  25                  30

agt cac tac tgg agc tgg atc cgg cag ccc cca ggg aag gga ctg gag       144
Ser His Tyr Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu
        35                  40                  45

tgg att ggg tat atc tat tac agt ggg acc tcc aac tac aac ccc tcc       192
Trp Ile Gly Tyr Ile Tyr Tyr Ser Gly Thr Ser Asn Tyr Asn Pro Ser
    50                  55                  60

ctc aag ggt cga gtc gcc ata tca gta gac acg tcc aag aac cag ttc       240
Leu Lys Gly Arg Val Ala Ile Ser Val Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

tcc ctg aag ctg agc tct gtg acc gct gcg gac acg gcc ata tat tac       288
Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Ile Tyr Tyr
                85                  90                  95

tgt gcg aga gtt ttt agt acg ata ttt cat ggg gtc gac ccc tgg ggc       336
Cys Ala Arg Val Phe Ser Thr Ile Phe His Gly Val Asp Pro Trp Gly
            100                 105                 110

cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg       384
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg       432
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       480
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       528
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       576
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac       624
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
```

```
        195                 200                 205

aag ccc agc aac acc aag gtg gac aag aaa gtg                              657
Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215

<210> 2338
<211> 672
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2338
cag gtg cag ctg gtg cag tct ggg gct gaa gtg aag aag cct ggg gcc        48
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

tca gta aag gtc tcc tgc agg gct tca gga tac agc ttc acc ggc tat        96
Ser Val Lys Val Ser Cys Arg Ala Ser Gly Tyr Ser Phe Thr Gly Tyr
            20                  25                  30

tat ata cac tgg gtg cga cag gcc cct gga caa ggg ctt gag tgg atg       144
Tyr Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

gga tgg atc aac cct aaa act ggt gac aca cac tat gca cag aac ttt       192
Gly Trp Ile Asn Pro Lys Thr Gly Asp Thr His Tyr Ala Gln Asn Phe
    50                  55                  60

cag ggc tgg gtc acc atg acc agg gac acg tcc atc agt acc gcc tac       240
Gln Gly Trp Val Thr Met Thr Arg Asp Thr Ser Ile Ser Thr Ala Tyr
65                  70                  75                  80

atg gag ttg acc att ttg aga tct gac gac acg gcc gtg tat tac tgt       288
Met Glu Leu Thr Ile Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga cac tta agc agt ggc gaa tac cac tac ggt ttg gac gtc tgg       336
Ala Arg His Leu Ser Ser Gly Glu Tyr His Tyr Gly Leu Asp Val Trp
            100                 105                 110

ggc caa ggg acc acg gtc act gcc tcc tca gca tcc ccg acc agc ccc       384
Gly Gln Gly Thr Thr Val Thr Ala Ser Ser Ala Ser Pro Thr Ser Pro
        115                 120                 125

aag gtc ttc ccg ctg agc ctc tgc agc acc cag cca gat ggg aac gtg       432
Lys Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val
    130                 135                 140

gtc atc gcc tgc ctg gtc cag ggc ttc ttc ccc cag gag cca ctc agt       480
Val Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser
```

```
145                 150                 155                 160

gtg acc tgg agc gaa agc gga cag ggc gtg acc gcc aga aac ttc cca       528
Val Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro
                165                 170                 175

ccc agc cag gat gcc tcc ggg gac ctg tac acc acg agc agc cag ctg       576
Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu
            180                 185                 190

acc ctg ccg gcc aca cag tgc cta gcc ggc aag tcc gtg aca tgc cac       624
Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His
        195                 200                 205

gtg aag cac tac acg aat ccc agc cag gat gtg act gtg ccc tgc cca       672
Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
    210                 215                 220

<210> 2339
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2339
tag gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg        48
    Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
    1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc cct gga ttc acc ttc agt aac tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Pro Gly Phe Thr Phe Ser Asn Tyr
                20                  25                  30

ggc atg cac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg       144
Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
            35                  40                  45

gca gtt ata tca tat gat gga agt aat aaa tac tat gca gac tcc gtg       192
Ala Val Ile Ser Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val
        50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aat tcc aag aac acg ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
    65                  70                  75

ctg caa atg aac agc ctg aga gct gag gac acg gct gtc tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
80                  85                  90                  95

gcg aaa gga aag ggt ata gtg gga gcc acc ttt gac tac tgg ggc cag       336
Ala Lys Gly Lys Gly Ile Val Gly Ala Thr Phe Asp Tyr Trp Gly Gln
```

```
               100                 105                 110

gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc       384
Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
            115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       432
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
        130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
    145                 150                 155

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
160                 165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
                180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       624
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
            195                 200                 205

ccc agc aac acc aag gtg gac aag aat gtg                               654
Pro Ser Asn Thr Lys Val Asp Lys Asn Val
        210                 215

<210> 2340
<211> 673
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2340
g tgt gag gtg cag ctg gtg gag tct ggg gga ggc ctg gtc aag cct ggg      49
  Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly
  1               5                  10                  15

ggg tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt aac        97
Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn
            20                  25                  30

tat aac atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg       145
Tyr Asn Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
        35                  40                  45

gtc tca tcc att agt agt agt agt agt tac ata tac tac gca gac tca       193
Val Ser Ser Ile Ser Ser Ser Ser Ser Tyr Ile Tyr Tyr Ala Asp Ser
```

```
    50                  55                  60

gtg aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tca ctg       241
Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu
65                  70                  75                  80

tat ctg caa atg aac agc ctg aga gcc gag gac acg gct gtg tat tac       289
Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr
                85                  90                  95

tgt gcg aga gat gcg cta gat ttt gac tgg tta ttg tca gcc ggg ggc       337
Cys Ala Arg Asp Ala Leu Asp Phe Asp Trp Leu Leu Ser Ala Gly Gly
            100                 105                 110

ttt gac tac tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc       385
Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser
        115                 120                 125

acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc       433
Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
    130                 135                 140

tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc       481
Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145                 150                 155                 160

gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg       529
Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
                165                 170                 175

cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc       577
His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
            180                 185                 190

agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc       625
Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile
        195                 200                 205

tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aag gtg       673
Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220
```

<210> 2341
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2341

```
ccc ctg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg gag        48
Pro Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
```

```
1               5                   10                  15

acc ctg tcc ctc acc tgc act gtc tct ggt ggc tcc atc agc agt agt        96
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Ser
            20                  25                  30

agt tac tac tgg ggc tgg atc cgc cag ccc cca ggg aag ggg ctg gag       144
Ser Tyr Tyr Trp Gly Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu
        35                  40                  45

tgg att ggg agt atc tat tat agt ggg agc acc tac tac aac ccg tcc       192
Trp Ile Gly Ser Ile Tyr Tyr Ser Gly Ser Thr Tyr Tyr Asn Pro Ser
    50                  55                  60

ctc aag agt cga gtc acc ata tcc gta gac acg tcc aag aac cag ttc       240
Leu Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

tcc ctg aag ctg agc tct gtg acc gcc gca gac acg gct gtg tat tcc       288
Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Ser
                85                  90                  95

tgt gcg aga cta ctt gtg ggg ggt gct ttt gat atc tgg ggc caa ggg       336
Cys Ala Arg Leu Leu Val Gly Gly Ala Phe Asp Ile Trp Gly Gln Gly
            100                 105                 110

aca atg gtc acc gtc tct tca gcc tcc acc aag ggc cca tcg gtc ttc       384
Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125

ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg       432
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140

ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg       480
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160

aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta       528
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc       576
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190

agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc       624
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205

agc aac acc aag gtg gac aag agt gag                                   651
Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215
```

<210> 2342
<211> 679
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2342
g tgt gag gtg cag ctg gtg gag tct ggg gga ggc ttg gta aag cct ggg 49
Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly
1 5 10 15

ggg tcc ctt aga ctc tcc tgt gca gcc tct ggt ttc act ttc agt aac 97
Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn
20 25 30

gcc tgg atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg 145
Ala Trp Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
35 40 45

gtc ggc cgt att aaa agc aaa act gat ggt ggg aca aca gac tac gct 193
Val Gly Arg Ile Lys Ser Lys Thr Asp Gly Gly Thr Thr Asp Tyr Ala
50 55 60

gca ccc gtg aaa ggc aga ttc acc atc tca aga gat gat tca aaa aac 241
Ala Pro Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser Lys Asn
65 70 75 80

acg ctg tat ctg caa atg aac agc ctg aaa acc gag gac aca gcc gtg 289
Thr Leu Tyr Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val
85 90 95

tat tac tgt acc cca gga tct tgt agt ggt ggt agc tgc tac tcc ggc 337
Tyr Tyr Cys Thr Pro Gly Ser Cys Ser Gly Gly Ser Cys Tyr Ser Gly
100 105 110

gat gct ttt gat atc tgg ggc caa ggg aca atg gtc acc gtc tct tca 385
Asp Ala Phe Asp Ile Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser
115 120 125

gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag 433
Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
130 135 140

agc acc tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac 481
Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
145 150 155 160

ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc 529
Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
165 170 175

```
ggc gtg cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc       577
Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
            180                 185                 190

ctc agc agc atg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc       625
Leu Ser Ser Met Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
        195                 200                 205

tac atc tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag       673
Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
    210                 215                 220

agt gag                                                               679
Ser Glu
225
```

<210> 2343
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2343

```
cag gtg cac ctg gtg cag tct ggg gct gag gtg aag aag cct ggg gcc        48
Gln Val His Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

tca gtg aaa gtt tcc tgt aag gca tct gga tac acc ttc acc aac tac        96
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asn Tyr
            20                  25                  30

ttt atc cac tgg gtg cga cag gcc cct gga cag ggg cct gag tgg atg       144
Phe Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Pro Glu Trp Met
        35                  40                  45

gga gta atc aac cct agt ttt gga agc aca acc tac gca cag aag ttg       192
Gly Val Ile Asn Pro Ser Phe Gly Ser Thr Thr Tyr Ala Gln Lys Leu
    50                  55                  60

cag ggc aga gtc acc atg acc agg gag acg tcc acg agc act gtc tac       240
Gln Gly Arg Val Thr Met Thr Arg Glu Thr Ser Thr Ser Thr Val Tyr
65                  70                  75                  80

atg gaa ctg agc agc ctg aga tct gag gac acg gcc gtc tat tac tgt       288
Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gag tcc ctt gat agt gcc tca tat agt acc atc gca cat tgg       336
Ala Arg Glu Ser Leu Asp Ser Ala Ser Tyr Ser Thr Ile Ala His Trp
            100                 105                 110
```

```
ggc cag gga acc ctg gtc acc gtc tct tca gcc tcc acc aag ggc cca       384
Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca       432
Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
    130                 135                 140

gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg       480
Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg       528
Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc       576
Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat       624
Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
        195                 200                 205

cac aag ccc agc aac acc aag gtg gac aag agt gag                       660
His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215                 220
```

<210> 2344
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2344

```
cag gtg cag ctg gtg cag tct ggg gct gag gtg aag aaa cct ggg tcc        48
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1               5                   10                  15

tcg gtg aag gtc tcc tgc aag gcc cct gga ggc acc ttc aac aac tat        96
Ser Val Lys Val Ser Cys Lys Ala Pro Gly Gly Thr Phe Asn Asn Tyr
            20                  25                  30

ggt atc agc tgg gtg cga cag gcc cct gga caa ggg ctt gag tgg atg       144
Gly Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

gga ggg atc atg cct atg ttt gga aga aca agc gag aca cag aag ttc       192
Gly Gly Ile Met Pro Met Phe Gly Arg Thr Ser Glu Thr Gln Lys Phe
    50                  55                  60
```

```
cag ggc aga gtc acc att agc gcg gac gaa tct acg agc aca gtg tac       240
Gln Gly Arg Val Thr Ile Ser Ala Asp Glu Ser Thr Ser Thr Val Tyr
65                  70                  75                  80

atg gag atg agt agc ctc aga ttt gac gac acg gcc gta tat tac tgt       288
Met Glu Met Ser Ser Leu Arg Phe Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gat cga gga ggc aac agc tgg ctt gat gtt ttt gat atg tgg       336
Ala Arg Asp Arg Gly Gly Asn Ser Trp Leu Asp Val Phe Asp Met Trp
            100                 105                 110

ggc caa ggg aca atg gtc acc gtc tcc tca gcc tcc acc aag ggc cca       384
Gly Gln Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

tcg gtc ttc ccc ctg gcg ccc tgc tcc agg agc acc tcc gag agc aca       432
Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr
    130                 135                 140

gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg       480
Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg       528
Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc       576
Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

gtg ccc tcc agc aac ttc ggc acc cag acc tac acc tgc aac gta gat       624
Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp
        195                 200                 205

cac aag ccc agc aac acc aag gtg gac aag aca gtt                       660
His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val
    210                 215                 220
```

<210> 2345
<211> 672
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2345

```
gag gta caa ttg ctg gag tct ggg gga ggc ttg gta cat cct gga ggg        48
Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val His Pro Gly Gly
1               5                   10                  15
```

```
tcc ctg aga ctg tcc tgt gtg gcc tct gga ttc acc ttc agt agt tat        96
Ser Leu Arg Leu Ser Cys Val Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

gag atg acc tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg atc       144
Glu Met Thr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Ile
        35                  40                  45

tcc tat atc agc agt act gga acc acc aca tac cac gca gac tct gtg       192
Ser Tyr Ile Ser Ser Thr Gly Thr Thr Thr Tyr His Ala Asp Ser Val
    50                  55                  60

agg ggc cga ttc acc atc tcc aga gac aac gcc aag agc tca ctg ttt       240
Arg Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Ser Ser Leu Phe
65                  70                  75                  80

ttg cag atg aac agc ctg cga gtc gaa gac acg gct ctg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Val Glu Asp Thr Ala Leu Tyr Tyr Cys
                85                  90                  95

gcg aga tcc ccc gcc gcc ttt ggc tca gag agt tac ttt gac tcc tgg       336
Ala Arg Ser Pro Ala Ala Phe Gly Ser Glu Ser Tyr Phe Asp Ser Trp
            100                 105                 110

ggt cag gga gtc ctg gtc acc gtc tcc tca gca tcc ccg acc agc ccc       384
Gly Gln Gly Val Leu Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro
        115                 120                 125

aag gtc ttc ccg ctg agc ctc tgc agc acc cag cca gat ggg aac gtg       432
Lys Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val
    130                 135                 140

gtc atc gcc tgc ctg gtc cag ggc ttc ttc ccc cag gag cca ctc agt       480
Val Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser
145                 150                 155                 160

gtg acc tgg agc gaa agc gga cag ggc gtg acc gcc aga aac ttc cca       528
Val Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro
                165                 170                 175

ccc agc cag gat gcc tcc ggg gac ctg tac acc acg agc agc cag ctg       576
Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu
            180                 185                 190

acc ctg ccg gcc aca cag tgc cta gcc ggc aag tcc gtg aca tgc cac       624
Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His
        195                 200                 205

gtg aag cac tac acg aat ccc agc cag gat gtg act gtg ccc tgc cca       672
Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
    210                 215                 220
```

<210> 2346
<211> 666

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2346
```
cag gtg cag ttg gtg gaa tct ggg gga ggc gtg gtc cag cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                  10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc acg acc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Thr Thr Tyr
            20                  25                  30

gct gtg cac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg       144
Ala Val His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gca gtt ata tca aat gac gga agt aat aaa aac tac gca gac tcc gtg       192
Ala Val Ile Ser Asn Asp Gly Ser Asn Lys Asn Tyr Ala Asp Ser Val
    50                  55                  60

agg ggc cga ttc atc atc tcc aga gac aat tcc aag aac act ctg tat       240
Arg Gly Arg Phe Ile Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

ctc caa atg aac agc ctg aga gct gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aaa gat ctt cta gag gac cca tac ttc ggg gac tta ttg ttt gac       336
Ala Lys Asp Leu Leu Glu Asp Pro Tyr Phe Gly Asp Leu Leu Phe Asp
            100                 105                 110

tac tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag       384
Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys
        115                 120                 125

ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg       432
Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
    130                 135                 140

ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg       480
Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145                 150                 155                 160

gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc       528
Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
                165                 170                 175

ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg       576
Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
```

```
            180                 185                 190

gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac       624
Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
        195                 200                 205

gtg aat cac aag ccc agc aac acc aag gtg gac aag aat gtg               666
Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Asn Val
    210                 215                 220
```

<210> 2347
<211> 671
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2347

```
cc gag gtg cag ctg gtg cag tct gga gca gag gtg aaa aag tcc ggg         47
   Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Ser Gly
   1               5                   10                  15

gag tct ctg aag atc tcc tgt aag ggt tct gga tac acc ttt acc agc        95
Glu Ser Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Thr Phe Thr Ser
                20                  25                  30

tac tgg atc gcc tgg gtg cgc cag atg ccc ggg aaa ggc ctg gag tgg       143
Tyr Trp Ile Ala Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp
            35                  40                  45

atg ggg atc atc tat cct ggt gac tct gat acc aga tac agc ccg tcc       191
Met Gly Ile Ile Tyr Pro Gly Asp Ser Asp Thr Arg Tyr Ser Pro Ser
        50                  55                  60

ttc caa ggc cag gtc acc atc tca gcc gac aag tcc atc agc acc gcc       239
Phe Gln Gly Gln Val Thr Ile Ser Ala Asp Lys Ser Ile Ser Thr Ala
    65                  70                  75

tac ctg cag tgg agc agc ctg aag gcc tcg gac acc gcc atg tat tac       287
Tyr Leu Gln Trp Ser Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr Tyr
80                  85                  90                  95

tgt gtg agg acc ccc gct gtt ggc acc gac cct gac tac tgg ggc cag       335
Cys Val Arg Thr Pro Ala Val Gly Thr Asp Pro Asp Tyr Trp Gly Gln
                100                 105                 110

gga acc ctg gtc acc gtc tcc tca ggg agt gca tcc gcc cca acc ctt       383
Gly Thr Leu Val Thr Val Ser Ser Gly Ser Ala Ser Ala Pro Thr Leu
            115                 120                 125

ttc ccc ctc gtc tcc tgt gag aat tcc ccg tcg gat acg agc agc gtg       431
Phe Pro Leu Val Ser Cys Glu Asn Ser Pro Ser Asp Thr Ser Ser Val
```

```
        130                 135                 140

gcc gtt ggc tgc ctc gca cag gac ttc ctt ccc gac tcc atc act ttc       479
Ala Val Gly Cys Leu Ala Gln Asp Phe Leu Pro Asp Ser Ile Thr Phe
    145                 150                 155

tcc tgg aaa tac aag aac aac tct gac atc agc agc acc cgg ggc ttc       527
Ser Trp Lys Tyr Lys Asn Asn Ser Asp Ile Ser Ser Thr Arg Gly Phe
160                 165                 170                 175

cca tca gtc ctg aga ggg ggc aag tac gca gcc acc tca cag gtg ctg       575
Pro Ser Val Leu Arg Gly Gly Lys Tyr Ala Ala Thr Ser Gln Val Leu
                180                 185                 190

ctg cct tcc aag gac gtc atg cag ggc aca gac gaa cac gtg gtg tgc       623
Leu Pro Ser Lys Asp Val Met Gln Gly Thr Asp Glu His Val Val Cys
            195                 200                 205

aaa gtc cag cac ccc aac ggc aac aaa gaa aag aac gtg cct ctt ccg       671
Lys Val Gln His Pro Asn Gly Asn Lys Glu Lys Asn Val Pro Leu Pro
        210                 215                 220

<210> 2348
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2348
gag gtc cag ttg atg gaa tct ggg gga ggt ttg gta cag ccg ggg ggg        48
Glu Val Gln Leu Met Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ctc acc ttc agc att tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Leu Thr Phe Ser Ile Tyr
            20                  25                  30

agc atg aat tgg gtc cgc cag gcc cca ggg aag ggg ctg gag tgg gtt       144
Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca tat att agt cgg ggg agc agt gtg ata tac cac gca gac tct gtg       192
Ser Tyr Ile Ser Arg Gly Ser Ser Val Ile Tyr His Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac gac ggc aag aac cta ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asp Gly Lys Asn Leu Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gac gac gac acg gct atg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Asp Asp Asp Thr Ala Met Tyr Tyr Cys
```

```
                85                  90                  95

tcg agt ggg ggg tcc aca tcg atg gtt ggg aga tac tgg ggc cag gga       336
Ser Ser Gly Gly Ser Thr Ser Met Val Gly Arg Tyr Trp Gly Gln Gly
            100                 105                 110

tcc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc       384
Ser Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125

ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg       432
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140

ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg       480
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160

aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta       528
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc       576
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190

agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc       624
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205

agc aac acc aag gtg gac aag aga gtg                                   651
Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215

<210> 2349
<211> 662
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2349
cc cag gtc acc ttg aag gag tct ggt cct gtg ctg gtg aaa ccc aca         47
   Gln Val Thr Leu Lys Glu Ser Gly Pro Val Leu Val Lys Pro Thr
   1               5                  10                  15

gag acc ctc acg ctg acc tgc acc gtc tct ggg ttc tca ctc agc aat        95
Glu Thr Leu Thr Leu Thr Cys Thr Val Ser Gly Phe Ser Leu Ser Asn
                20                  25                  30

gct aga atg ggt gtg agc tgg atc cgt cag ccc cca ggg aag gcc ctg       143
Ala Arg Met Gly Val Ser Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu
```

```
            35                  40                  45

gag tgg ctt gga cac att ttt tcg aat gac gaa aaa tcc tac agc aca       191
Glu Trp Leu Gly His Ile Phe Ser Asn Asp Glu Lys Ser Tyr Ser Thr
        50                  55                  60

tct ctg aag agc agg ctc acc atc tcc aag gac acc tcc aaa agc cag       239
Ser Leu Lys Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Ser Gln
    65                  70                  75

gtg gtc ctt acc ttg acc aac atg gac cct gtg gac aca gcc aca tat       287
Val Val Leu Thr Leu Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr
80                  85                  90                  95

tac tgt gca cgg atg acc cca ttc aag ttt gga cta tgc cct gac tac       335
Tyr Cys Ala Arg Met Thr Pro Phe Lys Phe Gly Leu Cys Pro Asp Tyr
                100                 105                 110

tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc       383
Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
            115                 120                 125

cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc       431
Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
        130                 135                 140

aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg       479
Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
    145                 150                 155

acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc       527
Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
160                 165                 170                 175

ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg       575
Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
                180                 185                 190

acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg       623
Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
            195                 200                 205

aat cac aag ccc agc aac acc aag gtg gac aag aag gtg                   662
Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
        210                 215                 220
```

<210> 2350
<211> 659
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2350
cc cag gtg cag ctg gtg cag tct ggg gct gag gtg aag aag cct ggg 47
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly
1 5 10 15

gcc tca gtg aag gtc tcc tgc aag gct tct gga tac acc ttc acc gtc 95
Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Val
20 25 30

tac tat atg cac tgg gtg cga cag gcc cct gga caa ggg ctt gag tgg 143
Tyr Tyr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp
35 40 45

atg gga cgg atc aac cct aac agt ggt ggc aca aac tat gca cag aag 191
Met Gly Arg Ile Asn Pro Asn Ser Gly Gly Thr Asn Tyr Ala Gln Lys
50 55 60

ttt cag ggc agg gtc acc atg acc agg gac acg tcc atc agc aca gcc 239
Phe Gln Gly Arg Val Thr Met Thr Arg Asp Thr Ser Ile Ser Thr Ala
65 70 75

tac atg gaa ctg agc agg ctg aca tct gac gac acg gcc gtg tat tac 287
Tyr Met Glu Leu Ser Arg Leu Thr Ser Asp Asp Thr Ala Val Tyr Tyr
80 85 90 95

tgt gcg aga gta gtg gtg gta ggt aca gac tac ggt atg gac gtc tgg 335
Cys Ala Arg Val Val Val Val Gly Thr Asp Tyr Gly Met Asp Val Trp
100 105 110

ggc caa ggg acc acg gtc acc gtc tcc tca gcc tcc acc aag ggc cca 383
Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
115 120 125

tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca 431
Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
130 135 140

gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg 479
Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145 150 155

gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg 527
Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
160 165 170 175

gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc 575
Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
180 185 190

gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat 623
Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
195 200 205

```
cac aag ccc agc aac acc aag gtg gac aag agt gag                        659
His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
        210                 215

<210> 2351
<211> 659
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2351
cc cag gtt cag ctg gtg cag tct gga gct gag gtg aag aag cct ggg          47
   Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly
   1               5                   10                  15

gcc tca gtg aag gtc tcc tgc aag gct tct ggt tac acc ttt acc agc         95
Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser
                20                  25                  30

tat ggt atc agc tgg gtg cga cag gcc cct gga caa ggg ctt gag tgg        143
Tyr Gly Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp
            35                  40                  45

atg gga tgg atc agc gct tac aat ggt aac aca aac tat gca cag aag        191
Met Gly Trp Ile Ser Ala Tyr Asn Gly Asn Thr Asn Tyr Ala Gln Lys
        50                  55                  60

ctc cag ggc aga gtc acc atg acc aca gac aca tcc acg agc aca gcc        239
Leu Gln Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Ser Thr Ala
    65                  70                  75

tac atg gag ctg agg agc ctg aca tct gac gac acg gcc gtg tat tac        287
Tyr Met Glu Leu Arg Ser Leu Thr Ser Asp Asp Thr Ala Val Tyr Tyr
80                  85                  90                  95

tgt gcg aga gat caa gga ctg gag agg gct aac tgg ttc gac ccc tgg        335
Cys Ala Arg Asp Gln Gly Leu Glu Arg Ala Asn Trp Phe Asp Pro Trp
                100                 105                 110

ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca        383
Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
            115                 120                 125

tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca        431
Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
        130                 135                 140

gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg        479
Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
    145                 150                 155
```

```
gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg       527
Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
160                 165                 170                 175

gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc       575
Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
                180                 185                 190

gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat       623
Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
            195                 200                 205

cac aag ccc agc aac acc aag gtg gac aag aaa gtg                       659
His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
        210                 215
```

<210> 2352
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2352

```
cag gta cac ctg cag gag tca ggt cca gga ctg gtg aag ccc tcg cgg        48
Gln Val His Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Arg
1               5                   10                  15

acc ctc tca ctc acc tgt gcc atc tcc ggg gac agt gtc tct agc acc        96
Thr Leu Ser Leu Thr Cys Ala Ile Ser Gly Asp Ser Val Ser Ser Thr
            20                  25                  30

agt gct gct tgg aac tgg atc agg cag tcc cca tcg gga ggc ctt gag       144
Ser Ala Ala Trp Asn Trp Ile Arg Gln Ser Pro Ser Gly Gly Leu Glu
        35                  40                  45

tgg ctg gga agg aca ttc tac agg acc aag tgg tat agt gaa tct aca       192
Trp Leu Gly Arg Thr Phe Tyr Arg Thr Lys Trp Tyr Ser Glu Ser Thr
    50                  55                  60

ggc tct ctg aaa agt cga ata atc gtc aac cca gac aca tcc aag aac       240
Gly Ser Leu Lys Ser Arg Ile Ile Val Asn Pro Asp Thr Ser Lys Asn
65                  70                  75                  80

cag ttc tcc cta cag ctg aat tct gtg act ccc gaa gac acg gct gtc       288
Gln Phe Ser Leu Gln Leu Asn Ser Val Thr Pro Glu Asp Thr Ala Val
                85                  90                  95

tat tac tgt gca aga ggt gtc cgc cac ttt gac tac tgg ggc cag ggc       336
Tyr Tyr Cys Ala Arg Gly Val Arg His Phe Asp Tyr Trp Gly Gln Gly
            100                 105                 110
```

```
acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc       384
Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125

ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg       432
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140

ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg       480
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160

aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta       528
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc       576
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190

agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc       624
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205

agc aac acc aag gtg gac aag aaa gtg                                   651
Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215
```

<210> 2353
<211> 653
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2353

```
cc cag gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg         47
   Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser
   1               5                  10                  15

ggg acc ctg tcc ctc acc tgc gca gtc tct ggt ggc tcc atc agc agt        95
Gly Thr Leu Ser Leu Thr Cys Ala Val Ser Gly Gly Ser Ile Ser Ser
                20                  25                  30

agt aac tgc tgg agt tgg gtc cgc cag ccc ccc ggg aag ggg ctg gag       143
Ser Asn Cys Trp Ser Trp Val Arg Gln Pro Pro Gly Lys Gly Leu Glu
            35                  40                  45

tgg ctt ggg gaa atc tgt cat agt ggg agc acc agc tac aac ccg tcc       191
Trp Leu Gly Glu Ile Cys His Ser Gly Ser Thr Ser Tyr Asn Pro Ser
        50                  55                  60
```

```
ctc aag agt cga gtc acc ata tca gtc gac aag tct aag aac cag ttc       239
Leu Lys Ser Arg Val Thr Ile Ser Val Asp Lys Ser Lys Asn Gln Phe
    65                  70                  75

tcc ctg aaa ctg cgc tct gtg acc gcc gcg gac acg gcc gtg tat tac       287
Ser Leu Lys Leu Arg Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
80                  85                  90                  95

tgt gcg aga gag tca cct tta act gtc gtc ttt gac tac tgg ggc cag       335
Cys Ala Arg Glu Ser Pro Leu Thr Val Val Phe Asp Tyr Trp Gly Gln
                100                 105                 110

gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc       383
Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
            115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       431
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
        130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       479
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
    145                 150                 155

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       527
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
160                 165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       575
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
                180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       623
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
            195                 200                 205

ccc agc aac acc aag gtg gac aag aaa gtg                               653
Pro Ser Asn Thr Lys Val Asp Lys Lys Val
        210                 215

<210> 2354
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2354
gag gtg cag ctg gtg gag tct ggg gga ggc ttg gtc cag cct ggg ggg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15
```

```
tcc ctg aga ctc tcc tgt gca gcc tct ggg ttc acc gtc agt agc aac        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Val Ser Ser Asn
            20                  25                  30

tac atg agc tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtc       144
Tyr Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca gtt att tat agc ggt ggt agc aca tac tac gca gac tcc gtg aag       192
Ser Val Ile Tyr Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val Lys
    50                  55                  60

ggc cga ttc acc atc tcc aga gac aat tcc aag aac acg ctg tct ctt       240
Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Ser Leu
65                  70                  75                  80

caa atg aac agc ctg aga gcc gag gac acg gcc gtg tat tac tgt gcg       288
Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala
                85                  90                  95

agg gaa tcc tca gca gct ggt tat gac tac tgg ggc cag gga acc ctg       336
Arg Glu Ser Ser Ala Ala Gly Tyr Asp Tyr Trp Gly Gln Gly Thr Leu
            100                 105                 110

gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg       384
Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu
        115                 120                 125

gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc tgc       432
Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys
    130                 135                 140

ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca       480
Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
145                 150                 155                 160

ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag tcc       528
Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser
                165                 170                 175

tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc agc       576
Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser
            180                 185                 190

ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc agc aac       624
Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn
        195                 200                 205

acc aag gtg gac aag agt gtg                                           645
Thr Lys Val Asp Lys Ser Val
    210                 215
```

<210> 2355
<211> 665

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2355
```
cc cag gtg cag ttg gtg cag tcg ggg gct gag gtg agg aag cct ggg         47
   Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Arg Lys Pro Gly
   1               5                   10                  15

gcc tca gtg aag gtt tcc tgc aag gca tct gga tac acc ttc acc acc        95
Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Thr
                20                  25                  30

tac tac ata cac tgg gtg cga cag gcc cct gga caa ggg ctt gag tgg       143
Tyr Tyr Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp
            35                  40                  45

atg ggg tta atc aac cct aat ggt ggt act act aac tac gca cag aag       191
Met Gly Leu Ile Asn Pro Asn Gly Gly Thr Thr Asn Tyr Ala Gln Lys
        50                  55                  60

ttc cag ggc aga ctc agc atg acc acg gac acg tcc acc aac aca gtc       239
Phe Gln Gly Arg Leu Ser Met Thr Thr Asp Thr Ser Thr Asn Thr Val
    65                  70                  75

tac atg gag ctg agt agc ctg aga tct gaa gac acg gcc gtg tat tac       287
Tyr Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr
80                  85                  90                  95

tgt gcg aga aag ctt atg tct ggc ata gtg tct cgg ggc tgg ttc gac       335
Cys Ala Arg Lys Leu Met Ser Gly Ile Val Ser Arg Gly Trp Phe Asp
                100                 105                 110

ccc tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag       383
Pro Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys
            115                 120                 125

ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg       431
Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
        130                 135                 140

ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg       479
Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
    145                 150                 155

gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc       527
Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
160                 165                 170                 175

ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg       575
Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
```

```
                180                 185                 190

gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac       623
Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
            195                 200                 205

gtg aat cac aag ccc agc aac acc aag gtg gac aag agt gtg               665
Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Val
        210                 215                 220

<210> 2356
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2356
ccc gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg gag        48
Pro Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15

acc ctg tcc ctc acc tgc act gtc tct ggt ggc tcc gtc agc agt ggt        96
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Val Ser Ser Gly
            20                  25                  30

agt tac tac tgg agc tgg atc cgg cag ccc cca ggg aag gga ctg gag       144
Ser Tyr Tyr Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu
        35                  40                  45

tgg att ggg tat atc tat tac agt ggg agc acc aac tac aac ccc tcc       192
Trp Ile Gly Tyr Ile Tyr Tyr Ser Gly Ser Thr Asn Tyr Asn Pro Ser
    50                  55                  60

ctc aag agt cga gtc acc ata tca gta gac acg tcc aag aac cag ttc       240
Leu Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

tcc ctg aag ctg agc tct gtg acc gct gcg gac acg gcc gtg tat tac       288
Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95

tgt gcg aga gat cgc ggt gac tac gtt acc cac tgg ttc gac ccc tgg       336
Cys Ala Arg Asp Arg Gly Asp Tyr Val Thr His Trp Phe Asp Pro Trp
            100                 105                 110

ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca       384
Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca       432
Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
```

```
    130                 135                 140

gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg       480
Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg       528
Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc       576
Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat       624
Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
        195                 200                 205

cac aag ccc agc aac acc aag gtg gac aag agt gag                       660
His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215                 220

<210> 2357
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2357
cag ctg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tgg gag        48
Gln Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Trp Glu
1               5                   10                  15

acc ctg tcc ctc agt tgc act gtc tct ggt ggc tcc atc agc agt agt        96
Thr Leu Ser Leu Ser Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Ser
            20                  25                  30

ttc ttc tac tgg ggc tgg atc cgc cag ccc cca ggg aag ggg ctg cag       144
Phe Phe Tyr Trp Gly Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Gln
        35                  40                  45

tgg att ggg aat atc cat tat act ggg agc acc tac tac aac ccg tcc       192
Trp Ile Gly Asn Ile His Tyr Thr Gly Ser Thr Tyr Tyr Asn Pro Ser
    50                  55                  60

ctc aag agt cga atc acc atg tcc gta gac acg tcc aag aac cag ttc       240
Leu Lys Ser Arg Ile Thr Met Ser Val Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

tcc ctg aag ctg agc tct gtg acc gcc gca gac acg gct gtg tat tac       288
Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
```

```
                85                  90                  95

tgt gcg aga cat agg gtt ggc gac agc ccg gga ctc cac tac tgg ggc       336
Cys Ala Arg His Arg Val Gly Asp Ser Pro Gly Leu His Tyr Trp Gly
            100                 105                 110

cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg       384
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg       432
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       480
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       528
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       576
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac       624
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

aag ccc agc aac acc aag gtg gac aag agt gag                           657
Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215

<210> 2358
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2358
cag gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt agc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

gct atg cac tgg gtc cgc cag gct cca ggc aag ggg cta gag tgg gtg       144
Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
```

```
        35                  40                  45

gca gtt ata tca tat gat gga agt aat aaa tac tac gca gac tcc gtg       192
Ala Val Ile Ser Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aat tcc aag aac acg ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gct gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg agc cct ata gca gtg gct gcc ccc ttt gcc tac tgg ggc cag gga       336
Ala Ser Pro Ile Ala Val Ala Ala Pro Phe Ala Tyr Trp Gly Gln Gly
            100                 105                 110

acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc       384
Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125

ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg       432
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140

ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg       480
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160

aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta       528
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc       576
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190

agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc       624
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205

agc aac acc aag gtg gac aag agt gag                                   651
Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215

<210> 2359
<211> 688
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain
```

<400> 2359
g tgt gag gtg caa ctg ttg gag tct ggg gga ggc ttg gta cag cct ggg 49
Cys Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
1 5 10 15

ggg tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt agc acc 97
Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Thr
20 25 30

tat gtc atg agc tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg 145
Tyr Val Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
35 40 45

gtc tca tta att agt ggc agt ggt ggt agc aca cac tac gca gac tcc 193
Val Ser Leu Ile Ser Gly Ser Gly Gly Ser Thr His Tyr Ala Asp Ser
50 55 60

gtg agg ggc cgg ttc acc atc tcc aga gac aat tcc aag aat acg ctg 241
Val Arg Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu
65 70 75 80

tat ctg caa atg aac agt ctg aga gcc gag gac acg gcc gta tat tac 289
Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr
85 90 95

tgt gtg aag gat tat ctt gct gtt ggt ggg acc tac tac gac tac ttt 337
Cys Val Lys Asp Tyr Leu Ala Val Gly Gly Thr Tyr Tyr Asp Tyr Phe
100 105 110

gac tac tgg ggc cag gga acc ctg gtc acc gtc tcc tca ggg agt gca 385
Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Gly Ser Ala
115 120 125

tcc gcc cca acc ctt ttc ccc ctc gtc tcc tgt gag aat tcc ccg tcg 433
Ser Ala Pro Thr Leu Phe Pro Leu Val Ser Cys Glu Asn Ser Pro Ser
130 135 140

gat acg agc agc gtg gcc gtt ggc tgc ctc gca cag gac ttc ctt ccc 481
Asp Thr Ser Ser Val Ala Val Gly Cys Leu Ala Gln Asp Phe Leu Pro
145 150 155 160

gac tcc atc act ttc tcc tgg aaa tac aag aac aac tct gac atc agc 529
Asp Ser Ile Thr Phe Ser Trp Lys Tyr Lys Asn Asn Ser Asp Ile Ser
165 170 175

agc acc cgg ggc ttc cca tca gtc ctg aga ggg ggc aag tac gca gcc 577
Ser Thr Arg Gly Phe Pro Ser Val Leu Arg Gly Gly Lys Tyr Ala Ala
180 185 190

acc tca cag gtg ctg ctg cct tcc aag gac gtc atg cag ggc aca gac 625
Thr Ser Gln Val Leu Leu Pro Ser Lys Asp Val Met Gln Gly Thr Asp
195 200 205

```
gaa cac gtg gtg tgc aaa gtc cag cac ccc aac ggc aac aaa gaa aag       673
Glu His Val Val Cys Lys Val Gln His Pro Asn Gly Asn Lys Glu Lys
    210                 215                 220

aac gtg cct ctt ccg                                                  688
Asn Val Pro Leu Pro
225
```

<210> 2360
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2360

```
ccc ctg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg gag        48
Pro Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15

acc ctg tcc ctc acc tgc act gtc tct ggt ggc tcc atc agc agt agt        96
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Ser
            20                  25                  30

agt tac tac tgg ggc tgg atc cgc cag tcc cca ggg aag ggg ctg gag       144
Ser Tyr Tyr Trp Gly Trp Ile Arg Gln Ser Pro Gly Lys Gly Leu Glu
        35                  40                  45

tgg atg ggg agt atc tat tat agt ggg agc acc tac tac aac ccg tcc       192
Trp Met Gly Ser Ile Tyr Tyr Ser Gly Ser Thr Tyr Tyr Asn Pro Ser
    50                  55                  60

ctc aag agt cga gtc acc ata tcc gta gac acg tcc aag aac cag ttc       240
Leu Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

tcc ctg aac ctg agc tct gtg acc gcc gca gac acg gct gtg tat tac       288
Ser Leu Asn Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95

tgt gcg aga cat gac tac cgt aac tac ttt gac tac tgg ggc cag gga       336
Cys Ala Arg His Asp Tyr Arg Asn Tyr Phe Asp Tyr Trp Gly Gln Gly
            100                 105                 110

acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc       384
Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125

ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg       432
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140
```

```
ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg       480
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160

aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta       528
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc       576
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190

agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc       624
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205

agc aac acc aag gtg gac aag agt gag                                   651
Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215

<210> 2361
<211> 662
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2361
cc cag gtg cag ctg gtg cag tct ggg gct gag gtg aag aag cct ggg         47
   Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly
   1               5                   10                  15

gcc tca gtg aag gtc tcc tgc cag gct tct gga tac acc ttc acc ggc        95
Ala Ser Val Lys Val Ser Cys Gln Ala Ser Gly Tyr Thr Phe Thr Gly
                20                  25                  30

tac tat ata cac tgg gtg cga cag gcc cct gga caa ggg ctt gag tgg       143
Tyr Tyr Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp
            35                  40                  45

atg gga tgg atc aac cct aac agt ggt ggc aca aac tat gca cag aag       191
Met Gly Trp Ile Asn Pro Asn Ser Gly Gly Thr Asn Tyr Ala Gln Lys
        50                  55                  60

ttt cag ggc agg gtc acc atg acc agg gac acg tcc atc agc aca gcc       239
Phe Gln Gly Arg Val Thr Met Thr Arg Asp Thr Ser Ile Ser Thr Ala
    65                  70                  75

cac atg gag ctg ggc agg ctg aga tct gac gac acg gcc gtg tat tac       287
His Met Glu Leu Gly Arg Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr
80                  85                  90                  95
```

```
tgt gcg acc cca ccg tct cga tat ggt gga aac tac tac gca gac tac       335
Cys Ala Thr Pro Pro Ser Arg Tyr Gly Gly Asn Tyr Tyr Ala Asp Tyr
                100                 105                 110

tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc       383
Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
            115                 120                 125

cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc       431
Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
        130                 135                 140

aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg       479
Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
    145                 150                 155

acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc       527
Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
160                 165                 170                 175

ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg       575
Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
                180                 185                 190

acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg       623
Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
            195                 200                 205

aat cac aag ccc agc aac acc aag gtg gac aag aag gtg                   662
Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
        210                 215                 220

<210> 2362
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2362
ccg gtg cag ctg gtg cag tct gga gca gag gtg aaa aag ccc ggg gac        48
Pro Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Asp
1               5                   10                  15

tct ctg agc atc tcc tgt gag gtt tct gga tac agc ttt acc agc tac        96
Ser Leu Ser Ile Ser Cys Glu Val Ser Gly Tyr Ser Phe Thr Ser Tyr
            20                  25                  30

tgg att ggc tgg gtg cgc cag atg ccc ggg aaa ggc ctg gag tgg atg       144
Trp Ile Gly Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp Met
        35                  40                  45
```

```
gcg atc atc aat cct gct gac tct gat acc aga tac agt ccg tcc ttc       192
Ala Ile Ile Asn Pro Ala Asp Ser Asp Thr Arg Tyr Ser Pro Ser Phe
    50                  55                  60

cga ggc cag gtc acc atc tca gtc gac aag tcc atc aac acc gcc tac       240
Arg Gly Gln Val Thr Ile Ser Val Asp Lys Ser Ile Asn Thr Ala Tyr
65                  70                  75                  80

ctg cag tgg acc agc ctg cag gcc tcg gac acc gcc atg tat tac tgt       288
Leu Gln Trp Thr Ser Leu Gln Ala Ser Asp Thr Ala Met Tyr Tyr Cys
                85                  90                  95

gcg aga caa ggg ccg aca gta gcg att gac ttc tgg ggc cag gga acc       336
Ala Arg Gln Gly Pro Thr Val Ala Ile Asp Phe Trp Gly Gln Gly Thr
            100                 105                 110

ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc       384
Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
        115                 120                 125

ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc       432
Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
    130                 135                 140

tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac       480
Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160

tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag       528
Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175

tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc       576
Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc agc       624
Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
        195                 200                 205

aac acc aag gtg gac aag agt gag                                      648
Asn Thr Lys Val Asp Lys Ser Glu
    210                 215
```

<210> 2363
<211> 349
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2363

```
gag gtg cag ctg gtg cag tct gga gca gag gtg aaa aag ccc ggg gag        48
Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1               5                   10                  15

tct ctg aag atc tcc tgt aag ggt tct gga tac agc ttt acc acc tac        96
Ser Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Thr Thr Tyr
            20                  25                  30

tgg atc gcc tgg gtg cgc cag atg ccc ggg aaa ggc ctg gag tgg atg       144
Trp Ile Ala Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp Met
        35                  40                  45

ggg atc atc tat cct gct gac tct gat acc aga tac agc ccg tcc ttc       192
Gly Ile Ile Tyr Pro Ala Asp Ser Asp Thr Arg Tyr Ser Pro Ser Phe
    50                  55                  60

caa ggc cag gtc acc atg tca gcc gac cag tcc atc aat acc gcc tac       240
Gln Gly Gln Val Thr Met Ser Ala Asp Gln Ser Ile Asn Thr Ala Tyr
65                  70                  75                  80

ctg cag tgg agc agc ctg aag gcc tcg gac acc gcc atg tat tac tgt       288
Leu Gln Trp Ser Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr Tyr Cys
                85                  90                  95

gcg aga cgg ggt aga gag ttt gat tac tgg ggc cag gga acc ctg ctc       336
Ala Arg Arg Gly Arg Glu Phe Asp Tyr Trp Gly Gln Gly Thr Leu Leu
            100                 105                 110

acc gtc tcc tca g                                                     349
Thr Val Ser Ser
        115

<210> 2364
<211> 670
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2364
g tgt gag gtg cag ctg ttg gag tct ggg gga ggc ttg gtg cag cct ggg      49
  Cys Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
  1               5                   10                  15

ggg tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt aga atc        97
Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Ile
            20                  25                  30

tat gcc atg agc tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg       145
Tyr Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
        35                  40                  45
```

```
gtc tca gct atc agt tat agt ggt aat acc aca tac tac gca gac tcc       193
Val Ser Ala Ile Ser Tyr Ser Gly Asn Thr Thr Tyr Tyr Ala Asp Ser
    50                  55                  60

gtg aag ggc cgt ttc acc atc tcc aga gac aat tcc aag aac acg ctg       241
Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu
65                  70                  75                  80

tat ctg caa atc aac aac cta aga gcc gag gac acg gcc ata tat tac       289
Tyr Leu Gln Ile Asn Asn Leu Arg Ala Glu Asp Thr Ala Ile Tyr Tyr
                85                  90                  95

tgt gcg atc cag gaa aaa cgg gaa ctg caa cta cgt cga gaa cta gat       337
Cys Ala Ile Gln Glu Lys Arg Glu Leu Gln Leu Arg Arg Glu Leu Asp
            100                 105                 110

aac tac tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc       385
Asn Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr
        115                 120                 125

aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct       433
Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
    130                 135                 140

ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa       481
Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145                 150                 155                 160

ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac       529
Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
                165                 170                 175

acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc       577
Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
            180                 185                 190

gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc       625
Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
        195                 200                 205

aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aaa gtg           670
Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220
```

<210> 2365
<211> 351
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2365

```
cag gtg cag ctg gtg cag tct ggg gct gag gtg aag aag cct ggg gcc        48
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

tca gtg aag gtt tcc tgc aag gca tct gga tac acc ttc acc agc tac        96
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser Tyr
            20                  25                  30

tat atg tac tgg gtg cga cag gcc cct gga caa ggg ctt gag tgg atg       144
Tyr Met Tyr Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

gga ata atc aac cct ggt ggt ggt agc aca agc tac gca cag aag ttc       192
Gly Ile Ile Asn Pro Gly Gly Gly Ser Thr Ser Tyr Ala Gln Lys Phe
    50                  55                  60

cag ggc aga gtc acc atg acc agg gac acg tcc acg agc aca gtc tac       240
Gln Gly Arg Val Thr Met Thr Arg Asp Thr Ser Thr Ser Thr Val Tyr
65                  70                  75                  80

atg gag ctg agc agc ctg aga tct gag gac acg gcc gtg tat tac tgt       288
Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gta ttt cga tac ggt atg gac gtc tgg ggc caa ggg acc acg       336
Ala Arg Val Phe Arg Tyr Gly Met Asp Val Trp Gly Gln Gly Thr Thr
            100                 105                 110

gtc acc gtc tcc tca                                                  351
Val Thr Val Ser Ser
        115

<210> 2366
<211> 352
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2366
cag gtg cag gtg gtg gaa tct ggg gga ggc ttg gtc aag cct gga ggg        48
Gln Val Gln Val Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gtc tct gga tta gac ttc agg gac tac        96
Ser Leu Arg Leu Ser Cys Ala Val Ser Gly Leu Asp Phe Arg Asp Tyr
            20                  25                  30

tat gta aac tgg atc cgt cag gct ccg ggg aag ggg ctg gag tgg ctt       144
Tyr Val Asn Trp Ile Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Leu
        35                  40                  45
```

```
tcc tac att act agt cct ggt ggt cac aca agc tac tca gac tct gtg       192
Ser Tyr Ile Thr Ser Pro Gly Gly His Thr Ser Tyr Ser Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aat tca gtg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Val Tyr
65                  70                  75                  80

ctc caa atg gac agc ctg aca gtc gag gac acg gcc gta tat ttc tgt       288
Leu Gln Met Asp Ser Leu Thr Val Glu Asp Thr Ala Val Tyr Phe Cys
                85                  90                  95

gcg atc aaa gaa ggc tac ggt ctt tca gac tgg ggc cag gga acc ctg       336
Ala Ile Lys Glu Gly Tyr Gly Leu Ser Asp Trp Gly Gln Gly Thr Leu
            100                 105                 110

gtc acc gtc tcg tca g                                             352
Val Thr Val Ser Ser
        115
```

<210> 2367
<211> 669
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2367

```
gtg gtg cag ctg ttg gag tct ggg gga ggc ttg gta cag cct ggg ggg        48
Val Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt atc agt tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ile Ser Tyr
            20                  25                  30

gcc atg agc tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtc       144
Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca gat att agt ggc agt ggt ggt agc aca tac tac gca gac tcc gtg       192
Ser Asp Ile Ser Gly Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cgg ctc acc atc tcc aga gac aat tcc aac aac acg ctg tat       240
Lys Gly Arg Leu Thr Ile Ser Arg Asp Asn Ser Asn Asn Thr Leu Tyr
65                  70                  75                  80

ttg caa atg aac agc ctg aga gcc gag gac acg gcc gta tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
```

```
gcg aaa gag gat ggc tac act caa aat ttt gac tac tgg ggc cag gga       336
Ala Lys Glu Asp Gly Tyr Thr Gln Asn Phe Asp Tyr Trp Gly Gln Gly
            100                 105                 110

acc ctg gtc acc gtc tcc tca ggg agt gca tcc gcc cca acc ctt ttc       384
Thr Leu Val Thr Val Ser Ser Gly Ser Ala Ser Ala Pro Thr Leu Phe
        115                 120                 125

ccc ctc gtc tcc tgt gag aat tcc ccg tcg gat acg agc agc gtg gcc       432
Pro Leu Val Ser Cys Glu Asn Ser Pro Ser Asp Thr Ser Ser Val Ala
    130                 135                 140

gtt ggc tgc ctc gca cag gac ttc ctt ccc gac tcc atc act ttc tcc       480
Val Gly Cys Leu Ala Gln Asp Phe Leu Pro Asp Ser Ile Thr Phe Ser
145                 150                 155                 160

tgg aaa tac aag aac aac tct gac atc agc agc acc cgg ggc ttc cca       528
Trp Lys Tyr Lys Asn Asn Ser Asp Ile Ser Ser Thr Arg Gly Phe Pro
                165                 170                 175

tca gtc ctg aga ggg ggc aag tac gca gcc acc tca cag gtg ctg ctg       576
Ser Val Leu Arg Gly Gly Lys Tyr Ala Ala Thr Ser Gln Val Leu Leu
            180                 185                 190

cct tcc aag gac gtc atg cag ggc aca gac gaa cac gtg gtg tgc aaa       624
Pro Ser Lys Asp Val Met Gln Gly Thr Asp Glu His Val Val Cys Lys
        195                 200                 205

gtc cag cac ccc aac ggc aac aaa gaa aag aac gtg cct ctt cca           669
Val Gln His Pro Asn Gly Asn Lys Glu Lys Asn Val Pro Leu Pro
    210                 215                 220
```

<210> 2368
<211> 364
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2368

```
cag gtc caa ctt gtg cag tct ggg gcc gag gtg aag aag cca ggg gcc        48
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

tca gtg aag att tcc tgc aag gcc tct gga tac acc ttc act agt cat        96
Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser His
            20                  25                  30

gcc ata cac tgg gtg cgc cag gcc ccc gga caa act ttt gag tgg ctg       144
Ala Ile His Trp Val Arg Gln Ala Pro Gly Gln Thr Phe Glu Trp Leu
        35                  40                  45
```

```
ggc tgg atc aac cct gtc aat ggg gtc aca aaa tat tca cag acg ttt       192
Gly Trp Ile Asn Pro Val Asn Gly Val Thr Lys Tyr Ser Gln Thr Phe
    50                  55                  60

cag gac aga gtc acc att gtg agg gac aag tcc gcg acc aca acc tac       240
Gln Asp Arg Val Thr Ile Val Arg Asp Lys Ser Ala Thr Thr Thr Tyr
65                  70                  75                  80

atg gac ctg agc ggg ctg aca ttt gaa gac acg gct atg tat tat tgt       288
Met Asp Leu Ser Gly Leu Thr Phe Glu Asp Thr Ala Met Tyr Tyr Cys
                85                  90                  95

gcg aga gtt ctg gac ttt tat gga agt agt gtc cta gac tac tgg ggc       336
Ala Arg Val Leu Asp Phe Tyr Gly Ser Ser Val Leu Asp Tyr Trp Gly
            100                 105                 110

cag gga acc ctg gtc act gtc tcc tca g                                364
Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120

<210> 2369
<211> 346
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2369
cac gtg cag ctg gtg caa tct ggg tct gag ttg aag aag cct ggg gcc        48
His Val Gln Leu Val Gln Ser Gly Ser Glu Leu Lys Lys Pro Gly Ala
1               5                   10                  15

tca gtg aaa ctt tcc tgc aag gct tct gga tac acc ttc act aac tat        96
Ser Val Lys Leu Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asn Tyr
            20                  25                  30

gct atg aat tgg gtg cga cag gcc cct gga caa ggg ctt gag tgg atg       144
Ala Met Asn Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

ggg tgg atc aac acc aac act ggg aac cca acg tat gcc cag ggc ttc       192
Gly Trp Ile Asn Thr Asn Thr Gly Asn Pro Thr Tyr Ala Gln Gly Phe
    50                  55                  60

aca gga cgg ttt gtc ttc tcc ttg gac acc tct gtc agc acg gca tat       240
Thr Gly Arg Phe Val Phe Ser Leu Asp Thr Ser Val Ser Thr Ala Tyr
65                  70                  75                  80

ctg cag atc agc agc cta aag gct gag gac act gcc ctg tat tac tgt       288
Leu Gln Ile Ser Ser Leu Lys Ala Glu Asp Thr Ala Leu Tyr Tyr Cys
                85                  90                  95
```

```
gcg aga gat cgg ccc ggg gac tac tgg ggc cag gga acc ctg gtc acc       336
Ala Arg Asp Arg Pro Gly Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr
            100                 105                 110

gtc tcc tca g                                                      346
Val Ser Ser
        115
```

<210> 2370
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2370

```
cag gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt aac ttt        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Phe
            20                  25                  30

gct atg cac tgg gtc cgc cag gct cca ggc aag ggg ttg gag tgg gtg       144
Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gtg gtt att tca tct gat gga agc aat aaa aac tac gca gac tcc gtg       192
Val Val Ile Ser Ser Asp Gly Ser Asn Lys Asn Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aat tcc aag aac acg ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gct gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gat ctt ggt gtg gga tct act acc tac tgg ggc cag gga acc       336
Ala Arg Asp Leu Gly Val Gly Ser Thr Thr Tyr Trp Gly Gln Gly Thr
            100                 105                 110

ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc       384
Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
        115                 120                 125

ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc       432
Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
    130                 135                 140
```

```
tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac       480
Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160

tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag       528
Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175

tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc       576
Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc agc       624
Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
        195                 200                 205

aac acc aag gtg gac aag aga gtc                                       648
Asn Thr Lys Val Asp Lys Arg Val
    210                 215

<210> 2371
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2371
ggg gag cag ctg ttg gag tct ggg gga ggc ttg gtt cag ccg ggg ggg        48
Gly Glu Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt cac tac        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser His Tyr
            20                  25                  30

gcc atg acc tgg gtc cgc cag gct cca ggg aag ggg ctc gaa tgg gtc       144
Ala Met Thr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca ggt gtt agt gga agt ggt ttt acc act tat tac gca gac tcc gtt       192
Ser Gly Val Ser Gly Ser Gly Phe Thr Thr Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cgg ttc acc atc tcc cga gac aat gcc cag aac aca ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Gln Asn Thr Leu Tyr
65                  70                  75                  80

ctg cac atg aac agc ctg aga gcc gag gac acg gcc ata tat tac tgt       288
Leu His Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Ile Tyr Tyr Cys
                85                  90                  95
```

```
gtg aaa gat ttg gag gtt tct ata ggt cac aat ttt gac ttt tgg ggc       336
Val Lys Asp Leu Glu Val Ser Ile Gly His Asn Phe Asp Phe Trp Gly
            100                 105                 110

cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg       384
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg       432
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       480
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       528
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       576
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac       624
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

aag ccc agc aac acc aag gtg gac aag aga gtc                           657
Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215
```

<210> 2372
<211> 675
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2372

```
gag gtg cag ctg gtg gag tct ggg gga ggc ctg gtc aag cct ggg ggg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt agc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

agc atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtc       144
Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45
```

```
tca tcc att agt agt agt agt agt tac ata tac tac gca gac tca gtg       192
Ser Ser Ile Ser Ser Ser Ser Ser Tyr Ile Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tca ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gcc gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gat agg ggg gta gtg gtg gta gct gct acc cct tac tac tac       336
Ala Arg Asp Arg Gly Val Val Val Val Ala Ala Thr Pro Tyr Tyr Tyr
            100                 105                 110

ggt atg gac gtc tgg ggc caa ggg acc acg gtc acc gtc tcc tca gcc       384
Gly Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala
        115                 120                 125

tcc acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc       432
Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser
    130                 135                 140

acc tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc       480
Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe
145                 150                 155                 160

ccc gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc       528
Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly
                165                 170                 175

gtg cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc       576
Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu
            180                 185                 190

agc agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac       624
Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr
        195                 200                 205

atc tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aaa       672
Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys
    210                 215                 220

gtc                                                                   675
Val
225
```

<210> 2373
<211> 669
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2373

```
cag atc acc ttg aag gag tct ggt cct acg ctg gtg aaa ccc aca cag        48
Gln Ile Thr Leu Lys Glu Ser Gly Pro Thr Leu Val Lys Pro Thr Gln
1               5                  10                  15

acc ctc act ctg acc tgc acc ttc tct ggg ttc tca ctc agt act aat        96
Thr Leu Thr Leu Thr Cys Thr Phe Ser Gly Phe Ser Leu Ser Thr Asn
            20                  25                  30

gga gtg ggt gtg ggc tgg atc cgt cag ccc cca gga aag gcc ctg gag       144
Gly Val Gly Val Gly Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu
        35                  40                  45

tgg ctt gca ctc att aat tgg gat gat gat aag cgc tac agt cca tct       192
Trp Leu Ala Leu Ile Asn Trp Asp Asp Asp Lys Arg Tyr Ser Pro Ser
    50                  55                  60

ctg aag agc agg ctc acc atc act aag gac acc tcc aaa aac cag gtt       240
Leu Lys Ser Arg Leu Thr Ile Thr Lys Asp Thr Ser Lys Asn Gln Val
65                  70                  75                  80

gtc ctt aca atg acc aac ctg gac cct gta gac aca gcc aca tat tac       288
Val Leu Thr Met Thr Asn Leu Asp Pro Val Asp Thr Ala Thr Tyr Tyr
                85                  90                  95

tgt gta cac gca cga gat gac tac ggt gac tcc gct tgg tca act ggg       336
Cys Val His Ala Arg Asp Asp Tyr Gly Asp Ser Ala Trp Ser Thr Gly
            100                 105                 110

cct gtc tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc       384
Pro Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr
        115                 120                 125

aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct       432
Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
    130                 135                 140

ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa       480
Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145                 150                 155                 160

ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac       528
Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
                165                 170                 175

acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc       576
Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
            180                 185                 190

gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc       624
Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
```

```
        195                 200                 205

aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aga gtt          669
Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220
```

<210> 2374
<211> 669
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2374

```
ctg atc acc ttg aag gag tct ggt cct acg ctg gtg aaa ccc aca cag        48
Leu Ile Thr Leu Lys Glu Ser Gly Pro Thr Leu Val Lys Pro Thr Gln
1               5                   10                  15

acc ctc acg ctg acc tgc acc gtc tct ggg ttg tca ctc agc act agt        96
Thr Leu Thr Leu Thr Cys Thr Val Ser Gly Leu Ser Leu Ser Thr Ser
            20                  25                  30

gga gtg gct gtg ggc tgg atc cgt cag ccc cca gga aag gcc ctg gag       144
Gly Val Ala Val Gly Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu
        35                  40                  45

tgg ctt gca ctc att tat tgg gat gat gat acg cgg tac agc cca tct       192
Trp Leu Ala Leu Ile Tyr Trp Asp Asp Asp Thr Arg Tyr Ser Pro Ser
    50                  55                  60

ctg aag agc agg ctc agc atc acc aag gac acc tcc aaa aac cag gtg       240
Leu Lys Ser Arg Leu Ser Ile Thr Lys Asp Thr Ser Lys Asn Gln Val
65                  70                  75                  80

gtc ctt aca atg aga aac gtg gac cct gtg gac aca gcc aca tat tac       288
Val Leu Thr Met Arg Asn Val Asp Pro Val Asp Thr Ala Thr Tyr Tyr
                85                  90                  95

tgt gga cac aga cgt ctg tta agg ggg gtt act act act gtc tat ttc       336
Cys Gly His Arg Arg Leu Leu Arg Gly Val Thr Thr Thr Val Tyr Phe
            100                 105                 110

gac ccc tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc       384
Asp Pro Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr
        115                 120                 125

aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct       432
Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
    130                 135                 140

ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa       480
Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
```

```
145                 150                 155                 160

ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac       528
Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
                165                 170                 175

acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc       576
Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
            180                 185                 190

gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc       624
Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
        195                 200                 205

aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aga gtc           669
Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220

<210> 2375
<211> 669
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2375
ccg gtg cag ctg cag gag tcg ggc cca gga ctt gtg aac cct tca cag        48
Pro Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Asn Pro Ser Gln
1               5                   10                  15

acc ctg tcc ctc acc tgc act gtc tct ggt ggc tcc atc agc agc ggt        96
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Gly
            20                  25                  30

ggt tac tgc tgg agc tgg gtc cgc cag cac cca ggg aag ggc ctg gaa       144
Gly Tyr Cys Trp Ser Trp Val Arg Gln His Pro Gly Lys Gly Leu Glu
        35                  40                  45

tgg att ggg tgc atc tat tac att ggg acc acc tac tac atg cgg tcc       192
Trp Ile Gly Cys Ile Tyr Tyr Ile Gly Thr Thr Tyr Tyr Met Arg Ser
    50                  55                  60

ctc aag agt cga ctt atc ata tca ata gac acg tct aag aac cag ttc       240
Leu Lys Ser Arg Leu Ile Ile Ser Ile Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

tcc ctg aag ctg acc tct gtg act gcc gcg gac tcg gcc gtg tat tac       288
Ser Leu Lys Leu Thr Ser Val Thr Ala Ala Asp Ser Ala Val Tyr Tyr
                85                  90                  95

tgt gcg aga gga ggg gag ctg ctg ggc gga ttc ggc tac agt ggt atg       336
Cys Ala Arg Gly Gly Glu Leu Leu Gly Gly Phe Gly Tyr Ser Gly Met
```

```
            100                 105                 110

gac gtc tgg ggc caa ggg acc acg gtc acc gtc tcc tca gct tcc acc       384
Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr
        115                 120                 125

aag ggc cca tcc gtc ttc ccc ctg gcg ccc tgc tcc agg agc acc tcc       432
Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser
    130                 135                 140

gag agc aca gcc gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa       480
Glu Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145                 150                 155                 160

ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac       528
Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
                165                 170                 175

acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc       576
Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
            180                 185                 190

gtg gtg acc gtg ccc tcc agc agc ttg ggc acg aag acc tac acc tgc       624
Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys
        195                 200                 205

aac gta gat cac aag ccc agc aac acc aag gtg gac aag aga gtt           669
Asn Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220
```

<210> 2376
<211> 672
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2376

```
gag ctg cag ctg gtg gag tct ggg gga ggc ttg gtc cag cct ggg ggg        48
Glu Leu Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg cga ctc tcc tgt gca gcc tct gga ttc acc ttt agt agc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

tgg atg agc tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtg       144
Trp Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gcc aac ata aac caa gat gga ggt gag aaa tac tat gtg gac tct gtg       192
Ala Asn Ile Asn Gln Asp Gly Gly Glu Lys Tyr Tyr Val Asp Ser Val
```

```
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tca ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gcc gag gac acg gcc gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg cat tat tat tat gat agt agt ggt tat tac caa aac gct gaa tac       336
Ala His Tyr Tyr Tyr Asp Ser Ser Gly Tyr Tyr Gln Asn Ala Glu Tyr
            100                 105                 110

ttc cag tac tgg ggc cag ggc acc ctg gtc acc gtc tcc tca gcc tcc       384
Phe Gln Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser
        115                 120                 125

acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc       432
Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
    130                 135                 140

tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc       480
Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145                 150                 155                 160

gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg       528
Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
                165                 170                 175

cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc       576
His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
            180                 185                 190

agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc       624
Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile
        195                 200                 205

tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aaa gtg       672
Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220

<210> 2377
<211> 678
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2377
cag gtt cag ctg gtg cag tct ggg gct gaa gtt aag aag cct ggg tcc        48
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
```

```
1               5                   10                  15

tcg gtg aag gtc tcc tgt aag gct tct aga ggc acc ttc agc aac cat        96
Ser Val Lys Val Ser Cys Lys Ala Ser Arg Gly Thr Phe Ser Asn His
            20                  25                  30

gct gtc agc tgg gtg cga cag gcc ccc gga caa ggg ctt gag tgg gtg       144
Ala Val Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Val
        35                  40                  45

gga ggg atc atc cct gtc ttt ggt cca cca aac tac gca cag aag ttc       192
Gly Gly Ile Ile Pro Val Phe Gly Pro Pro Asn Tyr Ala Gln Lys Phe
    50                  55                  60

cgg ggc aga gtc acg att acc gcg gac aga tcc acg aac aca gcc tac       240
Arg Gly Arg Val Thr Ile Thr Ala Asp Arg Ser Thr Asn Thr Ala Tyr
65                  70                  75                  80

atg gag ctg aac agc ctg aga tct gag gac acg gcc gta tat tac tgt       288
Met Glu Leu Asn Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga acc cag tgg ggg acc gat gta gag gca acg aat ccc tac tac       336
Ala Arg Thr Gln Trp Gly Thr Asp Val Glu Ala Thr Asn Pro Tyr Tyr
            100                 105                 110

tat ttc atg gac gtc tgg ggc aaa ggg acc acg gtc acc gtc tcc tca       384
Tyr Phe Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser
        115                 120                 125

gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag       432
Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
    130                 135                 140

agc acc tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac       480
Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
145                 150                 155                 160

ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc       528
Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
                165                 170                 175

ggc gtg cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc       576
Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
            180                 185                 190

ctc agc agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc       624
Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
        195                 200                 205

tac atc tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag       672
Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
    210                 215                 220
```

```
aga gtg                                                                 678
Arg Val
225

<210> 2378
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2378
cag gtg cag ctg gtg cag tct ggg act gag atg aag agg cct ggg tcc        48
Gln Val Gln Leu Val Gln Ser Gly Thr Glu Met Lys Arg Pro Gly Ser
1               5                   10                  15

tcg gtg aag gtc tcc tgc aag gct tct gga ggc acc ttc aac ttc tat        96
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Thr Phe Asn Phe Tyr
            20                  25                  30

gct atc aac tgg gtg cga cag gcc cct gga caa ggg ctt gag tgg atg       144
Ala Ile Asn Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

gga ggg atc gtc cct atc ttt gat aca aca act tac gca cag agg ttc       192
Gly Gly Ile Val Pro Ile Phe Asp Thr Thr Thr Tyr Ala Gln Arg Phe
    50                  55                  60

cag ggc aga gtc acc att acg gcg gac gag tcc acg acc aca gtc cac       240
Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Thr Thr Val His
65                  70                  75                  80

atg gaa ctg agc agc ctg aga ttt gac gac acg gcc gtc tat tac tgt       288
Met Glu Leu Ser Ser Leu Arg Phe Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg cga gat cag agt gga gct gac aga ttt gac tcc tgg ggc cag gga       336
Ala Arg Asp Gln Ser Gly Ala Asp Arg Phe Asp Ser Trp Gly Gln Gly
            100                 105                 110

acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc       384
Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125

ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg       432
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140

ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg       480
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160
```

```
aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta       528
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc       576
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190

agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc       624
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205

agc aac acc aag gtg gac aag agt gag                                   651
Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215
```

<210> 2379
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2379

```
cag gtc cag ctt gtg cag tct ggg gct gag gtg aag aag cct ggg gcc        48
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

tca gtg aaa att tcc tgt cag gct ttt gga tat aac ttc att gac aat        96
Ser Val Lys Ile Ser Cys Gln Ala Phe Gly Tyr Asn Phe Ile Asp Asn
            20                  25                  30

gct ata cat tgg gtg cgc cag gcc ccc gga caa agg cct gag tgg atg       144
Ala Ile His Trp Val Arg Gln Ala Pro Gly Gln Arg Pro Glu Trp Met
        35                  40                  45

gga tgg atc aac gct ggc aat ggg aac aca aga tat tca cag aat ttc       192
Gly Trp Ile Asn Ala Gly Asn Gly Asn Thr Arg Tyr Ser Gln Asn Phe
    50                  55                  60

cag ggc aga gtc acc ata acc aaa gtc aca tcc gcg agc aca gcc tac       240
Gln Gly Arg Val Thr Ile Thr Lys Val Thr Ser Ala Ser Thr Ala Tyr
65                  70                  75                  80

atg gag atg agc cgc ctg aaa tct gag gac acg gct gtg tat ttc tgt       288
Met Glu Met Ser Arg Leu Lys Ser Glu Asp Thr Ala Val Tyr Phe Cys
                85                  90                  95

gcg aga tct tcg aag tgg acg gac tgg cat ttt gac tac tgg ggc cag       336
Ala Arg Ser Ser Lys Trp Thr Asp Trp His Phe Asp Tyr Trp Gly Gln
            100                 105                 110
```

```
gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc       384
Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       432
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       624
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

ccc agc aac acc aag gtg gac aag agt gag                               654
Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215
```

<210> 2380
<211> 659
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2380

```
cc cag att caa ctg gtc cag tct gga gct gag gtg aag aag cct ggg         47
   Gln Ile Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly
   1               5                   10                  15

gcc tca gtg aag gtc tcc tgc aag act tct ggt tac act ttt acc cac        95
Ala Ser Val Lys Val Ser Cys Lys Thr Ser Gly Tyr Thr Phe Thr His
                20                  25                  30

tat ggt gtc gcc tgg gtg cga cag gcc cct gga caa ggg cct gag tgg       143
Tyr Gly Val Ala Trp Val Arg Gln Ala Pro Gly Gln Gly Pro Glu Trp
            35                  40                  45

atg gga tgg atc agc cct tac aat ggt aac ata gag tat gga cag aag       191
Met Gly Trp Ile Ser Pro Tyr Asn Gly Asn Ile Glu Tyr Gly Gln Lys
        50                  55                  60
```

```
ttc cag ggg aga gtc act atg acc aca gac aca tcg acg aat aca gcc       239
Phe Gln Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Asn Thr Ala
    65                  70                  75

tac atg gag ctg agg agc ctg aga tat gac gac acg gcc gtc tat tac       287
Tyr Met Glu Leu Arg Ser Leu Arg Tyr Asp Asp Thr Ala Val Tyr Tyr
80                  85                  90                  95

tgt gcg aga gat ctc gac gaa ata aat agt tct tgg ctc gac ccc tgg       335
Cys Ala Arg Asp Leu Asp Glu Ile Asn Ser Ser Trp Leu Asp Pro Trp
                100                 105                 110

ggc cag gga acc ctg atc atc gtc tcc cca gcc tcc acc aag ggc cca       383
Gly Gln Gly Thr Leu Ile Ile Val Ser Pro Ala Ser Thr Lys Gly Pro
            115                 120                 125

tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca       431
Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
        130                 135                 140

gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg       479
Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
    145                 150                 155

gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg       527
Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
160                 165                 170                 175

gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc       575
Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
                180                 185                 190

gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat       623
Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
            195                 200                 205

cac aag ccc agc aac acc aag gtg gac aag agt gag                       659
His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
        210                 215
```

<210> 2381
<211> 678
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2381

```
gtg gtg cag ttg ttg gag tct ggg gga ggc gtg gta cag ccg ggg ggg        48
Val Val Gln Leu Leu Glu Ser Gly Gly Gly Val Val Gln Pro Gly Gly
1               5                   10                  15
```

```
tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt agc aac tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Tyr
            20                  25                  30

gcc atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtc       144
Ala Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

aca ggc att agt ggt cct ggt gaa agt tca tac tac gca gac tcc gtg       192
Thr Gly Ile Ser Gly Pro Gly Glu Ser Ser Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cgg ttc acc gtc tcc aga gac aat tac agg aac act cta tat       240
Lys Gly Arg Phe Thr Val Ser Arg Asp Asn Tyr Arg Asn Thr Leu Tyr
65                  70                  75                  80

ctg caa atg aac gac ttg gga gcc gaa gac acg gcc aca tat ttc tgt       288
Leu Gln Met Asn Asp Leu Gly Ala Glu Asp Thr Ala Thr Tyr Phe Cys
                85                  90                  95

gcg aaa cgc ccc acc gct gga aac agc tat ggt gga tac tac ttt gac       336
Ala Lys Arg Pro Thr Ala Gly Asn Ser Tyr Gly Gly Tyr Tyr Phe Asp
            100                 105                 110

cat tgg ggc cag gga acc ctg gtc acc gtc tcc tca gca tcc ccg acc       384
His Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Pro Thr
        115                 120                 125

agc ccc aag gtc ttc ccg ctg agc ctc tgc agc acc cag cca gat ggg       432
Ser Pro Lys Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly
    130                 135                 140

aac gtg gtc atc gcc tgc ctg gtc cag ggc ttc ttc ccc cag gag cca       480
Asn Val Val Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro
145                 150                 155                 160

ctc agt gtg acc tgg agc gaa agc gga cag ggc gtg acc gcc aga aac       528
Leu Ser Val Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn
                165                 170                 175

ttc cca ccc agc cag gat gcc tcc ggg gac ctg tac acc acg agc agc       576
Phe Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser
            180                 185                 190

cag ctg acc ctg ccg gcc aca cag tgc cta gcc ggc aag tcc gtg aca       624
Gln Leu Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr
        195                 200                 205

tgc cac gtg aag cac tac acg aat ccc agc cag gat gtg act gtg ccc       672
Cys His Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro
    210                 215                 220

tgc cca                                                              678
Cys Pro
```

225

<210> 2382
<211> 672
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2382
```
cag gtg caa ctg gtg cag tct ggg gct gag gtg aag aag cct ggg gcc        48
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

tca gtg aag ctt tcc tgc aag cca tct gga tac acc ttc agc agc tac        96
Ser Val Lys Leu Ser Cys Lys Pro Ser Gly Tyr Thr Phe Ser Ser Tyr
            20                  25                  30

tat atc cac tgg ctg cga cag gcc cct gga caa ggg ctt gag tgg atg       144
Tyr Ile His Trp Leu Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

gga ata atc aac cct agc ggt ggt tac aca agc tcc gca cag aaa ttc       192
Gly Ile Ile Asn Pro Ser Gly Gly Tyr Thr Ser Ser Ala Gln Lys Phe
    50                  55                  60

cag ggc aga gtc acc atg acc agg gac acg tcc acg agc aca atc tac       240
Gln Gly Arg Val Thr Met Thr Arg Asp Thr Ser Thr Ser Thr Ile Tyr
65                  70                  75                  80

atg gag ctg agc agc ctg aga gct gag gac acg gcc gtg tat tac tgt       288
Met Glu Leu Ser Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga cgg ggc gaa gtc ggg act atg gtt cgg gtt ttc cga aag ccg       336
Ala Arg Arg Gly Glu Val Gly Thr Met Val Arg Val Phe Arg Lys Pro
            100                 105                 110

ttt gac tac tgg ggc cag gga acc ctg gtc acc gtc tcc tcc gcc tcc       384
Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser
        115                 120                 125

acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc       432
Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
    130                 135                 140

tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc       480
Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145                 150                 155                 160

gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg       528
Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
```

```
                165                 170                 175

cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc       576
His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
            180                 185                 190

agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc       624
Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile
        195                 200                 205

tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aag gtg       672
Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220

<210> 2383
<211> 669
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2383
ccg gtg cag ctg gtg cag tct gga gca gag gtg aaa aag ccc ggg gag        48
Pro Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1               5                   10                  15

tct ctg aag atc tcc tgt cag ggt tct gga tac aac ttt agt cgc tac        96
Ser Leu Lys Ile Ser Cys Gln Gly Ser Gly Tyr Asn Phe Ser Arg Tyr
            20                  25                  30

tgg atc ggc tgg gtg cgc cag atg ccc ggg aaa ggc ctg gag tgg atg       144
Trp Ile Gly Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp Met
        35                  40                  45

ggg gtc gtc ttt cct ggt gac tct gat atc aga tac agc ctg tcc ttc       192
Gly Val Val Phe Pro Gly Asp Ser Asp Ile Arg Tyr Ser Leu Ser Phe
    50                  55                  60

caa ggc cac atc acc atc tac gcc gac aac tcc atc agc acc gcc tac       240
Gln Gly His Ile Thr Ile Tyr Ala Asp Asn Ser Ile Ser Thr Ala Tyr
65                  70                  75                  80

ctc cag tgg agc agc ctg aag gcc tcg gac acc gcc att tat tac tgt       288
Leu Gln Trp Ser Ser Leu Lys Ala Ser Asp Thr Ala Ile Tyr Tyr Cys
                85                  90                  95

gcg aca acc tcg act atg cca atg cct act aga ggg aga gac tgg ttc       336
Ala Thr Thr Ser Thr Met Pro Met Pro Thr Arg Gly Arg Asp Trp Phe
            100                 105                 110

gac ccc tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc       384
Asp Pro Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr
```

```
        115                 120                 125

aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct       432
Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
    130                 135                 140

ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa       480
Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145                 150                 155                 160

ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac       528
Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
                165                 170                 175

acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc       576
Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
            180                 185                 190

gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc       624
Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
        195                 200                 205

aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aga gtg           669
Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220

<210> 2384
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2384
cag gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg acg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Thr
1               5                   10                  15

tcc ctg aca ctg tcc tgt gaa gcg tct gga ttc acc ttc aat aga tat        96
Ser Leu Thr Leu Ser Cys Glu Ala Ser Gly Phe Thr Phe Asn Arg Tyr
            20                  25                  30

ggc atg cac tgg gtc cgt cag gct cca ggc aag ggg ctg gaa tgg gtg       144
Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gca gta ata tgg tat gat gga acc aac aag tat tat gct gac tcc gtg       192
Ala Val Ile Trp Tyr Asp Gly Thr Asn Lys Tyr Tyr Ala Asp Ser Val
    50                  55                  60

agg ggc cga ttc acc atc tcc aga gac aat tcc aag aac acc ctt tat       240
Arg Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
```

```
65                  70                  75                  80

ctg caa atg aac aca ctg aga ggc gac gac acg gct gtg tac ttt tgt       288
Leu Gln Met Asn Thr Leu Arg Gly Asp Asp Thr Ala Val Tyr Phe Cys
                85                  90                  95

gcg ggt gcc cac ggt gac tac ggt ctt gac tat tgg ggc cag gga acc       336
Ala Gly Ala His Gly Asp Tyr Gly Leu Asp Tyr Trp Gly Gln Gly Thr
            100                 105                 110

ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc       384
Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
        115                 120                 125

ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc       432
Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
    130                 135                 140

tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac       480
Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160

tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag       528
Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175

tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc       576
Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc agc       624
Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
        195                 200                 205

aac acc aag gtg gac aag aga gag                                      648
Asn Thr Lys Val Asp Lys Arg Glu
    210                 215
```

<210> 2385
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2385

```
gaa gtg cag ctg gtg cag tct gga gca gag gtg aaa aag ccc ggg gag        48
Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1               5                   10                  15

tct ctg agg atc tcc tgt aag ggt tct gga tac agc ttt acc agc ttc        96
Ser Leu Arg Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Thr Ser Phe
```

```
            20                  25                  30

tgg atc agc tgg gtg cgc cag atg ccc ggg aaa ggc ctg gag tgg atg       144
Trp Ile Ser Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp Met
        35                  40                  45

ggg agg att gat cct agt gac tct tat acc aac tac agc ccg tcc ttc       192
Gly Arg Ile Asp Pro Ser Asp Ser Tyr Thr Asn Tyr Ser Pro Ser Phe
    50                  55                  60

caa ggc cac gtc acc atc tca gct gac aag tcc atc agc act gcc ttc       240
Gln Gly His Val Thr Ile Ser Ala Asp Lys Ser Ile Ser Thr Ala Phe
65                  70                  75                  80

ctg cag tgg agc agc ctg aag gcc tcg gac acc gcc atg tat tac tgt       288
Leu Gln Trp Ser Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr Tyr Cys
                85                  90                  95

gcg aga cat cag cag aag tat agc ccc att tcc ccg ctt gac tac tgg       336
Ala Arg His Gln Gln Lys Tyr Ser Pro Ile Ser Pro Leu Asp Tyr Trp
            100                 105                 110

ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca       384
Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca       432
Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
    130                 135                 140

gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg       480
Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg       528
Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc       576
Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat       624
Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
        195                 200                 205

cac aag ccc agc aac acc aag gtg gac aag aga gtt                       660
His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220
```

<210> 2386
<211> 360
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2386
gaa gtg cag ctg gtg gag tcg ggg gga ggc gtg atc aag cct ggg ggg 48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Val Ile Lys Pro Gly Gly
1 5 10 15

tcc ctg aaa ctc tcc tgt gaa ggc tct gga ttc acc ctg gat gat tat 96
Ser Leu Lys Leu Ser Cys Glu Gly Ser Gly Phe Thr Leu Asp Asp Tyr
20 25 30

gtc atg cac tgg gtc cgt cag gct cca ggg aag ggt ctg gag tgg atc 144
Val Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Ile
35 40 45

tct tct att agt ggg gat ggt act cgg aca tat tat gca gac tct gtg 192
Ser Ser Ile Ser Gly Asp Gly Thr Arg Thr Tyr Tyr Ala Asp Ser Val
50 55 60

aag ggc cga ttc acc atc tcc aga aac aac ggc aaa aat tcc ctg tat 240
Lys Gly Arg Phe Thr Ile Ser Arg Asn Asn Gly Lys Asn Ser Leu Tyr
65 70 75 80

ctg caa atg gac agt ctg aga agg gaa gac acc gcc ttg tat tac tgt 288
Leu Gln Met Asp Ser Leu Arg Arg Glu Asp Thr Ala Leu Tyr Tyr Cys
85 90 95

gca aaa gac gca cgc ctg gct tat tat ggt atg gac gtc tgg ggc caa 336
Ala Lys Asp Ala Arg Leu Ala Tyr Tyr Gly Met Asp Val Trp Gly Gln
100 105 110

ggg acc acg gtc acc gtc tcc tca 360
Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 2387
<211> 364
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2387
cag ctg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg gag 48
Gln Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

acc ctg tcc ctc acc tgc act gtc tct ggt gac tcc atc agt agt agc 96
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Asp Ser Ile Ser Ser Ser

```
            20                  25                  30

ggt ttc ttc tgg gcc tgg atc cgc cag gcc cca ggg aag ggc ctg gac       144
Gly Phe Phe Trp Ala Trp Ile Arg Gln Ala Pro Gly Lys Gly Leu Asp
        35                  40                  45

tgg att ggc agc act tat cat cgc aca act acc acc tac tac aac ccg       192
Trp Ile Gly Ser Thr Tyr His Arg Thr Thr Thr Thr Tyr Tyr Asn Pro
    50                  55                  60

tcc ctc aag agt cga gtc acc ata tcc gta gac acg tcc aag aac cag       240
Ser Leu Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln
65                  70                  75                  80

ttc tcc ctg acc ctg aac tct ctg acc gcc gca gac acg gct gtc tat       288
Phe Ser Leu Thr Leu Asn Ser Leu Thr Ala Ala Asp Thr Ala Val Tyr
                85                  90                  95

tac tgt gcg aga cac tcg agt ggt tat tca gaa ctt gcc tac tgg ggc       336
Tyr Cys Ala Arg His Ser Ser Gly Tyr Ser Glu Leu Ala Tyr Trp Gly
            100                 105                 110

cag gga acc ctg gtc atc gtc tcc aca g                                364
Gln Gly Thr Leu Val Ile Val Ser Thr
        115                 120

<210> 2388
<211> 669
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2388
cag gag caa ctg gtg cag tct ggg gct gag gtg aag aag cct ggg tcg        48
Gln Glu Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1               5                   10                  15

tcg gtg aag gtc tcc tgc aag gtt tct gga ggc ccc ttc aag acc tac        96
Ser Val Lys Val Ser Cys Lys Val Ser Gly Gly Pro Phe Lys Thr Tyr
            20                  25                  30

cct atc aac tgg gtg cga cag gcc cct gga caa ggg ctt gag tgg atg       144
Pro Ile Asn Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

gga ggg atc acc cct aat tct ggc aca cca aac tac gcc cag aag ttc       192
Gly Gly Ile Thr Pro Asn Ser Gly Thr Pro Asn Tyr Ala Gln Lys Phe
    50                  55                  60

cag ggc aga gtc aca att acc gcg gac gaa tcc acg act aca gtc tac       240
Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Thr Thr Val Tyr
```

```
65                  70                  75                  80

atg caa ctg agc agc ctg aga tct gag gac acg gcc gtg tat tac tgt       288
Met Gln Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gtc cac aat tgg gac ttc tac tac ggt atg gac gtc tgg ggc       336
Ala Arg Val His Asn Trp Asp Phe Tyr Tyr Gly Met Asp Val Trp Gly
            100                 105                 110

cta ggg acc acg gtc acc gtc tcc tca gca tcc ccg acc agc ccc aag       384
Leu Gly Thr Thr Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro Lys
        115                 120                 125

gtc ttc ccg ctg agc ctc tgc agc acc cag cca gat ggg aac gtg gtc       432
Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val
    130                 135                 140

atc gcc tgc ctg gtc cag ggc ttc ttc ccc cag gag cca ctc agt gtg       480
Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val
145                 150                 155                 160

acc tgg agc gaa agc gga cag ggc gtg acc gcc aga aac ttc cca ccc       528
Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro
                165                 170                 175

agc cag gat gcc tcc ggg gac ctg tac acc acg agc agc cag ctg acc       576
Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr
            180                 185                 190

ctg ccg gcc aca cag tgc cta gcc ggc aag tcc gtg aca tgc cac gtg       624
Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val
        195                 200                 205

aag cac tac acg aat ccc agc cag gat gtg act gtg ccc tgc cca           669
Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
    210                 215                 220

<210> 2389
<211> 678
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2389
gag gtg cag gtg gtg gag tct ggg gga ggc ttg gta cag cca ggg cgg        48
Glu Val Gln Val Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt aca cct tct gga ttc acc ttt ggt gat aat        96
Ser Leu Arg Leu Ser Cys Thr Pro Ser Gly Phe Thr Phe Gly Asp Asn
```

```
            20                  25                  30

gct atg ggc tgg ttc cgc cag gct cca ggg aag ggg ctg gag tgg gta       144
Ala Met Gly Trp Phe Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

ggt ttc att aga agc aaa gct tat ggt ggg aca aga gac tac gcc gcg       192
Gly Phe Ile Arg Ser Lys Ala Tyr Gly Gly Thr Arg Asp Tyr Ala Ala
    50                  55                  60

tct gtg aaa ggc aga ttc acc atc tca aga gat gac tcc aaa agc atc       240
Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser Lys Ser Ile
65                  70                  75                  80

gcc tat ctg caa atg aac agc ctg aaa acc gag gac aca gcc gtt tat       288
Ala Tyr Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr
                85                  90                  95

tac tgt act aga gag agg ccc cct aat tgt gga tct agc tgc ccc gag       336
Tyr Cys Thr Arg Glu Arg Pro Pro Asn Cys Gly Ser Ser Cys Pro Glu
            100                 105                 110

acc tgg ggc cag gga acc ctg gtc acc gtc tct tca gca tcc ccg acc       384
Thr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Pro Thr
        115                 120                 125

agc ccc aag gtc ttc ccg ctg agc ctc tgc agc acc cag cca gat ggg       432
Ser Pro Lys Val Phe Pro Leu Ser Leu Cys Ser Thr Gln Pro Asp Gly
    130                 135                 140

aac gtg gtc atc gcc tgc ctg gtc cag ggc ttc ttc ccc cag gag cca       480
Asn Val Val Ile Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro
145                 150                 155                 160

ctc agt gtg acc tgg agc gaa agc gga cag ggc gtg acc gcc aga aac       528
Leu Ser Val Thr Trp Ser Glu Ser Gly Gln Gly Val Thr Ala Arg Asn
                165                 170                 175

ttc cca ccc agc cag gat gcc tcc ggg gac ctg tac acc acg agc agc       576
Phe Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser
            180                 185                 190

cag ctg acc ctg ccg gcc aca cag tgc cta gcc ggc aag tcc gtg aca       624
Gln Leu Thr Leu Pro Ala Thr Gln Cys Leu Ala Gly Lys Ser Val Thr
        195                 200                 205

tgc cac gtg aag cac tac acg aat ccc agc cag gat gtg act gtg ccc       672
Cys His Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro
    210                 215                 220

tgc cca                                                              678
Cys Pro
225
```

<210> 2390
<211> 358
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2390
cag gtt cag ctg gta cag tct gga agt gag gtg aag aag cct ggg gcc 48
Gln Val Gln Leu Val Gln Ser Gly Ser Glu Val Lys Lys Pro Gly Ala
1 5 10 15

tcc gtg agg ctc gcc tgc aag acc tct ggt tac acc ttt agt aat tac 96
Ser Val Arg Leu Ala Cys Lys Thr Ser Gly Tyr Thr Phe Ser Asn Tyr
20 25 30

ggt gtc tcc tgg gtg cga cag ggc cct ggc cga gga ctt gag tgg ctg 144
Gly Val Ser Trp Val Arg Gln Gly Pro Gly Arg Gly Leu Glu Trp Leu
35 40 45

ggc tgg ata agc ggt tac aat gga aga aca cac tct gca gac aag ttt 192
Gly Trp Ile Ser Gly Tyr Asn Gly Arg Thr His Ser Ala Asp Lys Phe
50 55 60

cgg gac aga gtc acc ctg acc aca gac aca tcc aca acc aca gtc tac 240
Arg Asp Arg Val Thr Leu Thr Thr Asp Thr Ser Thr Thr Thr Val Tyr
65 70 75 80

gtg gac ctg aag aac ctg acc tct gac gac acg gcc gtg tat tat tgt 288
Val Asp Leu Lys Asn Leu Thr Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

gcg aga gtc ggg aca tct cat tgg tac tct gat tct tgg ggc cag gga 336
Ala Arg Val Gly Thr Ser His Trp Tyr Ser Asp Ser Trp Gly Gln Gly
100 105 110

acc ctg gtc acc gtc tcc tca g 358
Thr Leu Val Thr Val Ser Ser
115

<210> 2391
<211> 352
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2391
gag gta cag ttg gtg gag tct ggg gga ggg atg gtc cag cct ggg gaa 48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Met Val Gln Pro Gly Glu

```
1               5                   10                  15

tca ctc aga ctc tcg tgc gca gcc tct gga ttc gac ttt act tcg tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Asp Phe Thr Ser Tyr
            20                  25                  30

tgg atg gcc tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtg       144
Trp Met Ala Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gcc aat atg aac gca gat ggg agt gag aaa cac tat gtg gac tct gtg       192
Ala Asn Met Asn Ala Asp Gly Ser Glu Lys His Tyr Val Asp Ser Val
    50                  55                  60

aag ggg cga ttc agc ata tcc aga gac aac gcg aag aag tta ctg ttt       240
Lys Gly Arg Phe Ser Ile Ser Arg Asp Asn Ala Lys Lys Leu Leu Phe
65                  70                  75                  80

ctg caa atg aac agc ctg aca gtt gac gat aca ggt gtc tat tat tgt       288
Leu Gln Met Asn Ser Leu Thr Val Asp Asp Thr Gly Val Tyr Tyr Cys
                85                  90                  95

gcg aga gac gag ggg cga aga gag ggc gcc tgg ggc cag gga acc cag       336
Ala Arg Asp Glu Gly Arg Arg Glu Gly Ala Trp Gly Gln Gly Thr Gln
            100                 105                 110

gtc atc gtt tcc gct g                                                352
Val Ile Val Ser Ala
        115

<210> 2392
<211> 658
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2392
g tgt gag gtg cag ctg gtg gag tct ggg gga ggc ttg gta cag cct ggg      49
  Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
  1               5                   10                  15

ggg tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt agc        97
Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser
            20                  25                  30

tat agc atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg       145
Tyr Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
        35                  40                  45

gtt tca tac att agt agt agt agt agt acc ata tac tac gca gac tct       193
Val Ser Tyr Ile Ser Ser Ser Ser Ser Thr Ile Tyr Tyr Ala Asp Ser
```

```
    50                  55                  60

gtg aag ggc cga ttc acc atc tcc aga gac aat gcc aag aac tca ctg       241
Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu
65                  70                  75                  80

tat ctg caa atg aac agc ctg aga gcc gag gac acg gct gtg tat tac       289
Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr
                85                  90                  95

tgt gcg aga gat atc gcg ctg gga cgg ggc ggt atg gac gtc tgg ggc       337
Cys Ala Arg Asp Ile Ala Leu Gly Arg Gly Gly Met Asp Val Trp Gly
            100                 105                 110

caa ggg acc acg gtc acc gtc tcc tca ggg agt gca tcc ggc cca tcg       385
Gln Gly Thr Thr Val Thr Val Ser Ser Gly Ser Ala Ser Gly Pro Ser
        115                 120                 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg       433
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       481
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       529
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       577
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac       625
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

aag ccc agc aac acc aag gtg gac aag aat gtg                           658
Lys Pro Ser Asn Thr Lys Val Asp Lys Asn Val
    210                 215
```

<210> 2393
<211> 361
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2393

```
cag ctg caa ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg gag        48
Gln Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
```

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1               5                   10                  15

acc ctg tcc ctc acc tgc act gtc tct ggt gtc tcc atc ggc acc agt        96
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Val Ser Ile Gly Thr Ser
            20                  25                  30

agt tac tat tgg ggc tgg atc cgc cag ccc cct gcg aag ggt ctg gag       144
Ser Tyr Tyr Trp Gly Trp Ile Arg Gln Pro Pro Ala Lys Gly Leu Glu
        35                  40                  45

tgg att ggg agt atc tac tat agt ggg agc acc tac tac aac ccg tcc       192
Trp Ile Gly Ser Ile Tyr Tyr Ser Gly Ser Thr Tyr Tyr Asn Pro Ser
    50                  55                  60

ctc aag aat cga gtc acc ata tca gta gac acg tcc aag aac cac ttc       240
Leu Lys Asn Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn His Phe
65                  70                  75                  80

tcc ctg aag ctg agc tct gtg acc gcc gca gac acg gct gtg tat tac       288
Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95

tgt gcg aga cat aga acg ggc caa tat tac tat aat agt tgg ggc cag       336
Cys Ala Arg His Arg Thr Gly Gln Tyr Tyr Tyr Asn Ser Trp Gly Gln
            100                 105                 110

gga acc ctg gtc acc gtc tcc tca g                                    361
Gly Thr Leu Val Thr Val Ser Ser
        115                 120

<210> 2394
<211> 354
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2394
cc cag gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg         47
   Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser
   1               5                   10                  15

gag acc ctg tca ctc acc tgc tct gtc tct ggt gac tcc ttc agt gat        95
Glu Thr Leu Ser Leu Thr Cys Ser Val Ser Gly Asp Ser Phe Ser Asp
                20                  25                  30

tac tac tgg agc tgg acc cgt cag tcc cca ggg aag gga cta gag tgg       143
Tyr Tyr Trp Ser Trp Thr Arg Gln Ser Pro Gly Lys Gly Leu Glu Trp
            35                  40                  45

ctt ggt tat atg ttt tat ggt ggg agc acc aac tac aac ccc tcc ctc       191
Leu Gly Tyr Met Phe Tyr Gly Gly Ser Thr Asn Tyr Asn Pro Ser Leu
```

```
        50                  55                  60

aag agt cga ctc acc atg tca gta gac acg tcc aag aaa cac gtc tac       239
Lys Ser Arg Leu Thr Met Ser Val Asp Thr Ser Lys Lys His Val Tyr
    65                  70                  75

ctg aag ttg agc tct gtg acc gct gcg gac acg gcc gtg tat tat tgt       287
Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys
80                  85                  90                  95

gcg gcg tcc ggc tac ggt gac cac gtg gcc tac tgg ggc cag gga acc       335
Ala Ala Ser Gly Tyr Gly Asp His Val Ala Tyr Trp Gly Gln Gly Thr
                100                 105                 110

cta gtc acc gtc tcc tcc g                                            354
Leu Val Thr Val Ser Ser
            115

<210> 2395
<211> 663
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2395
cag gtg cag ctg gtg gag tct ggg gga ggc gta gtc cag cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gta gcg tct gga ttc acc ttc agt aat tat        96
Ser Leu Arg Leu Ser Cys Val Ala Ser Gly Phe Thr Phe Ser Asn Tyr
            20                  25                  30

gcc atg cac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg       144
Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gca gtt ata tgg tat gat gga agt aat gaa tac tat aga gac tcc gtg       192
Ala Val Ile Trp Tyr Asp Gly Ser Asn Glu Tyr Tyr Arg Asp Ser Val
    50                  55                  60

gag ggc cga ttc acc atc tcc aga gac agt tcc aag aat act ctg tat       240
Glu Gly Arg Phe Thr Ile Ser Arg Asp Ser Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

ctg cta gtg aac agc ctg aga gcc gag gac acg gct gtc tat tat tgt       288
Leu Leu Val Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga ggg aat gga cct aag agt ggg aag tac tcg gac ttt gac tac       336
Ala Arg Gly Asn Gly Pro Lys Ser Gly Lys Tyr Ser Asp Phe Asp Tyr
```

```
            100                 105                 110

tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc       384
Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125

cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc       432
Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
    130                 135                 140

aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg       480
Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc       528
Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165                 170                 175

ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg       576
Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg       624
Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

aat cac aag ccc agc aac acc aag gtg gac aag agt gag                   663
Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215                 220

<210> 2396
<211> 352
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2396
cag gtt cag ctg gtg caa tct gga act gag gtg aag aag cct ggg gcc        48
Gln Val Gln Leu Val Gln Ser Gly Thr Glu Val Lys Lys Pro Gly Ala
1               5                   10                  15

tca gtg aag gtc tcc tgc aag gct tct ggt tac aga ttt acc agc aat        96
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Arg Phe Thr Ser Asn
            20                  25                  30

ggt atc agt tgg gtg cga cag gct cct gga caa ggg ctt cag tgg atg       144
Gly Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Gln Trp Met
        35                  40                  45

gga tgg atc agc act gac agt ggt aac aca aat tac gca cag agc ttc       192
Gly Trp Ile Ser Thr Asp Ser Gly Asn Thr Asn Tyr Ala Gln Ser Phe
```

```
    50                  55                  60

cag ggc aga gtc acc ttg acc aga gac aca tcc acg aac aca gcc tat       240
Gln Gly Arg Val Thr Leu Thr Arg Asp Thr Ser Thr Asn Thr Ala Tyr
65                  70                  75                  80

ctg gaa ctc agg aga cta aga tct gag gac acg gcc gtg tat tat tgt       288
Leu Glu Leu Arg Arg Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gat aag tcc tgg tac ttt gac tac tgg ggc cag gga acc ctg       336
Ala Arg Asp Lys Ser Trp Tyr Phe Asp Tyr Trp Gly Gln Gly Thr Leu
            100                 105                 110

gtc agc gtc tcc tca g                                             352
Val Ser Val Ser Ser
        115

<210> 2397
<211> 664
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2397
g tgt gag gtg cag ctg gtg gag tct ggg gga ggt gtg gta cgg cct ggg      49
  Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Arg Pro Gly
  1               5                  10                  15

ggg tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt gat gat        97
Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asp Asp
            20                  25                  30

tat ggc atg agc tgg gtc cgc caa gct cca ggg aag ggg ctg gag tgg       145
Tyr Gly Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
        35                  40                  45

gtc tct ggt att cat tgg aat ggt ggt agc aca ggt tat gca gac tct       193
Val Ser Gly Ile His Trp Asn Gly Gly Ser Thr Gly Tyr Ala Asp Ser
    50                  55                  60

gtg aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tcc ctg       241
Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu
65                  70                  75                  80

tat ctg caa atg aac agt ctg aga gcc gag gac acg gcc ttg tat cac       289
Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Leu Tyr His
                85                  90                  95

tgt gcg aga tcc acc gct agt agt ggt tat tat gat gct ttt gat atc       337
Cys Ala Arg Ser Thr Ala Ser Ser Gly Tyr Tyr Asp Ala Phe Asp Ile
```

```
            100                 105                 110

tgg ggc caa ggg aca atg gtc acc gtc tct tca gcc tcc acc aag ggc       385
Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125

cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc       433
Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
    130                 135                 140

aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg       481
Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc       529
Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165                 170                 175

ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg       577
Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg       625
Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

aat cac aag ccc agc aac acc aag gtg gac aag agt gag                   664
Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215                 220

<210> 2398
<211> 681
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2398
cag gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcg tct gga ttc agt ttc agt gcc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Ser Phe Ser Ala Tyr
            20                  25                  30

ggc atg cac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg       144
Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gca att atg tgg tat gat gga aat aat aaa tac tat gca gac tcc gtg       192
Ala Ile Met Trp Tyr Asp Gly Asn Asn Lys Tyr Tyr Ala Asp Ser Val
```

```
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aat tcc aag aac acg cta tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gcc gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gat cgt cga gag tat agc agc tcg tcc cgg cct tca tat cac       336
Ala Arg Asp Arg Arg Glu Tyr Ser Ser Ser Ser Arg Pro Ser Tyr His
            100                 105                 110

tac tac tac atg gac gtc tgg ggc aaa ggg acc acg gtc acc gtc tcc       384
Tyr Tyr Tyr Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser
        115                 120                 125

tca gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc       432
Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser
    130                 135                 140

aag agc acc tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac       480
Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp
145                 150                 155                 160

tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc       528
Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr
                165                 170                 175

agc ggc gtg cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac       576
Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr
            180                 185                 190

tcc ctc agc agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag       624
Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln
        195                 200                 205

acc tac atc tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac       672
Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp
    210                 215                 220

aag agt gag                                                          681
Lys Ser Glu
225
```

<210> 2399
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2399

```
gtg gtg cag ctg ttg gag tct ggg gga ggc ttg gta cac cct ggg ggg        48
Val Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val His Pro Gly Gly
1               5                  10                  15

tcc ctg aga att tcc tgt gca gcc tct gaa ttc acc ttt agc gcc tat        96
Ser Leu Arg Ile Ser Cys Ala Ala Ser Glu Phe Thr Phe Ser Ala Tyr
            20                  25                  30

gcc atg acc tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtc       144
Ala Met Thr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tcg gct att agt ggc agt ggt ggt cgg aca tac tac gca gac tcc ctg       192
Ser Ala Ile Ser Gly Ser Gly Gly Arg Thr Tyr Tyr Ala Asp Ser Leu
    50                  55                  60

aag ggc cgg ttc acc atc tcc aga gac aat tcc aag cac act ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys His Thr Leu Tyr
65                  70                  75                  80

ctc cta atg aat agt ctg aga gtc gag gac acg gcc gtt tat tac tgt       288
Leu Leu Met Asn Ser Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg tcc cga tat aga agc ccg tcc ggt gct ttt gac atc tgg ggc caa       336
Ala Ser Arg Tyr Arg Ser Pro Ser Gly Ala Phe Asp Ile Trp Gly Gln
            100                 105                 110

ggg aca ttg gtc acc gtc tct tca gcc tcc acc aag ggc cca tcg gtc       384
Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       432
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       624
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205
```

```
ccc agc aac acc aag gtg gac aag aga gtc                                  654
Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215

<210> 2400
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2400
gag gtg cag ctg gtg gag tct ggg gga ggc ttg gta aag cct ggg ggg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
1               5                   10                  15

tcc ctt aga ctc tcc tgt gca gcc tct ggt ttc act ttc agt aac gcc        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Ala
            20                  25                  30

tgg atg aac tgg gtc cgc cag act cca ggg aag ggg ctg gag tgg gtc       144
Trp Met Asn Trp Val Arg Gln Thr Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

ggc cgt att aaa acc aaa act gat ggt ggg aca aca gac tac gct gaa       192
Gly Arg Ile Lys Thr Lys Thr Asp Gly Gly Thr Thr Asp Tyr Ala Glu
    50                  55                  60

ccc gta aaa ggc aga ttc acc atc tca aga gat gat tca aaa aac acg       240
Pro Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser Lys Asn Thr
65                  70                  75                  80

cta tat ctg caa atg aac agc ctg aaa acc gag gac aca gcc gtg tat       288
Leu Tyr Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr
                85                  90                  95

tat tgt acc aga gga gca gtg gcc gac tac tgg ggc cag gga acc cag       336
Tyr Cys Thr Arg Gly Ala Val Ala Asp Tyr Trp Gly Gln Gly Thr Gln
            100                 105                 110

gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg       384
Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu
        115                 120                 125

gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc tgc       432
Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys
    130                 135                 140

ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca       480
Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
145                 150                 155                 160
```

```
ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag tcc       528
Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser
                165                 170                 175

tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc agc       576
Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser
            180                 185                 190

ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc agc aac       624
Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn
        195                 200                 205

acc aag gtg gac aag aga gtc                                           645
Thr Lys Val Asp Lys Arg Val
    210                 215
```

<210> 2401
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2401

```
cag gtg cag ctg aag cag tcg ggg gga ggc gtg gtc cag cct ggg agg        48
Gln Val Gln Leu Lys Gln Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aca ctc tcc tgt gta gcg tct gga ctc acc ttc agt gac tat        96
Ser Leu Thr Leu Ser Cys Val Ala Ser Gly Leu Thr Phe Ser Asp Tyr
            20                  25                  30

ggc atg cac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg       144
Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gcc gtt att tgg cat gat ggc agt aag acg aat tat gca gac tcc gtg       192
Ala Val Ile Trp His Asp Gly Ser Lys Thr Asn Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga atc atc atc tcc aga gac aac tcc aag agc acg gtg tat       240
Lys Gly Arg Ile Ile Ile Ser Arg Asp Asn Ser Lys Ser Thr Val Tyr
65                  70                  75                  80

ttg caa atg aac aga ttg aga ggc gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Arg Leu Arg Gly Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg acc tcc cac gga gga cta gtg cct ggc ggc gaa aac tac tgg ggc       336
Ala Thr Ser His Gly Gly Leu Val Pro Gly Gly Glu Asn Tyr Trp Gly
            100                 105                 110
```

```
cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg       384
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg       432
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       480
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       528
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       576
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac       624
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

aag ccc agc aac acc aag gtg gac aag aga gtc                           657
Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215
```

<210> 2402
<211> 370
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2402

```
cag gtt cag ctg gtg cag tcg gga tct gag ttg aag aag cct ggg gcc        48
Gln Val Gln Leu Val Gln Ser Gly Ser Glu Leu Lys Lys Pro Gly Ala
1               5                   10                  15

tca gtg aag gtc tcc tgc aca agt tcc ggt tac gtc ttt acc agc ttt        96
Ser Val Lys Val Ser Cys Thr Ser Ser Gly Tyr Val Phe Thr Ser Phe
            20                  25                  30

ggg gtc agc tgg gtg cga cag gtc ccg gga caa ggg cct gag tgg atg       144
Gly Val Ser Trp Val Arg Gln Val Pro Gly Gln Gly Pro Glu Trp Met
        35                  40                  45

gga tgg att agc cct tac acc cgt cag aca aaa tat gca cag agt ctc       192
Gly Trp Ile Ser Pro Tyr Thr Arg Gln Thr Lys Tyr Ala Gln Ser Leu
    50                  55                  60
```

```
cag ggc aga atc acc ctg acc gca gac aca tcc aca aat acg act tac       240
Gln Gly Arg Ile Thr Leu Thr Ala Asp Thr Ser Thr Asn Thr Thr Tyr
65                  70                  75                  80

atg gaa ctg agg agc ctg aga tct gac gac acg gcc atg tat tac tgt       288
Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Met Tyr Tyr Cys
                85                  90                  95

gtg aga gag gag ttt gga gtg gtt cgt gga cct aat ccc ttt gat gtc       336
Val Arg Glu Glu Phe Gly Val Val Arg Gly Pro Asn Pro Phe Asp Val
            100                 105                 110

tgg ggc cag ggg aca atg gtc acc gtc tct tca g                        370
Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser
        115                 120
```

<210> 2403
<211> 672
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2403

```
gag gtg cag ctg gtg gag tcg ggg gga ggc gtg gtc cag cct ggg ggg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcg tct gga ttc acc ttc gaa gac ttc        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Glu Asp Phe
            20                  25                  30

ggc atg cac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg       144
Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gca ttt aca cgt ttt gat gga agt gaa aaa tat tat gtc gac tcc gtg       192
Ala Phe Thr Arg Phe Asp Gly Ser Glu Lys Tyr Tyr Val Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc gtc tcc aga gac aat tcc aag aat aca ctt ttt       240
Lys Gly Arg Phe Thr Val Ser Arg Asp Asn Ser Lys Asn Thr Leu Phe
65                  70                  75                  80

cta cat atg aac agc ctg aga ccg gaa gac acg gct gta tat tac tgt       288
Leu His Met Asn Ser Leu Arg Pro Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aaa acc cgt tct tat agt tcc gct gac act act cgt ccc aat gcc       336
Ala Lys Thr Arg Ser Tyr Ser Ser Ala Asp Thr Thr Arg Pro Asn Ala
            100                 105                 110
```

```
ccg ggc tac tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc       384
Pro Gly Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser
        115                 120                 125

acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc       432
Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
    130                 135                 140

tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc       480
Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145                 150                 155                 160

gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg       528
Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
                165                 170                 175

cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc       576
His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
            180                 185                 190

agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc       624
Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile
        195                 200                 205

tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aga gtc       672
Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220

<210> 2404
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2404
cag gtg cag ctg gtg gaa tct ggg gga ggc gtg gtc cag cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ctc agt acc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Leu Ser Thr Tyr
            20                  25                  30

ggc atg cac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg       144
Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gca gtt ata tca cat gat gga agt aat aac tac tat gca gac tac gtg       192
Ala Val Ile Ser His Asp Gly Ser Asn Asn Tyr Tyr Ala Asp Tyr Val
    50                  55                  60
```

```
aag ggc cga ttc acc atc tcc aga gac aat tcc aag aac acg ctg tac       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga att gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ile Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aaa gat ggc caa act gga act aca acc cca tac ttt gac tac tgg       336
Ala Lys Asp Gly Gln Thr Gly Thr Thr Thr Pro Tyr Phe Asp Tyr Trp
            100                 105                 110

ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca       384
Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

tcg gtc ttc ccc ctg gcg ccc tgc tcc agg agc acc tcc gag agc aca       432
Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr
    130                 135                 140

gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg       480
Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

gtg tcg tgg aac tca ggc gct ctg acc agc ggc gtg cac acc ttc ccg       528
Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc       576
Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

gtg acc tcc agc aac ttc ggc acc cag acc tac acc tgc aac gta gat       624
Val Thr Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp
        195                 200                 205

cac aag ccc agc aac acc aag gtg gac aag aca gtg                       660
His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val
    210                 215                 220
```

<210> 2405
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2405

```
ccc gtc cag ctt gtg cag tct ggg gcc cag gtg aag aag cct ggg gcc        48
Pro Val Gln Leu Val Gln Ser Gly Ala Gln Val Lys Lys Pro Gly Ala
1               5                   10                  15
```

```
tca gtg agg ctt tcc tgc aag tct tct gga tat acc ttc agt aac tat        96
Ser Val Arg Leu Ser Cys Lys Ser Ser Gly Tyr Thr Phe Ser Asn Tyr
            20                  25                  30

gct ata cat tgg ctg cgc cag gcc ccc gga cag agg ctt gag tgg gtg       144
Ala Ile His Trp Leu Arg Gln Ala Pro Gly Gln Arg Leu Glu Trp Val
        35                  40                  45

ggg tgg atc cac gtt gga aat gat cac aca aga tat tca cag agt ttc       192
Gly Trp Ile His Val Gly Asn Asp His Thr Arg Tyr Ser Gln Ser Phe
    50                  55                  60

cag ggc aga gtc acc att tcc gca gat aca tcc gcg aac acg gcc tac       240
Gln Gly Arg Val Thr Ile Ser Ala Asp Thr Ser Ala Asn Thr Ala Tyr
65                  70                  75                  80

atg gag gtg aga ggc ctg cga tct gaa gac acg tct ctg ttt tac tgt       288
Met Glu Val Arg Gly Leu Arg Ser Glu Asp Thr Ser Leu Phe Tyr Cys
                85                  90                  95

gcg aga gcc ggg gct gag ggc gtt gac tat tgg ggc cag gga acc cag       336
Ala Arg Ala Gly Ala Glu Gly Val Asp Tyr Trp Gly Gln Gly Thr Gln
            100                 105                 110

gtg acc gtc tcc tca gca tcc ccg acc agc ccc aag gtc ttc ccg ctg       384
Val Thr Val Ser Ser Ala Ser Pro Thr Ser Pro Lys Val Phe Pro Leu
        115                 120                 125

agc ctc tgc agc acc cag cca gat ggg aac gtg gtc atc gcc tgc ctg       432
Ser Leu Cys Ser Thr Gln Pro Asp Gly Asn Val Val Ile Ala Cys Leu
    130                 135                 140

gtc cag ggc ttc ttc ccc cag gag cca ctc agt gtg acc tgg agc gaa       480
Val Gln Gly Phe Phe Pro Gln Glu Pro Leu Ser Val Thr Trp Ser Glu
145                 150                 155                 160

agc gga cag ggc gtg acc gcc aga aac ttc cca ccc agc cag gat gcc       528
Ser Gly Gln Gly Val Thr Ala Arg Asn Phe Pro Pro Ser Gln Asp Ala
                165                 170                 175

tcc ggg gac ctg tac acc acg agc agc cag ctg acc ctg ccg gcc aca       576
Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln Leu Thr Leu Pro Ala Thr
            180                 185                 190

cag tgc cta gcc ggc aag tcc gtg aca tgc cac gtg aag cac tac acg       624
Gln Cys Leu Ala Gly Lys Ser Val Thr Cys His Val Lys His Tyr Thr
        195                 200                 205

aat ccc agc cag gat gtg act gtg ccc tgc cca                           657
Asn Pro Ser Gln Asp Val Thr Val Pro Cys Pro
    210                 215
```

<210> 2406
<211> 657

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2406
gca gtg cag ctg gtg cag tct gga gca gag gtg aaa aag ccc ggg gag 48
Ala Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1 5 10 15

tct ctg agg atc tcc tgt aag ggt tct gga tac agc ttt tcc acc tac 96
Ser Leu Arg Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Ser Thr Tyr
20 25 30

tgg atc atc tgg gtg cgc cag atg ccc ggg aaa ggc cta gag tgg att 144
Trp Ile Ile Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp Ile
35 40 45

ggg agg ttt gat cct agt gac tct tat aac gtc aac agc ccg tcc ttc 192
Gly Arg Phe Asp Pro Ser Asp Ser Tyr Asn Val Asn Ser Pro Ser Phe
50 55 60

caa ggc cac gtc acc atc tca gct gac acg tcc atc aac act gcc tac 240
Gln Gly His Val Thr Ile Ser Ala Asp Thr Ser Ile Asn Thr Ala Tyr
65 70 75 80

ttg cag tgg agc agc ctg aag gcc tcg gac agc gcc atg tat tac tgt 288
Leu Gln Trp Ser Ser Leu Lys Ala Ser Asp Ser Ala Met Tyr Tyr Cys
85 90 95

gcg aga cga tcc gat aaa gca gtg cct ggg acc ttt gac cag tgg ggc 336
Ala Arg Arg Ser Asp Lys Ala Val Pro Gly Thr Phe Asp Gln Trp Gly
100 105 110

cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg 384
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
115 120 125

gtc ttc ccc ctg gcg ccc tgc tcc agg agc acc tcc gag agc aca gcg 432
Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala
130 135 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg 480
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145 150 155 160

tcg tgg aac tca ggc gct ctg acc agc ggc gtg cac acc ttc ccg gct 528
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
165 170 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg 576
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val

```
            180                 185                 190

ccc tcc agc aac ttc ggc acc cag acc tac acc tgc aac gta gat cac       624
Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp His
        195                 200                 205

aag ccc agc aac acc aag gtg gac aag aca gtg                           657
Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val
    210                 215
```

<210> 2407
<211> 663
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2407

```
cag atc acc ctg aag gag tct ggt cct acg ctg ctg aaa ccc aca cag        48
Gln Ile Thr Leu Lys Glu Ser Gly Pro Thr Leu Leu Lys Pro Thr Gln
1               5                   10                  15

acc ctc acg ctg acc tgc aac ttc tct ggg ttc tca ctc acc aca tat        96
Thr Leu Thr Leu Thr Cys Asn Phe Ser Gly Phe Ser Leu Thr Thr Tyr
            20                  25                  30

gga gtg ggt gtg gcc tgg atc cgt cag ccc cca gga aag gcc ctg gag       144
Gly Val Gly Val Ala Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu
        35                  40                  45

tgg ctt gca ctc att tat tgg gat gat gat aag cgc tac agc cca tct       192
Trp Leu Ala Leu Ile Tyr Trp Asp Asp Asp Lys Arg Tyr Ser Pro Ser
    50                  55                  60

ctg aag agc aga ctc acc gtc acc aag gac acc tcc aaa aac cag gtg       240
Leu Lys Ser Arg Leu Thr Val Thr Lys Asp Thr Ser Lys Asn Gln Val
65                  70                  75                  80

gtc ctt aca atg acc aac atg gac cct gtg gac aca gcc aca tat tac       288
Val Leu Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr
                85                  90                  95

tgt gca cac agg ggg gga aag aac cct cgt tat tgg tac ttc gat ctc       336
Cys Ala His Arg Gly Gly Lys Asn Pro Arg Tyr Trp Tyr Phe Asp Leu
            100                 105                 110

tgg ggc cgc ggc act ctg gtc act gtc tcc tca gcc tcc acc aag ggc       384
Trp Gly Arg Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125

cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc       432
Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
```

```
    130                 135                 140

aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg       480
Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc       528
Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165                 170                 175

ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg       576
Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg       624
Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

aat cac aag ccc agc aac acc aag gtg gac aag aaa gtg                   663
Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220

<210> 2408
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2408
gag gta cag ctg gtg gag tct ggt gga ggc ctg gtc aag cct agg ggg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Arg Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt gct tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ala Tyr
            20                  25                  30

ggc atg aac tgg gtt cgc cag gct cca ggg aag gga ctg gag tgg gtc       144
Gly Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca tcc att agt gga gat agt cgt gac atc tac tat gga gcc tct atg       192
Ser Ser Ile Ser Gly Asp Ser Arg Asp Ile Tyr Tyr Gly Ala Ser Met
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag agc tca ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Ser Ser Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gcc gag gac acg gct gtt tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
```

```
                85                  90                  95

gcg aga ggg gag ggg ggg gaa tta tgg gcc ttt gac tac tgg ggc ctg       336
Ala Arg Gly Glu Gly Gly Glu Leu Trp Ala Phe Asp Tyr Trp Gly Leu
            100                 105                 110

gga gtc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc       384
Gly Val Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       432
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       624
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

ccc agc aac acc aag gtg gac aag aaa gcc                               654
Pro Ser Asn Thr Lys Val Asp Lys Lys Ala
    210                 215

<210> 2409
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2409
ccc gtg cag ctg gtg cag tct ggg gct gag gtg aag aag cct ggg tcc        48
Pro Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1               5                   10                  15

tcg gtg cag gtc tcc tgc aag ggt tct gga ggc acc ttc agc gaa tat        96
Ser Val Gln Val Ser Cys Lys Gly Ser Gly Gly Thr Phe Ser Glu Tyr
            20                  25                  30

ggt atc agc tgg ttg cga cag gcc cct gga caa ggg ctt gag tgg att       144
Gly Ile Ser Trp Leu Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
```

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        35                  40                  45

gga gga atc ata cct gtc cta ggt ata cca aat tac gca caa aaa ttc       192
Gly Gly Ile Ile Pro Val Leu Gly Ile Pro Asn Tyr Ala Gln Lys Phe
    50                  55                  60

cgg ggc aga gtc acc att acc gcg gac gaa tcc acg ggc tca gcc tac       240
Arg Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Gly Ser Ala Tyr
65                  70                  75                  80

atg gag gtg agc agc ctc aga tct gaa gac acg gcc gtt tat tac tgt       288
Met Glu Val Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gag ggg ctt cgt ctg gca cgt ggc tgg ttt cac ccc tgg ggc       336
Ala Arg Glu Gly Leu Arg Leu Ala Arg Gly Trp Phe His Pro Trp Gly
            100                 105                 110

cag gga acc ctc gtc acc gtc acc tca gcc tcc acc aag ggc cca tcg       384
Gln Gly Thr Leu Val Thr Val Thr Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg       432
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       480
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       528
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       576
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac       624
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

aag ccc agc aac acc aag gtg gac aag agt gag                           657
Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215

<210> 2410
<211> 361
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain
```

<400> 2410
cag gtg caa ctg caa gag tcg ggc cca gga ctg gtg aag cct tcg gag 48
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

acc ctg tcc ctc atc tgc act gtc tct ggt gcc tcc gtc aac agt ggg 96
Thr Leu Ser Leu Ile Cys Thr Val Ser Gly Ala Ser Val Asn Ser Gly
20 25 30

act cac ttc tgg agc tgg atc cgg cag ccc cca ggg aag gga ctg gag 144
Thr His Phe Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu
35 40 45

tgg att ggc tat gtc tat tac agt ggg aac acc aat tac aat ccc tcc 192
Trp Ile Gly Tyr Val Tyr Tyr Ser Gly Asn Thr Asn Tyr Asn Pro Ser
50 55 60

ctc aag agc cga gtc gcc ata tca gtt gac acg tcc aag aac cag ttc 240
Leu Lys Ser Arg Val Ala Ile Ser Val Asp Thr Ser Lys Asn Gln Phe
65 70 75 80

tcc ctg aag ctg acc tct gtg acc tct gcg gac acg gcc gtg tat tac 288
Ser Leu Lys Leu Thr Ser Val Thr Ser Ala Asp Thr Ala Val Tyr Tyr
85 90 95

tgt gcg aga gat ttt gat gat ggc tac gac atc cgt tac tgg ggc cag 336
Cys Ala Arg Asp Phe Asp Asp Gly Tyr Asp Ile Arg Tyr Trp Gly Gln
100 105 110

gga acc cgg gtc agc gtc tcc tca g 361
Gly Thr Arg Val Ser Val Ser Ser
115 120

<210> 2411
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2411
gtg gtg cag ctg gtg gag tct ggg gga ggc ttg gtc cag cct ggg ggg 48
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

tcc ctg aga ctc tcc tgt tca gcc tct gga ttc acc ttc agt agc tat 96
Ser Leu Arg Leu Ser Cys Ser Ala Ser Gly Phe Thr Phe Ser Ser Tyr
20 25 30

gct atg cac tgg gtc cgc cag gct cca ggg aag gga ctg gaa tat gtt 144
Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Tyr Val

```
        35                  40                  45

tca gct att agt agt aat ggg ggt agc aca tac tac gca gac tcc gtg       192
Ser Ala Ile Ser Ser Asn Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc aga ttc acc atc tcc aga gac aat tcc aag aac acg ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

ctt caa atg agc agt ctg aga gct gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Ser Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gtg aaa tca cca gtg gcc gca aat gat gct ttt gat atc tgg ggc caa       336
Val Lys Ser Pro Val Ala Ala Asn Asp Ala Phe Asp Ile Trp Gly Gln
            100                 105                 110

ggg aca atg gtc acc gtc tct tca gcc tcc acc aag ggc cca tcg gtc       384
Gly Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       432
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       624
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

ccc agc aac acc aag gtg gac aag agt gtg                               654
Pro Ser Asn Thr Lys Val Asp Lys Ser Val
    210                 215
```

<210> 2412
<211> 658
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2412
g tgt gag gtg cag ctg gtg gag tct ggg gga ggc ttg gta cag cct ggg 49
Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
1 5 10 15

ggg tcc ctg aga ctc tcc tgt gta gcc tct gga ttc acc ttc agt agc 97
Gly Ser Leu Arg Leu Ser Cys Val Ala Ser Gly Phe Thr Phe Ser Ser
20 25 30

tat agc atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg aag tgg 145
Tyr Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Lys Trp
35 40 45

gtt tca tac att agt agt agt agg agt acc ata tac aac gca gac tct 193
Val Ser Tyr Ile Ser Ser Ser Arg Ser Thr Ile Tyr Asn Ala Asp Ser
50 55 60

gtg aag ggc cga ttc acc atc tcc aga gac aat gcc aag aag tca ctg 241
Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Lys Ser Leu
65 70 75 80

tat ctg caa atg aac agc ctg aga gcc gag gac acg gct gtg tat tac 289
Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr
85 90 95

tgt gcg aga gtg tct gtg gcc gcc cca acg tgc ttg gac tac tgg ggc 337
Cys Ala Arg Val Ser Val Ala Ala Pro Thr Cys Leu Asp Tyr Trp Gly
100 105 110

cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg 385
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
115 120 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg 433
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
130 135 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg 481
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145 150 155 160

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct 529
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
165 170 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg 577
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
180 185 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac 625
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
195 200 205

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aag ccc agc aac acc aag gtg gac aag aag gtg                              658
Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215

<210> 2413
<211> 663
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2413
cag ctg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg gag        48
Gln Leu Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1               5                   10                  15

acc ctg tcc ctc acc tgc act gtc gct ggt gac tcc atc agc agg agt        96
Thr Leu Ser Leu Thr Cys Thr Val Ala Gly Asp Ser Ile Ser Arg Ser
            20                  25                  30

aat tac tac tgg gcc tgg atc cgc cag ccc cca ggg aag ggg ctg gag       144
Asn Tyr Tyr Trp Ala Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu
        35                  40                  45

tgg att ggg agt atc att cat act ggg acc acc tac cac aac ccg tcc       192
Trp Ile Gly Ser Ile Ile His Thr Gly Thr Thr Tyr His Asn Pro Ser
    50                  55                  60

ctc agg agt cgc ggc acc att ttg gta gac acg tcc aag aac caa ttc       240
Leu Arg Ser Arg Gly Thr Ile Leu Val Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

tcc ctg aaa ctg agc tct gtg acc gcc gca gac acg ggt cta tat tac       288
Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Gly Leu Tyr Tyr
                85                  90                  95

tgt gcg aga cat tca ggg cac gat cag ttg ccg cta gac ttt gac aac       336
Cys Ala Arg His Ser Gly His Asp Gln Leu Pro Leu Asp Phe Asp Asn
            100                 105                 110

tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc       384
Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125

cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc       432
Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
    130                 135                 140

aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg       480
Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160
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```
acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc       528
Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165                 170                 175

ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg       576
Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg       624
Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

aat cac aag ccc agc aac acc aag gtg gac aag agt gag                   663
Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215                 220

<210> 2414
<211> 349
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2414
gag gtg caa ctg gtt gag tcc ggg gga ggc tta gtt cag ccg ggg ggg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt agt aag ttt        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Lys Phe
            20                  25                  30

tgg atg cac tgg gtc cgc caa gct cca ggg aag ggg ctg gtg tgg ctc       144
Trp Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Val Trp Leu
        35                  40                  45

tca cgt att aat act gat ggg act gtc aca acc tac gcg gac tcc gtg       192
Ser Arg Ile Asn Thr Asp Gly Thr Val Thr Thr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cgg ttc acc atc tcc aga gac aac gcc aag agc acg ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Ser Thr Leu Tyr
65                  70                  75                  80

ctg caa atg aac agt ctg aga gtc gag gac acg gct gtt tat tat tgt       288
Leu Gln Met Asn Ser Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gca gga gga gga agt caa gtg gac ttc tgg ggc cag gga acc ctg gtc       336
Ala Gly Gly Gly Ser Gln Val Asp Phe Trp Gly Gln Gly Thr Leu Val
            100                 105                 110
```

```
acc gtc tcc tca g                                                    349
Thr Val Ser Ser
        115

<210> 2415
<211> 671
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2415
cc cag atc acc ttg aag gag tct ggt cct acg ctg gtg aaa ccc aca         47
   Gln Ile Thr Leu Lys Glu Ser Gly Pro Thr Leu Val Lys Pro Thr
   1               5                  10                  15

cag acc ctc acg ctg acc tgc acc ttc tct ggg ttc tct ctg acc act        95
Gln Thr Leu Thr Leu Thr Cys Thr Phe Ser Gly Phe Ser Leu Thr Thr
               20                  25                  30

act gga gtg ggt gtg ggc tgg atc cgt cag ccc cca gga aag gcc ctg       143
Thr Gly Val Gly Val Gly Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu
            35                  40                  45

gag tgg ctt gca ctc att tat tgg gat gat gat aag cgc tac agc cca       191
Glu Trp Leu Ala Leu Ile Tyr Trp Asp Asp Asp Lys Arg Tyr Ser Pro
        50                  55                  60

tct ctg aag agc agg ctc atc atc acc aag gac acc tcc aaa aac cag       239
Ser Leu Lys Ser Arg Leu Ile Ile Thr Lys Asp Thr Ser Lys Asn Gln
    65                  70                  75

gtg gtc ctt aca atg acc aac atg gac cct gtg gac aca gcc aca tat       287
Val Val Leu Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr
80                  85                  90                  95

tac tgt gca cac aga ttc ggg aga ggg gtg tcc tac tac tac tac ggt       335
Tyr Cys Ala His Arg Phe Gly Arg Gly Val Ser Tyr Tyr Tyr Tyr Gly
               100                 105                 110

atg gac gtc tgg ggc caa ggg acc acg gtc acc gtc tcc tca gcc tcc       383
Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser
            115                 120                 125

acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc       431
Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
        130                 135                 140

tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc       479
Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
    145                 150                 155
```

```
gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg       527
Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
160                 165                 170                 175

cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc       575
His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
                180                 185                 190

agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc       623
Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile
            195                 200                 205

tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aag gtg       671
Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
        210                 215                 220

<210> 2416
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2416
cag gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc atc ttc agt agc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Ile Phe Ser Ser Tyr
            20                  25                  30

ggc atg cac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg       144
Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gca gtt ata tca tat gat gga agt aat aaa tac tat gca gac tcc gtg       192
Ala Val Ile Ser Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aaa tcc aag aac acg ctg cat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Lys Ser Lys Asn Thr Leu His
65                  70                  75                  80

ctg caa atg aac agc ctg aga gct gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aaa gat agt ggg agc aac gac gac atg gac gtc tgg ggc aag ggg       336
Ala Lys Asp Ser Gly Ser Asn Asp Asp Met Asp Val Trp Gly Lys Gly
            100                 105                 110
```

```
acc acg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc       384
Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125

ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg       432
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140

ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg       480
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160

aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta       528
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc       576
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190

agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc       624
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205

agc aac acc aag gtg gac aag agt gag                                   651
Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215
```

<210> 2417
<211> 658
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2417

```
g tgt gag gtg cag ctg gtg gag tct ggg gga ggc ttg gta cag cct gga      49
  Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
  1               5                  10                  15

ggg tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt agt        97
Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser
            20                  25                  30

tat gaa atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg       145
Tyr Glu Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
        35                  40                  45

gtt tca tac att agt agt agt ggt agt acc ata tac tac gca gac tct       193
Val Ser Tyr Ile Ser Ser Ser Gly Ser Thr Ile Tyr Tyr Ala Asp Ser
    50                  55                  60
```

```
gtg aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tca ctg       241
Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu
65                  70                  75                  80

tat ctg caa atg aac agc ctg aga gcc gag gac acg gct gtt tat tac       289
Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr
                85                  90                  95

tgt gcg aga aga ggt ttt tac tac tac tac ggt atg gac gtc tgg ggc       337
Cys Ala Arg Arg Gly Phe Tyr Tyr Tyr Tyr Gly Met Asp Val Trp Gly
            100                 105                 110

caa ggg acc acg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg       385
Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg       433
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       481
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       529
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       577
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac       625
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

aag ccc agc aac acc aag gtg gac aag agt gag                           658
Lys Pro Ser Asn Thr Lys Val Asp Lys Ser Glu
    210                 215
```

<210> 2418
<211> 649
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2418

```
g tgt gag gtg cag ctg gtg gag tct ggg gga ggc ttg gta cag cct ggg      49
  Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
  1               5                  10                  15
```

```
ggg tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt agc        97
Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser
            20                  25                  30

tat agc atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg       145
Tyr Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
        35                  40                  45

gtt tca tac att agt agt agt agt agt acc ata tac tac gca gac tct       193
Val Ser Tyr Ile Ser Ser Ser Ser Ser Thr Ile Tyr Tyr Ala Asp Ser
    50                  55                  60

gtg aag ggc cga ttc acc atc tcc aga gac aat gcc aag aac tca ctg       241
Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu
65                  70                  75                  80

tat ctg caa atg aac agc ctg aga gcc gag gac acg gct gtg tat tac       289
Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr
                85                  90                  95

tgt gcg agt ctc ctc ggg ggc gat cct gac tac tgg ggc cag gga acc       337
Cys Ala Ser Leu Leu Gly Gly Asp Pro Asp Tyr Trp Gly Gln Gly Thr
            100                 105                 110

ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc       385
Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
        115                 120                 125

ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc       433
Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
    130                 135                 140

tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac       481
Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160

tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag       529
Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175

tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc       577
Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc agc       625
Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
        195                 200                 205

aac acc aag gtg gac aag aag gtg                                       649
Asn Thr Lys Val Asp Lys Lys Val
    210                 215
```

<210> 2419
<211> 678

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2419
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ccc gtc acc ttg agg gag tct ggt cct gcg ctg gtg aaa ccc aca cag        48
Pro Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1               5                   10                  15

acc ctc aca ctg acc tgc acc ttc tct ggg ttc tca ctc agc act agt        96
Thr Leu Thr Leu Thr Cys Thr Phe Ser Gly Phe Ser Leu Ser Thr Ser
            20                  25                  30

gga atg tgt gtg agc tgg atc cgt cag ccc cca ggg aag gcc ctg gag       144
Gly Met Cys Val Ser Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu
        35                  40                  45

tgg ctt gca cgc att gat tgg gat gat gat aaa tac tac agc aca tct       192
Trp Leu Ala Arg Ile Asp Trp Asp Asp Asp Lys Tyr Tyr Ser Thr Ser
    50                  55                  60

ctg aag acc agg ctc acc atc tcc aag gac acc tcc aaa aac cag gtg       240
Leu Lys Thr Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val
65                  70                  75                  80

gtc ctt aca atg acc aac atg gac cct gtg gac aca gcc acg tat tac       288
Val Leu Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr
                85                  90                  95

tgt gca cgg atg caa ata gtg gct acg aca cag acc tac tac tac tac       336
Cys Ala Arg Met Gln Ile Val Ala Thr Thr Gln Thr Tyr Tyr Tyr Tyr
            100                 105                 110

tac ggt atg gac gtc tgg ggc caa ggg acc acg gtc acc gtc tcc tca       384
Tyr Gly Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
        115                 120                 125

gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag       432
Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
    130                 135                 140

agc acc tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac       480
Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
145                 150                 155                 160

ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc       528
Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
                165                 170                 175

ggc gtg cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc       576
Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
```

```
            180                 185                 190

ctc agc agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc       624
Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
        195                 200                 205

tac atc tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag       672
Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
    210                 215                 220

agt gag                                                              678
Ser Glu
225
```

<210> 2420
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2420

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gag gtg cag ctg gtg gag tct ggg gga ggc ttg gtc cag cct ggg ggg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt agt agc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

tgg atg acc tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtg       144
Trp Met Thr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gcc aac ata aag caa gat gga agt gag aaa tac tat gtg gac tct gtg       192
Ala Asn Ile Lys Gln Asp Gly Ser Glu Lys Tyr Tyr Val Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aat tcc aag aac tcg ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gct gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gcg ggc tac gat ctt ttc ggc tgg ttc gac ccc tgg ggc cag       336
Ala Arg Ala Gly Tyr Asp Leu Phe Gly Trp Phe Asp Pro Trp Gly Gln
            100                 105                 110

gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc       384
Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
```

```
        115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       432
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       624
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

ccc agc aac acc aag gtg gac aag aag ttg                               654
Pro Ser Asn Thr Lys Val Asp Lys Lys Leu
    210                 215

<210> 2421
<211> 376
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2421
gag gtg cag ctg ttg gag tct ggg gga ggc ttg gta cag cct ggg gga        48
Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gta gcc tct gga ttc acc ttt gcc agc tat        96
Ser Leu Arg Leu Ser Cys Val Ala Ser Gly Phe Thr Phe Ala Ser Tyr
            20                  25                  30

ggc atg gcc tgg gtc cgc cag gct cca ggg cag ggg ctg acc tgg atc       144
Gly Met Ala Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Thr Trp Ile
        35                  40                  45

tgt ttt gtt ggt agc ggt gac acc aca cac tac gcg gag tcc gtg aag       192
Cys Phe Val Gly Ser Gly Asp Thr Thr His Tyr Ala Glu Ser Val Lys
    50                  55                  60

ggc cgc ttc acc tgt tcc aga gac aac tcc aac aat aca ctt tat ctc       240
Gly Arg Phe Thr Cys Ser Arg Asp Asn Ser Asn Asn Thr Leu Tyr Leu
```

```
65                  70                  75                  80

cat atg agc ggt ctg aga ggc gca gac acg gcc aaa tat tac tgt gcg       288
His Met Ser Gly Leu Arg Gly Ala Asp Thr Ala Lys Tyr Tyr Cys Ala
                85                  90                  95

aaa ccc aac tcc cct ttc act ggc agt gga agt ttc cac aac tac ttt       336
Lys Pro Asn Ser Pro Phe Thr Gly Ser Gly Ser Phe His Asn Tyr Phe
            100                 105                 110

gac tac tgg ggc cag ggc gcg ctg gtc atc gtc tcc tca g                 376
Asp Tyr Trp Gly Gln Gly Ala Leu Val Ile Val Ser Ser
        115                 120                 125

<210> 2422
<211> 342
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2422
gt gag gtg cag gtg gtg gag tct ggg gga ggc ttg gga cag cct ggg         47
   Glu Val Gln Val Val Glu Ser Gly Gly Gly Leu Gly Gln Pro Gly
   1               5                  10                  15

ggg tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt agc        95
Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser
                20                  25                  30

tat agt atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg       143
Tyr Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp
            35                  40                  45

gtt tca tac att agt agt agt agt agt acc aaa tac tac gca gac tct       191
Val Ser Tyr Ile Ser Ser Ser Ser Ser Thr Lys Tyr Tyr Ala Asp Ser
        50                  55                  60

gtg aag ggc cga ttc acc atc tcc aga gac aat gcc aag aaa tca ctg       239
Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Lys Ser Leu
    65                  70                  75

tat ctg caa atg aac agc ctg aga gac gag gac acg gct gtg tat tac       287
Tyr Leu Gln Met Asn Ser Leu Arg Asp Glu Asp Thr Ala Val Tyr Tyr
80                  85                  90                  95

tgt gcg agt ccc gtt cga ccc tgg ggc cag gga acc ctg gtc acc gtc       335
Cys Ala Ser Pro Val Arg Pro Trp Gly Gln Gly Thr Leu Val Thr Val
                100                 105                 110

tcc tca g                                                             342
Ser Ser
```

<210> 2423
<211> 678
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2423
```
cag gtg cag ctg gtg cag tcc ggg gct gag atg aag aag cct ggg acc        48
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Met Lys Lys Pro Gly Thr
1               5                   10                  15

tca gtg aag gtc tcc tgc agg act tct gga tac atc ttc acc ggc tcc        96
Ser Val Lys Val Ser Cys Arg Thr Ser Gly Tyr Ile Phe Thr Gly Ser
            20                  25                  30

ttt atg cac tgg gtg cga cag gcc cct gca caa ggg ctc gag tgg atg       144
Phe Met His Trp Val Arg Gln Ala Pro Ala Gln Gly Leu Glu Trp Met
        35                  40                  45

gga tgg atc aac cct aag act ggt gcc aca tac tat aca gag aaa ttt       192
Gly Trp Ile Asn Pro Lys Thr Gly Ala Thr Tyr Tyr Thr Glu Lys Phe
    50                  55                  60

aag ggc agg gtc acc ctg acc agg gac acg tcc atc aac aca gcc tac       240
Lys Gly Arg Val Thr Leu Thr Arg Asp Thr Ser Ile Asn Thr Ala Tyr
65                  70                  75                  80

atg gag atg acc agc ctg aga tct gac gac acg gcc gtg tat tat tgt       288
Met Glu Met Thr Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gga ttt tgt gat ctt ccc gcc tgt tat ccc gta cct caa tac       336
Ala Arg Gly Phe Cys Asp Leu Pro Ala Cys Tyr Pro Val Pro Gln Tyr
            100                 105                 110

aac tgg ttc gac ccc tgg ggc cag gga acc ctg gtc acc gtc tcc tca       384
Asn Trp Phe Asp Pro Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125

gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag       432
Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
    130                 135                 140

agc acc tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac       480
Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
145                 150                 155                 160

ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc       528
Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
```

```
                165                 170                 175

ggc gtg cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc       576
Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
            180                 185                 190

ctc agc agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc       624
Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
        195                 200                 205

tac atc tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag       672
Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
    210                 215                 220

aga gtt                                                               678
Arg Val
225

<210> 2424
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2424
ccc gtg cag ctg cag gag tcg ggc cca gga ctt gtg aag cct tca cag        48
Pro Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gln
1               5                   10                  15

acc ctg tcc ctc acc tgc act gtc tct ggt ggc tcc atc agc agt ggt        96
Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Gly
            20                  25                  30

act tac tac tgg agc tgg atc cgg cag ccc gcc ggg aag gga ctg gag       144
Thr Tyr Tyr Trp Ser Trp Ile Arg Gln Pro Ala Gly Lys Gly Leu Glu
        35                  40                  45

tgg att ggg cgt atc tat gcc agt ggg agc acc aac tac aac ccc tcc       192
Trp Ile Gly Arg Ile Tyr Ala Ser Gly Ser Thr Asn Tyr Asn Pro Ser
    50                  55                  60

ctc aag agt cga gtc acc ata tca gta gac acg tcc aag aac cag ttc       240
Leu Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe
65                  70                  75                  80

tcc ctg aag ctg acc tct gtg acc gcc gca gac acg gcc gtg tat tac       288
Ser Leu Lys Leu Thr Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95

tgt gcg cga tat agt ggg agc tac cct ttg ggc ttt gac tac tgg ggc       336
Cys Ala Arg Tyr Ser Gly Ser Tyr Pro Leu Gly Phe Asp Tyr Trp Gly
```

```
            100                 105                 110

cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg       384
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg       432
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       480
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       528
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       576
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac       624
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

aag ccc agc aac acc aag gtg gac aag aag gtg                           657
Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215

<210> 2425
<211> 650
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2425
gc ggt gcc gag gtg cag ctg gtg cag tct gga gca gag gtg aaa aag         47
   Gly Ala Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys
   1               5                  10                  15

ccg ggg cag tct ctg aag atc tcc tgt aag ggt tct gga tac agc ttt        95
Pro Gly Gln Ser Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe
                20                  25                  30

acc aac tac tgg atc ggc tgg gtg cgc cag atg ccc ggg aaa ggc ctg       143
Thr Asn Tyr Trp Ile Gly Trp Val Arg Gln Met Pro Gly Lys Gly Leu
            35                  40                  45

gag tgg atg ggg atc atc tat cct ggt gac tct gat acc aga tac agc       191
Glu Trp Met Gly Ile Ile Tyr Pro Gly Asp Ser Asp Thr Arg Tyr Ser
```

```
        50                  55                  60

ccg tcc ttc caa ggc cag gtc acc atc tca gcc gac aag tcc atc agc       239
Pro Ser Phe Gln Gly Gln Val Thr Ile Ser Ala Asp Lys Ser Ile Ser
    65                  70                  75

acc gcc tac ctg cag tgg agc agc ctg aag gcc tcg gac acc gcc atg       287
Thr Ala Tyr Leu Gln Trp Ser Ser Leu Lys Ala Ser Asp Thr Ala Met
80                  85                  90                  95

tat tac tgt gcg aga cat gaa ggt gct ttt gat atc tgg ggc caa ggg       335
Tyr Tyr Cys Ala Arg His Glu Gly Ala Phe Asp Ile Trp Gly Gln Gly
                100                 105                 110

aca atg gtc acc gtc tct tca gcc tcc acc aag ggc cca tcg gtc ttc       383
Thr Met Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
            115                 120                 125

ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg       431
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
        130                 135                 140

ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg       479
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
    145                 150                 155

aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta       527
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
160                 165                 170                 175

cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc       575
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
                180                 185                 190

agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc       623
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
            195                 200                 205

agc aac acc aag gtg gac aag aag gtg                                   650
Ser Asn Thr Lys Val Asp Lys Lys Val
        210                 215
```

<210> 2426
<211> 364
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2426

```
gtg gtg cag ctg gtg gag tct ggg gga ggc ttg gta aag cct ggg ggg        48
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly
```

```
1               5                   10                  15

tcc ctt aga ctc tcc tgt gca gcc tct gga ttc act ttc agt aac gcc        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Ala
            20                  25                  30

tgg atg agc tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtt       144
Trp Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

ggc cgt att aaa agc aaa act gat ggt ggg aca aca gac tac act gca       192
Gly Arg Ile Lys Ser Lys Thr Asp Gly Gly Thr Thr Asp Tyr Thr Ala
    50                  55                  60

ccc gtg aaa ggc aga ttc acc atc tca aga gat gat tca aaa aac acg       240
Pro Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser Lys Asn Thr
65                  70                  75                  80

ctg tat ctg caa atg aac agc ctg aaa acc gag gac aca gcc gtg tat       288
Leu Tyr Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr
                85                  90                  95

tac tgt acc aca gat ctt gcg gtg act acg cga ttt gac tac tgg ggc       336
Tyr Cys Thr Thr Asp Leu Ala Val Thr Thr Arg Phe Asp Tyr Trp Gly
            100                 105                 110

cag gga acc ctg gtc acc gtc tcc tca g                                364
Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120

<210> 2427
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2427
cag gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg        48
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc ccc ttc agt acc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Pro Phe Ser Thr Tyr
            20                  25                  30

gct ctg cac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg       144
Ala Leu His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gca gtc ata tca aaa gat gga aac agc aaa tct tcc gca gag tcc gtg       192
Ala Val Ile Ser Lys Asp Gly Asn Ser Lys Ser Ser Ala Glu Ser Val
```

```
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aaa tcc agg aac aca ctt tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Lys Ser Arg Asn Thr Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga cct gaa gac acg gct gta tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Pro Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga agc aca cgt aca gac gct ttg gac gtc tgg ggc caa ggg acc       336
Ala Arg Ser Thr Arg Thr Asp Ala Leu Asp Val Trp Gly Gln Gly Thr
            100                 105                 110

acg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc       384
Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
        115                 120                 125

ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc       432
Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
    130                 135                 140

tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac       480
Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160

tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag       528
Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175

tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc       576
Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190

agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc agc       624
Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
        195                 200                 205

aac acc aag gtg gac aag aga gtg                                       648
Asn Thr Lys Val Asp Lys Arg Val
    210                 215
```

<210> 2428
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2428

```
gag gtg cag ctg gtg gag tcc ggg gga ggc ttg gtc cag cct ggg ggg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
```

```
1               5                   10                  15

tcc ttg aaa ctc tcc tgt gca gcc tct ggt ttc tcc ttc agt ggc tct        96
Ser Leu Lys Leu Ser Cys Ala Ala Ser Gly Phe Ser Phe Ser Gly Ser
            20                  25                  30

tct gtg cac tgg gtc cgc cag gct tcc ggg aaa ggg ctg gag tgg gtt       144
Ser Val His Trp Val Arg Gln Ala Ser Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

ggc cgt att aga agc aaa act aag aat tac gcg aca gca tat gct gcg       192
Gly Arg Ile Arg Ser Lys Thr Lys Asn Tyr Ala Thr Ala Tyr Ala Ala
    50                  55                  60

tcg gtg aaa ggc agg ttc acc atc tcc aga gat gat tca aag aac acg       240
Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser Lys Asn Thr
65                  70                  75                  80

gcg ttt ctg caa atg cgc agc ctg aaa gcc gag gac acg gcc gta tat       288
Ala Phe Leu Gln Met Arg Ser Leu Lys Ala Glu Asp Thr Ala Val Tyr
                85                  90                  95

tac tgt gct aaa aat gac gag atg gac ttt aag ggc tat gac tac tgg       336
Tyr Cys Ala Lys Asn Asp Glu Met Asp Phe Lys Gly Tyr Asp Tyr Trp
            100                 105                 110

ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca       384
Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca       432
Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
    130                 135                 140

gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg       480
Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg       528
Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc       576
Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat       624
Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
        195                 200                 205

cac aag ccc agc aac acc aag gtg gac aag aag gtg                       660
His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220
```

<210> 2429
<211> 641
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2429
cc cag gtg cag ctg cag gag tcg ggc cca gga ctg gtg aag cct tcg 47
Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser
1 5 10 15

gag acc ctg tcc ctc acc tgc act gtc tct ggt ggc tcc atc agt agt 95
Glu Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser
20 25 30

tat tac tgg agc tgg atc cgg cag ccc gcc ggg aag gga ctg gag tgg 143
Tyr Tyr Trp Ser Trp Ile Arg Gln Pro Ala Gly Lys Gly Leu Glu Trp
35 40 45

att ggg cgt atc tac acc agt ggg agc acc aac tac aac ccc tcc ctc 191
Ile Gly Arg Ile Tyr Thr Ser Gly Ser Thr Asn Tyr Asn Pro Ser Leu
50 55 60

aag agt cga gtc acc atg tca gta gac acg tcc aag aac cag ttc tcg 239
Lys Ser Arg Val Thr Met Ser Val Asp Thr Ser Lys Asn Gln Phe Ser
65 70 75

ctg aag atg agc tct gtg acc gcc gcg gac acg gcc gtg tat tac tgt 287
Leu Lys Met Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys
80 85 90 95

gcg aga ggg gag tta tta ttc gac cac tgg ggc cag gga acg ctg gtc 335
Ala Arg Gly Glu Leu Leu Phe Asp His Trp Gly Gln Gly Thr Leu Val
100 105 110

acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg gca 383
Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala
115 120 125

ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg ggc tgc ctg 431
Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu
130 135 140

gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca ggc 479
Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly
145 150 155

gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta cag tcc tca 527
Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser
160 165 170 175

```
gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc agc agc ttg       575
Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu
                180                 185                 190

ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc agc aac acc       623
Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr
            195                 200                 205

aag gtg gac aag aat gtg                                               641
Lys Val Asp Lys Asn Val
        210
```

<210> 2430
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2430

```
gag gtg cag ctg gtg gag tct ggg gga ggc ttg gtg cag cca ggg cgg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gta gct tct gga ttc acc ttt ggt gat tat        96
Ser Leu Arg Leu Ser Cys Val Ala Ser Gly Phe Thr Phe Gly Asp Tyr
            20                  25                  30

gct gtg aac tgg ttc cgc cag gct cca ggg aag ggc ctg gaa tgg gtt       144
Ala Val Asn Trp Phe Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

ggt ttc att agt acc aaa ggt tat gat gag aca gca gaa tat gcc gcg       192
Gly Phe Ile Ser Thr Lys Gly Tyr Asp Glu Thr Ala Glu Tyr Ala Ala
    50                  55                  60

tct gtg aag ggc aga ttt acc atg tca aga gat gac tcc aaa aac atc       240
Ser Val Lys Gly Arg Phe Thr Met Ser Arg Asp Asp Ser Lys Asn Ile
65                  70                  75                  80

gcc tat ctg ctg atg gac agc ctg aaa gcc gag gac aca gcc atg tat       288
Ala Tyr Leu Leu Met Asp Ser Leu Lys Ala Glu Asp Thr Ala Met Tyr
                85                  90                  95

tat tgt gct aga gaa tct acg gtg gtt ctt gac ttc tgg ggc cag ggg       336
Tyr Cys Ala Arg Glu Ser Thr Val Val Leu Asp Phe Trp Gly Gln Gly
            100                 105                 110

acc ctg gtc gcc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc       384
Thr Leu Val Ala Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125
```

```
ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg       432
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140

ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg       480
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160

aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta       528
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc       576
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190

agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc       624
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205

agc aac acc aag gtg gac aag aaa gtg                                   651
Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215
```

<210> 2431
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2431

```
cag gtg cag ctg gtg gac tct ggg gga ggc gtg gtc cag ccg ggg ggg        48
Gln Val Gln Leu Val Asp Ser Gly Gly Gly Val Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcg tcg gga ttc acc ctc agt aac tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Leu Ser Asn Tyr
            20                  25                  30

ggc atg aac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg       144
Gly Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gca ttt ata ccg tat gat gga agt aat aaa tac tac gca gac tcc gtg       192
Ala Phe Ile Pro Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac att tcc aag aac aca ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Ile Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80
```

```
ctg caa atg aac agc ctg aga act gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Thr Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aaa agg tca aca gca gtg ggg gac ttc gac ccc tgg ggc cag gga       336
Ala Lys Arg Ser Thr Ala Val Gly Asp Phe Asp Pro Trp Gly Gln Gly
            100                 105                 110

acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc ttc       384
Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125

ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc ctg       432
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140

ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg tgg       480
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160

aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc cta       528
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175

cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc tcc       576
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190

agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag ccc       624
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205

agc aac acc aag gtg gac aag aag gtg                                   651
Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215

<210> 2432
<211> 675
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2432
gag gtg cag ctg gtg gag tct ggg gga ggc ttg gta cag ccg ggg ggg        48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc agc atc act acc cat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Ser Ile Thr Thr His
            20                  25                  30
```

```
agc atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg cag tgg gtt       144
Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Gln Trp Val
        35                  40                  45

gca tac atc agt act agt aca agt acc ata tac tac gca gac tct gtg       192
Ala Tyr Ile Ser Thr Ser Thr Ser Thr Ile Tyr Tyr Ala Asp Ser Val
    50                  55                  60

gag ggc cga ttc acc atc tcg aga gac aag gcc aag aac gca ctg tat       240
Glu Gly Arg Phe Thr Ile Ser Arg Asp Lys Ala Lys Asn Ala Leu Tyr
65                  70                  75                  80

cta caa atg gac agc ctg aga gcc cag gac acg gct gta tat tac tgt       288
Leu Gln Met Asp Ser Leu Arg Ala Gln Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg cgg ggg ccg tcc aac tgg aac ggg ggt ccg gag cac atg gac gtc       336
Ala Arg Gly Pro Ser Asn Trp Asn Gly Gly Pro Glu His Met Asp Val
            100                 105                 110

tgg ggc aaa ggg acc acg gtc acc gtc tcc tca gca tcc ccg acc agc       384
Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser Ala Ser Pro Thr Ser
        115                 120                 125

ccc aag gtc ttc ccg ctg agc ctc gac agc acc ccc caa gat ggg aac       432
Pro Lys Val Phe Pro Leu Ser Leu Asp Ser Thr Pro Gln Asp Gly Asn
    130                 135                 140

gtg gtc gtc gca tgc ctg gtc cag ggc ttc ttc ccc cag gag cca ctc       480
Val Val Val Ala Cys Leu Val Gln Gly Phe Phe Pro Gln Glu Pro Leu
145                 150                 155                 160

agt gtg acc tgg agc gaa agc gga cag aac gtg acc gcc aga aac ttc       528
Ser Val Thr Trp Ser Glu Ser Gly Gln Asn Val Thr Ala Arg Asn Phe
                165                 170                 175

cca cct agc cag gat gcc tcc ggg gac ctg tac acc acg agc agc cag       576
Pro Pro Ser Gln Asp Ala Ser Gly Asp Leu Tyr Thr Thr Ser Ser Gln
            180                 185                 190

ctg acc ctg ccg gcc aca cag tgc cca gac ggc aag tcc gtg aca tgc       624
Leu Thr Leu Pro Ala Thr Gln Cys Pro Asp Gly Lys Ser Val Thr Cys
        195                 200                 205

cac gtg aag cac tac acg aat ccc agc cag gat gtg act gtg ccc tgc       672
His Val Lys His Tyr Thr Asn Pro Ser Gln Asp Val Thr Val Pro Cys
    210                 215                 220

cca                                                                   675
Pro
225
```

<210> 2433
<211> 633

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VH chain

<400> 2433
gtg gtg cag ctg gtg gag tct ggg gga ggc ttg gta cag cct gga ggg 48
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt agt tat 96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
20 25 30

gag atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtt 144
Glu Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

tca tac att agt agt agt ggt agt acc ata tac tac gca gac tct gtg 192
Ser Tyr Ile Ser Ser Ser Gly Ser Thr Ile Tyr Tyr Ala Asp Ser Val
50 55 60

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tca ctg tat 240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65 70 75 80

ctg caa atg aac agc ctg aga gcc gag gac acg gct gtt tat tac tgt 288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

gcg aga gat ttt gac tac tgg ggc cag gga acc ctg gtc acc gtc tcc 336
Ala Arg Asp Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser
100 105 110

tca gcc tcc acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc 384
Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser
115 120 125

aag agc acc tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac 432
Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp
130 135 140

tac ttc ccc gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc 480
Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr
145 150 155 160

agc ggc gtg cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac 528
Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr
165 170 175

tcc ctc agc agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag 576
Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln

```
            180                 185                 190

acc tac atc tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac       624
Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp
        195                 200                 205

aag aat gtg                                                           633
Lys Asn Val
    210
```

<210> 2434
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2434

```
gtg gtg cag ctg gtg gag tct ggg gga ggc ttg gta cag cct ggg ggg        48
Val Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttc agt agc tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30

agc atg aac tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtt       144
Ser Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca tac att agt agt agt agt agt acc ata tac tac gca gac tct gtg       192
Ser Tyr Ile Ser Ser Ser Ser Ser Thr Ile Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aat gcc aag aac tca ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gac gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Asp Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gat ccc tat ggt tcg ggg acg gtc tgg ttc gac ccc tgg ggc       336
Ala Arg Asp Pro Tyr Gly Ser Gly Thr Val Trp Phe Asp Pro Trp Gly
            100                 105                 110

cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg       384
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125

gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg       432
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
```

```
    130                 135                 140

gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg       480
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160

tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct       528
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175

gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg       576
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190

ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac       624
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205

aag ccc agc aac acc aag gtg gac aag aat gtg                           657
Lys Pro Ser Asn Thr Lys Val Asp Lys Asn Val
    210                 215

<210> 2435
<211> 672
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2435
gag gca cag ttg gtg gag tct gga gga ggc ttg atc cag ccg ggg ggg        48
Glu Ala Gln Leu Val Glu Ser Gly Gly Gly Leu Ile Gln Pro Gly Gly
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcc tct ggg ttc agc gtc agt agc aag        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Ser Val Ser Ser Lys
            20                  25                  30

tac atg agc tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtc       144
Tyr Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

tca gtt atg tac agt ggt ggc gcc aca tac tac gca gat tcc gtg aag       192
Ser Val Met Tyr Ser Gly Gly Ala Thr Tyr Tyr Ala Asp Ser Val Lys
    50                  55                  60

ggc cga ttc gtc atc tcc aga gac agt tcc aag aac acg gta ttt ctt       240
Gly Arg Phe Val Ile Ser Arg Asp Ser Ser Lys Asn Thr Val Phe Leu
65                  70                  75                  80

caa atg aac agc ctg aga gcc gag gac acg gcc gtt tat tac tgt gcg       288
Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala
```

```
                85                  90                  95

aaa act gag tac act ttt ttg agt ggc tcc gac tac tac cag tac ggt       336
Lys Thr Glu Tyr Thr Phe Leu Ser Gly Ser Asp Tyr Tyr Gln Tyr Gly
            100                 105                 110

atg gac gtc tgg ggc caa ggg aca acg gtc acc gtc tcc tca gcc tcc       384
Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser
        115                 120                 125

acc aag ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc       432
Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr
    130                 135                 140

tct ggg ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc       480
Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
145                 150                 155                 160

gaa ccg gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg       528
Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
                165                 170                 175

cac acc ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc       576
His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
            180                 185                 190

agc gtg gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc       624
Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile
        195                 200                 205

tgc aac gtg aat cac aag ccc agc aac acc aag gtg gac aag aga gtg       672
Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
    210                 215                 220
```

<210> 2436
<211> 663
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2436

```
ccg gtg cag ctg gtg cag tct gga gca gag gtg aaa aag ccg ggg gag        48
Pro Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1               5                   10                  15

tct ctg aag atc tcc tgt aag ggt tct gga tac agc ttt acc aac tac        96
Ser Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Thr Asn Tyr
            20                  25                  30

tgg atc ggc tgg gtg cgc cag atg ccc ggg aaa ggc ctg gag tgg atg       144
Trp Ile Gly Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Trp Met
```

```
        35                  40                  45

ggg atc atc tat cct ggt gac tct gat acc aga tac agc ccg tcc ttc       192
Gly Ile Ile Tyr Pro Gly Asp Ser Asp Thr Arg Tyr Ser Pro Ser Phe
    50                  55                  60

caa ggc cag gtc acc atc tca gcc gac aag tcc atc agc acc gcc tac       240
Gln Gly Gln Val Thr Ile Ser Ala Asp Lys Ser Ile Ser Thr Ala Tyr
65                  70                  75                  80

ctt cag tgg agc agc ctg aag gcc tcg gac acc gcc atg tat tac tgt       288
Leu Gln Trp Ser Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr Tyr Cys
                85                  90                  95

gcg aga cgg ggg tta ttg cgt ggg agc aac gag gga agg ttt gac tac       336
Ala Arg Arg Gly Leu Leu Arg Gly Ser Asn Glu Gly Arg Phe Asp Tyr
            100                 105                 110

tgg ggc cag gga acc ctg gtc acc gtc tcc tca gcc tcc acc aag ggc       384
Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125

cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc       432
Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly
    130                 135                 140

aca gca gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg       480
Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val
145                 150                 155                 160

acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc       528
Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe
                165                 170                 175

ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg       576
Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            180                 185                 190

acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg       624
Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
        195                 200                 205

aat cac aag ccc agc aac acc aag gtg gac aag aag gtg                   663
Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215                 220

<210> 2437
<211> 666
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain
```

<400> 2437

```
gtg gtg cag ctg gtg gag tcc ggg gga gac ttg gtc cag cct ggg ggg        48
Val Val Gln Leu Val Glu Ser Gly Gly Asp Leu Val Gln Pro Gly Gly
1               5                  10                  15

tcc ctg aaa ctc tcc tgt gca gcc tct ggg ttc acc ttc agt ggc tct        96
Ser Leu Lys Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Gly Ser
            20                  25                  30

gct atg cac tgg gtc cgc cag gct tcc ggg aaa ggg ctg gag tgg gtt       144
Ala Met His Trp Val Arg Gln Ala Ser Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

ggc cgt att aga agt aaa cct aac agt tac gcg aca gca tat gct gtg       192
Gly Arg Ile Arg Ser Lys Pro Asn Ser Tyr Ala Thr Ala Tyr Ala Val
    50                  55                  60

tcg gtg aaa ggc agg ttc acc atc tcc aga gat gat tca aag aac acg       240
Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser Lys Asn Thr
65                  70                  75                  80

gcg tat ctg caa atg aac agc ctg aaa acc gag gac acg gcc gta tat       288
Ala Tyr Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Val Tyr
                85                  90                  95

tat tgt act aga cgc ggc agt gcc tgg acg gac ccc tac tac acg gac       336
Tyr Cys Thr Arg Arg Gly Ser Ala Trp Thr Asp Pro Tyr Tyr Thr Asp
            100                 105                 110

gtc tgg ggc aaa ggg acc acg gtc acc gtc tcc tca gcc tcc acc aag       384
Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys
        115                 120                 125

ggc cca tcg gtc ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg       432
Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
    130                 135                 140

ggc aca gcg gcc ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg       480
Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
145                 150                 155                 160

gtg acg gtg tcg tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc       528
Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
                165                 170                 175

ttc ccg gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg       576
Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
            180                 185                 190

gtg acc gtg ccc tcc agc agc ttg ggc acc cag acc tac atc tgc aac       624
Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
        195                 200                 205
```

```
gtg aat cac aag ccc agc aac acc aag gtg gac aag aga gag              666
Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Glu
    210                 215                 220

<210> 2438
<211> 666
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VH chain

<400> 2438
tcg gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg       48
Ser Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcg tct gga ttc acc ttc agt gac tat       96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asp Tyr
            20                  25                  30

ggc atg cac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg      144
Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gca gtt ata tgg tat gat gga agt aat gag tac tat gca gac tcc gtg      192
Ala Val Ile Trp Tyr Asp Gly Ser Asn Glu Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aat tcc aag aac acg gtt tat      240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Val Tyr
65                  70                  75                  80

ctg caa atg aac agc cta gga gcc gag gac acg gct gta tat tac tgt      288
Leu Gln Met Asn Ser Leu Gly Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gat gat gtc cct agg ggt tat gac tac tgg ggc cag gga acc      336
Ala Arg Asp Asp Val Pro Arg Gly Tyr Asp Tyr Trp Gly Gln Gly Thr
            100                 105                 110

ctg gtc acc gtc tcc tca ggg agt gca tcc gcc cca acc ctt ttc ccc      384
Leu Val Thr Val Ser Ser Gly Ser Ala Ser Ala Pro Thr Leu Phe Pro
        115                 120                 125

ctc gtc tcc tgt gag aat tcc ccg tcg gat acg agc agc gtg gcc gtt      432
Leu Val Ser Cys Glu Asn Ser Pro Ser Asp Thr Ser Ser Val Ala Val
    130                 135                 140

ggc tgc ctc gca cag gac ttc ctt ccc gac tcc atc act ttc tcc tgg      480
Gly Cys Leu Ala Gln Asp Phe Leu Pro Asp Ser Ile Thr Phe Ser Trp
145                 150                 155                 160
```

```
aaa tac aag aac aac tct gac atc agc agc acc cgg ggc ttc cca tca       528
Lys Tyr Lys Asn Asn Ser Asp Ile Ser Ser Thr Arg Gly Phe Pro Ser
                165                 170                 175

gtc ctg aga ggg ggc aag tac gca gcc acc tca cag gtg ctg ctg cct       576
Val Leu Arg Gly Gly Lys Tyr Ala Ala Thr Ser Gln Val Leu Leu Pro
            180                 185                 190

tcc aag gac gtc atg cag ggc aca gac gaa cac gtg gtg tgc aaa gtc       624
Ser Lys Asp Val Met Gln Gly Thr Asp Glu His Val Val Cys Lys Val
        195                 200                 205

cag cac ccc aac ggc aac aaa gaa aag aac gtg cct ctt cca               666
Gln His Pro Asn Gly Asn Lys Glu Lys Asn Val Pro Leu Pro
    210                 215                 220
```

<210> 2439
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VH chain

<400> 2439

```
tca gtg cag ctg gtg gag tct ggg gga ggc gtg gtc cag cct ggg agg        48
Ser Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15

tcc ctg aga ctc tcc tgt gca gcg tct gga tac acc ttc aat aac tat        96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Tyr Thr Phe Asn Asn Tyr
            20                  25                  30

ggc atg cac tgg gtc cgc cag gct cca ggc aag ggg ctg gag tgg gtg       144
Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

gca att ata tgg tat gat gga agt aat aaa tac tat gca gac tcc gtg       192
Ala Ile Ile Trp Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val
    50                  55                  60

aag ggc cga ttc acc atc tcc aga gac aat tcc aag aac acg ctg tat       240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

ctg caa atg aac agc ctg aga gcc gag gac acg gct gtg tat tac tgt       288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

gcg aga gag tac att gta ccc ttc tac ggt atg gac gtc tgg ggc caa       336
Ala Arg Glu Tyr Ile Val Pro Phe Tyr Gly Met Asp Val Trp Gly Gln
            100                 105                 110
```

```
ggg acc acg gtc acc gtc tcc tca gcc tcc acc aag ggc cca tcg gtc       384
Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115                 120                 125

ttc ccc ctg gca ccc tcc tcc aag agc acc tct ggg ggc aca gcg gcc       432
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130                 135                 140

ctg ggc tgc ctg gtc aag gac tac ttc ccc gaa ccg gtg acg gtg tcg       480
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
145                 150                 155                 160

tgg aac tca ggc gcc ctg acc agc ggc gtg cac acc ttc ccg gct gtc       528
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175

cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc gtg ccc       576
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190

tcc agc agc ttg ggc acc cag acc tac atc tgc aac gtg aat cac aag       624
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205

ccc agc aac acc aag gtg gac aag aag gtg                               654
Pro Ser Asn Thr Lys Val Asp Lys Lys Val
    210                 215

<210> 2440
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2440
gc gac atc cag atg acc cag tct cca tct tcc ctg tct gca tct gtg         47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
   1               5                  10                  15

gga gac aga gtc agc atc act tgt cgg gcg agt cag ggt gtt agc agc        95
Gly Asp Arg Val Ser Ile Thr Cys Arg Ala Ser Gln Gly Val Ser Ser
                20                  25                  30

tac tta gcc tgg tat caa aag aaa cca ggg aga gcc cct aaa ctc ctg       143
Tyr Leu Ala Trp Tyr Gln Lys Lys Pro Gly Arg Ala Pro Lys Leu Leu
            35                  40                  45

atc tat agt gca tcc agt ttg caa agt ggg gtc cca tca agg ttc agc       191
Ile Tyr Ser Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60
```

```
ggc agt gga tct ggg aca gat ttc act ctc acc atc acc ggc ctg cag       239
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Thr Gly Leu Gln
    65                  70                  75

cct gaa gat ttt gca act tac ttt tgt caa cag act aac act ttc ccc       287
Pro Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Thr Asn Thr Phe Pro
80                  85                  90                  95

ctc act ttc ggc gga ggg acc aag gtg gag atc aaa cga act gtg gct       335
Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
                100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa ctc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgt                                          644
Ser Phe Asn Arg Gly Glu Cys
        210

<210> 2441
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2441
gt gac atc cag atg acc cag tct cca tcc tcc ctg tct gca tct gtt         47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
   1               5                  10                  15
```

```
gga gac aga gtc acc atc act tgc cgg gca agt cag agc att ggc agc        95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Gly Ser
               20                  25                  30

tat tta aat tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg       143
Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
            35                  40                  45

atc tat gct gca tcc agt ttg caa agt ggg gtc cca tca agg ttc agt       191
Ile Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60

ggc agt gga tct ggg aca gat ttc act ctc acc atc agc agt ctg caa       239
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln
    65                  70                  75

cct gaa gat ttt gca act tac tac tgt caa cag agt tac agt acc cct       287
Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Pro
80                  85                  90                  95

ccg cgt ttt ggc cag ggg acc aag ctg gag atc aaa cga act gtg gct       335
Pro Arg Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala
               100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
               180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgt                                          644
Ser Phe Asn Arg Gly Glu Cys
        210
```

<210> 2442
<211> 644

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2442
gc gac atc cag atg acc cag tct cca tct tac gtg tct gca tct gta 47
Asp Ile Gln Met Thr Gln Ser Pro Ser Tyr Val Ser Ala Ser Val
1 5 10 15

gga gac aga gtc acc atc act tgt cgg gcg agt cag ggt att gac gtc 95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Gly Ile Asp Val
20 25 30

tgg ttg gcc tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg 143
Trp Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
35 40 45

atc tat act gca tcc agt tta caa agt ggg gtc cca tca agg ttt agc 191
Ile Tyr Thr Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser
50 55 60

ggc agt gga ggt ggg aca gaa ttc act ctc acc atc agc agc ctg cag 239
Gly Ser Gly Gly Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln
65 70 75

ccc gag gat ttt gca act tac tat tgt caa cag tct aac agt ttc ccc 287
Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Asn Ser Phe Pro
80 85 90 95

ggg act ttc ggc cct ggg acc aaa gtg gat gtc aaa cga act gtg gct 335
Gly Thr Phe Gly Pro Gly Thr Lys Val Asp Val Lys Arg Thr Val Ala
100 105 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct 383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
115 120 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag 431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
130 135 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc 479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145 150 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc 527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160 165 170 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc 575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val

```
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgt                                           644
Ser Phe Asn Arg Gly Glu Cys
        210
```

<210> 2443
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2443

```
ccg tct gtg ctg act cag cca ccc tca gcg tct ggg acc ccc ggg cag        48
Pro Ser Val Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Pro Gly Gln
1               5                   10                  15

agg gtc acc atc tct tgt tct gga agc agt tcc aac atc gga agt aat        96
Arg Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Ser Asn
            20                  25                  30

tat gta tac tgg tac cag cag ctc cca gga acg gcc ccc aaa ttc ctc       144
Tyr Val Tyr Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Phe Leu
        35                  40                  45

atc tat agg aat aat cag cgg ccc tca ggg gtc cct gac cga ttc tct       192
Ile Tyr Arg Asn Asn Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
    50                  55                  60

ggc tcc aag tct ggc acc tca gcc tcc ctg gcc atc agt ggg ctc cgg       240
Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Arg
65                  70                  75                  80

tcc gag gat gag gct gat tat tac tgt gca gca tgg gag gac agc ctg       288
Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ala Trp Glu Asp Ser Leu
                85                  90                  95

agt ggt ccg gtg ttc ggc gga ggg acc aag ctg acc gtc cta g             331
Ser Gly Pro Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110
```

<210> 2444
<211> 636
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2444

```
tct tct gag ctg act cag gac cct gct gtg tct gtg gcc ttg gga cag        48
Ser Ser Glu Leu Thr Gln Asp Pro Ala Val Ser Val Ala Leu Gly Gln
1               5                  10                  15

aca gtc agg atc aca tgc caa gga gac agc ctc aga aac tat tat gca        96
Thr Val Arg Ile Thr Cys Gln Gly Asp Ser Leu Arg Asn Tyr Tyr Ala
            20                  25                  30

agt tgg ttc cag cag aag cca gga cag gcc cct gta ctt gtc atc ttt       144
Ser Trp Phe Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Phe
        35                  40                  45

ggt aaa aac tac cgg ccc tcc ggg atc cca gac cga ttc tct ggc tcc       192
Gly Lys Asn Tyr Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly Ser
    50                  55                  60

aac tca gga aac aca gct tcc ctg acc atc act ggg gct cag gcg gaa       240
Asn Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala Glu
65                  70                  75                  80

gat gag gcc gac tac tac tgt aac tcc cgg gac agg agt ggt tat gtc       288
Asp Glu Ala Asp Tyr Tyr Cys Asn Ser Arg Asp Arg Ser Gly Tyr Val
                85                  90                  95

ttc gga tcc ggg acc aag gtc acc gtc cta ggt cag ccc aag gcc aac       336
Phe Gly Ser Gly Thr Lys Val Thr Val Leu Gly Gln Pro Lys Ala Asn
            100                 105                 110

ccc act gtc act ctg ttc ccg ccc tcc tct gag gag ctc caa gcc aac       384
Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125

aag gcc aca cta gtg tgt ctg atc agt gac ttc tac ccg gga gct gtg       432
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130                 135                 140

aca gtg gcc tgg aag gca gat ggc agc ccc gtc aag gcg gga gtg gag       480
Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys Ala Gly Val Glu
145                 150                 155                 160

acc acc aaa ccc tcc aaa cag agc aac aac aag tac gcg gcc agc agc       528
Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175

tac ctg agc ctg acg ccc gag cag tgg aag tcc cac aga agc tac agc       576
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190

tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg gcc cct       624
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
```

```
        195                 200                 205

aca gaa tgt tca                                                     636
Thr Glu Cys Ser
    210
```

<210> 2445
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2445

```
ctc tat gtg ctg act cag cca ccc tca gtg tca gtg gcc cca gga acg      48
Leu Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Thr
1               5                   10                  15

acg gcc tgg att tcc tgt ggg gga aac aac att gga att aaa agt gtc      96
Thr Ala Trp Ile Ser Cys Gly Gly Asn Asn Ile Gly Ile Lys Ser Val
            20                  25                  30

cac tgg tac cag cag aag cca ggc cag gcc cct ctg ttg gtc atc tct     144
His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Leu Leu Val Ile Ser
        35                  40                  45

tat gat agc gac cgg ccc tca gtg atc cct gag cga ttc tct gtc tcc     192
Tyr Asp Ser Asp Arg Pro Ser Val Ile Pro Glu Arg Phe Ser Val Ser
    50                  55                  60

aac tct ggg aac acg gtc acc ctg acc atc agc agg gtc gaa gcc ggg     240
Asn Ser Gly Asn Thr Val Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65                  70                  75                  80

gat gaa gcc gac tat tac tgt cag gtg tgg gat aat ggt cat tct cat     288
Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Asn Gly His Ser His
                85                  90                  95

tgg gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag ccc aag     336
Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
            100                 105                 110

gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag ctt caa     384
Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
        115                 120                 125

gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga     432
Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
    130                 135                 140

gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga     480
Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
```

```
145                 150                 155                 160

gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc       528
Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
                165                 170                 175

agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac aga agc       576
Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser
            180                 185                 190

tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg       624
Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
        195                 200                 205

gcc cct aca gaa tgt tca                                              642
Ala Pro Thr Glu Cys Ser
    210

<210> 2446
<211> 319
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2446
gac atc cag atg acc cag tct cca tcc tcc ctg tct gca tct gta gga        48
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

gac aga gtc acc atc act tgc cgg gca agt cag agc ata agc agt tat        96
Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Tyr
            20                  25                  30

tta aat tgg tat cag caa aaa ccc ggg aga gcc cct agg ctc ctg atc       144
Leu Asn Trp Tyr Gln Gln Lys Pro Gly Arg Ala Pro Arg Leu Leu Ile
        35                  40                  45

tat gct gca tcc agg ttg caa att ggg gtc cca tca agg ttc agt ggc       192
Tyr Ala Ala Ser Arg Leu Gln Ile Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

agt gga tct ggg aca gat ttc act ctc acc atc agc agt ctg cag cct       240
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

gaa gat ttt gca act tac tac tgt caa cag agt tac aga atg cct tgc       288
Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Arg Met Pro Cys
                85                  90                  95

agt ttt ggc cag ggg acc aag ctg gag atc a                            319
Ser Phe Gly Gln Gly Thr Lys Leu Glu Ile
```

```
            100                 105

<210> 2447
<211> 650
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2447
ga gaa att gtg ttg acg cag tct cca ggc acc ctg tct ttg tct cca         47
   Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro
   1               5                  10                  15

ggg gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc agc        95
Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser
                20                  25                  30

agc tac tta gcc tgg tac cag cag aaa cct ggc cag gct ccc agg ctc       143
Ser Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu
            35                  40                  45

ctc atc tat gat gca tcc agc agg gcc act ggc atc cca gac agg ttc       191
Leu Ile Tyr Asp Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe
        50                  55                  60

agt ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc aga ctg       239
Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu
    65                  70                  75

gag cct gaa gat ttt gca gtg tat tac tgt cag cag tat ggt agc tca       287
Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser
80                  85                  90                  95

cct ccc atc acc ttc ggc caa ggg aca cga ctg gag att aaa cga act       335
Pro Pro Ile Thr Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys Arg Thr
                100                 105                 110

gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg       383
Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu
            115                 120                 125

aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc       431
Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro
        130                 135                 140

aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt       479
Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly
    145                 150                 155

aac tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac       527
Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr
```

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160                 165                 170                 175

agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac       575
Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His
                180                 185                 190

aaa ctc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc       623
Lys Leu Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val
            195                 200                 205

aca aag agc ttc aac agg gga gag tgt                                   650
Thr Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215

<210> 2448
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2448
cat ttt atg ctg act cag ccc cac tct gtg tcg gag tct ccg ggg aag        48
His Phe Met Leu Thr Gln Pro His Ser Val Ser Glu Ser Pro Gly Lys
1               5                   10                  15

acg gta acc atc tcc tgc acc cgc agc agt ggc aac att gcc agc tac        96
Thr Val Thr Ile Ser Cys Thr Arg Ser Ser Gly Asn Ile Ala Ser Tyr
            20                  25                  30

tat gtg cag tgg tat cag cag cgc ccg ggc agt gcc ccc acc act gtg       144
Tyr Val Gln Trp Tyr Gln Gln Arg Pro Gly Ser Ala Pro Thr Thr Val
        35                  40                  45

atc tat gag gat gac caa aga cct tct ggg gtc cct gat cgg ttc tct       192
Ile Tyr Glu Asp Asp Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
    50                  55                  60

gcc tcc atc gac agc tcc tcc aac tct gcc tcc ctc acc atc tct gga       240
Ala Ser Ile Asp Ser Ser Ser Asn Ser Ala Ser Leu Thr Ile Ser Gly
65                  70                  75                  80

ctg aag act gag gac gag gct gac tat tat tgt cag tct tat gat aca       288
Leu Lys Thr Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Thr
                85                  90                  95

acc aat gtg ata ttc ggc gga ggg acc aag ctg acc gtg ctc g              331
Thr Asn Val Ile Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110

<210> 2449
<211> 645
```

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2449
```
gaa att gtt ttg acg cag tct cca ggc acc ctg tct ttg tct cca ggg        48
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc agc agt        96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Ser
            20                  25                  30

tac tta gcc tgg tat cag cag aaa cct ggc cag gct ccc agg ctc ctc       144
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

atc ttt ggt gca tcc acc agg gcc tct ggc atc cca gac agg ttc agt       192
Ile Phe Gly Ala Ser Thr Arg Ala Ser Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

ggc cgt ggg tct ggg aca gag ttc act ctc acc atc agc aga ctg gag       240
Gly Arg Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

cct gaa gat ttt gca gtg tat tac tgt caa cag tat gat agt tca ccc       288
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Asp Ser Ser Pro
                85                  90                  95

ttc act ttc ggc cct ggg acc aag gtg gag atc aaa cga act gtg gct       336
Phe Thr Phe Gly Pro Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
            100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       384
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       432
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       480
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       528
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa ctc       576
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu
```

```
            180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       624
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

agc ttc aac agg gga gag tgt                                       645
Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 2450
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2450

```
ccg tct gtg ttg acg cag ccg ccc tca gtg tct gcg gcc cca gga cag        48
Pro Ser Val Leu Thr Gln Pro Pro Ser Val Ser Ala Ala Pro Gly Gln
1               5                   10                  15

aac gtc acc att tcc tgc tct gga agt agc tcc aat att gag aat aat        96
Asn Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Glu Asn Asn
            20                  25                  30

gat gta tcc tgg tac cag cag ctc cca gga aca gcc ccc aaa gtc atc       144
Asp Val Ser Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Val Ile
        35                  40                  45

atc tat gaa aat aat cag cga ccc tca ggg att cct gac cga ttc tct       192
Ile Tyr Glu Asn Asn Gln Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

ggc tcc aag tct ggc acg tca gcc acc ctg ggc atc acc gga ctc cag       240
Gly Ser Lys Ser Gly Thr Ser Ala Thr Leu Gly Ile Thr Gly Leu Gln
65                  70                  75                  80

act ggg gac gag gcc gat tat tac tgc gga aca tgg gat gac aac ctg       288
Thr Gly Asp Glu Ala Asp Tyr Tyr Cys Gly Thr Trp Asp Asp Asn Leu
                85                  90                  95

agt gct gta ttc ggc gga ggg acc aaa ctg acc gtc cta ggt cag ccc       336
Ser Ala Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro
            100                 105                 110

aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag ctt       384
Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu
        115                 120                 125

caa gcc aac aag gcc aca ctg gtc tgt ctc ata agt gac ttc tac ccg       432
Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro
```

```
    130                 135                 140

gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg       480
Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala
145                 150                 155                 160

gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg       528
Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala
                165                 170                 175

gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc cac aga       576
Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg
            180                 185                 190

agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca       624
Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr
        195                 200                 205

gtg gcc cct aca gaa tgt tca                                          645
Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2451
<211> 337
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2451
gat gtt gtg atg act cag tct cca ctc tcc ctg ccc gtc acc ctt gga        48
Asp Val Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Leu Gly
1               5                   10                  15

cag ccg gcc tcc atc tcc tgc agg tct agt caa agc ctc gta cac agt        96
Gln Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Val His Ser
            20                  25                  30

gat gga aac acc tac ttg aat tgg ttt caa cag agg cca ggc caa tct       144
Asp Gly Asn Thr Tyr Leu Asn Trp Phe Gln Gln Arg Pro Gly Gln Ser
        35                  40                  45

cca agg cgc cta att tat atg gtt tct aac cgg gac tct ggg gtc cca       192
Pro Arg Arg Leu Ile Tyr Met Val Ser Asn Arg Asp Ser Gly Val Pro
    50                  55                  60

gac aga ttc agc ggc agt ggg tca ggc act gat ttc aca ctg aaa atc       240
Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65                  70                  75                  80

agc agg gtg gag gct gag gat gtt ggg gtt tat tac tgc ctg caa ggt       288
Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Leu Gln Gly
```

```
                85                  90                  95

aca cac tgg cct ccg acg atc ggc cag ggg acc aag gtg gaa atc gaa       336
Thr His Trp Pro Pro Thr Ile Gly Gln Gly Thr Lys Val Glu Ile Glu
            100                 105                 110

c                                                                     337
```

<210> 2452
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2452

```
ccg tct gga ctg act cag cca ccc tcg gcg tct ggg acc ccc ggg cag        48
Pro Ser Gly Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Pro Gly Gln
1               5                   10                  15

agg gtc acc atg tct tgc tct gga agc agc tcc aat atc ggg aga aat        96
Arg Val Thr Met Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Arg Asn
            20                  25                  30

tat gtt tac tgg tac caa caa ctc cca gga gcg gcc ccc aaa ctc ctc       144
Tyr Val Tyr Trp Tyr Gln Gln Leu Pro Gly Ala Ala Pro Lys Leu Leu
        35                  40                  45

atc tat agg gat aat cag cgg ccc tca ggg gtc cct gat cga ttc tct       192
Ile Tyr Arg Asp Asn Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
    50                  55                  60

ggc tcc aag tct ggc acc tca gcc tcc ctg gcc atc agt ggg ctc cgg       240
Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Arg
65                  70                  75                  80

tcc gag gat gag gct gat tat tac tgt gca gca tgg gat gac aat gtg       288
Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ala Trp Asp Asp Asn Val
                85                  90                  95

agt ggt cct ggc ttc gga gct ggg acc agg ctc acc gtc cta ggt cag       336
Ser Gly Pro Gly Phe Gly Ala Gly Thr Arg Leu Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gcc aac ccc act gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctc caa gcc aac aag gcc aca cta gtg tgt ctg atc agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
```

```
    130                 135                 140

ccg gga gct gtg aca gtg gcc tgg aag gca gat ggc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aaa ccc tcc aaa cag agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tac ctg agc ctg acg ccc gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2453
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2453
ccc gct gtg ctg act cag tca ccc tca gcg tct ggg acc ccc ggg cag        48
Pro Ala Val Leu Thr Gln Ser Pro Ser Ala Ser Gly Thr Pro Gly Gln
1               5                   10                  15

agg gtc acc atc tct tgt ttt ggg agc atc tcc aac atc gga agt aat        96
Arg Val Thr Ile Ser Cys Phe Gly Ser Ile Ser Asn Ile Gly Ser Asn
            20                  25                  30

cct gta aac tgg tac cag cag gtc cca gga gcg gcc ccc aaa ctc ctc       144
Pro Val Asn Trp Tyr Gln Gln Val Pro Gly Ala Ala Pro Lys Leu Leu
        35                  40                  45

atc tat agt agt agt cag cgg ccc tca ggg gtc cct gac cga ttc tct       192
Ile Tyr Ser Ser Ser Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
    50                  55                  60

ggc tcc aag tct ggc acc tca gcc tcc ctg gcc atc agt ggc ctc cag       240
Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Gln
65                  70                  75                  80

tct gag gat gag gct gac tat tac tgt gca aca tgg gat gac agc ctg       288
Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Thr Trp Asp Asp Ser Leu
```

```
                85                  90                  95

aat ggt ccg gtg ttc ggc gga ggg acc aag ctt acc gtc ctt ggt cag       336
Asn Gly Pro Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2454
<211> 639
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2454
gaa aca gtg atg acg cag tct cca gcc acc ctg tct gtg tct ccg ggg        48
Glu Thr Val Met Thr Gln Ser Pro Ala Thr Leu Ser Val Ser Pro Gly
1               5                   10                  15

gat aga gcc acc ctc tcc tgc agg gcc agt cag aat gtt aac ttc aac        96
Asp Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Asn Val Asn Phe Asn
            20                  25                  30

tta gcc tgg tac cag cag aaa cct ggc cag gct ccc agg ctc ctc atc       144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
```

```
        35                  40                  45

tat gat gca tcc acc agg gcc act ggt atc cct gcc agg ttc agt ggc       192
Tyr Asp Ala Ser Thr Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly
    50                  55                  60

agt gcg tct ggg aca gag ttc acg ctc acc atc aac agc ctg cag tct       240
Ser Ala Ser Gly Thr Glu Phe Thr Leu Thr Ile Asn Ser Leu Gln Ser
65                  70                  75                  80

gaa gat ttt gca gtt tac tac tgt cag cag tat aat aac tgg tgg acg       288
Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Asn Asn Trp Trp Thr
                85                  90                  95

ttc ggc caa ggg acc aaa ctg gag atc aaa cga act gtg gct gca cca       336
Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala Ala Pro
            100                 105                 110

tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga act       384
Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr
        115                 120                 125

gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc aaa       432
Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys
    130                 135                 140

gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag gag       480
Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu
145                 150                 155                 160

agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc agc       528
Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser
                165                 170                 175

acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac gcc       576
Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala
            180                 185                 190

tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc ttc       624
Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe
        195                 200                 205

aac agg gga gag tgg                                                   639
Asn Arg Gly Glu Trp
    210
```

<210> 2455
<211> 647
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2455

```
ca gaa att gtg ttg acg cag tct cca ggc acc ctg tct ttg tct cca         47
   Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro
   1               5                  10                  15

ggg gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc agc        95
Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser
               20                  25                  30

agc tcc tta gcc tgg tac cag cag aaa cct ggc cag gct ccc agg ctc       143
Ser Ser Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu
            35                  40                  45

ctc atc tat ggt gca tcc agc agg gcc act ggc atc cca gac agg ttc       191
Leu Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe
        50                  55                  60

agt ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc aga ctg       239
Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu
    65                  70                  75

gag cct gaa gat ttt gca gtg tat tac tgt cag caa tat ggt agt ttt       287
Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Phe
80                  85                  90                  95

cgg tac act ttt ggc cag ggg acc aag ctg gag atc aaa cga act gtg       335
Arg Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val
               100                 105                 110

gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa       383
Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
            115                 120                 125

tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga       431
Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
        130                 135                 140

gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac       479
Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
    145                 150                 155

tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc       527
Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
160                 165                 170                 175

ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa       575
Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
               180                 185                 190

gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca       623
Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
            195                 200                 205
```

```
aag agc ttc aac agg gga gag tgg                                        647
Lys Ser Phe Asn Arg Gly Glu Trp
        210                 215

<210> 2456
<211> 639
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2456
ccc tat gag ctg aca cag cca ccc tcg gtg tca gtg tcc cca gga cag         48
Pro Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                   10                  15

acg gcc agg atc acc tgc tct gga gat gct ttg cca aag caa tat gct         96
Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Lys Gln Tyr Ala
            20                  25                  30

tat tgg tac cag cag aag cca ggc cag gcc cct gtg ctg gtg ata tat        144
Tyr Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

aaa gac agt gag agg ccc tca ggg atc cct gag cga ttc tct ggc tcc        192
Lys Asp Ser Glu Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

agc tca ggg aca aca gtc acg ttg acc atc agt gga gtc cag gca gaa        240
Ser Ser Gly Thr Thr Val Thr Leu Thr Ile Ser Gly Val Gln Ala Glu
65                  70                  75                  80

gac gag gct gac tat tac tgt caa tca gca gac agc agt gat act tat        288
Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Ala Asp Ser Ser Asp Thr Tyr
                85                  90                  95

gtg ttc ggc gga ggg acc aag ttg acc gtc cta ggt cag ccc aag gct        336
Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys Ala
            100                 105                 110

gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag ctt caa gcc        384
Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala
        115                 120                 125

aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga gcc        432
Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala
    130                 135                 140

gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga gtg        480
Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val
145                 150                 155                 160
```

```
gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc agc       528
Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser
                165                 170                 175

agc tat ctg agc ctg acg cct gag cag tgg aag tcc cac aga agc tac       576
Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr
            180                 185                 190

agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg gcc       624
Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala
        195                 200                 205

cct aca gaa tgt tca                                                  639
Pro Thr Glu Cys Ser
    210
```

<210> 2457
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2457

```
ca gaa att gtg ttg aca cag tct cca gcc acc ctg tct ttg tct cca         47
   Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro
   1               5                  10                  15

ggg gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc agc        95
Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser
                20                  25                  30

tac tta gcc tgg tac caa cag aaa cct ggc cag gct ccc agg ctc ctc       143
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
            35                  40                  45

atc tat gat gca tcc aac agg gcc act ggc atc cca gcc agg ttc agt       191
Ile Tyr Asp Ala Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser
        50                  55                  60

ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc agc cta gag       239
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu
    65                  70                  75

cct gaa gat ttt gca gtt tat tac tgt cag cag cgt agc aac tgg cct       287
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ser Asn Trp Pro
80                  85                  90                  95

ctc act ttc ggc gga ggg acc aag gtg gag atc aaa cga act gtg gct       335
Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
                100                 105                 110
```

```
gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgg                                          644
Ser Phe Asn Arg Gly Glu Trp
        210

<210> 2458
<211> 647
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2458
ga gaa att gtg ttg aca cag tcg cca gcc acc ctg tct ttg tct cca         47
   Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro
   1               5                  10                  15

ggg gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt ggc agc        95
Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Gly Ser
                20                  25                  30

tac tta gcc tgg tac caa cag aaa cct ggc cag gct ccc agg ctc ctc       143
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
            35                  40                  45

atc tat gat gca tcc aac agg gcc act ggc atc cca gcc agg ttc agt       191
Ile Tyr Asp Ala Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser
        50                  55                  60
```

```
ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc agc cta gag       239
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu
    65                  70                  75

cct gaa gat ttt gca gtt tat tac tgt cag cag ggt agc aac tgg ttg       287
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Gly Ser Asn Trp Leu
80                  85                  90                  95

gcg ctc act ttc ggc gga ggg acc aag gtg gag atc aaa cga act gtg       335
Ala Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val
                100                 105                 110

gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa       383
Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
            115                 120                 125

tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga       431
Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
        130                 135                 140

gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac       479
Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
    145                 150                 155

tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc       527
Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
160                 165                 170                 175

ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa       575
Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
                180                 185                 190

gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca       623
Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
            195                 200                 205

aag agc ttc aac agg gga gag tgt                                      647
Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215
```

<210> 2459
<211> 639
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2459

```
atc cag atg acc cag tct cca tcc tcc ctg tct gca tct gta gga gac        48
Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly Asp
1               5                   10                  15
```

```
aga gtc acc atc act tgc cgg gcg agt cag gcc att gcc aac tct tta        96
Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ala Ile Ala Asn Ser Leu
            20                  25                  30

gcc tgg tat cag cag aga cca ggg aaa gcc cct aag ctc ctg atc tat       144
Ala Trp Tyr Gln Gln Arg Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr
        35                  40                  45

gct gca tcc agt ttg gaa agt ggg gtc cca tcc agg ttc agc ggc agt       192
Ala Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly Ser
    50                  55                  60

gga tct ggg acg gat tac act ctc acc atc agc agc ctg cag cct gaa       240
Gly Ser Gly Thr Asp Tyr Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu
65                  70                  75                  80

gac ttt gca acc tat tac tgt caa cag tat tat att aac cct cgg acg       288
Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Tyr Ile Asn Pro Arg Thr
                85                  90                  95

ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg gct gca cca       336
Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala Pro
            100                 105                 110

tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga act       384
Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr
        115                 120                 125

gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc aaa       432
Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys
    130                 135                 140

gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag gag       480
Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu
145                 150                 155                 160

agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc agc       528
Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser
                165                 170                 175

acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac gcc       576
Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala
            180                 185                 190

tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc ttc       624
Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe
        195                 200                 205

aac agg gga gag tgt                                                   639
Asn Arg Gly Glu Cys
    210
```

<210> 2460
<211> 660

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2460
```
ggc atc gtg atg acc cag tct cca gac tcc ctg gct gtg tct ctg ggc        48
Gly Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1               5                   10                  15

gag agg gcc acc atc aac tgc aag tcc agc cag agt gtt tta tac agc        96
Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Val Leu Tyr Ser
            20                  25                  30

tcc aac aat gag aac tac tta gct tgg tac cag cag aaa cca gga cag       144
Ser Asn Asn Glu Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
        35                  40                  45

cct cct aag ctg ctc att tac tgg gca tct acc cgg gaa tcc ggg gtc       192
Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
    50                  55                  60

cct gac cga ttc agt ggc agc ggg tct ggg aca gat ttc act ctc acc       240
Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65                  70                  75                  80

atc agc agc ctg cag gct gaa gat gtg gca gtt tat tac tgt cag caa       288
Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
                85                  90                  95

tat tat agt act ccg tac act ttt ggc cag ggg acc aag ctg gag atc       336
Tyr Tyr Ser Thr Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile
            100                 105                 110

aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat       384
Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115                 120                 125

gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac       432
Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130                 135                 140

ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc       480
Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac       528
Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175

agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac       576
Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
```

```
            180                 185                 190

gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc       624
Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
        195                 200                 205

tcg ccc gtc aca aag agc ttc aac agg gga gag tgg                       660
Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Trp
    210                 215                 220
```

<210> 2461
<211> 320
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2461

```
gac atc cag atg acc cag tct cca tcc tcc ctg tct gca tct gta gga        48
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

gac aga gtc acc atc tct tgc cgg gca agt cac aac att aac acc tat        96
Asp Arg Val Thr Ile Ser Cys Arg Ala Ser His Asn Ile Asn Thr Tyr
            20                  25                  30

tta aat tgg tat caa cac aaa cca ggg aaa gcc cct aag atc gtg att       144
Leu Asn Trp Tyr Gln His Lys Pro Gly Lys Ala Pro Lys Ile Val Ile
        35                  40                  45

tat ggt gca tcc agt ttg caa agt gga gtc cca tca agg ttc agt ggc       192
Tyr Gly Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

agt gga tct ggg aca gac ttc tct ctc acc atc agc agt ctg cag cgt       240
Ser Gly Ser Gly Thr Asp Phe Ser Leu Thr Ile Ser Ser Leu Gln Arg
65                  70                  75                  80

gaa gat ttt gca act tac ttc tgt caa cag agt ttc aac acc gtg ctc       288
Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Ser Phe Asn Thr Val Leu
                85                  90                  95

act ttc ggc gga ggg acc agg gtg gat atc aa                           320
Thr Phe Gly Gly Gly Thr Arg Val Asp Ile
            100                 105
```

<210> 2462
<211> 651
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2462

```
cag tct gcc ctg act cag cct gcc tcc gtg tct ggg tct cct gga cag        48
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                  10                  15

tcg atc acc atc tcc tgc act gga acc agc agt gac gtt ggt ggt tat        96
Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr
            20                  25                  30

aac tat gtc tcc tgg tac caa cag cac cca ggc aaa gcc ccc aaa ctc       144
Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

atg att tat gag gtc agt aat cgg ccc tca ggg gtt tct aat cgc ttc       192
Met Ile Tyr Glu Val Ser Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc aac acg gcc tcc ctg acc atc tct ggg ctc       240
Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

cag gct gag gac gag gct gat tat cac tgc agc tca tat aca atc acc       288
Gln Ala Glu Asp Glu Ala Asp Tyr His Cys Ser Ser Tyr Thr Ile Thr
                85                  90                  95

agc acg ctt tgg gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt       336
Ser Thr Leu Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

cag ccc aag gct gcc ccc tcg gtc act ctg ttc cca ccc tcc tct gag       384
Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

tac gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

cac aaa agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
```

```
        195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                    651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2463
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2463

```
cag tct gtg ctg act cag cca ccc tca gcg tct ggg acc ccc ggg cag        48
Gln Ser Val Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Pro Gly Gln
1               5                   10                  15

ggg gtc acc atc tct tgt tct gga acc agc gcc aac atc gga aag aat        96
Gly Val Thr Ile Ser Cys Ser Gly Thr Ser Ala Asn Ile Gly Lys Asn
            20                  25                  30

tat gta tct tgg tac cag cac ctc ccg gga acg gcc ccc aga ctc ctc       144
Tyr Val Ser Trp Tyr Gln His Leu Pro Gly Thr Ala Pro Arg Leu Leu
        35                  40                  45

atc tat agg att gat cag cgg ccc tca ggg gtc cct gac cga ttc tct       192
Ile Tyr Arg Ile Asp Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
    50                  55                  60

ggc tcc aag tct ggc acc tca gcc tcc ctg gcc atc agt ggg ctc cgg       240
Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Arg
65                  70                  75                  80

ccc gag gat gag gct gat tat tac tgt gca gca tgg gat gac agc ctg       288
Pro Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ala Trp Asp Asp Ser Leu
                85                  90                  95

agt ggt ccg gta ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag       336
Ser Gly Pro Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
```

```
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2464
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2464
gac ctg cag atg acc cag tct cca tcc tcc ctg tct gca tct ata gga        48
Asp Leu Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Ile Gly
1               5                   10                  15

gac aga gtc acc atc act tgc cgg gca agt cag agc att agc act tat        96
Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Thr Tyr
            20                  25                  30

ttc aat tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg atc       144
Phe Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

tat gct gca tcc agt ttg caa agt ggg gtc cca tca agg ttc agt ggc       192
Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

agt gga tct ggg aca gat ttc act ctc acc atc acc agt ctg cag cct       240
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Thr Ser Leu Gln Pro
65                  70                  75                  80

gaa gac ttt gca act tac tac tgt cag cag act tac agt aat cct tgg       288
Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Thr Tyr Ser Asn Pro Trp
                85                  90                  95

acg ttc ggc caa ggg acc aag gtg gac ttc aaa cga act gtg gct gca       336
Thr Phe Gly Gln Gly Thr Lys Val Asp Phe Lys Arg Thr Val Ala Ala
```

```
            100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       384
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       432
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       480
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       528
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       576
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       624
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

ttc aac agg gga gag tgg                                              642
Phe Asn Arg Gly Glu Trp
    210
```

<210> 2465
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2465

```
gt gac atc cag atg acc cag tct ccg tcc tcc ctg tct gca tct gta         47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
   1               5                  10                  15

gga gat aga gtt acc atc act tgc cgg gca agt cag agc att aag aac        95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Lys Asn
                20                  25                  30

tat gta aat tgg tat cag cag aaa cca gga gaa gcc cct aac ctc ttg       143
Tyr Val Asn Trp Tyr Gln Gln Lys Pro Gly Glu Ala Pro Asn Leu Leu
            35                  40                  45

atc ttt gct gca tcc aat ttg caa agt ggg gtc cca tca agg ttc act       191
Ile Phe Ala Ala Ser Asn Leu Gln Ser Gly Val Pro Ser Arg Phe Thr
```

```
        50                  55                  60

ggc agt gga tct ggg aca gat ttc tct ctc acc atc agc agt ctg caa       239
Gly Ser Gly Ser Gly Thr Asp Phe Ser Leu Thr Ile Ser Ser Leu Gln
    65                  70                  75

cct gaa gac ttt gca gct tac tac tgt caa cag act tac agt cac cct       287
Pro Glu Asp Phe Ala Ala Tyr Tyr Cys Gln Gln Thr Tyr Ser His Pro
80                  85                  90                  95

cgc acg ttc ggc caa ggg acc agg gtg gaa atc aaa cga act gtg gct       335
Arg Thr Phe Gly Gln Gly Thr Arg Val Glu Ile Lys Arg Thr Val Ala
                100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa ctc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgt                                          644
Ser Phe Asn Arg Gly Glu Cys
        210

<210> 2466
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2466
caa tct gtc ctg acg cag ccg ccc tca gtg tct ggg gcc cca ggg cag        48
Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
```

```
1               5                   10                  15

agg gtc acc atc tcc tgc act ggg agc agc tcc aac atc ggg gca ggt        96
Arg Val Thr Ile Ser Cys Thr Gly Ser Ser Ser Asn Ile Gly Ala Gly
            20                  25                  30

tat gat gta cac tgg tac cag cac ctt cca gga aca gcc ccc aaa ctc       144
Tyr Asp Val His Trp Tyr Gln His Leu Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

ctc att tat ggt gac agc cat cgg ccc tca ggg gtc cct gac gga ttc       192
Leu Ile Tyr Gly Asp Ser His Arg Pro Ser Gly Val Pro Asp Gly Phe
    50                  55                  60

tct ggc tcc aag tct ggc acc tca gcc tcc ctg gcc atc act ggg ctc       240
Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80

cag gct gag gat gag gct gat tat tac tgc cag tcc tat gac agc agc       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser
                85                  90                  95

ctg agt ggt tat gtc ttc gga act ggg acc aag gtc acc gtc cta ggt       336
Leu Ser Gly Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly
            100                 105                 110

cag ccc aag gcc aac ccc act gtc act ctg ttc ccg ccc tcc tct gag       384
Gln Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

gag ctt caa gcc aac aag gcc aca cta gtg tgt ctg atc agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

tac ccg gga gct gtg aca gtg gcc tgg aag gca gat ggc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aaa ccc tcc aaa cag agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

tac gcg gcc agc agc tac ctg agc ctg acg ccc gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                   651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2467
<211> 325
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2467
tcc tat gtg ctg act cag cca ccc tcg gtg tca gtg gcc cca gga cag 48
Ser Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Gln
1 5 10 15

acg gcc agg att gcc tgt ggg gga aac aac att gga agt aaa act gtg 96
Thr Ala Arg Ile Ala Cys Gly Gly Asn Asn Ile Gly Ser Lys Thr Val
20 25 30

cac tgg tac cag cag aag cca ggc cag gcc cct atg gtg gtc gtc tat 144
His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Met Val Val Val Tyr
35 40 45

gat gat agc gac cgg ccc tca ggg atc cct gag cga ttc tct ggc tcc 192
Asp Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

aac tct ggg aac acg gcc acc ctg acc atc agc agg gtc gaa gcc ggg 240
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65 70 75 80

gat gag gcc gac tac tac tgt cag gtg tgg gat agt agt agt gat cat 288
Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Ser Asp His
85 90 95

tat gtc ctc gga act ggg acc aag gtc acc gtc cta g 325
Tyr Val Leu Gly Thr Gly Thr Lys Val Thr Val Leu
100 105

<210> 2468
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2468
gc gac atc cag atg acc cag tct cca tct tct gtg tct gca tct gta 47
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Val Ser Ala Ser Val
1 5 10 15

ggg gac aga gtc acc atc act tgt cgg gcg agt cag gat att agc aac 95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Asp Ile Ser Asn

```
                20                  25                  30

tgg tta gcc tgg tat ctg cag aaa cca ggg aaa gcc cct aag ctc ctg       143
Trp Leu Ala Trp Tyr Leu Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
            35                  40                  45

atc tat gct gca tcc agt ttg caa agt gga gtc cca tcc agg ttc agc       191
Ile Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60

ggc agt gga tct ggg aca gat ttc act ctc acc atc agc agc ctg cag       239
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln
    65                  70                  75

cct gaa gat ttt gcg act tac tat tgt caa cag act agc agt ttc cct       287
Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Thr Ser Ser Phe Pro
80                  85                  90                  95

cga act ttc ggc cct ggg acc aaa gtg gat atc aaa cga act gtg gct       335
Arg Thr Phe Gly Pro Gly Thr Lys Val Asp Ile Lys Arg Thr Val Ala
                100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgt                                          644
Ser Phe Asn Arg Gly Glu Cys
        210

<210> 2469
<211> 639
<212> DNA
<213> Artificial Sequence
```

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2469

```
ccc tat gag ctg aca cag cca ccc tcg gtg tca gtg tcc cca gga cag        48
Pro Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                  10                  15

acg gcc agg atc acc tgc tct gga gat gca ttg cca aac gaa aat gct        96
Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Asn Glu Asn Ala
            20                  25                  30

ttt tgg tac cag cag aag cca ggc cag gcc cct gtg ttg gtg ata tat       144
Phe Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

gag gac att aag agg ccc tca ggg atc cct gag cga ttc tct ggc tcc       192
Glu Asp Ile Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

agt tca ggg aca aca gtc aca ttg acc atc agt ggg gtc cag gca gag       240
Ser Ser Gly Thr Thr Val Thr Leu Thr Ile Ser Gly Val Gln Ala Glu
65                  70                  75                  80

gac gag gct gac tat tac tgt caa tca gta gac att act tct act tgg       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Val Asp Ile Thr Ser Thr Trp
                85                  90                  95

gtg ttc ggc ggg ggg acc aag ctg acc gtc cta ggt cag ccc aag gct       336
Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys Ala
            100                 105                 110

gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag ctt caa gcc       384
Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala
        115                 120                 125

aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga gcc       432
Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala
    130                 135                 140

gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga gtg       480
Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val
145                 150                 155                 160

gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc agc       528
Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser
                165                 170                 175

agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac aaa agc tac       576
Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser Tyr
            180                 185                 190
```

```
agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg gcc       624
Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala
        195                 200                 205

cct aca gaa tgt tca                                                639
Pro Thr Glu Cys Ser
    210
```

<210> 2470
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2470

```
cag tct gcc ctg act cag cct ccc tcc gtg tcc ggg tct cct gga cag        48
Gln Ser Ala Leu Thr Gln Pro Pro Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

tca gtc acc atc tcc tgc act gga acc acc agt gac att ggt agt tat        96
Ser Val Thr Ile Ser Cys Thr Gly Thr Thr Ser Asp Ile Gly Ser Tyr
            20                  25                  30

gac cgt gtc tcc tgg tac cag aag ccc cca ggc aca gcc ccc aaa ctc       144
Asp Arg Val Ser Trp Tyr Gln Lys Pro Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

atc att tat gag gtc agt cat cgg ccc tca ggg gtc cct gat cgc ttc       192
Ile Ile Tyr Glu Val Ser His Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

tct ggg tcc aag tct ggc aac acg gcc tcc ctg acc atc tct ggg ctc       240
Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

cag gct gag gac gag gct gat tat tat tgc agc tca tat ata agt agc       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Ile Ser Ser
                85                  90                  95

ctc act tat gtg ctg ttc ggc gga ggg acc aag ctg acc gtc ctg ggt       336
Leu Thr Tyr Val Leu Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

cag ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag       384
Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140
```

```
tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

tac gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                   651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2471
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2471
ccc tct gtg ttg acg cag ccg ccc tca gtg tct gcg gcc cca gga cag        48
Pro Ser Val Leu Thr Gln Pro Pro Ser Val Ser Ala Ala Pro Gly Gln
1               5                   10                  15

aag gtc acc atc tcc tgc tct gga agc agc tcc aac att ggg aac aat        96
Lys Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Asn Asn
            20                  25                  30

tat gtg tcc tgg tac cag cag ctc cca gga aca gcc ccc aaa ctc ctc       144
Tyr Val Ser Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
        35                  40                  45

att tat gac aat aat aag cga ccc tca ggg atc cgt gac cga ttc tct       192
Ile Tyr Asp Asn Asn Lys Arg Pro Ser Gly Ile Arg Asp Arg Phe Ser
    50                  55                  60

ggc tcc aag tct ggc acc tca gcc acc ctg ggc atc acc gga ctc cag       240
Gly Ser Lys Ser Gly Thr Ser Ala Thr Leu Gly Ile Thr Gly Leu Gln
65                  70                  75                  80

act ggg gac gag gcc gac tat tac tgc gga aca tgg gat agt agc ctg       288
Thr Gly Asp Glu Ala Asp Tyr Tyr Cys Gly Thr Trp Asp Ser Ser Leu
                85                  90                  95
```

```
agt gtt ggg gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag       336
Ser Val Gly Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aaa agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2472
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2472

```
ggg gtt gtg atg act cag tct cca ctc tcc ctg ccc gtc acc ctt gga        48
Gly Val Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Leu Gly
1               5                   10                  15

cag ccg gcc tcc atc tcc tgc agg tct agt caa agc ctc gta tac agt        96
Gln Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Val Tyr Ser
            20                  25                  30

gat gga aac acc tac ttg aat tgg ttt cag cag agg cca ggc caa tct       144
Asp Gly Asn Thr Tyr Leu Asn Trp Phe Gln Gln Arg Pro Gly Gln Ser
        35                  40                  45
```

```
cca agg cgc cta att tat aag gtt tct aac cgg gac tct ggg gtc cca       192
Pro Arg Arg Leu Ile Tyr Lys Val Ser Asn Arg Asp Ser Gly Val Pro
    50                  55                  60

gac aga ttc agc ggc agt ggg tca ggc act gat ttc aca ctg aaa atc       240
Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65                  70                  75                  80

agc agg gtg gag gct gag gat gtt ggg gtt tat tac tgc atg caa ggt       288
Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln Gly
                85                  90                  95

aca cac tgg ccg atc acc ttc ggc caa ggg aca cga ctg gag att aaa       336
Thr His Trp Pro Ile Thr Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys
            100                 105                 110

cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag       384
Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
        115                 120                 125

cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc       432
Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
    130                 135                 140

tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa       480
Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
145                 150                 155                 160

tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac agc       528
Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
                165                 170                 175

acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag       576
Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
            180                 185                 190

aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg       624
Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
        195                 200                 205

ccc gtc aca aag agc ttc aac agg gga gag tgg                           657
Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Trp
    210                 215
```

<210> 2473
<211> 325
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2473

```
gaa att gtg ttg acg cag tct cca ggc acc ctg tct ttg tct cca ggg        48
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt att aga agc agc        96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Ile Arg Ser Ser
            20                  25                  30

tac tta gcc tgg tac cag cag aaa cct ggc cag gct ccc agg ctc ctc       144
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

atc tat ggt gca tcc agc agg gcc act ggc atc cca gac agg ttc agt       192
Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc aga ctg gag       240
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

cct gaa gat ttt gca gtg tat tac tgt cag cag tat gat agc tca tcg       288
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Asp Ser Ser Ser
                85                  90                  95

tgg acg ttc ggc caa ggg acc aag gtg gaa atc aaa c                    325
Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
            100                 105
```

<210> 2474
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2474

```
ccc tct gtg ctg acg cag ccg ccc tca gtg tct ggg gcc cca ggg cag        48
Pro Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

agg gtc acc atc tcc tgc tct ggg agc acc tcc aac atc ggg gct ggt        96
Arg Val Thr Ile Ser Cys Ser Gly Ser Thr Ser Asn Ile Gly Ala Gly
            20                  25                  30

tat gat gta cac tgg tac cag caa ttt cca gga aca gcc ccc aaa ctc       144
Tyr Asp Val His Trp Tyr Gln Gln Phe Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

ctc atc tat ggt aac atc ttt cgg ccg tca ggg gtc cct gac cga ttc       192
Leu Ile Tyr Gly Asn Ile Phe Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60
```

```
tct ggc tcc aag tct ggc acc tca gcc tcc ctg gcc atc act ggg ctc       240
Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80

cag gct gag gac gag gct gct tat tac tgc cag tcg tat gac agc agc       288
Gln Ala Glu Asp Glu Ala Ala Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser
                85                  90                  95

ctg aga ggt gtg gtg ttc ggc gga ggg acc tac ctg acc gtc cta ggt       336
Leu Arg Gly Val Val Phe Gly Gly Gly Thr Tyr Leu Thr Val Leu Gly
            100                 105                 110

cag ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag       384
Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

tac gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                   651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2475
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

```
<400> 2475
gt gac atc cag atg acc cag tct cca tcc tcc ctg tct gca tct gta         47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
   1               5                  10                  15
```

```
gga gac aga gtc acc atc act tgc cgg gca agt cag agc att agc agc        95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser
               20                  25                  30

tat tta aat tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg       143
Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
            35                  40                  45

atc tat gct gca tcc agt ttg caa agt ggg gtc cca tca agg ttc agt       191
Ile Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60

ggc agt gga tct ggg aca gat ttc act ctc acc atc agc agt ctg caa       239
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln
    65                  70                  75

cct gaa gat ttt gca act tac tac tgt caa cag agt tac agt acc cct       287
Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Pro
80                  85                  90                  95

cgg acg ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg gct       335
Arg Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
               100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
               180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgg                                          644
Ser Phe Asn Arg Gly Glu Trp
        210
```

<210> 2476
<211> 660

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2476
```
ggc atc gtg atg acc cag tct cca gac tcc ctg gct gtg tct ctg ggc        48
Gly Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1               5                   10                  15

gag agg gcc acc atc aac tgc aag tcc agc cag aat gtt tta tac agt        96
Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Asn Val Leu Tyr Ser
            20                  25                  30

tcc aac aat aaa aac tac tta ggt tgg tac cag cag aaa cca gga cag       144
Ser Asn Asn Lys Asn Tyr Leu Gly Trp Tyr Gln Gln Lys Pro Gly Gln
        35                  40                  45

cct cct aag ttg ctc att tac tgg gca tct acc cgg gaa tcg ggg gtc       192
Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
    50                  55                  60

cct gac cga ttc agt ggc agc ggg tct ggg aca gat ttc act ctc acc       240
Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65                  70                  75                  80

atc aac agc ctg cag gct gaa gat gtg gca gtt tat tac tgt cag caa       288
Ile Asn Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
                85                  90                  95

tat tat agc act ccg tgg acg ttc ggc caa ggg acc aag gtg gaa atc       336
Tyr Tyr Ser Thr Pro Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile
            100                 105                 110

aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat       384
Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115                 120                 125

gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac       432
Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130                 135                 140

ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc       480
Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac       528
Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175

agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac       576
Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
```

```
            180                 185                 190

gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc       624
Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
        195                 200                 205

tcg ccc gtc aca aag agc ttc aac agg gga gag tgg                       660
Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Trp
    210                 215                 220
```

<210> 2477
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2477

```
ccg tct gtg ctg acg cag ccg ccc tca gtg tct ggg gcc cca ggg cag        48
Pro Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

aag gtc acc atc tcc tgc act ggg agc agc tcc aac atc ggg gca ggt        96
Lys Val Thr Ile Ser Cys Thr Gly Ser Ser Ser Asn Ile Gly Ala Gly
            20                  25                  30

tat gat gta cac tgg tac cag cag ctt cca gga aca gcc ccc aaa ctc       144
Tyr Asp Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

ctc atc tat cgt aac aac aat cgg ccc tca ggg gtc cct gac cga ttc       192
Leu Ile Tyr Arg Asn Asn Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc acc tca gcc tcc ctg gcc atc act gga ctc       240
Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80

cag act gag gat gag gct gat tat tac tgc cag tcc tat gac agc ggc       288
Gln Thr Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Gly
                85                  90                  95

ctg agt ggt tcg aag gtg gtc ttc ggc gga ggg acc aag ctg acc gtc       336
Leu Ser Gly Ser Lys Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val
            100                 105                 110

cta ggt cag ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc       384
Leu Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser
        115                 120                 125

tct gag gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt       432
Ser Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser
```

```
    130                 135                 140

gac ttc tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc       480
Asp Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser
145                 150                 155                 160

ccc gtc aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac       528
Pro Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn
                165                 170                 175

aac aag tac gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg       576
Asn Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp
            180                 185                 190

aag tcc cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc       624
Lys Ser His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr
        195                 200                 205

gtg gag aag aca gtg gcc cct aca gaa tgt tca                           657
Val Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2478
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2478
cat ttt atg ctg act cag ccc cac tct gtg tcg gag tct ccg ggg aag        48
His Phe Met Leu Thr Gln Pro His Ser Val Ser Glu Ser Pro Gly Lys
1               5                   10                  15

acg gta acc atc tcc tgc acc cgc agc agt ggc agc att gcc agc agc        96
Thr Val Thr Ile Ser Cys Thr Arg Ser Ser Gly Ser Ile Ala Ser Ser
            20                  25                  30

tat gtg cag tgg tac cag cag cgc ccg ggc agt tcc ccc acc act atg       144
Tyr Val Gln Trp Tyr Gln Gln Arg Pro Gly Ser Ser Pro Thr Thr Met
        35                  40                  45

atc tat gag gat aaa aaa aga ccc tct ggt gtc cct gat cgc ttc tct       192
Ile Tyr Glu Asp Lys Lys Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
    50                  55                  60

ggc tcc atc gac agc tcc tcc aac tct gcc tcc ctc acc atc tct gga       240
Gly Ser Ile Asp Ser Ser Ser Asn Ser Ala Ser Leu Thr Ile Ser Gly
65                  70                  75                  80

ctg aag act gag gac gag gct gac tac tac tgt cag tct tat gat ctc       288
Leu Lys Thr Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Leu
```

```
                85                  90                  95

agc act tgg gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag       336
Ser Thr Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2479
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

```
<400> 2479
gac atc cag atg acc cag tct cca ttc tcc ctg tct gca tct gtt gga        48
Asp Ile Gln Met Thr Gln Ser Pro Phe Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

gac aga gtc acc atc act tgc cgg gca agt cag agc att agc agc tat        96
Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Tyr
            20                  25                  30

tta aat tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg atc       144
Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
```

```
        35                  40                  45

tat gct gca tcc agt ttg caa agt ggg gtc cca tca agg ttc agt ggc       192
Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

agt gga tct ggg aca gat ttc act ctc acc atc agc agt ctg caa cct       240
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

gaa gat ttt gca act tac tac tgt cac cag agt tac agt acc tct ctc       288
Glu Asp Phe Ala Thr Tyr Tyr Cys His Gln Ser Tyr Ser Thr Ser Leu
                85                  90                  95

act ttc ggc gga ggg acc aag gtg gag atc aaa cga act gtg gct gca       336
Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       384
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       432
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       480
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       528
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       576
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       624
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

ttc aac agg gga gag tgt                                               642
Phe Asn Arg Gly Glu Cys
    210
```

<210> 2480
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2480
tcc tat gtg ctg act cag cca ccc tca gtg tca gtg gcc cca gga aag 48
Ser Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Lys
1 5 10 15

acg gcc agg att acc tgt ggg gga aac aac att gga agt aaa agt gtg 96
Thr Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Ser Lys Ser Val
20 25 30

cac tgg tac cag cag aag cca ggc cag gcc cct gtg ctg gtc atc tat 144
His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
35 40 45

tat gat agc gac cgg ccc tca ggg atc cct gag cga ttc tct ggc tcc 192
Tyr Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

aac tct ggg aac acg gcc acc ctg acc atc agc agg gtc gaa gcc ggg 240
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65 70 75 80

gat gag gcc gac tat tac tgt cag gtg tgg gat agt agt agt gat cat 288
Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Ser Asp His
85 90 95

tgg gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag ccc aag 336
Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
100 105 110

gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag ctt caa 384
Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
115 120 125

gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga 432
Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
130 135 140

gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga 480
Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145 150 155 160

gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc 528
Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
165 170 175

agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac aaa agc 576
Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser
180 185 190

tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg 624
Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
195 200 205

```
gcc cct aca gaa tgt tca                                                 642
Ala Pro Thr Glu Cys Ser
    210

<210> 2481
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2481
cag tct gcc ctg act cag cct gcc tcc gtg tct ggg tct cct gga cag        48
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

tcg atc acc atc tcc tgc act gga acc agc agt gac gtt ggt ggt tat        96
Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr
            20                  25                  30

aac tat gtc tcc tgg tac caa cag cac cca ggc aaa gcc ccc aaa ctc       144
Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

atg att tat gat gtc agt aat cgg ccc tca ggg gtt tct aat cgc ttc       192
Met Ile Tyr Asp Val Ser Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc aac acg gcc tcc ctg acc atc tct ggg ctc       240
Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

cag gct gag gac gag gct gat tat tac tgc agc tca tat aca agc agc       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Thr Ser Ser
                85                  90                  95

agc act cag gta ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag       336
Ser Thr Gln Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160
```

```
gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2482
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2482

```
gt gac atc cag atg acc cag tct cca tcc tcc ctg tct gca tct gta         47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
   1               5                  10                  15

gga gac aga gtc acc atc act tgc cgg gca agt cag agc att agc agc        95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser
                20                  25                  30

tat tta aat tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg       143
Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
            35                  40                  45

atc tat gct gca tcc agt ttg caa agt ggg gtc cca tca agg ttc agt       191
Ile Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60

ggc agt gga tct ggg aca gat ttc act ctc acc atc agc agt ctg caa       239
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln
    65                  70                  75

cct gaa gat ttt gca act tac tac tgt caa cag agt tac agt acc cct       287
Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Pro
80                  85                  90                  95

aag acg ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg gct       335
Lys Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
                100                 105                 110
```

```
gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgg                                          644
Ser Phe Asn Arg Gly Glu Trp
        210

<210> 2483
<211> 325
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2483
gcc atc cag ttg acc cag tct cca tcc tcc ctg tct gca tct gta ggc        48
Ala Ile Gln Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

gac aga gtc atc ctc act tgc cgg gca agt cag ggc att aac agt gcc        96
Asp Arg Val Ile Leu Thr Cys Arg Ala Ser Gln Gly Ile Asn Ser Ala
            20                  25                  30

tta gcc tgg tat cag caa aaa cca ggg aaa cct cct aag ctc ctg att       144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Pro Pro Lys Leu Leu Ile
        35                  40                  45

tat gct gcc tcc agt ttg gaa agt ggg gtc cca tcg agg ttc agc ggc       192
Tyr Ala Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60
```

```
agt ggg tct ggg aca gat ttc act ctc acc atc agc aac ctg cag cct       240
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Asn Leu Gln Pro
65                  70                  75                  80

gaa gat ttt gca act tat ttc tgt caa cag ttt aat act tac cct ctg       288
Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Phe Asn Thr Tyr Pro Leu
                85                  90                  95

tac acc ttt ggc cag ggg acc aag ctg gat atc acg a                     325
Tyr Thr Phe Gly Gln Gly Thr Lys Leu Asp Ile Thr
            100                 105
```

<210> 2484
<211> 328
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2484

```
gtt tct tct gag ctg act cag gac cct gct gtg tct gtg gcc ttg gga        48
Val Ser Ser Glu Leu Thr Gln Asp Pro Ala Val Ser Val Ala Leu Gly
1               5                   10                  15

cag aca gtc agg atc aca tgc caa gga gac agc ctc aga agg tat tat        96
Gln Thr Val Arg Ile Thr Cys Gln Gly Asp Ser Leu Arg Arg Tyr Tyr
            20                  25                  30

gca agc tgg tac cag cag aag gca gga cag gcc cct ata ctt gtc atc       144
Ala Ser Trp Tyr Gln Gln Lys Ala Gly Gln Ala Pro Ile Leu Val Ile
        35                  40                  45

tat ggt gaa aac aac cgg ccc tca ggg atc cca gac cga ttc tct ggc       192
Tyr Gly Glu Asn Asn Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly
    50                  55                  60

tcc ggc tca gga aac aca gct tcc ttg acc atc act ggg gct cag gcg       240
Ser Gly Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala
65                  70                  75                  80

gaa gat gag gct gac tat tac tgt gac tcc cgg gac agc agt ggt aac       288
Glu Asp Glu Ala Asp Tyr Tyr Cys Asp Ser Arg Asp Ser Ser Gly Asn
                85                  90                  95

ctc gtg gta ttc ggc gga ggg acc aag ctg acc gtc cta g                 328
Leu Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105
```

<210> 2485
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2485
```
gac atc cag atg acc cag tcc cca tct tcc gtg cct gca tct gta gga        48
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Val Pro Ala Ser Val Gly
1               5                  10                  15

gac aga gtc acc atc act tgt cgg gcg agt cag ggt att agg aat tgg        96
Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Gly Ile Arg Asn Trp
            20                  25                  30

tta gcc tgg tat cgg cag aga cca ggg aaa gcc cct gag ctc cta atc       144
Leu Ala Trp Tyr Arg Gln Arg Pro Gly Lys Ala Pro Glu Leu Leu Ile
        35                  40                  45

tat gct gca tcc aat ttg caa ttt ggg gtc cca tca agg ttc agc ggc       192
Tyr Ala Ala Ser Asn Leu Gln Phe Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

agt gga tct ggg aca gac ttc gct ctc acc atc agc agc gtg cag cct       240
Ser Gly Ser Gly Thr Asp Phe Ala Leu Thr Ile Ser Ser Val Gln Pro
65                  70                  75                  80

gaa gat ttt gca act tac tat tgt caa cag act aac agt ttc ccc cgg       288
Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Thr Asn Ser Phe Pro Arg
                85                  90                  95

act ttc ggc cct ggg acc aaa gtg gat atc aaa cga act gtg gct gca       336
Thr Phe Gly Pro Gly Thr Lys Val Asp Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       384
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       432
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       480
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       528
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       576
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190
```

```
gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       624
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

ttc aac agg gga gag tgg                                           642
Phe Asn Arg Gly Glu Trp
    210
```

<210> 2486
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2486

```
gac atc cag atg acc cag tct cca tcc tcc ctg tct gca tct gta gga        48
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

gac aga atc acc atc act tgc cgg gca agt cag agc gtt ggc acc tat        96
Asp Arg Ile Thr Ile Thr Cys Arg Ala Ser Gln Ser Val Gly Thr Tyr
            20                  25                  30

tta agt tgg ttt cag cag aaa cca ggg aaa gcc cct aag ctc ctg att       144
Leu Ser Trp Phe Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

tat gct gca tcc agt tta caa agt ggg gtc ccg tca agg ttc agt ggc       192
Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

agt gga tcc ggg aca gat ttc act ctc acc atc agc agt ctg caa cct       240
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

gaa gat ttt gca act tac ttt tgt caa cag agt tac agt gtc cct ccg       288
Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Ser Tyr Ser Val Pro Pro
                85                  90                  95

tgg acg ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg gct       336
Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
            100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       384
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       432
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140
```

```
gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       480
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       528
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       576
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       624
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

agc ttc aac agg gga gag tgg                                          645
Ser Phe Asn Arg Gly Glu Trp
    210                 215

<210> 2487
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2487
gaa gtt gta ttg acg cag tct cca ggc acc ctg tct ttg tct cca ggg        48
Glu Val Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

gaa aga gcg acc ctc tcc tgc agg gcc agt cag agc gtt agc agt aat        96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Asn
            20                  25                  30

tac tta gcc tgg tac cag caa aaa ctt ggc cag gct ccc agg ctc ctc       144
Tyr Leu Ala Trp Tyr Gln Gln Lys Leu Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

atc tat ggt gca tcc agc agg gcc act ggc atc cca gac agg ttc agt       192
Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc aga ctg gag       240
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

gct gaa gat ttt gca gtg tat tac tgt cag caa tat ggt agc tca cct       288
Ala Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser Pro
                85                  90                  95
```

```
cgg tac act ttt ggc cag ggg acc aag gtg gag atc aga cga act gtg       336
Arg Tyr Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Arg Arg Thr Val
            100                 105                 110

gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa       384
Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
        115                 120                 125

tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga       432
Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
    130                 135                 140

gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac       480
Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
145                 150                 155                 160

tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc       528
Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
                165                 170                 175

ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa       576
Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
            180                 185                 190

ctc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca       624
Leu Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
        195                 200                 205

aag agc ttc aac agg gga gag tgg                                       648
Lys Ser Phe Asn Arg Gly Glu Trp
    210                 215
```

<210> 2488
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2488

```
ca gaa att gtg ttg acg cag tct cca ggc acc ctg tct ttg tct cca         47
   Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro
   1               5                  10                  15

ggg gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc agc        95
Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser
                20                  25                  30

agg tac tta gcc tgg tac cag cag aaa cct ggc cag gct ccc agg ctc       143
Arg Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu
            35                  40                  45
```

```
ctc atc cat ggt gca tcc agc agg gcc act ggc atc cca gac agg ttc       191
Leu Ile His Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe
        50                  55                  60

agt ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc aga ctg       239
Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu
    65                  70                  75

gag cct gaa gat ttt gca gtg tat tac tgt cag cag tat ggt agc gcg       287
Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ala
80                  85                  90                  95

tgg acg ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg gct       335
Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
                100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgg                                          644
Ser Phe Asn Arg Gly Glu Trp
        210
```

<210> 2489
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2489

```
gaa att gtg ttg aca cag tct cca gcc acc ctg tcc ttg tct cca ggg        48
Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1               5                  10                  15

gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt ggc agc tcc        96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Gly Ser Ser
            20                  25                  30

tta gcc tgg tac caa cag aaa cct ggc cag gct ccc agg ctc ctc atc       144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
        35                  40                  45

ttt gat tca tcc aac agg gcc act gcc atc cca gcc agg ttc act ggc       192
Phe Asp Ser Ser Asn Arg Ala Thr Ala Ile Pro Ala Arg Phe Thr Gly
    50                  55                  60

agt ggg tct ggg aca gac ttc act ctc acc atc agc agc cta gag cct       240
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65                  70                  75                  80

gaa gat ttt gca gtt tat tac tgt cag cag cgt gcc aac tgg cct cct       288
Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ala Asn Trp Pro Pro
                85                  90                  95

atc acc ttc ggc caa ggg aca cga ctg gac att aga cga act gtg gct       336
Ile Thr Phe Gly Gln Gly Thr Arg Leu Asp Ile Arg Arg Thr Val Ala
            100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       384
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       432
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       480
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       528
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       576
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       624
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

agc ttc aac agg gga gag tgt                                           645
Ser Phe Asn Arg Gly Glu Cys
```

210 215

<210> 2490
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2490
gt gac atc cag atg acc cag tct cct tcc acc ctg tct gca tct gta 47
Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val
1 5 10 15

gga gac aga gtc acc atc act tgc cgg gcc agt cag agt att agt agc 95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser
20 25 30

tgg ttg gcc tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc gtg 143
Trp Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Val
35 40 45

atc tat aag gca tct agt tta aaa agt ggg gtc cca tca agg ttc agc 191
Ile Tyr Lys Ala Ser Ser Leu Lys Ser Gly Val Pro Ser Arg Phe Ser
50 55 60

ggc agt gga tct ggg aca gag ttc act ctc acc atc agc agc ctg cag 239
Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln
65 70 75

cct gat gat ttt gct act tat tac tgc caa cag tat aat agt tac ccg 287
Pro Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Tyr Pro
80 85 90 95

tgg acg ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg gct 335
Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
100 105 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct 383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
115 120 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag 431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
130 135 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc 479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145 150 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc 527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu

```
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgg                                           644
Ser Phe Asn Arg Gly Glu Trp
        210

<210> 2491
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2491
ccc tat gtg ctg act cag cca ccc tca gtg tca gtg gcc cca gga aag        48
Pro Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Lys
1               5                   10                  15

acg gcc agg att acc tgt ggg gga aac aac att gga agt aaa agt gtg        96
Thr Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Ser Lys Ser Val
            20                  25                  30

cac tgg tac cag cag aag cca ggc cag gcc cct gtg ctg gtc atc tat       144
His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

tat gat agc gac cgg ccc tca ggg atc cct gag cga ttc tct ggc tcc       192
Tyr Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

aac tct ggg aac acg gcc acc ctg acc atc agc agg gtc gaa gcc ggg       240
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65                  70                  75                  80

gat gag gcc gac tat tac tgt cag gtg tgg gat agt agt agt gat cat       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Ser Asp His
                85                  90                  95

tat gtg gta ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag ccc       336
Tyr Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro
            100                 105                 110

aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag ctt       384
Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu
```

```
        115                 120                 125

caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg       432
Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro
    130                 135                 140

gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg       480
Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala
145                 150                 155                 160

gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg       528
Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala
                165                 170                 175

gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac aga       576
Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg
            180                 185                 190

agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca       624
Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr
        195                 200                 205

gtg gcc cct aca gaa tgt tca                                          645
Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2492
<211> 327
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2492
ga gaa att gtg ttg aca cag tct cca gcc acc ctg tct ttg tct cca         47
   Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro
   1               5                  10                  15

ggg gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc acc        95
Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Thr
                20                  25                  30

tac tta gcc tgg tac caa cag aaa cct ggc cag gct ccc agg ctc ctc       143
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
            35                  40                  45

atc tat gat gca tcc aac agg gcc act ggc atc cca gcc agg ttc agt       191
Ile Tyr Asp Ala Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser
        50                  55                  60

ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc agc cta gag       239
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu
```

```
    65                  70                  75

cct gaa gat ttt gca gtt tat tac tgt cag cag cgt agc aac tgg cct       287
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ser Asn Trp Pro
80                  85                  90                  95

ccg ctc act ttc ggc gga ggg acc aag gtg gag atc gaa c                 327
Pro Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Glu
                100                 105
```

<210> 2493
<211> 659
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2493

```
gg gat att gtg atg act cag tct cca ctc tcc ctg ccc gtc acc cct         47
   Asp Ile Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Pro
   1               5                  10                  15

gga gag ccg gcc tcc atc tcc tgc agg tct agt cag agc ctc ctg cat        95
Gly Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu His
                20                  25                  30

agt aat gga tac aac tat ttg gat tgg tac gtg cag aag cca ggg cag       143
Ser Asn Gly Tyr Asn Tyr Leu Asp Trp Tyr Val Gln Lys Pro Gly Gln
            35                  40                  45

tct cca cag ctc ctg atc tat ttg ggg tct aat cgg gcc tcc ggg gtc       191
Ser Pro Gln Leu Leu Ile Tyr Leu Gly Ser Asn Arg Ala Ser Gly Val
        50                  55                  60

act gac agg ctc agt ggc agt gga tca ggc aca gat ttc aca ctg gaa       239
Thr Asp Arg Leu Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Glu
    65                  70                  75

atc ggc aga gtg gag gct gag gat gtt ggg gtt tat tac tgc atg caa       287
Ile Gly Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln
80                  85                  90                  95

gct cta caa act ccc tac act ttt ggc cag ggg acc aag ctg gag atc       335
Ala Leu Gln Thr Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile
                100                 105                 110

aga cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat       383
Arg Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
            115                 120                 125

gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac       431
Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
```

```
        130                 135                 140

ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc       479
Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
    145                 150                 155

caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac       527
Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
160                 165                 170                 175

agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac       575
Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
                180                 185                 190

gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc       623
Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
            195                 200                 205

tcg ccc gtc aca aag agc ttc aac agg gga gag tgt                       659
Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215

<210> 2494
<211> 641
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2494
gt gac atc cag atg acc cag tct cct tcc acc ctg tct gca tct gta         47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val
   1               5                  10                  15

gga gac aga gtc acc atc act tgc cgg gcc agt cag agt att agt agc        95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser
                20                  25                  30

tgg ttg gcc tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg       143
Trp Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
            35                  40                  45

atc tat aag gcg tct agt tta gaa agt ggg gtc cca tca agg ttc agc       191
Ile Tyr Lys Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60

ggc agt gga tct ggg aca gaa ttc act ctc acc atc agc agc ctg cag       239
Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln
    65                  70                  75

cct gat gat ttt gca act tat tac tgc caa cag tat aat agt tat tcg       287
Pro Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Tyr Ser
```

```
80                  85                  90                  95

acg ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg gct gca       335
Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
                100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       383
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
            115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       431
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
        130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       479
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
    145                 150                 155

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       527
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
160                 165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       575
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
                180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       623
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
            195                 200                 205

ttc aac agg gga gag tgg                                              641
Phe Asn Arg Gly Glu Trp
        210

<210> 2495
<211> 333
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2495
ct cag act gtg gtg acc cag gag ccg tcg gtc tca gtg tcc cct gga         47
   Gln Thr Val Val Thr Gln Glu Pro Ser Val Ser Val Ser Pro Gly
   1               5                   10                  15

ggg aca gtc aca ctc act tgt ggc ttg agg tct ggc tca gtc tca act        95
Gly Thr Val Thr Leu Thr Cys Gly Leu Arg Ser Gly Ser Val Ser Thr
                20                  25                  30

gga aac tac ccc agc tgg tac cag cag acc cca ggc cag gct cca cgc       143
Gly Asn Tyr Pro Ser Trp Tyr Gln Gln Thr Pro Gly Gln Ala Pro Arg
```

```
            35                  40                  45

act ctc atc tac aac att aat act cgg tcg tcc ggg gtc cct cat cgc       191
Thr Leu Ile Tyr Asn Ile Asn Thr Arg Ser Ser Gly Val Pro His Arg
        50                  55                  60

ttc tct gcc tcc att att gat aac aga gct gcc ctc acc atc acg ggg       239
Phe Ser Ala Ser Ile Ile Asp Asn Arg Ala Ala Leu Thr Ile Thr Gly
    65                  70                  75

gcc cag tca gat gat gaa tct ctt tat tac tgt ttg cta tat atg ggc       287
Ala Gln Ser Asp Asp Glu Ser Leu Tyr Tyr Cys Leu Leu Tyr Met Gly
80                  85                  90                  95

agt ggc att tcg gtt ttc ggc gga ggg acc aag gtg acc gtc tta g         333
Ser Gly Ile Ser Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu
                100                 105                 110

<210> 2496
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2496
gaa att gtc ttg acg cag tct cca ggc acc ctg tct tcg act cta ggt        48
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Ser Thr Leu Gly
1               5                   10                  15

gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc agc agc        96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Ser
            20                  25                  30

tac tta gcc tgg tac caa cag aaa cct ggc cag gct ccc agg ctc ctc       144
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

atc tat ggt gca tcc cgc agg gcc act ggc atc cca gac agg ttc agt       192
Ile Tyr Gly Ala Ser Arg Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc aga ctg gag       240
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

cct gaa gat ttt gca gtg tat tac tgt cag cac tat ggt gcc tca ccg       288
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln His Tyr Gly Ala Ser Pro
                85                  90                  95

ccg tgg acg ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg       336
Pro Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val
```

```
            100                 105                 110

gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa       384
Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
        115                 120                 125

tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga       432
Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
    130                 135                 140

gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac       480
Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
145                 150                 155                 160

tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc       528
Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
                165                 170                 175

ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa       576
Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
            180                 185                 190

gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca       624
Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
        195                 200                 205

aag agc ttc aac agg gga gag tgt                                      648
Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 2497
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2497
ccc tat gtg ctg act cag cca ccc tcg gtg tca gtg gcc cca gga cag        48
Pro Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Gln
1               5                   10                  15

acg gcc aga att acc tgt ggg gga aac aac att gga agt aag agt gtg        96
Thr Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Ser Lys Ser Val
            20                  25                  30

cac tgg tac cag cag aag cca ggc cag gcc cct gtg atg gtc gtc tat       144
His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Met Val Val Tyr
        35                  40                  45

gct gat aga gag cgg ccc tca ggg atc ccc gag cga ctc tct ggc tcc       192
Ala Asp Arg Glu Arg Pro Ser Gly Ile Pro Glu Arg Leu Ser Gly Ser
```

```
    50                  55                  60

aac ttt ggg aac acg gcc acc ctg acc atc agc agg gtc gaa gcc ggg       240
Asn Phe Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65                  70                  75                  80

gat gag gcc gac tat tac tgt cag gtg tgg gat agt aat aat gat cac       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Asn Asn Asp His
                85                  90                  95

cgg gag gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag ccc       336
Arg Glu Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro
            100                 105                 110

aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag ctt       384
Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu
        115                 120                 125

caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg       432
Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro
    130                 135                 140

gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg       480
Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala
145                 150                 155                 160

gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg       528
Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala
                165                 170                 175

gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac aaa       576
Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys
            180                 185                 190

agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca       624
Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr
        195                 200                 205

gtg gcc cct aca gaa tgt tca                                          645
Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2498
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2498
gac atc cag atg acc cag tct cct tcc acc ctg tct gca tct gta gga        48
Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
```

```
1               5                   10                  15

gac aga gtc acc atc act tgc cgg gcc agt cag agt att agt agg tgg        96
Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Arg Trp
            20                  25                  30

ttg gcc tgg tat cag cag aaa cca ggg aaa gcc cct aaa ctc ctg atc       144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

tat aag gcg tct gct tta gaa agt ggg gtc cca tca agg ttc agc ggc       192
Tyr Lys Ala Ser Ala Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

agt gga tct ggg aca gaa ttc act ctc acc atc agc agc ctg caa cct       240
Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

gat gat ttt gca act tat tac tgc caa cag tat gat agt tat cct ctc       288
Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asp Ser Tyr Pro Leu
                85                  90                  95

tct ttc ggc gga ggg acc aag gtg gag atc aaa cga act gtg gct gca       336
Ser Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       384
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       432
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       480
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       528
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       576
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       624
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

ttc aac agg gga gag tgg                                              642
Phe Asn Arg Gly Glu Trp
    210
```

<210> 2499
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2499
```
gca acg aca ctc acg cag tct cca gca ttc atg tca gcg act cca gga        48
Ala Thr Thr Leu Thr Gln Ser Pro Ala Phe Met Ser Ala Thr Pro Gly
1               5                   10                  15

gac aga gtc aac atc tcc tgc aaa gcc agc caa gac att gat gat gat        96
Asp Arg Val Asn Ile Ser Cys Lys Ala Ser Gln Asp Ile Asp Asp Asp
            20                  25                  30

atg aac tgg tac caa cag aaa cca gga gaa gct gct att ttc att att       144
Met Asn Trp Tyr Gln Gln Lys Pro Gly Glu Ala Ala Ile Phe Ile Ile
        35                  40                  45

caa gaa gct act act ctc gtt cct ggc gtc cca cct cga ttc agt ggc       192
Gln Glu Ala Thr Thr Leu Val Pro Gly Val Pro Pro Arg Phe Ser Gly
    50                  55                  60

agc ggg tat ggg aca gat ttt acc ctc aca att aat aac ata gaa tct       240
Ser Gly Tyr Gly Thr Asp Phe Thr Leu Thr Ile Asn Asn Ile Glu Ser
65                  70                  75                  80

gag gat gct gca tat tac ttc tgt cta caa cat gat aat ttc ccg tac       288
Glu Asp Ala Ala Tyr Tyr Phe Cys Leu Gln His Asp Asn Phe Pro Tyr
                85                  90                  95

act ttt ggc cag ggg acc aag ctg gag atc aaa cga act gtg gct gca       336
Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       384
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       432
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       480
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       528
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175
```

```
agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       576
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       624
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

ttc aac agg gga gag tgg                                               642
Phe Asn Arg Gly Glu Trp
    210
```

<210> 2500
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2500

```
gaa att gtg ttg acg cag tct cca ggc acc ctg tct ttg tct cca ggg        48
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

gaa aga gcc atc ctc tcc tgc agg gcc ggt cag agt att ggc gcc gcc        96
Glu Arg Ala Ile Leu Ser Cys Arg Ala Gly Gln Ser Ile Gly Ala Ala
            20                  25                  30

tac tta gcc tgg tac caa cag aaa cct ggc cag gct ccc aga ctc ctc       144
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

atc tct ggt gca tcc agg agg gcc act ggc atc cca gac agg ttc agt       192
Ile Ser Gly Ala Ser Arg Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc aga cta gag       240
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

cct gaa gat ttt gca gtg tat tac tgt cag caa tac ggc agt tca ccg       288
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser Pro
                85                  90                  95

ctc acc ttc ggc gga ggg acc aag gtg gag atc aaa cga act gtg gct       336
Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
            100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       384
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125
```

```
gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       432
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       480
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       528
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       576
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       624
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

agc ttc aac agg gga gag tgt                                          645
Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 2501
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2501

```
ctc tat gag ctg aca cag cca ccc tcg gtg tca gtg tcc cca gga caa        48
Leu Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                   10                  15

acg gcc agg atc acc tgc tct gga gat gca ttg cca aaa aaa tat gct        96
Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Lys Lys Tyr Ala
            20                  25                  30

tat tgg tac cag cag aag tca ggc cag gcc cct gtg ctg gtc atc tat       144
Tyr Trp Tyr Gln Gln Lys Ser Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

gag gac agc aaa cga ccc tcc ggg atc cct gag aga ttc tct ggc tcc       192
Glu Asp Ser Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

agc tca ggg aca atg gcc acc ttg act atc agt ggg gcc cag gtg gag       240
Ser Ser Gly Thr Met Ala Thr Leu Thr Ile Ser Gly Ala Gln Val Glu
65                  70                  75                  80
```

```
gat gaa gct gac tac tac tgt tac tca aca gac agc agt ggt aat cat       288
Asp Glu Ala Asp Tyr Tyr Cys Tyr Ser Thr Asp Ser Ser Gly Asn His
                85                  90                  95

ggg gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag ccc aag       336
Gly Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
            100                 105                 110

gct gcc ccc tcg gtc act ctg ttc cca ccc tcc tct gag gag ctt caa       384
Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
        115                 120                 125

gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga       432
Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
    130                 135                 140

gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga       480
Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145                 150                 155                 160

gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc       528
Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
                165                 170                 175

agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac aaa agc       576
Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser
            180                 185                 190

tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg       624
Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
        195                 200                 205

gcc cct aca gaa tgt tca                                              642
Ala Pro Thr Glu Cys Ser
    210
```

<210> 2502
<211> 659
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2502

```
gg gat att gtg atg act cag tct cca ctc tcc ctg ccc gtc acc cct         47
   Asp Ile Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Pro
   1               5                  10                  15

gga gag ccg gcc tcc atc tcc tgc agg tct agt cag agc ctc ctg cat        95
Gly Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu His
                20                  25                  30
```

```
agt gat gga tac aac tat ttg gat tgg tac ctg cag aag cca ggg cag       143
Ser Asp Gly Tyr Asn Tyr Leu Asp Trp Tyr Leu Gln Lys Pro Gly Gln
            35                  40                  45

tct cca cag ctc ctg atc tac ttg ggt tct aat cgg gcc tcc ggg gtc       191
Ser Pro Gln Leu Leu Ile Tyr Leu Gly Ser Asn Arg Ala Ser Gly Val
        50                  55                  60

cct gac agg ttc agt ggc agt gga tca ggc aca gat ttt aca ctg aaa       239
Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys
    65                  70                  75

atc agc aga gtg gag gct gag gat gtt ggg gtt tat tac tgc atg caa       287
Ile Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln
80                  85                  90                  95

gct cta caa act cct aac act ttt ggc cag ggg acc aag ctg gag atc       335
Ala Leu Gln Thr Pro Asn Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile
                100                 105                 110

aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat       383
Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
            115                 120                 125

gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac       431
Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
        130                 135                 140

ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc       479
Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
    145                 150                 155

caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac       527
Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
160                 165                 170                 175

agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac       575
Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
                180                 185                 190

gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc       623
Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
            195                 200                 205

tcg ccc gtc aca aag agc ttc aac agg gga gag tgt                       659
Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215
```

<210> 2503
<211> 651
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2503

```
cag tct gcc ctg act cag cct gcc tcc gtg tct ggg tct cct gga cag        48
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                  10                  15

tcg atc acc atc tcc tgc act gga acc agc agt gac gtt ggt ggt tat        96
Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr
            20                  25                  30

aac tat gtc tcc tgg tac caa cac cac cca gac aaa gcc ccc aaa ctc       144
Asn Tyr Val Ser Trp Tyr Gln His His Pro Asp Lys Ala Pro Lys Leu
        35                  40                  45

ata att tat gag gtc aag aat cgg ccc tca ggg gtt tct aat cgc ttc       192
Ile Ile Tyr Glu Val Lys Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
    50                  55                  60

tct ggc tcc aag tct gac aac acg gcc tcc ctg acc atc tct ggg ctc       240
Ser Gly Ser Lys Ser Asp Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

cag gct gag gac gag gct gat tat tac tgc aac tca tat tca agc agc       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Asn Ser Tyr Ser Ser Ser
                85                  90                  95

agc act ctt tat gtc ttc gga act ggg acc aag gtc acc gtc cta agt       336
Ser Thr Leu Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Ser
            100                 105                 110

cag ccc aag gcc aac ccc act gtc act ctg ttc ccg ccc tcc tct gag       384
Gln Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

gag ctc caa gcc aac aag gcc aca cta gtg tgt ctg atc agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

tac ccg gga gct gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aaa ccc tcc aaa cag agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

tac gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
```

```
        195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                    651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2504
<211> 647
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2504
ga gaa att gtg ttg acg cag tct cca gcc acc ctg tct ttg tct cca          47
   Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro
   1               5                  10                  15

ggg gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt att agc agt         95
Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Ile Ser Ser
                20                  25                  30

aac tta gcc tgg tac caa cag aaa cct ggc cag gct ccc agg ctc ctc        143
Asn Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
            35                  40                  45

atc tat gat gca tcc aac agg gcc act ggc atc cca gcc agg ttc agt        191
Ile Tyr Asp Ala Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser
        50                  55                  60

ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc agc ctc gag        239
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu
    65                  70                  75

cct gaa gat ttt gca gtt tat tac tgt caa caa cat agc aac tgg cct        287
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln His Ser Asn Trp Pro
80                  85                  90                  95

gag ctc act ttc ggc gga ggg acc aag gtg gag atc aaa cga act gtg        335
Glu Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val
                100                 105                 110

gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa        383
Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
            115                 120                 125

tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga        431
Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
        130                 135                 140

gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac        479
Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
```

```
    145                 150                 155

tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc       527
Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
160                 165                 170                 175

ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa       575
Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
                180                 185                 190

gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca       623
Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
            195                 200                 205

aag agc ttc aac agg gga gag tgt                                       647
Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215

<210> 2505
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2505
gcc tct gcc ctg act cag cct gcc tcc gtg tct ggg tct cct gga cag        48
Ala Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

tcg atc acc atc tcc tgc act gga acc agc agt gac gtt ggt ggt tat        96
Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr
            20                  25                  30

aac tat gtc tcc tgg tac caa caa cac cca ggc aaa gcc ccc aaa ctc       144
Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

atg att tat gat gtc agt aat cgg ccc tca ggg gtt tct aat cgc ttc       192
Met Ile Tyr Asp Val Ser Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc aac acg gcc tcc ctg acc atc tct ggg ctc       240
Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

cag gct gag gac gag gct gat tat tac tgc agc tcg tat aga agc agc       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Arg Ser Ser
                85                  90                  95

ggc gtt tat gtc ttc gga act ggg acc aag gtc acc gtc cta ggt cag       336
Gly Val Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly Gln
```

```
            100                 105                 110

ccc aag gcc aac ccc act gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctc caa gcc aac aag gcc aca cta gtg tgt ctg atc agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gct gtg aca gtg gcc tgg aag gca gat ggc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aaa ccc tcc aaa cag agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tac ctg agc ctg acg ccc gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2506
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2506
caa gtt gtg atg acc cag act cca ctc tct ctg tcc gtc acc cct gga        48
Gln Val Val Met Thr Gln Thr Pro Leu Ser Leu Ser Val Thr Pro Gly
1               5                   10                  15

cag ccg gcc tcc atc tcc tgc aag tct agt cag cgc ctc ctg cat agt        96
Gln Pro Ala Ser Ile Ser Cys Lys Ser Ser Gln Arg Leu Leu His Ser
            20                  25                  30

gat gga aag acc tat ttg tat tgg tac ctg cag aag cca ggc cag tct       144
Asp Gly Lys Thr Tyr Leu Tyr Trp Tyr Leu Gln Lys Pro Gly Gln Ser
        35                  40                  45

cca cag ctc ctg atc tat gaa gtt tcc aac cgg ttc tct gga gtg cca       192
Pro Gln Leu Leu Ile Tyr Glu Val Ser Asn Arg Phe Ser Gly Val Pro
```

```
    50                  55                  60

gat agg ttc agt ggc agc ggg tca ggg aca gat ttc aca ctg aaa atc       240
Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65                  70                  75                  80

agc cgg gtg gag gct gcg gat gtt ggg gtt tat tac tgc atg caa agt       288
Ser Arg Val Glu Ala Ala Asp Val Gly Val Tyr Tyr Cys Met Gln Ser
                85                  90                  95

ata cac ctt ccg tac act ttt ggc cag ggg acc aag ctg gag atc aaa       336
Ile His Leu Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
            100                 105                 110

cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag       384
Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
        115                 120                 125

cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc       432
Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
    130                 135                 140

tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa       480
Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
145                 150                 155                 160

tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac agc       528
Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
                165                 170                 175

acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag       576
Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
            180                 185                 190

aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg       624
Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
        195                 200                 205

ccc gtc aca aag agc ttc aac agg gga gag tgg                           657
Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Trp
    210                 215
```

<210> 2507
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2507

```
gaa att gtg ttg acg cag tct cca ggc acc ctg tct ttg tct cca ggg        48
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
```

```
1               5                   10                  15

gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtc agc agt agc        96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Ser
            20                  25                  30

ttc ttg gcc tgg tac cag cag aaa cct ggc cag gct ccc aga ctc ctc       144
Phe Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

atc tat ggc gca tcc agc agg gcc act ggc gtc gca gac agg ttc agt       192
Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Val Ala Asp Arg Phe Ser
    50                  55                  60

ggc agt ggg tct ggg aca gac ttc act ctc acc atc aac aga ctg gag       240
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Asn Arg Leu Glu
65                  70                  75                  80

cct gaa gat ttt gca gtg tat tac tgt cac cag tat ggt ggc tca cct       288
Pro Glu Asp Phe Ala Val Tyr Tyr Cys His Gln Tyr Gly Gly Ser Pro
                85                  90                  95

cca aac act ttt ggc cag ggg acc aag gtg gag atc aaa cga act gtg       336
Pro Asn Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val
            100                 105                 110

gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa       384
Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
        115                 120                 125

tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga       432
Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
    130                 135                 140

gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac       480
Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
145                 150                 155                 160

tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc       528
Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
                165                 170                 175

ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa       576
Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
            180                 185                 190

gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca       624
Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
        195                 200                 205

aag agc ttc aac agg gga gag tgt                                       648
Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 2508
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2508
```
gac atc cag ttg acc cag tct cca tcc ttc ctg tct gca tct gta gga        48
Asp Ile Gln Leu Thr Gln Ser Pro Ser Phe Leu Ser Ala Ser Val Gly
1               5                  10                  15

gac aga gtc acc atc act tgc cgg gcc agt cag gac gtt gac act tat        96
Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Asp Val Asp Thr Tyr
            20                  25                  30

tta gcc tgg tat cag caa aaa cca ggg aaa gcc cct aag ctc ctg atc       144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

tat gct gca tcc act ttg cac agt ggg gtc cca tca agg ttc agc ggc       192
Tyr Ala Ala Ser Thr Leu His Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

agt gga gct ggg aca gaa ttc act ctc aca atc agc agc ctg cag cct       240
Ser Gly Ala Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

gaa gat ttt gca act tat tat tgt caa caa ctt aat agt tac cct cca       288
Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Leu Asn Ser Tyr Pro Pro
                85                  90                  95

ctc act ttc ggc ggg ggg acc aag gtg gag atc aaa cga act gtg gct       336
Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
            100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       384
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       432
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       480
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       528
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175
```

```
agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       576
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       624
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

agc ttc aac agg gga gag tgt                                           645
Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 2509
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2509
cag tct gtg ttg acg cag ccg ccc tca tta tct gcg gcc cca gga cag        48
Gln Ser Val Leu Thr Gln Pro Pro Ser Leu Ser Ala Ala Pro Gly Gln
1               5                   10                  15

aag gtc ata atc tcc tgc tct gga agc agc tcc aat att ggg aaa tat        96
Lys Val Ile Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Lys Tyr
            20                  25                  30

tct gtt ttc tgg tac cag caa gtc cca gga aca ggc ccc aaa ctc ctc       144
Ser Val Phe Trp Tyr Gln Gln Val Pro Gly Thr Gly Pro Lys Leu Leu
        35                  40                  45

att ttt gac aat aac aga cga ccc tct ggg atc cgt gac cga ttc tct       192
Ile Phe Asp Asn Asn Arg Arg Pro Ser Gly Ile Arg Asp Arg Phe Ser
    50                  55                  60

gcc tcc aag tct ggc acg tca gcc acc ctg gag atc acc ggc ctc cag       240
Ala Ser Lys Ser Gly Thr Ser Ala Thr Leu Glu Ile Thr Gly Leu Gln
65                  70                  75                  80

act ggg gac gag gca cat tat tac tgc gca aca tgg gat agc agc ctg       288
Thr Gly Asp Glu Ala His Tyr Tyr Cys Ala Thr Trp Asp Ser Ser Leu
                85                  90                  95

act gct ggg gtg ttc ggc gga ggg acc aaa ctg acc gtc cta cgt cag       336
Thr Ala Gly Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Arg Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc cca ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125
```

```
ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat ggc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aaa agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2510
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2510

```
ga gaa att gtg ttg aca cag tct cca gcc acc ctg tcc ttg tct cca         47
   Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro
   1               5                  10                  15

gga aat aga gcc gcc ctc tcc tgc agg gcc agt cag agt gtt ggt agc        95
Gly Asn Arg Ala Ala Leu Ser Cys Arg Ala Ser Gln Ser Val Gly Ser
                20                  25                  30

tcc tta cac tgg tat caa cag aaa cct ggc cag gcc ccc agg ctc ctc       143
Ser Leu His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
            35                  40                  45

atc tat gat gtg tcc aac agg gcc gct ggc atc cca ggc agg ttc agt       191
Ile Tyr Asp Val Ser Asn Arg Ala Ala Gly Ile Pro Gly Arg Phe Ser
        50                  55                  60

gcc agt ggg tct ggg aca gac ttc act ctc acc atc agc aac cta gag       239
Ala Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Asn Leu Glu
    65                  70                  75
```

```
cct gaa gat ttt gca gtt tat tac tgt cag cag cgt agc gcc tgg cct       287
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ser Ala Trp Pro
80                  85                  90                  95

atc act ttc ggc caa ggg aca cga ctg gag att aaa cga act gtg gct       335
Ile Thr Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys Arg Thr Val Ala
                100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgt                                          644
Ser Phe Asn Arg Gly Glu Cys
        210

<210> 2511
<211> 650
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2511
ga gaa att gtg ttg acg cag tct cca ggc acc ctg tct ttg tct cca         47
   Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro
   1               5                  10                  15

ggg gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc agc        95
Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser
                20                  25                  30
```

```
agc tac tta gcc tgg tac cag cag aaa cct ggc cag gct ccc agg ctc       143
Ser Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu
            35                  40                  45

ctc atc tct ggt gca tcc agc agg gcc act ggc atc cca gac agg ttc       191
Leu Ile Ser Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe
        50                  55                  60

agt ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc aga ctg       239
Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu
    65                  70                  75

gag cct gaa gat ttt gca gtg tat tac tgt cag cag tat ggt agc tca       287
Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser
80                  85                  90                  95

cgg aag ctc act ttc ggc gga ggg acc aag gtg gag atc aaa cga act       335
Arg Lys Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr
                100                 105                 110

gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg       383
Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu
            115                 120                 125

aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc       431
Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro
        130                 135                 140

aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt       479
Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly
    145                 150                 155

aac tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac       527
Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr
160                 165                 170                 175

agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac       575
Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His
                180                 185                 190

aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc       623
Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val
            195                 200                 205

aca aag agc ttc aac agg gga gag tgt                                   650
Thr Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215
```

<210> 2512
<211> 322
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2512
gac atc cag atg acc cag tct cct tcc acc ctg tct gca tct gta gga 48
Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1 5 10 15

gac aga gtc acc atc act tgc cgg gcc agt cag agt att agt gtc tgg 96
Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Val Trp
20 25 30

ttg gcc tgg tat caa cag aaa cca ggg aaa gcc cct aaa ctc ctg atc 144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

tat aag gcg tct act tta gaa gct ggg gtc cca tcg agg ttt tcc ggc 192
Tyr Lys Ala Ser Thr Leu Glu Ala Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

agc gga tct ggg aca gaa ttt tct ctc act atc agc ggc cta cag cct 240
Ser Gly Ser Gly Thr Glu Phe Ser Leu Thr Ile Ser Gly Leu Gln Pro
65 70 75 80

gat gac ttt gga act tat ttc tgt caa cac tat gac agt tat ccg tgg 288
Asp Asp Phe Gly Thr Tyr Phe Cys Gln His Tyr Asp Ser Tyr Pro Trp
85 90 95

acg ttc ggc caa ggg acc aag gtg gag atg aaa c 322
Thr Phe Gly Gln Gly Thr Lys Val Glu Met Lys
100 105

<210> 2513
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2513
gtt tct tcc gag ctg act cag gac cct gct gtg tct gtg gcc ttg gga 48
Val Ser Ser Glu Leu Thr Gln Asp Pro Ala Val Ser Val Ala Leu Gly
1 5 10 15

cag aca gtc agg atc aca tgc caa gga gac agt ctc aga agg tat tat 96
Gln Thr Val Arg Ile Thr Cys Gln Gly Asp Ser Leu Arg Arg Tyr Tyr
20 25 30

gta agc tgg tac cgg cag aag cca gga gag gcc cct gta gtt gtc atc 144
Val Ser Trp Tyr Arg Gln Lys Pro Gly Glu Ala Pro Val Val Val Ile
35 40 45

```
tat ggt aaa aac aat cgg ccc tca tgg atc cca gac cga ctc tct ggc       192
Tyr Gly Lys Asn Asn Arg Pro Ser Trp Ile Pro Asp Arg Leu Ser Gly
    50                  55                  60

tcc agt tca gga aac aca gct tcc ttg acc atc act ggg gct cag gcg       240
Ser Ser Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala
65                  70                  75                  80

gaa gat gag gct gac tat tac tgt tgt tcc cgg gac agc agt ggt aac       288
Glu Asp Glu Ala Asp Tyr Tyr Cys Cys Ser Arg Asp Ser Ser Gly Asn
                85                  90                  95

cct tgg gta ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag ccc       336
Pro Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro
            100                 105                 110

aag gct gcc ccc tcg gtc act ctg ttc cca ccc tcc tct gag gag ctt       384
Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu
        115                 120                 125

caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg       432
Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro
    130                 135                 140

gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg       480
Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala
145                 150                 155                 160

gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg       528
Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala
                165                 170                 175

gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac aaa       576
Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys
            180                 185                 190

agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca       624
Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr
        195                 200                 205

gtg gcc cct aca gaa tgt tca                                          645
Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2514
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2514

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gtc atc cag atg acc cag tct cca acc tcc ctg tct gca tct gta gga        48
Val Ile Gln Met Thr Gln Ser Pro Thr Ser Leu Ser Ala Ser Val Gly
1               5                  10                  15

gac aga gtc acc atc act tgc cgg gca agt cag agc att agc agc tat        96
Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Tyr
            20                  25                  30

tta aat tgg tat cag cag aaa cta ggg aaa gcc cct aag ctc ctg atc       144
Leu Asn Trp Tyr Gln Gln Lys Leu Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

tat gct gca tcc agt ttg caa agt ggg gtc cca tca agg ttc agt ggc       192
Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

agt gga tct ggg aca gat ttc act ctc acc atc agc agt ctg caa cct       240
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

gaa gat ttt gca act tac tac tgt caa cag agt tac agc acg tcg ctc       288
Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Ser Leu
                85                  90                  95

act ttc ggc gga ggg acc aag gtg gag atc aaa cga act gtg gct gca       336
Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       384
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       432
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       480
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       528
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       576
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       624
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

ttc aac agg gga gag tgt                                               642
Phe Asn Arg Gly Glu Cys
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210

<210> 2515
<211> 653
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2515
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ga gaa att gtg ttg acg cag tct cca ggc acc ctg tct ttg tct cca         47
   Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro
   1               5                  10                  15

ggg gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc agc        95
Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser
                20                  25                  30

agc tac tta gcc tgg tac cag cag aaa cct ggc cag gct ccc agg ctc       143
Ser Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu
            35                  40                  45

ctc atc tat gat gca tcc agc agg gcc gct ggc gtc cca gac agg ttc       191
Leu Ile Tyr Asp Ala Ser Ser Arg Ala Ala Gly Val Pro Asp Arg Phe
        50                  55                  60

agt ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc aga ctg       239
Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu
    65                  70                  75

gag cct gaa gat ttt gca gtg tat ttc tgt cag cag tat gat agc tca       287
Glu Pro Glu Asp Phe Ala Val Tyr Phe Cys Gln Gln Tyr Asp Ser Ser
80                  85                  90                  95

cct ccc atg tac act ttt ggc cag ggg acc aag ctg gag atc aga cga       335
Pro Pro Met Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Arg Arg
                100                 105                 110

act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag       383
Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln
            115                 120                 125

ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat       431
Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr
        130                 135                 140

ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg       479
Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
    145                 150                 155

ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc       527
Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr
```

```
160                 165                 170                 175

tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa       575
Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys
                180                 185                 190

cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc       623
His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro
            195                 200                 205

gtc aca aag agc ttc aac agg gga gag tgt                               653
Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215

<210> 2516
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2516
ccg tct gtg ttg acg cag ccg ccc tca gtg tct gcg gcc cca gga cag        48
Pro Ser Val Leu Thr Gln Pro Pro Ser Val Ser Ala Ala Pro Gly Gln
1               5                   10                  15

aag gtc acc atc tcc tgc tct gga agc agc tcc aac att gac aat aat        96
Lys Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Asp Asn Asn
            20                  25                  30

tat gta tcc tgg tac cag cag ctc cca gga aca gcc ccc aaa ctc ctc       144
Tyr Val Ser Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
        35                  40                  45

atc tat gaa aat aat aag cga gcc tca ggg att cct gac cga ttc tct       192
Ile Tyr Glu Asn Asn Lys Arg Ala Ser Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

ggc tcc aag tct ggc acg tca gcc acc ctg ggc atc acc gga ctc cag       240
Gly Ser Lys Ser Gly Thr Ser Ala Thr Leu Gly Ile Thr Gly Leu Gln
65                  70                  75                  80

act ggg gac gag gcc gat tat tac tgc gga aca tgg gat agc agc ctg       288
Thr Gly Asp Glu Ala Asp Tyr Tyr Cys Gly Thr Trp Asp Ser Ser Leu
                85                  90                  95

agt cct ggg ggg gta ttc ggc gga ggg acc aag ctg acc gtc cta ggt       336
Ser Pro Gly Gly Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

cag ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag       384
Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
```

```
        115                 120                 125

gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

tac gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                   651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2517
<211> 641
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2517
gt gac atc cag atg acc cag tct cca tcc tcc ctg tct gca tct gta         47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
   1               5                  10                  15

gga gac aga gtc acc atc act tgc cgg gca agt cag acc att agc acc        95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Thr Ile Ser Thr
                20                  25                  30

tac tta aat tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg       143
Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
            35                  40                  45

atc tat gct gca tcc agt tta cag agt ggg gtc cca tca agg ttc agt       191
Ile Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60

ggc agt gga tct gag aca gat ttc act ctc acc atc agc agt ctg caa       239
Gly Ser Gly Ser Glu Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln
```

```
    65                  70                  75

cct gaa gat ttt gca act tac tac tgt caa cag agt tac aat gcc cgg       287
Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Asn Ala Arg
80                  85                  90                  95

acg ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg gct gca       335
Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
                100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       383
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
            115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       431
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
        130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       479
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
    145                 150                 155

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       527
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
160                 165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       575
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
                180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       623
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
            195                 200                 205

ttc aac agg gga gag tgt                                              641
Phe Asn Arg Gly Glu Cys
        210

<210> 2518
<211> 665
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2518
gg gac atc gtg atg acc cag tct cca gac tcc ctg gct gtg tct ctg         47
   Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu
   1               5                  10                  15

ggc gag agg gcc acc atc aac tgc aag tcc agc cag act gtt tta cac        95
Gly Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Thr Val Leu His
```

```
                20                  25                  30

agt tcc aac aat agg aac tac tta gct tgg tat cag cac aaa cca ggc       143
Ser Ser Asn Asn Arg Asn Tyr Leu Ala Trp Tyr Gln His Lys Pro Gly
            35                  40                  45

cag cct cct aag ctg ctc att tac tgg gct tct acc cgg gaa tcc ggg       191
Gln Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly
        50                  55                  60

gtc cct gac cga ttc agt ggc agc ggg tct ggg aca gat ttc act ctc       239
Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu
    65                  70                  75

acc atc aac agc ctt cag gct gaa gat gtg gct gtt tat tac tgt cag       287
Thr Ile Asn Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln
80                  85                  90                  95

caa tat tat gat act gct ccg ctc act ttc ggc ggc ggg acc aag gtg       335
Gln Tyr Tyr Asp Thr Ala Pro Leu Thr Phe Gly Gly Gly Thr Lys Val
                100                 105                 110

gag atc aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca       383
Glu Ile Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro
            115                 120                 125

tct gat gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg       431
Ser Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu
        130                 135                 140

aat aac ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac       479
Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn
    145                 150                 155

gcc ctc caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc       527
Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser
160                 165                 170                 175

aag gac agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca       575
Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala
                180                 185                 190

gac tac gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc       623
Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly
            195                 200                 205

ctg agc tcg ccc gtc aca aag agc ttc aac agg gga gag tgt               665
Leu Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215                 220

<210> 2519
<211> 642
<212> DNA
<213> Artificial Sequence
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2519
gaa ata gtg atg acg cag tct cca gcc acc ctg tct gtg tct cca ggg 48
Glu Ile Val Met Thr Gln Ser Pro Ala Thr Leu Ser Val Ser Pro Gly
1 5 10 15

gaa agg gcc acc ctc tcc tgc agg gcc agt cag agt gtt gac ggc aac 96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Asp Gly Asn
20 25 30

tta gcc tgg tac caa cag aaa cct ggc cag gct ccc agg ctc ctc atc 144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
35 40 45

ttt gac gca tct acc agg gcc act act atc cca gtc agg ttc agt ggc 192
Phe Asp Ala Ser Thr Arg Ala Thr Thr Ile Pro Val Arg Phe Ser Gly
50 55 60

agt ggg tct ggg aca gag ttc act ctc acc atc agc agc ctg cag tct 240
Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Ser
65 70 75 80

gaa gat ttt gca gtt tat tac tgt cag cag tat agt aaa tgg ccc atc 288
Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Ser Lys Trp Pro Ile
85 90 95

acc ttc ggc caa ggg aca cga ctg gag att aaa cga act gtg gct gca 336
Thr Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga 384
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc 432
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag 480
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc 528
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa ctc tac 576
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu Tyr
180 185 190

```
gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       624
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

ttc aac agg gga gag tgt                                           642
Phe Asn Arg Gly Glu Cys
    210
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<210> 2520
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2520

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gt gac atc cag atg acc cag tct cca tcc tcc ctg tct gca tct cta         47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Leu
   1               5                  10                  15

gga gac aga atc acc atc act tgc cgg gca act cag agc att agc aac        95
Gly Asp Arg Ile Thr Ile Thr Cys Arg Ala Thr Gln Ser Ile Ser Asn
                20                  25                  30

tat tta aat tgg tat caa caa aaa tca ggg aaa gtc cct gaa ctt ctg       143
Tyr Leu Asn Trp Tyr Gln Gln Lys Ser Gly Lys Val Pro Glu Leu Leu
            35                  40                  45

att tat gct gca tcc cat ttg caa agt ggg gtc cca tca agg ttc agt       191
Ile Tyr Ala Ala Ser His Leu Gln Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60

ggc act gga tct ggg aca gac ttc agt ctc aca atc agc ggt ctg cag       239
Gly Thr Gly Ser Gly Thr Asp Phe Ser Leu Thr Ile Ser Gly Leu Gln
    65                  70                  75

cct gaa gat ttt gca act tac tac tgt caa cag act tac act acc cct       287
Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Thr Tyr Thr Thr Pro
80                  85                  90                  95

agg acg ttc ggc cga ggg acc acg gtg gag atc aga cga act gtg gct       335
Arg Thr Phe Gly Arg Gly Thr Thr Val Glu Ile Arg Arg Thr Val Ala
                100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140
```

```
gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgt                                          644
Ser Phe Asn Arg Gly Glu Cys
        210

<210> 2521
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2521
ccg tct gtg ctg acg cag ccg ccc tca gtg tct ggg gcc cca gga cag        48
Pro Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

agg gtc acc atc tcc tgc act ggg agc agc tcc aac atc ggg gca ggt        96
Arg Val Thr Ile Ser Cys Thr Gly Ser Ser Ser Asn Ile Gly Ala Gly
            20                  25                  30

tat gat gta cac tgg tac cag cag ctt cca gga aca gcc ccc aaa ctc       144
Tyr Asp Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

ctc atc tat ggt aac atc aat cgg ccc tca ggg gtc cct gac cga ttc       192
Leu Ile Tyr Gly Asn Ile Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc ccc tca gcc tcc ctg acc atc act ggg ctc       240
Ser Gly Ser Lys Ser Gly Pro Ser Ala Ser Leu Thr Ile Thr Gly Leu
65                  70                  75                  80

cag gct gac gat gag gct gat tat tac tgc cag tcc tat gac agc cgc       288
Gln Ala Asp Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Arg
                85                  90                  95
```

```
ctg agt ggt gtg gta ttc ggc ggg ggg acc aag ctg acc gtc cta ggt       336
Leu Ser Gly Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

cag ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag       384
Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

tac gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                  651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2522
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2522

```
gaa ata gtg atg acg cag tct cca gcc acc ctg tct gtg tct cca ggg        48
Glu Ile Val Met Thr Gln Ser Pro Ala Thr Leu Ser Val Ser Pro Gly
1               5                   10                  15

gag aga gcc acc ctc tcc tgc agg gcc agt cag agt gtg agc acc aac        96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Thr Asn
            20                  25                  30

tta gcc tgg tac cag cag aga cct ggc cag gct ccc agg ctc ttc atc       144
Leu Ala Trp Tyr Gln Gln Arg Pro Gly Gln Ala Pro Arg Leu Phe Ile
        35                  40                  45
```

```
ttt ggt gca tcc acc agg gcc act ggt atc cca gcc agg ttc agt ggc       192
Phe Gly Ala Ser Thr Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly
    50                  55                  60

agt ggg tct ggg aca gag ttc act ctc acc atc agc agc ccg cag cct       240
Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Pro Gln Pro
65                  70                  75                  80

gaa gac tct gca gtt tat tac tgt cag cag tat act acc agg cct ctc       288
Glu Asp Ser Ala Val Tyr Tyr Cys Gln Gln Tyr Thr Thr Arg Pro Leu
                85                  90                  95

act ttc ggc gga ggg acc aag gtg gag atc aaa cga act gtg gct gca       336
Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       384
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       432
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       480
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       528
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       576
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       624
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

ttc aac agg gga gag tgt                                              642
Phe Asn Arg Gly Glu Cys
    210
```

<210> 2523
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2523

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gc gaa att gtg ttg aca cag tct cca gcc acc ttg tct ttg tct cca         47
   Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro
   1               5                  10                  15

ggg gaa gga gcc acc ctc tcc tgc agg gcc agt cag agt gtg agt ggc        95
Gly Glu Gly Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Gly
                20                  25                  30

tac tta gcc tgg tac caa cag aaa cct ggc cag gct ccc agg ctc ctc       143
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
            35                  40                  45

atc tat gac gca tcc aac agg gcc act ggc atc cct gcc agg ttc agt       191
Ile Tyr Asp Ala Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser
        50                  55                  60

ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc agc cta gag       239
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu
    65                  70                  75

cct gaa gat ttt gca gtt tat tac tgt caa cag cgg agc aag tgg cct       287
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ser Lys Trp Pro
80                  85                  90                  95

ctc act ttc ggc gga ggg acc cag gtg gag atc aaa cga act gtg gct       335
Leu Thr Phe Gly Gly Gly Thr Gln Val Glu Ile Lys Arg Thr Val Ala
                100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa ctc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgt                                          644
Ser Phe Asn Arg Gly Glu Cys
```

210

<210> 2524
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2524

```
cag tct gtg gtg act caa cca ccc tca gcg tct ggg ccc ccc ggg cag        48
Gln Ser Val Val Thr Gln Pro Pro Ser Ala Ser Gly Pro Pro Gly Gln
1               5                  10                  15

aca gtc acc atc tct tgt tct gga ggc agg tcc aac gtc gcc agt cat        96
Thr Val Thr Ile Ser Cys Ser Gly Gly Arg Ser Asn Val Ala Ser His
            20                  25                  30

gct gta cat tgg tac cag cat ctc ccg gga acg gcc ccc aaa ctc ctc       144
Ala Val His Trp Tyr Gln His Leu Pro Gly Thr Ala Pro Lys Leu Leu
        35                  40                  45

atc tat aat gat cat cag cgg ccc tcc ggg gtc cct gac cga ttc tct       192
Ile Tyr Asn Asp His Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
    50                  55                  60

ggc tcc aag tct ggc cct tca gcc tcc ctg gcc atc agt ggc ctc cgg       240
Gly Ser Lys Ser Gly Pro Ser Ala Ser Leu Ala Ile Ser Gly Leu Arg
65                  70                  75                  80

tcc gaa gat gag gct gat tat tac tgt gca aca tgg gat gac agc ctg       288
Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Thr Trp Asp Asp Ser Leu
                85                  90                  95

ggt ggc cgt gtg gtt ttc ggc gga ggg acc aaa ttg acc gtc cta ggt       336
Gly Gly Arg Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

cag ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag       384
Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
```

```
                165                 170                 175

tac gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                   651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2525
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2525
gat att gtg atg acc cag act cca ctc tcc atg ccc gtc acc cct gga        48
Asp Ile Val Met Thr Gln Thr Pro Leu Ser Met Pro Val Thr Pro Gly
1               5                   10                  15

gag ccg gcc tcc atc tcc tgc agg tct agt cag agc ctc ttg gac agt        96
Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu Asp Ser
            20                  25                  30

gat gat gga aaa acc tat ttg gac tgg tac ctg cag aag cca ggg cag       144
Asp Asp Gly Lys Thr Tyr Leu Asp Trp Tyr Leu Gln Lys Pro Gly Gln
        35                  40                  45

tct cca cag ctc ctg atc tat acg gtt tcc tat cgg gcc tct gga gtc       192
Ser Pro Gln Leu Leu Ile Tyr Thr Val Ser Tyr Arg Ala Ser Gly Val
    50                  55                  60

cca gac agg ttc agt ggc agt ggg tca ggc act gat ttc aca ctg aaa       240
Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys
65                  70                  75                  80

atc agc agg gtg gag gct gag gat gtt gga gtt tat tac tgc atg caa       288
Ile Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln
                85                  90                  95

cgt ata gag ttt cct ttc act ttc ggc cct ggg acc aaa gtg gat atc       336
Arg Ile Glu Phe Pro Phe Thr Phe Gly Pro Gly Thr Lys Val Asp Ile
            100                 105                 110

aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat       384
Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
```

```
        115                 120                 125

gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac       432
Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130                 135                 140

ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc       480
Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac       528
Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175

agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac       576
Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
            180                 185                 190

gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc       624
Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
        195                 200                 205

tcg ccc gtc aca aag agc ttc aac agg gga gag tgt                       660
Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215                 220

<210> 2526
<211> 319
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2526
tcc tat gag ctg act cag cca ccc tca gtg tcc gtg tcc cca gga cag        48
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                   10                  15

aca gcc agc atc acc tgc tct gga gat aaa ttg ggg gat aaa tat gct        96
Thr Ala Ser Ile Thr Cys Ser Gly Asp Lys Leu Gly Asp Lys Tyr Ala
            20                  25                  30

tgc tgg tat cag cag aag cca ggc cag tcc cct gtg ctg gtc atc tat       144
Cys Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45

caa gat agc aag cgg ccc tca ggg atc cct gag cga ttc tct ggc tcc       192
Gln Asp Ser Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

aac tct ggg aac aca gcc act ctg acc atc agc ggg acc cag gct atg       240
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
```

```
65                  70                  75                  80

gat gag gct gac tat tac tgt cag gcg tgg gac agc agc act gcg gta       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Ala Trp Asp Ser Ser Thr Ala Val
                85                  90                  95

ttc ggc gga ggg acc aag ctg acc gtc cta g                             319
Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105
```

<210> 2527
<211> 636
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2527

```
ccc tat gaa ctg act cag cca ccc tca gtg tcc gtg tcc cca gga cag        48
Pro Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                   10                  15

aca gcc aac atc acc tgt tct gga gat aaa ttg ggg gat ata tgt gtt        96
Thr Ala Asn Ile Thr Cys Ser Gly Asp Lys Leu Gly Asp Ile Cys Val
            20                  25                  30

tgc tgg tat cag cag aag cca ggc cag tcc cct gtg ttg gtc atc tat       144
Cys Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45

caa cat aac aag cgg ccc tca ggg atc cct gag cga ttc tct ggc tcc       192
Gln His Asn Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

aac tct ggc aac aca gcc acg ctg acc atc agc gcg acc cag gct acg       240
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Ala Thr Gln Ala Thr
65                  70                  75                  80

gat gag gct atc tat tac tgt cag tcg tgg gac agt agt tct gtg cta       288
Asp Glu Ala Ile Tyr Tyr Cys Gln Ser Trp Asp Ser Ser Ser Val Leu
                85                  90                  95

ttc ggc gga ggg acc aag ctg acc gtc ctc ggt cag ccc aag gct gcc       336
Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
            100                 105                 110

ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag ctt caa gcc aac       384
Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125

aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga gcc gtg       432
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
```

```
    130                 135                 140

aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga gtg gag       480
Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
145                 150                 155                 160

acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc agc agc       528
Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175

tat ctg agc ctg acg cct gag cag tgg aag tcc cac aga agc tac agc       576
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190

tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg gcc cct       624
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195                 200                 205

aca gaa tgt tca                                                      636
Thr Glu Cys Ser
    210

<210> 2528
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2528
ggc atc gtg atg acc cag tct cca gac tcc ctg ggt gtg tct ctg ggc        48
Gly Ile Val Met Thr Gln Ser Pro Asp Ser Leu Gly Val Ser Leu Gly
1               5                   10                  15

gag agg gcc acc atc aac tgc aag tcc agc cag agt ctt ttc tat agc        96
Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Leu Phe Tyr Ser
            20                  25                  30

tcc aac aat aag aac tac tta gct tgg tac cag cag aaa cca ggg cag       144
Ser Asn Asn Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
        35                  40                  45

cct cct aaa ctg ctc att tac tgg gca tct acc cgg gaa tcc ggg gtc       192
Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
    50                  55                  60

cct gac cga ttc agt ggc agc ggg tct ggg aca gat ttc act ctc acc       240
Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65                  70                  75                  80

atc agc agc ctg cag gct gaa gat gtg gca gtt tat tac tgt cag caa       288
Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
```

```
                85                  90                  95

tat tat ggt cgt cta ttc act ttc ggc cct ggg acc aaa gtg gat atc       336
Tyr Tyr Gly Arg Leu Phe Thr Phe Gly Pro Gly Thr Lys Val Asp Ile
            100                 105                 110

aga cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat       384
Arg Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115                 120                 125

gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac       432
Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130                 135                 140

ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc       480
Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac       528
Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175

agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac       576
Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
            180                 185                 190

gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc       624
Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
        195                 200                 205

tcg ccc gtc aca aag agc ttc aac agg gga gag tgt                       660
Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215                 220

<210> 2529
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2529
caa att gtg ttg aca cag tct cca gcc acc ctg tct ttg tct cca ggg        48
Gln Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc agc tac        96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Tyr
            20                  25                  30

tta gcc tgg tac caa cag aaa cct ggc cag gct ccc agg ctc ctc atc       144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
```

```
        35                  40                  45

tat gat gca tcc aac agg gcc act ggc atc cca gcc agg ttc agt ggc       192
Tyr Asp Ala Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly
    50                  55                  60

ggt ggg tct gag aca gac ttc act ctc acc atc agc agc cta gag cct       240
Gly Gly Ser Glu Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65                  70                  75                  80

gaa gat ttt gca gtt tat tac tgt cag cag cgt agc aac tgg cct ccg       288
Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ser Asn Trp Pro Pro
                85                  90                  95

agg ctc cct ttc ggc gga ggg acc aag gtg gag atc aaa cga act gtg       336
Arg Leu Pro Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val
            100                 105                 110

gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa       384
Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
        115                 120                 125

tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga       432
Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
    130                 135                 140

gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac       480
Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
145                 150                 155                 160

tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc       528
Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
                165                 170                 175

ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa       576
Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
            180                 185                 190

gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca       624
Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
        195                 200                 205

aag agc ttc aac agg gga gag tgt                                       648
Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 2530
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2530

```
caa att gtg ttg aca cag tct cca gcc acc ctg tct ttg tct cca ggg        48
Gln Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1               5                  10                  15

gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc aac tat        96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Asn Tyr
            20                  25                  30

tta gcc tgg tac caa cag aaa cct ggc cag gct ccc agg ctc ctc atc       144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
        35                  40                  45

tat gat gca tcc aac agg gcc act ggc atc cca gcc agg ttc agt ggc       192
Tyr Asp Ala Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly
    50                  55                  60

agt ggg tct ggg aca gac ttc act ctc acc atc agc agc cta gag cct       240
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65                  70                  75                  80

gaa gat ttt gca gtt tat tac tgt cag cag cgt agc aac tgg cct ccg       288
Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ser Asn Trp Pro Pro
                85                  90                  95

tac act ttt ggc cag ggg acc aag ctg gac atc aaa cga act gtg gct       336
Tyr Thr Phe Gly Gln Gly Thr Lys Leu Asp Ile Lys Arg Thr Val Ala
            100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       384
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       432
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       480
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       528
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       576
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       624
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205
```

```
agc ttc aac agg gga gag tgt                                             645
Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 2531
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2531
gat att gtg atg act cag tct cca ctc tcc ctg ccc gtc acc cct gga        48
Asp Ile Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Pro Gly
1               5                   10                  15

gag ccg gcc tcc atc tcc tgc agg tct agt cag agc ctc cta cag agt        96
Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu Gln Ser
            20                  25                  30

aat gga aac aac tat ttg gct tgg tac ctg cag aag cca ggg cag tct       144
Asn Gly Asn Asn Tyr Leu Ala Trp Tyr Leu Gln Lys Pro Gly Gln Ser
        35                  40                  45

cca caa ctc ctg atc tat ttg ggt tct aat cgg gcc tcc ggg gtc cct       192
Pro Gln Leu Leu Ile Tyr Leu Gly Ser Asn Arg Ala Ser Gly Val Pro
    50                  55                  60

gac agg ttc agt ggc agt gga tca ggc aca gat ttt aca ctg aaa atc       240
Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65                  70                  75                  80

agc aaa ttg gcg gct gag gat gtt ggg gtt tat tac tgc atg caa gct       288
Ser Lys Leu Ala Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln Ala
                85                  90                  95

cta caa act ccg tac act ttt ggc cag ggg acc aag ctg gac atc aaa       336
Leu Gln Thr Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Asp Ile Lys
            100                 105                 110

cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag       384
Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
        115                 120                 125

cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc       432
Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
    130                 135                 140

tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa       480
Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
145                 150                 155                 160
```

```
tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac agc       528
Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
                165                 170                 175

acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag       576
Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
            180                 185                 190

aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg       624
Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
        195                 200                 205

ccc gtc aca aag agc ttc aac agg gga gag tgt                           657
Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 2532
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2532
gac atc cag atg acc cag tct cct tcc acc ctg tct gca tct gta gga        48
Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1               5                   10                  15

gac aga gtc acc atc act tgc cgg gcc agt cag agt att agt ggc tgg        96
Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Gly Trp
            20                  25                  30

ttg gcc tgg tat cag cag aag cca ggg aaa gcc cct caa ctc ctg atc       144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Gln Leu Leu Ile
        35                  40                  45

tat ttg gtg tct agt tta gaa agt ggg gtc ccg tca agg ttt agc ggc       192
Tyr Leu Val Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

agt gga tct ggg aca gaa ttc act ctc acc atc agc agc ctg cag cct       240
Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

gat gat ttt gca act tat tac tgc caa cac tat gat agt tat att gga       288
Asp Asp Phe Ala Thr Tyr Tyr Cys Gln His Tyr Asp Ser Tyr Ile Gly
                85                  90                  95

acg ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg gct gca       336
Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110
```

```
cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       384
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       432
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       480
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       528
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa ctc tac       576
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu Tyr
            180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       624
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

ttc aac agg gga gag tgt                                              642
Phe Asn Arg Gly Glu Cys
    210
```

<210> 2533
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2533

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cag tct gtg ttg acg cag ccg ccc tca gtg tct gcg gcc cca gga cag        48
Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Ala Ala Pro Gly Gln
1               5                   10                  15

aag gtc acc atc tcc tgc tct gga ggc agc tcc aac att gga aat aat        96
Lys Val Thr Ile Ser Cys Ser Gly Gly Ser Ser Asn Ile Gly Asn Asn
            20                  25                  30

tat gta tcc tgg tac cag cag ctc cca gga aca gcc ccc aaa ctc atc       144
Tyr Val Ser Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Ile
        35                  40                  45

att tat gac aat gat aaa cga ccc gca ggg att cct gac cga ttc tct       192
Ile Tyr Asp Asn Asp Lys Arg Pro Ala Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60
```

```
ggc tcc aag tct ggt tcg tca gcc acc ctg ggc atc acc gga ctc cag       240
Gly Ser Lys Ser Gly Ser Ser Ala Thr Leu Gly Ile Thr Gly Leu Gln
65                  70                  75                  80

aat ggg gac gag gcc gag tat tat tgc gga aca tgg gat agc agt ttg       288
Asn Gly Asp Glu Ala Glu Tyr Tyr Cys Gly Thr Trp Asp Ser Ser Leu
                85                  90                  95

ggt ggc gga gtg ttc ggc gga ggg acc aag gtg acc gtc cta ggt cag       336
Gly Gly Gly Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct acg gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2534
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2534
caa att gtg ttg aca cag tct cca gcc acc ctg tct ttg tct cca ggg        48
Gln Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15
```

```
gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc aac tat        96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Asn Tyr
            20                  25                  30

tta gcc tgg tac caa cag aaa cct ggc cag gct ccc agg ctc ctc atc       144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
        35                  40                  45

tat gat gca tcc aac agg gcc act ggc atc cca gcc agg ttc agt ggc       192
Tyr Asp Ala Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly
    50                  55                  60

agt ggg tct ggg aca gac ttc act ctc acc atc agc agc cta gag cct       240
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65                  70                  75                  80

gaa gat ttt gca gtt tat tac tgt cag cag cgt agc aac tgg cct ccg       288
Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ser Asn Trp Pro Pro
                85                  90                  95

tac act ttt ggc cag ggg acc aag ctg gac atc aaa cga act gtg gct       336
Tyr Thr Phe Gly Gln Gly Thr Lys Leu Asp Ile Lys Arg Thr Val Ala
            100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       384
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       432
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       480
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       528
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       576
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       624
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

agc ttc aac agg gga gag tgt                                          645
Ser Phe Asn Arg Gly Glu Cys
    210                 215
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<210> 2535
<211> 337

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2535
gga att gtg atg act cag tct cca ctc tcc ctg ccc gtc acc cct gga 48
Gly Ile Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Pro Gly
1 5 10 15

gag acg gcc tcc atc tcc tgt agg tct agt cag agc ctc ctt cgt cgt 96
Glu Thr Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu Arg Arg
20 25 30

gat gga aac aac tat ttg gag tgg tac ctg cag aaa cca ggg cag cct 144
Asp Gly Asn Asn Tyr Leu Glu Trp Tyr Leu Gln Lys Pro Gly Gln Pro
35 40 45

cca cac ctc ctg atc tat ttg ggt tct att cgg gcc tcc aga gtc cct 192
Pro His Leu Leu Ile Tyr Leu Gly Ser Ile Arg Ala Ser Arg Val Pro
50 55 60

gac agg ttc agt ggc act ggg tca ggg aca gac ttc aca ctg ata atc 240
Asp Arg Phe Ser Gly Thr Gly Ser Gly Thr Asp Phe Thr Leu Ile Ile
65 70 75 80

agc aga gtg gag gct gac gat gtt ggc gtt tat tac tgc atg gaa gct 288
Ser Arg Val Glu Ala Asp Asp Val Gly Val Tyr Tyr Cys Met Glu Ala
85 90 95

gaa caa act ccg ggg act ttt ggc cag ggg acc aag ctg gag atc aaa 336
Glu Gln Thr Pro Gly Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105 110

c 337

<210> 2536
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2536
cag tct gcc ctg act cag cct gcc tcc gtg tct ggg tct cct gga cag 48
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1 5 10 15

```
tcg atc acc atc tcc tgc act gga acc agc agt gac gtt ggt ggt ttt        96
Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Phe
            20                  25                  30

aac tat gtc tcc tgg tac caa caa cac cca ggc aaa gcc ccc aaa ctc       144
Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

ctg att tat gat gtc agt gag cgg ccc tca ggg gtt tct agt cgc ttc       192
Leu Ile Tyr Asp Val Ser Glu Arg Pro Ser Gly Val Ser Ser Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc aac acg gcc tcc ctg acc atc tct ggg ctc       240
Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

cag gct gag gac gag gct gat tat tac tgc agc tca tat aca agc agc       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Thr Ser Ser
                85                  90                  95

acc act gtg ctt ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag       336
Thr Thr Val Leu Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2537
<211> 660
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<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2537
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ggg gtt gtg atg act cag tct cca ctc tcc ctg ccc gtc acc ctt gga        48
Gly Val Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Leu Gly
1               5                   10                  15

cag ccg gcc tcc atc tcc tgc agg tct agt caa agc ctc gta tac agt        96
Gln Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Val Tyr Ser
            20                  25                  30

gat gga aac acc tac ttg aat tgg ttt cag cag agg cca ggc caa tct       144
Asp Gly Asn Thr Tyr Leu Asn Trp Phe Gln Gln Arg Pro Gly Gln Ser
        35                  40                  45

cca agg cgc cta att tat aag gtt tct aac cgg gac tct ggg gtc cca       192
Pro Arg Arg Leu Ile Tyr Lys Val Ser Asn Arg Asp Ser Gly Val Pro
    50                  55                  60

gac aga ttc agc ggc agt ggg tca ggc act gat ttc aca ctg aaa atc       240
Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65                  70                  75                  80

agc agg gtg gag gct gag gat gtt ggg gtt tat tac tgc atg caa ggt       288
Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln Gly
                85                  90                  95

aca cac tgg cct ccg atc acc ttc ggc caa ggg aca cga ctg gag att       336
Thr His Trp Pro Pro Ile Thr Phe Gly Gln Gly Thr Arg Leu Glu Ile
            100                 105                 110

aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat       384
Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115                 120                 125

gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac       432
Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130                 135                 140

ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc       480
Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac       528
Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175

agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac       576
Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
```

```
            180                 185                 190

gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc       624
Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
        195                 200                 205

tcg ccc gtc aca aag agc ttc aac agg gga gag tgt                       660
Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215                 220
```

<210> 2538
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2538

```
gac atc cag atg acc cag tct cca tcc tcc ctg tct gca tct gta gga        48
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

gac aga gtc acc atc act tgc cgg gca agt cag agt att agc agc tat        96
Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Tyr
            20                  25                  30

tta aat tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg atc       144
Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

tat gct gca tcc agt ttg caa agt ggg gtc cca tca agg ttc agt ggc       192
Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

agt gga tct ggg aca gat ttc act ctc gcc atc agc agt ctg caa cct       240
Ser Gly Ser Gly Thr Asp Phe Thr Leu Ala Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

gaa gat ttt gca act tac tac tgt cac cag act tac agt acc cgg ctc       288
Glu Asp Phe Ala Thr Tyr Tyr Cys His Gln Thr Tyr Ser Thr Arg Leu
                85                  90                  95

act ttc ggc gga ggg acc gag gtg gag atc aaa cga act gtg gct gca       336
Thr Phe Gly Gly Gly Thr Glu Val Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       384
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       432
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
```

```
    130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       480
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       528
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       576
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       624
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

ttc aac agg gga gag tgt                                              642
Phe Asn Arg Gly Glu Cys
    210
```

<210> 2539
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2539

```
gt gac atc cag atg acc cag tct cca tcc tcc ctg tct gca tct gta         47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
   1               5                   10                  15

gga gac aga gtc acc atc act tgc cag gcg agt cag gac att agc aac        95
Gly Asp Arg Val Thr Ile Thr Cys Gln Ala Ser Gln Asp Ile Ser Asn
                20                  25                  30

tat tta aat tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg       143
Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
            35                  40                  45

atc tac gat gca tcc aat ttg gaa aca ggg gtc cca tca agg ttc agt       191
Ile Tyr Asp Ala Ser Asn Leu Glu Thr Gly Val Pro Ser Arg Phe Ser
        50                  55                  60

ggc agt gga tct ggg aca gat ttc act ctc acc atc agc agc ctg cag       239
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln
    65                  70                  75

cct gaa gat ttt gca aca tat tac tgt caa cag tat gat aat ctc ccg       287
Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asp Asn Leu Pro
```

```
80                  85                  90                  95

ctc act ttc ggc gga ggg acc aag gtg gag atc aaa cga act gtg gct       335
Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
                100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgt                                          644
Ser Phe Asn Arg Gly Glu Cys
        210

<210> 2540
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2540
tcc tat gtg ctg act cag cca ccc tcg gtg tca gtg gcc cca gga cag        48
Ser Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Gln
1               5                   10                  15

acg gcc agg att acc tgt ggg gga aac aac att gga agt aaa agt gtg        96
Thr Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Ser Lys Ser Val
            20                  25                  30

cac tgg tac cag cag aag cca ggc cag gcc cct gtg ctg gtc gtc tat       144
His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Val Tyr
```

```
        35                  40                  45

gat gat agc gac cgg ccc tca ggg atc cct gag cga ttc tct ggc tcc       192
Asp Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

aac tct ggg aac acg gcc acc ctg acc atc agc agg gtc gaa gcc ggg       240
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65                  70                  75                  80

gat gag gcc gac tat tac tgt cag gtg tgg gat agc agt agt gat cct       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Ser Asp Pro
                85                  90                  95

tgg gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag ccc aag       336
Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
            100                 105                 110

gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag ctt caa       384
Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
        115                 120                 125

gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga       432
Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
    130                 135                 140

gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga       480
Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145                 150                 155                 160

gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc       528
Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
                165                 170                 175

agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac aaa agc       576
Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser
            180                 185                 190

tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg       624
Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
        195                 200                 205

gcc cct aca gaa tgt tca                                              642
Ala Pro Thr Glu Cys Ser
    210

<210> 2541
<211> 647
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain
```

<400> 2541
gt gac atc cag ttg acc cag tct cca tcc ttc ctg tct gca tct gta 47
Asp Ile Gln Leu Thr Gln Ser Pro Ser Phe Leu Ser Ala Ser Val
1 5 10 15

gga gac aga gtc acc atc act tgc cgg gcc agt cag gtc att agc gat 95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Val Ile Ser Asp
20 25 30

tat gta gcc tgg tat cag caa aaa cca ggg aaa gcc cct aag ctc ctg 143
Tyr Val Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
35 40 45

atc tat gct gca tcc act ttg caa agt ggg gtc cca tct agg ttc agc 191
Ile Tyr Ala Ala Ser Thr Leu Gln Ser Gly Val Pro Ser Arg Phe Ser
50 55 60

ggc agt gga tct ggg aca gaa ttc act ctc aca atc agc agc ctg cag 239
Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln
65 70 75

tct gaa gat ttt gca act tat tac tgt caa caa ctg aat agt tac cct 287
Ser Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Leu Asn Ser Tyr Pro
80 85 90 95

ccg gtc acc ttc ggc caa ggg aca cga ctg gac att aaa cga act gtg 335
Pro Val Thr Phe Gly Gln Gly Thr Arg Leu Asp Ile Lys Arg Thr Val
100 105 110

gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa 383
Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
115 120 125

tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga 431
Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
130 135 140

gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac 479
Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
145 150 155

tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc 527
Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
160 165 170 175

ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa 575
Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
180 185 190

gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca 623
Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
195 200 205

```
aag agc ttc aac agg gga gag tgt                                        647
Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215

<210> 2542
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2542
gt gac atc cag atg acc cag tct cca tcc tcc ctg tct gca tct gta          47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
   1               5                  10                  15

gga gac aga gtc acc atc act tgc cgg gca agt cag agc att agc act         95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Thr
                20                  25                  30

tat tta aat tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg        143
Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
            35                  40                  45

atc tat gtt gca tcc agt ttg caa agt ggg gtc cca tca agg ttc agt        191
Ile Tyr Val Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60

ggc agt gga tct ggg aca gat ttc act ctc aca atc agc ggt ctg caa        239
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Gly Leu Gln
    65                  70                  75

cct gaa gat ttt gca act tac tac tgt caa cag agt tac agt acc ccg        287
Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Pro
80                  85                  90                  95

tac act ttt ggc cag ggg acc aag ctg gag atc aaa cga act gtg gct        335
Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala
                100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct        383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag        431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc        479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155
```

```
cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgt                                          644
Ser Phe Asn Arg Gly Glu Cys
        210

<210> 2543
<211> 647
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2543
gt gac atc cag atg acc cag tct cct tcc acc ctg tct gca tct gta         47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val
   1               5                   10                  15

gga gac aga gtc acc atc act tgc cgg gcc agt cag aga att agt aac        95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Arg Ile Ser Asn
                20                  25                  30

tgg ttg gcc tgg tat cag cag aca cca ggg aaa gcc cct aag ctc ctg       143
Trp Leu Ala Trp Tyr Gln Gln Thr Pro Gly Lys Ala Pro Lys Leu Leu
            35                  40                  45

atc tat aag gcg tcc agt tta gaa agt ggg gtc cca tca agg ttc agc       191
Ile Tyr Lys Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60

ggc agt gga tct ggg aca gaa ttc act ctc acc atc agc agc ctg cag       239
Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln
    65                  70                  75

cct gat gat ttt gca act tat tac tgc caa cag tat agt agt tct tct       287
Pro Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Ser Ser Ser Ser
80                  85                  90                  95

cca aga acg ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg       335
Pro Arg Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val
                100                 105                 110
```

```
gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa       383
Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
            115                 120                 125

tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga       431
Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
        130                 135                 140

gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac       479
Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
    145                 150                 155

tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc       527
Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
160                 165                 170                 175

ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa       575
Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
                180                 185                 190

gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca       623
Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
            195                 200                 205

aag agc ttc aac agg gga gag tgt                                      647
Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215
```

<210> 2544
<211> 337
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2544

```
gat att ttg atg acc cag act cca ctc tct ctg tcc gtc acc cct gga        48
Asp Ile Leu Met Thr Gln Thr Pro Leu Ser Leu Ser Val Thr Pro Gly
1               5                   10                  15

cag ccg gcc tcc atc tcc tgc aag tct agt cag agc ctc ctg aat cct        96
Gln Pro Ala Ser Ile Ser Cys Lys Ser Ser Gln Ser Leu Leu Asn Pro
            20                  25                  30

gat gga aag acc tat ttg tat tgg tac ctg cag aag tca ggc cag cct       144
Asp Gly Lys Thr Tyr Leu Tyr Trp Tyr Leu Gln Lys Ser Gly Gln Pro
        35                  40                  45

cca cag ctc ctg atc tat gaa ctt tcc aac cgc ttc tct gga gtg cca       192
Pro Gln Leu Leu Ile Tyr Glu Leu Ser Asn Arg Phe Ser Gly Val Pro
    50                  55                  60
```

```
gat agg ttc agt ggc agc ggg tca ggg aca gat ttc aca ctg aag atc       240
Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65                  70                  75                  80

agc cgg gtg gag gct gag gat att gga gtt tat ttc tgc atg caa agt       288
Ser Arg Val Glu Ala Glu Asp Ile Gly Val Tyr Phe Cys Met Gln Ser
                85                  90                  95

tta caa ctt ccg att acc ttc ggc caa ggg aca cga ctg gag att aaa       336
Leu Gln Leu Pro Ile Thr Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys
            100                 105                 110

c                                                                     337
```

<210> 2545
<211> 647
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2545

```
gt gac atc cag atg acc cag tct cca tcc tcc ctg tct gca tct gta         47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
   1               5                   10                  15

gga gac aga gtc acc atc act tgc cgg gca agt cag agc att agc ggc        95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Gly
                20                  25                  30

tat tta aat tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg       143
Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
            35                  40                  45

atc tat gct gca tcc agt ttg caa agt ggg gtc cca tca agg ttc agt       191
Ile Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60

ggc agt gga tct ggg aca gat ttc act ctc acc atc agc agt ctg caa       239
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln
    65                  70                  75

cct gaa gat ttt gca act tac tac tgt caa cag agt tac agt acc cgt       287
Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Arg
80                  85                  90                  95

tta ctc act ttc ggc cct ggg acc aaa gtg gat atc aaa cga act gtg       335
Leu Leu Thr Phe Gly Pro Gly Thr Lys Val Asp Ile Lys Arg Thr Val
                100                 105                 110
```

```
gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa       383
Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
            115                 120                 125

tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga       431
Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
        130                 135                 140

gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac       479
Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
    145                 150                 155

tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc       527
Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
160                 165                 170                 175

ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa       575
Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
                180                 185                 190

gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca       623
Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
            195                 200                 205

aag agc ttc aac agg gga gag tgt                                      647
Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215

<210> 2546
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2546
cag tct gtg ctg acg cag ccg ccc tca gtg tct ggg gcc cca ggg cag        48
Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

agg gtc acc atc tcc tgc act ggg agt agc tcc aac gtc ggg gca gat        96
Arg Val Thr Ile Ser Cys Thr Gly Ser Ser Ser Asn Val Gly Ala Asp
            20                  25                  30

tat gat gtg cac tgg tac cag cag ctt cca gga aca gcc ccc aaa ctc       144
Tyr Asp Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

ctc atc tat ggt aac aga aat cgg ccc tca ggg gtc cct gac cga ttc       192
Leu Ile Tyr Gly Asn Arg Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60
```

```
tct ggc tcc aag tct ggc acc tca gcc tcc ctg gcc atc act ggg ctc       240
Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80

cag gct gag gat gag gct gat tat tac tgc cag tcc ttt gac agc agc       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Phe Asp Ser Ser
                85                  90                  95

ctg aga ggt tat gtc ttc gga act ggg acc aag gtc acc gtc cta ggt       336
Leu Arg Gly Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly
            100                 105                 110

cag ccc aag gcc aac ccc act gtc act ctg ttc ccg ccc tcc tct gag       384
Gln Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

gag ctc caa gcc aac aag gcc aca cta gtg tgt ctg atc agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

tac ccg gga gct gtg aca gtg gcc tgg aag gca gat ggc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aaa ccc tcc aaa cag agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

tac gcg gcc agc agc tac ctg agc ctg acg ccc gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                   651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2547
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2547
gaa att gta ttg acc cag tct cca gac acc ctg tct ttg tct cca ggg        48
Glu Ile Val Leu Thr Gln Ser Pro Asp Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15
```

```
gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc agc tcc        96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Ser
            20                  25                  30

tta gcc tgg tac caa cag aaa cct ggc cag gct ccc cga ctc ctc atc       144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
        35                  40                  45

tat tat gca tcc aac agg gcc act gac atc cca gcc agg ttc agt ggc       192
Tyr Tyr Ala Ser Asn Arg Ala Thr Asp Ile Pro Ala Arg Phe Ser Gly
    50                  55                  60

agt ggg tct ggg aca gac ttc act ctc acc atc agc agc cta gag cct       240
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65                  70                  75                  80

gaa gat ttt gca ctt tat tac tgt cag cac cgt atc acc tgg cct ccc       288
Glu Asp Phe Ala Leu Tyr Tyr Cys Gln His Arg Ile Thr Trp Pro Pro
                85                  90                  95

ctg atc acc ttc ggc caa ggg aca cga ctg gag att aaa cga act gtg       336
Leu Ile Thr Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys Arg Thr Val
            100                 105                 110

gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa       384
Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
        115                 120                 125

tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga       432
Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
    130                 135                 140

gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac       480
Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
145                 150                 155                 160

tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc       528
Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
                165                 170                 175

ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa       576
Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
            180                 185                 190

gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca       624
Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
        195                 200                 205

aag agc ttc aac agg gga gag tgt                                       648
Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 2548
<211> 645

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2548
gaa att gtg ttg acg cag tct cca ggc acc ctg tct ttg tct cca ggg 48
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt ttt gac ggc aag 96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Phe Asp Gly Lys
20 25 30

tcc tta gcc tgg tac cag cag aaa cct ggc cag act ccc cgc ctc ctc 144
Ser Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Thr Pro Arg Leu Leu
35 40 45

gtc tat ggc gcg tcc agc agg gcc act ggc atc cca gac agg ttc ggt 192
Val Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Gly
50 55 60

ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc aga ctg gag 240
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65 70 75 80

tct gaa gat ttt gca gtg tat ttc tgt cag caa tat gct tat gta ccg 288
Ser Glu Asp Phe Ala Val Tyr Phe Cys Gln Gln Tyr Ala Tyr Val Pro
85 90 95

atc acc ttc ggc caa ggg aca cga ctg gag cgt aaa cga act gtg gct 336
Ile Thr Phe Gly Gln Gly Thr Arg Leu Glu Arg Lys Arg Thr Val Ala
100 105 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct 384
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
115 120 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag 432
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
130 135 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc 480
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145 150 155 160

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc 528
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
165 170 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc 576
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val

```
            180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       624
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

agc ttc aac agg gga gag tgt                                           645
Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 2549
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2549

```
ggc atc gtg atg acc cag tct cca gac tcc ctg gct gtg tct ctg ggc        48
Gly Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1               5                   10                  15

gag agg gcc acc atc aac tgc aag tcc agc cag agt att tta tac agc        96
Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Ile Leu Tyr Ser
            20                  25                  30

tcc aac aat aag gac tcc tta gct tgg tac cag cag aaa cca gga cag       144
Ser Asn Asn Lys Asp Ser Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
        35                  40                  45

cct cct aaa ctt ctc att tcc tcg gca tct acc cgg caa tcc ggg gtc       192
Pro Pro Lys Leu Leu Ile Ser Ser Ala Ser Thr Arg Gln Ser Gly Val
    50                  55                  60

cct gac cga ttc agt ggc agc ggg tct ggg aca gat ttc acc ctc acc       240
Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65                  70                  75                  80

atc agc agc cta cag gct gaa gat gtg gca gtt tat tac tgt cag caa       288
Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
                85                  90                  95

tat tat agt att ccc ctc act ttc ggc cct ggg acc aaa gtg gat atc       336
Tyr Tyr Ser Ile Pro Leu Thr Phe Gly Pro Gly Thr Lys Val Asp Ile
            100                 105                 110

aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat       384
Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115                 120                 125

gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac       432
Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
```

```
    130                 135                 140

ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc       480
Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac       528
Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175

agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac       576
Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
            180                 185                 190

gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc       624
Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
        195                 200                 205

tcg ccc gtc aca aag agc ttc aac agg gga gag tgg                       660
Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Trp
    210                 215                 220

<210> 2550
<211> 325
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2550
gaa att gtg ttg acg cag tct cca ggc acc ctg tct ttg tct cta ggg        48
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Leu Gly
1               5                   10                  15

gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc ggc agc        96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Gly Ser
            20                  25                  30

cac tta gcc tgg tat cag cag aaa cct ggc cag gct ccc agg ctc ctc       144
His Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

atc tat gat gca tcc agc agg gcc act ggc atc cca gac agg ttc agt       192
Ile Tyr Asp Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

ggc agt ggg tct ggg aca gag ttc act ctc acc atc agc aga ctg gag       240
Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

cct gaa gat ttt gca gtg tat tac tgt cag cag tat ggt agc tca ccc       288
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser Pro
```

```
                85                  90                  95

ctg tgg ttc ggc caa ggg acc aag gtg gaa atc aaa c                    325
Leu Trp Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
            100                 105

<210> 2551
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2551
cag tct gcc ctg act cag cct gcc tcc gtg tct ggg tct cct gga cag        48
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

tcg atc acc atc tcc tgc act gga acc agc agt gac gtt ggt ggt tat        96
Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr
            20                  25                  30

aac tat gtc tcc tgg tac caa caa cac cca ggc aaa gcc ccc aaa ctc       144
Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

atg att tat gat gtc agt aat cgg ccc tca ggg gtt tct aat cgc ttc       192
Met Ile Tyr Asp Val Ser Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc aac acg gcc tcc ctg acc atc tct ggg ctc       240
Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

cag gct gag gac gag gct gat tat tac tgc agc tca tat aca agc agc       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Thr Ser Ser
                85                  90                  95

agc act caa gtc ttc gga act ggg acc aag gtc acc gtc cta ggt cag       336
Ser Thr Gln Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gcc aac ccc act gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctc caa gcc aac aag gcc aca cta gtg tgt ctg atc agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gct gtg aca gtg gcc tgg aag gca gat ggc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys
```

```
145                 150                 155                 160

gcg gga gtg gag acc acc aaa ccc tcc aaa cag agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tac ctg agc ctg acg ccc gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2552
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2552
ccc tat gag ctg aca cag cca ccc tcg gtg tca gtg tcc cca gga caa        48
Pro Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                   10                  15

acg gcc agg atc acc tgc tct gga gat gca ttg cca aaa aaa tat gct        96
Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Lys Lys Tyr Ala
            20                  25                  30

tat tgg tac cag cag aag tca ggc cag gcc cct gtg ctg gtc atc tat       144
Tyr Trp Tyr Gln Gln Lys Ser Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

gag gac agc aaa cga ccc tcc ggg atc cct gag aga ttc tct ggc tcc       192
Glu Asp Ser Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

agc tca ggg aca atg gcc acc ttg act atc agt ggg gcc cag gtg gag       240
Ser Ser Gly Thr Met Ala Thr Leu Thr Ile Ser Gly Ala Gln Val Glu
65                  70                  75                  80

gat gaa gct gac tac tac tgt tac tca aca gac agc agt ggt aat cat       288
Asp Glu Ala Asp Tyr Tyr Cys Tyr Ser Thr Asp Ser Ser Gly Asn His
                85                  90                  95

agg gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag ccc aag       336
Arg Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
```

```
            100                 105                 110

gct gcc ccc tcg gtc act ctg ttc cca ccc tcc tct gag gag ctt caa       384
Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
        115                 120                 125

gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga       432
Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
    130                 135                 140

gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga       480
Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145                 150                 155                 160

gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc       528
Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
                165                 170                 175

agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac aaa agc       576
Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser
            180                 185                 190

tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg       624
Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
        195                 200                 205

gcc cct aca gaa tgt tca                                              642
Ala Pro Thr Glu Cys Ser
    210

<210> 2553
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2553
gaa ata gtg atg acg cag tct cca gcc acc ctg tct gtg tct cca ggg        48
Glu Ile Val Met Thr Gln Ser Pro Ala Thr Leu Ser Val Ser Pro Gly
1               5                   10                  15

gaa aca gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc agc aac        96
Glu Thr Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Asn
            20                  25                  30

tta gcc tgg tac cag cag aaa cct ggc cag gct ccc agg ctc ctc atg       144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Met
        35                  40                  45

tat ggt gca tcc acc agg gcc act agt gtc cca gcc agg ttc agt ggc       192
Tyr Gly Ala Ser Thr Arg Ala Thr Ser Val Pro Ala Arg Phe Ser Gly
```

```
    50                  55                  60

agt gcg tct ggg aca gat ttc act ctc acc atc agc agc ctg cag tct       240
Ser Ala Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Ser
65                  70                  75                  80

gaa gat ttt gca ctt tat tac tgt cag cag tat aat aac tgg cct cag       288
Glu Asp Phe Ala Leu Tyr Tyr Cys Gln Gln Tyr Asn Asn Trp Pro Gln
                85                  90                  95

tac act ttt ggc cag ggg acc aag ctg gag atc aaa cga act gtg gct       336
Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala
            100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       384
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       432
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       480
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       528
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       576
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       624
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

agc ttc aac agg gga gag tgg                                          645
Ser Phe Asn Arg Gly Glu Trp
    210                 215

<210> 2554
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2554
gaa att gtg ttg acg cag tct cca ggc acc ctg tct ttg tct cca ggg        48
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
```

```
1               5                   10                  15

gag aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc agc agc        96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Ser
            20                  25                  30

tac tta gtc tgg tac caa caa aaa gct ggc cag gct ccc agg ctc cta       144
Tyr Leu Val Trp Tyr Gln Gln Lys Ala Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

atc tat ggt gca tcc agc agg gcc act ggc atc tca gac agg ttc agt       192
Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Ser Asp Arg Phe Ser
    50                  55                  60

ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc aga ctg gag       240
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

cct gaa gat ttt gca gtg tat tac tgt cag cac ttt cgt agc tca cct       288
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln His Phe Arg Ser Ser Pro
                85                  90                  95

ccc acg tac act ttt ggc cag ggg acc aag ctg gag atc aaa cga act       336
Pro Thr Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr
            100                 105                 110

gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg       384
Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu
        115                 120                 125

aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc       432
Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro
    130                 135                 140

aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt       480
Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly
145                 150                 155                 160

aac tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac       528
Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr
                165                 170                 175

agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac       576
Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His
            180                 185                 190

aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc       624
Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val
        195                 200                 205

aca aag agc ttc aac agg gga gag tgt                                   651
Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 2555
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2555
```
cag tct gcc ctg act cag cct gcc tcc gtg tct ggg tct cct gga cag        48
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

tcg atc acc atc tcc tgc act gga acc agc agt gac gtt ggt ctt tat        96
Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Leu Tyr
            20                  25                  30

aac ttt gtc tcc tgg tat caa caa cac cca ggc aaa gcc ccc aaa ctc       144
Asn Phe Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

atg att ttt gat gtc aat aat cgg ccc tca ggg gtt tct aat cgc ttc       192
Met Ile Phe Asp Val Asn Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
    50                  55                  60

tct ggc tcc aag tct gac aac acg gcc tcc ctg acc atc tct ggc ctc       240
Ser Gly Ser Lys Ser Asp Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

cag gct gag gac gag gct gat tat tac tgc agc tca tat tca agg acc       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Ser Arg Thr
                85                  90                  95

acc act ctc gta ttc ggc gga ggg acc aag gtg acc gtc cta ggt cag       336
Thr Thr Leu Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc atc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Ile Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175
```

```
gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                       648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2556
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2556

```
cca gct gta ctg acg cag ccg ccc tca gtt tct ggg gcc cca ggg cag        48
Pro Ala Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

agg gtc acc atc tcc tgc act ggg agc aac tcc aac atc ggg gca ggt        96
Arg Val Thr Ile Ser Cys Thr Gly Ser Asn Ser Asn Ile Gly Ala Gly
            20                  25                  30

tat tat gta cac tgg tac cag cac cgt cca gga gca gcc ccc aaa cgc       144
Tyr Tyr Val His Trp Tyr Gln His Arg Pro Gly Ala Ala Pro Lys Arg
        35                  40                  45

ctc atc tat gca gac agc gat cgc ccc tca gga gtc cct gac cga ttc       192
Leu Ile Tyr Ala Asp Ser Asp Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

tct ggc tcc agg tct ggc acc tca gcc tcc ctg gcc atc act ggg ctc       240
Ser Gly Ser Arg Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80

cag gct gag gat gag gct gat tat tac tgc cag tcc tat gac agc ggc       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Gly
                85                  90                  95

ctg agt gct cct tgg gtg ttc ggc gga ggg acc aag ttg acc gtc cta       336
Leu Ser Ala Pro Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110

ggt cag ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct       384
Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser
        115                 120                 125
```

```
gag gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac       432
Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp
    130                 135                 140

ttc tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc       480
Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro
145                 150                 155                 160

gtc aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac       528
Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn
                165                 170                 175

aag tac gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag       576
Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys
            180                 185                 190

tcc cac aaa agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg       624
Ser His Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val
        195                 200                 205

gag aag aca gtg gcc cct aca gaa tgt tca                               654
Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2557
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2557

```
gaa att gtg ctg acg cag tct cca ggc acc ctg tct ttg tct cca gga        48
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

caa aga gcc acc ctc tcc tgt agg gcc agt cag agt gtt acc agc agc        96
Gln Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Thr Ser Ser
            20                  25                  30

tac tta gcc tgg tac cag cag aaa cct ggc cag gct ccc agg ctc ctc       144
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

atc tat gct gca tcc agc agg gcc act ggc acc cca gac agg ttc agt       192
Ile Tyr Ala Ala Ser Ser Arg Ala Thr Gly Thr Pro Asp Arg Phe Ser
    50                  55                  60

ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc aga ctg gag       240
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80
```

```
cct gag gat ttt gca gtg tat tcc tgt cag caa tat ggt aac tca cct       288
Pro Glu Asp Phe Ala Val Tyr Ser Cys Gln Gln Tyr Gly Asn Ser Pro
                85                  90                  95

ccc act ttc ggc gga ggg acc aag gtg gag atc aaa cga act gtg gct       336
Pro Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
            100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       384
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       432
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       480
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       528
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       576
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       624
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

agc ttc aac agg gga gag tgt                                           645
Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 2558
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2558

```
ccg tct gtg ctg act cag cca ctc tca gcg tct ggg acc ccc ggg cag        48
Pro Ser Val Leu Thr Gln Pro Leu Ser Ala Ser Gly Thr Pro Gly Gln
1               5                   10                  15

agg gtc acc atc tct tgt tct gga agc agc tcc aac atc gga gat aat        96
Arg Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Asp Asn
            20                  25                  30
```

```
ttt gtt tat tgg tat cag caa ttc ccg gga acg gcc ccc aaa gtc ctc       144
Phe Val Tyr Trp Tyr Gln Gln Phe Pro Gly Thr Ala Pro Lys Val Leu
        35                  40                  45

atc ttt aaa aat aat cag cgg ccc tca ggg gtc cct gac cga ttc ttc       192
Ile Phe Lys Asn Asn Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Phe
    50                  55                  60

ggc tcc aag tct ggc acc tca gcc tcc ctg gcc atc agt gga ctc cgg       240
Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Arg
65                  70                  75                  80

tcc gag gat gag gct gag tat tac tgt gca acc tgg gat gac gac ctg       288
Ser Glu Asp Glu Ala Glu Tyr Tyr Cys Ala Thr Trp Asp Asp Asp Leu
                85                  90                  95

agt ggt ccg gtc ttc ggc gga ggg acc aag gtg acc gtc cta g            331
Ser Gly Pro Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu
            100                 105                 110
```

<210> 2559
<211> 322
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2559

```
gaa acg aca ctc atg cag tct cca gca ctc ata tca gcg act cca gga        48
Glu Thr Thr Leu Met Gln Ser Pro Ala Leu Ile Ser Ala Thr Pro Gly
1               5                   10                  15

gac aaa gtc cac atc tcc tgc aaa gcc agc caa gac att gac gat gat        96
Asp Lys Val His Ile Ser Cys Lys Ala Ser Gln Asp Ile Asp Asp Asp
            20                  25                  30

ttg aat tgg tat caa cag aaa cca gga gaa gct cct att ctc att att       144
Leu Asn Trp Tyr Gln Gln Lys Pro Gly Glu Ala Pro Ile Leu Ile Ile
        35                  40                  45

gaa gaa gca act aat ctc ggt cct gga ttc tca cct cga ttc agt ggc       192
Glu Glu Ala Thr Asn Leu Gly Pro Gly Phe Ser Pro Arg Phe Ser Gly
    50                  55                  60

agc ggg tat gga aca gat ttc acc ctc aca att tat gac ata gag tct       240
Ser Gly Tyr Gly Thr Asp Phe Thr Leu Thr Ile Tyr Asp Ile Glu Ser
65                  70                  75                  80

gga gat gct gca ttt tac ttc tgt cta caa cat gat act ttc cct ctg       288
Gly Asp Ala Ala Phe Tyr Phe Cys Leu Gln His Asp Thr Phe Pro Leu
                85                  90                  95
```

```
acg ttc ggc caa ggg acc aaa gtg gaa atc aaa c                          322
Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
            100                 105

<210> 2560
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2560
gt gac atc cag atg acc cag tct cct tcc acc ctg tct gca tct gta          47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val
   1               5                  10                  15

gga gac aaa gtc acc atc act tgc cgg gcc agt cag agt gtt ggt agc         95
Gly Asp Lys Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Val Gly Ser
                20                  25                  30

tgg ttg gcc tgg tat cag caa aaa cca ggg aaa gcc cct aag ctc ctg        143
Trp Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
            35                  40                  45

atc tct gtg gcg tct agt tta gaa agt ggg gtc cca tca agg ttc agc        191
Ile Ser Val Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60

ggc agt gga tct ggg aca gaa ttc act ctc acc gtc agc agc ctg cag        239
Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Val Ser Ser Leu Gln
    65                  70                  75

cct gat gat ttt gca act tat tac tgt caa cag tat aat agt tat tcg        287
Pro Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Tyr Ser
80                  85                  90                  95

tgg acg ttc ggc caa ggg acc aag gtg gag ctc aaa cga act gtg gct        335
Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Leu Lys Arg Thr Val Ala
                100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct        383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag        431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc        479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155
```

```
cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tta                                          644
Ser Phe Asn Arg Gly Glu Leu
        210
```

<210> 2561
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2561

```
gt gac atc cag ttg acc cag tct cca tcc ttc ctg tct gca tct gta         47
   Asp Ile Gln Leu Thr Gln Ser Pro Ser Phe Leu Ser Ala Ser Val
   1               5                   10                  15

gga gac aga gtc acc atc act tgc cgg gcc agt cag gac att agc agt        95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Asp Ile Ser Ser
                20                  25                  30

ttt tta gcc tgg tat cag caa aaa cca ggg aaa gcc cct gac ctc cta       143
Phe Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Asp Leu Leu
            35                  40                  45

atc tat gct gca tcc act ttg cag agt ggg gtc cca tca agg ttc agc       191
Ile Tyr Ala Ala Ser Thr Leu Gln Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60

ggc agt gga tct ggg aca gaa ttc act ctc aca atc agt agc ctg cag       239
Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln
    65                  70                  75

cct gaa gat ttt gca gct tat tac tgt caa cac ctt act agt ttc ccg       287
Pro Glu Asp Phe Ala Ala Tyr Tyr Cys Gln His Leu Thr Ser Phe Pro
80                  85                  90                  95

tac act ttt ggc cag ggg acc aag ctg gag atc aaa cga act gtg gct       335
Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala
                100                 105                 110
```

```
gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tta                                          644
Ser Phe Asn Arg Gly Glu Leu
        210
```

<210> 2562
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2562

```
gtt tct tct gag ctg act cag gac cct gct gtg tct gtg gcc ttg gga        48
Val Ser Ser Glu Leu Thr Gln Asp Pro Ala Val Ser Val Ala Leu Gly
1               5                   10                  15

cag aca gtc agg atc aca tgc caa gga gac agc ctc aga gac tat tct        96
Gln Thr Val Arg Ile Thr Cys Gln Gly Asp Ser Leu Arg Asp Tyr Ser
            20                  25                  30

gct agc tgg tac cag cag aag cca gga cag gcc cct att ctt gtc atc       144
Ala Ser Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Ile Leu Val Ile
        35                  40                  45

ttt ttc aga aac aag cgg ccc tct ggg atc cca gac cga ttc tct ggc       192
Phe Phe Arg Asn Lys Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly
    50                  55                  60
```

```
tcc gcc tca gga aac aca gct tcc ttg acc atc act ggg gct cag gcg       240
Ser Ala Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala
65                  70                  75                  80

gaa gat gag gct gac tat tac tgt ggc tcc cgg gac agt agt ggt aac       288
Glu Asp Glu Ala Asp Tyr Tyr Cys Gly Ser Arg Asp Ser Ser Gly Asn
                85                  90                  95

cct tct gtc ttc gga gct ggg acc aag gtc acc gtc cta ggt cag ccc       336
Pro Ser Val Phe Gly Ala Gly Thr Lys Val Thr Val Leu Gly Gln Pro
            100                 105                 110

aag gcc aac ccc act gtc act ctg ttc ccg ccc tcc tct gag gag ctc       384
Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu
        115                 120                 125

caa gcc aac aag gcc aca cta gtg tgt ctg atc agt gac ttc tac ccg       432
Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro
    130                 135                 140

gga gct gtg aca gtg gcc tgg aag gca gat ggc agc ccc gtc aag gcg       480
Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys Ala
145                 150                 155                 160

gga gtg gag acc acc aaa ccc tcc aaa cag agc aac aac aag tac gcg       528
Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala
                165                 170                 175

gcc agc agc tac ctg agc ctg acg ccc gag cag tgg aag tcc cac aga       576
Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg
            180                 185                 190

agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca       624
Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr
        195                 200                 205

gtg gcc cct aca gaa tgt tca                                           645
Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2563
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2563
ca gaa att gtg ttg aca cag tct cca gcc acc ctg tct ttg tct cca         47
   Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro
   1               5                  10                  15
```

```
ggg gaa gga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc gcc        95
Gly Glu Gly Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ala
                20                  25                  30

tac tta ggc tgg tac caa cag aaa cct ggc cag gct ccc agg ctc ctc       143
Tyr Leu Gly Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
            35                  40                  45

atc tat gat aca tcc aac agg gcc act ggc atc cca gcc agg ttc agt       191
Ile Tyr Asp Thr Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser
        50                  55                  60

ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc agc cta gag       239
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu
    65                  70                  75

cct gaa gat ttt gca gtt tat tac tgt cag cag cgt agc aac tgg ctg       287
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ser Asn Trp Leu
80                  85                  90                  95

tac act ttt ggc cag ggg acc aag ctg gag atc aaa cga act gtg gct       335
Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala
                100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgg                                          644
Ser Phe Asn Arg Gly Glu Trp
        210
```

<210> 2564
<211> 645

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2564
```
tcc tat gtg ctg act cag cca ccc tca gtg tca gtg gcc cca gga aag        48
Ser Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Lys
1               5                  10                  15

acg gcc agg att acc tgt ggg gga aac aac att gga agt aaa agt gtg        96
Thr Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Ser Lys Ser Val
            20                  25                  30

cac tgg tac cag cag aag cca ggc cag gcc cct gtg ctg gtc atc tat       144
His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

tat gat agc gac cgg ccc tca ggg atc cct gag cga ttc tct ggc tcc       192
Tyr Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

aac tct ggg aac acg gcc acc ctg acc atc agc agg gtc gaa gcc ggg       240
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65                  70                  75                  80

gat gag gcc gac tat tac tgt cag gtg tgg gat agt agt agt gat cat       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Ser Asp His
                85                  90                  95

caa gag gta ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag ccc       336
Gln Glu Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro
            100                 105                 110

aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag ctt       384
Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu
        115                 120                 125

caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg       432
Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro
    130                 135                 140

gga gcc gtg aca gtg gcc tgg aag gca gat ggc agc ccc gtc aag gcg       480
Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys Ala
145                 150                 155                 160

gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg       528
Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala
                165                 170                 175

gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc cac aga       576
Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg
```

```
            180                 185                 190

agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca       624
Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr
        195                 200                 205

gtg gcc cct aca gaa tgt tca                                           645
Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2565
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2565

```
cag tct gcc ctg act cag cct gcc tcc gtg tct ggg tct cct gga cag        48
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

tcg atc acc atc tcc tgc act gga tcc agc agt gat gtt gga aat tat        96
Ser Ile Thr Ile Ser Cys Thr Gly Ser Ser Ser Asp Val Gly Asn Tyr
            20                  25                  30

aac ctt gtc tcc tgg tac caa cta cac ccc ggc aaa gcc ccc aaa ctc       144
Asn Leu Val Ser Trp Tyr Gln Leu His Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

atg att tat gag gtc att aag cgg ccc tca gga gtt tct agt cac ttc       192
Met Ile Tyr Glu Val Ile Lys Arg Pro Ser Gly Val Ser Ser His Phe
    50                  55                  60

tct ggc tcc aag tct ggc aac acg gcc tcc ctg aca atc tct ggg ctc       240
Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

cag gct gag gac gag gct gat tat tac tgc tgc tca tat gca cct agt       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Cys Ser Tyr Ala Pro Ser
                85                  90                  95

aac act tat gtc ttc gga act ggg acc agg gtc acc gtc cta ggt cag       336
Asn Thr Tyr Val Phe Gly Thr Gly Thr Arg Val Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gcc aac ccc act gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctc caa gcc aac aag gcc aca cta gtg tgt ctg atc agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
```

```
    130                 135                 140

ccg gga gct gtg aca gtg gcc tgg aag gca gat ggc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aaa ccc tcc aaa cag agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tac ctg agc ctg acg ccc gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2566
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2566
cag att gtg ttg aca cag tct cca gcc acc ctg tct ttg tct cca ggg        48
Gln Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

gaa aga gtc acc ctc tcc tgc agg gcc agt cag agt gtc aga agc cac        96
Glu Arg Val Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Arg Ser His
            20                  25                  30

tta gcc tgg tac cag cag aaa cct ggc cag gct ccc agg ctc ctc atg       144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Met
        35                  40                  45

tat gat gca ttc aat agg gcc act ggc acc cca gcc agg ttc agt ggc       192
Tyr Asp Ala Phe Asn Arg Ala Thr Gly Thr Pro Ala Arg Phe Ser Gly
    50                  55                  60

agt ggg tct ggg aca gac ttc act ctc acc att agc agc cta gag cct       240
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65                  70                  75                  80

gaa gat ttt gca att tat tac tgt cag cag cgt agc aac tgg cct ctc       288
Glu Asp Phe Ala Ile Tyr Tyr Cys Gln Gln Arg Ser Asn Trp Pro Leu
```

```
                85                  90                  95

act ttc ggc gga ggg acc aag gtg gag atc aaa cga act gtg gct gca       336
Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       384
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       432
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       480
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       528
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       576
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       624
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

ttc aac agg gga gag tta                                              642
Phe Asn Arg Gly Glu Leu
    210

<210> 2567
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2567
gtt tct tct gag ctg act caa gac cct gct gtg tct gtg gcc ttg gga        48
Val Ser Ser Glu Leu Thr Gln Asp Pro Ala Val Ser Val Ala Leu Gly
1               5                   10                  15

cag aca gtc cgg atc aca tgc caa gga gac agc ctc aga agt tat tat        96
Gln Thr Val Arg Ile Thr Cys Gln Gly Asp Ser Leu Arg Ser Tyr Tyr
            20                  25                  30

gca acc tgg tac cag cag aag cca gga cag gcc cct cta ctt gtc ata       144
Ala Thr Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Leu Leu Val Ile
```

```
        35                  40                  45

ttt gat aaa gac aaa cgg ccc tca ggg atc cca gac cga ttc tcc ggc       192
Phe Asp Lys Asp Lys Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly
    50                  55                  60

tcc agc tca gga aac aca gct tcc ttg acc atc act ggg gct cag ccg       240
Ser Ser Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Ala Gln Pro
65                  70                  75                  80

gaa gat gag gct gtc tat tac tgt aac tcc cga gac agc agt gct cat       288
Glu Asp Glu Ala Val Tyr Tyr Cys Asn Ser Arg Asp Ser Ser Ala His
                85                  90                  95

gac cat ctg tta ttc ggc gga ggg acc acg ctg acc gtc ctg ggt cag       336
Asp His Leu Leu Phe Gly Gly Gly Thr Thr Leu Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2568
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain
```

<400> 2568
gaa gtt gtt ttg acg cag tct cca ggc acc ctg tct ttg tct cca ggt 48
Glu Val Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

gag aga gcc acc ctc ttc tgc aag gcc agt cag gct att gtc agc aat 96
Glu Arg Ala Thr Leu Phe Cys Lys Ala Ser Gln Ala Ile Val Ser Asn
20 25 30

tac tta gtc tgg tat cag cag aaa cct ggc ctg gct ccc aga ctc ctc 144
Tyr Leu Val Trp Tyr Gln Gln Lys Pro Gly Leu Ala Pro Arg Leu Leu
35 40 45

atc tac agt gct tcc acc agg gcc act ggc att cca gac agg ttc agt 192
Ile Tyr Ser Ala Ser Thr Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
50 55 60

ggc ggt ggc tct gga aca gac ttc agt ctc acc atc agc gga ctg gaa 240
Gly Gly Gly Ser Gly Thr Asp Phe Ser Leu Thr Ile Ser Gly Leu Glu
65 70 75 80

cct gaa gat ttt gca gtt tat tac tgt caa cac ttt ggt gac tca ccc 288
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln His Phe Gly Asp Ser Pro
85 90 95

ttg tac att ttt ggc cag ggg acc aag gtg gag atc aaa cga act gtg 336
Leu Tyr Ile Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val
100 105 110

gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa 384
Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
115 120 125

tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga 432
Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
130 135 140

gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac 480
Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
145 150 155 160

tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc 528
Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
165 170 175

ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa 576
Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
180 185 190

gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca 624
Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
195 200 205

```
aag agc ttc aac agg gga gag tgt                                        648
Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 2569
<211> 636
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2569
ccc tat gag ctg act cag cca ctc tca gtg tcg gtg gcc ctg gga cag         48
Pro Tyr Glu Leu Thr Gln Pro Leu Ser Val Ser Val Ala Leu Gly Gln
1               5                   10                  15

acg gcc agg gtt acc tgt ggg gga acg aac att gga aag aaa gat gtt         96
Thr Ala Arg Val Thr Cys Gly Gly Thr Asn Ile Gly Lys Lys Asp Val
            20                  25                  30

cat tgg tac caa caa aag cca ggc cag gcc cct gtg ttg gtc att tat        144
His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

agg gat gac aac cgg ccc tct ggg atc cct gag cga ttc tct ggc ctc        192
Arg Asp Asp Asn Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Leu
    50                  55                  60

aat tcg ggg cac acg gcc acc ttg acc atc agc aga gcc cag gcc ggg        240
Asn Ser Gly His Thr Ala Thr Leu Thr Ile Ser Arg Ala Gln Ala Gly
65                  70                  75                  80

gat gag gct gat tat tac tgt cag gtg tgg gac agc agt act gcg gtg        288
Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Thr Ala Val
                85                  90                  95

ttc ggc gga ggg acc aag ctg acc gtc ctc ggt cag ccc aag gct gcc        336
Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
            100                 105                 110

ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag ctt caa gcc aac        384
Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125

aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga gcc gtg        432
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130                 135                 140

aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga gtg gag        480
Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
145                 150                 155                 160
```

```
acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc agc agc       528
Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175

tac ctg agc ctg acg cct gag cag tgg aag tcc cac aga agc tac agc       576
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190

tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg gcc cct       624
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195                 200                 205

aca gaa tgt tca                                                      636
Thr Glu Cys Ser
    210
```

<210> 2570
<211> 325
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2570

```
ctc tat gtg ctg act cag cca ccc tca gtg tca gtg gcc cca gga aag        48
Leu Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Lys
1               5                   10                  15

acg gcc agg att acc tgt ggg gga aac aac att gga agt aaa agt gtg        96
Thr Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Ser Lys Ser Val
            20                  25                  30

cac tgg tac cag cag aag cca ggc cag gcc cct gtg ctg gtc atc tat       144
His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

gat gat agc gac cgg ccc tca ggg atc cct gag cga ttc tct ggc tcc       192
Asp Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

aac tct ggg aac acg gcc acc ctg acc atc agc agg gtc gaa gcc ggg       240
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65                  70                  75                  80

gat gag gcc gac tat tac tgt cag gtg tgg gat agt agt agt gat cat       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Ser Asp His
                85                  90                  95

gtg gta ttc ggc gga ggg acc aag ctg acc gtc cag g                    325
Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Gln
            100                 105
```

<210> 2571
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2571
```
tcc tat gag ctg aca cag aca ccc tcg gtg tca gtg tcc cca gga cag        48
Ser Tyr Glu Leu Thr Gln Thr Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                   10                  15

acg gcc agg atc acc tgc tct gga gat gca ttg cca aag caa tct gtt        96
Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Lys Gln Ser Val
            20                  25                  30

aat tgg tac cag cag agg cca ggc cag gcc cct gtg gtg gtg ata tgt       144
Asn Trp Tyr Gln Gln Arg Pro Gly Gln Ala Pro Val Val Val Ile Cys
        35                  40                  45

aaa gac act gag agg ccc tca ggg atc cct gag cga ttc tct ggc tcc       192
Lys Asp Thr Glu Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

acc tca ggg aca aca gtc acg ttg acc atc ggt gga gtc cag gca gaa       240
Thr Ser Gly Thr Thr Val Thr Leu Thr Ile Gly Gly Val Gln Ala Glu
65                  70                  75                  80

gat gag gct gac tat tac tgt caa tca gca gac agc agt ggt ttt tat       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Ala Asp Ser Ser Gly Phe Tyr
                85                  90                  95

gtg gta ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag ccc aag       336
Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
            100                 105                 110

gct gcc ccc tcg gtc act ctg ttc cca ccc tcc tct gag gag ctt caa       384
Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
        115                 120                 125

gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga       432
Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
    130                 135                 140

gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga       480
Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145                 150                 155                 160

gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc       528
Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
                165                 170                 175
```

```
agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac aaa agc       576
Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser
            180                 185                 190

tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg       624
Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
        195                 200                 205

gcc cct aca gaa tgt tca                                              642
Ala Pro Thr Glu Cys Ser
    210
```

<210> 2572
<211> 636
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2572

```
tcc tat gag ctg aca cag cca ccc tcg gtg tca gtg tcc cca gga cag        48
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                   10                  15

acg gcc agg atc acc tgc tct gga gat gca ttg cca aag caa tat gct        96
Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Lys Gln Tyr Ala
            20                  25                  30

tat tgg tac cag cag aag cca ggc cag gcc cct gtg ctg gtg ata tat       144
Tyr Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

aaa gac agt gag agg ccc tca ggg atc cct gag cga ttc tct ggc tcc       192
Lys Asp Ser Glu Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

agc tca ggg aca aca gtc acg ttg acc atc agt gga gtc cag gca gaa       240
Ser Ser Gly Thr Thr Val Thr Leu Thr Ile Ser Gly Val Gln Ala Glu
65                  70                  75                  80

gac gag gct gac tat tac tgt caa tca gca gac agc agt agt ccc gtg       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Ala Asp Ser Ser Ser Pro Val
                85                  90                  95

ttt ggc gga ggg acc aag ctg acc gtc cta ggt cag ccc aag gct gcc       336
Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
            100                 105                 110

ccc tcg gtc act ctg ttc cca ccc tcc tct gag gag ctt caa gcc aac       384
Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125
```

```
aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga gcc gtg       432
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130                 135                 140

aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga gtg gag       480
Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
145                 150                 155                 160

acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc agc agc       528
Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175

tac ctg agc ctg acg cct gag cag tgg aag tcc cac aga agc tac agc       576
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190

tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg gcc cct       624
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195                 200                 205

aca gaa tgt tca                                                      636
Thr Glu Cys Ser
    210
```

<210> 2573
<211> 639
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2573

```
tcc tat gag ctg aca cag cca ccc tcg gtg tca gtg ccc cca gga caa        48
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Pro Pro Gly Gln
1               5                   10                  15

acg gcc agg atc acc tgc tct gga gat gca ttg cca aaa aaa tat gct        96
Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Lys Lys Tyr Ala
            20                  25                  30

tat tgg tac cag cag aag tca ggc cag gcc cct gtg ctg gtc atc tat       144
Tyr Trp Tyr Gln Gln Lys Ser Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

gag gac acc aaa cga ccc tcc ggg atc cct gac aga ttc tct ggc tcc       192
Glu Asp Thr Lys Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly Ser
    50                  55                  60

agc tca ggg aca atg gcc acc ttg act atc agt ggg gcc cag gtg gag       240
Ser Ser Gly Thr Met Ala Thr Leu Thr Ile Ser Gly Ala Gln Val Glu
65                  70                  75                  80
```

```
gat gat gct gac tac tac tgt tac tca aca gac agt agg gct acc ggg       288
Asp Asp Ala Asp Tyr Tyr Cys Tyr Ser Thr Asp Ser Arg Ala Thr Gly
                85                  90                  95

gtt ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag ccc aag gct       336
Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys Ala
            100                 105                 110

gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag ctt caa gcc       384
Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala
        115                 120                 125

aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga gcc       432
Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala
    130                 135                 140

gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga gtg       480
Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val
145                 150                 155                 160

gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc agc       528
Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser
                165                 170                 175

agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac aga agc tac       576
Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr
            180                 185                 190

agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg gcc       624
Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala
        195                 200                 205

cct aca gaa tgt tca                                                  639
Pro Thr Glu Cys Ser
    210
```

<210> 2574
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2574

```
gcc gtc cag atg acc cag tct cca tcc tcc ctg tct gca tct gtg gga        48
Ala Val Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

gac aga gtc acc atc tct tgc cgg gca agt cag acc att gac acc tat        96
Asp Arg Val Thr Ile Ser Cys Arg Ala Ser Gln Thr Ile Asp Thr Tyr
            20                  25                  30
```

```
tta aac tgg tat caa cag aga cca gga aaa gcc cct cag ctc ctg atc       144
Leu Asn Trp Tyr Gln Gln Arg Pro Gly Lys Ala Pro Gln Leu Leu Ile
        35                  40                  45

tat gct gca tcc agt ttg caa agt ggg gtc cct tca agg ttc agt gcc       192
Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Ala
    50                  55                  60

agt gga tct ggg aca cat ttc act ctc atc atc aac agt ctg caa cct       240
Ser Gly Ser Gly Thr His Phe Thr Leu Ile Ile Asn Ser Leu Gln Pro
65                  70                  75                  80

gaa gac ttt gca act tac tac tgt caa cag agt tac agt acc cct cag       288
Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Pro Gln
                85                  90                  95

acg ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg gct gca       336
Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       384
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       432
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       480
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       528
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       576
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       624
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

ttc aac agg gga gag tgt                                              642
Phe Asn Arg Gly Glu Cys
    210
```

<210> 2575
<211> 324
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2575
gt gac atc cag atg acc cag tct cca tcc tcc ctg tct gct tct gta 47
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
1 5 10 15

gga gac aga gtc acc atc act tgc cag gcg act cag ggc att acc aac 95
Gly Asp Arg Val Thr Ile Thr Cys Gln Ala Thr Gln Gly Ile Thr Asn
20 25 30

tat tta aat tgg tat cag caa aaa cca ggg aaa gcc cct aag gtc ctg 143
Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Val Leu
35 40 45

atc tac gat gca tcc aat ttg gaa aca ggg gtc cca tca agg ttc agt 191
Ile Tyr Asp Ala Ser Asn Leu Glu Thr Gly Val Pro Ser Arg Phe Ser
50 55 60

gga aat gga tct ggg aca cat ttt act ttc acc atc agc agc ctg cag 239
Gly Asn Gly Ser Gly Thr His Phe Thr Phe Thr Ile Ser Ser Leu Gln
65 70 75

cct gaa gat atc gca aca tat tac tgt caa cag tat gaa aat ctc ccg 287
Pro Glu Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Tyr Glu Asn Leu Pro
80 85 90 95

ctc act ttc ggc gga ggg acc aag gtg gag atc aaa c 324
Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105

<210> 2576
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2576
gt gac atc cag atg acc cag tct cca tcc tcc ctg tct gca tct gta 47
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
1 5 10 15

gga gac aga gtc acc atc act tgc cag gcg agt cag gac att agc acg 95
Gly Asp Arg Val Thr Ile Thr Cys Gln Ala Ser Gln Asp Ile Ser Thr
20 25 30

ttt tta aat tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg 143
Phe Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
35 40 45

```
atc tac gat gaa tcc aat ttg gaa aca ggg gtc ccg tca agg ttc agt       191
Ile Tyr Asp Glu Ser Asn Leu Glu Thr Gly Val Pro Ser Arg Phe Ser
        50                  55                  60

gga agt gga tct ggg aca gat ttt act ttc acc atc agc agc ctg cag       239
Gly Ser Gly Ser Gly Thr Asp Phe Thr Phe Thr Ile Ser Ser Leu Gln
    65                  70                  75

cct gaa gat att gca aca tat tac tgt caa cag ttt gat aat ctc ccg       287
Pro Glu Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Phe Asp Asn Leu Pro
80                  85                  90                  95

ctc act ttc ggc gga ggg acc agg ttg gag atc aaa cga act gtg gct       335
Leu Thr Phe Gly Gly Gly Thr Arg Leu Glu Ile Lys Arg Thr Val Ala
                100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgt                                          644
Ser Phe Asn Arg Gly Glu Cys
        210
```

<210> 2577
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2577

```
cag tct gcc ctg act cag cct cgc tca gtg tcc ggg tct cct gga cag        48
Gln Ser Ala Leu Thr Gln Pro Arg Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

tca gtc acc atc tcc tgc act gga acc agc agt gat att ggt ggt tat        96
Ser Val Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Ile Gly Gly Tyr
            20                  25                  30

aac tat gtc tcc tgg tac caa caa cac cca ggc aaa gcc ccc aaa ttt       144
Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Phe
        35                  40                  45

gtg att tat gat gtc agt cag cgg ccc tca ggg gtc cct gat cgc ttc       192
Val Ile Tyr Asp Val Ser Gln Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc aac acg gcc tcc ctg acc atc tct ggg ctc       240
Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

cag gct gac gat gag gct gat tat tac tgc tcc tca tat gca ggc agc       288
Gln Ala Asp Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Ala Gly Ser
                85                  90                  95

tac act tgg gtg ttc ggc gga ggg acc aag gtg atc gtc cta g             331
Tyr Thr Trp Val Phe Gly Gly Gly Thr Lys Val Ile Val Leu
            100                 105                 110
```

<210> 2578
<211> 317
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2578

```
tcc tat gag ctg act cag cca ccc tca gtg tcc gtg tcc cca gga cag        48
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                   10                  15

aca gcc agc atc acc tgc tct gga gat aaa ttg ggg gat aaa tat gct        96
Thr Ala Ser Ile Thr Cys Ser Gly Asp Lys Leu Gly Asp Lys Tyr Ala
            20                  25                  30

tgc tgg tat cag cag aag cca ggc cag tcc cct gtg gtg gtc atc tat       144
Cys Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Val Val Ile Tyr
        35                  40                  45

caa gat acc aag cgg ccc tca ggg atc cct gag cga ttc tct ggc tcc       192
Gln Asp Thr Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60
```

```
aac tct ggg aac aca gcc act ctg acc atc agc ggg acc cag gct atg       240
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65                  70                  75                  80

gat gag gct gac tat tac tgt cag gcg tgg gac agc agc act gtg gta       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Ala Trp Asp Ser Ser Thr Val Val
                85                  90                  95

ttt ggc gga ggg acc aag ctg acc gtc ct                                317
Phe Gly Gly Gly Thr Lys Leu Thr Val
            100                 105

<210> 2579
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2579
ccg tct gtg ttg acg cag ccg ccc tca ctg tct gcg gcc cca gga cag        48
Pro Ser Val Leu Thr Gln Pro Pro Ser Leu Ser Ala Ala Pro Gly Gln
1               5                   10                  15

agg gtc acc atc tcc tgc tct gga agc acc tcc aac att gga aat aat        96
Arg Val Thr Ile Ser Cys Ser Gly Ser Thr Ser Asn Ile Gly Asn Asn
            20                  25                  30

ttt gta tcc tgg tac cag cag ctc cca gga gca gcc ccc aaa ctc ctc       144
Phe Val Ser Trp Tyr Gln Gln Leu Pro Gly Ala Ala Pro Lys Leu Leu
        35                  40                  45

att tat gac aat gat aag cga ccc tca gag att cct gac cga ttc tct       192
Ile Tyr Asp Asn Asp Lys Arg Pro Ser Glu Ile Pro Asp Arg Phe Ser
    50                  55                  60

ggc tcc aag tct ggc acg tca gcc acc ctg gcc atc acc gga ctc cag       240
Gly Ser Lys Ser Gly Thr Ser Ala Thr Leu Ala Ile Thr Gly Leu Gln
65                  70                  75                  80

act ggg gac gag gcc gat tat tat tgc gga aca tgg gat agc agc ctg       288
Thr Gly Asp Glu Ala Asp Tyr Tyr Cys Gly Thr Trp Asp Ser Ser Leu
                85                  90                  95

ggt gct tat gtc ttc gga act ggg acc aag gtc acc gtc ctg g              331
Gly Ala Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu
            100                 105                 110

<210> 2580
<211> 644
<212> DNA
<213> Artificial Sequence
```

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2580
```
ga gaa att gtg ttg acg cag tct cca ggc aca ctg tct ttg tct cca         47
   Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro
   1               5                  10                  15

ggg gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt atc agc agc        95
Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Ile Ser Ser
               20                  25                  30

acc tac tta gtc tgg tac cag cag aaa cct ggc cag gct ccc agg ctc       143
Thr Tyr Leu Val Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu
            35                  40                  45

ctc atc tat gct gcg tcc tat agg gcc act ggc atc cca gac agg ttc       191
Leu Ile Tyr Ala Ala Ser Tyr Arg Ala Thr Gly Ile Pro Asp Arg Phe
        50                  55                  60

agt ggc agt ggg tct ggg aca gac ttc att ctc acc atc agc aga ctg       239
Ser Gly Ser Gly Ser Gly Thr Asp Phe Ile Leu Thr Ile Ser Arg Leu
    65                  70                  75

gag cct gaa gat ttt gca gta tat tac tgt cag cag tat ggt agc tca       287
Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser
80                  85                  90                  95

ctc act ttc ggc gga ggg acc aag gtg gag atc aaa cga act gtg gct       335
Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
                100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
                180                 185                 190
```

```
tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgt                                       644
Ser Phe Asn Arg Gly Glu Cys
        210
```

<210> 2581
<211> 647
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2581

```
ga gaa att gag ttg acg cag tct cca ggc acc ctg tct ttg tct cca         47
   Glu Ile Glu Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro
   1               5                  10                  15

ggg gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc agc        95
Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser
                20                  25                  30

agc tac tta gcc tgg tac cag cag aaa cct ggc cag gct ccc agg ctc       143
Ser Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu
            35                  40                  45

ctc atc tat ggt gca tcc agc agg gcc act ggc atc cca gac agg ttc       191
Leu Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe
        50                  55                  60

agt ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc aga ctg       239
Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu
    65                  70                  75

gag cct gaa gat ttt gca gtg tat tac tgt cag cag tat ggt agc tca       287
Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser
80                  85                  90                  95

cct ctc act ttc ggc gga ggg acc aag gtg gag atc aaa cga act gtg       335
Pro Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val
                100                 105                 110

gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa       383
Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
            115                 120                 125

tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga       431
Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
        130                 135                 140
```

```
gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac       479
Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
    145                 150                 155

tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc       527
Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
160                 165                 170                 175

ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa       575
Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
                180                 185                 190

ctc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca       623
Leu Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
            195                 200                 205

aag agc ttc aac agg gga gag tgt                                      647
Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215

<210> 2582
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2582
gcc tct gcc ctg act cag cct gcc tcc gtg tct ggg tct cct gga cag        48
Ala Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

tcg atc acc atc tcc tgc aat gga agc agc agt gac gtt ggc gat tat        96
Ser Ile Thr Ile Ser Cys Asn Gly Ser Ser Ser Asp Val Gly Asp Tyr
            20                  25                  30

aac tat gtc tcc tgg tac caa caa cac cca ggc aaa gcc ccc aaa ctc       144
Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

atg att tat gac gtc agt aat cgg ccc tca ggg gtt tct aat cgc ttc       192
Met Ile Tyr Asp Val Ser Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc aac acg gcc tcc ctg acc atc tct ggg ctc       240
Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

cag gct gag gac gag gct gat tat tac tgc agc tca tat aca agc agc       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Thr Ser Ser
                85                  90                  95
```

```
agg agt ctg gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag       336
Arg Ser Leu Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2583
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2583
gt gac atc cag atg acc cag tct cca tcc tcc ctg tct gca tct gta         47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
   1               5                  10                  15

gga gac aaa gtc acc atg acc tgc cgg gca agt cag ttc att agc gtc         95
Gly Asp Lys Val Thr Met Thr Cys Arg Ala Ser Gln Phe Ile Ser Val
                20                  25                  30

tat gta aat tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg       143
Tyr Val Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
            35                  40                  45
```

```
atc tat act gcg tcc tct ttg gaa agt ggg gtc tca tca agg ttc agt       191
Ile Tyr Thr Ala Ser Ser Leu Glu Ser Gly Val Ser Ser Arg Phe Ser
        50                  55                  60

ggc ggc gga tct ggg aca gat ttc act ctc acg atc cgc agt ctg caa       239
Gly Gly Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Arg Ser Leu Gln
    65                  70                  75

cct gaa gat ttt gca att tac tac tgt caa cag act tac agc acc ccg       287
Pro Glu Asp Phe Ala Ile Tyr Tyr Cys Gln Gln Thr Tyr Ser Thr Pro
80                  85                  90                  95

tgg acg ttc ggc cca ggg acg agg gta gaa att aaa cga act gtg gct       335
Trp Thr Phe Gly Pro Gly Thr Arg Val Glu Ile Lys Arg Thr Val Ala
                100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgt                                          644
Ser Phe Asn Arg Gly Glu Cys
        210
```

<210> 2584
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2584

```
gga gaa gta gtg atg acg cag tct cca gcc acg ctg tct gtg tct cca        48
Gly Glu Val Val Met Thr Gln Ser Pro Ala Thr Leu Ser Val Ser Pro
1               5                  10                  15

ggg gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc agc        96
Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser
            20                  25                  30

aag gta gcc tgg tac cag cag aga cct ggc cgg gct ccc agg ctc ctc       144
Lys Val Ala Trp Tyr Gln Gln Arg Pro Gly Arg Ala Pro Arg Leu Leu
        35                  40                  45

atc tat ggt gca tcc acc agg gcc act gat atc cca gcc agg ttc agt       192
Ile Tyr Gly Ala Ser Thr Arg Ala Thr Asp Ile Pro Ala Arg Phe Ser
    50                  55                  60

ggc agt ggg tct ggg aca gag ttc act ctc acc atc agc agc ctg cag       240
Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln
65                  70                  75                  80

tct gaa gat ttt gca gtt tat tac tgt caa caa tat aat aat tgg ctc       288
Ser Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Asn Asn Trp Leu
                85                  90                  95

act ttc ggc gga ggg acc aag gtg gaa atc aag cga act gtg gct gca       336
Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       384
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       432
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       480
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       528
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       576
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       624
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

ttc aac agg gga gag tgg                                               642
Phe Asn Arg Gly Glu Trp
```

210

<210> 2585
<211> 319
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2585
```
tcc tat gag ctg aca cag cca tcc tca gtg tca gtg tct ccg gga cag        48
Ser Tyr Glu Leu Thr Gln Pro Ser Ser Val Ser Val Ser Pro Gly Gln
1               5                  10                  15

aca gcc agg atc acc tgc tca gga gat gta ttg gca aaa aat tat gct        96
Thr Ala Arg Ile Thr Cys Ser Gly Asp Val Leu Ala Lys Asn Tyr Ala
            20                  25                  30

cgg tgg ttc cag cag aag cca ggc cag gcc cct ctg ttg gtg att tat       144
Arg Trp Phe Gln Gln Lys Pro Gly Gln Ala Pro Leu Leu Val Ile Tyr
        35                  40                  45

aaa gac aat att cgg ccc tca ggg atc cct gag cga ttc tcc ggc tcc       192
Lys Asp Asn Ile Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

agc tca ggg acc aca gtc acc ttg acc atc agc ggg gcc cac gtt gac       240
Ser Ser Gly Thr Thr Val Thr Leu Thr Ile Ser Gly Ala His Val Asp
65                  70                  75                  80

gat gag gct gac tat tac tgt tac tct acg cct gac aac aat ggg gtg       288
Asp Glu Ala Asp Tyr Tyr Cys Tyr Ser Thr Pro Asp Asn Asn Gly Val
                85                  90                  95

ttc ggc gga ggg acc aag ctg atc gtc cta g                             319
Phe Gly Gly Gly Thr Lys Leu Ile Val Leu
            100                 105
```

<210> 2586
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2586
```
cag tct gcc ctg act cag cct gcc tcc gtg tct ggg tct cct gga cag        48
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                  10                  15
```

```
tcg atc acc atc tcc tgc act ggg acc agc agt gac gtt ggt gct tat        96
Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Ala Tyr
            20                  25                  30

ccg tat gtc tcc tgg tat caa cat cac cca ggc aga gcc ccc aaa ctc       144
Pro Tyr Val Ser Trp Tyr Gln His His Pro Gly Arg Ala Pro Lys Leu
        35                  40                  45

acg att ttt gat gtc att aat cgg ccc tca ggg gtt tct aat cgc ttc       192
Thr Ile Phe Asp Val Ile Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc aac acg gcc tcc ctg acc atc tct ggg ctc       240
Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

cag gct gag gac gag gct ttt tat tac tgc agc tca tat aca acc tcc       288
Gln Ala Glu Asp Glu Ala Phe Tyr Tyr Cys Ser Ser Tyr Thr Thr Ser
                85                  90                  95

aac agt gtg gtg ttc ggc gga ggg acc aaa ctg acc gtc ctg agt cag       336
Asn Ser Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Ser Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2587
<211> 647

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2587
```
ga gaa att gtg ttg aca cag tct cca ggc acc ctg tct ttg tct cca         47
   Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro
   1               5                  10                  15

ggg gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt tta agc agc        95
Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Leu Ser Ser
                20                  25                  30

ggt tac tta gcc tgg tac cag cag aaa cct ggc cag gct ccc agg ctc       143
Gly Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu
            35                  40                  45

ctc atc tat ggt gca tcc tac agg gcc act gac atc cca gac agg ttc       191
Leu Ile Tyr Gly Ala Ser Tyr Arg Ala Thr Asp Ile Pro Asp Arg Phe
        50                  55                  60

agt ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc aga ctg       239
Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu
    65                  70                  75

gag cct gaa gat ttc gca gtg tat tac tgt cag cag tat gat aac tca       287
Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Asp Asn Ser
80                  85                  90                  95

cct ctc act ttc ggc gga ggg acc aag gtg gag atc aaa cga act gtg       335
Pro Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val
                100                 105                 110

gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa       383
Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
            115                 120                 125

tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga       431
Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
        130                 135                 140

gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac       479
Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
    145                 150                 155

tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc       527
Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
160                 165                 170                 175

ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa       575
Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
```

```
                180                 185                 190

gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca       623
Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
            195                 200                 205

aag agc ttc aac agg gga gag tgt                                       647
Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215
```

<210> 2588
<211> 340
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2588

```
ggg atc gtg atg acc cag tct cca gac tcc ctg gct gtg tct ctg ggc        48
Gly Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1               5                   10                  15

gag agg gcc acc atc aac tgc aag tcc agc cag agt ctt tta tac agg        96
Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Leu Leu Tyr Arg
            20                  25                  30

tcc aac gat aag aac tac ttc gct tgg tac cag cag aaa cca gga cag       144
Ser Asn Asp Lys Asn Tyr Phe Ala Trp Tyr Gln Gln Lys Pro Gly Gln
        35                  40                  45

cct cct aaa ctg ctc att tac tgg gcg tct acc cgg gaa tcc ggg gtc       192
Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
    50                  55                  60

cct gac cga ttc agt ggc agc ggg tca ggg aca gat ttc act ctc acc       240
Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65                  70                  75                  80

atc agc agc ctg cag gct gaa gat gtg gca gtt tat tac tgt cag caa       288
Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
                85                  90                  95

tat tgg ggt act ccg tac act ttt ggc cag ggg acc aag ctg gag atc       336
Tyr Trp Gly Thr Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile
            100                 105                 110

aaa c                                                                 340
Lys
```

<210> 2589
<211> 648

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2589
```
ccg gct gta ctg acg cag gcg ccc tca gtg tct ggg gcc cca ggg cag        48
Pro Ala Val Leu Thr Gln Ala Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

agg gtc acc atc tcc tgt act ggg agc ggc tcc aat atc ggg gct ggt        96
Arg Val Thr Ile Ser Cys Thr Gly Ser Gly Ser Asn Ile Gly Ala Gly
            20                  25                  30

tat gat gca cac tgg tat caa caa ctt cca gga aca gcc ccc aaa ctc       144
Tyr Asp Ala His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

ctc atc tat cgt aac acc aat cgg ccc tct ggg gtc cct gac cga ttc       192
Leu Ile Tyr Arg Asn Thr Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc tcc tca gcc tcc ctg gcc atc act ggg ctc       240
Ser Gly Ser Lys Ser Gly Ser Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80

cag cct gag gat gag gct gaa tat tat tgt cag tcc tat gac agt ggc       288
Gln Pro Glu Asp Glu Ala Glu Tyr Tyr Cys Gln Ser Tyr Asp Ser Gly
                85                  90                  95

ctg ggg gtg gta ttc ggc gga ggg acc aaa ctg acc gtc cta ggt cag       336
Leu Gly Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
```

```
            180                 185                 190

aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                       648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2590
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2590

```
cag tct gcc ctg act cag cct ccc tcc gcg tcc ggg tct cct gga cag        48
Gln Ser Ala Leu Thr Gln Pro Pro Ser Ala Ser Gly Ser Pro Gly Gln
1               5                   10                  15

tca gtc acc atc tcc tgc act gga acc agc agt gac gtt ggt ggt tat        96
Ser Val Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr
            20                  25                  30

gac cat gtc tcc tgg tac caa cag cac cca ggc aaa gcc ccc aaa gtc       144
Asp His Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Val
        35                  40                  45

atg att tat gag gtc act aag cgg ccc tca ggg gtc cct gat cgc ttc       192
Met Ile Tyr Glu Val Thr Lys Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc aac acg gcc tcc ctg acc gtc tct ggg ctc       240
Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Val Ser Gly Leu
65                  70                  75                  80

cag gct gag gat gag gct gaa tat tac tgc agc tca tat gca ggc atc       288
Gln Ala Glu Asp Glu Ala Glu Tyr Tyr Cys Ser Ser Tyr Ala Gly Ile
                85                  90                  95

aac aat ttg gtt ttt ggc gga ggg acc aag ctg acc gtc cta ggt cag       336
Asn Asn Leu Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
```

```
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2591
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2591
gt gac atc cag atg acc cag tct cct tcc acc ctg tct gca tct gta         47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val
   1               5                   10                  15

ggc gac aga gtc acc atc act tgc cgg gcc agt cag agt att agt agc        95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser
                20                  25                  30

tgg ttg gcc tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg       143
Trp Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
            35                  40                  45

atc tat aag gcg tct agt tta gaa agt ggg gtc cca tca agg ttc agc       191
Ile Tyr Lys Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60

ggc agt gga tct ggg aca gag ttc act ctc acc atc agc agc ctg cag       239
Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln
    65                  70                  75

cct gat gat ttt gca act tat tac tgc caa cag tat aat agt tat tct       287
Pro Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Tyr Ser
```

```
80                  85                  90                  95

cag acg ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg gct       335
Gln Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
                100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgt                                          644
Ser Phe Asn Arg Gly Glu Cys
        210

<210> 2592
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2592
gaa ata gtg atg acg cag tcg cca gcc acc ctg tct gtg tct ccc ggc        48
Glu Ile Val Met Thr Gln Ser Pro Ala Thr Leu Ser Val Ser Pro Gly
1               5                   10                  15

gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt att gtc acc aac        96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Ile Val Thr Asn
            20                  25                  30

tta gcc tgg ttt cag cag aaa cct gcc cag gct ccc agg ctc ctc atc       144
Leu Ala Trp Phe Gln Gln Lys Pro Ala Gln Ala Pro Arg Leu Leu Ile
```

```
        35                  40                  45

tat ggt gca tcc acc agg gcc act gat gtc cca gcc aga ttc agt ggc       192
Tyr Gly Ala Ser Thr Arg Ala Thr Asp Val Pro Ala Arg Phe Ser Gly
    50                  55                  60

agt ggg tct ggg aca gag ttc act ctc acc gtc agc agc ctg cag tct       240
Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Val Ser Ser Leu Gln Ser
65                  70                  75                  80

gaa gat ttt gca att tat ttc tgt cag cag tat act gac tgg ccg tac       288
Glu Asp Phe Ala Ile Tyr Phe Cys Gln Gln Tyr Thr Asp Trp Pro Tyr
                85                  90                  95

act ttt ggc cag ggg acc aag ctg gag atc aaa cga act gtg gct gca       336
Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       384
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       432
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       480
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       528
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       576
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       624
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

ttc aac agg gga gag tgt                                              642
Phe Asn Arg Gly Glu Cys
    210
```

<210> 2593
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2593

```
ccc ctt gtg ctg act caa tcg ccc tct gcc tct gcc tcc ctg gga gcc        48
Pro Leu Val Leu Thr Gln Ser Pro Ser Ala Ser Ala Ser Leu Gly Ala
1               5                  10                  15

tcg gtc aag ctc acc tgc act ctg agt agt ggg cac agc acc tac gcc        96
Ser Val Lys Leu Thr Cys Thr Leu Ser Ser Gly His Ser Thr Tyr Ala
            20                  25                  30

atc gca tgg cat cag cag cgg cca gag aag ggc cct cgg tac ttg atg       144
Ile Ala Trp His Gln Gln Arg Pro Glu Lys Gly Pro Arg Tyr Leu Met
        35                  40                  45

aag ctt aac agt gat ggc agc cac atc aag ggg gac ggg atc cct gct       192
Lys Leu Asn Ser Asp Gly Ser His Ile Lys Gly Asp Gly Ile Pro Ala
    50                  55                  60

cgc ttc tca ggc gcc agc tct ggg gtt gac cgc tac ctc atc atc tcc       240
Arg Phe Ser Gly Ala Ser Ser Gly Val Asp Arg Tyr Leu Ile Ile Ser
65                  70                  75                  80

agt tca cag tct gag gat gag gct gac tat tac tgt cag acc tgg ggc       288
Ser Ser Gln Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Thr Trp Gly
                85                  90                  95

act gtt ggc gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag       336
Thr Val Gly Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aaa agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205
```

```
aca gtg gcc cct aca gaa tgt tca                                        648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2594
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2594
gaa att gtg ttg acg cag tct cca ggc acc ctg tct ttg tct cca ggg         48
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

gaa aga gcc acc ctc tcc tgc agg gcc ggt cag agt gtt agc agc agc         96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Gly Gln Ser Val Ser Ser Ser
            20                  25                  30

tac tta gcc tgg tac cag cag aaa cct ggc cag gct ccc agg ctc ctc        144
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

atc tat ggt gca tcc agc agg gcc act ggc atc cca gac agg ttc agt        192
Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc aga ctg gag        240
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

cct gaa gat ttt gca gtg tat tac tgt cag cag tat ggt agc tca ccg        288
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser Pro
                85                  90                  95

tgg acg ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg gct        336
Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
            100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct        384
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag        432
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc        480
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160
```

```
cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       528
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       576
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       624
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

agc ttc aac agg gga gag tgt                                           645
Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 2595
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2595
cag tct gtg ctg acg cag ccg ccc tca gtg tct ggg gcc cca ggg cag        48
Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

agg gtc acc atc ccc tgc act ggg agc agc tcc aac ctc ggg gca ggt        96
Arg Val Thr Ile Pro Cys Thr Gly Ser Ser Ser Asn Leu Gly Ala Gly
            20                  25                  30

tat gct gta cac tgg tac cag cag ctt cca gca aca acc ccc aaa ctc       144
Tyr Ala Val His Trp Tyr Gln Gln Leu Pro Ala Thr Thr Pro Lys Leu
        35                  40                  45

ctc atc tat gct aac agc agt cga ccc tca ggg gtc cct gac cga ttc       192
Leu Ile Tyr Ala Asn Ser Ser Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

tct ggc tcc agg tct gac acc tca gcc tcc ctg gcc atc act ggg ctc       240
Ser Gly Ser Arg Ser Asp Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80

cag gct gag gat gag gct gat tat tac tgc cag tct tat gac agc agc       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser
                85                  90                  95

ctg agt ggt tat gtc ttc gga act ggg acc tgg gtc acc gtc cta agt       336
Leu Ser Gly Tyr Val Phe Gly Thr Gly Thr Trp Val Thr Val Leu Ser
            100                 105                 110
```

```
cag ccc aag gcc aac ccc act gtc act ctg ttc ccg ccc tcc tct gag       384
Gln Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

gag ctc caa gcc aac aag gcc aca cta gtg tgt ctg atc agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

tac ccg gga gct gtg aca gtg gcc tgg aag gca gat ggc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aaa ccc tcc aaa cag agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

tac gcg gcc agc agc tac ctg agc ctg acg ccc gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                  651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2596
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2596

```
cag tct gtg ttg acg cag ccg ccc tca gtg tct ggg gcc cca ggc cag        48
Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

agg atc acc atc tcc tgc act gga ggc agc acc aac atc ggg aca att        96
Arg Ile Thr Ile Ser Cys Thr Gly Gly Ser Thr Asn Ile Gly Thr Ile
            20                  25                  30

tat gat gtt cac tgg tac caa cag ctt ccc gga gca gcc ccc aaa ctc       144
Tyr Asp Val His Trp Tyr Gln Gln Leu Pro Gly Ala Ala Pro Lys Leu
        35                  40                  45

ctc atc tat ggt aac agt cgt cga ccc tca ggg gtc cct gac cga ttc       192
Leu Ile Tyr Gly Asn Ser Arg Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60
```

```
tct gcc tcc aag tct ggc acc tca gcc tcc ctg gcc atc agt ggg ctc       240
Ser Ala Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu
65                  70                  75                  80

cgg cct gag gat gag gcg gat tat tac tgc cag tgt ttt gac acc agc       288
Arg Pro Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Cys Phe Asp Thr Ser
                85                  90                  95

ctg act gca aag gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt       336
Leu Thr Ala Lys Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

cag ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag       384
Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

tac gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                   651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2597
<211> 337
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2597
gat att ctg ctg act cag tct cca ctc ttc ctg tcc gtc acc cct gga        48
Asp Ile Leu Leu Thr Gln Ser Pro Leu Phe Leu Ser Val Thr Pro Gly
1               5                   10                  15
```

```
gag ccg gcc tcc atc tcc tgc agg tct aat cag agc ctc ctt tct agt        96
Glu Pro Ala Ser Ile Ser Cys Arg Ser Asn Gln Ser Leu Leu Ser Ser
            20                  25                  30

aat gga cat cat ctt ttg gat tgg tac ttc caa aaa cca ggc cag tct       144
Asn Gly His His Leu Leu Asp Trp Tyr Phe Gln Lys Pro Gly Gln Ser
        35                  40                  45

cct caa ctc ctg atg ttt ctg ggt tct act cgg gcc tcc ggg gtc cct       192
Pro Gln Leu Leu Met Phe Leu Gly Ser Thr Arg Ala Ser Gly Val Pro
    50                  55                  60

gac agg ttc agt ggc agt gca tca ggc aca gaa ttt aca ctg aaa atc       240
Asp Arg Phe Ser Gly Ser Ala Ser Gly Thr Glu Phe Thr Leu Lys Ile
65                  70                  75                  80

agc aca gtg gag gcg gaa gat ttt gga gtg tat tac tgc atg caa gct       288
Ser Thr Val Glu Ala Glu Asp Phe Gly Val Tyr Tyr Cys Met Gln Ala
                85                  90                  95

cta caa gtt cct cgg acg ttc ggc cga ggg acc aag gtg gaa atc aaa       336
Leu Gln Val Pro Arg Thr Phe Gly Arg Gly Thr Lys Val Glu Ile Lys
            100                 105                 110

c                                                                     337
```

<210> 2598
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2598

```
gt gac atc cag ttg acc cag tct cca tcc ttc ctg tct gca tct gta         47
   Asp Ile Gln Leu Thr Gln Ser Pro Ser Phe Leu Ser Ala Ser Val
   1               5                  10                  15

gga gac aga gtc acc atc act tgc cgg gcc agt cag ggc att agc agt        95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Gly Ile Ser Ser
                20                  25                  30

tat tta gcc tgg tat cag caa aaa cca ggg aaa gcc cct aag ctc ctg       143
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
            35                  40                  45

atc tat gct gca tcc act ttg caa agt ggg gtc cca tca cgg ttc agc       191
Ile Tyr Ala Ala Ser Thr Leu Gln Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60
```

```
ggc agt gga tct ggg aca gaa ttc act ctc aca atc agc agc ctg cag       239
Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln
    65                  70                  75

cct gaa gat ttt gca act tat tac tgt caa caa ctt aat agt tac ccg       287
Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Leu Asn Ser Tyr Pro
80                  85                  90                  95

ctc act ttc ggc gga ggg acc aag gtg gag atc aaa cga act gtg gct       335
Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
                100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa ctc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tta                                          644
Ser Phe Asn Arg Gly Glu Leu
        210
```

<210> 2599
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2599

```
ccg gct gtg ctg act cag cca ccc tca gcg tct ggg acc ccc ggg cag        48
Pro Ala Val Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Pro Gly Gln
1               5                   10                  15
```

```
agg gtc acc atc tct tgt tct gga agc aac tcc aac atc gga agt act        96
Arg Val Thr Ile Ser Cys Ser Gly Ser Asn Ser Asn Ile Gly Ser Thr
            20                  25                  30

ttt gta tac tgg tac cag cag ctc cca gga acg gcc ccc aaa ctc ctc       144
Phe Val Tyr Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
        35                  40                  45

atc cat agt aat aat cag cgg ccc tca ggg gtc cct gac cga gtc tct       192
Ile His Ser Asn Asn Gln Arg Pro Ser Gly Val Pro Asp Arg Val Ser
    50                  55                  60

ggc tcc aag tct ggc acc tca gcc tcc ctg gcc atc agt ggg ctc cgg       240
Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Arg
65                  70                  75                  80

tcc gag gat gag gct gat tat tac tgt gca gca tgg gat gac agc ctg       288
Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ala Trp Asp Asp Ser Leu
                85                  90                  95

agt ggt ccg gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag       336
Ser Gly Pro Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc cca ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aaa agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2600
<211> 657

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2600
```
gat att gtg ttg act cag tct cca ctc tcc ctg ccc gtc acc cct gga        48
Asp Ile Val Leu Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Pro Gly
1               5                   10                  15

gag ccg gcc tcc atc tcc tgc agg tct agt cag agc ctc ctg cat agt        96
Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu His Ser
            20                  25                  30

aat gga gtc tac tac ttg gat tgg tac ctg ctg aag cca gga cag tct       144
Asn Gly Val Tyr Tyr Leu Asp Trp Tyr Leu Leu Lys Pro Gly Gln Ser
        35                  40                  45

cca caa ctc gtg atc tat atg ggt tcg agt cgg gcc tcc ggg gtc cct       192
Pro Gln Leu Val Ile Tyr Met Gly Ser Ser Arg Ala Ser Gly Val Pro
    50                  55                  60

gac agg ttc agt ggc agt gga tca ggc acg gat ttt aga ctg aaa atc       240
Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Arg Leu Lys Ile
65                  70                  75                  80

agc aga gtg gag gct gag gat gtt gga att tat tac tgc atg caa gct       288
Ser Arg Val Glu Ala Glu Asp Val Gly Ile Tyr Tyr Cys Met Gln Ala
                85                  90                  95

ctg caa act ccg tgg acg ttc ggc caa ggg acc aag gtg gaa atc aaa       336
Leu Gln Thr Pro Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
            100                 105                 110

cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag       384
Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
        115                 120                 125

cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc       432
Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
    130                 135                 140

tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa       480
Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
145                 150                 155                 160

tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac agc       528
Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
                165                 170                 175

acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag       576
Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
```

```
            180                 185                 190

aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg       624
Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
        195                 200                 205

ccc gtc aca aag agc ttc aac agg gga gag tgg                           657
Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Trp
    210                 215
```

<210> 2601
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2601

```
gtt tct tct gag ctg act cag gac cct gct gtg tct gtg gcc ttg gga        48
Val Ser Ser Glu Leu Thr Gln Asp Pro Ala Val Ser Val Ala Leu Gly
1               5                   10                  15

cag aca gtc agg atc aca tgc caa gga gac agc ctc aga agc tat ttt        96
Gln Thr Val Arg Ile Thr Cys Gln Gly Asp Ser Leu Arg Ser Tyr Phe
            20                  25                  30

gca acc tgg tat cag cag aag cca gga cag gcc cct gtt ctt gtc atc       144
Ala Thr Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile
        35                  40                  45

tat ggt aaa aac agc cgg ccc tca ggg atc cca gac cga ttc tct ggc       192
Tyr Gly Lys Asn Ser Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly
    50                  55                  60

tcc acc tca gga aac aca gct tcc ttg acc atc tct ggg gct cag gcg       240
Ser Thr Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Ala Gln Ala
65                  70                  75                  80

gaa gat gag gct gac tat tac tgt aac tcc cgg gac agc agt gat gac       288
Glu Asp Glu Ala Asp Tyr Tyr Cys Asn Ser Arg Asp Ser Ser Asp Asp
                85                  90                  95

cat ctg gaa gta ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag       336
His Leu Glu Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
```

```
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2602
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2602
gt tac atc cag atg acc cag tct cct tcc acc ctg tct gca tct gta         47
   Tyr Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val
   1               5                   10                  15

gga gac aga gtc acc atc act tgc cgg gcc agt cag agt ata agt agt        95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser
                20                  25                  30

tgg ttg gcc tgg ttt cag cag aaa cca ggg aaa gcc cct aaa ctc ctg       143
Trp Leu Ala Trp Phe Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
            35                  40                  45

atc tat aag gcg tct act tta gaa agt ggg gtc cca tca aga ttc agc       191
Ile Tyr Lys Ala Ser Thr Leu Glu Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60

ggc agt gaa tct ggg aca gaa ttc act ctc acc atc ggc agc ctg cag       239
Gly Ser Glu Ser Gly Thr Glu Phe Thr Leu Thr Ile Gly Ser Leu Gln
    65                  70                  75

cct gat gat ttt gca act tat tac tgt caa cag tat aat agt tac ccg       287
Pro Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Tyr Pro
```

```
80                  85                  90                  95

agg acg ttc ggc caa ggg acc aag gtg gat atc aaa cga act gtg gct       335
Arg Thr Phe Gly Gln Gly Thr Lys Val Asp Ile Lys Arg Thr Val Ala
                100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgt                                          644
Ser Phe Asn Arg Gly Glu Cys
        210

<210> 2603
<211> 662
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2603
gt gac atc gtg atg acc cag tct cca gac tcc ctg gct gtg act ctg         47
   Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Thr Leu
   1               5                  10                  15

ggc gag agg gcc acc atc aac tgt agg tcc agc cag act gtt tta tac        95
Gly Glu Arg Ala Thr Ile Asn Cys Arg Ser Ser Gln Thr Val Leu Tyr
                20                  25                  30

gac tcc aac aat aaa aac tac tta gct tgg tat cag cag aaa cca gga       143
Asp Ser Asn Asn Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly
```

```
            35                  40                  45

cag cct cct aaa cta ctc att tac tgg gcg tct att cgg gaa tct ggg       191
Gln Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Ile Arg Glu Ser Gly
        50                  55                  60

gtc cct gac cga ttc agt ggc agc ggg tct ggg aca gat ttc act ctc       239
Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu
    65                  70                  75

acc atc aac acc ctg cag gct gaa gat gtg gca att tat ttc tgt cag       287
Thr Ile Asn Thr Leu Gln Ala Glu Asp Val Ala Ile Tyr Phe Cys Gln
80                  85                  90                  95

caa tat ttt act act cct cgc acg ttc ggc caa ggg acc aag gtg gaa       335
Gln Tyr Phe Thr Thr Pro Arg Thr Phe Gly Gln Gly Thr Lys Val Glu
                100                 105                 110

atc aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct       383
Ile Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser
            115                 120                 125

gat gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat       431
Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn
        130                 135                 140

aac ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc       479
Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala
    145                 150                 155

ctc caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag       527
Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys
160                 165                 170                 175

gac agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac       575
Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp
                180                 185                 190

tac gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg       623
Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu
            195                 200                 205

agc tcg ccc gtc aca aag agc ttc aac agg gga gag tta                   662
Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Leu
        210                 215                 220

<210> 2604
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain
```

<400> 2604

```
ccc gct gtg ctg act cag cca ccc tca gtg tct ggg acc ccc ggg cag        48
Pro Ala Val Leu Thr Gln Pro Pro Ser Val Ser Gly Thr Pro Gly Gln
1               5                   10                  15

agg gtc acc atc tct tgt tct gga ggc agc agc aac atc gga ggt aag        96
Arg Val Thr Ile Ser Cys Ser Gly Gly Ser Ser Asn Ile Gly Gly Lys
            20                  25                  30

tat gta tac tgg tac cag caa ctc cca gga acg gcc ccc aag gtt gtc       144
Tyr Val Tyr Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Val Val
        35                  40                  45

atc tac agg aat aat cag cgg ccc tca gga gtc tct gac cga ttc tct       192
Ile Tyr Arg Asn Asn Gln Arg Pro Ser Gly Val Ser Asp Arg Phe Ser
    50                  55                  60

ggc tcc aag tct ggc att tca gcc tcc ctg acc atc agt ggg ctc cgg       240
Gly Ser Lys Ser Gly Ile Ser Ala Ser Leu Thr Ile Ser Gly Leu Arg
65                  70                  75                  80

tcc gag gat gag gct gtt tat tac tgt gca gca tgg gat gac ggc ctg       288
Ser Glu Asp Glu Ala Val Tyr Tyr Cys Ala Ala Trp Asp Asp Gly Leu
                85                  90                  95

ggt ggc ctt tat gtg ttc gga act ggg acc aag gtc acc gcc cta ggt       336
Gly Gly Leu Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Ala Leu Gly
            100                 105                 110

cag ccc aag gcc aac ccc act gtc act ctg ttc ccg ccc tcc tct gag       384
Gln Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

gag ctc caa gcc aac aag gcc aca cta gtg tgt ctg atc agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

tac ccg gga gct gtg aca gtg gcc tgg aag gca gat ggc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aaa ccc tcc aaa cag agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

tac gcg gcc agc agc tac ctg agc ctg acg ccc gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205
```

```
aag aca gtg gcc cct aca gaa tgt tca                                    651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2605
<211> 639
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2605
gac atc cag atg acc cag tct cct tcc acc ctg tct gca tct gta gga        48
Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1               5                   10                  15

gac aga gtc acc atc tct tgc cgg gcc agt cag agt att agt gac tgg        96
Asp Arg Val Thr Ile Ser Cys Arg Ala Ser Gln Ser Ile Ser Asp Trp
            20                  25                  30

ttg gcc tgg tat cag cag aag cca ggg aaa gcc cct aag ctc ctg atc       144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

tat gct gca tcc att tta caa agt ggg gtc cca tca aga ttc agc ggc       192
Tyr Ala Ala Ser Ile Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

agt gga tct ggg aca gaa ttc act ctc acc atc agc agc ctg cag acc       240
Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Thr
65                  70                  75                  80

gat gat ttt gca act tat tac tgc caa cag tat aat agg ggg tcc act       288
Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Arg Gly Ser Thr
                85                  90                  95

ttc ggc cct ggg acc aaa gtg gat atc aaa cga act gtg gct gca cca       336
Phe Gly Pro Gly Thr Lys Val Asp Ile Lys Arg Thr Val Ala Ala Pro
            100                 105                 110

tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga act       384
Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr
        115                 120                 125

gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc aaa       432
Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys
    130                 135                 140

gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag gag       480
Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu
145                 150                 155                 160
```

```
agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc agc       528
Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser
                165                 170                 175

acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac gcc       576
Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala
            180                 185                 190

tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc ttc       624
Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe
        195                 200                 205

aac agg gga gag tgg                                                   639
Asn Arg Gly Glu Trp
    210
```

<210> 2606
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2606

```
tcc tat gtg ctg cct cag cca ccc tca gtg tca gtg gcc cca gga cag        48
Ser Tyr Val Leu Pro Gln Pro Pro Ser Val Ser Val Ala Pro Gly Gln
1               5                   10                  15

acg gcc aaa atc acc tgt ggg gga aac aac cct gga att aag agt gtg        96
Thr Ala Lys Ile Thr Cys Gly Gly Asn Asn Pro Gly Ile Lys Ser Val
            20                  25                  30

cac tgg tac cag cag agg cca ggc cag gcc ccc gtg ctg gtc atc tat       144
His Trp Tyr Gln Gln Arg Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

gac gat agc gac cgg ccc tca ggg atc cct gag cga ttc tct ggc tcc       192
Asp Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

aac tct ggg aac acg gtc acc ctg acc atc agc tgg gtc gaa gcc ggg       240
Asn Ser Gly Asn Thr Val Thr Leu Thr Ile Ser Trp Val Glu Ala Gly
65                  70                  75                  80

gat gag gcc gac tat tac tgt cag gtg tgg gac agg aat agt cat cgt       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Arg Asn Ser His Arg
                85                  90                  95

gtg att ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag ccc aag       336
Val Ile Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
            100                 105                 110
```

```
gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag ctt caa       384
Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
        115                 120                 125

gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga       432
Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
    130                 135                 140

gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga       480
Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145                 150                 155                 160

gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc       528
Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
                165                 170                 175

agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc cac aga agc       576
Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser
            180                 185                 190

tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg       624
Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
        195                 200                 205

gcc cct aca gaa tgt tca                                              642
Ala Pro Thr Glu Cys Ser
    210

<210> 2607
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2607
ccc tct gtg ctg acg cag ccg ccc tca gtg tct ggg gcc ccg ggg cag        48
Pro Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

agg gtc acc atc tcc tgc act ggg agc acc tcc aac atc ggg gca gat        96
Arg Val Thr Ile Ser Cys Thr Gly Ser Thr Ser Asn Ile Gly Ala Asp
            20                  25                  30

tat gat gta cac tgg tac caa caa ctt cca aga aca gcc ccc aaa ctc       144
Tyr Asp Val His Trp Tyr Gln Gln Leu Pro Arg Thr Ala Pro Lys Leu
        35                  40                  45

ctc atc tat gct aac aac aat cgg ccc tca ggg gtc cct gac cgg ttc       192
Leu Ile Tyr Ala Asn Asn Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60
```

```
tct ggc tcc aag tct ggc acc tca gcc tcc ctg gcc atc act ggg ctc       240
Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80

cag gct gag gat gag gct gat tat tac tgc cag tcc tat gac aac agt       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Asn Ser
                85                  90                  95

ctg agt gct tgg gtg ttc ggc gga ggg acc aag ttg acc gtc cta ggt       336
Leu Ser Ala Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

cag ccc aag gct gcc ccc tcg gtc act ctg ttc cca ccc tcc tct gag       384
Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

tac gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

cac aaa agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                   651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2608
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2608
tct tct gag ctg act cag gac cct gct gtg tct gtg gcc ttg gga cag        48
Ser Ser Glu Leu Thr Gln Asp Pro Ala Val Ser Val Ala Leu Gly Gln
1               5                   10                  15
```

```
aca gtc agg atc aca tgc caa gga gac agc ctc aga agc ttt tat gga        96
Thr Val Arg Ile Thr Cys Gln Gly Asp Ser Leu Arg Ser Phe Tyr Gly
            20                  25                  30

agc tgg tac cag cag aag cca gga cag gcc cct gta ctt gtc atc tat       144
Ser Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

ggt gaa aac aac cgg ccc tca ggg atc cca gac cga ttc tct ggc tcc       192
Gly Glu Asn Asn Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly Ser
    50                  55                  60

agc tca gga aac aca gct tcc ttg acc atc act ggg gct cag gcg gaa       240
Ser Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala Glu
65                  70                  75                  80

gat gag gct gac tat tac tgt aac tcc cgg gac agc agt ggt aac cat       288
Asp Glu Ala Asp Tyr Tyr Cys Asn Ser Arg Asp Ser Ser Gly Asn His
                85                  90                  95

tgg gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag ccc aag       336
Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
            100                 105                 110

gct gcc ccc tcg gtc act ctg ttc cca ccc tcc tct gag gag ctt caa       384
Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
        115                 120                 125

gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga       432
Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
    130                 135                 140

gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga       480
Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145                 150                 155                 160

gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc       528
Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
                165                 170                 175

agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac aaa agc       576
Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser
            180                 185                 190

tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg       624
Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
        195                 200                 205

gcc cct aca gaa tgt tca                                              642
Ala Pro Thr Glu Cys Ser
    210
```

<210> 2609
<211> 651

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2609
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cag tct gcc ctg act cag cct gcc tcc gtg tct ggg tct cct gga cag        48
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

tcg atc acc atc tcc tgc act gga atc agc agt gac gtt gat ggt tat        96
Ser Ile Thr Ile Ser Cys Thr Gly Ile Ser Ser Asp Val Asp Gly Tyr
            20                  25                  30

aat tat gtc tcc tgg tac caa ctc tac tca ggt aaa gcc ccc aaa ctc       144
Asn Tyr Val Ser Trp Tyr Gln Leu Tyr Ser Gly Lys Ala Pro Lys Leu
        35                  40                  45

ata att tat gat gtc act aat cgg ccc tca ggg gtt tct cat cgc ttc       192
Ile Ile Tyr Asp Val Thr Asn Arg Pro Ser Gly Val Ser His Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc aac acg gcc tcc ctg acc atc tct ggg ctc       240
Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

cag gct gag gac gag gct gat tac tac tgc agc tca tat ata agg agc       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Ile Arg Ser
                85                  90                  95

agc act cct gtg gta ttc ggc gga ggg acc aag ctg acc gtc cta ggt       336
Ser Thr Pro Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

cag ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag       384
Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

tac gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
```

```
            180                 185                 190

cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                   651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2610
<211> 662
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2610

```
gg gac atc gtg atg acc cag tct cca gac tcc ctg gct gtg tct ctg         47
   Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu
   1               5                  10                  15

ggc gag agg gcc acc atc aac tgc aag tcc agc cag agt gtt tta tac        95
Gly Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Val Leu Tyr
                20                  25                  30

agc tcc gac aat aag aac tac tta gct tgg tac cag cag aaa cca gga       143
Ser Ser Asp Asn Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly
            35                  40                  45

cag cct cct aag ctg ctc att tac tgg gca tct acc cgg gaa tcc ggg       191
Gln Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly
        50                  55                  60

gtc cct gac cga ttc agt ggc agc ggg tct ggg aca gat ttc act ctc       239
Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu
    65                  70                  75

acc atc agc agc ctg gag gct gaa gat gtg gca gtt tat tac tgt cag       287
Thr Ile Ser Ser Leu Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln
80                  85                  90                  95

cag tat tat gat act ccc tac act ttt ggc cag ggg acc aag ctg gag       335
Gln Tyr Tyr Asp Thr Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu
                100                 105                 110

atc aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct       383
Ile Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser
            115                 120                 125

gat gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat       431
Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn
```

```
        130                 135                 140

aac ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc       479
Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala
    145                 150                 155

ctc caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag       527
Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys
160                 165                 170                 175

gac agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac       575
Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp
                180                 185                 190

tac gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg       623
Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu
            195                 200                 205

agc tcg ccc gtc aca aag agc ttc aac agg gga gag tgt                   662
Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215                 220

<210> 2611
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2611
gcc tct gcc ctg act cag cct gcc tcc gtg tct ggg tct cct gga cag        48
Ala Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

tcg atc acc atc tcc tgc act gga acc agc agt gac gtt ggt ggt tat        96
Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr
            20                  25                  30

aac tat gtc tcc tgg tac caa cag cac cca ggc aaa gcc ccc aaa ctc       144
Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

atg att tat gag gtc agt aat cgg ccc tca ggg gtt tct aat cgc ttc       192
Met Ile Tyr Glu Val Ser Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc aac acg gcc tcc ctg acc atc tct ggg ctc       240
Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

cag gct gag gac gag gct gat tat tac tgc agc tca tat aca agc agc       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Thr Ser Ser
```

```
                85                  90                  95

agc act ctg gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag       336
Ser Thr Leu Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc cca ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aaa agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2612
<211> 641
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2612
gt gac atc cag atg acc cag tct cca tcc tcc ctg tct gca tct gta         47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
   1               5                  10                  15

gga gac aga gtc acc atc act tgc cag gcg agt cag gac att agc aac        95
Gly Asp Arg Val Thr Ile Thr Cys Gln Ala Ser Gln Asp Ile Ser Asn
                20                  25                  30

tat tta aat tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg       143
Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
```

```
            35                  40                  45

atc tac gat gca tcc aat ttg gaa aca ggg gtc cca tca agg ttc agt       191
Ile Tyr Asp Ala Ser Asn Leu Glu Thr Gly Val Pro Ser Arg Phe Ser
        50                  55                  60

gga agt gga tct ggg aca gat ttt act ttc acc atc agc agc ctg cag       239
Gly Ser Gly Ser Gly Thr Asp Phe Thr Phe Thr Ile Ser Ser Leu Gln
    65                  70                  75

cct gaa gat att gca aca tat tac tgt caa cag tat gat aat ctc tgg       287
Pro Glu Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Tyr Asp Asn Leu Trp
80                  85                  90                  95

acg ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg gct gca       335
Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
                100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       383
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
            115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       431
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
        130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       479
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
    145                 150                 155

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       527
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
160                 165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       575
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
                180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       623
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
            195                 200                 205

ttc aac agg gga gag tgt                                              641
Phe Asn Arg Gly Glu Cys
        210
```

<210> 2613
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2613

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ccc tat gtg ctg act cag cca ccc tcg gtg tca gtg gcc cca gga cag        48
Pro Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Gln
1               5                  10                  15

acg gcc agg att acc tgt ggg gga aac aac att gga agt aaa agt gtg        96
Thr Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Ser Lys Ser Val
            20                  25                  30

cac tgg tac cag cag aag cca ggc cag gcc cct gtg ttg gtc gtc tat       144
His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Val Tyr
        35                  40                  45

gat gat agt gac cgg ccc tca ggg atc cct gag cga ttc tct ggc tcc       192
Asp Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

aac tct ggg aac acg gcc acc ctg acc atc agc agg gtc gaa gcc ggg       240
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65                  70                  75                  80

gat gag gcc gac tat tac tgt cag gtg tgg gat agt agt agt gat cat       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Ser Asp His
                85                  90                  95

ctt tat gtc ttc gga act ggg acc aag gtc acc gtc cta ggt cag ccc       336
Leu Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly Gln Pro
            100                 105                 110

aag gcc aac ccc act gtc act ctg ttc ccg ccc tcc tct gag gag ctc       384
Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu
        115                 120                 125

caa gcc aac aag gcc aca cta gtg tgt ctg atc agt gac ttc tac ccg       432
Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro
    130                 135                 140

gga gct gtg aca gtg gcc tgg aag gca gat ggc agc ccc gtc aag gcg       480
Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys Ala
145                 150                 155                 160

gga gtg gag acc acc aaa ccc tcc aaa cag agc aac aac aag tac gcg       528
Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala
                165                 170                 175

gcc agc agc tac ctg agc ctg acg ccc gag cag tgg aag tcc cac aga       576
Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg
            180                 185                 190

agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca       624
Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr
        195                 200                 205
```

```
gtg gcc cct aca gaa tgt tca                                             645
Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2614
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2614
gaa att gtc ttg gcg cag tct cca ggc acc cta tat ttg tct ccg ggg          48
Glu Ile Val Leu Ala Gln Ser Pro Gly Thr Leu Tyr Leu Ser Pro Gly
1               5                   10                  15

gaa aga gcc acg ctc tcc tgc agg gcc agt cag agt gta aga ggc aat          96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Arg Gly Asn
            20                  25                  30

tat ttg gcc tgg tac cag cag agg cct ggc cag gct ccc cgg ctc ctc         144
Tyr Leu Ala Trp Tyr Gln Gln Arg Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

atc tat ggg gcc tcc agc agg gcc act ggc atc cca gac agg ttc ggc         192
Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Gly
    50                  55                  60

ggc agt ggg tct ggg aca gac ttc act ctc acc atc acc aga ctg ctg         240
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Thr Arg Leu Leu
65                  70                  75                  80

cct gaa gat ttt gca gtg tac tac tgt cac cag tat ggt agc tca cca         288
Pro Glu Asp Phe Ala Val Tyr Tyr Cys His Gln Tyr Gly Ser Ser Pro
                85                  90                  95

agg acg ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg gct         336
Arg Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
            100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct         384
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag         432
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc         480
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160
```

```
cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       528
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       576
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       624
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

agc ttc aac agg gga gag tgt                                           645
Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 2615
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2615
cag tct gtg ttg acg cag ccg ccc tca gtg tct gcg gcc acg gga cag        48
Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Ala Ala Thr Gly Gln
1               5                   10                  15

aag gtc acc atc tcc tgc tct gga ggc agc tcc aac att ggg agt aat        96
Lys Val Thr Ile Ser Cys Ser Gly Gly Ser Ser Asn Ile Gly Ser Asn
            20                  25                  30

tat gta tcc tgg tac caa caa ctc cca gga aca gcc ccc aaa ctt ctc       144
Tyr Val Ser Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
        35                  40                  45

atc ttt gaa aat aat aag cga ccc tca ggg att cct gac cga ttc tct       192
Ile Phe Glu Asn Asn Lys Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

ggc tcc aag tct ggc acg tca gcc acc ctg ggc atc acc gga ctc cag       240
Gly Ser Lys Ser Gly Thr Ser Ala Thr Leu Gly Ile Thr Gly Leu Gln
65                  70                  75                  80

act ggg gac gag gcc gat tat tac tgc gga aca tgg gac agc agc ctg       288
Thr Gly Asp Glu Ala Asp Tyr Tyr Cys Gly Thr Trp Asp Ser Ser Leu
                85                  90                  95

act ggt ggt ttt gtc ttc ggg act ggg acc aag gtc acc gtc cta ggt       336
Thr Gly Gly Phe Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly
            100                 105                 110
```

```
cag ccc aag gcc aac ccc act gtc act ctg ttc ccg ccc tcc tct gag       384
Gln Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

gag ctc caa gcc aac aag gcc aca cta gtg tgt ctg atc agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

tac ccg gga gct gtg aca gtg gcc tgg aag gca gat ggc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aaa ccc tcc aaa cag agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

tac gcg gcc agc agc tac ctg agc ctg acg ccc gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                  651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2616
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2616

```
tcc tat gtc ctg act cag ccc ccc tca gtg tca gtg gcc cca gga aag        48
Ser Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Lys
1               5                   10                  15

acg gcc act atc gcc tgt ggg gaa aac aac att gga agt tac aat gtg        96
Thr Ala Thr Ile Ala Cys Gly Glu Asn Asn Ile Gly Ser Tyr Asn Val
            20                  25                  30

aac tgg tac caa cag agg cca ggc cag gcc cct gta tta gta atc cat       144
Asn Trp Tyr Gln Gln Arg Pro Gly Gln Ala Pro Val Leu Val Ile His
        35                  40                  45

tct gat agc gac cgg ccc tcg ggg atc tct gag cga ttc tct ggc tcc       192
Ser Asp Ser Asp Arg Pro Ser Gly Ile Ser Glu Arg Phe Ser Gly Ser
    50                  55                  60
```

```
aac tct ggg aac acg gcc acc ctg acc atc agc agg gtc gaa gcc ggg       240
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65                  70                  75                  80

gat gag gcc gac tat tac tgt cag gtg tgg gac act tct aat gat gtg       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Thr Ser Asn Asp Val
                85                  90                  95

ggg gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag ccc aag       336
Gly Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
            100                 105                 110

gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag ctt caa       384
Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
        115                 120                 125

gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga       432
Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
    130                 135                 140

gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga       480
Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145                 150                 155                 160

gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc       528
Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
                165                 170                 175

agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac aga agc       576
Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser
            180                 185                 190

tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg       624
Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
        195                 200                 205

gcc cct aca gaa tgt tca                                              642
Ala Pro Thr Glu Cys Ser
    210

<210> 2617
<211> 647
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2617
ga gaa att gtg ttg acg cag tct cca ggc acc ctg tct ttg tct cca         47
   Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro
   1               5                  10                  15
```

```
ggg gga aga gcc acc ctc tcc tgc agg gcc agt cag agg gtt agc agc        95
Gly Gly Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Arg Val Ser Ser
                20                  25                  30

aac tac tta gcc tgg tac caa cag aaa cct ggc cag gct ccc agg ctc       143
Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu
            35                  40                  45

ctc atc tat ggt cca tcc agc agg gcc act ggc gtc cca gac agg ttc       191
Leu Ile Tyr Gly Pro Ser Ser Arg Ala Thr Gly Val Pro Asp Arg Phe
        50                  55                  60

agt agc agt ggg tct ggg aca gac ttc act ctc agc atc agc aga ctg       239
Ser Ser Ser Gly Ser Gly Thr Asp Phe Thr Leu Ser Ile Ser Arg Leu
    65                  70                  75

gag cct gaa gat ttt gca gtg tat ttc tgt cag cag tat ggt agc tca       287
Glu Pro Glu Asp Phe Ala Val Tyr Phe Cys Gln Gln Tyr Gly Ser Ser
80                  85                  90                  95

cct ccg act ttc ggc gga ggg acc aag gtg gag atc aaa cga act gtg       335
Pro Pro Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val
                100                 105                 110

gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa       383
Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
            115                 120                 125

tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga       431
Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
        130                 135                 140

gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac       479
Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
    145                 150                 155

tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc       527
Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
160                 165                 170                 175

ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa       575
Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
                180                 185                 190

gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca       623
Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
            195                 200                 205

aag agc ttc aac agg gga gag tgt                                      647
Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215
```

<210> 2618
<211> 648

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2618
```
gcc tct gcc ctg act cag cct gcc tcc gtg tct ggg tct cct gga cag        48
Ala Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

tcg atc acc atc tcc tgc act gga acc agc agt gat gtt ggg agt tat        96
Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Ser Tyr
            20                  25                  30

aac ctt gtc tcc tgg tac caa caa cac cca ggc aaa gcc ccc gaa ctc       144
Asn Leu Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Glu Leu
        35                  40                  45

atg att tat gag ggc agt aag cgg ccc tca ggg gtt tct aat cgc ttc       192
Met Ile Tyr Glu Gly Ser Lys Arg Pro Ser Gly Val Ser Asn Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc aac acg gcc tcc ctg aca atc tct gga ctc       240
Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

cag gct gag gac gag gct gat tat tac tgc tgc tca tat gca ggt agt       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Cys Ser Tyr Ala Gly Ser
                85                  90                  95

agc aat tgg gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag       336
Ser Asn Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
```

```
            180                 185                 190

aaa agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                       648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2619
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2619

```
gat gtt gta atg act cag tct cca ctc tac ctg ccc gtc acc ctt gga        48
Asp Val Val Met Thr Gln Ser Pro Leu Tyr Leu Pro Val Thr Leu Gly
1               5                   10                  15

cag ccg gcc tcc atc tcc tgc agg gct agt caa agc ctc gta tac agt        96
Gln Pro Ala Ser Ile Ser Cys Arg Ala Ser Gln Ser Leu Val Tyr Ser
            20                  25                  30

gat gga aac acc tac ttg aat tgg gtt cat cag agg cca ggc caa tct       144
Asp Gly Asn Thr Tyr Leu Asn Trp Val His Gln Arg Pro Gly Gln Ser
        35                  40                  45

cca agg cgc cta att tac atg gtt tct cag cgg ggc tct ggg gtc cca       192
Pro Arg Arg Leu Ile Tyr Met Val Ser Gln Arg Gly Ser Gly Val Pro
    50                  55                  60

gac aga ttc agc ggc agc ggg tca gac act gat ttc aca ctg aaa atc       240
Asp Arg Phe Ser Gly Ser Gly Ser Asp Thr Asp Phe Thr Leu Lys Ile
65                  70                  75                  80

agc agg gtg gag gct gag gat gtt ggg gtt tat tac tgc atg caa ggt       288
Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln Gly
                85                  90                  95

aca cac tgg tcc gct ttt ggc cag ggg acc aag ctg gag atc aaa cga       336
Thr His Trp Ser Ala Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg
            100                 105                 110

act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag       384
Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln
        115                 120                 125

ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat       432
Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr
```

```
    130                 135                 140

ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg       480
Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
145                 150                 155                 160

ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc       528
Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr
                165                 170                 175

tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa       576
Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys
            180                 185                 190

cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc       624
His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro
        195                 200                 205

gtc aca aag agc ttc aac agg gga gag tgt                               654
Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 2620
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2620
ccc tct gtg ctg act cag cca ccc tca gcg tct ggg acc ccc ggg cag        48
Pro Ser Val Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Pro Gly Gln
1               5                   10                  15

agg gtc acc atc tct tgt tct gga agc agc tcc aac atc gga agt aat        96
Arg Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Ser Asn
            20                  25                  30

tat gta tac tgg tac cag cag ctc cca gga acg gcc ccc aaa ctc ctc       144
Tyr Val Tyr Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
        35                  40                  45

atc tat agg aat aat cag cgg ccc tca ggg gtc cct gac cga ttc tct       192
Ile Tyr Arg Asn Asn Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
    50                  55                  60

ggc tcc aag tct ggc acc tca gcc tcc ctg gcc atc agt ggg ctc cgg       240
Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Arg
65                  70                  75                  80

tcc gag gat gag gct gat tat tac tgt gca gca tgg gat gac agc ctg       288
Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ala Trp Asp Asp Ser Leu
```

```
                85                  90                  95

agt ggt cag gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag       336
Ser Gly Gln Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aaa agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2621
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2621
gtt tct tct gag ctg act cag gac cct gct gtg tct gtg gcc ttg gga        48
Val Ser Ser Glu Leu Thr Gln Asp Pro Ala Val Ser Val Ala Leu Gly
1               5                   10                  15

cag aca gtc agg atc aca tgc caa gga gac agc ctc aga agc tat tat        96
Gln Thr Val Arg Ile Thr Cys Gln Gly Asp Ser Leu Arg Ser Tyr Tyr
            20                  25                  30

gca agc tgg tac cag cag agg cca gga cag gcc cct gta ctt gtc atc       144
Ala Ser Trp Tyr Gln Gln Arg Pro Gly Gln Ala Pro Val Leu Val Ile
```

```
        35                  40                  45

tat ggt aaa aac aac cgg ccc tca ggg atc cca gac cga ttc tct ggc       192
Tyr Gly Lys Asn Asn Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly
    50                  55                  60

tcc agc tca gga aac aca gct tcc ttg acc atc act ggg gct cag gcg       240
Ser Ser Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala
65                  70                  75                  80

gaa gat gag gct gac tat tac tgt aac tcc cgg gac agc agt ggt aac       288
Glu Asp Glu Ala Asp Tyr Tyr Cys Asn Ser Arg Asp Ser Ser Gly Asn
                85                  90                  95

cat gtc ttc gga act ggg acc aag gtc acc gtc cta ggt cag ccc aag       336
His Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly Gln Pro Lys
            100                 105                 110

gcc aac ccc act gtc act ctg ttc ccg ccc tcc tct gag gag ctc caa       384
Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
        115                 120                 125

gcc aac aag gcc aca cta gtg tgt ctg atc agt gac ttc tac ccg gga       432
Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
    130                 135                 140

gct gtg aca gtg gcc tgg aag gca gat ggc agc ccc gtc aag gcg gga       480
Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys Ala Gly
145                 150                 155                 160

gtg gag acc acc aaa ccc tcc aaa cag agc aac aac aag tac gcg gcc       528
Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
                165                 170                 175

agc agc tac ctg agc ctg acg ccc gag cag tgg aag tcc cac aga agc       576
Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser
            180                 185                 190

tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg       624
Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
        195                 200                 205

gcc cct aca gaa tgt tca                                              642
Ala Pro Thr Glu Cys Ser
    210

<210> 2622
<211> 641
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain
```

<400> 2622
gt gac atc cag atg acc cag tct cca tcc tcc ctg tct gca tct gta 47
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
1 5 10 15

gga gac aga gtc acc atc act tgc cgg gca agt cag agc att agc agc 95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser
20 25 30

tat tta aat tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg 143
Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
35 40 45

atc tat gct gca tcc agt ttg caa agt ggg gtc cca tca agg ttc agt 191
Ile Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser
50 55 60

ggc agt gga tct ggg aca gat ttc act ctc acc atc agc agt ctg caa 239
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln
65 70 75

cct gaa gat ttt gca act tac tac tgt caa cag agt tac agt act ccc 287
Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Pro
80 85 90 95

acc ttc ggc caa ggg aca cga ctg gag atc aaa cga act gtg gct gca 335
Thr Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga 383
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc 431
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag 479
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc 527
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
160 165 170 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac 575
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc 623
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

```
ttc aac agg gga gag tgt                                                641
Phe Asn Arg Gly Glu Cys
        210

<210> 2623
<211> 641
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2623
cc tat gtg ctg act cag cca ccc tcg gtg tcc gtg gcc cca gga cag          47
   Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Gln
   1               5                  10                  15

acg gcc agg att acc tgt ggg gga aac aac att gga tat aga aat gtg         95
Thr Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Tyr Arg Asn Val
                20                  25                  30

tac tgg tac cac caa aag cca ggc cag gcc cct gtg ctg gtc gtc tat        143
Tyr Trp Tyr His Gln Lys Pro Gly Gln Ala Pro Val Leu Val Val Tyr
            35                  40                  45

gat gat agc gac cgg ccc tca ggg atc cct gag cga ttc tct ggc tcc        191
Asp Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
        50                  55                  60

aac tct ggg aac acg gcc acc ctg acc atc agc agg gtc gaa gcc ggg        239
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
    65                  70                  75

gat gag gcc gac tat ttt tgt cag gtg tgg gaa agt ggt ggt gat cat        287
Asp Glu Ala Asp Tyr Phe Cys Gln Val Trp Glu Ser Gly Gly Asp His
80                  85                  90                  95

ccg gtg ttc ggc gga ggg acc aag ttg acc gtc cta ggt cag ccc aag        335
Pro Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
                100                 105                 110

gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag ctt caa        383
Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
            115                 120                 125

gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga        431
Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
        130                 135                 140

gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga        479
Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
    145                 150                 155
```

```
gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc       527
Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
160                 165                 170                 175

agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc cac aga agc       575
Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser
                180                 185                 190

tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg       623
Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
            195                 200                 205

gcc cct aca gaa tgt tca                                           641
Ala Pro Thr Glu Cys Ser
        210
```

<210> 2624
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2624

```
gt gac atc cag atg acc cag tct cca tcc tcc ctg tct gca tct gta         47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
   1               5                   10                  15

gga gac aga gtc acc atc act tgc cgg gca agt cag ggc att aga aat        95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Gly Ile Arg Asn
                20                  25                  30

gat tta ggc tgg ttt cag cag aaa cca ggg aaa gcc cct aag cgc ctc       143
Asp Leu Gly Trp Phe Gln Gln Lys Pro Gly Lys Ala Pro Lys Arg Leu
            35                  40                  45

atc tat gct gca tcc aat ttg cca agt ggg gtc tca tca agg ttc agc       191
Ile Tyr Ala Ala Ser Asn Leu Pro Ser Gly Val Ser Ser Arg Phe Ser
        50                  55                  60

ggc agt gga tct ggg aca gaa ttc act ctc aca atc agc agc ctg cag       239
Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln
    65                  70                  75

cct gaa gat ttt gca acg tat tac tgt cta cag cat aat aat tac ccg       287
Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Leu Gln His Asn Asn Tyr Pro
80                  85                  90                  95

ttg acg ttc ggc caa ggg acc aag gtg gaa ttc aaa cga act gtg gct       335
Leu Thr Phe Gly Gln Gly Thr Lys Val Glu Phe Lys Arg Thr Val Ala
                100                 105                 110
```

```
gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgt                                          644
Ser Phe Asn Arg Gly Glu Cys
        210

<210> 2625
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2625
gt gac atc cag atg acc cag tct cct tcc acc ctg tct gca tct gta         47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val
   1               5                  10                  15

gga gac aga gtc acc atc act tgc cgg gcc agt cag agt att agt agc        95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser
                20                  25                  30

tgg ttg gcc tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg       143
Trp Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
            35                  40                  45

atc tat gat gcc tcc agt ttg gaa agt ggg gtc cca tca agg ttc agc       191
Ile Tyr Asp Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60
```

```
ggc agt gga tct ggg aca gaa ttc act ctc acc atc agc agc ctg cag       239
Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln
    65                  70                  75

cct gat gat ttt gca act ttt tac tgc caa cag tat aat agt tat ccg       287
Pro Asp Asp Phe Ala Thr Phe Tyr Cys Gln Gln Tyr Asn Ser Tyr Pro
80                  85                  90                  95

tac act ttt ggc cag ggg acc aag ctg gag atc aaa cga act gtg gct       335
Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala
                100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgt                                          644
Ser Phe Asn Arg Gly Glu Cys
        210

<210> 2626
<211> 659
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2626
gg gat att gtg atg act cag tct cca ctc tcc ctg ccc gtc acc cct         47
   Asp Ile Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Pro
   1               5                  10                  15
```

```
gga gag ccg gcc tcc atc tcc tgc agg tcc agt cag agc ctc ctt cat        95
Gly Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu His
                20                  25                  30

agt aat gga ttc aac tat ttg gat tgg tac ctg cag aag cca ggg cag       143
Ser Asn Gly Phe Asn Tyr Leu Asp Trp Tyr Leu Gln Lys Pro Gly Gln
            35                  40                  45

tct cca cag ctc ctg att tat ttg ggt tct aat cgg gcc tcc ggg gtc       191
Ser Pro Gln Leu Leu Ile Tyr Leu Gly Ser Asn Arg Ala Ser Gly Val
        50                  55                  60

cct gac agg ttc agt ggc agt gga tca ggc aca gat ttt aca ctg aag       239
Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys
    65                  70                  75

atc agc aga gtg gag gct gag gat gtt ggg gtt tat tac tgc atg caa       287
Ile Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln
80                  85                  90                  95

gct cta cag atc ccc cgg acg ttc ggc caa ggg acc aag gtg gaa atc       335
Ala Leu Gln Ile Pro Arg Thr Phe Gly Gln Gly Thr Lys Val Glu Ile
                100                 105                 110

aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat       383
Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
            115                 120                 125

gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac       431
Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
        130                 135                 140

ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc       479
Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
    145                 150                 155

caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac       527
Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
160                 165                 170                 175

agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac       575
Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
                180                 185                 190

gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc       623
Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
            195                 200                 205

tcg ccc gtc aca aag agc ttc aac agg gga gag tgt                       659
Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215
```

<210> 2627
<211> 636

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2627
```
ccc tat gag ctg act cag cca ccc tca gtg tcc gtg tcc cca gga cag        48
Pro Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                  10                  15

aca gcc agc atc acc tgc tct gga gat aaa ttg ggg gat aaa tat gct        96
Thr Ala Ser Ile Thr Cys Ser Gly Asp Lys Leu Gly Asp Lys Tyr Ala
            20                  25                  30

tgc tgg tat cag cag aag cca ggc cag tcc cct gtg ctg gtc atc tat       144
Cys Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45

caa gat agc aag cgg ccc tca ggg atc cct gag cga ttc tct ggc tcc       192
Gln Asp Ser Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

aac tct ggg aac aca gcc act ctg acc atc agc ggg acc cag gct atg       240
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65                  70                  75                  80

gat gag gct gac tat tac tgt cag gcg tgg gac agc aac gtc cat gtc       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Ala Trp Asp Ser Asn Val His Val
                85                  90                  95

ttc gga act ggg acc aag gtc acc gtc cta ggt cag ccc aag gcc aac       336
Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly Gln Pro Lys Ala Asn
            100                 105                 110

ccc act gtc act ctg ttc ccg ccc tcc tct gag gag ctc caa gcc aac       384
Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125

aag gcc aca cta gtg tgt ctg atc agt gac ttc tac ccg gga gct gtg       432
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130                 135                 140

aca gtg gcc tgg aag gca gat ggc agc ccc gtc aag gcg gga gtg gag       480
Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys Ala Gly Val Glu
145                 150                 155                 160

acc acc aaa ccc tcc aaa cag agc aac aac aag tac gcg gcc agc agc       528
Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175

tac ctg agc ctg acg ccc gag cag tgg aag tcc cac aga agc tac agc       576
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
```

```
            180                 185                 190

tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg gcc cct       624
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195                 200                 205

aca gaa tgt tca                                                       636
Thr Glu Cys Ser
    210
```

<210> 2628
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2628

```
tcc tat gag ctg aca cag cca ccc tcg gtg tca gtg tcc cca gga caa        48
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                   10                  15

acg gcc agg atc acc tgc tct gga gat gca ttg cca aaa aaa tat gct        96
Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Lys Lys Tyr Ala
            20                  25                  30

ttt tgg tac cag cag aag tca ggc cag gcc cct gtg ttg gtc atc tat       144
Phe Trp Tyr Gln Gln Lys Ser Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

gag gac agc aaa cga ccc tcc ggg atc cct gag aga ttc tct ggc tcc       192
Glu Asp Ser Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

agc tca ggg aca atg gcc acc ttg act atc agt ggg gcc cag gtg gag       240
Ser Ser Gly Thr Met Ala Thr Leu Thr Ile Ser Gly Ala Gln Val Glu
65                  70                  75                  80

gat gaa tct gac tac tac tgt tac tca aca gac agc agt ggt aat gtc       288
Asp Glu Ser Asp Tyr Tyr Cys Tyr Ser Thr Asp Ser Ser Gly Asn Val
                85                  90                  95

tgg gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag ccc aag       336
Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
            100                 105                 110

gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag ctt caa       384
Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
        115                 120                 125

gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga       432
Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
```

```
    130                 135                 140

gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga       480
Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145                 150                 155                 160

gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc       528
Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
                165                 170                 175

agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac aga agc       576
Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser
            180                 185                 190

tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg       624
Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
        195                 200                 205

gcc cct aca gaa tgt tca                                              642
Ala Pro Thr Glu Cys Ser
    210

<210> 2629
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2629
gtt tct tct gag ctg act cag gac cct gct gtg tct gtg gcc ttg gga        48
Val Ser Ser Glu Leu Thr Gln Asp Pro Ala Val Ser Val Ala Leu Gly
1               5                   10                  15

cag aca gtc agg atc aca tgc caa gga gac agc ctc aga agc tat tat        96
Gln Thr Val Arg Ile Thr Cys Gln Gly Asp Ser Leu Arg Ser Tyr Tyr
            20                  25                  30

gca agc tgg tac cag cag aag cca gga cag gcc cct gta ctt gtc atc       144
Ala Ser Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile
        35                  40                  45

tat ggt aaa aac aac cgg ccc tca ggg atc cca gac cga ttc tct ggc       192
Tyr Gly Lys Asn Asn Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly
    50                  55                  60

tcc agc tca gga aac aca gct tcc ttg acc atc act ggg gct cag gcg       240
Ser Ser Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala
65                  70                  75                  80

gaa gat gag gct gac tat tac tgt aac tcc cgg gac agc agt ggt aac       288
Glu Asp Glu Ala Asp Tyr Tyr Cys Asn Ser Arg Asp Ser Ser Gly Asn
```

```
                85                  90                  95

ctt tat gtc ttc gga act ggg acc aag gtc acc gtc cta ggt cag ccc       336
Leu Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly Gln Pro
            100                 105                 110

aag gcc aac ccc act gtc act ctg ttc ccg ccc tcc tct gag gag ctc       384
Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu
        115                 120                 125

caa gcc aac aag gcc aca cta gtg tgt ctg atc agt gac ttc tac ccg       432
Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro
    130                 135                 140

gga gct gtg aca gtg gcc tgg aag gca gat ggc agc ccc gtc aag gcg       480
Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys Ala
145                 150                 155                 160

gga gtg gag acc acc aaa ccc tcc aaa cag agc aac aac aag tac gcg       528
Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala
                165                 170                 175

gcc agc agc tac ctg agc ctg acg ccc gag cag tgg aag tcc cac aga       576
Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg
            180                 185                 190

agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca       624
Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr
        195                 200                 205

gtg gcc cct aca gaa tgt tca                                           645
Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2630
<211> 662
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2630
gg gac atc gcg atg acc cag tct cca gac tcc ctg gct gtg tct ctg         47
   Asp Ile Ala Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu
   1               5                  10                  15

ggc gag agg gcc acc atc aac tgc aag tcc agc cag agt gtt tta tac        95
Gly Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Val Leu Tyr
                20                  25                  30

agc tcc agc agt aag aac tac tta gct tgg tac cag cag aaa cca gga       143
Ser Ser Ser Ser Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly
```

```
            35                  40                  45

cag cct cct aag ctg ctc att tac tgg gca tct acc cgg gaa tcc ggg       191
Gln Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly
        50                  55                  60

gtc cct gac cga ttc agt ggc agc ggg tct ggg aca gat ttc act ctc       239
Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu
    65                  70                  75

acc atc agc agc ctg cag gct gaa gat gtg gca gtt tat tac tgt cag       287
Thr Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln
80                  85                  90                  95

caa tat tat agt agt cct ctc act ttc ggc gga ggg acc aag gtg gag       335
Gln Tyr Tyr Ser Ser Pro Leu Thr Phe Gly Gly Gly Thr Lys Val Glu
                100                 105                 110

atc aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct       383
Ile Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser
            115                 120                 125

gat gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat       431
Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn
        130                 135                 140

aac ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc       479
Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala
    145                 150                 155

ctc caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag       527
Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys
160                 165                 170                 175

gac agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac       575
Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp
                180                 185                 190

tac gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg       623
Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu
            195                 200                 205

agc tcg ccc gtc aca aag agc ttc aac agg gga gag tgt                   662
Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215                 220

<210> 2631
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain
```

<400> 2631
```
gat att gtg atg act cag tct cca ctc tcc ctg ccc gtc acc cct gga        48
Asp Ile Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Pro Gly
1               5                  10                  15

gag ccg gcc tcc atc tcc tgc agg tct agt cag agc ctc ctg cat agc        96
Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu His Ser
            20                  25                  30

aat gga tac aac tat ttg gat tgg tac ctg cag aag cca ggg cag tct       144
Asn Gly Tyr Asn Tyr Leu Asp Trp Tyr Leu Gln Lys Pro Gly Gln Ser
        35                  40                  45

cca cag ctc ctg atc tat ttg ggt tct aat cgg gcc tcc ggg gtc cct       192
Pro Gln Leu Leu Ile Tyr Leu Gly Ser Asn Arg Ala Ser Gly Val Pro
    50                  55                  60

gac agg ttc agt ggc agt ggg tca ggc aca gat ttt aca ctg aaa atc       240
Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65                  70                  75                  80

agc aga gtg gag gct gac gat gtt ggg gtt tat tac tgc atg caa gct       288
Ser Arg Val Glu Ala Asp Asp Val Gly Val Tyr Tyr Cys Met Gln Ala
                85                  90                  95

cta caa act ccc ccg tac act ttt ggc cag ggg acc aag ctg gag atc       336
Leu Gln Thr Pro Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile
            100                 105                 110

aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat       384
Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115                 120                 125

gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac       432
Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130                 135                 140

ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc       480
Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac       528
Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175

agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac       576
Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
            180                 185                 190

gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc       624
Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
        195                 200                 205
```

```
tcg ccc gtc aca aag agc ttc aac agg gga gag tgt                        660
Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215                 220
```

<210> 2632
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2632

```
gcc tct gcc ctg act cag cct gcc tcc gtg tct ggg tct cct gga cag        48
Ala Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

tcg atc acc atc tcc tgc act gga acc agc agt gac gtt ggt ggt tat        96
Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr
            20                  25                  30

aac tat gtc tcc tgg tac caa cag cac cca ggc aaa gcc ccc caa ctc       144
Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Gln Leu
        35                  40                  45

atg att ttt gac gtc agt aat cgg ccc tca ggg gtt tct aat cgc ttc       192
Met Ile Phe Asp Val Ser Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc gac acg gcc tcc ctg acc atc tct ggg ctc       240
Ser Gly Ser Lys Ser Gly Asp Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

cag gct gag gac gag gct gat tat tac tgc agc tca tat aca agc agc       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Thr Ser Ser
                85                  90                  95

agc act tgg gtg ttc ggc gga ggg acc aag ctg acc gtc ctc ggt cag       336
Ser Thr Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc cca ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160
```

```
gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aaa agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2633
<211> 662
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2633

```
gg gac atc gtg atg acc cag tct cca gac tcc ctg gct gtg tct ctg         47
   Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu
   1               5                  10                  15

ggc gag agg gcc acc atc aac tgc aag tcc agc cag agt gtt tta tac        95
Gly Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Val Leu Tyr
                20                  25                  30

agc tcc aac aat aag aac tac tta ggt tgg tac cag cag aaa cca gga       143
Ser Ser Asn Asn Lys Asn Tyr Leu Gly Trp Tyr Gln Gln Lys Pro Gly
            35                  40                  45

gag cct cct aag ctg gtc att cac tgg gca tct acc cgg gaa tcc ggg       191
Glu Pro Pro Lys Leu Val Ile His Trp Ala Ser Thr Arg Glu Ser Gly
        50                  55                  60

gtc cct gac cga ttc agt ggc agc ggg tct ggg aca gat ttc act ctg       239
Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu
    65                  70                  75

acc atc agc agc ctg cag gct gaa gat gtg gca gtt tat tac tgt cag       287
Thr Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln
80                  85                  90                  95

caa agt tac agt act ccg tac acc ttt ggc cag ggg acc aag ctg gag       335
Gln Ser Tyr Ser Thr Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu
                100                 105                 110
```

```
atc aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct       383
Ile Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser
            115                 120                 125

gat gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat       431
Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn
        130                 135                 140

aac ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc       479
Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala
    145                 150                 155

ctc caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag       527
Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys
160                 165                 170                 175

gac agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac       575
Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp
                180                 185                 190

tac gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg       623
Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu
            195                 200                 205

agc tcg ccc gtc aca aag agc ttc aac agg gga gag tgt                   662
Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215                 220
```

<210> 2634
<211> 334
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2634

```
cag tct gcc ctg act cag cct gcc tcc gtg tct ggg tct cct gga cag        48
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

tcg atc acc atc tcc tgc act gga acc agc agt gat gtt ggg agt tat        96
Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Ser Tyr
            20                  25                  30

aac ctt gtc tcc tgg tac caa cag cac cca ggc aaa gcc ccc aaa ctc       144
Asn Leu Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

atg att tat gag ggc agt aag cgg ccc tca ggg gtt tct aat cgc ttc       192
Met Ile Tyr Glu Gly Ser Lys Arg Pro Ser Gly Val Ser Asn Arg Phe
    50                  55                  60
```

```
tct ggc tcc aag tct ggc aac acg gcc tcc ctg aca atc tct ggg ctc       240
Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

cag gct gag gac gag gct gat tat tac tgc tgc tca tat gca ggt agt       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Cys Ser Tyr Ala Gly Ser
                85                  90                  95

agc act cct tgg gtg ttc ggc gga ggg acc aag ctg acc gtc cta g         334
Ser Thr Pro Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110

<210> 2635
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2635
ccc tat gag ctg aca cag cca ccc tcg gtg tca ctg tcc cca gga caa        48
Pro Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Leu Ser Pro Gly Gln
1               5                   10                  15

acg gcc agg atc acc tgc tct gga gat gct ttg cca aaa aaa tat gct        96
Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Lys Lys Tyr Ala
            20                  25                  30

tac tgg tac cag cag aag tca ggc cag gcc cct gta ctg gtc atc tat       144
Tyr Trp Tyr Gln Gln Lys Ser Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

gag gac agc aaa cga ccc tcc ggg atc cct gag aga ttc tct ggc tcc       192
Glu Asp Ser Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

agc tca ggg aca acg gcc acc ttg act atc agt ggg gcc cag gtg gac       240
Ser Ser Gly Thr Thr Ala Thr Leu Thr Ile Ser Gly Ala Gln Val Asp
65                  70                  75                  80

gat gaa ggt gac tac tac tgt tac tca cca gac agc agt ggt aat gtt       288
Asp Glu Gly Asp Tyr Tyr Cys Tyr Ser Pro Asp Ser Ser Gly Asn Val
                85                  90                  95

tgg gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag ccc aag       336
Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
            100                 105                 110

gct gcc ccc tcg gtc act ctg ttc cca ccc tcc tct gag gag ctt caa       384
Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
        115                 120                 125
```

```
gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga       432
Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
    130                 135                 140

gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga       480
Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145                 150                 155                 160

gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc       528
Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
                165                 170                 175

agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac aaa agc       576
Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser
            180                 185                 190

tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg       624
Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
        195                 200                 205

gcc cct aca gaa tgt tca                                              642
Ala Pro Thr Glu Cys Ser
    210

<210> 2636
<211> 310
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2636
gaa ata gtg atg acg cag tct cca gcc acc ctg tct gtg tct cca ggg        48
Glu Ile Val Met Thr Gln Ser Pro Ala Thr Leu Ser Val Ser Pro Gly
1               5                   10                  15

gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc agc aac        96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Asn
            20                  25                  30

tta gcc tgg tac cag cag aaa cct ggc cag gct ccc agg ctc ctc atc       144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
        35                  40                  45

tat ggt gca tcc acc agg gcc act ggt ctc cca gcc agg ttc agt ggc       192
Tyr Gly Ala Ser Thr Arg Ala Thr Gly Leu Pro Ala Arg Phe Ser Gly
    50                  55                  60

agt ggg tct ggg aca gag ttc act ctc acc atc agc agc ctg cag tct       240
Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Ser
65                  70                  75                  80
```

```
gaa gat ttt gca gtt tat tac tgt cag tcc cgg ggc act ttc ggc gga       288
Glu Asp Phe Ala Val Tyr Tyr Cys Gln Ser Arg Gly Thr Phe Gly Gly
                85                  90                  95

ggg acc aag gtg gag atc aaa c                                       310
Gly Thr Lys Val Glu Ile Lys
            100
```

<210> 2637
<211> 329
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2637

```
gaa att gtg ttg acg cag tct cca gtc acc ctg tct ttg tct cca ggg        48
Glu Ile Val Leu Thr Gln Ser Pro Val Thr Leu Ser Leu Ser Pro Gly
1               5                  10                  15

gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc agc agc        96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Ser
            20                  25                  30

tac ata gcc tgg tac cag cag aaa cct ggc cag gct ccc agg ctc ctc       144
Tyr Ile Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

atc tat ggt gca tcc acc agg gcc act ggc atc cca gac agg ttc agt       192
Ile Tyr Gly Ala Ser Thr Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc aga ctg gag       240
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

cct gaa gat tgt gca gtg ttt tac tgt cag cag tat ggt agc tca cat       288
Pro Glu Asp Cys Ala Val Phe Tyr Cys Gln Gln Tyr Gly Ser Ser His
                85                  90                  95

tac act ttt ggc cag ggg acc aag ctg gag atc aaa cga ac               329
Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg
            100                 105
```

<210> 2638
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2638

```
tcc tat gtg ctg act cag cca ccc tca gtg tca gtg gcc cca gga aag        48
Ser Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Lys
1               5                  10                  15

acg gcc agg att acc tgt ggg gga gac aac att gga agt aga agt gtc        96
Thr Ala Arg Ile Thr Cys Gly Gly Asp Asn Ile Gly Ser Arg Ser Val
            20                  25                  30

cac tgg tac cag cag aag cca ggc cag gcc cct gtg ctg gtc atc tat       144
His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

tat gat agc gac cgg ccc tca ggg atc cct gag cga ttc tct ggc tcc       192
Tyr Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

aac tct ggc aac acg gcc acc ctg acc atc agc agg gtc gaa gcc ggg       240
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65                  70                  75                  80

gat gag gcc gac tat tac tgt cag gtg tgg gat agt agt agt gat cat       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Ser Asp His
                85                  90                  95

cct tgg gtg ttc ggc gga ggg acc aag ctg acc gtc cta cgt cag ccc       336
Pro Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Arg Gln Pro
            100                 105                 110

aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag ctt       384
Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu
        115                 120                 125

caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg       432
Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro
    130                 135                 140

gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg       480
Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala
145                 150                 155                 160

gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg       528
Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala
                165                 170                 175

gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac aaa       576
Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys
            180                 185                 190

agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca       624
Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr
        195                 200                 205
```

```
gtg gcc cct aca gaa tgt tca                                             645
Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2639
<211> 334
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2639
cag tct gcc ctg act cag cct gcc tcc gtg tct ggg tct cct gga cag          48
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

tcg atc acc atc tcc tgc act ggc acc agc agt gat att ggg act tat          96
Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Ile Gly Thr Tyr
            20                  25                  30

aac ctt gtc tcc tgg tac caa caa cgc cca ggc aaa gcc ccc aaa ctc         144
Asn Leu Val Ser Trp Tyr Gln Gln Arg Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

atc att tat gac gtc att aag cgg ccc tca ggg att tct gat cgc ttc         192
Ile Ile Tyr Asp Val Ile Lys Arg Pro Ser Gly Ile Ser Asp Arg Phe
    50                  55                  60

tct ggc tcc aag tct gac aac atg gcc tcc ctg aca atc tct ggc ctc         240
Ser Gly Ser Lys Ser Asp Asn Met Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

cag gct gag gac gag gct cac tat tac tgc tgc tcg tat aga agt agt         288
Gln Ala Glu Asp Glu Ala His Tyr Tyr Cys Cys Ser Tyr Arg Ser Ser
                85                  90                  95

acg gct ccc gtg gtc ttc ggc ggg ggg acc aag gtg acc gtc cta g           334
Thr Ala Pro Val Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu
            100                 105                 110

<210> 2640
<211> 340
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2640
ggc atc gtg atg acc cag tct cca gac tcc ctg gct gtg tct ctg ggc          48
Gly Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
```

```
1               5                   10                  15

gag agg gcc acc atc aac tgc aag tcc agc cag agt gtt tta tcc acc        96
Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Val Leu Ser Thr
            20                  25                  30

tcc aac aat aag aac tac tta gct tgg tac cag cag aaa cca gga cag       144
Ser Asn Asn Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
        35                  40                  45

cct cct aag ctg ctc att tac tgg gca tct acc cgg gaa tcc ggg gtc       192
Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
    50                  55                  60

cct gac cga ttc agt ggc agc ggg tct ggg aca gat ttc act ctc acc       240
Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65                  70                  75                  80

atc agc agc ctg cag gct gaa gat gtg gca gtt tat tac tgt cag caa       288
Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
                85                  90                  95

tat ttt agt act ccg tgg acg ttc ggc caa ggg acc aag gtg gaa atc       336
Tyr Phe Ser Thr Pro Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile
            100                 105                 110

aaa c                                                                 340
Lys
```

<210> 2641
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2641

```
tcc tat gtg ctg act cag cca ccc tcg gtg tca gtg gcc cca gga cag        48
Ser Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Gln
1               5                   10                  15

acg gcc agg att acc tgt ggg gga aac aac att gga agt aaa agt gtg        96
Thr Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Ser Lys Ser Val
            20                  25                  30

cac tgg tac caa cag aag cca ggc cag gcc cct gtg ctg gtc gtc tat       144
His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Val Tyr
        35                  40                  45

gat gat agc gac cgg ccc tca ggg atc cct gag cga ttc tct ggc tcc       192
Asp Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
```

```
    50                  55                  60

aac tct gga aac acg gcc acc ctg acc atc agc agg gtc gaa gcc ggg       240
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65                  70                  75                  80

gat gag gcc gac tat tac tgt cag gtg tgg gat ggt tat agt gat cca       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Gly Tyr Ser Asp Pro
                85                  90                  95

ttg gta ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag ccc aag       336
Leu Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
            100                 105                 110

gct gcc ccc tcg gtc act ctg ttc cca ccc tcc tct gag gag ctt caa       384
Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
        115                 120                 125

gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga       432
Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
    130                 135                 140

gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga       480
Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145                 150                 155                 160

gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc       528
Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
                165                 170                 175

agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac aaa agc       576
Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser
            180                 185                 190

tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg       624
Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
        195                 200                 205

gcc cct aca gaa tgt tca                                              642
Ala Pro Thr Glu Cys Ser
    210

<210> 2642
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2642
gag gtc cag atg acc cag tct cca tcc tcc ctg tct gca tct gtt ggc        48
Glu Val Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
```

```
1               5                   10                  15

gac aga gtc acc atc act tgc cgg gca agt cag cac att gcc ggg cgt        96
Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln His Ile Ala Gly Arg
            20                  25                  30

cta aat tgg tat cag cag aaa cca ggg aaa gcc cca aaa ctc ctg atc       144
Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

cat agt gca tcc agt gtg caa aga gag gtc cca tca agg ttc ggt ggc       192
His Ser Ala Ser Ser Val Gln Arg Glu Val Pro Ser Arg Phe Gly Gly
    50                  55                  60

agt gga ttt ggg aca gat ttc act ctc acc atc tac agt ctg caa gct       240
Ser Gly Phe Gly Thr Asp Phe Thr Leu Thr Ile Tyr Ser Leu Gln Ala
65                  70                  75                  80

gaa gat ttt gca act tac ttc tgt caa cag agt tac tat acc cct ccc       288
Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Ser Tyr Tyr Thr Pro Pro
                85                  90                  95

act ttc gcc gga ggg acc agg gtg gat ttg aaa cga act gtg gct gca       336
Thr Phe Ala Gly Gly Thr Arg Val Asp Leu Lys Arg Thr Val Ala Ala
            100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       384
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       432
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       480
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       528
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       576
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       624
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

ttc aac agg gga gag tgt                                              642
Phe Asn Arg Gly Glu Cys
    210
```

<210> 2643
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2643
```
cgg tct gtg ctg act cag cca ccc tca gcg tct ggg acc ccc ggg cag        48
Arg Ser Val Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Pro Gly Gln
1               5                  10                  15

agg gtc acc atc tct tgt tct gga agc agc tcc aac atc gga agt aat        96
Arg Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Ser Asn
            20                  25                  30

act gta aac tgg tac cag cag ctc cca gga acg gcc ccc aaa ctc ctc       144
Thr Val Asn Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
        35                  40                  45

atc tat agt aat aat cag cgg ccc tca ggg gtc cct gac cga ttc tct       192
Ile Tyr Ser Asn Asn Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
    50                  55                  60

ggc tcc aag tct ggc acc tca gcc tcc ctg gcc atc agt ggg ctc cag       240
Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Gln
65                  70                  75                  80

tct gag gat gag gct gat tat tac tgt gca gca tgg gat gac agc ctg       288
Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ala Trp Asp Asp Ser Leu
                85                  90                  95

aat ggg ctt tgg gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt       336
Asn Gly Leu Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

cag ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag       384
Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175
```

```
tac gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

cac aaa agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                   651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2644
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2644

```
gat ttt ctg ctg act cag ccc cac tct gtg tcg gag tct ccg ggg aag        48
Asp Phe Leu Leu Thr Gln Pro His Ser Val Ser Glu Ser Pro Gly Lys
1               5                   10                  15

acg gta acc atc tcc tgc acc cgc agc agt ggc agc att gcc agc aac        96
Thr Val Thr Ile Ser Cys Thr Arg Ser Ser Gly Ser Ile Ala Ser Asn
            20                  25                  30

tat gtg cag tgg tac cag cag cgc ccg ggc agt tcc ccc tcc act gtg       144
Tyr Val Gln Trp Tyr Gln Gln Arg Pro Gly Ser Ser Pro Ser Thr Val
        35                  40                  45

atc tat gaa gat cac caa aga ccc tct ggg gtc cct ggt cgg ttc tct       192
Ile Tyr Glu Asp His Gln Arg Pro Ser Gly Val Pro Gly Arg Phe Ser
    50                  55                  60

ggc tcc atc gac agc tcc tcc aac tct gcc tcc ctc acc atc tct gga       240
Gly Ser Ile Asp Ser Ser Ser Asn Ser Ala Ser Leu Thr Ile Ser Gly
65                  70                  75                  80

ctg aag act gag gac gag gct gac tac ttc tgt cag tct tct gac agc       288
Leu Lys Thr Glu Asp Glu Ala Asp Tyr Phe Cys Gln Ser Ser Asp Ser
                85                  90                  95

aac aat cat gtg gtc ttc ggc gga ggg acc aag ctg acc gtc cta ggt       336
Asn Asn His Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

cag ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag       384
Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125
```

```
gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

tac gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                  651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2645
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2645

```
cgg tct gtg ctg acg cag ccg ccc tca gtg tct ggg gcc cca ggg cag        48
Arg Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

agg gtc acc atc tcc tgc act ggg agc agc tcc aac atc ggg gca cat        96
Arg Val Thr Ile Ser Cys Thr Gly Ser Ser Ser Asn Ile Gly Ala His
            20                  25                  30

tat gat gta cac tgg tac cag cag ctt cca gga aca gcc ccc aaa ctc       144
Tyr Asp Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

ctc atc tat ggt aac agc aat cgg ccc tca ggg gtc cct gac cga ttc       192
Leu Ile Tyr Gly Asn Ser Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc acc tca gcc tcc ctg gcc atc act ggg ctc       240
Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80
```

```
cag gct gag gat gag gct gat tat tac tgc cag tcc tat gac agc agc       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser
                85                  90                  95

ctg agt ggt gtg cta ttc ggc gga ggg acc aaa ctg acc gtc cta ggt       336
Leu Ser Gly Val Leu Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

cag ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag       384
Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

tac gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                   651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2646
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2646

```
gac atc cag atg acc cag tct cca tcc tcc ctg tct gca tct gtg gga        48
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

gac aga gtc acc atc act tgc cgg gca agt cag agc att agt agt tat        96
Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Tyr
            20                  25                  30
```

```
tta aat tgg tat cag cag aaa cca ggg aaa gcc cct aag ttc ctg atc       144
Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Phe Leu Ile
        35                  40                  45

tat gct gca tcc agt ttg caa agt ggg gtc cca tca agg ttc agt ggc       192
Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

agt gga tct ggg aca gat ttc act ctc acc atc agc agt ctg caa cct       240
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

gaa gat ttt gca act tac tac tgt caa cag agt tac agt acc ccc ttc       288
Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Pro Phe
                85                  90                  95

act ttc ggc cct ggg acc aaa gtg gat ctc aaa cga act gtg gct gca       336
Thr Phe Gly Pro Gly Thr Lys Val Asp Leu Lys Arg Thr Val Ala Ala
            100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       384
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       432
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       480
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       528
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       576
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       624
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

ttc aac agg gga gag tgt                                              642
Phe Asn Arg Gly Glu Cys
    210
```

<210> 2647
<211> 642
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2647

```
gac atc cag atg acc cag tct cca ccc tcc ctg tct gca tct gtg gga        48
Asp Ile Gln Met Thr Gln Ser Pro Pro Ser Leu Ser Ala Ser Val Gly
1               5                  10                  15

gac aga gtc acc atc act tgc cag gcg agt cag gac att agc aac tat        96
Asp Arg Val Thr Ile Thr Cys Gln Ala Ser Gln Asp Ile Ser Asn Tyr
            20                  25                  30

tta aat tgg tat cag cag aaa cca ggg aaa acc cct aag ctc ctg atc       144
Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Thr Pro Lys Leu Leu Ile
        35                  40                  45

tac gct gca tcc act ttg gaa aca ggg gtc cca tca agg ttc agt gga       192
Tyr Ala Ala Ser Thr Leu Glu Thr Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

agt gga tct ggg aca gat ttt act ttc acc atc aac agc ctg cag cct       240
Ser Gly Ser Gly Thr Asp Phe Thr Phe Thr Ile Asn Ser Leu Gln Pro
65                  70                  75                  80

gaa gat att gca aca tat tac tgt caa cag tat gat agt ctc cct ctc       288
Glu Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Tyr Asp Ser Leu Pro Leu
                85                  90                  95

act ttc ggc gga ggg acc aag gtg gag atc aaa cga act gtg gct gca       336
Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       384
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       432
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       480
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       528
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       576
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       624
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
```

```
        195                 200                 205

ttc aac agg gga gag tgt                                                642
Phe Asn Arg Gly Glu Cys
    210

<210> 2648
<211> 650
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2648
ga gaa att gtg ttg acg cag tct cca ggc acc ctg tct ttg tct cca          47
   Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro
   1               5                  10                  15

ggg cat aga gcc acc ctc tcc tgc agg gcc agt caa gat gtt gcc agc         95
Gly His Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Asp Val Ala Ser
                20                  25                  30

acc tac tta gcc tgg tac cag cag aaa cct ggc cag gct ccc agg ctc        143
Thr Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu
            35                  40                  45

ctc atc tat ggt gca tcc agc agg gcc act ggc atc cca gac agg ttc        191
Leu Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe
        50                  55                  60

agt ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc aga ctg        239
Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu
    65                  70                  75

gag cct gaa gat ttt gca gtg ttt tat tgt cag tac tat ggt ggc tca        287
Glu Pro Glu Asp Phe Ala Val Phe Tyr Cys Gln Tyr Tyr Gly Gly Ser
80                  85                  90                  95

ccg gga ttc act ttc ggc cct ggg acc aaa gtg gat ttc aaa cga act        335
Pro Gly Phe Thr Phe Gly Pro Gly Thr Lys Val Asp Phe Lys Arg Thr
                100                 105                 110

gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg        383
Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu
            115                 120                 125

aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc        431
Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro
        130                 135                 140

aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt        479
Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly
```

```
    145                 150                 155

aac tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac       527
Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr
160                 165                 170                 175

agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac       575
Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His
                180                 185                 190

aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc       623
Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val
            195                 200                 205

aca aag agc ttc aac agg gga gag tgt                                   650
Thr Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215

<210> 2649
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2649
cag tct gcc ctg act cag cct gcc tcc gtg tct ggg tct cct gga cag        48
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

tcg atc acc atc tcc tgc act gga acc acc agt gat gtt ggg act tat        96
Ser Ile Thr Ile Ser Cys Thr Gly Thr Thr Ser Asp Val Gly Thr Tyr
            20                  25                  30

aac ctt gtc tcc tgg tac caa caa ctc cca ggc aaa gcc ccc aaa ctc       144
Asn Leu Val Ser Trp Tyr Gln Gln Leu Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

att att tat gag gtc act aag cgg ccc tca gga gtt tct aat cgc ttc       192
Ile Ile Tyr Glu Val Thr Lys Arg Pro Ser Gly Val Ser Asn Arg Phe
    50                  55                  60

tct gcc tcc aag tct ggc agc acg gcc tcc ctg aca atc tct ggg ctc       240
Ser Ala Ser Lys Ser Gly Ser Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

cag gct gag gac gag gct gat tat tac tgc tgc tca tat gca ggt agt       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Cys Ser Tyr Ala Gly Ser
                85                  90                  95

agc act tat gtc ttc gga agt ggg gcc agg gtc acc gtc cta ggt cag       336
Ser Thr Tyr Val Phe Gly Ser Gly Ala Arg Val Thr Val Leu Gly Gln
```

```
            100                 105                 110

ccc aag gcc aac ccc act gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctc caa gcc aac aag gcc aca cta gtg tgt ctg atc agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gct gtg aca gtg gcc tgg aag gca gat ggc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aaa ccc tcc aaa cag agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tac ctg agc ctg acg ccc gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2650
<211> 650
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2650
ga gaa att gtg ttg acg cag tct cca ggc acc ctg tct ttg tct cca         47
   Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro
   1               5                  10                  15

ggg gaa aca gcc acc ctc tcc tgc agg gcc agt cag agt gtt gcc aac        95
Gly Glu Thr Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ala Asn
                20                  25                  30

aac tac tta gcc tgg cat cag cag aag cct ggc cag gct ccc aga ctc       143
Asn Tyr Leu Ala Trp His Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu
            35                  40                  45

ctc atc tat ggt gca tcc aaa agg gcc gct ggc atc cca gac cgg ttc       191
Leu Ile Tyr Gly Ala Ser Lys Arg Ala Ala Gly Ile Pro Asp Arg Phe
```

```
        50                  55                  60

agt ggc agt ggg tct ggg aca gag ttc act ctc acc atc agc aga ctg       239
Ser Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Arg Leu
    65                  70                  75

gag cct gaa gat tgt gca gtg tat tac tgt cag gag tat gtt aaa tca       287
Glu Pro Glu Asp Cys Ala Val Tyr Tyr Cys Gln Glu Tyr Val Lys Ser
80                  85                  90                  95

cct gga ttc gct ttc ggc cct ggg acc aga gtg gat atc aaa cga act       335
Pro Gly Phe Ala Phe Gly Pro Gly Thr Arg Val Asp Ile Lys Arg Thr
                100                 105                 110

gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg       383
Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu
            115                 120                 125

aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc       431
Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro
        130                 135                 140

aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt       479
Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly
    145                 150                 155

aac tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac       527
Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr
160                 165                 170                 175

agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac       575
Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His
                180                 185                 190

aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc       623
Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val
            195                 200                 205

aca aag agc ttc aac agg gga gag tgt                                   650
Thr Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215
```

<210> 2651
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2651

```
gaa att gtg ttg acg cag tct cca gcc acc ctg tct ttg tct cca ggg        48
Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly
```

```
1               5                   10                  15

gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc agc aac        96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Asn
            20                  25                  30

tac tta gcc tgg tac cag cag aaa cct ggc cag gct ccc agg ctc ctc       144
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

atc cat ggt gca tcc agc agg gcc act ggc ttc cca gac aga ttc agt       192
Ile His Gly Ala Ser Ser Arg Ala Thr Gly Phe Pro Asp Arg Phe Ser
    50                  55                  60

ggc agt ggg tct ggg aca gac ttc act ctc acc atc aac aga ctg gag       240
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Asn Arg Leu Glu
65                  70                  75                  80

cct gaa gat ttt gca gtg tat tat tgt cag cag tat ggt act tca cct       288
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Thr Ser Pro
                85                  90                  95

cag acg ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg gct       336
Gln Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
            100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       384
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       432
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       480
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       528
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       576
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       624
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

agc ttc aac agg gga gag tgt                                          645
Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 2652
<211> 650
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2652
```
ct cag act gtg gtg acc cag gag cca tcg ttc tca gtg tcc cct gga         47
   Gln Thr Val Val Thr Gln Glu Pro Ser Phe Ser Val Ser Pro Gly
   1               5                  10                  15

ggg aca gtc aca ttc act tgt gcc tgg agt tct ggt tca gtc tcc act        95
Gly Thr Val Thr Phe Thr Cys Ala Trp Ser Ser Gly Ser Val Ser Thr
                20                  25                  30

agt ttc tac acc agc tgg tac cgc cag acc cca ggc cag gct cca caa       143
Ser Phe Tyr Thr Ser Trp Tyr Arg Gln Thr Pro Gly Gln Ala Pro Gln
            35                  40                  45

acg ctc atc tac aac aca aat cgt cgt tct tct ggg gtc cct gat cgc       191
Thr Leu Ile Tyr Asn Thr Asn Arg Arg Ser Ser Gly Val Pro Asp Arg
        50                  55                  60

ttc tct ggc tcc atc ctt ggg aac aaa gct gcc ctc acc atc acg ggg       239
Phe Ser Gly Ser Ile Leu Gly Asn Lys Ala Ala Leu Thr Ile Thr Gly
    65                  70                  75

gcc cag gca gat gat gac tct gat tat tat tgt atg ttg tat atg ggt       287
Ala Gln Ala Asp Asp Asp Ser Asp Tyr Tyr Cys Met Leu Tyr Met Gly
80                  85                  90                  95

agt ggc att tcg ctc ttc ggc gga ggg acc aag ctg acc gtc cta ggt       335
Ser Gly Ile Ser Leu Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
                100                 105                 110

cag ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag       383
Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
            115                 120                 125

gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc       431
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
        130                 135                 140

tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc       479
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
    145                 150                 155

aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag       527
Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
160                 165                 170                 175
```

```
tac gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc       575
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
                180                 185                 190

cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       623
His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
            195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                   650
Lys Thr Val Ala Pro Thr Glu Cys Ser
        210                 215
```

<210> 2653
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2653

```
cag tct gtg ctg acg cag ccg ccc tca gtg tct ggg gcc cca ggg cag        48
Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

agg gtc acc atc tcc tgc act ggg agc agc tcc aac atc ggg gca caa        96
Arg Val Thr Ile Ser Cys Thr Gly Ser Ser Ser Asn Ile Gly Ala Gln
            20                  25                  30

tat gat gta cac tgg tac aag gta att cca gga aca gcc ccc aaa ctc       144
Tyr Asp Val His Trp Tyr Lys Val Ile Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

ctc atc tat ggt aac gac aat cgg ccc tca ggg gtc cct gac cga ttc       192
Leu Ile Tyr Gly Asn Asp Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc acc tca gcc tcc ctg gcc atc act ggg ctc       240
Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80

caa tct gag gat gag gct gat tat tac tgc cag tcc aat gac atc agc       288
Gln Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Asn Asp Ile Ser
                85                  90                  95

ctg agt ggt tct gtg gta ttt ggc gga ggg act aag ctg acc gtc cta       336
Leu Ser Gly Ser Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110

ggt cag ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct       384
Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser
        115                 120                 125
```

```
gag gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac       432
Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp
    130                 135                 140

ttc tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc       480
Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro
145                 150                 155                 160

gtc aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac       528
Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn
                165                 170                 175

aag tac gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag       576
Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys
            180                 185                 190

tcc cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg       624
Ser His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val
        195                 200                 205

gag aag aca gtg gcc cct aca gaa tgt tca                               654
Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2654
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2654
ccg tct gta ctg acg cag ccg ccc tca gtg tct ggg gcc cca ggg cag        48
Pro Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

agg gtc acc atc tcc tgc act ggg agc agc tcc aac atc ggg gca ggt        96
Arg Val Thr Ile Ser Cys Thr Gly Ser Ser Ser Asn Ile Gly Ala Gly
            20                  25                  30

tac gat gta cac tgg tac caa cag ctt cca gga aca gcc ccc aaa ctc       144
Tyr Asp Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

ctc atc tat gct aac acc aat cga ccc tca ggg gtc cct gac cga ttc       192
Leu Ile Tyr Ala Asn Thr Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc acc tca gcc tcc ctg gcc atc act ggg ctc       240
Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80
```

```
cag gct gaa gat gag gct gat tat tac tgc caa tcc tat gac aat agc       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Asn Ser
                85                  90                  95

ctg agt ggg ggg gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt       336
Leu Ser Gly Gly Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

cag ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag       384
Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

tac gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                   651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2655
<211> 647
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2655
ga aaa att gtg ttg acg cag tct ccc ggc acc ctg tct ttg tct cca         47
   Lys Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro
   1               5                  10                  15

ggg gaa agg gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc agc        95
Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser
                20                  25                  30
```

```
agt tac tta gcc tgg tac cag cag aga cct ggc cag tct ccc agg ctc       143
Ser Tyr Leu Ala Trp Tyr Gln Gln Arg Pro Gly Gln Ser Pro Arg Leu
            35                  40                  45

ctc atc tat gag act tcc acc agg gcc act ggc atc cca gac agg ttc       191
Leu Ile Tyr Glu Thr Ser Thr Arg Ala Thr Gly Ile Pro Asp Arg Phe
        50                  55                  60

agt ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc gga ctg       239
Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Gly Leu
    65                  70                  75

gag cct gaa gat ttt gca gtc tat tac tgt cag cag ttt gat att tca       287
Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Phe Asp Ile Ser
80                  85                  90                  95

ccc ttc act ttc ggc cct ggg acc aaa gtg gat gtc aaa cga act gtg       335
Pro Phe Thr Phe Gly Pro Gly Thr Lys Val Asp Val Lys Arg Thr Val
                100                 105                 110

gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa       383
Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
            115                 120                 125

tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga       431
Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
        130                 135                 140

gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac       479
Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
    145                 150                 155

tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc       527
Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
160                 165                 170                 175

ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa       575
Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
                180                 185                 190

gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca       623
Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
            195                 200                 205

aag agc ttc aac agg gga gag tgt                                      647
Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215
```

<210> 2656
<211> 648
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2656

```
cag tct gcc ctg act cag cct gcc tcc gtg tct ggg tct cct gga cag        48
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                  10                  15

tcg atc acc atc tcc tgc act gga acc agc agt gac gtt ggt ggt tat        96
Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr
            20                  25                  30

aac tat gtc tcc tgg tac caa caa cac cca ggc aaa gcc ccc aaa ctc       144
Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

atg att tat gat gtc agt aat cgg ccc tca ggg gtt tct aat cgc ttc       192
Met Ile Tyr Asp Val Ser Asn Arg Pro Ser Gly Val Ser Asn Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc aac acg gcc tcc ctg acc atc tct ggg ctc       240
Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

cag gct gag gac gag gct gat tat tac tgc agc tca tat aca agc agc       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Thr Ser Ser
                85                  90                  95

agc tcc ttg gtg ttc ggc gga ggg acc aag gtg acc gtc cta ggt cag       336
Ser Ser Leu Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aaa agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
```

```
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                     648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2657
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2657
cag tct gcc ctg act cag cct gcc tcc gtg tct ggc tct cct ggg cag      48
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

tcg atc acc atc tcc tgc act gga acc agc agt gat att ggg ggt tat      96
Ser Ile Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Ile Gly Gly Tyr
            20                  25                  30

gac ctt gtc tcc tgg tac caa cac cac cca ggc aaa gcc ccc aaa ctc     144
Asp Leu Val Ser Trp Tyr Gln His His Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

gtg att tct gag ggc agt aag cgg ccc tca ggg gtt tct aat cgc ttc     192
Val Ile Ser Glu Gly Ser Lys Arg Pro Ser Gly Val Ser Asn Arg Phe
    50                  55                  60

ttt ggc tcc aag tct ggc aac acg gcc tcc ctg aca atc tct ggc ctc     240
Phe Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80

cag gct gag gac gag gct gat tat tac tgc tgc tca ttt aca ggt act     288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Cys Ser Phe Thr Gly Thr
                85                  90                  95

agc act ttt gtc ttc gga act ggg acc aag gtc acc gtc cta g            331
Ser Thr Phe Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu
            100                 105                 110

<210> 2658
<211> 340
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2658
```

```
gac atc gtg atg acc cag tct cca gac tcc ctg gct gtg tct ctg ggc        48
Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1               5                  10                  15

gag agg gcc acc atc aac tgc aag tcc agc cag agt gtt tta tac agc        96
Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Val Leu Tyr Ser
            20                  25                  30

tcc aac aat aag aac tac tta gct tgg tac cag cag aaa cca gga cag       144
Ser Asn Asn Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
        35                  40                  45

cct cct aag ctg ctc att tac tgg gca tct acc cgg gaa tcc ggg gtc       192
Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
    50                  55                  60

cct gac cga ttc agt ggc agc ggg tct ggg aca gac ttc act ctc acc       240
Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65                  70                  75                  80

atc agc agc cta gag cct gaa gat ttt gca gtt tat tac tgt cag caa       288
Ile Ser Ser Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln
                85                  90                  95

tat tat agt act ccg tac act ttt ggc cag ggg acc aag ctg gag atc       336
Tyr Tyr Ser Thr Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile
            100                 105                 110

aaa c                                                                 340
Lys
```

<210> 2659
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2659

```
cag tct gtg ctg act cag cca ccc tca gcg tct ggg acc ccc ggg cag        48
Gln Ser Val Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Pro Gly Gln
1               5                  10                  15

agg gtc acc atc tct tgt tct gga agc agc tcc aac atc gga agt aat        96
Arg Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Ser Asn
            20                  25                  30

act gtt aac tgg tac cag cag ttc cca gga acg gcc ccc aaa ctc ctc       144
Thr Val Asn Trp Tyr Gln Gln Phe Pro Gly Thr Ala Pro Lys Leu Leu
        35                  40                  45
```

```
atc tac agt aat aat cac cgg ccc tta ggg gtc cct gac cga ttc tct       192
Ile Tyr Ser Asn Asn His Arg Pro Leu Gly Val Pro Asp Arg Phe Ser
    50                  55                  60

ggc tcc aag tct ggc acc tca gcc tcc ctg gcc atc agt gag gtc cgc       240
Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Glu Val Arg
65                  70                  75                  80

tct gag gat gag gct gat tat tat tgt gca aca tgg gat gac agc ctg       288
Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Thr Trp Asp Asp Ser Leu
                85                  90                  95

aat gga ggg gtg ttc ggc gca ggg acc aag ctg acc gtc gta ggt cag       336
Asn Gly Gly Val Phe Gly Ala Gly Thr Lys Leu Thr Val Val Gly Gln
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2660
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2660

```
cca gct gtg gtg act cag gag ccc tca ctg act gtg tcc cca gga ggg        48
Pro Ala Val Val Thr Gln Glu Pro Ser Leu Thr Val Ser Pro Gly Gly
1               5                  10                  15

aca gtc act ctc acc tgt ggc tcc agc act gga gta gtc acc act ggt        96
Thr Val Thr Leu Thr Cys Gly Ser Ser Thr Gly Val Val Thr Thr Gly
            20                  25                  30

cat tat ccc tac tgg ttc cag cag aag cct ggc caa gcc ccc acg aca       144
His Tyr Pro Tyr Trp Phe Gln Gln Lys Pro Gly Gln Ala Pro Thr Thr
        35                  40                  45

ctg att ttt gat aca agc aac aaa cac tcc tgg acc cct gcc cgc ttc       192
Leu Ile Phe Asp Thr Ser Asn Lys His Ser Trp Thr Pro Ala Arg Phe
    50                  55                  60

tca ggc tcc ctc ctt ggg ggc aaa gct gcc ctg acc ctt tct gct gcg       240
Ser Gly Ser Leu Leu Gly Gly Lys Ala Ala Leu Thr Leu Ser Ala Ala
65                  70                  75                  80

cag cct gaa gat gag gct gac tat tac tgc tgg ctc atc tct ggt ggt       288
Gln Pro Glu Asp Glu Ala Asp Tyr Tyr Cys Trp Leu Ile Ser Gly Gly
                85                  90                  95

gcc cct gta ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag ccc       336
Ala Pro Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro
            100                 105                 110

aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag ctt       384
Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu
        115                 120                 125

caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg       432
Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro
    130                 135                 140

gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg       480
Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala
145                 150                 155                 160

gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg       528
Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala
                165                 170                 175

gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag tcc cac aga       576
Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg
            180                 185                 190

agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca       624
Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr
        195                 200                 205

gtg gcc cct aca gaa tgt tca                                           645
Val Ala Pro Thr Glu Cys Ser
```

210 215

<210> 2661
<211> 334
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2661
cag tct gtg ctg acg cag ccg ccc tca gtg tct ggg gcc cca ggg cag 48
Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1 5 10 15

aga gtc acc atc tcc tgc gct ggg agc tac tcc aac atc ggg gca ggt 96
Arg Val Thr Ile Ser Cys Ala Gly Ser Tyr Ser Asn Ile Gly Ala Gly
20 25 30

tat gat gta cac tgg tac cgc caa ctt cca gga aca gcc ccc aca ctc 144
Tyr Asp Val His Trp Tyr Arg Gln Leu Pro Gly Thr Ala Pro Thr Leu
35 40 45

ctc atc tat agt aac aac aat cgg ccc tca ggg gtc tct gac cga ttc 192
Leu Ile Tyr Ser Asn Asn Asn Arg Pro Ser Gly Val Ser Asp Arg Phe
50 55 60

tct ggc tcc aaa tct ggc acc tca gcc tcc ctg gcc atc act ggg ctc 240
Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65 70 75 80

cag gct gag gat gag gct gat tat tac tgc cag tcc ttt gac agc agc 288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Phe Asp Ser Ser
85 90 95

ctg agt cgt tct gtc ttc gga act ggg acc aag gtc acc gtc cta g 334
Leu Ser Arg Ser Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu
100 105 110

<210> 2662
<211> 324
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2662
ga gaa att gta ttg aca cag tct cca gcc acc ctg tct ttc tct cca 47
Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Phe Ser Pro
1 5 10 15

```
ggg gac aga gcc acc ctc tcc tgc agg gcc agt cag aat att aac agg        95
Gly Asp Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Asn Ile Asn Arg
                20                  25                  30

ttc tta gcc tgg tat caa cag aaa ccg ggc cag act ccc agg ctc ctc       143
Phe Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Thr Pro Arg Leu Leu
            35                  40                  45

atc tat gat gca tcc act cgg gcc act ggc atc cct gcc cgg ttc agt       191
Ile Tyr Asp Ala Ser Thr Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser
        50                  55                  60

ggc agt ggg tct ggg aca gac ttc agt ctc atc atc agc agc cta gag       239
Gly Ser Gly Ser Gly Thr Asp Phe Ser Leu Ile Ile Ser Ser Leu Glu
    65                  70                  75

cct gaa gat ttt gcg att tat tac tgc cag cag cgt aac aac tgg cct       287
Pro Glu Asp Phe Ala Ile Tyr Tyr Cys Gln Gln Arg Asn Asn Trp Pro
80                  85                  90                  95

atc act ttc ggc cct ggg acc aaa gtg gat gtc aaa c                    324
Ile Thr Phe Gly Pro Gly Thr Lys Val Asp Val Lys
                100                 105

<210> 2663
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2663
gcc atc caa atg acc cag tct cca tcc tcc ctg tct gca tct gta gga        48
Ala Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

gac aga gtc acc atc act tgc cgg gca agt cag ggc att aga aat gat        96
Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Gly Ile Arg Asn Asp
            20                  25                  30

tta ggc tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg atc       144
Leu Gly Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

tat gct gca tcc agt tta caa agt ggg gtc cca tca agg ttc agc ggc       192
Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

agt gga tct ggc aca gat ttc act ctc acc atc agc agc ctg cag cct       240
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80
```

```
gaa gat ttt gca act tat tac tgt cta caa gat tac aat tac cct ccg       288
Glu Asp Phe Ala Thr Tyr Tyr Cys Leu Gln Asp Tyr Asn Tyr Pro Pro
                85                  90                  95

acg ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg gct gca       336
Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       384
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       432
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       480
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       528
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa ctc tac       576
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu Tyr
            180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       624
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

ttc aac agg gga gag tgt                                              642
Phe Asn Arg Gly Glu Cys
    210
```

<210> 2664
<211> 324
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2664

```
tct tct gag ctg act cag gac cct gct gtg tct gtg gcc ttg gga cag        48
Ser Ser Glu Leu Thr Gln Asp Pro Ala Val Ser Val Ala Leu Gly Gln
1               5                   10                  15

aca gtc agg atc aca tgc caa gga gac agc ctc aga acg gat tat gca        96
Thr Val Arg Ile Thr Cys Gln Gly Asp Ser Leu Arg Thr Asp Tyr Ala
            20                  25                  30
```

```
acc tgg tac caa cag aag cca gga cag gcc cct ata ctt gtc ttc tat       144
Thr Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Ile Leu Val Phe Tyr
        35                  40                  45

ggt gag gac aac cgg ccc tca ggg atc cca gac cga ttc tct ggc tcc       192
Gly Glu Asp Asn Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly Ser
    50                  55                  60

agc tca gga aac aca gct tcg ttg acc atc act ggg gct cag gcg gaa       240
Ser Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala Glu
65                  70                  75                  80

gat gag gct gac tat tac tgt aac tcc cgg gac agc agc ggt cac cat       288
Asp Glu Ala Asp Tyr Tyr Cys Asn Ser Arg Asp Ser Ser Gly His His
                85                  90                  95

tgg gtg ttc ggc gga ggg acc aaa ctg acc gtc cta                       324
Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105

<210> 2665
<211> 342
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2665
gg gac atc gtg atg acc cag tct ccg gac tcc ctg gcc gtg tct ctg         47
   Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu
   1               5                   10                  15

ggc gag agg gcc acc ctc aac tgc aag tcc agc cag agt gtt tta tcc        95
Gly Glu Arg Ala Thr Leu Asn Cys Lys Ser Ser Gln Ser Val Leu Ser
                20                  25                  30

agc tac aac aat aag gac tac tta gct tgg ttc cag cag aaa cca gga       143
Ser Tyr Asn Asn Lys Asp Tyr Leu Ala Trp Phe Gln Gln Lys Pro Gly
            35                  40                  45

cag cct cct cag ttg ctc ttt tac tgg gca tct acc cgg aaa acc gga       191
Gln Pro Pro Gln Leu Leu Phe Tyr Trp Ala Ser Thr Arg Lys Thr Gly
        50                  55                  60

gtc cct gac cga ttc agt ggc agc ggg tct ggg act gat ttc act ctc       239
Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu
    65                  70                  75

acc atc agc agc ctg cag act gaa gat gtg gca gtt tat tac tgt cag       287
Thr Ile Ser Ser Leu Gln Thr Glu Asp Val Ala Val Tyr Tyr Cys Gln
80                  85                  90                  95
```

```
caa tat tat tct act cca tac act ttt ggc cag ggg acc aag ctg gag       335
Gln Tyr Tyr Ser Thr Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu
                100                 105                 110

atc aaa c                                                          342
Ile Lys
```

<210> 2666
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2666

```
gat gtt gtg atg act cag tct cca ctc tcc ctg ccc gtt acc ctt gga        48
Asp Val Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Leu Gly
1               5                   10                  15

cag gcg gcc tcc atc tcc tgc agg tct agt caa agc ctc gta tac agt        96
Gln Ala Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Val Tyr Ser
            20                  25                  30

gat gga aac acc tac ttg aat tgg ttt cag cag agg ccc ggc caa tct       144
Asp Gly Asn Thr Tyr Leu Asn Trp Phe Gln Gln Arg Pro Gly Gln Ser
        35                  40                  45

cca agg cgc cta att tat aag gtt tct aac cgg gag tct ggg gtc cca       192
Pro Arg Arg Leu Ile Tyr Lys Val Ser Asn Arg Glu Ser Gly Val Pro
    50                  55                  60

gac aga ttc agc ggc agt ggg tca ggc act gat ttc aca ctg caa atc       240
Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Gln Ile
65                  70                  75                  80

agc agg gtg gag gct gag gat gtt ggg att tat tac tgc atg caa ggt       288
Ser Arg Val Glu Ala Glu Asp Val Gly Ile Tyr Tyr Cys Met Gln Gly
                85                  90                  95

gca cac tgg cct cca atc acc ttc ggc caa ggg aca cga ctg gag att       336
Ala His Trp Pro Pro Ile Thr Phe Gly Gln Gly Thr Arg Leu Glu Ile
            100                 105                 110

aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat       384
Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115                 120                 125

gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac       432
Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130                 135                 140
```

```
ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc       480
Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac       528
Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175

agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac       576
Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
            180                 185                 190

gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc       624
Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
        195                 200                 205

tcg ccc gtc aca aag agc ttc aac agg gga gag tgt                       660
Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215                 220
```

<210> 2667
<211> 322
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2667

```
tcc tat gag ctg aca cag cca ccc tcg gtg tca gtg tcc cca gga caa        48
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                   10                  15

acg gcc agg atc acc tgc tct gga gat gca ttg cca aaa aaa tat gtt        96
Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Lys Lys Tyr Val
            20                  25                  30

ttt tgg tac cag cag agg tca ggc cag gcc cct gtg tta gtc atc tat       144
Phe Trp Tyr Gln Gln Arg Ser Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

gaa gac agt aaa cga ccc tcc ggg atc cct gac aga ttc tct ggc tcc       192
Glu Asp Ser Lys Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly Ser
    50                  55                  60

agc tca ggg aca ctg gcc acc ctc act atc agt ggc gcc cag gtg gag       240
Ser Ser Gly Thr Leu Ala Thr Leu Thr Ile Ser Gly Ala Gln Val Glu
65                  70                  75                  80

gat gag gct gac tac tac tgt tac tca aca gac act att gga aat tgg       288
Asp Glu Ala Asp Tyr Tyr Cys Tyr Ser Thr Asp Thr Ile Gly Asn Trp
                85                  90                  95
```

```
gtg ttc ggc gga ggg acc agg ctg acc gtc cta g                          322
Val Phe Gly Gly Gly Thr Arg Leu Thr Val Leu
            100                 105

<210> 2668
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2668
ctc tat gtg ctg act cag cca ccc tcg gtg tca gtg gcc cca gga cag        48
Leu Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Gln
1               5                   10                  15

acg gcc agg att acc tgt ggg gga aac aac att gga agt aaa agt gtg        96
Thr Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Ser Lys Ser Val
            20                  25                  30

cac tgg tac cag cag aag cca ggc cag gcc cct gtg ctg gtc gtc tat       144
His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Val Tyr
        35                  40                  45

gat gat agc gac cgg ccc tca ggg atc cct gag cga ttc tct ggc tcc       192
Asp Asp Ser Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

aac tct ggg aac acg gcc acc ctg acc atc agc agg gtc gaa gcc ggg       240
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65                  70                  75                  80

gat gag gcc gac tat tac tgt cag gtg tgg gat agt agt agt gat cat       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Ser Asp His
                85                  90                  95

tgg att ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag ccc aag       336
Trp Ile Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys
            100                 105                 110

gct gcc ccc tcg gtc act ctg ttc cca ccc tcc tct gag gag ctt caa       384
Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
        115                 120                 125

gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga       432
Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
    130                 135                 140

gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga       480
Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145                 150                 155                 160
```

```
gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc       528
Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
                165                 170                 175

agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac aaa agc       576
Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser
            180                 185                 190

tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg       624
Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
        195                 200                 205

gcc cct aca gaa tgt tca                                              642
Ala Pro Thr Glu Cys Ser
    210
```

<210> 2669
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2669

```
gt gac atc cag atg acc cag tct cca tcc tcc ctg tct gca tct gtt         47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
   1               5                  10                  15

gga gac aga gtc acc atc act tgc cgg gca agt cag agc att agc acc        95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Thr
                20                  25                  30

tat tta aat tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg       143
Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
            35                  40                  45

atc tat gct gct tcc aat ttg cag agt ggg gtc cca tca acg ttc agt       191
Ile Tyr Ala Ala Ser Asn Leu Gln Ser Gly Val Pro Ser Thr Phe Ser
        50                  55                  60

ggc agt gga tct ggg aca gat ttc act ctc acc atc agc agt ctg caa       239
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln
    65                  70                  75

cct gaa gat ttt gca act tac tac tgt caa cag agt tac agt ccc cct       287
Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Pro Pro
80                  85                  90                  95

ctc act ttc ggc ggg ggg acc acg gtg gag atc aaa cga act gtg gct       335
Leu Thr Phe Gly Gly Gly Thr Thr Val Glu Ile Lys Arg Thr Val Ala
                100                 105                 110
```

```
gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgt                                          644
Ser Phe Asn Arg Gly Glu Cys
        210

<210> 2670
<211> 645
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2670
gaa ata gtg atg acg cag tct cca gcc acc ctg tct gtg tct cag ggg        48
Glu Ile Val Met Thr Gln Ser Pro Ala Thr Leu Ser Val Ser Gln Gly
1               5                   10                  15

gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt ggc agc gac        96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Gly Ser Asp
            20                  25                  30

tta gcc tgg tac cag cag aaa cct ggc cag gct ccc agg ctc ctc atc       144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
        35                  40                  45

tat gat gct tcc gcc agg gcc act gat atc cca gcc agg ttc agt ggc       192
Tyr Asp Ala Ser Ala Arg Ala Thr Asp Ile Pro Ala Arg Phe Ser Gly
    50                  55                  60
```

```
agt ggg tct gag aca gag ttc act ctc acc atc agc agc ctg cag tct       240
Ser Gly Ser Glu Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Ser
65                  70                  75                  80

gaa gat ttt gca gtt tat tac tgt cag cat tat agt gac tgg cga gca       288
Glu Asp Phe Ala Val Tyr Tyr Cys Gln His Tyr Ser Asp Trp Arg Ala
                85                  90                  95

ctc act ttc ggc gga ggg acc aag gtg gag atc aaa cga act gtg gct       336
Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
            100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       384
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       432
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       480
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       528
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       576
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       624
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205

agc ttc aac agg gga gag tgt                                          645
Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 2671
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2671

```
ggc atc gtg atg acc cag tct cca gac tcc ctg gct gtg tct ctg ggc        48
Gly Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1               5                   10                  15
```

```
gag agg gcc acc atc aac tgc agg tcc agc cag agt gtt tta tac agc        96
Glu Arg Ala Thr Ile Asn Cys Arg Ser Ser Gln Ser Val Leu Tyr Ser
            20                  25                  30

tcc aac aat aag aac tac tta gct tgg tac cag cag aaa cca gga cag       144
Ser Asn Asn Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
        35                  40                  45

cct cct aag ctg ctc att tac tgg gca tct acc cgg gaa tcc ggg gtc       192
Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
    50                  55                  60

cct gac cga ttc agt ggc agc ggg tct ggg aca gat ttc act ctc acc       240
Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65                  70                  75                  80

atc agc agc ctg cag gct gaa gat gtg gca gtc tat tac tgt caa caa       288
Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
                85                  90                  95

tat tat ggt cct ctg tgg acg ttc ggc caa ggg acc agg gtg gaa atc       336
Tyr Tyr Gly Pro Leu Trp Thr Phe Gly Gln Gly Thr Arg Val Glu Ile
            100                 105                 110

aga cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat       384
Arg Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115                 120                 125

gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac       432
Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130                 135                 140

ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc       480
Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac       528
Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175

agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac       576
Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
            180                 185                 190

gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc       624
Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
        195                 200                 205

tcg ccc gtc aca aag agc ttc aac agg gga gag tgt                       660
Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215                 220
```

<210> 2672
<211> 642

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2672
```
tcc gat gag ctg aca cag cca ccc tcg gtg tca gtg tcc cca gga cag        48
Ser Asp Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                   10                  15

acg gcc agg atc acc tgc tct gga gat gca ttg gca aag gaa tat gct        96
Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Ala Lys Glu Tyr Ala
            20                  25                  30

tat tgg tac cag caa aag tca ggc cag gcc cct gta ttg gtg atc tct       144
Tyr Trp Tyr Gln Gln Lys Ser Gly Gln Ala Pro Val Leu Val Ile Ser
        35                  40                  45

aaa gac acg gag agg ccc tca ggg atc cct gcg cga ttt tct ggc tcc       192
Lys Asp Thr Glu Arg Pro Ser Gly Ile Pro Ala Arg Phe Ser Gly Ser
    50                  55                  60

agt tca ggg aca aca gtc acg ttg acc atc agt gga gtc cag tct gat       240
Ser Ser Gly Thr Thr Val Thr Leu Thr Ile Ser Gly Val Gln Ser Asp
65                  70                  75                  80

gac gag gct gac tat tac tgt caa tca gca gac agc agt ctt act tat       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Ala Asp Ser Ser Leu Thr Tyr
                85                  90                  95

tgg ctc ttc ggc gga ggg acc aag ctg acc gtc cta cgt cag ccc aag       336
Trp Leu Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Arg Gln Pro Lys
            100                 105                 110

gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag ctt caa       384
Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln
        115                 120                 125

gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga       432
Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly
    130                 135                 140

gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga       480
Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly
145                 150                 155                 160

gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc       528
Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala
                165                 170                 175

agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac aaa agc       576
Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Lys Ser
```

```
            180                 185                 190

tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg       624
Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val
        195                 200                 205

gcc cct aca gaa tgt tca                                               642
Ala Pro Thr Glu Cys Ser
    210
```

<210> 2673
<211> 319
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2673

```
gac atc cag atg acc cag gct cct tcc acc ctg tct gca tct gtt gga        48
Asp Ile Gln Met Thr Gln Ala Pro Ser Thr Leu Ser Ala Ser Val Gly
1               5                   10                  15

gac aga gtc agc atc act tgc cgg gcc agt cag aat att cgc gac ttc        96
Asp Arg Val Ser Ile Thr Cys Arg Ala Ser Gln Asn Ile Arg Asp Phe
            20                  25                  30

ttg gcc tgg tat cag cag aaa cca ggg aga gcc cct gac ctc ctc atc       144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Arg Ala Pro Asp Leu Leu Ile
        35                  40                  45

tat cgg gca tct act tta gaa aaa ggg gtg tcg gcg agg ttc agc ggc       192
Tyr Arg Ala Ser Thr Leu Glu Lys Gly Val Ser Ala Arg Phe Ser Gly
    50                  55                  60

agt ggg tct ggg aca gaa ttc act cta acc atc acc ggc ctg cag cct       240
Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Thr Gly Leu Gln Pro
65                  70                  75                  80

gat gat ttt gca aca tat tac tgc caa caa tat tcc gat tac tcc act       288
Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Ser Asp Tyr Ser Thr
                85                  90                  95

ttc ggc gga ggg acc agg gtg gag atc aaa c                             319
Phe Gly Gly Gly Thr Arg Val Glu Ile Lys
            100                 105
```

<210> 2674
<211> 660
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2674

```
gac atc gtg atg acc cag tct cca gac tcc ctg gct gtg tct ctg ggc        48
Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1               5                  10                  15

gag agg gcc acc atc acc tgc aag tcc agc cag act att tta tac agc        96
Glu Arg Ala Thr Ile Thr Cys Lys Ser Ser Gln Thr Ile Leu Tyr Ser
            20                  25                  30

tcc aac aat aag aac tat tta gct tgg tac cag cag aaa cca gga cag       144
Ser Asn Asn Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
        35                  40                  45

cct cct aaa cta ctc att tac tgg gca tct acc cgg gaa tcc ggg gtc       192
Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
    50                  55                  60

cct gac cgg ttc agt ggc agc ggg tct ggg aca gat ttc act ctc acc       240
Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65                  70                  75                  80

atc agc agc ctg cag gct gaa gat gtg gca gtt tat tac tgt cac caa       288
Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys His Gln
                85                  90                  95

tat tat act act cct ttc act ttc ggc cct ggg acc act gtg gat atc       336
Tyr Tyr Thr Thr Pro Phe Thr Phe Gly Pro Gly Thr Thr Val Asp Ile
            100                 105                 110

aga cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat       384
Arg Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115                 120                 125

gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac       432
Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130                 135                 140

ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc       480
Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac       528
Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175

agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac       576
Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
            180                 185                 190

gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc       624
Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
```

```
        195                 200                 205

tcg ccc gtc aca aag agc ttc aac agg gga gag tgt                         660
Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215                 220
```

<210> 2675
<211> 636
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2675

```
tcc tat gag ctg act cag cca ccc tca gtg tcc gtg tcc cca gga cag        48
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                   10                  15

aca gcc agc atc acc tgc tct gga gat aaa ttg ggg aat aaa tat gtt        96
Thr Ala Ser Ile Thr Cys Ser Gly Asp Lys Leu Gly Asn Lys Tyr Val
            20                  25                  30

tgc tgg tat cag cag aag cca ggc cag tcc cct gtg ttg gtc atc tat       144
Cys Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45

cag gat acc aag cgg ccc tca ggg atc cct gag cga ttc tct ggc tcc       192
Gln Asp Thr Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

aag tct ggg aac aca gcc act ctg acc atc agc ggg acc cag gct ctg       240
Lys Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Leu
65                  70                  75                  80

gat gag gct gac tat tac tgt cag gcg tgg gac agc agc act gca gaa       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Ala Trp Asp Ser Ser Thr Ala Glu
                85                  90                  95

ttc ggc gga ggg acc aag ctg acc gtc cta ggt cag ccc aag gct gcc       336
Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
            100                 105                 110

ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag ctt caa gcc aac       384
Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125

aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac ccg gga gcc gtg       432
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130                 135                 140

aca gtg gcc tgg aag gca gat agc agc ccc gtc aag gcg gga gtg gag       480
Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
```

```
145                 150                 155                 160

acc acc aca ccc tcc aaa caa agc aac aac aag tac gcg gcc agc agc       528
Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175

tat ctg agc ctg acg cct gag cag tgg aag tcc cac aga agc tac agc       576
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190

tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg gcc cct       624
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195                 200                 205

aca gaa tgt tca                                                      636
Thr Glu Cys Ser
    210

<210> 2676
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2676
cgg tct gtg ctg act cag cca ccc tca gcg tct ggg act ccc ggg cag        48
Arg Ser Val Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Pro Gly Gln
1               5                   10                  15

acg gtc acc atc tct tgt tct ggt agc agg tcc aac atc ggg agt aat        96
Thr Val Thr Ile Ser Cys Ser Gly Ser Arg Ser Asn Ile Gly Ser Asn
            20                  25                  30

ttt gtg tat tgg tac caa cac ctc cca gga tcg gcc ccc aaa acg acc       144
Phe Val Tyr Trp Tyr Gln His Leu Pro Gly Ser Ala Pro Lys Thr Thr
        35                  40                  45

atc cat tct aat act cag cgg ccc ccc ggg gtc cct gat cga ttt tct       192
Ile His Ser Asn Thr Gln Arg Pro Pro Gly Val Pro Asp Arg Phe Ser
    50                  55                  60

ggc tcc aag tct ggc acc tca gcc tcc ctg gcc atc agt ggg ctc cgg       240
Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Arg
65                  70                  75                  80

tct gaa gat gag gct gat tat tac tgt gtg aca tgg gat gac gac ctg       288
Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Val Thr Trp Asp Asp Asp Leu
                85                  90                  95

cat ggt tgg gtg ttc ggc gga ggg acc agg ctg acc gtc cta ggt cag       336
His Gly Trp Val Phe Gly Gly Gly Thr Arg Leu Thr Val Leu Gly Gln
```

```
            100                 105                 110

ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aaa agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2677
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2677
cgg tct gtg ttg acg cag ccg ccc tca gtg tct gcg gcc cca gga cag        48
Arg Ser Val Leu Thr Gln Pro Pro Ser Val Ser Ala Ala Pro Gly Gln
1               5                   10                  15

aag gtc atc atc tcc tgc tct gga agc agc tcc aac att ggg aat aac        96
Lys Val Ile Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Asn Asn
            20                  25                  30

tat gtt tcc tgg tac cag caa ttc cta gga aca gcc ccc aaa ctc ctc       144
Tyr Val Ser Trp Tyr Gln Gln Phe Leu Gly Thr Ala Pro Lys Leu Leu
        35                  40                  45

att tat gac act gat aag cga ccc tca ggg att cct gac cga ttc tct       192
Ile Tyr Asp Thr Asp Lys Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser
```

```
    50                  55                  60

ggc tcc aag tct ggc acg tca gcc acc ctg ggc att acc ggg ctc cag       240
Gly Ser Lys Ser Gly Thr Ser Ala Thr Leu Gly Ile Thr Gly Leu Gln
65                  70                  75                  80

act ggg gac gag gcc cat tat tac tgc gca acg tgg gat agc agc ctg       288
Thr Gly Asp Glu Ala His Tyr Tyr Cys Ala Thr Trp Asp Ser Ser Leu
                85                  90                  95

cgt gct ggc cct gta gta ttc ggc gga ggg acg aaa ttg acc gtc cta       336
Arg Ala Gly Pro Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110

ggt cag ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct       384
Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser
        115                 120                 125

gag gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac       432
Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp
    130                 135                 140

ttc tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc       480
Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro
145                 150                 155                 160

gtc aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac       528
Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn
                165                 170                 175

aaa tac gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag       576
Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys
            180                 185                 190

tcc cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg       624
Ser His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val
        195                 200                 205

gag aag aca gtg gcc cct aca gaa tgt tca                               654
Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2678
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2678
gac atc cag atg acc caa tct cct tcc acc ctg tct gca tct gta gga        48
Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
```

```
1               5                   10                  15

gac aga gtc acc atc act tgc cgg gcc agc cag agt gtt agt ttc tgg        96
Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Val Ser Phe Trp
            20                  25                  30

ttg gcc tgg tat cag cag aaa cca ggg aaa gcc cct aac ctc ctg atc       144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Asn Leu Leu Ile
        35                  40                  45

agt aag gcg tct act tta gaa agt gga gtc ccc tca aga ttt agc ggc       192
Ser Lys Ala Ser Thr Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

agt ggc tct ggg aca gaa ttc act ctc acc atc agc agc ctg cag cct       240
Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

gat gat ttc gca act tat tac tgc caa cag tac aat gct tac ccg gtc       288
Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ala Tyr Pro Val
                85                  90                  95

act ttc ggc ggg ggg acc aag gtg gag atc aga cga act gtg gct gca       336
Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Arg Arg Thr Val Ala Ala
            100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       384
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       432
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       480
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       528
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       576
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       624
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

ttc aac agg gga gag tgt                                              642
Phe Asn Arg Gly Glu Cys
    210
```

<210> 2679
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2679
```
ggc atc gtg atg atc cag tct cca gac tcc ctg gct gtg tct ctg ggc        48
Gly Ile Val Met Ile Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1               5                   10                  15

gag agg gcc acc atc aac tgc aag tcc agc cag agt gtc ttc tac agc        96
Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Val Phe Tyr Ser
            20                  25                  30

tcc aac aat aag aac tac tta gct tgg tac cag cag aaa cca gga cag       144
Ser Asn Asn Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
        35                  40                  45

cct cct aaa ctg ctc att tac tgg gca tct acc cgg gaa tcc ggg gtc       192
Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
    50                  55                  60

cct gac cga ttc agt ggc agc ggg tct ggg aca gat ttc act ctc acc       240
Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65                  70                  75                  80

ctc acc agc ctg cag gct gaa gat gtg gca gtt tat tac tgt caa caa       288
Leu Thr Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
                85                  90                  95

tat tat agt act ccg tgg acg ttc ggc caa ggg acc aag gtg gaa atc       336
Tyr Tyr Ser Thr Pro Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile
            100                 105                 110

aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat       384
Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115                 120                 125

gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac       432
Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130                 135                 140

ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc       480
Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac       528
Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175
```

```
agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac       576
Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
            180                 185                 190

gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc       624
Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
        195                 200                 205

tcg ccc gtc aca aag agc ttc aac agg gga gag tgt                       660
Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215                 220

<210> 2680
<211> 662
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2680
gg gac atc gtg atg acc cag tct cca gac tcc ctg gct gtg tct ctg         47
   Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu
   1               5                  10                  15

ggc gag agg gcc gcc atc aac tgc aag tcc agc cag agt gtt tta tac        95
Gly Glu Arg Ala Ala Ile Asn Cys Lys Ser Ser Gln Ser Val Leu Tyr
                20                  25                  30

agc tcc aac aat aag aac tac tta gct tgg tac cag cag aga cca gga       143
Ser Ser Asn Asn Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Arg Pro Gly
            35                  40                  45

cag cct cct aag ctg ctc att cac tgg gca tct atg cgg gaa tcc ggg       191
Gln Pro Pro Lys Leu Leu Ile His Trp Ala Ser Met Arg Glu Ser Gly
        50                  55                  60

gtc cct gac cga ttc agt ggc agc ggg tct ggg aca gat ttc act ctc       239
Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu
    65                  70                  75

acc atc agc agc ctg cag gct gaa gat gtg gca att tat tac tgt cag       287
Thr Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Ile Tyr Tyr Cys Gln
80                  85                  90                  95

caa tat tat agt cct cct ctc act ttc ggc gga ggg acc aag gtg gag       335
Gln Tyr Tyr Ser Pro Pro Leu Thr Phe Gly Gly Gly Thr Lys Val Glu
                100                 105                 110

atc aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct       383
Ile Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser
            115                 120                 125
```

```
gat gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat       431
Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn
        130                 135                 140

aac ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc       479
Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala
    145                 150                 155

ctc caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag       527
Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys
160                 165                 170                 175

gac agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac       575
Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp
                180                 185                 190

tac gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg       623
Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu
            195                 200                 205

agc tcg ccc gtc aca aag agc ttc aac agg gga gag tgt                   662
Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215                 220
```

<210> 2681
<211> 330
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2681

```
cag tct gcc ctg act cag cct gcc tcc gtg tct ggg tct cct gga cag        48
Gln Ser Ala Leu Thr Gln Pro Ala Ser Val Ser Gly Ser Pro Gly Gln
1               5                   10                  15

tcg atc acc atc tct tgc act gga agc agc aat gac att ggt cgt tat        96
Ser Ile Thr Ile Ser Cys Thr Gly Ser Ser Asn Asp Ile Gly Arg Tyr
            20                  25                  30

aag tat gtc tcc tgg ttc caa cat cac cca ggc aga gcc ccc aaa ctc       144
Lys Tyr Val Ser Trp Phe Gln His His Pro Gly Arg Ala Pro Lys Leu
        35                  40                  45

ata att tat gag gtc aat aat cgg ccc tca ggg ctt tct cat cgc ttc       192
Ile Ile Tyr Glu Val Asn Asn Arg Pro Ser Gly Leu Ser His Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc aac acg gcc tcc ctg acc atc tct ggg ctc       240
Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65                  70                  75                  80
```

```
cag gct gag gac gag gct gat tat tac tgc tgc tca tat aca agc agc       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Cys Ser Tyr Thr Ser Ser
                85                  90                  95

ctc act tat gtc ttc gga act ggg acc gcg gtc acc gtc cta              330
Leu Thr Tyr Val Phe Gly Thr Gly Thr Ala Val Thr Val Leu
            100                 105                 110
```

<210> 2682
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2682

```
gat gtt gtg atg act cag tct cca ctc tcc ctg ccc gtc acc ctt gga        48
Asp Val Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Leu Gly
1               5                   10                  15

cag ccg gcc tcc atc tcc tgc agg tct agt caa agc ctc gta tac agt        96
Gln Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Val Tyr Ser
            20                  25                  30

gat gga aac acc tac ttg aat tgg ttt cag cag agg cca ggc caa tct       144
Asp Gly Asn Thr Tyr Leu Asn Trp Phe Gln Gln Arg Pro Gly Gln Ser
        35                  40                  45

cca agg cgc cta att tat aag gtt tct aac cgg gac tct ggg gtc cca       192
Pro Arg Arg Leu Ile Tyr Lys Val Ser Asn Arg Asp Ser Gly Val Pro
    50                  55                  60

gac aga ttc agc ggc agt ggg tca ggc act gat ttc aca ctg aaa atc       240
Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65                  70                  75                  80

agc agg gtg gag gct gag gat gtt ggg gtt tat tac tgc atg caa ggt       288
Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln Gly
                85                  90                  95

aca cac tgg ccg tac act ttt ggc cag ggg acc aag ctg gag atc aaa       336
Thr His Trp Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
            100                 105                 110

cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag       384
Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
        115                 120                 125

cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc       432
Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
    130                 135                 140
```

```
tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa       480
Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
145                 150                 155                 160

tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac agc       528
Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
                165                 170                 175

acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag       576
Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
            180                 185                 190

aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg       624
Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
        195                 200                 205

ccc gtc aca aag agc ttc aac agg gga gag tgt                           657
Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 2683
<211> 636
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2683
ccc tat gag ctg act cag cca ccc tca gtg tcc gtg tcc cca gga cag        48
Pro Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                   10                  15

aca gcc agc atc acc tgc tct gga gat aaa ttg ggg gat aaa tat gct        96
Thr Ala Ser Ile Thr Cys Ser Gly Asp Lys Leu Gly Asp Lys Tyr Ala
            20                  25                  30

tgc tgg tat cag cag aag cca ggc cag tcc cct gtg ctg gtc atc tat       144
Cys Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45

caa gat agc aag cgg ccc tca ggg atc cct gag cga ttc tct ggc tcc       192
Gln Asp Ser Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

aac tct ggg aac aca gcc act ctg acc atc agc ggg acc cag gct atg       240
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65                  70                  75                  80

gat gag gct gac tat tac tgt cag gcg tgg gac agc agc act tat gtc       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Ala Trp Asp Ser Ser Thr Tyr Val
                85                  90                  95
```

```
ttc gga act ggg acc aag gtc acc gtc cta ggt cag ccc aag gcc aac       336
Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly Gln Pro Lys Ala Asn
            100                 105                 110

ccc act gtc act ctg ttc ccg ccc tcc tct gag gag ctc caa gcc aac       384
Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125

aag gcc aca cta gtg tgt ctg atc agt gac ttc tac ccg gga gct gtg       432
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130                 135                 140

aca gtg gcc tgg aag gca gat ggc agc ccc gtc aag gcg gga gtg gag       480
Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys Ala Gly Val Glu
145                 150                 155                 160

acc acc aaa ccc tcc aaa cag agc aac aac aag tac gcg gcc agc agc       528
Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175

tac ctg agc ctg acg ccc gag cag tgg aag tcc cac aga agc tac agc       576
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190

tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg gcc cct       624
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195                 200                 205

aca gaa tgt tca                                                      636
Thr Glu Cys Ser
    210
```

<210> 2684
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2684

```
gaa aat gtg ttg acg cag tct cca ggc acc ctg tct ttg tct cca ggg        48
Glu Asn Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

gaa aga gcc acc ctc tcc tgc agg gcc agt cag agg gtt aac agc aac        96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Arg Val Asn Ser Asn
            20                  25                  30

tac tta gcc tgg tac cag cag aaa tct ggc cag gct ccc agg ctc ctc       144
Tyr Leu Ala Trp Tyr Gln Gln Lys Ser Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45
```

```
atc tat ggt gca tcc agc agg gcc act ggt atc cca gac agg ttc agt       192
Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc aga ctg gag       240
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

cct gaa gat ttt gca gtg tat tac tgt cag cag tat ggt ggc tca cct       288
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Gly Ser Pro
                85                  90                  95

cta ttc act ttc ggc cct ggg acc aaa gtg gat atc aaa cga act gtg       336
Leu Phe Thr Phe Gly Pro Gly Thr Lys Val Asp Ile Lys Arg Thr Val
            100                 105                 110

gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa       384
Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
        115                 120                 125

tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga       432
Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
    130                 135                 140

gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac       480
Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
145                 150                 155                 160

tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc       528
Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
                165                 170                 175

ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa       576
Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
            180                 185                 190

ctc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca       624
Leu Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
        195                 200                 205

aag agc ttc aac agg gga gag tgt                                       648
Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 2685
<211> 319
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2685

```
ccc tat gaa ctg act cag cca ccc tca gtg tcc gtg tcc cca gga cag        48
Pro Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                  10                  15

aca gcc agc atc gcc tgc tct gga gat aat ttg gga aat aaa tat gct        96
Thr Ala Ser Ile Ala Cys Ser Gly Asp Asn Leu Gly Asn Lys Tyr Ala
            20                  25                  30

tgg tgg tat cga cag aag cca ggc cag tcc cct gtc ctg gtc atg tat       144
Trp Trp Tyr Arg Gln Lys Pro Gly Gln Ser Pro Val Leu Val Met Tyr
        35                  40                  45

aaa gat aac aag cgg ccc tca ggg atc cct gag cga ttc tct ggc tcc       192
Lys Asp Asn Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

aac tct ggg aac aca gcc act ctg acc atc agc ggg acc cag gct atg       240
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65                  70                  75                  80

gat gag gct gac tat tac tgt cag acg tgg gac agc agc act gtg ata       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Thr Trp Asp Ser Ser Thr Val Ile
                85                  90                  95

ttc ggc gga ggg acc aag ctg acc gtc caa g                            319
Phe Gly Gly Gly Thr Lys Leu Thr Val Gln
            100                 105

<210> 2686
<211> 659
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2686
gg gat att gtg atg act cag tct cca ctc tcc ctg ccc gtc acc cct         47
   Asp Ile Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Pro
   1               5                  10                  15

gga gag ccg gcc tcc atc tcc tgc agg tct agt cag agc ctc ctg cat        95
Gly Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu His
                20                  25                  30

agt aat gga tac aac tat ttg gat tgg tac ctg cag aag cca ggg cag       143
Ser Asn Gly Tyr Asn Tyr Leu Asp Trp Tyr Leu Gln Lys Pro Gly Gln
            35                  40                  45

tct cca cag ctc ctg atc tat ttg ggt tct aat cgg gcc tcc ggg gtc       191
Ser Pro Gln Leu Leu Ile Tyr Leu Gly Ser Asn Arg Ala Ser Gly Val
        50                  55                  60
```

```
cct gac agg ttc agt ggc agt gga tca ggc aca gat ttt aca ctg aaa       239
Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys
    65                  70                  75

atc agc aga gtg gag gct gag gat gtt ggg gtt tat tac tgc atg caa       287
Ile Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln
80                  85                  90                  95

gct cta caa act ccg tac act ttt ggc cag ggg acc aag ctg gag atc       335
Ala Leu Gln Thr Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile
                100                 105                 110

aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat       383
Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
            115                 120                 125

gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac       431
Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
        130                 135                 140

ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc       479
Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
    145                 150                 155

caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac       527
Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
160                 165                 170                 175

agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac       575
Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
                180                 185                 190

gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc       623
Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
            195                 200                 205

tcg ccc gtc aca aag agc ttc aac agg gga gag tgt                       659
Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215

<210> 2687
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2687
cag tct gtg ttg acg cag ccg ccc tca gtg tct gcg gcc cca gga cag        48
Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Ala Ala Pro Gly Gln
1               5                   10                  15
```

```
aag gtc acc atc tcc tgc tct gga agc agc tcc aac att ggg aat aat        96
Lys Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Asn Asn
            20                  25                  30

tat gta tcc tgg tac cag cag ctc cca gga aca gcc ccc aaa ctc ctc       144
Tyr Val Ser Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
        35                  40                  45

att tat gac aat aat aag cga ccc tca ggg att cct gac cga ttc tct       192
Ile Tyr Asp Asn Asn Lys Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

ggc tcc aag tct ggc acg tca gcc acc ctg ggc atc acc gga ctc cag       240
Gly Ser Lys Ser Gly Thr Ser Ala Thr Leu Gly Ile Thr Gly Leu Gln
65                  70                  75                  80

act ggg gac gag gcc gat tat tac tgc gga aca tgg gat agc agt ctg       288
Thr Gly Asp Glu Ala Asp Tyr Tyr Cys Gly Thr Trp Asp Ser Ser Leu
                85                  90                  95

agt gct ggc gtc ttc gga act ggg acc aag gtc acc gtc cta ggt cag       336
Ser Ala Gly Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly Gln
            100                 105                 110

ccc aag gcc aac ccc act gtc act ctg ttc ccg ccc tcc tct gag gag       384
Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
        115                 120                 125

ctc caa gcc aac aag gcc aca cta gtg tgt ctg atc agt gac ttc tac       432
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc aag       480
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag tac       528
Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr
                165                 170                 175

gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc cac       576
Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag       624
Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

aca gtg gcc cct aca gaa tgt tca                                      648
Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2688
<211> 641

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2688
```
gt gac atc cag atg acc cag tct cct tcc acc ctg tct gca tct gta         47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val
   1               5                  10                  15

gga gac aga gtc acc atc act tgc cgg gcc agt cag agt att agt agc        95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser
                20                  25                  30

tgg ttg gcc tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg       143
Trp Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
            35                  40                  45

atc tat aag gcg tct agt tta gaa agt ggg gtc cca tca agg ttc agc       191
Ile Tyr Lys Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60

ggc agt gga tct ggg aca gaa ttc act ctc acc atc agc agc ctg cag       239
Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln
    65                  70                  75

cct gat gat ttt gca act tat tac tgc caa cag tat aat agt tat tgg       287
Pro Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Tyr Trp
80                  85                  90                  95

acg ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg gct gca       335
Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
                100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       383
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
            115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       431
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
        130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       479
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
    145                 150                 155

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       527
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
160                 165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       575
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
```

```
                180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       623
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
            195                 200                 205

ttc aac agg gga gag tgt                                           641
Phe Asn Arg Gly Glu Cys
        210
```

<210> 2689
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2689

```
gt gac atc cag atg acc cag tct cct tcc acc ctg tct gca tct gta         47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val
   1               5                  10                  15

gga gac aga gtc acc atc act tgc cgg gcc agt cag agt att agt agc        95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser
                20                  25                  30

tgg ttg gcc tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg       143
Trp Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
            35                  40                  45

atc tat aag gcg tct agt tta gaa agt ggg gtc cca tca agg ttc agc       191
Ile Tyr Lys Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60

ggc agt gga tct ggg aca gaa ttc act ctc acc atc agc agc ctg cag       239
Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln
    65                  70                  75

cct gat gat ttt gca act tat tac tgc caa cag tat aat agt tat ccg       287
Pro Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Tyr Pro
80                  85                  90                  95

tgg acg ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg gct       335
Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
                100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
```

```
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgt                                          644
Ser Phe Asn Arg Gly Glu Cys
        210

<210> 2690
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2690
cca gct gtg ctg acg cag ccg ccc tca gtg tct ggg gcc cca ggg cag        48
Pro Ala Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

agg gtc acc atc tcc tgc act ggg agc agc tcc aac atc ggg gca ggt        96
Arg Val Thr Ile Ser Cys Thr Gly Ser Ser Ser Asn Ile Gly Ala Gly
            20                  25                  30

tat gat gta cac tgg tac cag cag ctt cca gga aca gcc ccc aaa ctc       144
Tyr Asp Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

ctc atc tat ggt aac agc aat cgg ccc tca ggg gtc cct gac cga ttc       192
Leu Ile Tyr Gly Asn Ser Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc acc tca gcc tcc ctg gcc atc act ggg ctc       240
Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80

cag gct gag gat gag gct gat tat tac tgc cag tcc tat gac agc agc       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser
```

```
                85                  90                  95

ctg agt ggt tca ggg gtg ttc ggc gga ggg acc aag ctg acc gtc cta       336
Leu Ser Gly Ser Gly Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110

ggt cag ccc aag gct gcc ccc tcg gtc act ctg ttc cca ccc tcc tct       384
Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser
        115                 120                 125

gag gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac       432
Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp
    130                 135                 140

ttc tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc       480
Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro
145                 150                 155                 160

gtc aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac       528
Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn
                165                 170                 175

aag tac gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag       576
Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys
            180                 185                 190

tcc cac aaa agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg       624
Ser His Lys Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val
        195                 200                 205

gag aag aca gtg gcc cct aca gaa tgt tca                               654
Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 2691
<211> 639
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2691

```
tcc tat gag ctg aca cag cca ccc tcg gtg tca gtg tcc cca gga cag        48
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                   10                  15

acg gcc agg atc acc tgc tct gga gat gca ttg cca aag caa tat gct        96
Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Lys Gln Tyr Ala
            20                  25                  30

tat tgg tac cag cag aag cca ggc cag gcc cct gtg ttg gtg ata tat       144
Tyr Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
```

```
        35                  40                  45

aaa gac agt gag agg ccc tca ggg atc cct gag cga ttc tct ggc tcc       192
Lys Asp Ser Glu Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

agc tca ggg aca aca gtc acg ttg acc atc agt gga gtc cag gca gaa       240
Ser Ser Gly Thr Thr Val Thr Leu Thr Ile Ser Gly Val Gln Ala Glu
65                  70                  75                  80

gac gag gct gac tat tac tgt caa tca gca gac agc agt ggt act tat       288
Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Ala Asp Ser Ser Gly Thr Tyr
                85                  90                  95

gtc ttc gga act ggg acc aag gtc acc gtc cta ggt cag ccc aag gcc       336
Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly Gln Pro Lys Ala
            100                 105                 110

aac ccc act gtc act ctg ttc ccg ccc tcc tct gag gag ctc caa gcc       384
Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala
        115                 120                 125

aac aag gcc aca cta gtg tgt ctg atc agt gac ttc tac ccg gga gct       432
Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala
    130                 135                 140

gtg aca gtg gcc tgg aag gca gat ggc agc ccc gtc aag gcg gga gtg       480
Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val Lys Ala Gly Val
145                 150                 155                 160

gag acc acc aaa ccc tcc aaa cag agc aac aac aag tac gcg gcc agc       528
Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser
                165                 170                 175

agc tac ctg agc ctg acg ccc gag cag tgg aag tcc cac aga agc tac       576
Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr
            180                 185                 190

agc tgc cag gtc acg cat gaa ggg agc acc gtg gag aag aca gtg gcc       624
Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala
        195                 200                 205

cct aca gaa tgt tca                                                   639
Pro Thr Glu Cys Ser
    210
```

<210> 2692
<211> 308
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2692
gac atc cag atg acc cag tct cca tct tcc ctg tct gca tct gtc gga 48
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

gac aga gtc acc ttc act tgt cgg gcg agt cag aat att cgc aac aat 96
Asp Arg Val Thr Phe Thr Cys Arg Ala Ser Gln Asn Ile Arg Asn Asn
20 25 30

tta gcc tgg tat cag ctc aaa cca ggg aaa gcc ccg cag ctc ctg atc 144
Leu Ala Trp Tyr Gln Leu Lys Pro Gly Lys Ala Pro Gln Leu Leu Ile
35 40 45

tat tct gct tcc agt ttg gag act ggg gtc cct tca agg ttc agc ggc 192
Tyr Ser Ala Ser Ser Leu Glu Thr Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

tct gga tct gga aca gat ttc act ctc gcc atc agc agc ctg cag cct 240
Ser Gly Ser Gly Thr Asp Phe Thr Leu Ala Ile Ser Ser Leu Gln Pro
65 70 75 80

gaa gat ttt gcg act tac tat tgt caa cag gct cac ggt ttc cca atc 288
Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ala His Gly Phe Pro Ile
85 90 95

act ttt ggg cag ggg agc aa 308
Thr Phe Gly Gln Gly Ser
100

<210> 2693
<211> 319
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2693
gaa ata gtg atg acg cag tct cca gcc acc ctg tct gtg tct ccc ggg 48
Glu Ile Val Met Thr Gln Ser Pro Ala Thr Leu Ser Val Ser Pro Gly
1 5 10 15

gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc agc aac 96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Asn
20 25 30

tta gcc tgg tac cag cag aaa cct ggc cag gct ccc agg ctc ctc atc 144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
35 40 45

tat ggt gca tcc acc agg gcc act ggt atc cca gcc agg ttc agt ggc 192
Tyr Gly Ala Ser Thr Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly

```
    50                  55                  60

agt ggg tct ggg aca gag ttc act ctc acc atc agc agc ctg cag tct       240
Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Ser
65                  70                  75                  80

gaa gat ttt gca att tat tac tgt cag cag tat aat agc tgg ccc gct       288
Glu Asp Phe Ala Ile Tyr Tyr Cys Gln Gln Tyr Asn Ser Trp Pro Ala
                85                  90                  95

ttc ggc gga ggg acc aag gtg gag atc aaa c                             319
Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
            100                 105

<210> 2694
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2694
gac atc cag atg acc cag tct cca tcc tcc ctg tct gca tct gta gga        48
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

gac aga gtc acc atc act tgc cgg gca agt cag agc att agc agc tat        96
Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Tyr
            20                  25                  30

tta aat tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg atc       144
Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45

tat gct gca tcc agt ttg caa agt ggg gtc cca tca agg ttc agt ggc       192
Tyr Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

agt gga tct ggg aca gat ttc act ctc acc gtc agc agt cta caa cct       240
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Val Ser Ser Leu Gln Pro
65                  70                  75                  80

gaa gac ttt gca act tac tac tgt caa cag agt tac aat acc ccg tac       288
Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Asn Thr Pro Tyr
                85                  90                  95

act ttt ggc cag ggg acc aag ctg gag atc aaa cga act gtg gct gca       336
Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga       384
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
```

```
        115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc       432
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag       480
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160

gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       528
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       576
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       624
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

ttc aac agg gga gag tgt                                              642
Phe Asn Arg Gly Glu Cys
    210

<210> 2695
<211> 644
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2695
gt gac atc cag atg acc cag tct cca tcc tcc ctg tct gca tct gta         47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
   1               5                  10                  15

gga gac aga gtc acc atc act tgc cgg gca agt cag agc att agc acc        95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Thr
                20                  25                  30

tat tta aat tgg tat cag cag aaa cca ggg atg gcc cct aag ctc ctg       143
Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Met Ala Pro Lys Leu Leu
            35                  40                  45

atc tat gct gca tcc act ttg caa agt ggg gtc cca tca agg ttc agt       191
Ile Tyr Ala Ala Ser Thr Leu Gln Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60

ggc agt gga tct gcg aca gat tac act ctc acc atc agc agt ctg caa       239
Gly Ser Gly Ser Ala Thr Asp Tyr Thr Leu Thr Ile Ser Ser Leu Gln
```

```
    65                  70                  75

cct gaa gat ttc gcg act tac tac tgt caa cag agt tac aat acc ccg       287
Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Asn Thr Pro
80                  85                  90                  95

ctc act ttc ggc gga ggg acc aag gtg gac atc aaa cga act gtg gct       335
Leu Thr Phe Gly Gly Gly Thr Lys Val Asp Ile Lys Arg Thr Val Ala
                100                 105                 110

gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct       383
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
            115                 120                 125

gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag       431
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
        130                 135                 140

gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc       479
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
    145                 150                 155

cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc       527
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
160                 165                 170                 175

agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa ctc       575
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu
                180                 185                 190

tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag       623
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
            195                 200                 205

agc ttc aac agg gga gag tgt                                          644
Ser Phe Asn Arg Gly Glu Cys
        210

<210> 2696
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2696
gaa att gtg ttg acg cag tct cca ggc acc ctg tct ttg tct cca ggg        48
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt acc agc agc        96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Thr Ser Ser
```

```
            20                  25                  30

tac tta gcc tgg tac cag cag aaa cct ggc cag gct ccc agg ctc ctc       144
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

atc tat ggt gca tcc agc agg gcc act ggc atc cca gac agg ttc agt       192
Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

ggc agt ggg tct ggg aca gac ttc act ctc acc atc agc aga ctg gag       240
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80

cct gaa gat ttt gca gtg tat tac tgt cag cag tat ggt agc tca cct       288
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser Pro
                85                  90                  95

ccg aac agt ttt ggc cag ggg acc aag ctg gag atc aaa cga act gtg       336
Pro Asn Ser Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val
            100                 105                 110

gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa       384
Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
        115                 120                 125

tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga       432
Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
    130                 135                 140

gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac       480
Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
145                 150                 155                 160

tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc       528
Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
                165                 170                 175

ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa       576
Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
            180                 185                 190

gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca       624
Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
        195                 200                 205

aag agc ttc aac agg gga gag tgt                                      648
Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 2697
<211> 325
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2697
tcc tat gtg ctg act cag cca ccc tca gtg tca gtg gcc cca gga aag 48
Ser Tyr Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Lys
1 5 10 15

acg gcc agg att acc tgt ggg gga aac aac att gga agt aaa agt gtg 96
Thr Ala Arg Ile Thr Cys Gly Gly Asn Asn Ile Gly Ser Lys Ser Val
20 25 30

cac tgg tac cag cag aag cca ggc cag gcc cct gtg ctg gtc atc tat 144
His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
35 40 45

tat gat aga gac agg ccc tca ggg atc cct gag cga ttc tct ggc tcc 192
Tyr Asp Arg Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

aac tct ggg aac acg gcc acc ctg acc atc agc agg gtc gaa gcc ggg 240
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65 70 75 80

gat gag gcc gac tat tac tgt cag gtg tgg gat agt agt agt gat cat 288
Asp Glu Ala Asp Tyr Tyr Cys Gln Val Trp Asp Ser Ser Ser Asp His
85 90 95

ccg gta ttc ggc gga ggg acc aag ctg acc gtc cta g 325
Pro Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105

<210> 2698
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2698
aat ttt atg ctg act cag ccc cac tct gtg tcg gag tct ccg ggg aag 48
Asn Phe Met Leu Thr Gln Pro His Ser Val Ser Glu Ser Pro Gly Lys
1 5 10 15

acg gta acc atc tcc tgc acc cgc agc agt ggc agc att gcc gac aag 96
Thr Val Thr Ile Ser Cys Thr Arg Ser Ser Gly Ser Ile Ala Asp Lys
20 25 30

tat gtc cac tgg tac cgg cag cgc ccg ggc agc tcc ccc acc att gtg 144
Tyr Val His Trp Tyr Arg Gln Arg Pro Gly Ser Ser Pro Thr Ile Val

```
        35                  40                  45

atc tat gag gat aaa caa agg ccc tct ggg gtc cct gat cgg gtc tct       192
Ile Tyr Glu Asp Lys Gln Arg Pro Ser Gly Val Pro Asp Arg Val Ser
    50                  55                  60

ggc gcc atc gac acc tcc tcc aac tct gcc tcc ctc acc atc tct gga       240
Gly Ala Ile Asp Thr Ser Ser Asn Ser Ala Ser Leu Thr Ile Ser Gly
65                  70                  75                  80

ctg aag act gag gac gag gct gac tac tac tgt cag tct tat gat agc       288
Leu Lys Thr Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser
                85                  90                  95

aac act cat tgg gtg ttc ggc gga ggg acc aag ctg acc gtc cta ggt       336
Asn Thr His Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110

cag ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct gag       384
Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

tac gcg gcc agc agc tac ctg agc ctg acg cct gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                   651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2699
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain
```

<400> 2699

```
gat att gtg atg act cag tct cca ctc tcc ctg ccc gtc acc cct gga        48
Asp Ile Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Pro Gly
1               5                  10                  15

gag ccg gcc tcc atc tcc tgc agg tct agt cag agc ctc cta cat agt        96
Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu His Ser
            20                  25                  30

aat gga tac aac tat ttg gat tgg tac ctg cag aag cca ggg cag tct       144
Asn Gly Tyr Asn Tyr Leu Asp Trp Tyr Leu Gln Lys Pro Gly Gln Ser
        35                  40                  45

cca cag ctc ctg atc tat ttg ggt tct aat cgg gcc tcc ggg gtc cct       192
Pro Gln Leu Leu Ile Tyr Leu Gly Ser Asn Arg Ala Ser Gly Val Pro
    50                  55                  60

gac agg ttc agt ggt agt gga tca ggc aca gat ttt aca ctg aaa atc       240
Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65                  70                  75                  80

agc aga gtg gag gct gag gat gtt ggg gtt tat tac tgc atg caa gct       288
Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln Ala
                85                  90                  95

cta gaa act cct cgc act ttc ggc gga ggg acc aag gtg gag atc aaa       336
Leu Glu Thr Pro Arg Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
            100                 105                 110

cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag       384
Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
        115                 120                 125

cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc       432
Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
    130                 135                 140

tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa       480
Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
145                 150                 155                 160

tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac agc       528
Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
                165                 170                 175

acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag       576
Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
            180                 185                 190

aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg       624
Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
        195                 200                 205
```

```
ccc gtc aca aag agc ttc aac agg gga gag tgt                              657
Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 2700
<211> 641
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2700
gt gac atc cag atg acc cag tct cct tcc acc ctg tct gca tct gta          47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val
   1               5                  10                  15

gga gac aga gtc acc atc act tgc cgg gcc agt cag agt att agt agc         95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser
                20                  25                  30

tgg ttg gcc tgg tat cag cag aaa cca ggg aaa gcc cct aag ctc ctg        143
Trp Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
            35                  40                  45

atc tat aag gcg tct agt tta gaa agt ggg gtc cca tca agg ttc agc        191
Ile Tyr Lys Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60

ggc agt gga tct ggg aca gaa ttc act ctc acc atc agc agc ctg cag        239
Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln
    65                  70                  75

cct gat gat ttt gca act tat tac tgc caa cag tat aat agt tat tcg        287
Pro Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Tyr Ser
80                  85                  90                  95

acg ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg gct gca        335
Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
                100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga        383
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
            115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc        431
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
        130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag        479
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
    145                 150                 155
```

```
gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       527
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
160                 165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       575
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
                180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       623
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
            195                 200                 205

ttc aac agg gga gag tgt                                              641
Phe Asn Arg Gly Glu Cys
        210
```

<210> 2701
<211> 657
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2701

```
gga att gca atg act cag tct cca cgc tcc ctg ccc gtc acc cct gga        48
Gly Ile Ala Met Thr Gln Ser Pro Arg Ser Leu Pro Val Thr Pro Gly
1               5                   10                  15

gag ccg gcc tcc atc tcc tgc agg tct agt cag agc ctc ctg tat cgt        96
Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu Tyr Arg
            20                  25                  30

gat gga gag cac tat ttg gat tgg tac cta cag aag cca ggg cag tct       144
Asp Gly Glu His Tyr Leu Asp Trp Tyr Leu Gln Lys Pro Gly Gln Ser
        35                  40                  45

cca cac ctc ctg atc tac tcg gga tct aat cgg gcc tcc ggg gtc cct       192
Pro His Leu Leu Ile Tyr Ser Gly Ser Asn Arg Ala Ser Gly Val Pro
    50                  55                  60

gac agg ttc agt ggc agt gga tca ggc aca gat ttt aca cta ata atc       240
Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Ile Ile
65                  70                  75                  80

agc aga gtg gag gct gag gat gct ggg gtc tat tac tgc atg caa gct       288
Ser Arg Val Glu Ala Glu Asp Ala Gly Val Tyr Tyr Cys Met Gln Ala
                85                  90                  95

cta caa cct ccg tac act ttc ggc cag ggg acc aag ctg gag atc aca       336
Leu Gln Pro Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Thr
            100                 105                 110
```

```
cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag       384
Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
        115                 120                 125

cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc       432
Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
    130                 135                 140

tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa       480
Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
145                 150                 155                 160

tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac agc       528
Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
                165                 170                 175

acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag       576
Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
            180                 185                 190

aaa cac aaa ctc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg       624
Lys His Lys Leu Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
        195                 200                 205

ccc gtc aca aag agc ttc aac agg gga gag tgt                           657
Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 2702
<211> 647
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2702
gt gac atc cag atg acc cag tct cca tcc tcc ctg cct gca tct gta         47
   Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Pro Ala Ser Val
   1               5                  10                  15

gga gac aga gtc acc atc act tgc cgg gca agt cag agc att agt agc        95
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser
                20                  25                  30

tat tta aat tgg tat caa aag aaa cca ggg aaa gcc cct aag ctc ctg       143
Tyr Leu Asn Trp Tyr Gln Lys Lys Pro Gly Lys Ala Pro Lys Leu Leu
            35                  40                  45

atc gat gct gca tcc agt ttg caa agt ggg gtc cca tca agg ttc agt       191
Ile Asp Ala Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser
        50                  55                  60
```

```
ggc agt gga tct ggg aca gat ttc act ctc acc atc agc agt ctg caa       239
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln
    65                  70                  75

cct gaa gat ttt gca act tac tac tgt caa cag agt tac agt acc cct       287
Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Pro
80                  85                  90                  95

ccg tgg acg ttc ggc caa ggg acc aag gtg gaa atc aaa cga act gtg       335
Pro Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val
                100                 105                 110

gct gca cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa       383
Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys
            115                 120                 125

tct gga act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga       431
Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg
        130                 135                 140

gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac       479
Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn
    145                 150                 155

tcc cag gag agt gtc aca gag cag gac agc aag gac agc acc tac agc       527
Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser
160                 165                 170                 175

ctc agc agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa       575
Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys
                180                 185                 190

gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca       623
Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr
            195                 200                 205

aag agc ttc aac agg gga gag tgt                                      647
Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215
```

<210> 2703
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2703

```
gac atc gtg atg acc cag tct cca gac tcc ctg tct ctg tct ctg ggc        48
Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ser Leu Ser Leu Gly
1               5                   10                  15
```

```
gag agg gcc acc atc aac tgc aag tcc agc cag agt ctt tta tac agt        96
Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Leu Leu Tyr Ser
            20                  25                  30

tcc aac tat aag aac tac tta gct tgg tac caa cag aaa cca gga cag       144
Ser Asn Tyr Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
        35                  40                  45

cct cct aaa ttg ctc att tac tgg gca tct acc cgg gag tcc ggg gtc       192
Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
    50                  55                  60

cct gac cga ttc agt ggc agc ggg tct ggg aca gat ttc act ctc acc       240
Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
65                  70                  75                  80

atc agc agc ctg cag gct gaa gat gtg gca gtt tat tac tgt cag caa       288
Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
                85                  90                  95

tat tat ctt gtt ccc gtc acc ttc ggc caa ggg aca cga ctg gac att       336
Tyr Tyr Leu Val Pro Val Thr Phe Gly Gln Gly Thr Arg Leu Asp Ile
            100                 105                 110

aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat       384
Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
        115                 120                 125

gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac       432
Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
    130                 135                 140

ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc       480
Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145                 150                 155                 160

caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac       528
Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
                165                 170                 175

agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac       576
Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
            180                 185                 190

gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc       624
Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
        195                 200                 205

tcg ccc gtc aca aag agc ttc aac agg gga gag tgt                       660
Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215                 220
```

<210> 2704
<211> 651

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
VL chain

<400> 2704
```
gcc tct gtg ctg act cag cca ccc tca gcg tct ggg acc ccc ggg cag        48
Ala Ser Val Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Pro Gly Gln
1               5                  10                  15

agg gtc acc atc tct tgt tct gga agc agc tcc aac atc gga agt aat        96
Arg Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Ser Asn
            20                  25                  30

tat gta tac tgg tac cag cag ctc cca gga acg gcc ccc aaa ctc ctc       144
Tyr Val Tyr Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
        35                  40                  45

atc tat agg aat aat cag cgg ccc tca ggg gtc cct gac cga ttc tct       192
Ile Tyr Arg Asn Asn Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
    50                  55                  60

ggc tcc aag tct ggc acc tca gcc tcc ctg gcc atc agt ggg ctc cgg       240
Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Arg
65                  70                  75                  80

tcc gag gat gag gct gat tat tac tgt gca gca tgg gat gac agc ctg       288
Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ala Trp Asp Asp Ser Leu
                85                  90                  95

agt ggc cct tat gtc ttc gga act ggg acc aag gtc acc gtc cta ggt       336
Ser Gly Pro Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly
            100                 105                 110

cag ccc aag gcc aac ccc act gtc act ctg ttc ccg ccc tcc tct gag       384
Gln Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

gag ctt caa gcc aac aag gcc aca cta gtg tgt ctg atc agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
    130                 135                 140

tac ccg gga gct gtg aca gtg gcc tgg aag gca gat ggc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aaa ccc tcc aaa cag agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

tac gcg gcc agc agc tac ctg agc ctg acg ccc gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
```

```
            180                 185                 190

cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                   651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
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<210> 2705
<211> 651
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2705

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cag tct gcc ctg act cag cct ccc tcc gcg tcc ggg tct cct gga cag        48
Gln Ser Ala Leu Thr Gln Pro Pro Ser Ala Ser Gly Ser Pro Gly Gln
1               5                   10                  15

tca gtc acc atc tcc tgc act gga acc agc agt gac gtt ggt ggt tat        96
Ser Val Thr Ile Ser Cys Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr
            20                  25                  30

aac tat gtc tcc tgg tac caa cag cac cca ggc aaa gcc ccc aaa ctc       144
Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

atg att tat gag gtc agt aag cgg ccc tca ggg gtc cct gat cgc ttc       192
Met Ile Tyr Glu Val Ser Lys Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

tct ggc tcc aag tct ggc aac acg gcc tcc ctg acc gtc tct ggg ctc       240
Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Val Ser Gly Leu
65                  70                  75                  80

cag gct gag gat gag gct gat tat tac tgc agc tca tat gca ggc agc       288
Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Ala Gly Ser
                85                  90                  95

aac aat ttt tat gtc ttc gga act ggg acc aag gtc acc gtc cta ggt       336
Asn Asn Phe Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly
            100                 105                 110

cag ccc aag gcc aac ccc act gtc act ctg ttc ccg ccc tcc tct gag       384
Gln Pro Lys Ala Asn Pro Thr Val Thr Leu Phe Pro Pro Ser Ser Glu
        115                 120                 125

gag ctc caa gcc aac aag gcc aca cta gtg tgt ctg atc agt gac ttc       432
Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe
```

```
    130                 135                 140

tac ccg gga gct gtg aca gtg gcc tgg aag gca gat ggc agc ccc gtc       480
Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Gly Ser Pro Val
145                 150                 155                 160

aag gcg gga gtg gag acc acc aaa ccc tcc aaa cag agc aac aac aag       528
Lys Ala Gly Val Glu Thr Thr Lys Pro Ser Lys Gln Ser Asn Asn Lys
                165                 170                 175

tac gcg gcc agc agc tac ctg agc ctg acg ccc gag cag tgg aag tcc       576
Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser
            180                 185                 190

cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg gag       624
His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu
        195                 200                 205

aag aca gtg gcc cct aca gaa tgt tca                                   651
Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2706
<211> 654
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2706
cag tct gtg ctg acg cag ccg ccc tca gtg tct ggg gcc cca ggg cag        48
Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1               5                   10                  15

agg gtc acc atc tcc tgc act ggg agc aac tcc aac atc ggg gca ggt        96
Arg Val Thr Ile Ser Cys Thr Gly Ser Asn Ser Asn Ile Gly Ala Gly
            20                  25                  30

tat gat gta cac tgg tat cag cag ctt cca gga gca gcc ccc aaa ctc       144
Tyr Asp Val His Trp Tyr Gln Gln Leu Pro Gly Ala Ala Pro Lys Leu
        35                  40                  45

ctc atc tat ggt aac ggc aat cgg ccc tca ggg gtc cct gac cga ttc       192
Leu Ile Tyr Gly Asn Gly Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

tct ggc tcc aag tct gac acc tca gcc tcc ctg gcc atc act ggg ctc       240
Ser Gly Ser Lys Ser Asp Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80

cag gct gac gat gag gct gat tat tac tgc cag tcc tat gac agc agc       288
Gln Ala Asp Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser
```

```
                85                  90                  95

ctg agt ggt tca atg ata ttc ggc gga ggg acc aag ctg acc gtc cta       336
Leu Ser Gly Ser Met Ile Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110

ggt cag ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc tcc tct       384
Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser
        115                 120                 125

gag gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata agt gac       432
Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp
    130                 135                 140

ttc tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc agc ccc       480
Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro
145                 150                 155                 160

gtc aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc aac aac       528
Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn
                165                 170                 175

aag tac gcg gcc agc agc tat ctg agc ctg acg cct gag cag tgg aag       576
Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys
            180                 185                 190

tcc cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc acc gtg       624
Ser His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val
        195                 200                 205

gag aag aca gtg gcc cct aca gaa tgt tca                               654
Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215

<210> 2707
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2707
ctc cct gtg ctg act cag cca cct tcc tcc tcc gca tct cct gga gaa        48
Leu Pro Val Leu Thr Gln Pro Pro Ser Ser Ser Ala Ser Pro Gly Glu
1               5                   10                  15

tcc gcc aga ctc acc tgc acc ttg ccc agt gac atc aat gtt act aac        96
Ser Ala Arg Leu Thr Cys Thr Leu Pro Ser Asp Ile Asn Val Thr Asn
            20                  25                  30

tac aac ata tac tgg tac cag cag aag cca ggg agc cct ccc agg tat       144
Tyr Asn Ile Tyr Trp Tyr Gln Gln Lys Pro Gly Ser Pro Pro Arg Tyr
```

```
        35                  40                  45

ctc ctg tac cag tac tca gac tca gat aag ggc cag gtc tct gga gtc       192
Leu Leu Tyr Gln Tyr Ser Asp Ser Asp Lys Gly Gln Val Ser Gly Val
    50                  55                  60

ccc agc cgc ttc tct gga tcc aaa gat gct tca gcc aat aca ggg att       240
Pro Ser Arg Phe Ser Gly Ser Lys Asp Ala Ser Ala Asn Thr Gly Ile
65                  70                  75                  80

tta ctc atc tcc ggg ctc cag tct gag gat gag gct gac tat tac tgt       288
Leu Leu Ile Ser Gly Leu Gln Ser Glu Asp Glu Ala Asp Tyr Tyr Cys
                85                  90                  95

atg att tgg tca agc ctt gtg gta ttc ggc gga ggg acc aag ctg acc       336
Met Ile Trp Ser Ser Leu Val Val Phe Gly Gly Gly Thr Lys Leu Thr
            100                 105                 110

gtc cta ggt cag ccc aag gct gcc ccc tcg gtc act ctg ttc ccg ccc       384
Val Leu Gly Gln Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro
        115                 120                 125

tcc tct gag gag ctt caa gcc aac aag gcc aca ctg gtg tgt ctc ata       432
Ser Ser Glu Glu Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile
    130                 135                 140

agt gac ttc tac ccg gga gcc gtg aca gtg gcc tgg aag gca gat agc       480
Ser Asp Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser
145                 150                 155                 160

agc ccc gtc aag gcg gga gtg gag acc acc aca ccc tcc aaa caa agc       528
Ser Pro Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser
                165                 170                 175

aac aac aag tac gcg gcc agc agc tat ctg agc ctg acg cct gag cag       576
Asn Asn Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln
            180                 185                 190

tgg aag tcc cac aga agc tac agc tgc cag gtc acg cat gaa ggg agc       624
Trp Lys Ser His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser
        195                 200                 205

acc gtg gag aag aca gtg gcc cct aca gaa tgt tca                       660
Thr Val Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
    210                 215                 220
```

<210> 2708
<211> 659
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2708
gg gat att gtg atg act cag tct cca ctc tcc ctg ccc gtc acc cct 47
Asp Ile Val Met Thr Gln Ser Pro Leu Ser Leu Pro Val Thr Pro
1 5 10 15

gga gag ccg gcc tcc atc tcc tgc agg tct agt cag agc ctc ctg cat 95
Gly Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu His
20 25 30

agt gat gga tac aac tat ttg gat tgg ttc ctg cag aag cca ggg cag 143
Ser Asp Gly Tyr Asn Tyr Leu Asp Trp Phe Leu Gln Lys Pro Gly Gln
35 40 45

tct cca cag ctc ctc atc tat ttg ggt tct tat cgg gcc tcc ggg gtc 191
Ser Pro Gln Leu Leu Ile Tyr Leu Gly Ser Tyr Arg Ala Ser Gly Val
50 55 60

cct gac agg ttc agt ggc agt ggc tca ggc aca gat ttt aca ctg aaa 239
Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys
65 70 75

atc acc aga gtg gag gct gag gat gtt ggg gtt tat tac tgc atg caa 287
Ile Thr Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln
80 85 90 95

gct cta caa act ccg tgg acg ttc ggc caa ggg acc aag gtg gaa atc 335
Ala Leu Gln Thr Pro Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile
100 105 110

aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat 383
Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
115 120 125

gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac 431
Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
130 135 140

ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc 479
Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
145 150 155

caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac 527
Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
160 165 170 175

agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac 575
Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
180 185 190

gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc 623
Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
195 200 205

```
tcg ccc gtc aca aag agc ttc aac agg gga gag tgt                        659
Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215

<210> 2709
<211> 642
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
      VL chain

<400> 2709
gtc atc caa atg acc cag tct cca tcc tcc ctg tct gca tct gta gga         48
Val Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1               5                   10                  15

gac aga gtc acc atc gct tgc cgg gca agt cag ggc att aga aat gat         96
Asp Arg Val Thr Ile Ala Cys Arg Ala Ser Gln Gly Ile Arg Asn Asp
            20                  25                  30

tta ggc tgg tat cag cag aaa cca ggg aga gcc cct aaa ctc ctg atc        144
Leu Gly Trp Tyr Gln Gln Lys Pro Gly Arg Ala Pro Lys Leu Leu Ile
        35                  40                  45

tat gct gca tcc act tta caa agt ggg gtc cca tca agg ttc agc ggc        192
Tyr Ala Ala Ser Thr Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

agt gga tct ggc aca gat ttc act ctc acc atc tac agc ctg cag cct        240
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Tyr Ser Leu Gln Pro
65                  70                  75                  80

gaa gat ttt gca act tat tac tgt cta caa aat tac aat tac cct tgg        288
Glu Asp Phe Ala Thr Tyr Tyr Cys Leu Gln Asn Tyr Asn Tyr Pro Trp
                85                  90                  95

acg ttc ggc caa ggg acc aag gtg gag atc caa gga act gtg gct gca        336
Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Gln Gly Thr Val Ala Ala
            100                 105                 110

cca tct gtc ttc atc ttc ccg cca tct gat gag cag ttg aaa tct gga        384
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

act gcc tct gtt gtg tgc ctg ctg aat aac ttc tat ccc aga gag gcc        432
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

aaa gta cag tgg aag gtg gat aac gcc ctc caa tcg ggt aac tcc cag        480
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160
```

```
gag agt gtc aca gag cag gac agc aag gac agc acc tac agc ctc agc       528
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

agc acc ctg acg ctg agc aaa gca gac tac gag aaa cac aaa gtc tac       576
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

gcc tgc gaa gtc acc cat cag ggc ctg agc tcg ccc gtc aca aag agc       624
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

ttc aac agg gga gag tgt                                              642
Phe Asn Arg Gly Glu Cys
    210
```

<210> 2710
<211> 659
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody VL chain

<400> 2710

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cg gat att gtg atg acc cag act cca ctc tct ctg tcc gtc acc cct         47
   Asp Ile Val Met Thr Gln Thr Pro Leu Ser Leu Ser Val Thr Pro
   1               5                   10                  15

gga cag ccg gcc tcc atc tcc tgc aag tct agt cag agc ctc ctg cat        95
Gly Gln Pro Ala Ser Ile Ser Cys Lys Ser Ser Gln Ser Leu Leu His
                20                  25                  30

agt gat gga aag acc tat ttg tat tgg tac ctg cag aag cca ggc cag       143
Ser Asp Gly Lys Thr Tyr Leu Tyr Trp Tyr Leu Gln Lys Pro Gly Gln
            35                  40                  45

tct cca cag ctc cta atc tat gaa gtt tcc agc cgg ttc tct gga gtg       191
Ser Pro Gln Leu Leu Ile Tyr Glu Val Ser Ser Arg Phe Ser Gly Val
        50                  55                  60

cca gat agg ttc agt ggc agc ggg tca ggg aca gat ttc aca ctg aaa       239
Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys
    65                  70                  75

atc agc cgg gtg gag gct gag gat gtt ggg gtt tat tac tgc atg caa       287
Ile Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln
80                  85                  90                  95

ggt ata cac ctt cct agg act ttt ggc cag ggg acc aag ctg gag atc       335
Gly Ile His Leu Pro Arg Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile
                100                 105                 110
```

```
aaa cga act gtg gct gca cca tct gtc ttc atc ttc ccg cca tct gat       383
Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
            115                 120                 125

gag cag ttg aaa tct gga act gcc tct gtt gtg tgc ctg ctg aat aac       431
Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
        130                 135                 140

ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc ctc       479
Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
    145                 150                 155

caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag gac       527
Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
160                 165                 170                 175

agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac tac       575
Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr
                180                 185                 190

gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg agc       623
Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
            195                 200                 205

tcg ccc gtc aca aag agc ttc aac agg gga gag tgt                       659
Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
        210                 215
```

<210> 2711
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2711
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gaa gtg acg ttc aac act tat ggc                                        24
Glu Val Thr Phe Asn Thr Tyr Gly
1               5
```

<210> 2712
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2712
```
gga ttc acc ttt agt agc tat tgg                                        24
Gly Phe Thr Phe Ser Ser Tyr Trp
```

1 5

<210> 2713
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2713
gga ttc acc ttt gaa gat tat gcc 24
Gly Phe Thr Phe Glu Asp Tyr Ala
1 5

<210> 2714
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2714
ggg ttc tca ctc agc act agt gga gtg ggt 30
Gly Phe Ser Leu Ser Thr Ser Gly Val Gly
1 5 10

<210> 2715
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2715
gga tat acc ttc acc acc tac tat 24
Gly Tyr Thr Phe Thr Thr Tyr Tyr
1 5

<210> 2716
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2716

gga ttc gtc ttt gat gat tat gcc 24
Gly Phe Val Phe Asp Asp Tyr Ala
1 5

<210> 2717
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2717
ggt tac acc ttt acc aac tat ggt 24
Gly Tyr Thr Phe Thr Asn Tyr Gly
1 5

<210> 2718
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2718
gga ttc acc ttt gat gat tat gcc 24
Gly Phe Thr Phe Asp Asp Tyr Ala
1 5

<210> 2719
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2719
gga ttc act ttt agt tac tat ggc 24
Gly Phe Thr Phe Ser Tyr Tyr Gly
1 5

<210> 2720
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2720
gga ttc ccc ttt ggt gat tat gcc 24
Gly Phe Pro Phe Gly Asp Tyr Ala
1 5

<210> 2721
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2721
ggt tac atc gat atc aac aac ggc 24
Gly Tyr Ile Asp Ile Asn Asn Gly
1 5

<210> 2722
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2722
gga ttc acc ttc act cgc cat ggt 24
Gly Phe Thr Phe Thr Arg His Gly
1 5

<210> 2723
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2723
cga ttc acc ttt agc agc tat gcc 24
Arg Phe Thr Phe Ser Ser Tyr Ala
1 5

<210> 2724
<211> 30
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2724
ggg gac ggt gtc tct agc aac agt gct agt 30
Gly Asp Gly Val Ser Ser Asn Ser Ala Ser
1 5 10

<210> 2725
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2725
gga ttc gcc ttc agt agt aat ggc 24
Gly Phe Ala Phe Ser Ser Asn Gly
1 5

<210> 2726
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2726
gga atc acc ttc agt agc tat gac 24
Gly Ile Thr Phe Ser Ser Tyr Asp
1 5

<210> 2727
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2727
ggt tac aac ttt acc aac tat ggt 24
Gly Tyr Asn Phe Thr Asn Tyr Gly
1 5

<210> 2728
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2728
gga ttc agc ttc agg agt tat gaa 24
Gly Phe Ser Phe Arg Ser Tyr Glu
1 5

<210> 2729
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2729
gga tac atc ttc act agc tat gct 24
Gly Tyr Ile Phe Thr Ser Tyr Ala
1 5

<210> 2730
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2730
ggt tac tta atc agt agt ggc tac tac 27
Gly Tyr Leu Ile Ser Ser Gly Tyr Tyr
1 5

<210> 2731
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2731
ggg ttc tca ctc aac act agt gga gtg ggt 30
Gly Phe Ser Leu Asn Thr Ser Gly Val Gly
1 5 10

<210> 2732
<211> 24

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2732
gga ttc acc ttc agc aac tat agc 24
Gly Phe Thr Phe Ser Asn Tyr Ser
1 5

<210> 2733
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2733
gga ttc acc ttc agt agc tat agc 24
Gly Phe Thr Phe Ser Ser Tyr Ser
1 5

<210> 2734
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2734
ggt gac tcc atg agt ttt tac tat 24
Gly Asp Ser Met Ser Phe Tyr Tyr
1 5

<210> 2735
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2735
ggt ggc tcc atc agc agt ggt agt tac tac 30
Gly Gly Ser Ile Ser Ser Gly Ser Tyr Tyr
1 5 10

<210> 2736
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2736
gga ttt agt ttc agt agt tat agc 24
Gly Phe Ser Phe Ser Ser Tyr Ser
1 5

<210> 2737
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2737
ggt ggc tcc atc agc aga agt cct tac ttc 30
Gly Gly Ser Ile Ser Arg Ser Pro Tyr Phe
1 5 10

<210> 2738
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2738
gga ttc acc ttc act agt tat ggc 24
Gly Phe Thr Phe Thr Ser Tyr Gly
1 5

<210> 2739
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2739
agt ggc tcc agt ggt agt tat tac 24
Ser Gly Ser Ser Gly Ser Tyr Tyr

1 5

<210> 2740
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2740
gga tac aac ttc agg gac tac tat 24
Gly Tyr Asn Phe Arg Asp Tyr Tyr
1 5

<210> 2741
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2741
ggt ggc tcc atc aac agt ggt gat tac cac 30
Gly Gly Ser Ile Asn Ser Gly Asp Tyr His
1 5 10

<210> 2742
<211> 30
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2742
ggt ggc tcc atc agc agt agt ggt tac tac 30
Gly Gly Ser Ile Ser Ser Ser Gly Tyr Tyr
1 5 10

<210> 2743
<211> 24
<212> DNA
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<220>
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<400> 2743

gga ttc acc ttc agt agc tat ggc 24
Gly Phe Thr Phe Ser Ser Tyr Gly
1 5

<210> 2744
<211> 30
<212> DNA
<213> Artificial Sequence

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CDR-H1 region

<400> 2744
ggg ttc tca ctc acc act agt gga gtg ggt 30
Gly Phe Ser Leu Thr Thr Ser Gly Val Gly
1 5 10

<210> 2745
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2745
gga ttc acc ttc agt aca tat gaa 24
Gly Phe Thr Phe Ser Thr Tyr Glu
1 5

<210> 2746
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2746
gga ggc acc ttc agc agc tat gct 24
Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 2747
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2747
ggt ggc tcc atc agc agt gat aat tac tac 30
Gly Gly Ser Ile Ser Ser Asp Asn Tyr Tyr
1 5 10

<210> 2748
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2748
ggt gcc tcc atc agt agt tac tac 24
Gly Ala Ser Ile Ser Ser Tyr Tyr
1 5

<210> 2749
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2749
gga aac acc ttc act acc tat act 24
Gly Asn Thr Phe Thr Thr Tyr Thr
1 5

<210> 2750
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2750
gga ttc acc ttt agc agc tat gcc 24
Gly Phe Thr Phe Ser Ser Tyr Ala
1 5

<210> 2751
<211> 24
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2751
gga ttc acc ttt gat gat tat ggc 24
Gly Phe Thr Phe Asp Asp Tyr Gly
1 5

<210> 2752
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2752
gga ttc acc ttc agt agc tat ggc 24
Gly Phe Thr Phe Ser Ser Tyr Gly
1 5

<210> 2753
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2753
ggt ggc tcc atc agc agt ggt ggt tac tac 30
Gly Gly Ser Ile Ser Ser Gly Gly Tyr Tyr
1 5 10

<210> 2754
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2754
gga tac acc ttc acc ggc tac tat 24
Gly Tyr Thr Phe Thr Gly Tyr Tyr
1 5

<210> 2755
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2755
gga ttc acc ttc agt agc tac gac 24
Gly Phe Thr Phe Ser Ser Tyr Asp
1 5

<210> 2756
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2756
gga ttc acc ttc agg agt tat ggc 24
Gly Phe Thr Phe Arg Ser Tyr Gly
1 5

<210> 2757
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2757
gga ttc acc ttc agt gac tac tac 24
Gly Phe Thr Phe Ser Asp Tyr Tyr
1 5

<210> 2758
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2758
gga ttc acc ttc agt agt tat cac 24
Gly Phe Thr Phe Ser Ser Tyr His
1 5

<210> 2759
<211> 24

<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2759
gga ttc acc ttc agt agc tat gct 24
Gly Phe Thr Phe Ser Ser Tyr Ala
1 5

<210> 2760
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2760
gga ttc acc ctt gaa gag ttt gcc 24
Gly Phe Thr Leu Glu Glu Phe Ala
1 5

<210> 2761
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2761
ggt ggc tcc atc agt gat tac tac 24
Gly Gly Ser Ile Ser Asp Tyr Tyr
1 5

<210> 2762
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2762
gga ggc acc ttc agc agc tat gct 24
Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 2763
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2763
ggt tac acc ttt agc agc tac ggt 24
Gly Tyr Thr Phe Ser Ser Tyr Gly
1 5

<210> 2764
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2764
gga ttc acc ttc cgg agt tat gaa 24
Gly Phe Thr Phe Arg Ser Tyr Glu
1 5

<210> 2765
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2765
gga ggc acc ttc agc agc tat gct 24
Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 2766
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2766
gga gac agc ttc aac aag tac ttt 24
Gly Asp Ser Phe Asn Lys Tyr Phe

1 5

<210> 2767
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2767
ggt ttc aca ttc agt acc tat ggc 24
Gly Phe Thr Phe Ser Thr Tyr Gly
1 5

<210> 2768
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2768
gga ttc gcc ttt agc agc tat gcc 24
Gly Phe Ala Phe Ser Ser Tyr Ala
1 5

<210> 2769
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2769
gga ttc acc ttc agt aat cat gct 24
Gly Phe Thr Phe Ser Asn His Ala
1 5

<210> 2770
<211> 24
<212> DNA
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<220>
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<400> 2770

gga ttc acc ttc agt agt cat ggc 24
Gly Phe Thr Phe Ser Ser His Gly
1 5

<210> 2771
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2771
ggt ggc tcc gtc gac aat gtt gat tcc tac 30
Gly Gly Ser Val Asp Asn Val Asp Ser Tyr
1 5 10

<210> 2772
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2772
gga tac agc ttt acc acc tac tgg 24
Gly Tyr Ser Phe Thr Thr Tyr Trp
1 5

<210> 2773
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2773
ggt gac tcc atc agc agt ggg agt tac tat 30
Gly Asp Ser Ile Ser Ser Gly Ser Tyr Tyr
1 5 10

<210> 2774
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2774
ggg gac agt gtc tct agc aac agt gct gct 30
Gly Asp Ser Val Ser Ser Asn Ser Ala Ala
1 5 10

<210> 2775
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2775
gga tac acc ctc agt gaa tta tcc 24
Gly Tyr Thr Leu Ser Glu Leu Ser
1 5

<210> 2776
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2776
gga ttc acc ttc agt agc tat agc 24
Gly Phe Thr Phe Ser Ser Tyr Ser
1 5

<210> 2777
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2777
gga ttc acc ttt agc aac tat gcc 24
Gly Phe Thr Phe Ser Asn Tyr Ala
1 5

<210> 2778
<211> 24
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2778
gga ggc ccc ttc agc agc tat act 24
Gly Gly Pro Phe Ser Ser Tyr Thr
1 5

<210> 2779
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2779
ggt ggc tcc gtc aac act ggt act tcc tac 30
Gly Gly Ser Val Asn Thr Gly Thr Ser Tyr
1 5 10

<210> 2780
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2780
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Gly Phe His Phe Gly Ser His Gly
1 5

<210> 2781
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2781
ggt ggc tcc atc acc act ggt agt tat tac 30
Gly Gly Ser Ile Thr Thr Gly Ser Tyr Tyr
1 5 10

<210> 2782
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2782
gga ttc acc ttt gat gat tat gcc 24
Gly Phe Thr Phe Asp Asp Tyr Ala
1 5

<210> 2783
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2783
ggt gcc tcc atg aat aat tac tac 24
Gly Ala Ser Met Asn Asn Tyr Tyr
1 5

<210> 2784
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2784
ggg ttc tca ctc acc act act gac gtg ggt 30
Gly Phe Ser Leu Thr Thr Thr Asp Val Gly
1 5 10

<210> 2785
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2785
gga ttc acc ttc agt agc tat tcc 24
Gly Phe Thr Phe Ser Ser Tyr Ser
1 5

<210> 2786
<211> 24

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2786
gga tac aac ttt atc agc cac tgg 24
Gly Tyr Asn Phe Ile Ser His Trp
1 5

<210> 2787
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2787
gga tac agc ttt acc agc ttc tgg 24
Gly Tyr Ser Phe Thr Ser Phe Trp
1 5

<210> 2788
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2788
ggt ggc tcc atc gat agt tat tac 24
Gly Gly Ser Ile Asp Ser Tyr Tyr
1 5

<210> 2789
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2789
gga ggc atc ttc agt tac ttt gct 24
Gly Gly Ile Phe Ser Tyr Phe Ala
1 5

<210> 2790
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2790
gaa ttc agc ttt caa tat ttt tcc 24
Glu Phe Ser Phe Gln Tyr Phe Ser
1 5

<210> 2791
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2791
ggt tac acc ctt aac aat gat gtc gct 27
Gly Tyr Thr Leu Asn Asn Asp Val Ala
1 5

<210> 2792
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2792
gga ttc agg ttt aat tac tat tgg 24
Gly Phe Arg Phe Asn Tyr Tyr Trp
1 5

<210> 2793
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2793
ggt ggc tcc atc agt ggt gat aaa aac ttc 30
Gly Gly Ser Ile Ser Gly Asp Lys Asn Phe

1 5 10

<210> 2794
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2794
gga ttc aca ttc agt gat tat gaa 24
Gly Phe Thr Phe Ser Asp Tyr Glu
1 5

<210> 2795
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2795
gga ttc ccc cct agg agt ttt gcc 24
Gly Phe Pro Pro Arg Ser Phe Ala
1 5

<210> 2796
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2796
gga ttc acc ttc agc aac tat ggg 24
Gly Phe Thr Phe Ser Asn Tyr Gly
1 5

<210> 2797
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2797

gga ttc acc ttt gat gat tat acc 24
Gly Phe Thr Phe Asp Asp Tyr Thr
1 5

<210> 2798
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2798
ggt gac acc ttt ccc aac tat gtt 24
Gly Asp Thr Phe Pro Asn Tyr Val
1 5

<210> 2799
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2799
gga ttc aca ttt gat gat tat gcc 24
Gly Phe Thr Phe Asp Asp Tyr Ala
1 5

<210> 2800
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2800
gga ttc acc ttt agc agc tat gcc 24
Gly Phe Thr Phe Ser Ser Tyr Ala
1 5

<210> 2801
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2801
gga ttc acc ttc agt aac tat gac 24
Gly Phe Thr Phe Ser Asn Tyr Asp
1 5

<210> 2802
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2802
gga ttc acc ttc agt ccc tat agt 24
Gly Phe Thr Phe Ser Pro Tyr Ser
1 5

<210> 2803
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2803
ggt ggc tcc atc acc agt ggt agt tac ttc 30
Gly Gly Ser Ile Thr Ser Gly Ser Tyr Phe
1 5 10

<210> 2804
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2804
ggt ggc tcc gtc agc agt agt agt tac tac 30
Gly Gly Ser Val Ser Ser Ser Ser Tyr Tyr
1 5 10

<210> 2805
<211> 24
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2805
gga ttc acc ttc agt aac tat gac 24
Gly Phe Thr Phe Ser Asn Tyr Asp
1 5

<210> 2806
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2806
ggc tac gcc ttt atc ggt aac tgg 24
Gly Tyr Ala Phe Ile Gly Asn Trp
1 5

<210> 2807
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2807
gga ttc acc ttt tcc ttt agc agt tat gcc 30
Gly Phe Thr Phe Ser Phe Ser Ser Tyr Ala
1 5 10

<210> 2808
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2808
gga ttc acc ttc aat aat tat gaa 24
Gly Phe Thr Phe Asn Asn Tyr Glu
1 5

<210> 2809
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2809
gga ttc acc ttt agt agc aat tgg 24
Gly Phe Thr Phe Ser Ser Asn Trp
1 5

<210> 2810
<211> 30
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2810
ggt ggc tcc atc agc agt ggt ggt tac tac 30
Gly Gly Ser Ile Ser Ser Gly Gly Tyr Tyr
1 5 10

<210> 2811
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2811
gga ttc acg ttc agt agc tat ggc 24
Gly Phe Thr Phe Ser Ser Tyr Gly
1 5

<210> 2812
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2812
gga ttc acc ttc agt gac tac tac 24
Gly Phe Thr Phe Ser Asp Tyr Tyr
1 5

<210> 2813
<211> 30

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2813
ggt ggc tcc atc agc agt ggt ggt tac ccc 30
Gly Gly Ser Ile Ser Ser Gly Gly Tyr Pro
1 5 10

<210> 2814
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2814
ggt ggc tcc atc agt att tac tac 24
Gly Gly Ser Ile Ser Ile Tyr Tyr
1 5

<210> 2815
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2815
aat agc tcc atc agt agt tac tac 24
Asn Ser Ser Ile Ser Ser Tyr Tyr
1 5

<210> 2816
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2816
gga ttc acc ttt aat agc tat tgg 24
Gly Phe Thr Phe Asn Ser Tyr Trp
1 5

<210> 2817
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2817
gga ttc acc ttt gat gat tat gcc 24
Gly Phe Thr Phe Asp Asp Tyr Ala
1 5

<210> 2818
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2818
ggt tac agg ttt aac gcc tac tgg 24
Gly Tyr Arg Phe Asn Ala Tyr Trp
1 5

<210> 2819
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2819
ggg gac agt gtc tct agt acc agt ggt gct 30
Gly Asp Ser Val Ser Ser Thr Ser Gly Ala
1 5 10

<210> 2820
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2820
ggg gac agt gtc tct agc aac agt gct gct 30
Gly Asp Ser Val Ser Ser Asn Ser Ala Ala

1 5 10

<210> 2821
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2821
ggt ggc tcc atc agt agt tac tac 24
Gly Gly Ser Ile Ser Ser Tyr Tyr
1 5

<210> 2822
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2822
gga tac agc ttt acc agc tac tgg 24
Gly Tyr Ser Phe Thr Ser Tyr Trp
1 5

<210> 2823
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2823
gga ttc acc ttc agt agc tat ggc 24
Gly Phe Thr Phe Ser Ser Tyr Gly
1 5

<210> 2824
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2824

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Gly Phe Thr Phe Arg Ser Tyr Ser
1 5

<210> 2825
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2825
gga ggc acc ttc agc agt tat act 24
Gly Gly Thr Phe Ser Ser Tyr Thr
1 5

<210> 2826
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2826
gga ttc agc ttc agc aga tat aat 24
Gly Phe Ser Phe Ser Arg Tyr Asn
1 5

<210> 2827
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2827
gga ttc acc ttc act aat tat gcc 24
Gly Phe Thr Phe Thr Asn Tyr Ala
1 5

<210> 2828
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2828
gga ttc tcc ttc agt agt ttt ggc 24
Gly Phe Ser Phe Ser Ser Phe Gly
1 5

<210> 2829
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2829
gga ttc aca ttt agc tcg tat gcc 24
Gly Phe Thr Phe Ser Ser Tyr Ala
1 5

<210> 2830
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2830
gga ttc acc ttc agt agt cat ggc 24
Gly Phe Thr Phe Ser Ser His Gly
1 5

<210> 2831
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2831
gga ttc agc ttt agt acc tat tgg 24
Gly Phe Ser Phe Ser Thr Tyr Trp
1 5

<210> 2832
<211> 24
<212> DNA
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<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2832
gga ttc acc ttc aat aac tac tgg 24
Gly Phe Thr Phe Asn Asn Tyr Trp
1 5

<210> 2833
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2833
gga ttt act ttc agt cac ggc tgg 24
Gly Phe Thr Phe Ser His Gly Trp
1 5

<210> 2834
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2834
ggt ggc tcc atc aga aat gac tac 24
Gly Gly Ser Ile Arg Asn Asp Tyr
1 5

<210> 2835
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2835
gga ggc acc ttc agc agc tat gct 24
Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 2836
<211> 30
<212> DNA
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<220>
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CDR-H1 region

<400> 2836
ggt ggc tcc atc agc agt agt aat tac ttc 30
Gly Gly Ser Ile Ser Ser Ser Asn Tyr Phe
1 5 10

<210> 2837
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2837
gga ttt acc ttc agt gac tac tgg 24
Gly Phe Thr Phe Ser Asp Tyr Trp
1 5

<210> 2838
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2838
gat gtc tcc atc atc agt agt ttc tat tac 30
Asp Val Ser Ile Ile Ser Ser Phe Tyr Tyr
1 5 10

<210> 2839
<211> 30
<212> DNA
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<220>
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CDR-H1 region

<400> 2839
ggt gcc tcc gtt tcc agt ggt tct tac tac 30
Gly Ala Ser Val Ser Ser Gly Ser Tyr Tyr
1 5 10

<210> 2840
<211> 24

<212> DNA
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<220>
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CDR-H1 region

<400> 2840
gga ggc acc ttc agc ggc tat ggc 24
Gly Gly Thr Phe Ser Gly Tyr Gly
1 5

<210> 2841
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2841
gga ttc acc ttc agt agc tac tgg 24
Gly Phe Thr Phe Ser Ser Tyr Trp
1 5

<210> 2842
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2842
ggt ggc tcc atc agc agt gga gat tac tac 30
Gly Gly Ser Ile Ser Ser Gly Asp Tyr Tyr
1 5 10

<210> 2843
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2843
gga ttc acc ttt agc agc tat gcc 24
Gly Phe Thr Phe Ser Ser Tyr Ala
1 5

<210> 2844
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2844
gga ttc acc ttt agc agc tat gcc 24
Gly Phe Thr Phe Ser Ser Tyr Ala
1 5

<210> 2845
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2845
gga ttc acc ttg agc agc tat gct 24
Gly Phe Thr Leu Ser Ser Tyr Ala
1 5

<210> 2846
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2846
ggt ggc tcc atc agc agt ggt ggt tac tcc 30
Gly Gly Ser Ile Ser Ser Gly Gly Tyr Ser
1 5 10

<210> 2847
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2847
gga ttc acc ttc agt aac tct gct 24
Gly Phe Thr Phe Ser Asn Ser Ala

1 5

<210> 2848
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2848
gga tac acc ttc acc agt cac tat 24
Gly Tyr Thr Phe Thr Ser His Tyr
1 5

<210> 2849
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2849
gga ttc acc ttc agc gcc tac tgg 24
Gly Phe Thr Phe Ser Ala Tyr Trp
1 5

<210> 2850
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2850
gga tac tcc ctc act gaa atc tcc 24
Gly Tyr Ser Leu Thr Glu Ile Ser
1 5

<210> 2851
<211> 30
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2851

ggt ggc tcc atc agg agc agt gct ccc ttc 30
Gly Gly Ser Ile Arg Ser Ser Ala Pro Phe
1 5 10

<210> 2852
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2852
ggt tac atc ttt acc acc tat gtt 24
Gly Tyr Ile Phe Thr Thr Tyr Val
1 5

<210> 2853
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2853
gga ttc acg ttt gat gat tat gcc 24
Gly Phe Thr Phe Asp Asp Tyr Ala
1 5

<210> 2854
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2854
gga ttc acc ttc aat aat tac tgg 24
Gly Phe Thr Phe Asn Asn Tyr Trp
1 5

<210> 2855
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2855
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Gly Asp Ser Val Ser Ser Phe Tyr
1 5

<210> 2856
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2856
gga tat aat ttt aat gat gat cgg 24
Gly Tyr Asn Phe Asn Asp Asp Arg
1 5

<210> 2857
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2857
gga ttc acc gtc agt acc aac tac 24
Gly Phe Thr Val Ser Thr Asn Tyr
1 5

<210> 2858
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2858
gga ttc acg ttc agt gac cac tac 24
Gly Phe Thr Phe Ser Asp His Tyr
1 5

<210> 2859
<211> 24
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2859
gga ttc acc ttc cgt gat tat ggc 24
Gly Phe Thr Phe Arg Asp Tyr Gly
1 5

<210> 2860
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2860
gga ttc gac atc agg agt tat acc 24
Gly Phe Asp Ile Arg Ser Tyr Thr
1 5

<210> 2861
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2861
gga tac acc ttc acc gac tac tat 24
Gly Tyr Thr Phe Thr Asp Tyr Tyr
1 5

<210> 2862
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2862
gga ttc acc ttt agc aac tat gcc 24
Gly Phe Thr Phe Ser Asn Tyr Ala
1 5

<210> 2863
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2863
gga ttc aac ttc aat tct tat aca 24
Gly Phe Asn Phe Asn Ser Tyr Thr
1 5

<210> 2864
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2864
gga ttc aca ttt gat gat tat gcc 24
Gly Phe Thr Phe Asp Asp Tyr Ala
1 5

<210> 2865
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2865
gga ggc acc ttc agc agc tat ggt 24
Gly Gly Thr Phe Ser Ser Tyr Gly
1 5

<210> 2866
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2866
gga tta acc ttt aac aga ttt gcc 24
Gly Leu Thr Phe Asn Arg Phe Ala
1 5

<210> 2867
<211> 27

<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2867
ggc tac tcc att agc act gct tac tac 27
Gly Tyr Ser Ile Ser Thr Ala Tyr Tyr
1 5

<210> 2868
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2868
gga ggc aac gtc aga agt tat agc 24
Gly Gly Asn Val Arg Ser Tyr Ser
1 5

<210> 2869
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2869
ggt gac tcc atc agt agt aac tac 24
Gly Asp Ser Ile Ser Ser Asn Tyr
1 5

<210> 2870
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2870
ggt tac agg ttt tcc aac ttt ggg 24
Gly Tyr Arg Phe Ser Asn Phe Gly
1 5

<210> 2871
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2871
gga tac acg ttc act aat tat gct 24
Gly Tyr Thr Phe Thr Asn Tyr Ala
1 5

<210> 2872
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2872
ggt gac tcc atc agc agc agt agc tac ttc 30
Gly Asp Ser Ile Ser Ser Ser Ser Tyr Phe
1 5 10

<210> 2873
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2873
gga ttc acc ttc agt aac tat ggc 24
Gly Phe Thr Phe Ser Asn Tyr Gly
1 5

<210> 2874
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2874
gga ggc tcc ttc aac acc tat gca 24
Gly Gly Ser Phe Asn Thr Tyr Ala

1 5

<210> 2875
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2875
gga gac acc ttc acc tct ttt gcc 24
Gly Asp Thr Phe Thr Ser Phe Ala
1 5

<210> 2876
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2876
ggt gac tcc atc agt aac ggt gat tat tgc 30
Gly Asp Ser Ile Ser Asn Gly Asp Tyr Cys
1 5 10

<210> 2877
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2877
gga ttc acc ttt aga agc tat tgg 24
Gly Phe Thr Phe Arg Ser Tyr Trp
1 5

<210> 2878
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2878

gga ttc acc tac gac agt tat gtc 24
Gly Phe Thr Tyr Asp Ser Tyr Val
1 5

<210> 2879
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2879
agt ggc tcc gtc agc agt ggt agt cac tac 30
Ser Gly Ser Val Ser Ser Gly Ser His Tyr
1 5 10

<210> 2880
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2880
gga tac agc ttc acc ggc tat tat 24
Gly Tyr Ser Phe Thr Gly Tyr Tyr
1 5

<210> 2881
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2881
gga ttc acc ttc agt aac tat ggc 24
Gly Phe Thr Phe Ser Asn Tyr Gly
1 5

<210> 2882
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2882
gga ttc acc ttc agt aac tat aac 24
Gly Phe Thr Phe Ser Asn Tyr Asn
1 5

<210> 2883
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2883
ggt ggc tcc atc agc agt agt agt tac tac 30
Gly Gly Ser Ile Ser Ser Ser Ser Tyr Tyr
1 5 10

<210> 2884
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2884
ggt ttc act ttc agt aac gcc tgg 24
Gly Phe Thr Phe Ser Asn Ala Trp
1 5

<210> 2885
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2885
gga tac acc ttc acc aac tac ttt 24
Gly Tyr Thr Phe Thr Asn Tyr Phe
1 5

<210> 2886
<211> 24
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2886
gga ggc acc ttc aac aac tat ggt 24
Gly Gly Thr Phe Asn Asn Tyr Gly
1 5

<210> 2887
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2887
gga ttc acc ttc agt agt tat gag 24
Gly Phe Thr Phe Ser Ser Tyr Glu
1 5

<210> 2888
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2888
gga ttc acc ttc acg acc tat gct 24
Gly Phe Thr Phe Thr Thr Tyr Ala
1 5

<210> 2889
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2889
gga tac acc ttt acc agc tac tgg 24
Gly Tyr Thr Phe Thr Ser Tyr Trp
1 5

<210> 2890
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2890
gga ctc acc ttc agc att tat agc 24
Gly Leu Thr Phe Ser Ile Tyr Ser
1 5

<210> 2891
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2891
ggg ttc tca ctc agc aat gct aga atg ggt 30
Gly Phe Ser Leu Ser Asn Ala Arg Met Gly
1 5 10

<210> 2892
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2892
gga tac acc ttc acc gtc tac tat 24
Gly Tyr Thr Phe Thr Val Tyr Tyr
1 5

<210> 2893
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2893
ggt tac acc ttt acc agc tat ggt 24
Gly Tyr Thr Phe Thr Ser Tyr Gly
1 5

<210> 2894
<211> 30

<212> DNA
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<220>
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CDR-H1 region

<400> 2894
ggg gac agt gtc tct agc acc agt gct gct 30
Gly Asp Ser Val Ser Ser Thr Ser Ala Ala
1 5 10

<210> 2895
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2895
ggt ggc tcc atc agc agt agt aac tgc 27
Gly Gly Ser Ile Ser Ser Ser Asn Cys
1 5

<210> 2896
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2896
ggg ttc acc gtc agt agc aac tac 24
Gly Phe Thr Val Ser Ser Asn Tyr
1 5

<210> 2897
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2897
gga tac acc ttc acc acc tac tac 24
Gly Tyr Thr Phe Thr Thr Tyr Tyr
1 5

<210> 2898
<211> 30
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2898
ggt ggc tcc gtc agc agt ggt agt tac tac 30
Gly Gly Ser Val Ser Ser Gly Ser Tyr Tyr
1 5 10

<210> 2899
<211> 30
<212> DNA
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<220>
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CDR-H1 region

<400> 2899
ggt ggc tcc atc agc agt agt ttc ttc tac 30
Gly Gly Ser Ile Ser Ser Ser Phe Phe Tyr
1 5 10

<210> 2900
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2900
gga ttc acc ttc agt agc tat gct 24
Gly Phe Thr Phe Ser Ser Tyr Ala
1 5

<210> 2901
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2901
gga ttc acc ttt agc acc tat gtc 24
Gly Phe Thr Phe Ser Thr Tyr Val

1 5

<210> 2902
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2902
ggt ggc tcc atc agc agt agt agt tac tac 30
Gly Gly Ser Ile Ser Ser Ser Ser Tyr Tyr
1 5 10

<210> 2903
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2903
gga tac acc ttc acc ggc tac tat 24
Gly Tyr Thr Phe Thr Gly Tyr Tyr
1 5

<210> 2904
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2904
gga tac agc ttt acc agc tac tgg 24
Gly Tyr Ser Phe Thr Ser Tyr Trp
1 5

<210> 2905
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2905

gga tac agc ttt acc acc tac tgg 24
Gly Tyr Ser Phe Thr Thr Tyr Trp
1 5

<210> 2906
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2906
gga ttc acc ttt aga atc tat gcc 24
Gly Phe Thr Phe Arg Ile Tyr Ala
1 5

<210> 2907
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2907
gga tac acc ttc acc agc tac tat 24
Gly Tyr Thr Phe Thr Ser Tyr Tyr
1 5

<210> 2908
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2908
gga tta gac ttc agg gac tac tat 24
Gly Leu Asp Phe Arg Asp Tyr Tyr
1 5

<210> 2909
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2909
gga ttc acc ttt atc agt tat gcc 24
Gly Phe Thr Phe Ile Ser Tyr Ala
1 5

<210> 2910
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2910
gga tac acc ttc act agt cat gcc 24
Gly Tyr Thr Phe Thr Ser His Ala
1 5

<210> 2911
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2911
gga tac acc ttc act aac tat gct 24
Gly Tyr Thr Phe Thr Asn Tyr Ala
1 5

<210> 2912
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

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Gly Phe Thr Phe Ser Asn Phe Ala
1 5

<210> 2913
<211> 24
<212> DNA
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<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2913
gga ttc acc ttc agt cac tac gcc 24
Gly Phe Thr Phe Ser His Tyr Ala
1 5

<210> 2914
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

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Gly Phe Thr Phe Ser Ser Tyr Ser
1 5

<210> 2915
<211> 30
<212> DNA
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<220>
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CDR-H1 region

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Gly Phe Ser Leu Ser Thr Asn Gly Val Gly
1 5 10

<210> 2916
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<220>
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CDR-H1 region

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Gly Leu Ser Leu Ser Thr Ser Gly Val Ala
1 5 10

<210> 2917
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<220>
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CDR-H1 region

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Gly Gly Ser Ile Ser Ser Gly Gly Tyr Cys
1 5 10

<210> 2918
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2918
gga ttc acc ttt agt agc tat tgg 24
Gly Phe Thr Phe Ser Ser Tyr Trp
1 5

<210> 2919
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2919
aga ggc acc ttc agc aac cat gct 24
Arg Gly Thr Phe Ser Asn His Ala
1 5

<210> 2920
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2920
gga ggc acc ttc aac ttc tat gct 24
Gly Gly Thr Phe Asn Phe Tyr Ala
1 5

<210> 2921
<211> 24

<212> DNA
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<220>
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CDR-H1 region

<400> 2921
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Gly Tyr Asn Phe Ile Asp Asn Ala
1 5

<210> 2922
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2922
ggt tac act ttt acc cac tat ggt 24
Gly Tyr Thr Phe Thr His Tyr Gly
1 5

<210> 2923
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2923
gga ttc acc ttt agc aac tat gcc 24
Gly Phe Thr Phe Ser Asn Tyr Ala
1 5

<210> 2924
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2924
gga tac acc ttc agc agc tac tat 24
Gly Tyr Thr Phe Ser Ser Tyr Tyr
1 5

<210> 2925
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2925
gga tac aac ttt agt cgc tac tgg 24
Gly Tyr Asn Phe Ser Arg Tyr Trp
1 5

<210> 2926
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2926
gga ttc acc ttc aat aga tat ggc 24
Gly Phe Thr Phe Asn Arg Tyr Gly
1 5

<210> 2927
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2927
gga tac agc ttt acc agc ttc tgg 24
Gly Tyr Ser Phe Thr Ser Phe Trp
1 5

<210> 2928
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2928
gga ttc acc ctg gat gat tat gtc 24
Gly Phe Thr Leu Asp Asp Tyr Val

1 5

<210> 2929
<211> 30
<212> DNA
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<220>
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<400> 2929
ggt gac tcc atc agt agt agc ggt ttc ttc 30
Gly Asp Ser Ile Ser Ser Ser Gly Phe Phe
1 5 10

<210> 2930
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2930
gga ggc ccc ttc aag acc tac cct 24
Gly Gly Pro Phe Lys Thr Tyr Pro
1 5

<210> 2931
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2931
gga ttc acc ttt ggt gat aat gct 24
Gly Phe Thr Phe Gly Asp Asn Ala
1 5

<210> 2932
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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<400> 2932

ggt tac acc ttt agt aat tac ggt 24
Gly Tyr Thr Phe Ser Asn Tyr Gly
1 5

<210> 2933
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2933
gga ttc gac ttt act tcg tat tgg 24
Gly Phe Asp Phe Thr Ser Tyr Trp
1 5

<210> 2934
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2934
gga ttc acc ttc agt agc tat agc 24
Gly Phe Thr Phe Ser Ser Tyr Ser
1 5

<210> 2935
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2935
ggt gtc tcc atc ggc acc agt agt tac tat 30
Gly Val Ser Ile Gly Thr Ser Ser Tyr Tyr
1 5 10

<210> 2936
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2936
ggt gac tcc ttc agt gat tac tac 24
Gly Asp Ser Phe Ser Asp Tyr Tyr
1 5

<210> 2937
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2937
gga ttc acc ttc agt aat tat gcc 24
Gly Phe Thr Phe Ser Asn Tyr Ala
1 5

<210> 2938
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2938
ggt tac aga ttt acc agc aat ggt 24
Gly Tyr Arg Phe Thr Ser Asn Gly
1 5

<210> 2939
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2939
gga ttc acc ttt gat gat tat ggc 24
Gly Phe Thr Phe Asp Asp Tyr Gly
1 5

<210> 2940
<211> 24
<212> DNA
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<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2940
gga ttc agt ttc agt gcc tat ggc 24
Gly Phe Ser Phe Ser Ala Tyr Gly
1 5

<210> 2941
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2941
gaa ttc acc ttt agc gcc tat gcc 24
Glu Phe Thr Phe Ser Ala Tyr Ala
1 5

<210> 2942
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2942
ggt ttc act ttc agt aac gcc tgg 24
Gly Phe Thr Phe Ser Asn Ala Trp
1 5

<210> 2943
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2943
gga ctc acc ttc agt gac tat ggc 24
Gly Leu Thr Phe Ser Asp Tyr Gly
1 5

<210> 2944
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2944
ggt tac gtc ttt acc agc ttt ggg 24
Gly Tyr Val Phe Thr Ser Phe Gly
1 5

<210> 2945
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2945
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Gly Phe Thr Phe Glu Asp Phe Gly
1 5

<210> 2946
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2946
gga ttc acc ctc agt acc tat ggc 24
Gly Phe Thr Leu Ser Thr Tyr Gly
1 5

<210> 2947
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2947
gga tat acc ttc agt aac tat gct 24
Gly Tyr Thr Phe Ser Asn Tyr Ala
1 5

<210> 2948
<211> 24

<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2948
gga tac agc ttt tcc acc tac tgg 24
Gly Tyr Ser Phe Ser Thr Tyr Trp
1 5

<210> 2949
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2949
ggg ttc tca ctc acc aca tat gga gtg ggt 30
Gly Phe Ser Leu Thr Thr Tyr Gly Val Gly
1 5 10

<210> 2950
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2950
gga ttc acc ttc agt gct tat ggc 24
Gly Phe Thr Phe Ser Ala Tyr Gly
1 5

<210> 2951
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2951
gga ggc acc ttc agc gaa tat ggt 24
Gly Gly Thr Phe Ser Glu Tyr Gly
1 5

<210> 2952
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2952
ggt gcc tcc gtc aac agt ggg act cac ttc 30
Gly Ala Ser Val Asn Ser Gly Thr His Phe
1 5 10

<210> 2953
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2953
gga ttc acc ttc agt agc tat gct 24
Gly Phe Thr Phe Ser Ser Tyr Ala
1 5

<210> 2954
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2954
gga ttc acc ttc agt agc tat agc 24
Gly Phe Thr Phe Ser Ser Tyr Ser
1 5

<210> 2955
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2955
ggt gac tcc atc agc agg agt aat tac tac 30
Gly Asp Ser Ile Ser Arg Ser Asn Tyr Tyr

1 5 10

<210> 2956
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2956
gga ttc acc ttt agt aag ttt tgg 24
Gly Phe Thr Phe Ser Lys Phe Trp
1 5

<210> 2957
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2957
ggg ttc tct ctg acc act act gga gtg ggt 30
Gly Phe Ser Leu Thr Thr Thr Gly Val Gly
1 5 10

<210> 2958
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2958
gga ttc atc ttc agt agc tat ggc 24
Gly Phe Ile Phe Ser Ser Tyr Gly
1 5

<210> 2959
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2959

gga ttc acc ttc agt agt tat gaa 24
Gly Phe Thr Phe Ser Ser Tyr Glu
1 5

<210> 2960
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2960
gga ttc acc ttc agt agc tat agc 24
Gly Phe Thr Phe Ser Ser Tyr Ser
1 5

<210> 2961
<211> 30
<212> DNA
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<220>
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CDR-H1 region

<400> 2961
ggg ttc tca ctc agc act agt gga atg tgt 30
Gly Phe Ser Leu Ser Thr Ser Gly Met Cys
1 5 10

<210> 2962
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2962
gga ttc acc ttt agt agc tat tgg 24
Gly Phe Thr Phe Ser Ser Tyr Trp
1 5

<210> 2963
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2963
gga ttc acc ttt gcc agc tat ggc 24
Gly Phe Thr Phe Ala Ser Tyr Gly
1 5

<210> 2964
<211> 24
<212> DNA
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<220>
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<400> 2964
gga ttc acc ttc agt agc tat agt 24
Gly Phe Thr Phe Ser Ser Tyr Ser
1 5

<210> 2965
<211> 24
<212> DNA
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<220>
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<400> 2965
gga tac atc ttc acc ggc tcc ttt 24
Gly Tyr Ile Phe Thr Gly Ser Phe
1 5

<210> 2966
<211> 30
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H1 region

<400> 2966
ggt ggc tcc atc agc agt ggt act tac tac 30
Gly Gly Ser Ile Ser Ser Gly Thr Tyr Tyr
1 5 10

<210> 2967
<211> 24
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2967
gga tac agc ttt acc aac tac tgg 24
Gly Tyr Ser Phe Thr Asn Tyr Trp
1 5

<210> 2968
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2968
gga ttc act ttc agt aac gcc tgg 24
Gly Phe Thr Phe Ser Asn Ala Trp
1 5

<210> 2969
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2969
gga ttc ccc ttc agt acc tat gct 24
Gly Phe Pro Phe Ser Thr Tyr Ala
1 5

<210> 2970
<211> 24
<212> DNA
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<220>
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CDR-H1 region

<400> 2970
ggt ttc tcc ttc agt ggc tct tct 24
Gly Phe Ser Phe Ser Gly Ser Ser
1 5

<210> 2971
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2971
ggt ggc tcc atc agt agt tat tac 24
Gly Gly Ser Ile Ser Ser Tyr Tyr
1 5

<210> 2972
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2972
gga ttc acc ttt ggt gat tat gct 24
Gly Phe Thr Phe Gly Asp Tyr Ala
1 5

<210> 2973
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2973
gga ttc acc ctc agt aac tat ggc 24
Gly Phe Thr Leu Ser Asn Tyr Gly
1 5

<210> 2974
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2974
gga ttc agc atc act acc cat agc 24
Gly Phe Ser Ile Thr Thr His Ser
1 5

<210> 2975
<211> 24

<212> DNA
<213> Artificial Sequence

<220>
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CDR-H1 region

<400> 2975
gga ttc acc ttc agt agt tat gag 24
Gly Phe Thr Phe Ser Ser Tyr Glu
1 5

<210> 2976
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2976
gga ttc acc ttc agt agc tat agc 24
Gly Phe Thr Phe Ser Ser Tyr Ser
1 5

<210> 2977
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2977
ggg ttc agc gtc agt agc aag tac 24
Gly Phe Ser Val Ser Ser Lys Tyr
1 5

<210> 2978
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2978
gga tac agc ttt acc aac tac tgg 24
Gly Tyr Ser Phe Thr Asn Tyr Trp
1 5

<210> 2979
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2979
ggg ttc acc ttc agt ggc tct gct 24
Gly Phe Thr Phe Ser Gly Ser Ala
1 5

<210> 2980
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2980
gga ttc acc ttc agt gac tat ggc 24
Gly Phe Thr Phe Ser Asp Tyr Gly
1 5

<210> 2981
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H1 region

<400> 2981
gga tac acc ttc aat aac tat ggc 24
Gly Tyr Thr Phe Asn Asn Tyr Gly
1 5

<210> 2982
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 2982
cag ggt gtt agc agc tac 18
Gln Gly Val Ser Ser Tyr

1 5

<210> 2983
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 2983
cag agc att ggc agc tat 18
Gln Ser Ile Gly Ser Tyr
1 5

<210> 2984
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 2984
cag ggt att gac gtc tgg 18
Gln Gly Ile Asp Val Trp
1 5

<210> 2985
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 2985
agt tcc aac atc gga agt aat tat 24
Ser Ser Asn Ile Gly Ser Asn Tyr
1 5

<210> 2986
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 2986

agc ctc aga aac tat tat 18
Ser Leu Arg Asn Tyr Tyr
1 5

<210> 2987
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 2987
aac att gga att aaa agt 18
Asn Ile Gly Ile Lys Ser
1 5

<210> 2988
<211> 18
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 2988
cag agc ata agc agt tat 18
Gln Ser Ile Ser Ser Tyr
1 5

<210> 2989
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 2989
cag agt gtt agc agc agc tac 21
Gln Ser Val Ser Ser Ser Tyr
1 5

<210> 2990
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 2990
agt ggc aac att gcc agc tac tat 24
Ser Gly Asn Ile Ala Ser Tyr Tyr
1 5

<210> 2991
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 2991
cag agt gtt agc agc agt tac 21
Gln Ser Val Ser Ser Ser Tyr
1 5

<210> 2992
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 2992
agc tcc aat att gag aat aat gat 24
Ser Ser Asn Ile Glu Asn Asn Asp
1 5

<210> 2993
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 2993
caa agc ctc gta cac agt gat gga aac acc tac 33
Gln Ser Leu Val His Ser Asp Gly Asn Thr Tyr
1 5 10

<210> 2994
<211> 24
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 2994
agc tcc aat atc ggg aga aat tat 24
Ser Ser Asn Ile Gly Arg Asn Tyr
1 5

<210> 2995
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 2995
atc tcc aac atc gga agt aat cct 24
Ile Ser Asn Ile Gly Ser Asn Pro
1 5

<210> 2996
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 2996
cag aat gtt aac ttc aac 18
Gln Asn Val Asn Phe Asn
1 5

<210> 2997
<211> 21
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 2997
cag agt gtt agc agc agc tcc 21
Gln Ser Val Ser Ser Ser Ser
1 5

<210> 2998
<211> 18
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 2998
gct ttg cca aag caa tat 18
Ala Leu Pro Lys Gln Tyr
1 5

<210> 2999
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 2999
cag agt gtt agc agc tac 18
Gln Ser Val Ser Ser Tyr
1 5

<210> 3000
<211> 18
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3000
cag agt gtt ggc agc tac 18
Gln Ser Val Gly Ser Tyr
1 5

<210> 3001
<211> 18
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3001
cag gcc att gcc aac tct 18
Gln Ala Ile Ala Asn Ser
1 5

<210> 3002
<211> 36

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3002
cag agt gtt tta tac agc tcc aac aat gag aac tac 36
Gln Ser Val Leu Tyr Ser Ser Asn Asn Glu Asn Tyr
1 5 10

<210> 3003
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3003
cac aac att aac acc tat 18
His Asn Ile Asn Thr Tyr
1 5

<210> 3004
<211> 27
<212> DNA
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<220>
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CDR-L1 region

<400> 3004
agc agt gac gtt ggt ggt tat aac tat 27
Ser Ser Asp Val Gly Gly Tyr Asn Tyr
1 5

<210> 3005
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3005
agc gcc aac atc gga aag aat tat 24
Ser Ala Asn Ile Gly Lys Asn Tyr
1 5

<210> 3006
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3006
cag agc att agc act tat 18
Gln Ser Ile Ser Thr Tyr
1 5

<210> 3007
<211> 18
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3007
cag agc att aag aac tat 18
Gln Ser Ile Lys Asn Tyr
1 5

<210> 3008
<211> 27
<212> DNA
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<220>
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CDR-L1 region

<400> 3008
agc tcc aac atc ggg gca ggt tat gat 27
Ser Ser Asn Ile Gly Ala Gly Tyr Asp
1 5

<210> 3009
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3009
aac att gga agt aaa act 18
Asn Ile Gly Ser Lys Thr

1 5

<210> 3010
<211> 18
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3010
cag gat att agc aac tgg 18
Gln Asp Ile Ser Asn Trp
1 5

<210> 3011
<211> 18
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3011
gca ttg cca aac gaa aat 18
Ala Leu Pro Asn Glu Asn
1 5

<210> 3012
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3012
acc agt gac att ggt agt tat gac cgt 27
Thr Ser Asp Ile Gly Ser Tyr Asp Arg
1 5

<210> 3013
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3013

agc tcc aac att ggg aac aat tat 24
Ser Ser Asn Ile Gly Asn Asn Tyr
1 5

<210> 3014
<211> 33
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3014
caa agc ctc gta tac agt gat gga aac acc tac 33
Gln Ser Leu Val Tyr Ser Asp Gly Asn Thr Tyr
1 5 10

<210> 3015
<211> 21
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3015
cag agt att aga agc agc tac 21
Gln Ser Ile Arg Ser Ser Tyr
1 5

<210> 3016
<211> 27
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3016
acc tcc aac atc ggg gct ggt tat gat 27
Thr Ser Asn Ile Gly Ala Gly Tyr Asp
1 5

<210> 3017
<211> 18
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3017
cag agc att agc agc tat 18
Gln Ser Ile Ser Ser Tyr
1 5

<210> 3018
<211> 36
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3018
cag aat gtt tta tac agt tcc aac aat aaa aac tac 36
Gln Asn Val Leu Tyr Ser Ser Asn Asn Lys Asn Tyr
1 5 10

<210> 3019
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3019
agc tcc aac atc ggg gca ggt tat gat 27
Ser Ser Asn Ile Gly Ala Gly Tyr Asp
1 5

<210> 3020
<211> 24
<212> DNA
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<220>
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CDR-L1 region

<400> 3020
agt ggc agc att gcc agc agc tat 24
Ser Gly Ser Ile Ala Ser Ser Tyr
1 5

<210> 3021
<211> 18
<212> DNA
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<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3021
cag agc att agc agc tat 18
Gln Ser Ile Ser Ser Tyr
1 5

<210> 3022
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3022
aac att gga agt aaa agt 18
Asn Ile Gly Ser Lys Ser
1 5

<210> 3023
<211> 27
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3023
agc agt gac gtt ggt ggt tat aac tat 27
Ser Ser Asp Val Gly Gly Tyr Asn Tyr
1 5

<210> 3024
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3024
cag agc att agc agc tat 18
Gln Ser Ile Ser Ser Tyr
1 5

<210> 3025
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3025
cag ggc att aac agt gcc 18
Gln Gly Ile Asn Ser Ala
1 5

<210> 3026
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3026
agc ctc aga agg tat tat 18
Ser Leu Arg Arg Tyr Tyr
1 5

<210> 3027
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3027
cag ggt att agg aat tgg 18
Gln Gly Ile Arg Asn Trp
1 5

<210> 3028
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3028
cag agc gtt ggc acc tat 18
Gln Ser Val Gly Thr Tyr
1 5

<210> 3029
<211> 21

<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3029
cag agc gtt agc agt aat tac 21
Gln Ser Val Ser Ser Asn Tyr
1 5

<210> 3030
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3030
cag agt gtt agc agc agg tac 21
Gln Ser Val Ser Ser Arg Tyr
1 5

<210> 3031
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3031
cag agt gtt ggc agc tcc 18
Gln Ser Val Gly Ser Ser
1 5

<210> 3032
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3032
cag agt att agt agc tgg 18
Gln Ser Ile Ser Ser Trp
1 5

<210> 3033
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3033
aac att gga agt aaa agt 18
Asn Ile Gly Ser Lys Ser
1 5

<210> 3034
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3034
cag agt gtt agc acc tac 18
Gln Ser Val Ser Thr Tyr
1 5

<210> 3035
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3035
cag agc ctc ctg cat agt aat gga tac aac tat 33
Gln Ser Leu Leu His Ser Asn Gly Tyr Asn Tyr
1 5 10

<210> 3036
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3036
cag agt att agt agc tgg 18
Gln Ser Ile Ser Ser Trp

1 5

<210> 3037
<211> 27
<212> DNA
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<220>
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<400> 3037
tct ggc tca gtc tca act gga aac tac 27
Ser Gly Ser Val Ser Thr Gly Asn Tyr
1 5

<210> 3038
<211> 21
<212> DNA
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<220>
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<400> 3038
cag agt gtt agc agc agc tac 21
Gln Ser Val Ser Ser Ser Tyr
1 5

<210> 3039
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3039
aac att gga agt aag agt 18
Asn Ile Gly Ser Lys Ser
1 5

<210> 3040
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3040

cag agt att agt agg tgg 18
Gln Ser Ile Ser Arg Trp
1 5

<210> 3041
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3041
caa gac att gat gat gat 18
Gln Asp Ile Asp Asp Asp
1 5

<210> 3042
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3042
cag agt att ggc gcc gcc tac 21
Gln Ser Ile Gly Ala Ala Tyr
1 5

<210> 3043
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3043
gca ttg cca aaa aaa tat 18
Ala Leu Pro Lys Lys Tyr
1 5

<210> 3044
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3044
cag agc ctc ctg cat agt gat gga tac aac tat 33
Gln Ser Leu Leu His Ser Asp Gly Tyr Asn Tyr
1 5 10

<210> 3045
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3045
agc agt gac gtt ggt ggt tat aac tat 27
Ser Ser Asp Val Gly Gly Tyr Asn Tyr
1 5

<210> 3046
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3046
cag agt att agc agt aac 18
Gln Ser Ile Ser Ser Asn
1 5

<210> 3047
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3047
agc agt gac gtt ggt ggt tat aac tat 27
Ser Ser Asp Val Gly Gly Tyr Asn Tyr
1 5

<210> 3048
<211> 33
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3048
cag cgc ctc ctg cat agt gat gga aag acc tat 33
Gln Arg Leu Leu His Ser Asp Gly Lys Thr Tyr
1 5 10

<210> 3049
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3049
cag agt gtc agc agt agc ttc 21
Gln Ser Val Ser Ser Ser Phe
1 5

<210> 3050
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3050
cag gac gtt gac act tat 18
Gln Asp Val Asp Thr Tyr
1 5

<210> 3051
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3051
agc tcc aat att ggg aaa tat tct 24
Ser Ser Asn Ile Gly Lys Tyr Ser
1 5

<210> 3052
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3052
cag agt gtt ggt agc tcc 18
Gln Ser Val Gly Ser Ser
1 5

<210> 3053
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3053
cag agt gtt agc agc agc tac 21
Gln Ser Val Ser Ser Ser Tyr
1 5

<210> 3054
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3054
cag agt att agt gtc tgg 18
Gln Ser Ile Ser Val Trp
1 5

<210> 3055
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3055
agt ctc aga agg tat tat 18
Ser Leu Arg Arg Tyr Tyr
1 5

<210> 3056
<211> 18

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3056
cag agc att agc agc tat 18
Gln Ser Ile Ser Ser Tyr
1 5

<210> 3057
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3057
cag agt gtt agc agc agc tac 21
Gln Ser Val Ser Ser Ser Tyr
1 5

<210> 3058
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3058
agc tcc aac att gac aat aat tat 24
Ser Ser Asn Ile Asp Asn Asn Tyr
1 5

<210> 3059
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3059
cag acc att agc acc tac 18
Gln Thr Ile Ser Thr Tyr
1 5

<210> 3060
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3060
cag act gtt tta cac agt tcc aac aat agg aac tac 36
Gln Thr Val Leu His Ser Ser Asn Asn Arg Asn Tyr
1 5 10

<210> 3061
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3061
cag agt gtt gac ggc aac 18
Gln Ser Val Asp Gly Asn
1 5

<210> 3062
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3062
cag agc att agc aac tat 18
Gln Ser Ile Ser Asn Tyr
1 5

<210> 3063
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3063
agc tcc aac atc ggg gca ggt tat gat 27
Ser Ser Asn Ile Gly Ala Gly Tyr Asp

1 5

<210> 3064
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3064
cag agt gtg agc acc aac 18
Gln Ser Val Ser Thr Asn
1 5

<210> 3065
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3065
cag agt gtg agt ggc tac 18
Gln Ser Val Ser Gly Tyr
1 5

<210> 3066
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3066
agg tcc aac gtc gcc agt cat gct 24
Arg Ser Asn Val Ala Ser His Ala
1 5

<210> 3067
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3067

cag agc ctc ttg gac agt gat gat gga aaa acc tat 36
Gln Ser Leu Leu Asp Ser Asp Asp Gly Lys Thr Tyr
1 5 10

<210> 3068
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3068
aaa ttg ggg gat aaa tat 18
Lys Leu Gly Asp Lys Tyr
1 5

<210> 3069
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3069
aaa ttg ggg gat ata tgt 18
Lys Leu Gly Asp Ile Cys
1 5

<210> 3070
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3070
cag agt ctt ttc tat agc tcc aac aat aag aac tac 36
Gln Ser Leu Phe Tyr Ser Ser Asn Asn Lys Asn Tyr
1 5 10

<210> 3071
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3071
cag agt gtt agc agc tac 18
Gln Ser Val Ser Ser Tyr
1 5

<210> 3072
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3072
cag agt gtt agc aac tat 18
Gln Ser Val Ser Asn Tyr
1 5

<210> 3073
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3073
cag agc ctc cta cag agt aat gga aac aac tat 33
Gln Ser Leu Leu Gln Ser Asn Gly Asn Asn Tyr
1 5 10

<210> 3074
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3074
cag agt att agt ggc tgg 18
Gln Ser Ile Ser Gly Trp
1 5

<210> 3075
<211> 24
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3075
agc tcc aac att gga aat aat tat 24
Ser Ser Asn Ile Gly Asn Asn Tyr
1 5

<210> 3076
<211> 18
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3076
cag agt gtt agc aac tat 18
Gln Ser Val Ser Asn Tyr
1 5

<210> 3077
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3077
cag agc ctc ctt cgt cgt gat gga aac aac tat 33
Gln Ser Leu Leu Arg Arg Asp Gly Asn Asn Tyr
1 5 10

<210> 3078
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3078
agc agt gac gtt ggt ggt ttt aac tat 27
Ser Ser Asp Val Gly Gly Phe Asn Tyr
1 5

<210> 3079
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3079
caa agc ctc gta tac agt gat gga aac acc tac 33
Gln Ser Leu Val Tyr Ser Asp Gly Asn Thr Tyr
1 5 10

<210> 3080
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3080
cag agt att agc agc tat 18
Gln Ser Ile Ser Ser Tyr
1 5

<210> 3081
<211> 18
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3081
cag gac att agc aac tat 18
Gln Asp Ile Ser Asn Tyr
1 5

<210> 3082
<211> 18
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3082
aac att gga agt aaa agt 18
Asn Ile Gly Ser Lys Ser
1 5

<210> 3083
<211> 18

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3083
cag gtc att agc gat tat 18
Gln Val Ile Ser Asp Tyr
1 5

<210> 3084
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3084
cag agc att agc act tat 18
Gln Ser Ile Ser Thr Tyr
1 5

<210> 3085
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3085
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Gln Arg Ile Ser Asn Trp
1 5

<210> 3086
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

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Gln Ser Leu Leu Asn Pro Asp Gly Lys Thr Tyr
1 5 10

<210> 3087
<211> 18
<212> DNA
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<220>
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CDR-L1 region

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cag agc att agc ggc tat 18
Gln Ser Ile Ser Gly Tyr
1 5

<210> 3088
<211> 27
<212> DNA
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<220>
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CDR-L1 region

<400> 3088
agc tcc aac gtc ggg gca gat tat gat 27
Ser Ser Asn Val Gly Ala Asp Tyr Asp
1 5

<210> 3089
<211> 18
<212> DNA
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<220>
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CDR-L1 region

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cag agt gtt agc agc tcc 18
Gln Ser Val Ser Ser Ser
1 5

<210> 3090
<211> 21
<212> DNA
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<220>
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CDR-L1 region

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cag agt ttt gac ggc aag tcc 21
Gln Ser Phe Asp Gly Lys Ser

1 5

<210> 3091
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<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3091
cag agt att tta tac agc tcc aac aat aag gac tcc 36
Gln Ser Ile Leu Tyr Ser Ser Asn Asn Lys Asp Ser
1 5 10

<210> 3092
<211> 21
<212> DNA
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<220>
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cag agt gtt agc ggc agc cac 21
Gln Ser Val Ser Gly Ser His
1 5

<210> 3093
<211> 27
<212> DNA
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<220>
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<400> 3093
agc agt gac gtt ggt ggt tat aac tat 27
Ser Ser Asp Val Gly Gly Tyr Asn Tyr
1 5

<210> 3094
<211> 18
<212> DNA
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<220>
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gca ttg cca aaa aaa tat 18
Ala Leu Pro Lys Lys Tyr
1 5

<210> 3095
<211> 18
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<220>
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CDR-L1 region

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cag agt gtt agc agc aac 18
Gln Ser Val Ser Ser Asn
1 5

<210> 3096
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3096
cag agt gtt agc agc agc tac 21
Gln Ser Val Ser Ser Ser Tyr
1 5

<210> 3097
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<212> DNA
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<220>
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CDR-L1 region

<400> 3097
agc agt gac gtt ggt ctt tat aac ttt 27
Ser Ser Asp Val Gly Leu Tyr Asn Phe
1 5

<210> 3098
<211> 27
<212> DNA
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<220>
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CDR-L1 region

<400> 3098
aac tcc aac atc ggg gca ggt tat tat 27
Asn Ser Asn Ile Gly Ala Gly Tyr Tyr
1 5

<210> 3099
<211> 21
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<220>
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CDR-L1 region

<400> 3099
cag agt gtt acc agc agc tac 21
Gln Ser Val Thr Ser Ser Tyr
1 5

<210> 3100
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<212> DNA
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<220>
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CDR-L1 region

<400> 3100
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Ser Ser Asn Ile Gly Asp Asn Phe
1 5

<210> 3101
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3101
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Gln Asp Ile Asp Asp Asp
1 5

<210> 3102
<211> 18
<212> DNA
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<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3102
cag agt gtt ggt agc tgg 18
Gln Ser Val Gly Ser Trp
1 5

<210> 3103
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3103
cag gac att agc agt ttt 18
Gln Asp Ile Ser Ser Phe
1 5

<210> 3104
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3104
agc ctc aga gac tat tct 18
Ser Leu Arg Asp Tyr Ser
1 5

<210> 3105
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3105
cag agt gtt agc gcc tac 18
Gln Ser Val Ser Ala Tyr
1 5

<210> 3106
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3106
aac att gga agt aaa agt 18
Asn Ile Gly Ser Lys Ser
1 5

<210> 3107
<211> 27
<212> DNA
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<220>
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CDR-L1 region

<400> 3107
agc agt gat gtt gga aat tat aac ctt 27
Ser Ser Asp Val Gly Asn Tyr Asn Leu
1 5

<210> 3108
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3108
cag agt gtc aga agc cac 18
Gln Ser Val Arg Ser His
1 5

<210> 3109
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3109
agc ctc aga agt tat tat 18
Ser Leu Arg Ser Tyr Tyr
1 5

<210> 3110
<211> 21

<212> DNA
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<220>
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CDR-L1 region

<400> 3110
cag gct att gtc agc aat tac 21
Gln Ala Ile Val Ser Asn Tyr
1 5

<210> 3111
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3111
aac att gga aag aaa gat 18
Asn Ile Gly Lys Lys Asp
1 5

<210> 3112
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3112
aac att gga agt aaa agt 18
Asn Ile Gly Ser Lys Ser
1 5

<210> 3113
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3113
gca ttg cca aag caa tct 18
Ala Leu Pro Lys Gln Ser
1 5

<210> 3114
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3114
gca ttg cca aag caa tat 18
Ala Leu Pro Lys Gln Tyr
1 5

<210> 3115
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3115
gca ttg cca aaa aaa tat 18
Ala Leu Pro Lys Lys Tyr
1 5

<210> 3116
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3116
cag acc att gac acc tat 18
Gln Thr Ile Asp Thr Tyr
1 5

<210> 3117
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3117
cag ggc att acc aac tat 18
Gln Gly Ile Thr Asn Tyr

1 5

<210> 3118
<211> 18
<212> DNA
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<220>
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<400> 3118
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Gln Asp Ile Ser Thr Phe
1 5

<210> 3119
<211> 27
<212> DNA
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<220>
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<400> 3119
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Ser Ser Asp Ile Gly Gly Tyr Asn Tyr
1 5

<210> 3120
<211> 18
<212> DNA
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<220>
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<400> 3120
aaa ttg ggg gat aaa tat 18
Lys Leu Gly Asp Lys Tyr
1 5

<210> 3121
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3121

acc tcc aac att gga aat aat ttt 24
Thr Ser Asn Ile Gly Asn Asn Phe
1 5

<210> 3122
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3122
cag agt atc agc agc acc tac 21
Gln Ser Ile Ser Ser Thr Tyr
1 5

<210> 3123
<211> 21
<212> DNA
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<220>
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CDR-L1 region

<400> 3123
cag agt gtt agc agc agc tac 21
Gln Ser Val Ser Ser Ser Tyr
1 5

<210> 3124
<211> 27
<212> DNA
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<220>
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CDR-L1 region

<400> 3124
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Ser Ser Asp Val Gly Asp Tyr Asn Tyr
1 5

<210> 3125
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3125
cag ttc att agc gtc tat 18
Gln Phe Ile Ser Val Tyr
1 5

<210> 3126
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3126
cag agt gtt agc agc aag 18
Gln Ser Val Ser Ser Lys
1 5

<210> 3127
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3127
gta ttg gca aaa aat tat 18
Val Leu Ala Lys Asn Tyr
1 5

<210> 3128
<211> 27
<212> DNA
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<220>
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CDR-L1 region

<400> 3128
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Ser Ser Asp Val Gly Ala Tyr Pro Tyr
1 5

<210> 3129
<211> 21
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3129
cag agt tta agc agc ggt tac 21
Gln Ser Leu Ser Ser Gly Tyr
1 5

<210> 3130
<211> 36
<212> DNA
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<220>
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CDR-L1 region

<400> 3130
cag agt ctt tta tac agg tcc aac gat aag aac tac 36
Gln Ser Leu Leu Tyr Arg Ser Asn Asp Lys Asn Tyr
1 5 10

<210> 3131
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3131
ggc tcc aat atc ggg gct ggt tat gat 27
Gly Ser Asn Ile Gly Ala Gly Tyr Asp
1 5

<210> 3132
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3132
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Ser Ser Asp Val Gly Gly Tyr Asp His
1 5

<210> 3133
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3133
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Gln Ser Ile Ser Ser Trp
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<210> 3134
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3134
cag agt att gtc acc aac 18
Gln Ser Ile Val Thr Asn
1 5

<210> 3135
<211> 21
<212> DNA
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<220>
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CDR-L1 region

<400> 3135
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Ser Gly His Ser Thr Tyr Ala
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<210> 3136
<211> 21
<212> DNA
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<220>
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CDR-L1 region

<400> 3136
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Gln Ser Val Ser Ser Ser Tyr
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<210> 3137
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<212> DNA
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CDR-L1 region

<400> 3137
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Ser Ser Asn Leu Gly Ala Gly Tyr Ala
1 5

<210> 3138
<211> 27
<212> DNA
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<220>
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CDR-L1 region

<400> 3138
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Ser Thr Asn Ile Gly Thr Ile Tyr Asp
1 5

<210> 3139
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<212> DNA
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<220>
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CDR-L1 region

<400> 3139
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Gln Ser Leu Leu Ser Ser Asn Gly His His Leu
1 5 10

<210> 3140
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3140
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Gln Gly Ile Ser Ser Tyr
1 5

<210> 3141
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3141
aac tcc aac atc gga agt act ttt 24
Asn Ser Asn Ile Gly Ser Thr Phe
1 5

<210> 3142
<211> 33
<212> DNA
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<220>
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CDR-L1 region

<400> 3142
cag agc ctc ctg cat agt aat gga gtc tac tac 33
Gln Ser Leu Leu His Ser Asn Gly Val Tyr Tyr
1 5 10

<210> 3143
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3143
agc ctc aga agc tat ttt 18
Ser Leu Arg Ser Tyr Phe
1 5

<210> 3144
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3144
cag agt ata agt agt tgg 18
Gln Ser Ile Ser Ser Trp

1 5

<210> 3145
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3145
cag act gtt tta tac gac tcc aac aat aaa aac tac 36
Gln Thr Val Leu Tyr Asp Ser Asn Asn Lys Asn Tyr
1 5 10

<210> 3146
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3146
agc agc aac atc gga ggt aag tat 24
Ser Ser Asn Ile Gly Gly Lys Tyr
1 5

<210> 3147
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3147
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Gln Ser Ile Ser Asp Trp
1 5

<210> 3148
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3148

aac cct gga att aag agt 18
Asn Pro Gly Ile Lys Ser
1 5

<210> 3149
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3149
acc tcc aac atc ggg gca gat tat gat 27
Thr Ser Asn Ile Gly Ala Asp Tyr Asp
1 5

<210> 3150
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3150
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Ser Leu Arg Ser Phe Tyr
1 5

<210> 3151
<211> 27
<212> DNA
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<220>
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CDR-L1 region

<400> 3151
agc agt gac gtt gat ggt tat aat tat 27
Ser Ser Asp Val Asp Gly Tyr Asn Tyr
1 5

<210> 3152
<211> 36
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3152
cag agt gtt tta tac agc tcc gac aat aag aac tac 36
Gln Ser Val Leu Tyr Ser Ser Asp Asn Lys Asn Tyr
1 5 10

<210> 3153
<211> 27
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3153
agc agt gac gtt ggt ggt tat aac tat 27
Ser Ser Asp Val Gly Gly Tyr Asn Tyr
1 5

<210> 3154
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3154
cag gac att agc aac tat 18
Gln Asp Ile Ser Asn Tyr
1 5

<210> 3155
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3155
aac att gga agt aaa agt 18
Asn Ile Gly Ser Lys Ser
1 5

<210> 3156
<211> 21
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3156
cag agt gta aga ggc aat tat 21
Gln Ser Val Arg Gly Asn Tyr
1 5

<210> 3157
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3157
agc tcc aac att ggg agt aat tat 24
Ser Ser Asn Ile Gly Ser Asn Tyr
1 5

<210> 3158
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3158
aac att gga agt tac aat 18
Asn Ile Gly Ser Tyr Asn
1 5

<210> 3159
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3159
cag agg gtt agc agc aac tac 21
Gln Arg Val Ser Ser Asn Tyr
1 5

<210> 3160
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3160
agc agt gat gtt ggg agt tat aac ctt 27
Ser Ser Asp Val Gly Ser Tyr Asn Leu
1 5

<210> 3161
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3161
caa agc ctc gta tac agt gat gga aac acc tac 33
Gln Ser Leu Val Tyr Ser Asp Gly Asn Thr Tyr
1 5 10

<210> 3162
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3162
agc tcc aac atc gga agt aat tat 24
Ser Ser Asn Ile Gly Ser Asn Tyr
1 5

<210> 3163
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3163
agc ctc aga agc tat tat 18
Ser Leu Arg Ser Tyr Tyr
1 5

<210> 3164
<211> 18

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3164
cag agc att agc agc tat 18
Gln Ser Ile Ser Ser Tyr
1 5

<210> 3165
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3165
aac att gga tat aga aat 18
Asn Ile Gly Tyr Arg Asn
1 5

<210> 3166
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3166
cag ggc att aga aat gat 18
Gln Gly Ile Arg Asn Asp
1 5

<210> 3167
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3167
cag agt att agt agc tgg 18
Gln Ser Ile Ser Ser Trp
1 5

<210> 3168
<211> 33
<212> DNA
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<220>
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CDR-L1 region

<400> 3168
cag agc ctc ctt cat agt aat gga ttc aac tat 33
Gln Ser Leu Leu His Ser Asn Gly Phe Asn Tyr
1 5 10

<210> 3169
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3169
aaa ttg ggg gat aaa tat 18
Lys Leu Gly Asp Lys Tyr
1 5

<210> 3170
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3170
gca ttg cca aaa aaa tat 18
Ala Leu Pro Lys Lys Tyr
1 5

<210> 3171
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3171
agc ctc aga agc tat tat 18
Ser Leu Arg Ser Tyr Tyr

1 5

<210> 3172
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3172
cag agt gtt tta tac agc tcc agc agt aag aac tac 36
Gln Ser Val Leu Tyr Ser Ser Ser Ser Lys Asn Tyr
1 5 10

<210> 3173
<211> 33
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3173
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Gln Ser Leu Leu His Ser Asn Gly Tyr Asn Tyr
1 5 10

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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L1 region

<400> 3174
agc agt gac gtt ggt ggt tat aac tat 27
Ser Ser Asp Val Gly Gly Tyr Asn Tyr
1 5

<210> 3175
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<220>
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<400> 3175

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Gln Ser Val Leu Tyr Ser Ser Asn Asn Lys Asn Tyr
1 5 10

<210> 3176
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3176
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Ser Ser Asp Val Gly Ser Tyr Asn Leu
1 5

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CDR-L1 region

<400> 3177
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Ala Leu Pro Lys Lys Tyr
1 5

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CDR-L1 region

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Gln Ser Val Ser Ser Asn
1 5

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CDR-L1 region

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Gln Ser Val Ser Ser Ser Tyr
1 5

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CDR-L1 region

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Asn Ile Gly Ser Arg Ser
1 5

<210> 3181
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<220>
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CDR-L1 region

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Ser Ser Asp Ile Gly Thr Tyr Asn Leu
1 5

<210> 3182
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CDR-L1 region

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Gln Ser Val Leu Ser Thr Ser Asn Asn Lys Asn Tyr
1 5 10

<210> 3183
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<220>

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CDR-L1 region

<400> 3183
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Asn Ile Gly Ser Lys Ser
1 5

<210> 3184
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<212> DNA
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CDR-L1 region

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Gln His Ile Ala Gly Arg
1 5

<210> 3185
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<220>
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CDR-L1 region

<400> 3185
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Ser Ser Asn Ile Gly Ser Asn Thr
1 5

<210> 3186
<211> 24
<212> DNA
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<220>
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CDR-L1 region

<400> 3186
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Ser Gly Ser Ile Ala Ser Asn Tyr
1 5

<210> 3187
<211> 27
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<220>
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CDR-L1 region

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Ser Ser Asn Ile Gly Ala His Tyr Asp
1 5

<210> 3188
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CDR-L1 region

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Gln Ser Ile Ser Ser Tyr
1 5

<210> 3189
<211> 18
<212> DNA
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<220>
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CDR-L1 region

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Gln Asp Ile Ser Asn Tyr
1 5

<210> 3190
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<220>
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CDR-L1 region

<400> 3190
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Gln Asp Val Ala Ser Thr Tyr
1 5

<210> 3191
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<212> DNA
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<220>
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CDR-L1 region

<400> 3191
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Thr Ser Asp Val Gly Thr Tyr Asn Leu
1 5

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<220>
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CDR-L1 region

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Gln Ser Val Ala Asn Asn Tyr
1 5

<210> 3193
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CDR-L1 region

<400> 3193
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Gln Ser Val Ser Ser Asn Tyr
1 5

<210> 3194
<211> 27
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CDR-L1 region

<400> 3194
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Ser Gly Ser Val Ser Thr Ser Phe Tyr
1 5

<210> 3195
<211> 27
<212> DNA
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CDR-L1 region

<400> 3195
agc tcc aac atc ggg gca caa tat gat 27
Ser Ser Asn Ile Gly Ala Gln Tyr Asp
1 5

<210> 3196
<211> 27
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CDR-L1 region

<400> 3196
agc tcc aac atc ggg gca ggt tac gat 27
Ser Ser Asn Ile Gly Ala Gly Tyr Asp
1 5

<210> 3197
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<220>
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CDR-L1 region

<400> 3197
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Gln Ser Val Ser Ser Ser Tyr
1 5

<210> 3198
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CDR-L1 region

<400> 3198
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Ser Ser Asp Val Gly Gly Tyr Asn Tyr

1 5

<210> 3199
<211> 27
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<220>
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<400> 3199
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Ser Ser Asp Ile Gly Gly Tyr Asp Leu
1 5

<210> 3200
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<220>
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<400> 3200
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Gln Ser Val Leu Tyr Ser Ser Asn Asn Lys Asn Tyr
1 5 10

<210> 3201
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<212> DNA
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<220>
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<400> 3201
agc tcc aac atc gga agt aat act 24
Ser Ser Asn Ile Gly Ser Asn Thr
1 5

<210> 3202
<211> 27
<212> DNA
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<220>
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<400> 3202

act gga gta gtc acc act ggt cat tat 27
Thr Gly Val Val Thr Thr Gly His Tyr
1 5

<210> 3203
<211> 27
<212> DNA
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<220>
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CDR-L1 region

<400> 3203
tac tcc aac atc ggg gca ggt tat gat 27
Tyr Ser Asn Ile Gly Ala Gly Tyr Asp
1 5

<210> 3204
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3204
cag aat att aac agg ttc 18
Gln Asn Ile Asn Arg Phe
1 5

<210> 3205
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3205
cag ggc att aga aat gat 18
Gln Gly Ile Arg Asn Asp
1 5

<210> 3206
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3206
agc ctc aga acg gat tat 18
Ser Leu Arg Thr Asp Tyr
1 5

<210> 3207
<211> 36
<212> DNA
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<220>
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CDR-L1 region

<400> 3207
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Gln Ser Val Leu Ser Ser Tyr Asn Asn Lys Asp Tyr
1 5 10

<210> 3208
<211> 33
<212> DNA
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<220>
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CDR-L1 region

<400> 3208
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Gln Ser Leu Val Tyr Ser Asp Gly Asn Thr Tyr
1 5 10

<210> 3209
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3209
gca ttg cca aaa aaa tat 18
Ala Leu Pro Lys Lys Tyr
1 5

<210> 3210
<211> 18
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<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3210
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Asn Ile Gly Ser Lys Ser
1 5

<210> 3211
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3211
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Gln Ser Ile Ser Thr Tyr
1 5

<210> 3212
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3212
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Gln Ser Val Gly Ser Asp
1 5

<210> 3213
<211> 36
<212> DNA
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<220>
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CDR-L1 region

<400> 3213
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Gln Ser Val Leu Tyr Ser Ser Asn Asn Lys Asn Tyr
1 5 10

<210> 3214
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3214
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Ala Leu Ala Lys Glu Tyr
1 5

<210> 3215
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3215
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Gln Asn Ile Arg Asp Phe
1 5

<210> 3216
<211> 36
<212> DNA
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CDR-L1 region

<400> 3216
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Gln Thr Ile Leu Tyr Ser Ser Asn Asn Lys Asn Tyr
1 5 10

<210> 3217
<211> 18
<212> DNA
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<220>
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CDR-L1 region

<400> 3217
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Lys Leu Gly Asn Lys Tyr
1 5

<210> 3218
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<212> DNA
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<220>
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CDR-L1 region

<400> 3218
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Arg Ser Asn Ile Gly Ser Asn Phe
1 5

<210> 3219
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<212> DNA
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CDR-L1 region

<400> 3219
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Ser Ser Asn Ile Gly Asn Asn Tyr
1 5

<210> 3220
<211> 18
<212> DNA
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CDR-L1 region

<400> 3220
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Gln Ser Val Ser Phe Trp
1 5

<210> 3221
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<212> DNA
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<220>
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CDR-L1 region

<400> 3221
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Gln Ser Val Phe Tyr Ser Ser Asn Asn Lys Asn Tyr
1 5 10

<210> 3222
<211> 36
<212> DNA
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CDR-L1 region

<400> 3222
cag agt gtt tta tac agc tcc aac aat aag aac tac 36
Gln Ser Val Leu Tyr Ser Ser Asn Asn Lys Asn Tyr
1 5 10

<210> 3223
<211> 27
<212> DNA
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<220>
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CDR-L1 region

<400> 3223
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Ser Asn Asp Ile Gly Arg Tyr Lys Tyr
1 5

<210> 3224
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CDR-L1 region

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Gln Ser Leu Val Tyr Ser Asp Gly Asn Thr Tyr
1 5 10

<210> 3225
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CDR-L1 region

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aaa ttg ggg gat aaa tat 18
Lys Leu Gly Asp Lys Tyr

1 5

<210> 3226
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<220>
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<400> 3226
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Gln Arg Val Asn Ser Asn Tyr
1 5

<210> 3227
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Asn Leu Gly Asn Lys Tyr
1 5

<210> 3228
<211> 33
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<400> 3228
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Gln Ser Leu Leu His Ser Asn Gly Tyr Asn Tyr
1 5 10

<210> 3229
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<400> 3229

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Ser Ser Asn Ile Gly Asn Asn Tyr
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<210> 3230
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CDR-L1 region

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Gln Ser Ile Ser Ser Trp
1 5

<210> 3231
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CDR-L1 region

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Gln Ser Ile Ser Ser Trp
1 5

<210> 3232
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CDR-L1 region

<400> 3232
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Ser Ser Asn Ile Gly Ala Gly Tyr Asp
1 5

<210> 3233
<211> 18
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CDR-L1 region

<400> 3233
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Ala Leu Pro Lys Gln Tyr
1 5

<210> 3234
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CDR-L1 region

<400> 3234
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Gln Asn Ile Arg Asn Asn
1 5

<210> 3235
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CDR-L1 region

<400> 3235
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Gln Ser Val Ser Ser Asn
1 5

<210> 3236
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CDR-L1 region

<400> 3236
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Gln Ser Ile Ser Ser Tyr
1 5

<210> 3237
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CDR-L1 region

<400> 3237
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Gln Ser Ile Ser Thr Tyr
1 5

<210> 3238
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CDR-L1 region

<400> 3238
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Gln Ser Val Thr Ser Ser Tyr
1 5

<210> 3239
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CDR-L1 region

<400> 3239
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Asn Ile Gly Ser Lys Ser
1 5

<210> 3240
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<220>
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CDR-L1 region

<400> 3240
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Ser Gly Ser Ile Ala Asp Lys Tyr
1 5

<210> 3241
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<220>
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CDR-L1 region

<400> 3241
cag agc ctc cta cat agt aat gga tac aac tat 33
Gln Ser Leu Leu His Ser Asn Gly Tyr Asn Tyr
1 5 10

<210> 3242
<211> 18
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<220>
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CDR-L1 region

<400> 3242
cag agt att agt agc tgg 18
Gln Ser Ile Ser Ser Trp
1 5

<210> 3243
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L1 region

<400> 3243
cag agc ctc ctg tat cgt gat gga gag cac tat 33
Gln Ser Leu Leu Tyr Arg Asp Gly Glu His Tyr
1 5 10

<210> 3244
<211> 18
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<220>
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CDR-L1 region

<400> 3244
cag agc att agt agc tat 18
Gln Ser Ile Ser Ser Tyr
1 5

<210> 3245
<211> 36

<212> DNA
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<220>
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CDR-L1 region

<400> 3245
cag agt ctt tta tac agt tcc aac tat aag aac tac 36
Gln Ser Leu Leu Tyr Ser Ser Asn Tyr Lys Asn Tyr
1 5 10

<210> 3246
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3246
agc tcc aac atc gga agt aat tat 24
Ser Ser Asn Ile Gly Ser Asn Tyr
1 5

<210> 3247
<211> 27
<212> DNA
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<220>
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CDR-L1 region

<400> 3247
agc agt gac gtt ggt ggt tat aac tat 27
Ser Ser Asp Val Gly Gly Tyr Asn Tyr
1 5

<210> 3248
<211> 27
<212> DNA
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CDR-L1 region

<400> 3248
aac tcc aac atc ggg gca ggt tat gat 27
Asn Ser Asn Ile Gly Ala Gly Tyr Asp
1 5

<210> 3249
<211> 27
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3249
agt gac atc aat gtt act aac tac aac 27
Ser Asp Ile Asn Val Thr Asn Tyr Asn
1 5

<210> 3250
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3250
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Gln Ser Leu Leu His Ser Asp Gly Tyr Asn Tyr
1 5 10

<210> 3251
<211> 18
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L1 region

<400> 3251
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Gln Gly Ile Arg Asn Asp
1 5

<210> 3252
<211> 33
<212> DNA
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<220>
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CDR-L1 region

<400> 3252
cag agc ctc ctg cat agt gat gga aag acc tat 33
Gln Ser Leu Leu His Ser Asp Gly Lys Thr Tyr

1 5 10

<210> 3253
<211> 24
<212> DNA
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<220>
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<400> 3253
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Met Ser Gly Gly Gly Gly Ser Ile
1 5

<210> 3254
<211> 24
<212> DNA
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<220>
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<400> 3254
ata aag caa gat gga agt gag aaa 24
Ile Lys Gln Asp Gly Ser Glu Lys
1 5

<210> 3255
<211> 24
<212> DNA
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<220>
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<400> 3255
att agt tgg aac agt ggg aac ata 24
Ile Ser Trp Asn Ser Gly Asn Ile
1 5

<210> 3256
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<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3256

att tat tgg gat gat gat aag 21
Ile Tyr Trp Asp Asp Asp Lys
1 5

<210> 3257
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CDR-H2 region

<400> 3257
atc aac act agt ggt gga agc aca 24
Ile Asn Thr Ser Gly Gly Ser Thr
1 5

<210> 3258
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3258
att agt tgg aat agt gtt agt ata 24
Ile Ser Trp Asn Ser Val Ser Ile
1 5

<210> 3259
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3259
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Ile Thr Thr Tyr Asn Arg Asp Thr
1 5

<210> 3260
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<212> DNA
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<220>
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CDR-H2 region

<400> 3260
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Ile Ser Gly Asp Gly Gly Gly Thr
1 5

<210> 3261
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3261
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Ile Arg Tyr Asp Gly Arg Asn Lys
1 5

<210> 3262
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3262
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Ile Gly Trp Asp Ser Gly Gly Ile
1 5

<210> 3263
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<212> DNA
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<220>
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CDR-H2 region

<400> 3263
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Ile Ser Ile Tyr Ser Gly Asn Thr
1 5

<210> 3264
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<212> DNA
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<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

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Ile Ser Ser Asp Gly Arg Lys Ile
1 5

<210> 3265
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CDR-H2 region

<400> 3265
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Ile Ser Ala Thr Thr Gly Ser Thr
1 5

<210> 3266
<211> 27
<212> DNA
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<220>
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CDR-H2 region

<400> 3266
aca tac tac agg tcc aag tgg tat aat 27
Thr Tyr Tyr Arg Ser Lys Trp Tyr Asn
1 5

<210> 3267
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3267
att cac tat gat gga agg aat aaa 24
Ile His Tyr Asp Gly Arg Asn Lys
1 5

<210> 3268
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3268
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Ile Ser Ser Ser Ser Ser Ser Ile
1 5

<210> 3269
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3269
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Ile Ser Ala Tyr Asn Gly Asn Thr
1 5

<210> 3270
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3270
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Ile Gly Ile Gly Gly Asn Thr Ile
1 5

<210> 3271
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3271
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Ile Asn Ala Gly Asn Gly Asn Thr
1 5

<210> 3272
<211> 21

<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3272
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Val Tyr His Ser Gly Asn Ala
1 5

<210> 3273
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3273
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Ile Tyr Trp Asp Asp Asp Glu
1 5

<210> 3274
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3274
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Ile Ser Trp Gly Ser Ser Tyr Ile
1 5

<210> 3275
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3275
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Ile Ser Ser Ser Ser Arg Tyr Ile
1 5

<210> 3276
<211> 21
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<220>
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CDR-H2 region

<400> 3276
atc tat tac agt ggg aac agg 21
Ile Tyr Tyr Ser Gly Asn Arg
1 5

<210> 3277
<211> 21
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<220>
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CDR-H2 region

<400> 3277
atc tat acc agt ggg aat acc 21
Ile Tyr Thr Ser Gly Asn Thr
1 5

<210> 3278
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3278
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Ile Ser Ser Lys Ser Ser Ser Lys
1 5

<210> 3279
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3279
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Ile Tyr Tyr Arg Gly Thr Thr

1 5

<210> 3280
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<220>
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CDR-H2 region

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Ile Trp Tyr Asp Gly Ser Asn Lys
1 5

<210> 3281
<211> 21
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<220>
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CDR-H2 region

<400> 3281
atg tac acc agt ggg agc acc 21
Met Tyr Thr Ser Gly Ser Thr
1 5

<210> 3282
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3282
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Ile Asn Pro Asn Ser Gly Gly Thr
1 5

<210> 3283
<211> 21
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3283

atc cat cac act ggg agc gcc 21
Ile His His Thr Gly Ser Ala
1 5

<210> 3284
<211> 21
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<220>
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CDR-H2 region

<400> 3284
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Ile Tyr Tyr Ser Gly Asp Thr
1 5

<210> 3285
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<212> DNA
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<220>
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CDR-H2 region

<400> 3285
ata tca cat gat gga agt aat aaa 24
Ile Ser His Asp Gly Ser Asn Lys
1 5

<210> 3286
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3286
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Ile Tyr Trp Asp Asp Asp Lys
1 5

<210> 3287
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3287
att aat act act agt gat ccc ata 24
Ile Asn Thr Thr Ser Asp Pro Ile
1 5

<210> 3288
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3288
atc atc cct atc ttt ggt aca gca 24
Ile Ile Pro Ile Phe Gly Thr Ala
1 5

<210> 3289
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3289
atc tat ttc agt gtg acc acc 21
Ile Tyr Phe Ser Val Thr Thr
1 5

<210> 3290
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3290
ctc tct tac agt ggg aac acc 21
Leu Ser Tyr Ser Gly Asn Thr
1 5

<210> 3291
<211> 24
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<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3291
atc aac gct ggc aat ggt gac ata 24
Ile Asn Ala Gly Asn Gly Asp Ile
1 5

<210> 3292
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3292
att agt ggt agt ggt cat agc aca 24
Ile Ser Gly Ser Gly His Ser Thr
1 5

<210> 3293
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3293
att aat tgg aat ggt ggt agc aca 24
Ile Asn Trp Asn Gly Gly Ser Thr
1 5

<210> 3294
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3294
ata tca tat gat gga agt aat aaa 24
Ile Ser Tyr Asp Gly Ser Asn Lys
1 5

<210> 3295
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3295
atc tat tac agt ggg agc acc 21
Ile Tyr Tyr Ser Gly Ser Thr
1 5

<210> 3296
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3296
atc aac cct aac agt ggt ggc aca 24
Ile Asn Pro Asn Ser Gly Gly Thr
1 5

<210> 3297
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3297
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Ile Gly Thr Ala Gly Asp Thr
1 5

<210> 3298
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3298
ata tca tat gat gga agt aat agt 24
Ile Ser Tyr Asp Gly Ser Asn Ser
1 5

<210> 3299
<211> 24

<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3299
atg agt agt ggc ggt aat cgc aga 24
Met Ser Ser Gly Gly Asn Arg Arg
1 5

<210> 3300
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3300
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Ile Ser Ser Ser Gly Thr Tyr Ile
1 5

<210> 3301
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3301
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Ile Ser Tyr Asp Gly Ser Asn Lys
1 5

<210> 3302
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3302
atc agt tgg aat agt ggt tcg ata 24
Ile Ser Trp Asn Ser Gly Ser Ile
1 5

<210> 3303
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3303
atc tat tat agt ggg agc acc 21
Ile Tyr Tyr Ser Gly Ser Thr
1 5

<210> 3304
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3304
atc atc cct atc ttt ggt aca gca 24
Ile Ile Pro Ile Phe Gly Thr Ala
1 5

<210> 3305
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3305
atc aac ggt tac aat ggt aac aca 24
Ile Asn Gly Tyr Asn Gly Asn Thr
1 5

<210> 3306
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3306
att act agt agt ggt gat acc ata 24
Ile Thr Ser Ser Gly Asp Thr Ile

1 5

<210> 3307
<211> 24
<212> DNA
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<220>
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<400> 3307
atc atc cct atc ttt ggt aca aca 24
Ile Ile Pro Ile Phe Gly Thr Thr
1 5

<210> 3308
<211> 24
<212> DNA
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<220>
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<400> 3308
atc tat cct ggt gac tct gat acc 24
Ile Tyr Pro Gly Asp Ser Asp Thr
1 5

<210> 3309
<211> 24
<212> DNA
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<220>
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<400> 3309
aca tgg tat gag ggg act aac gaa 24
Thr Trp Tyr Glu Gly Thr Asn Glu
1 5

<210> 3310
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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<400> 3310

atg agt ggt agt ggt gct ggc aca 24
Met Ser Gly Ser Gly Ala Gly Thr
1 5

<210> 3311
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3311
ata tca tat gat gga ggc act aaa 24
Ile Ser Tyr Asp Gly Gly Thr Lys
1 5

<210> 3312
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3312
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Ile Trp Tyr Asp Gly Ser Thr Lys
1 5

<210> 3313
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3313
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Ile Tyr Phe Thr Gly Ser Thr
1 5

<210> 3314
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3314
atc tat cct ggt gac tct gat acc 24
Ile Tyr Pro Gly Asp Ser Asp Thr
1 5

<210> 3315
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3315
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Ile Tyr Thr Ser Gly Ser Thr
1 5

<210> 3316
<211> 27
<212> DNA
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<220>
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CDR-H2 region

<400> 3316
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Thr His Tyr Arg Ser Lys Trp Tyr Asn
1 5

<210> 3317
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3317
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Phe Asp Pro Glu Asp Gly Glu Thr
1 5

<210> 3318
<211> 24
<212> DNA
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<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3318
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Ile Ser Ser Ser Ser Ser Tyr Ile
1 5

<210> 3319
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3319
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Ile Ser Gly Ser Gly Gly Ser Thr
1 5

<210> 3320
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3320
atc acc cct att ttt aat ata acg 24
Ile Thr Pro Ile Phe Asn Ile Thr
1 5

<210> 3321
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3321
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Ile Tyr Tyr Ser Gly Ser Thr
1 5

<210> 3322
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3322
ata act tat gat gga caa atc aaa 24
Ile Thr Tyr Asp Gly Gln Ile Lys
1 5

<210> 3323
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3323
att tat tat agt ggg acc acc 21
Ile Tyr Tyr Ser Gly Thr Thr
1 5

<210> 3324
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3324
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Ile Ser Trp Asn Ser Gly Ser Ile
1 5

<210> 3325
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3325
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Ile Tyr Ser Ser Gly Asp Thr
1 5

<210> 3326
<211> 21

<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3326
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Ile Tyr Trp Asp Asp Asp Glu
1 5

<210> 3327
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3327
gtt agc agt agt ggt agt acc atg 24
Val Ser Ser Ser Gly Ser Thr Met
1 5

<210> 3328
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3328
att gat cct agt gac tct tat acc 24
Ile Asp Pro Ser Asp Ser Tyr Thr
1 5

<210> 3329
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3329
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Ile Phe Pro Ala Asp Ser Asp Thr
1 5

<210> 3330
<211> 21
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3330
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Ile Phe Tyr Ser Gly Ile Thr
1 5

<210> 3331
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3331
atc atc cct att ttt gga aca tca 24
Ile Ile Pro Ile Phe Gly Thr Ser
1 5

<210> 3332
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3332
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Ile Thr Trp Asp Gly Ser Ile Ile
1 5

<210> 3333
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3333
atc aat gct tac cag ggc gtc aca 24
Ile Asn Ala Tyr Gln Gly Val Thr

1 5

<210> 3334
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3334
ata aag gaa gat gga agt gag aaa 24
Ile Lys Glu Asp Gly Ser Glu Lys
1 5

<210> 3335
<211> 21
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3335
atc tct tac aat ggg aac acc 21
Ile Ser Tyr Asn Gly Asn Thr
1 5

<210> 3336
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3336
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Ile Gly Ser Ser Gly Thr
1 5

<210> 3337
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3337

att agt ggt ctt gga aat agt ata 24
Ile Ser Gly Leu Gly Asn Ser Ile
1 5

<210> 3338
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3338
ata tca gat gat ggg aat gat aaa 24
Ile Ser Asp Asp Gly Asn Asp Lys
1 5

<210> 3339
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3339
att agt tgg gat ggt ggt agc aca 24
Ile Ser Trp Asp Gly Gly Ser Thr
1 5

<210> 3340
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3340
atc aac acg aac aat ggt aaa aca 24
Ile Asn Thr Asn Asn Gly Lys Thr
1 5

<210> 3341
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3341
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Ile Asp Trp Ser Gly Lys Thr Thr
1 5

<210> 3342
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3342
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Ile Ser Gly Ser Gly Gly Ser Thr
1 5

<210> 3343
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3343
gta tca tat gat gga act aat aaa 24
Val Ser Tyr Asp Gly Thr Asn Lys
1 5

<210> 3344
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3344
att act agt acc agt agt tac tta 24
Ile Thr Ser Thr Ser Ser Tyr Leu
1 5

<210> 3345
<211> 21
<212> DNA
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<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3345
ata tat acc agt ggg agc acc 21
Ile Tyr Thr Ser Gly Ser Thr
1 5

<210> 3346
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3346
gtc tat tac agt ggg agg acc 21
Val Tyr Tyr Ser Gly Arg Thr
1 5

<210> 3347
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3347
gta tca tat gat gga act aat aaa 24
Val Ser Tyr Asp Gly Thr Asn Lys
1 5

<210> 3348
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3348
att tat cct gtt gac tct gat acc 24
Ile Tyr Pro Val Asp Ser Asp Thr
1 5

<210> 3349
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3349
acc ggt ggt agt ggt tat acc aaa 24
Thr Gly Gly Ser Gly Tyr Thr Lys
1 5

<210> 3350
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3350
att agt agt agt ggt agt acc ata 24
Ile Ser Ser Ser Gly Ser Thr Ile
1 5

<210> 3351
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3351
ata aag gaa gat gga agt gag aaa 24
Ile Lys Glu Asp Gly Ser Glu Lys
1 5

<210> 3352
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3352
atc tat tac agt ggg agc acc 21
Ile Tyr Tyr Ser Gly Ser Thr
1 5

<210> 3353
<211> 24

<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3353
ata tca tat gat gga agt aat aaa 24
Ile Ser Tyr Asp Gly Ser Asn Lys
1 5

<210> 3354
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3354
att ggt agt agt act act gcc ata 24
Ile Gly Ser Ser Thr Thr Ala Ile
1 5

<210> 3355
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3355
atc tct tac agt ggg agc acc 21
Ile Ser Tyr Ser Gly Ser Thr
1 5

<210> 3356
<211> 21
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3356
atc tat tat agt ggg agc acc 21
Ile Tyr Tyr Ser Gly Ser Thr
1 5

<210> 3357
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3357
atc tct tat tct ggg agc acc 21
Ile Ser Tyr Ser Gly Ser Thr
1 5

<210> 3358
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3358
ata aag caa gat gga agt gag aaa 24
Ile Lys Gln Asp Gly Ser Glu Lys
1 5

<210> 3359
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3359
att agt tgg aat agt ggt agt ata 24
Ile Ser Trp Asn Ser Gly Ser Ile
1 5

<210> 3360
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3360
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Ile Tyr Pro Gly Asp Ser Asp Thr

1 5

<210> 3361
<211> 27
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3361
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Thr Tyr Tyr Arg Ser Gln Trp Met Asn
1 5

<210> 3362
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3362
aca tac tac agg tcc aag tgg tat aat 27
Thr Tyr Tyr Arg Ser Lys Trp Tyr Asn
1 5

<210> 3363
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3363
ctc ttt tac agt ggg agc acc 21
Leu Phe Tyr Ser Gly Ser Thr
1 5

<210> 3364
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3364

atc tat cct ggt gac tct gat acc 24
Ile Tyr Pro Gly Asp Ser Asp Thr
1 5

<210> 3365
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3365
ata tgg tat gat gga agt aat aaa 24
Ile Trp Tyr Asp Gly Ser Asn Lys
1 5

<210> 3366
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3366
att agt agc agt agt cgt tac gtg 24
Ile Ser Ser Ser Ser Arg Tyr Val
1 5

<210> 3367
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3367
atc atc cct ata ctt aat ata aca 24
Ile Ile Pro Ile Leu Asn Ile Thr
1 5

<210> 3368
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3368
att agt agt act agc aat tac ata 24
Ile Ser Ser Thr Ser Asn Tyr Ile
1 5

<210> 3369
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3369
att tca tat gat gga agt gat gaa 24
Ile Ser Tyr Asp Gly Ser Asp Glu
1 5

<210> 3370
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3370
ata tgg cat gat gga agt cat aaa 24
Ile Trp His Asp Gly Ser His Lys
1 5

<210> 3371
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3371
att agt ggt gat ggt cgt agc aca 24
Ile Ser Gly Asp Gly Arg Ser Thr
1 5

<210> 3372
<211> 24
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3372
ata tca gat gat gga aaa aat aaa 24
Ile Ser Asp Asp Gly Lys Asn Lys
1 5

<210> 3373
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3373
ata aag caa gat ggg agt gag aaa 24
Ile Lys Gln Asp Gly Ser Glu Lys
1 5

<210> 3374
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3374
att tcc agt gat ggg agt acc aca 24
Ile Ser Ser Asp Gly Ser Thr Thr
1 5

<210> 3375
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3375
att agg agc aaa acc gat ggt ggg act aca 30
Ile Arg Ser Lys Thr Asp Gly Gly Thr Thr
1 5 10

<210> 3376
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3376
atc tct gac att ggg gac acc 21
Ile Ser Asp Ile Gly Asp Thr
1 5

<210> 3377
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3377
atc atc ccc atc ttt ggt aca gca 24
Ile Ile Pro Ile Phe Gly Thr Ala
1 5

<210> 3378
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3378
atc tat ttt agt ggg aaa act 21
Ile Tyr Phe Ser Gly Lys Thr
1 5

<210> 3379
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3379
att aat cgt gat ggg agt tac aca 24
Ile Asn Arg Asp Gly Ser Tyr Thr
1 5

<210> 3380
<211> 21

<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3380
gtc tat tat agt ggg agc acc 21
Val Tyr Tyr Ser Gly Ser Thr
1 5

<210> 3381
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3381
gtg tct ccc agc ggg act aac 21
Val Ser Pro Ser Gly Thr Asn
1 5

<210> 3382
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3382
atc atc cct att gtt gga gaa gca 24
Ile Ile Pro Ile Val Gly Glu Ala
1 5

<210> 3383
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3383
att aat agt gat ggg agt agc aca 24
Ile Asn Ser Asp Gly Ser Ser Thr
1 5

<210> 3384
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3384
atc tat tac aat ggg agc acc 21
Ile Tyr Tyr Asn Gly Ser Thr
1 5

<210> 3385
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3385
att agt ggt agt ggt ggt agc aca 24
Ile Ser Gly Ser Gly Gly Ser Thr
1 5

<210> 3386
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3386
att agt gcc agt ggt cgt acc aca 24
Ile Ser Ala Ser Gly Arg Thr Thr
1 5

<210> 3387
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3387
att act gct aat ggg ggt agc aca 24
Ile Thr Ala Asn Gly Gly Ser Thr

1 5

<210> 3388
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3388
atc tat cat agg ggg acc tcc 21
Ile Tyr His Arg Gly Thr Ser
1 5

<210> 3389
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3389
atc tca ttt gat gga agc aat caa 24
Ile Ser Phe Asp Gly Ser Asn Gln
1 5

<210> 3390
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3390
atc gac cct agt ggc ggc agc aga 24
Ile Asp Pro Ser Gly Gly Ser Arg
1 5

<210> 3391
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3391

att aat act gat ggg agt agc aca 24
Ile Asn Thr Asp Gly Ser Ser Thr
1 5

<210> 3392
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3392
ttt gat cct gaa ggt ggt gaa aca 24
Phe Asp Pro Glu Gly Gly Glu Thr
1 5

<210> 3393
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3393
atc tat tat aat gga gac acc 21
Ile Tyr Tyr Asn Gly Asp Thr
1 5

<210> 3394
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3394
atc agc gct tac act ggt aac aca 24
Ile Ser Ala Tyr Thr Gly Asn Thr
1 5

<210> 3395
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3395
att att tgg aat agt ggt acg aca 24
Ile Ile Trp Asn Ser Gly Thr Thr
1 5

<210> 3396
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3396
ata aat act gat ggt agt cga gga 24
Ile Asn Thr Asp Gly Ser Arg Gly
1 5

<210> 3397
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3397
att tat cac agt ggc agc acc 21
Ile Tyr His Ser Gly Ser Thr
1 5

<210> 3398
<211> 30
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3398
att aaa agt aaa agt gat ggt ggg tca aca 30
Ile Lys Ser Lys Ser Asp Gly Gly Ser Thr
1 5 10

<210> 3399
<211> 21
<212> DNA
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<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3399
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Ile Tyr Ser Gly Gly Thr Thr
1 5

<210> 3400
<211> 30
<212> DNA
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<220>
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CDR-H2 region

<400> 3400
att aaa aac aga gct aac agt tac aac aca 30
Ile Lys Asn Arg Ala Asn Ser Tyr Asn Thr
1 5 10

<210> 3401
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3401
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Ile Ser Phe Asp Gly Ser Asp Lys
1 5

<210> 3402
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3402
att act gct ggt gga agt ttc ata 24
Ile Thr Ala Gly Gly Ser Phe Ile
1 5

<210> 3403
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3403
atc aac cct aat agt ggt ggc aca 24
Ile Asn Pro Asn Ser Gly Gly Thr
1 5

<210> 3404
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3404
att agt tat agt ggt ggt agc aca 24
Ile Ser Tyr Ser Gly Gly Ser Thr
1 5

<210> 3405
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3405
att agt agt agt ggt ggt gac atc 24
Ile Ser Ser Ser Gly Gly Asp Ile
1 5

<210> 3406
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3406
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Ile Ser Trp Asn Ser Gly Asp Ile
1 5

<210> 3407
<211> 6

<212> DNA
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<220>
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CDR-H2 region

<400> 3407
atg gca 6
Met Ala
1

<210> 3408
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3408
att ggt ggt agt ggt ggt tac aca 24
Ile Gly Gly Ser Gly Gly Tyr Thr
1 5

<210> 3409
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3409
atc ttt cac agt ggg agc gcc 21
Ile Phe His Ser Gly Ser Ala
1 5

<210> 3410
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3410
atg atc acc act ttt gga aaa gcg 24
Met Ile Thr Thr Phe Gly Lys Ala
1 5

<210> 3411
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3411
atc tat tac agt ggg agc acc 21
Ile Tyr Tyr Ser Gly Ser Thr
1 5

<210> 3412
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3412
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Ile Ser Ala Tyr Asn Gly Asn Thr
1 5

<210> 3413
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3413
atc aac acc gtc act ggg atc cca 24
Ile Asn Thr Val Thr Gly Ile Pro
1 5

<210> 3414
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3414
gtc tat tat agt ggg agc acc 21
Val Tyr Tyr Ser Gly Ser Thr

1 5

<210> 3415
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3415
ata gcc tat gat gga agt cag aaa 24
Ile Ala Tyr Asp Gly Ser Gln Lys
1 5

<210> 3416
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3416
atc atc cct gtt ttt gga aca aca 24
Ile Ile Pro Val Phe Gly Thr Thr
1 5

<210> 3417
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3417
atc aac gct ggc aat ggt gac acg 24
Ile Asn Ala Gly Asn Gly Asp Thr
1 5

<210> 3418
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3418

atc tat cat agt ggg agc acc 21
Ile Tyr His Ser Gly Ser Thr
1 5

<210> 3419
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3419
gta gag gga tac cga agt gaa gaa 24
Val Glu Gly Tyr Arg Ser Glu Glu
1 5

<210> 3420
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3420
att agt gcc agt ggc ggt ggc acc 24
Ile Ser Ala Ser Gly Gly Gly Thr
1 5

<210> 3421
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3421
atc tat tac agt ggg acc tcc 21
Ile Tyr Tyr Ser Gly Thr Ser
1 5

<210> 3422
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3422
atc aac cct aaa act ggt gac aca 24
Ile Asn Pro Lys Thr Gly Asp Thr
1 5

<210> 3423
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3423
ata tca tat gat gga agt aat aaa 24
Ile Ser Tyr Asp Gly Ser Asn Lys
1 5

<210> 3424
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3424
att agt agt agt agt agt tac ata 24
Ile Ser Ser Ser Ser Ser Tyr Ile
1 5

<210> 3425
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3425
atc tat tat agt ggg agc acc 21
Ile Tyr Tyr Ser Gly Ser Thr
1 5

<210> 3426
<211> 30
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3426
att aaa agc aaa act gat ggt ggg aca aca 30
Ile Lys Ser Lys Thr Asp Gly Gly Thr Thr
1 5 10

<210> 3427
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3427
atc aac cct agt ttt gga agc aca 24
Ile Asn Pro Ser Phe Gly Ser Thr
1 5

<210> 3428
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3428
atc atg cct atg ttt gga aga aca 24
Ile Met Pro Met Phe Gly Arg Thr
1 5

<210> 3429
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3429
atc agc agt act gga acc acc aca 24
Ile Ser Ser Thr Gly Thr Thr Thr
1 5

<210> 3430
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3430
ata tca aat gac gga agt aat aaa 24
Ile Ser Asn Asp Gly Ser Asn Lys
1 5

<210> 3431
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3431
atc tat cct ggt gac tct gat acc 24
Ile Tyr Pro Gly Asp Ser Asp Thr
1 5

<210> 3432
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3432
att agt cgg ggg agc agt gtg ata 24
Ile Ser Arg Gly Ser Ser Val Ile
1 5

<210> 3433
<211> 21
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3433
att ttt tcg aat gac gaa aaa 21
Ile Phe Ser Asn Asp Glu Lys
1 5

<210> 3434
<211> 24

<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3434
atc aac cct aac agt ggt ggc aca 24
Ile Asn Pro Asn Ser Gly Gly Thr
1 5

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<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3435
atc agc gct tac aat ggt aac aca 24
Ile Ser Ala Tyr Asn Gly Asn Thr
1 5

<210> 3436
<211> 27
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3436
aca ttc tac agg acc aag tgg tat agt 27
Thr Phe Tyr Arg Thr Lys Trp Tyr Ser
1 5

<210> 3437
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3437
atc tgt cat agt ggg agc acc 21
Ile Cys His Ser Gly Ser Thr
1 5

<210> 3438
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3438
att tat agc ggt ggt agc aca 21
Ile Tyr Ser Gly Gly Ser Thr
1 5

<210> 3439
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

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atc aac cct aat ggt ggt act act 24
Ile Asn Pro Asn Gly Gly Thr Thr
1 5

<210> 3440
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3440
atc tat tac agt ggg agc acc 21
Ile Tyr Tyr Ser Gly Ser Thr
1 5

<210> 3441
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<220>
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CDR-H2 region

<400> 3441
atc cat tat act ggg agc acc 21
Ile His Tyr Thr Gly Ser Thr

1 5

<210> 3442
<211> 24
<212> DNA
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<220>
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<400> 3442
ata tca tat gat gga agt aat aaa 24
Ile Ser Tyr Asp Gly Ser Asn Lys
1 5

<210> 3443
<211> 24
<212> DNA
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<220>
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<400> 3443
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Ile Ser Gly Ser Gly Gly Ser Thr
1 5

<210> 3444
<211> 21
<212> DNA
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<220>
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<400> 3444
atc tat tat agt ggg agc acc 21
Ile Tyr Tyr Ser Gly Ser Thr
1 5

<210> 3445
<211> 24
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<220>
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<400> 3445

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Ile Asn Pro Asn Ser Gly Gly Thr
1 5

<210> 3446
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<212> DNA
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<220>
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CDR-H2 region

<400> 3446
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Ile Asn Pro Ala Asp Ser Asp Thr
1 5

<210> 3447
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3447
atc tat cct gct gac tct gat acc 24
Ile Tyr Pro Ala Asp Ser Asp Thr
1 5

<210> 3448
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3448
atc agt tat agt ggt aat acc aca 24
Ile Ser Tyr Ser Gly Asn Thr Thr
1 5

<210> 3449
<211> 24
<212> DNA
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<220>
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CDR-H2 region

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Ile Asn Pro Gly Gly Gly Ser Thr
1 5

<210> 3450
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3450
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Ile Thr Ser Pro Gly Gly His Thr
1 5

<210> 3451
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3451
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Ile Ser Gly Ser Gly Gly Ser Thr
1 5

<210> 3452
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3452
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Ile Asn Pro Val Asn Gly Val Thr
1 5

<210> 3453
<211> 24
<212> DNA
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<220>

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CDR-H2 region

<400> 3453
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Ile Asn Thr Asn Thr Gly Asn Pro
1 5

<210> 3454
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3454
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Ile Ser Ser Asp Gly Ser Asn Lys
1 5

<210> 3455
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3455
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Val Ser Gly Ser Gly Phe Thr Thr
1 5

<210> 3456
<211> 24
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<220>
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CDR-H2 region

<400> 3456
att agt agt agt agt agt tac ata 24
Ile Ser Ser Ser Ser Ser Tyr Ile
1 5

<210> 3457
<211> 21
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<220>
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CDR-H2 region

<400> 3457
att aat tgg gat gat gat aag 21
Ile Asn Trp Asp Asp Asp Lys
1 5

<210> 3458
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3458
att tat tgg gat gat gat acg 21
Ile Tyr Trp Asp Asp Asp Thr
1 5

<210> 3459
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3459
atc tat tac att ggg acc acc 21
Ile Tyr Tyr Ile Gly Thr Thr
1 5

<210> 3460
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3460
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Ile Asn Gln Asp Gly Gly Glu Lys
1 5

<210> 3461
<211> 24

<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3461
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Ile Ile Pro Val Phe Gly Pro Pro
1 5

<210> 3462
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3462
atc gtc cct atc ttt gat aca aca 24
Ile Val Pro Ile Phe Asp Thr Thr
1 5

<210> 3463
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3463
atc aac gct ggc aat ggg aac aca 24
Ile Asn Ala Gly Asn Gly Asn Thr
1 5

<210> 3464
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3464
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Ile Ser Pro Tyr Asn Gly Asn Ile
1 5

<210> 3465
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3465
att agt ggt cct ggt gaa agt tca 24
Ile Ser Gly Pro Gly Glu Ser Ser
1 5

<210> 3466
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3466
atc aac cct agc ggt ggt tac aca 24
Ile Asn Pro Ser Gly Gly Tyr Thr
1 5

<210> 3467
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3467
gtc ttt cct ggt gac tct gat atc 24
Val Phe Pro Gly Asp Ser Asp Ile
1 5

<210> 3468
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3468
ata tgg tat gat gga acc aac aag 24
Ile Trp Tyr Asp Gly Thr Asn Lys

1 5

<210> 3469
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3469
att gat cct agt gac tct tat acc 24
Ile Asp Pro Ser Asp Ser Tyr Thr
1 5

<210> 3470
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3470
att agt ggg gat ggt act cgg aca 24
Ile Ser Gly Asp Gly Thr Arg Thr
1 5

<210> 3471
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3471
act tat cat cgc aca act acc acc 24
Thr Tyr His Arg Thr Thr Thr Thr
1 5

<210> 3472
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3472

atc acc cct aat tct ggc aca cca 24
Ile Thr Pro Asn Ser Gly Thr Pro
1 5

<210> 3473
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3473
att aga agc aaa gct tat ggt ggg aca aga 30
Ile Arg Ser Lys Ala Tyr Gly Gly Thr Arg
1 5 10

<210> 3474
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3474
ata agc ggt tac aat gga aga aca 24
Ile Ser Gly Tyr Asn Gly Arg Thr
1 5

<210> 3475
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3475
atg aac gca gat ggg agt gag aaa 24
Met Asn Ala Asp Gly Ser Glu Lys
1 5

<210> 3476
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

<400> 3476
att agt agt agt agt agt acc ata 24
Ile Ser Ser Ser Ser Ser Thr Ile
1 5

<210> 3477
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3477
atc tac tat agt ggg agc acc 21
Ile Tyr Tyr Ser Gly Ser Thr
1 5

<210> 3478
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3478
atg ttt tat ggt ggg agc acc 21
Met Phe Tyr Gly Gly Ser Thr
1 5

<210> 3479
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3479
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Ile Trp Tyr Asp Gly Ser Asn Glu
1 5

<210> 3480
<211> 24
<212> DNA
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<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3480
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Ile Ser Thr Asp Ser Gly Asn Thr
1 5

<210> 3481
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3481
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Ile His Trp Asn Gly Gly Ser Thr
1 5

<210> 3482
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3482
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Met Trp Tyr Asp Gly Asn Asn Lys
1 5

<210> 3483
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3483
att agt ggc agt ggt ggt cgg aca 24
Ile Ser Gly Ser Gly Gly Arg Thr
1 5

<210> 3484
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3484
att aaa acc aaa act gat ggt ggg aca aca 30
Ile Lys Thr Lys Thr Asp Gly Gly Thr Thr
1 5 10

<210> 3485
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3485
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Ile Trp His Asp Gly Ser Lys Thr
1 5

<210> 3486
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3486
att agc cct tac acc cgt cag aca 24
Ile Ser Pro Tyr Thr Arg Gln Thr
1 5

<210> 3487
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3487
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Thr Arg Phe Asp Gly Ser Glu Lys
1 5

<210> 3488
<211> 24

<212> DNA
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<220>
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CDR-H2 region

<400> 3488
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Ile Ser His Asp Gly Ser Asn Asn
1 5

<210> 3489
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3489
atc cac gtt gga aat gat cac aca 24
Ile His Val Gly Asn Asp His Thr
1 5

<210> 3490
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3490
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Phe Asp Pro Ser Asp Ser Tyr Asn
1 5

<210> 3491
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3491
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Ile Tyr Trp Asp Asp Asp Lys
1 5

<210> 3492
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3492
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Ile Ser Gly Asp Ser Arg Asp Ile
1 5

<210> 3493
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3493
atc ata cct gtc cta ggt ata cca 24
Ile Ile Pro Val Leu Gly Ile Pro
1 5

<210> 3494
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3494
gtc tat tac agt ggg aac acc 21
Val Tyr Tyr Ser Gly Asn Thr
1 5

<210> 3495
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3495
att agt agt aat ggg ggt agc aca 24
Ile Ser Ser Asn Gly Gly Ser Thr

1 5

<210> 3496
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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<400> 3496
att agt agt agt agg agt acc ata 24
Ile Ser Ser Ser Arg Ser Thr Ile
1 5

<210> 3497
<211> 21
<212> DNA
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<220>
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<400> 3497
atc att cat act ggg acc acc 21
Ile Ile His Thr Gly Thr Thr
1 5

<210> 3498
<211> 24
<212> DNA
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<220>
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<400> 3498
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Ile Asn Thr Asp Gly Thr Val Thr
1 5

<210> 3499
<211> 21
<212> DNA
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<220>
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<400> 3499

att tat tgg gat gat gat aag 21
Ile Tyr Trp Asp Asp Asp Lys
1 5

<210> 3500
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3500
ata tca tat gat gga agt aat aaa 24
Ile Ser Tyr Asp Gly Ser Asn Lys
1 5

<210> 3501
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3501
att agt agt agt ggt agt acc ata 24
Ile Ser Ser Ser Gly Ser Thr Ile
1 5

<210> 3502
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3502
att agt agt agt agt agt acc ata 24
Ile Ser Ser Ser Ser Ser Thr Ile
1 5

<210> 3503
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3503
att gat tgg gat gat gat aaa 21
Ile Asp Trp Asp Asp Asp Lys
1 5

<210> 3504
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3504
ata aag caa gat gga agt gag aaa 24
Ile Lys Gln Asp Gly Ser Glu Lys
1 5

<210> 3505
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3505
ttt gtt ggt agc ggt gac acc aca 24
Phe Val Gly Ser Gly Asp Thr Thr
1 5

<210> 3506
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H2 region

<400> 3506
att agt agt agt agt agt acc aaa 24
Ile Ser Ser Ser Ser Ser Thr Lys
1 5

<210> 3507
<211> 24
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3507
atc aac cct aag act ggt gcc aca 24
Ile Asn Pro Lys Thr Gly Ala Thr
1 5

<210> 3508
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3508
atc tat gcc agt ggg agc acc 21
Ile Tyr Ala Ser Gly Ser Thr
1 5

<210> 3509
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3509
atc tat cct ggt gac tct gat acc 24
Ile Tyr Pro Gly Asp Ser Asp Thr
1 5

<210> 3510
<211> 30
<212> DNA
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<220>
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CDR-H2 region

<400> 3510
att aaa agc aaa act gat ggt ggg aca aca 30
Ile Lys Ser Lys Thr Asp Gly Gly Thr Thr
1 5 10

<210> 3511
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3511
ata tca aaa gat gga aac agc aaa 24
Ile Ser Lys Asp Gly Asn Ser Lys
1 5

<210> 3512
<211> 30
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H2 region

<400> 3512
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Ile Arg Ser Lys Thr Lys Asn Tyr Ala Thr
1 5 10

<210> 3513
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3513
atc tac acc agt ggg agc acc 21
Ile Tyr Thr Ser Gly Ser Thr
1 5

<210> 3514
<211> 30
<212> DNA
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<220>
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CDR-H2 region

<400> 3514
att agt acc aaa ggt tat gat gag aca gca 30
Ile Ser Thr Lys Gly Tyr Asp Glu Thr Ala
1 5 10

<210> 3515
<211> 24

<212> DNA
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<220>
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CDR-H2 region

<400> 3515
ata ccg tat gat gga agt aat aaa 24
Ile Pro Tyr Asp Gly Ser Asn Lys
1 5

<210> 3516
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3516
atc agt act agt aca agt acc ata 24
Ile Ser Thr Ser Thr Ser Thr Ile
1 5

<210> 3517
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3517
att agt agt agt ggt agt acc ata 24
Ile Ser Ser Ser Gly Ser Thr Ile
1 5

<210> 3518
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3518
att agt agt agt agt agt acc ata 24
Ile Ser Ser Ser Ser Ser Thr Ile
1 5

<210> 3519
<211> 21
<212> DNA
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<220>
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CDR-H2 region

<400> 3519
atg tac agt ggt ggc gcc aca 21
Met Tyr Ser Gly Gly Ala Thr
1 5

<210> 3520
<211> 24
<212> DNA
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<220>
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CDR-H2 region

<400> 3520
atc tat cct ggt gac tct gat acc 24
Ile Tyr Pro Gly Asp Ser Asp Thr
1 5

<210> 3521
<211> 30
<212> DNA
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<220>
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CDR-H2 region

<400> 3521
att aga agt aaa cct aac agt tac gcg aca 30
Ile Arg Ser Lys Pro Asn Ser Tyr Ala Thr
1 5 10

<210> 3522
<211> 24
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CDR-H2 region

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Ile Trp Tyr Asp Gly Ser Asn Glu

1 5

<210> 3523
<211> 24
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H2 region

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Ile Trp Tyr Asp Gly Ser Asn Lys
1 5

<210> 3524
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<212> DNA
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Ser Ala Ser
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<210> 3525
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Ala Ala Ser
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<400> 3526

act gca tcc 9
Thr Ala Ser
1

<210> 3527
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CDR-L2 region

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Arg Asn Asn
1

<210> 3528
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CDR-L2 region

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Gly Lys Asn
1

<210> 3529
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CDR-L2 region

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Tyr Asp Ser
1

<210> 3530
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CDR-L2 region

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Ala Ala Ser
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<210> 3531
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CDR-L2 region

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Asp Ala Ser
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<210> 3532
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CDR-L2 region

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Glu Asp Asp
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<210> 3533
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CDR-L2 region

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Gly Ala Ser
1

<210> 3534
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CDR-L2 region

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gaa aat aat 9
Glu Asn Asn
1

<210> 3535
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CDR-L2 region

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Met Val Ser
1

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CDR-L2 region

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agg gat aat 9
Arg Asp Asn
1

<210> 3537
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CDR-L2 region

<400> 3537
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Ser Ser Ser
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<210> 3538
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CDR-L2 region

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Asp Ala Ser
1

<210> 3539
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CDR-L2 region

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Gly Ala Ser
1

<210> 3540
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CDR-L2 region

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Lys Asp Ser
1

<210> 3541
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CDR-L2 region

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Asp Ala Ser
1

<210> 3542
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CDR-L2 region

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Asp Ala Ser
1

<210> 3543
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CDR-L2 region

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gct gca tcc 9
Ala Ala Ser
1

<210> 3544
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CDR-L2 region

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Trp Ala Ser
1

<210> 3545
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CDR-L2 region

<400> 3545
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Gly Ala Ser
1

<210> 3546
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CDR-L2 region

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gag gtc agt 9
Glu Val Ser
1

<210> 3547
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CDR-L2 region

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agg att gat 9
Arg Ile Asp
1

<210> 3548
<211> 9
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<220>
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CDR-L2 region

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gct gca tcc 9
Ala Ala Ser
1

<210> 3549
<211> 9
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<220>
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CDR-L2 region

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gct gca tcc 9
Ala Ala Ser

1

<210> 3550
<211> 9
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<220>
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CDR-L2 region

<400> 3550
ggt gac agc 9
Gly Asp Ser
1

<210> 3551
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3551
gat gat agc 9
Asp Asp Ser
1

<210> 3552
<211> 9
<212> DNA
<213> Artificial Sequence

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CDR-L2 region

<400> 3552
gct gca tcc 9
Ala Ala Ser
1

<210> 3553
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3553

gag gac att 9
Glu Asp Ile
1

<210> 3554
<211> 9
<212> DNA
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CDR-L2 region

<400> 3554
gag gtc agt 9
Glu Val Ser
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<210> 3555
<211> 9
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CDR-L2 region

<400> 3555
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Asp Asn Asn
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<210> 3556
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3556
aag gtt tct 9
Lys Val Ser
1

<210> 3557
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3557
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Gly Ala Ser
1

<210> 3558
<211> 9
<212> DNA
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CDR-L2 region

<400> 3558
ggt aac atc 9
Gly Asn Ile
1

<210> 3559
<211> 9
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<220>
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CDR-L2 region

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Ala Ala Ser
1

<210> 3560
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<220>
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CDR-L2 region

<400> 3560
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Trp Ala Ser
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<210> 3561
<211> 9
<212> DNA
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<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3561
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Arg Asn Asn
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<210> 3562
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CDR-L2 region

<400> 3562
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Glu Asp Lys
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<210> 3563
<211> 9
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<220>
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CDR-L2 region

<400> 3563
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Ala Ala Ser
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<210> 3564
<211> 9
<212> DNA
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CDR-L2 region

<400> 3564
tat gat agc 9
Tyr Asp Ser
1

<210> 3565
<211> 9
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CDR-L2 region

<400> 3565
gat gtc agt 9
Asp Val Ser
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<210> 3566
<211> 9
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CDR-L2 region

<400> 3566
gct gca tcc 9
Ala Ala Ser
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<210> 3567
<211> 9
<212> DNA
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CDR-L2 region

<400> 3567
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Ala Ala Ser
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<210> 3568
<211> 9
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CDR-L2 region

<400> 3568
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Gly Glu Asn
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<210> 3569
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<212> DNA
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CDR-L2 region

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Ala Ala Ser
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<210> 3570
<211> 9
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CDR-L2 region

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Ala Ala Ser
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<210> 3571
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CDR-L2 region

<400> 3571
ggt gca tcc 9
Gly Ala Ser
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<210> 3572
<211> 9
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CDR-L2 region

<400> 3572
ggt gca tcc 9
Gly Ala Ser
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<210> 3573
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3573
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Asp Ser Ser
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<210> 3574
<211> 9
<212> DNA
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CDR-L2 region

<400> 3574
aag gca tct 9
Lys Ala Ser
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<210> 3575
<211> 9
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CDR-L2 region

<400> 3575
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Tyr Asp Ser
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<210> 3576
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CDR-L2 region

<400> 3576
gat gca tcc 9
Asp Ala Ser

1

<210> 3577
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CDR-L2 region

<400> 3577
ttg ggg tct 9
Leu Gly Ser
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<210> 3578
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3578
aag gcg tct 9
Lys Ala Ser
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<210> 3579
<211> 9
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CDR-L2 region

<400> 3579
aac att aat 9
Asn Ile Asn
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<210> 3580
<211> 9
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CDR-L2 region

<400> 3580

ggt gca tcc 9
Gly Ala Ser
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<210> 3581
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CDR-L2 region

<400> 3581
gct gat aga 9
Ala Asp Arg
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<210> 3582
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<220>
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CDR-L2 region

<400> 3582
aag gcg tct 9
Lys Ala Ser
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<210> 3583
<211> 9
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<220>
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CDR-L2 region

<400> 3583
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Glu Ala Thr
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<210> 3584
<211> 9
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<220>
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CDR-L2 region

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Gly Ala Ser
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<210> 3585
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CDR-L2 region

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Glu Asp Ser
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<210> 3586
<211> 9
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CDR-L2 region

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Leu Gly Ser
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<210> 3587
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CDR-L2 region

<400> 3587
gag gtc aag 9
Glu Val Lys
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<210> 3588
<211> 9
<212> DNA
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<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

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Asp Ala Ser
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<210> 3589
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CDR-L2 region

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Asp Val Ser
1

<210> 3590
<211> 9
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CDR-L2 region

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gaa gtt tcc 9
Glu Val Ser
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<210> 3591
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3591
ggc gca tcc 9
Gly Ala Ser
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<210> 3592
<211> 9
<212> DNA
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CDR-L2 region

<400> 3592
gct gca tcc 9
Ala Ala Ser
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<210> 3593
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3593
gac aat aac 9
Asp Asn Asn
1

<210> 3594
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3594
gat gtg tcc 9
Asp Val Ser
1

<210> 3595
<211> 9
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CDR-L2 region

<400> 3595
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Gly Ala Ser
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<210> 3596
<211> 9

<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3596
aag gcg tct 9
Lys Ala Ser
1

<210> 3597
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3597
ggt aaa aac 9
Gly Lys Asn
1

<210> 3598
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3598
gct gca tcc 9
Ala Ala Ser
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<210> 3599
<211> 9
<212> DNA
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CDR-L2 region

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gat gca tcc 9
Asp Ala Ser
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<210> 3600
<211> 9
<212> DNA
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CDR-L2 region

<400> 3600
gaa aat aat 9
Glu Asn Asn
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<210> 3601
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<212> DNA
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<220>
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CDR-L2 region

<400> 3601
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Ala Ala Ser
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<210> 3602
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3602
tgg gct tct 9
Trp Ala Ser
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<210> 3603
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3603
gac gca tct 9
Asp Ala Ser

1

<210> 3604
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3604
gct gca tcc 9
Ala Ala Ser
1

<210> 3605
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3605
ggt aac atc 9
Gly Asn Ile
1

<210> 3606
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3606
ggt gca tcc 9
Gly Ala Ser
1

<210> 3607
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3607

gac gca tcc 9
Asp Ala Ser
1

<210> 3608
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3608
aat gat cat 9
Asn Asp His
1

<210> 3609
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3609
acg gtt tcc 9
Thr Val Ser
1

<210> 3610
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3610
caa gat agc 9
Gln Asp Ser
1

<210> 3611
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3611
caa cat aac 9
Gln His Asn
1

<210> 3612
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3612
tgg gca tct 9
Trp Ala Ser
1

<210> 3613
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3613
gat gca tcc 9
Asp Ala Ser
1

<210> 3614
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3614
gat gca tcc 9
Asp Ala Ser
1

<210> 3615
<211> 9
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3615
ttg ggt tct 9
Leu Gly Ser
1

<210> 3616
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3616
ttg gtg tct 9
Leu Val Ser
1

<210> 3617
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3617
gac aat gat 9
Asp Asn Asp
1

<210> 3618
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3618
gat gca tcc 9
Asp Ala Ser
1

<210> 3619
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3619
ttg ggt tct 9
Leu Gly Ser
1

<210> 3620
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3620
gat gtc agt 9
Asp Val Ser
1

<210> 3621
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3621
aag gtt tct 9
Lys Val Ser
1

<210> 3622
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3622
gct gca tcc 9
Ala Ala Ser
1

<210> 3623
<211> 9

<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3623
gat gca tcc 9
Asp Ala Ser
1

<210> 3624
<211> 9
<212> DNA
<213> Artificial Sequence

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CDR-L2 region

<400> 3624
gat gat agc 9
Asp Asp Ser
1

<210> 3625
<211> 9
<212> DNA
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CDR-L2 region

<400> 3625
gct gca tcc 9
Ala Ala Ser
1

<210> 3626
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CDR-L2 region

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Val Ala Ser
1

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CDR-L2 region

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Lys Ala Ser
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CDR-L2 region

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Glu Leu Ser
1

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CDR-L2 region

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Ala Ala Ser
1

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CDR-L2 region

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Gly Asn Arg

1

<210> 3631
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CDR-L2 region

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tat gca tcc 9
Tyr Ala Ser
1

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CDR-L2 region

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Gly Ala Ser
1

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CDR-L2 region

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Ser Ala Ser
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CDR-L2 region

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Asp Ala Ser
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CDR-L2 region

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Asp Val Ser
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CDR-L2 region

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Glu Asp Ser
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CDR-L2 region

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Gly Ala Ser
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CDR-L2 region

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Gly Ala Ser
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CDR-L2 region

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Asp Val Asn
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CDR-L2 region

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Ala Asp Ser
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CDR-L2 region

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Ala Ala Ser
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CDR-L2 region

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Lys Asn Asn
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CDR-L2 region

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Glu Ala Thr
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CDR-L2 region

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Val Ala Ser
1

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CDR-L2 region

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Ala Ala Ser
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CDR-L2 region

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Phe Arg Asn
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CDR-L2 region

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gat aca tcc 9
Asp Thr Ser
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<210> 3648
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CDR-L2 region

<400> 3648
tat gat agc 9
Tyr Asp Ser
1

<210> 3649
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CDR-L2 region

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Glu Val Ile
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<210> 3650
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CDR-L2 region

<400> 3650
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Asp Ala Phe
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<210> 3651
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CDR-L2 region

<400> 3651
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Asp Lys Asp
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<210> 3652
<211> 9
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CDR-L2 region

<400> 3652
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Ser Ala Ser
1

<210> 3653
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3653
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Arg Asp Asp
1

<210> 3654
<211> 9
<212> DNA
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CDR-L2 region

<400> 3654
gat gat agc 9
Asp Asp Ser
1

<210> 3655
<211> 9
<212> DNA
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CDR-L2 region

<400> 3655
aaa gac act 9
Lys Asp Thr
1

<210> 3656
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CDR-L2 region

<400> 3656
aaa gac agt 9
Lys Asp Ser
1

<210> 3657
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CDR-L2 region

<400> 3657
gag gac acc 9
Glu Asp Thr

1

<210> 3658
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CDR-L2 region

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gct gca tcc 9
Ala Ala Ser
1

<210> 3659
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CDR-L2 region

<400> 3659
gat gca tcc 9
Asp Ala Ser
1

<210> 3660
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CDR-L2 region

<400> 3660
gat gaa tcc 9
Asp Glu Ser
1

<210> 3661
<211> 9
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<220>
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CDR-L2 region

<400> 3661

gat gtc agt 9
Asp Val Ser
1

<210> 3662
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3662
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Gln Asp Thr
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<210> 3663
<211> 9
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CDR-L2 region

<400> 3663
gac aat gat 9
Asp Asn Asp
1

<210> 3664
<211> 9
<212> DNA
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CDR-L2 region

<400> 3664
gct gcg tcc 9
Ala Ala Ser
1

<210> 3665
<211> 9
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<220>
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CDR-L2 region

<400> 3665
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Gly Ala Ser
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<210> 3666
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CDR-L2 region

<400> 3666
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Asp Val Ser
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<210> 3667
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CDR-L2 region

<400> 3667
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Thr Ala Ser
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<210> 3668
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CDR-L2 region

<400> 3668
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Gly Ala Ser
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<210> 3669
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<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3669
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Lys Asp Asn
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<210> 3670
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CDR-L2 region

<400> 3670
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Asp Val Ile
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<210> 3671
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CDR-L2 region

<400> 3671
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Gly Ala Ser
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<210> 3672
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CDR-L2 region

<400> 3672
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Trp Ala Ser
1

<210> 3673
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3673
cgt aac acc 9
Arg Asn Thr
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<210> 3674
<211> 9
<212> DNA
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CDR-L2 region

<400> 3674
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Glu Val Thr
1

<210> 3675
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<212> DNA
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<220>
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CDR-L2 region

<400> 3675
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Lys Ala Ser
1

<210> 3676
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3676
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Gly Ala Ser
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<210> 3677
<211> 21

<212> DNA
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CDR-L2 region

<400> 3677
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Leu Asn Ser Asp Gly Ser His
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<210> 3678
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<220>
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CDR-L2 region

<400> 3678
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Gly Ala Ser
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<210> 3679
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<220>
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CDR-L2 region

<400> 3679
gct aac agc 9
Ala Asn Ser
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<210> 3680
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CDR-L2 region

<400> 3680
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Gly Asn Ser
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<210> 3681
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<220>
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CDR-L2 region

<400> 3681
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Leu Gly Ser
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<210> 3682
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3682
gct gca tcc 9
Ala Ala Ser
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<210> 3683
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3683
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Ser Asn Asn
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<210> 3684
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<220>
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CDR-L2 region

<400> 3684
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Met Gly Ser

1

<210> 3685
<211> 9
<212> DNA
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CDR-L2 region

<400> 3685
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Gly Lys Asn
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<210> 3686
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CDR-L2 region

<400> 3686
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Lys Ala Ser
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<210> 3687
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CDR-L2 region

<400> 3687
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Trp Ala Ser
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CDR-L2 region

<400> 3688

agg aat aat 9
Arg Asn Asn
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<210> 3689
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CDR-L2 region

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Ala Ala Ser
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<210> 3690
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CDR-L2 region

<400> 3690
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Asp Asp Ser
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<210> 3691
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<220>
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CDR-L2 region

<400> 3691
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Ala Asn Asn
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<210> 3692
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CDR-L2 region

<400> 3692
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Gly Glu Asn
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<210> 3693
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CDR-L2 region

<400> 3693
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Asp Val Thr
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<210> 3694
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CDR-L2 region

<400> 3694
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Trp Ala Ser
1

<210> 3695
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CDR-L2 region

<400> 3695
gag gtc agt 9
Glu Val Ser
1

<210> 3696
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<220>

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CDR-L2 region

<400> 3696
gat gca tcc 9
Asp Ala Ser
1

<210> 3697
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<220>
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CDR-L2 region

<400> 3697
gat gat agt 9
Asp Asp Ser
1

<210> 3698
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<212> DNA
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<220>
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CDR-L2 region

<400> 3698
ggg gcc tcc 9
Gly Ala Ser
1

<210> 3699
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<212> DNA
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<220>
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CDR-L2 region

<400> 3699
gaa aat aat 9
Glu Asn Asn
1

<210> 3700
<211> 9
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<220>
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CDR-L2 region

<400> 3700
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Ser Asp Ser
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<210> 3701
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3701
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Gly Pro Ser
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<210> 3702
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3702
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Glu Gly Ser
1

<210> 3703
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3703
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Met Val Ser
1

<210> 3704
<211> 9

<212> DNA
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<220>
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CDR-L2 region

<400> 3704
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Arg Asn Asn
1

<210> 3705
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3705
ggt aaa aac 9
Gly Lys Asn
1

<210> 3706
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3706
gct gca tcc 9
Ala Ala Ser
1

<210> 3707
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3707
gat gat agc 9
Asp Asp Ser
1

<210> 3708
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3708
gct gca tcc 9
Ala Ala Ser
1

<210> 3709
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3709
gat gcc tcc 9
Asp Ala Ser
1

<210> 3710
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3710
ttg ggt tct 9
Leu Gly Ser
1

<210> 3711
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3711
caa gat agc 9
Gln Asp Ser

1

<210> 3712
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3712
gag gac agc 9
Glu Asp Ser
1

<210> 3713
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3713
ggt aaa aac 9
Gly Lys Asn
1

<210> 3714
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3714
tgg gca tct 9
Trp Ala Ser
1

<210> 3715
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3715

ttg ggt tct 9
Leu Gly Ser
1

<210> 3716
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3716
gac gtc agt 9
Asp Val Ser
1

<210> 3717
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3717
tgg gca tct 9
Trp Ala Ser
1

<210> 3718
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3718
gag ggc agt 9
Glu Gly Ser
1

<210> 3719
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3719
gag gac agc 9
Glu Asp Ser
1

<210> 3720
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3720
ggt gca tcc 9
Gly Ala Ser
1

<210> 3721
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3721
ggt gca tcc 9
Gly Ala Ser
1

<210> 3722
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3722
tat gat agc 9
Tyr Asp Ser
1

<210> 3723
<211> 9
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3723
gac gtc att 9
Asp Val Ile
1

<210> 3724
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3724
tgg gca tct 9
Trp Ala Ser
1

<210> 3725
<211> 9
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3725
gat gat agc 9
Asp Asp Ser
1

<210> 3726
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3726
agt gca tcc 9
Ser Ala Ser
1

<210> 3727
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3727
agt aat aat 9
Ser Asn Asn
1

<210> 3728
<211> 9
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CDR-L2 region

<400> 3728
gaa gat cac 9
Glu Asp His
1

<210> 3729
<211> 9
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CDR-L2 region

<400> 3729
ggt aac agc 9
Gly Asn Ser
1

<210> 3730
<211> 9
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<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3730
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Ala Ala Ser
1

<210> 3731
<211> 9

<212> DNA
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<220>
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CDR-L2 region

<400> 3731
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Ala Ala Ser
1

<210> 3732
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3732
ggt gca tcc 9
Gly Ala Ser
1

<210> 3733
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<212> DNA
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<220>
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CDR-L2 region

<400> 3733
gag gtc act 9
Glu Val Thr
1

<210> 3734
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3734
ggt gca tcc 9
Gly Ala Ser
1

<210> 3735
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3735
ggt gca tcc 9
Gly Ala Ser
1

<210> 3736
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3736
aac aca aat 9
Asn Thr Asn
1

<210> 3737
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3737
ggt aac gac 9
Gly Asn Asp
1

<210> 3738
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3738
gct aac acc 9
Ala Asn Thr

1

<210> 3739
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3739
gag act tcc 9
Glu Thr Ser
1

<210> 3740
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3740
gat gtc agt 9
Asp Val Ser
1

<210> 3741
<211> 9
<212> DNA
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<220>
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CDR-L2 region

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Glu Gly Ser
1

<210> 3742
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3742

tgg gca tct 9
Trp Ala Ser
1

<210> 3743
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3743
agt aat aat 9
Ser Asn Asn
1

<210> 3744
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3744
gat aca agc 9
Asp Thr Ser
1

<210> 3745
<211> 9
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3745
agt aac aac 9
Ser Asn Asn
1

<210> 3746
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3746
gat gca tcc 9
Asp Ala Ser
1

<210> 3747
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3747
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Ala Ala Ser
1

<210> 3748
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3748
ggt gag gac 9
Gly Glu Asp
1

<210> 3749
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3749
tgg gca tct 9
Trp Ala Ser
1

<210> 3750
<211> 9
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3750
aag gtt tct 9
Lys Val Ser
1

<210> 3751
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3751
gaa gac agt 9
Glu Asp Ser
1

<210> 3752
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3752
gat gat agc 9
Asp Asp Ser
1

<210> 3753
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3753
gct gct tcc 9
Ala Ala Ser
1

<210> 3754
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3754
gat gct tcc 9
Asp Ala Ser
1

<210> 3755
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3755
tgg gca tct 9
Trp Ala Ser
1

<210> 3756
<211> 9
<212> DNA
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<220>
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CDR-L2 region

<400> 3756
aaa gac acg 9
Lys Asp Thr
1

<210> 3757
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3757
cgg gca tct 9
Arg Ala Ser
1

<210> 3758
<211> 9

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3758
tgg gca tct 9
Trp Ala Ser
1

<210> 3759
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3759
cag gat acc 9
Gln Asp Thr
1

<210> 3760
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3760
tct aat act 9
Ser Asn Thr
1

<210> 3761
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3761
gac act gat 9
Asp Thr Asp
1

<210> 3762
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3762
aag gcg tct 9
Lys Ala Ser
1

<210> 3763
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3763
tgg gca tct 9
Trp Ala Ser
1

<210> 3764
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3764
tgg gca tct 9
Trp Ala Ser
1

<210> 3765
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3765
gag gtc aat 9
Glu Val Asn

1

<210> 3766
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3766
aag gtt tct 9
Lys Val Ser
1

<210> 3767
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3767
caa gat agc 9
Gln Asp Ser
1

<210> 3768
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3768
ggt gca tcc 9
Gly Ala Ser
1

<210> 3769
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3769

aaa gat aac 9
Lys Asp Asn
1

<210> 3770
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3770
ttg ggt tct 9
Leu Gly Ser
1

<210> 3771
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3771
gac aat aat 9
Asp Asn Asn
1

<210> 3772
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3772
aag gcg tct 9
Lys Ala Ser
1

<210> 3773
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3773
aag gcg tct 9
Lys Ala Ser
1

<210> 3774
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3774
ggt aac agc 9
Gly Asn Ser
1

<210> 3775
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3775
aaa gac agt 9
Lys Asp Ser
1

<210> 3776
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3776
tct gct tcc 9
Ser Ala Ser
1

<210> 3777
<211> 9
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3777
ggt gca tcc 9
Gly Ala Ser
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<210> 3778
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3778
gct gca tcc 9
Ala Ala Ser
1

<210> 3779
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3779
gct gca tcc 9
Ala Ala Ser
1

<210> 3780
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3780
ggt gca tcc 9
Gly Ala Ser
1

<210> 3781
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3781
tat gat aga 9
Tyr Asp Arg
1

<210> 3782
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3782
gag gat aaa 9
Glu Asp Lys
1

<210> 3783
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3783
ttg ggt tct 9
Leu Gly Ser
1

<210> 3784
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L2 region

<400> 3784
aag gcg tct 9
Lys Ala Ser
1

<210> 3785
<211> 9

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3785
tcg gga tct 9
Ser Gly Ser
1

<210> 3786
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3786
gct gca tcc 9
Ala Ala Ser
1

<210> 3787
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3787
tgg gca tct 9
Trp Ala Ser
1

<210> 3788
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3788
agg aat aat 9
Arg Asn Asn
1

<210> 3789
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3789
gag gtc agt 9
Glu Val Ser
1

<210> 3790
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3790
ggt aac ggc 9
Gly Asn Gly
1

<210> 3791
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3791
cag tac tca gac tca gat aag 21
Gln Tyr Ser Asp Ser Asp Lys
1 5

<210> 3792
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3792
ttg ggt tct 9
Leu Gly Ser

1

<210> 3793
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3793
gct gca tcc 9
Ala Ala Ser
1

<210> 3794
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L2 region

<400> 3794
gaa gtt tcc 9
Glu Val Ser
1

<210> 3795
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3795
gcg agg gtt acc ctt ggg agt tac ttt tac ggc atg gac gtc 42
Ala Arg Val Thr Leu Gly Ser Tyr Phe Tyr Gly Met Asp Val
1 5 10

<210> 3796
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3796

gcg aga gat ggg gga tca ggg agt tac ttc gac tgc ttt gac tac 45
Ala Arg Asp Gly Gly Ser Gly Ser Tyr Phe Asp Cys Phe Asp Tyr
1 5 10 15

<210> 3797
<211> 54
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 3797
gca aaa gat ata aac ttt ttt ggg tta ggg aca ggg gga ggt gct atg 48
Ala Lys Asp Ile Asn Phe Phe Gly Leu Gly Thr Gly Gly Gly Ala Met
1 5 10 15

gac gtc 54
Asp Val

<210> 3798
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3798
gca cac aga gca ata gta gga ctc ttt gac tac 33
Ala His Arg Ala Ile Val Gly Leu Phe Asp Tyr
1 5 10

<210> 3799
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
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CDR-H3 region

<400> 3799
gcg cga gga ggg gat ggg gga ccc caa gat gct ttt gat atc 42
Ala Arg Gly Gly Asp Gly Gly Pro Gln Asp Ala Phe Asp Ile
1 5 10

<210> 3800
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3800
gtg aag tca ttt tcg gct gaa tat tac tac tat tac tac ggt atg gac 48
Val Lys Ser Phe Ser Ala Glu Tyr Tyr Tyr Tyr Tyr Gly Met Asp
1 5 10 15

gtc 51
Val

<210> 3801
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3801
gcg aga gtt gtt cca ggt gac tcc gtc tat ggt gct ttt gat atc 45
Ala Arg Val Val Pro Gly Asp Ser Val Tyr Gly Ala Phe Asp Ile
1 5 10 15

<210> 3802
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3802
gca aag cgg acc ccg ttc ggg gag tgg gca ttt gac tac 39
Ala Lys Arg Thr Pro Phe Gly Glu Trp Ala Phe Asp Tyr
1 5 10

<210> 3803
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3803
gcg aaa gat ccg ggg acc ttt agg gac cat ctt tgg agt ggt gtt gac 48
Ala Lys Asp Pro Gly Thr Phe Arg Asp His Leu Trp Ser Gly Val Asp

1 5 10 15

tac 51
Tyr

<210> 3804
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3804
gca aaa gcg gcg gct aca ctc ccc tac ttc cgc ttc gct atg gac gtc 48
Ala Lys Ala Ala Ala Thr Leu Pro Tyr Phe Arg Phe Ala Met Asp Val
1 5 10 15

<210> 3805
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3805
gcg aga gtg gga gtc ttt aag ggc ctg gct cct ttc ggg ggg ttc gac 48
Ala Arg Val Gly Val Phe Lys Gly Leu Ala Pro Phe Gly Gly Phe Asp
1 5 10 15

ccc 51
Pro

<210> 3806
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3806
gcg aga gac agt ggt ggc act ccg ggg ccc tac 33
Ala Arg Asp Ser Gly Gly Thr Pro Gly Pro Tyr
1 5 10

<210> 3807
<211> 48

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3807
gtg agg tcg ttc gtc ggc gca gtt ccc gct tat ccc aac ttt gac ttc 48
Val Arg Ser Phe Val Gly Ala Val Pro Ala Tyr Pro Asn Phe Asp Phe
1 5 10 15

<210> 3808
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3808
gta aga ggg gta gtg ggg gct act ctc gac aac 33
Val Arg Gly Val Val Gly Ala Thr Leu Asp Asn
1 5 10

<210> 3809
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3809
gtg aaa gat tcc cgg gtt acg ggg caa agc agt ggt tat atc ttt gac 48
Val Lys Asp Ser Arg Val Thr Gly Gln Ser Ser Gly Tyr Ile Phe Asp
1 5 10 15

tct 51
Ser

<210> 3810
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3810

gcg aga ccc cgt tta ggc tgg tac ttc gat ctc 33
Ala Arg Pro Arg Leu Gly Trp Tyr Phe Asp Leu
1 5 10

<210> 3811
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3811
gcg aga gaa acc gcc ggg cag ctc atc ccc ttt gac tac 39
Ala Arg Glu Thr Ala Gly Gln Leu Ile Pro Phe Asp Tyr
1 5 10

<210> 3812
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3812
gcg aga gat tat atg ggt gtg gat ttc tac tac tac tac ggt atg gac 48
Ala Arg Asp Tyr Met Gly Val Asp Phe Tyr Tyr Tyr Tyr Gly Met Asp
1 5 10 15

gtc 51
Val

<210> 3813
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3813
gcg aga gat ata gca gtg gct att act aac tac ttt ggc tcc 42
Ala Arg Asp Ile Ala Val Ala Ile Thr Asn Tyr Phe Gly Ser
1 5 10

<210> 3814
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3814
gcg aga gaa cat cgt agt ggg tat cag cga tac 33
Ala Arg Glu His Arg Ser Gly Tyr Gln Arg Tyr
1 5 10

<210> 3815
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3815
gca cac ttc tct acg gtg att aac ttt ggc cac 33
Ala His Phe Ser Thr Val Ile Asn Phe Gly His
1 5 10

<210> 3816
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3816
gcg tgc cga cgg ata tat cag ggg ttc gac ccc 33
Ala Cys Arg Arg Ile Tyr Gln Gly Phe Asp Pro
1 5 10

<210> 3817
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3817
gcg aga gat cga gct acc tcg ttt gat tac 30
Ala Arg Asp Arg Ala Thr Ser Phe Asp Tyr
1 5 10

<210> 3818
<211> 27

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3818
gcg aga ggt cgg ggg gaa atg gac gtc 27
Ala Arg Gly Arg Gly Glu Met Asp Val
1 5

<210> 3819
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3819
gcg act acc cct agc agc agc tgg tac tgg tac ttc gac ccc 42
Ala Thr Thr Pro Ser Ser Ser Trp Tyr Trp Tyr Phe Asp Pro
1 5 10

<210> 3820
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3820
gcg aga gat ctt gaa ctt att att gca gca ggt gct ccc ctt gac cac 48
Ala Arg Asp Leu Glu Leu Ile Ile Ala Ala Gly Ala Pro Leu Asp His
1 5 10 15

<210> 3821
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3821
gcg aga ctg gta aca tca cct gaa gaa ggg ggt ccc tgg ttc gac ccc 48
Ala Arg Leu Val Thr Ser Pro Glu Glu Gly Gly Pro Trp Phe Asp Pro
1 5 10 15

<210> 3822
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3822
gcg aga gat acg gaa gtg ggg cat cac ttt gac tac 36
Ala Arg Asp Thr Glu Val Gly His His Phe Asp Tyr
1 5 10

<210> 3823
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3823
gcg aag ccc tgg aga agt gat ggt ttt gat gtc 33
Ala Lys Pro Trp Arg Ser Asp Gly Phe Asp Val
1 5 10

<210> 3824
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3824
gca gtg ggc atg gtt aca gat ggt ttt gaa atc 33
Ala Val Gly Met Val Thr Asp Gly Phe Glu Ile
1 5 10

<210> 3825
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3825
gcc agg ctg gat ttg cgg acc gtg agg ttc gac ccc 36
Ala Arg Leu Asp Leu Arg Thr Val Arg Phe Asp Pro

1 5 10

<210> 3826
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3826
gcg aga cat agc agt ggc ccc ccc cgg ctc gct ttt gat atc 42
Ala Arg His Ser Ser Gly Pro Pro Arg Leu Ala Phe Asp Ile
1 5 10

<210> 3827
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3827
gcg aaa gat ttc gct atg cct aca gta act acg gac tac 39
Ala Lys Asp Phe Ala Met Pro Thr Val Thr Thr Asp Tyr
1 5 10

<210> 3828
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3828
gta cac aga cca tcc ctg gcc tat tgg tac ttc gat gtc 39
Val His Arg Pro Ser Leu Ala Tyr Trp Tyr Phe Asp Val
1 5 10

<210> 3829
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3829

gtg aga gag ggt gat tca cgg aaa tat tat agt ctt gac tat 42
Val Arg Glu Gly Asp Ser Arg Lys Tyr Tyr Ser Leu Asp Tyr
1 5 10

<210> 3830
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3830
gcg aga gat cca atg tgg gtc tct tat gct ttt gat atc 39
Ala Arg Asp Pro Met Trp Val Ser Tyr Ala Phe Asp Ile
1 5 10

<210> 3831
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3831
gcg agt ggt tat gtt tct ttc gat ctc 27
Ala Ser Gly Tyr Val Ser Phe Asp Leu
1 5

<210> 3832
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3832
gcg aga gag ggg gcc tat gag agt agt gga cct gat cct ttt gat atc 48
Ala Arg Glu Gly Ala Tyr Glu Ser Ser Gly Pro Asp Pro Phe Asp Ile
1 5 10 15

<210> 3833
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3833
gcg agc ctc ttt cta aca tac tat ggt tcg ggg act tat tat cgc 45
Ala Ser Leu Phe Leu Thr Tyr Tyr Gly Ser Gly Thr Tyr Tyr Arg
1 5 10 15

<210> 3834
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3834
gcg aaa tcg acc ctc ggt ggt ggt ttt gac ttc 33
Ala Lys Ser Thr Leu Gly Gly Gly Phe Asp Phe
1 5 10

<210> 3835
<211> 54
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3835
gcg aga gtt ggt agc agc agc tgg tac agc tcc ggg cga tcc cct ttt 48
Ala Arg Val Gly Ser Ser Ser Trp Tyr Ser Ser Gly Arg Ser Pro Phe
1 5 10 15

gac tac 54
Asp Tyr

<210> 3836
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3836
gcg aaa gat caa atc gtc cta gag atg gct aca agc ccc ttt gac tac 48
Ala Lys Asp Gln Ile Val Leu Glu Met Ala Thr Ser Pro Phe Asp Tyr
1 5 10 15

<210> 3837
<211> 51

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3837
gcg aga gat ctc agt tgt agt agt acc agc tgc cat gat gct ttt gat 48
Ala Arg Asp Leu Ser Cys Ser Ser Thr Ser Cys His Asp Ala Phe Asp
1 5 10 15

atc 51
Ile

<210> 3838
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3838
gcg aga gga ccc aat ttc cat gag agt ata cgt gat ggc ttt gat atc 48
Ala Arg Gly Pro Asn Phe His Glu Ser Ile Arg Asp Gly Phe Asp Ile
1 5 10 15

<210> 3839
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3839
gca aga gtt aac tgg aat tcc gat acc ttt gac tcc 36
Ala Arg Val Asn Trp Asn Ser Asp Thr Phe Asp Ser
1 5 10

<210> 3840
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3840

gcg aga gat ccg ggg aga gat ccg tat ttg gac ttg gac tat cac tac 48
Ala Arg Asp Pro Gly Arg Asp Pro Tyr Leu Asp Leu Asp Tyr His Tyr
1 5 10 15

ggc atg gac gtc 60
Gly Met Asp Val
20

<210> 3841
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3841
gcg aga gat aag agg agc ggt atg act tcc gac aga cga att gac tac 48
Ala Arg Asp Lys Arg Ser Gly Met Thr Ser Asp Arg Arg Ile Asp Tyr
1 5 10 15

<210> 3842
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3842
tcg ggg ggc tat tac tcc tcc tcc cac atg gac gtc 36
Ser Gly Gly Tyr Tyr Ser Ser Ser His Met Asp Val
1 5 10

<210> 3843
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3843
gcg aga gtg aat ata gca gca gct ggt act ctt gac tac 39
Ala Arg Val Asn Ile Ala Ala Ala Gly Thr Leu Asp Tyr
1 5 10

<210> 3844
<211> 63
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3844
gta aaa gat atg ggg cct gct gga act gct tcg gct tat cac tac cac 48
Val Lys Asp Met Gly Pro Ala Gly Thr Ala Ser Ala Tyr His Tyr His
1 5 10 15

aat gga atg gac gtc 63
Asn Gly Met Asp Val
20

<210> 3845
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3845
gcg aga cta act act agt acc agc gcg ctg agc tac 36
Ala Arg Leu Thr Thr Ser Thr Ser Ala Leu Ser Tyr
1 5 10

<210> 3846
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3846
gcg aga gag aac tgg aac tcc gct gga act acg gag tgg ttc gac ccc 48
Ala Arg Glu Asn Trp Asn Ser Ala Gly Thr Thr Glu Trp Phe Asp Pro
1 5 10 15

<210> 3847
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3847
gcg aga gat act cta caa aag ggg gac tac 30
Ala Arg Asp Thr Leu Gln Lys Gly Asp Tyr

1 5 10

<210> 3848
<211> 57
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3848
gcg aga gcc tcc cgc gtt cta gaa agt aag agc tgg cac ggg gat gct 48
Ala Arg Ala Ser Arg Val Leu Glu Ser Lys Ser Trp His Gly Asp Ala
1 5 10 15

ttt gat gtc 57
Phe Asp Val

<210> 3849
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3849
gcg agg ggt ctt ggc ggt agt ggt tat tat ttt gac tac 39
Ala Arg Gly Leu Gly Gly Ser Gly Tyr Tyr Phe Asp Tyr
1 5 10

<210> 3850
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3850
gcg aga cag gca ttt tgt ggt gct aat tgc tgg tcg ggc gct tat gat 48
Ala Arg Gln Ala Phe Cys Gly Ala Asn Cys Trp Ser Gly Ala Tyr Asp
1 5 10 15

atc 51
Ile

<210> 3851
<211> 57

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3851
gtg aga agg ggg gcg act gta ttt cag gga aag ata att aaa ggc tac 48
Val Arg Arg Gly Ala Thr Val Phe Gln Gly Lys Ile Ile Lys Gly Tyr
1 5 10 15

atg gac gtc 57
Met Asp Val

<210> 3852
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3852
gcg aaa gtg aag ggg ggg tcc aat gac tac 30
Ala Lys Val Lys Gly Gly Ser Asn Asp Tyr
1 5 10

<210> 3853
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3853
gcg aga cac ctc tac ggt gac ttt tac tac tta gac tac 39
Ala Arg His Leu Tyr Gly Asp Phe Tyr Tyr Leu Asp Tyr
1 5 10

<210> 3854
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3854

gcg aga gac cat cgt acg ggg agt tat tat ccc gac tac 39
Ala Arg Asp His Arg Thr Gly Ser Tyr Tyr Pro Asp Tyr
1 5 10

<210> 3855
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3855
gcg aga ggg gtg agg cag cag cag gtt cgg aag tgg ttc gac ccc 45
Ala Arg Gly Val Arg Gln Gln Gln Val Arg Lys Trp Phe Asp Pro
1 5 10 15

<210> 3856
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3856
gcg atg gat aat tcg ggg agc ggg ggc gtt gac tac 36
Ala Met Asp Asn Ser Gly Ser Gly Gly Val Asp Tyr
1 5 10

<210> 3857
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3857
gcg aga gat agt tat cac tac tac ggt atg gac gtc 36
Ala Arg Asp Ser Tyr His Tyr Tyr Gly Met Asp Val
1 5 10

<210> 3858
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3858
gca aga gag acc gtt tac atc tct act tac tac tac ggt ttg gac gtc 48
Ala Arg Glu Thr Val Tyr Ile Ser Thr Tyr Tyr Tyr Gly Leu Asp Val
1 5 10 15

<210> 3859
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3859
gca aca gat ggg ccc tta cat acg tcg gga ctt gac tac 39
Ala Thr Asp Gly Pro Leu His Thr Ser Gly Leu Asp Tyr
1 5 10

<210> 3860
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3860
gcg tgc ttg ggg gct gag gcg aac gat gct ttt gat atc 39
Ala Cys Leu Gly Ala Glu Ala Asn Asp Ala Phe Asp Ile
1 5 10

<210> 3861
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3861
gcg aaa gtc cct ggg gac tac 21
Ala Lys Val Pro Gly Asp Tyr
1 5

<210> 3862
<211> 45
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3862
gcg aga gcg ggc ctt agt acc agt tgg ccg agc tgg ttc gac ccc 45
Ala Arg Ala Gly Leu Ser Thr Ser Trp Pro Ser Trp Phe Asp Pro
1 5 10 15

<210> 3863
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3863
gcg aga aac gat att tcc ttc aaa cag agt gct atc gac gtc 42
Ala Arg Asn Asp Ile Ser Phe Lys Gln Ser Ala Ile Asp Val
1 5 10

<210> 3864
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3864
gcg aaa acg aag act atg ggt gtg ggg gga gag tat ttc ggc ttg gac 48
Ala Lys Thr Lys Thr Met Gly Val Gly Gly Glu Tyr Phe Gly Leu Asp
1 5 10 15

gtc 51
Val

<210> 3865
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3865
gcg aga cac aag gcc ctc tgg ttc ggg gag gca ggg gct ttt gat atc 48
Ala Arg His Lys Ala Leu Trp Phe Gly Glu Ala Gly Ala Phe Asp Ile
1 5 10 15

<210> 3866
<211> 54
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3866
gca aaa gat ttg tta ggg ttc agg gac caa agg aac tac tac ggt atg 48
Ala Lys Asp Leu Leu Gly Phe Arg Asp Gln Arg Asn Tyr Tyr Gly Met
1 5 10 15

gac gtc 54
Asp Val

<210> 3867
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3867
gcg aga agc ttc tac gac acc ctt ttc tac ttt gag aac 39
Ala Arg Ser Phe Tyr Asp Thr Leu Phe Tyr Phe Glu Asn
1 5 10

<210> 3868
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3868
gca cgc gtt tat agt acc aag tgg gac ttt gac tac 36
Ala Arg Val Tyr Ser Thr Lys Trp Asp Phe Asp Tyr
1 5 10

<210> 3869
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3869
gcg aaa ggg ggc cct tta cgt cct ttt gat atc 33
Ala Lys Gly Gly Pro Leu Arg Pro Phe Asp Ile
1 5 10

<210> 3870
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3870
gcg aga ctt agt aga gac ggc tac acc att gag cac ttt gac tac 45
Ala Arg Leu Ser Arg Asp Gly Tyr Thr Ile Glu His Phe Asp Tyr
1 5 10 15

<210> 3871
<211> 57
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3871
gcg aga cgc ggg gtt agt ggt ggg agc gcc tgg acg tat tac aac ttt 48
Ala Arg Arg Gly Val Ser Gly Gly Ser Ala Trp Thr Tyr Tyr Asn Phe
1 5 10 15

ttc gac ccc 57
Phe Asp Pro

<210> 3872
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3872
gcg aga gaa ctt ccc gtg att ggt aga cgt act ttt gat atc 42
Ala Arg Glu Leu Pro Val Ile Gly Arg Arg Thr Phe Asp Ile
1 5 10

<210> 3873
<211> 66

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3873
gcg aga gat tcc gag gtg gaa aag agt gat ggg tac atg gcc tcg acc 48
Ala Arg Asp Ser Glu Val Glu Lys Ser Asp Gly Tyr Met Ala Ser Thr
1 5 10 15

gct gaa tac ttc caa ctc 66
Ala Glu Tyr Phe Gln Leu
20

<210> 3874
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3874
gta aaa gca ggt gtc ccg tgg gag gtc cag cga tgg ttc gac ccc 45
Val Lys Ala Gly Val Pro Trp Glu Val Gln Arg Trp Phe Asp Pro
1 5 10 15

<210> 3875
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3875
gcg aga gat cgt cag ggc cta ggc cgt atg gac gtc 36
Ala Arg Asp Arg Gln Gly Leu Gly Arg Met Asp Val
1 5 10

<210> 3876
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3876

gcg agg gaa ctg ggt gcg aac tac tac ttt gcc tat 36
Ala Arg Glu Leu Gly Ala Asn Tyr Tyr Phe Ala Tyr
1 5 10

<210> 3877
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3877
gcg agg gaa gtc gat ata cgt gga gac agc gat gct ttt gat att 45
Ala Arg Glu Val Asp Ile Arg Gly Asp Ser Asp Ala Phe Asp Ile
1 5 10 15

<210> 3878
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3878
gcg act acc cga aac tca gct ttc ctc aac 30
Ala Thr Thr Arg Asn Ser Ala Phe Leu Asn
1 5 10

<210> 3879
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3879
gcg aag tcc gca ttt ggg gga gtt cct gat ggt ttt gat atc 42
Ala Lys Ser Ala Phe Gly Gly Val Pro Asp Gly Phe Asp Ile
1 5 10

<210> 3880
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3880
gcg aga gat ggg ttt gac tac 21
Ala Arg Asp Gly Phe Asp Tyr
1 5

<210> 3881
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3881
gca aaa gcg gga tac agc ttt act acc gct cct gac tac 39
Ala Lys Ala Gly Tyr Ser Phe Thr Thr Ala Pro Asp Tyr
1 5 10

<210> 3882
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3882
gcg cga gag aga ggc cag gtc cgt tcc tac ggc atg gac gtc 42
Ala Arg Glu Arg Gly Gln Val Arg Ser Tyr Gly Met Asp Val
1 5 10

<210> 3883
<211> 57
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3883
gta aaa att ggc ggg gat ggg aca gcc tac gct tgg acc ttt agg cac 48
Val Lys Ile Gly Gly Asp Gly Thr Ala Tyr Ala Trp Thr Phe Arg His
1 5 10 15

ttt gac tcc 57
Phe Asp Ser

<210> 3884
<211> 39

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3884
gcg aga ggg ttg ggt gga gat tgg aac tac ctt gcc tac 39
Ala Arg Gly Leu Gly Gly Asp Trp Asn Tyr Leu Ala Tyr
1 5 10

<210> 3885
<211> 63
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3885
gcg aaa gaa ggt gga tgg ggg aat aca gta act acg tcc tac tac tac 48
Ala Lys Glu Gly Gly Trp Gly Asn Thr Val Thr Thr Ser Tyr Tyr Tyr
1 5 10 15

tac ggt atg gat gtc 63
Tyr Gly Met Asp Val
20

<210> 3886
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3886
acg agg gat ggg gga tac ttc gca act ggc gag ttt gac tac 42
Thr Arg Asp Gly Gly Tyr Phe Ala Thr Gly Glu Phe Asp Tyr
1 5 10

<210> 3887
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3887

gcg aga gag cgc ttt ggc caa ggt gcc ctt gac tac 36
Ala Arg Glu Arg Phe Gly Gln Gly Ala Leu Asp Tyr
1 5 10

<210> 3888
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3888
gcg acc atc gtc gct gcc tac agc tat ggt ttc gag ttc gac ccc 45
Ala Thr Ile Val Ala Ala Tyr Ser Tyr Gly Phe Glu Phe Asp Pro
1 5 10 15

<210> 3889
<211> 63
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3889
gcg aaa gaa ggt gga tgg ggg aat aca gta act acg tcc tac tac tac 48
Ala Lys Glu Gly Gly Trp Gly Asn Thr Val Thr Thr Ser Tyr Tyr Tyr
1 5 10 15

tac ggt atg gat gtc 63
Tyr Gly Met Asp Val
20

<210> 3890
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3890
gcg cga cag gga ttt gag gct ctg gtt att cga ggc ttt gac tac 45
Ala Arg Gln Gly Phe Glu Ala Leu Val Ile Arg Gly Phe Asp Tyr
1 5 10 15

<210> 3891
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3891
gcg agg aga tct acc agt agc ccc tct ttc agc act ctg gac gtc 45
Ala Arg Arg Ser Thr Ser Ser Pro Ser Phe Ser Thr Leu Asp Val
1 5 10 15

<210> 3892
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3892
gcg aga caa atg gtg act acg agg ggc tac 30
Ala Arg Gln Met Val Thr Thr Arg Gly Tyr
1 5 10

<210> 3893
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3893
gcg aga gtc cca tct cgc tat ggc cgt tcc agg ggc gct ttt gat atc 48
Ala Arg Val Pro Ser Arg Tyr Gly Arg Ser Arg Gly Ala Phe Asp Ile
1 5 10 15

<210> 3894
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3894
gcg aga aat ctt tat cgt ctg ggc tgg ttc gac ccc 36
Ala Arg Asn Leu Tyr Arg Leu Gly Trp Phe Asp Pro
1 5 10

<210> 3895
<211> 39

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3895
gcg aaa tcg aaa ggt aac tac cgg gac gct atg gac gtc 39
Ala Lys Ser Lys Gly Asn Tyr Arg Asp Ala Met Asp Val
1 5 10

<210> 3896
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3896
gcg acc tca tat aca gta acg act ttc tac ggt atg gac gtc 42
Ala Thr Ser Tyr Thr Val Thr Thr Phe Tyr Gly Met Asp Val
1 5 10

<210> 3897
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3897
gcc aga ggg gcg gcc ttc tac tac ggt atg gac gtc 36
Ala Arg Gly Ala Ala Phe Tyr Tyr Gly Met Asp Val
1 5 10

<210> 3898
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3898
gcg aga gat acc tac ggt gac ccg agg ggt gac tac ttt gac tac 45
Ala Arg Asp Thr Tyr Gly Asp Pro Arg Gly Asp Tyr Phe Asp Tyr
1 5 10 15

<210> 3899
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3899
gcg aga ctg tgg ggt agc ggt gac tgg tgg ccc tcc ctg tat ttt gac 48
Ala Arg Leu Trp Gly Ser Gly Asp Trp Trp Pro Ser Leu Tyr Phe Asp
1 5 10 15

tcc 51
Ser

<210> 3900
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3900
gcg aga atc cgg cgt ata gca gca act agt ttt gac tac 39
Ala Arg Ile Arg Arg Ile Ala Ala Thr Ser Phe Asp Tyr
1 5 10

<210> 3901
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3901
gca aaa ata gca cgt cgt cct ccc agt ttt tac gac tac atg gac gtc 48
Ala Lys Ile Ala Arg Arg Pro Pro Ser Phe Tyr Asp Tyr Met Asp Val
1 5 10 15

<210> 3902
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3902
gcg agg tcg aca agt agt tcc acc tcc gac ttc cac tac atg gac gta 48
Ala Arg Ser Thr Ser Ser Ser Thr Ser Asp Phe His Tyr Met Asp Val
1 5 10 15

<210> 3903
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3903
aca aga gga tgg gca ttc acc agc tcc gac 30
Thr Arg Gly Trp Ala Phe Thr Ser Ser Asp
1 5 10

<210> 3904
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3904
gca gga gga tgg gcc ctt ggc tac 24
Ala Gly Gly Trp Ala Leu Gly Tyr
1 5

<210> 3905
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3905
gcg aga cac cga att ttc ggt ttg gac gtc 30
Ala Arg His Arg Ile Phe Gly Leu Asp Val
1 5 10

<210> 3906
<211> 57
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3906
gcg aga cgc gga ccg acc gat aca tgg tca ggg gaa gtt ggc tac tac 48
Ala Arg Arg Gly Pro Thr Asp Thr Trp Ser Gly Glu Val Gly Tyr Tyr
1 5 10 15

ttt gac tac 57
Phe Asp Tyr

<210> 3907
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3907
gcg aga gat gga aaa aca tta ggg tac ggt ggt aac tcc gtt gac tac 48
Ala Arg Asp Gly Lys Thr Leu Gly Tyr Gly Gly Asn Ser Val Asp Tyr
1 5 10 15

<210> 3908
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3908
gct cgg aca gaa act aaa tgg gag gac agg ggg ctt tgg gac tac 45
Ala Arg Thr Glu Thr Lys Trp Glu Asp Arg Gly Leu Trp Asp Tyr
1 5 10 15

<210> 3909
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3909
gcg aga tcg ttt tat ggt tca ggt ttg cag 30
Ala Arg Ser Phe Tyr Gly Ser Gly Leu Gln
1 5 10

<210> 3910
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3910
gcg agg gcc atg ggt ggc tac act tac tac ctt gac gac 39
Ala Arg Ala Met Gly Gly Tyr Thr Tyr Tyr Leu Asp Asp
1 5 10

<210> 3911
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3911
gcg agg gcg ggg aaa gac ggc tac aat ttt ttc tac tac ggt atg gac 48
Ala Arg Ala Gly Lys Asp Gly Tyr Asn Phe Phe Tyr Tyr Gly Met Asp
1 5 10 15

gtc 51
Val

<210> 3912
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3912
gcg aga ggg atc atg act aca gca att tcc tac tac ttt gac tac 45
Ala Arg Gly Ile Met Thr Thr Ala Ile Ser Tyr Tyr Phe Asp Tyr
1 5 10 15

<210> 3913
<211> 54
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3913
gcg aaa gga gaa agg gac ctg aca gac tac ggt gac ccc gaa tat ttc 48
Ala Lys Gly Glu Arg Asp Leu Thr Asp Tyr Gly Asp Pro Glu Tyr Phe
1 5 10 15

cag cac 54
Gln His

<210> 3914
<211> 54
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3914
gcg aaa gat ctg cga tat tgt agc gct cgt agt agt tgt ttt ggc att 48
Ala Lys Asp Leu Arg Tyr Cys Ser Ala Arg Ser Ser Cys Phe Gly Ile
1 5 10 15

gac ttc 54
Asp Phe

<210> 3915
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3915
gcg aga aga gca tac agc ttt gac tac 27
Ala Arg Arg Ala Tyr Ser Phe Asp Tyr
1 5

<210> 3916
<211> 54
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3916
gca aga gag ggg gcc cca gat gac tac ggt gac tcc ggg act gct ttt 48
Ala Arg Glu Gly Ala Pro Asp Asp Tyr Gly Asp Ser Gly Thr Ala Phe

1 5 10 15

gat att 54
Asp Ile

<210> 3917
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3917
acc acc gat cac ccc tat ggt gac tac tct gac aac 36
Thr Thr Asp His Pro Tyr Gly Asp Tyr Ser Asp Asn
1 5 10

<210> 3918
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3918
gcg aag gaa tta tta ggg ggt ttt gac tat 30
Ala Lys Glu Leu Leu Gly Gly Phe Asp Tyr
1 5 10

<210> 3919
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3919
gcg aga gtt ttt gga tca gca gct ggt gct ttt gat atc 39
Ala Arg Val Phe Gly Ser Ala Ala Gly Ala Phe Asp Ile
1 5 10

<210> 3920
<211> 36
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3920
gcg aga cac gat tgg cgc tta tac gca ttt gac tac 36
Ala Arg His Asp Trp Arg Leu Tyr Ala Phe Asp Tyr
1 5 10

<210> 3921
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3921
gca gga ggg gaa acc agt cct gac tac 27
Ala Gly Gly Glu Thr Ser Pro Asp Tyr
1 5

<210> 3922
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3922
gtg agt agg ggg ccc cta ggg gga gca gca gct gga ccg gac tac 45
Val Ser Arg Gly Pro Leu Gly Gly Ala Ala Ala Gly Pro Asp Tyr
1 5 10 15

<210> 3923
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3923
gcg cga gat gtc cga ggg tgg ttc gtc ccc 30
Ala Arg Asp Val Arg Gly Trp Phe Val Pro
1 5 10

<210> 3924
<211> 57
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3924
gtg aga gat cgc aac att gta tct gtg cca ggt gct atc ccc tac gga 48
Val Arg Asp Arg Asn Ile Val Ser Val Pro Gly Ala Ile Pro Tyr Gly
1 5 10 15

atg gac gtc 57
Met Asp Val

<210> 3925
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3925
gca aga ggg agt gac acc ctt gac tac 27
Ala Arg Gly Ser Asp Thr Leu Asp Tyr
1 5

<210> 3926
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3926
gcc aga gtg ggg cta act ttt gcc ttg ttc gac ccc 36
Ala Arg Val Gly Leu Thr Phe Ala Leu Phe Asp Pro
1 5 10

<210> 3927
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3927
gcg aac agt gcg ggg ata cag cta tgg tcc tca gac aac tgg ttc gac 48
Ala Asn Ser Ala Gly Ile Gln Leu Trp Ser Ser Asp Asn Trp Phe Asp

1 5 10 15

ccc 51
Pro

<210> 3928
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3928
gcg aaa gag ggc ata gaa ctc atg atc ctc 30
Ala Lys Glu Gly Ile Glu Leu Met Ile Leu
1 5 10

<210> 3929
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3929
gcg aga ggc att acc ctg act cgg gga gtc tcc ttt gac tac 42
Ala Arg Gly Ile Thr Leu Thr Arg Gly Val Ser Phe Asp Tyr
1 5 10

<210> 3930
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3930
gcc aga gat ggg gga gct ttt gat atc 27
Ala Arg Asp Gly Gly Ala Phe Asp Ile
1 5

<210> 3931
<211> 48
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3931
gcg aga gat cgg ctt ttc aca gct att aac agt ggg tac ttt gac tac 48
Ala Arg Asp Arg Leu Phe Thr Ala Ile Asn Ser Gly Tyr Phe Asp Tyr
1 5 10 15

<210> 3932
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3932
gcg aga gag ggg agc tac tac ggg att ggc tac 33
Ala Arg Glu Gly Ser Tyr Tyr Gly Ile Gly Tyr
1 5 10

<210> 3933
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3933
gcg aga gat acg gac agt ggc tgg ttg gat tcg ttt gac tac 42
Ala Arg Asp Thr Asp Ser Gly Trp Leu Asp Ser Phe Asp Tyr
1 5 10

<210> 3934
<211> 63
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3934
gcg aca gat cag ggg tgt gat gat ggc agc tgc tat gta ggc cac tac 48
Ala Thr Asp Gln Gly Cys Asp Asp Gly Ser Cys Tyr Val Gly His Tyr
1 5 10 15

tac gga atg gac gtc 63
Tyr Gly Met Asp Val
20

<210> 3935
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3935
ggg agg att atg act ccc tcg att gac ctc 30
Gly Arg Ile Met Thr Pro Ser Ile Asp Leu
1 5 10

<210> 3936
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3936
gcg aga gaa gga cgg ggg gga gga gac ttc ttt gac tac 39
Ala Arg Glu Gly Arg Gly Gly Gly Asp Phe Phe Asp Tyr
1 5 10

<210> 3937
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3937
gca aaa gat ggg gac agt ttg ggg gat ttc tct act ttt gat atc 45
Ala Lys Asp Gly Asp Ser Leu Gly Asp Phe Ser Thr Phe Asp Ile
1 5 10 15

<210> 3938
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3938
gca aga gac ggc tat gac ttt cgg gct ttt gac cac 36
Ala Arg Asp Gly Tyr Asp Phe Arg Ala Phe Asp His

1 5 10

<210> 3939
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3939
gcg cga gct cgc ggt ggg ggt ttt tgt agt aat atg gac tgc ccg gca 48
Ala Arg Ala Arg Gly Gly Gly Phe Cys Ser Asn Met Asp Cys Pro Ala
1 5 10 15

atg ttt gac tac 60
Met Phe Asp Tyr
20

<210> 3940
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3940
acc acg att cat gac tac ggt gac cac 27
Thr Thr Ile His Asp Tyr Gly Asp His
1 5

<210> 3941
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3941
gcg agg ggc ctt tta cga tcc ctg gac gtc 30
Ala Arg Gly Leu Leu Arg Ser Leu Asp Val
1 5 10

<210> 3942
<211> 42
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3942
gct aga gtg aaa ctg ggg gca tcg agc cgt gtt ttt gat gtc 42
Ala Arg Val Lys Leu Gly Ala Ser Ser Arg Val Phe Asp Val
1 5 10

<210> 3943
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3943
gcg aca acc gtt aca cct aag gtg acc agt ttt gct tcc 39
Ala Thr Thr Val Thr Pro Lys Val Thr Ser Phe Ala Ser
1 5 10

<210> 3944
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3944
gcg aga gaa cag agc ccc ctt tat ttc ggt cca tct ttg gac gtc 45
Ala Arg Glu Gln Ser Pro Leu Tyr Phe Gly Pro Ser Leu Asp Val
1 5 10 15

<210> 3945
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3945
gcg aga gag cct tac tcc tcc tac gct atg gac gtc 36
Ala Arg Glu Pro Tyr Ser Ser Tyr Ala Met Asp Val
1 5 10

<210> 3946
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3946
gcg aaa gat gga tcc gag atg tta ttg tgt gac tac 36
Ala Lys Asp Gly Ser Glu Met Leu Leu Cys Asp Tyr
1 5 10

<210> 3947
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3947
gcg aga gac act agg tgg cga ggg ttg gac agc 33
Ala Arg Asp Thr Arg Trp Arg Gly Leu Asp Ser
1 5 10

<210> 3948
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3948
gca aaa gat ctg tta gca gtg cct ggc cta ctt gac gac 39
Ala Lys Asp Leu Leu Ala Val Pro Gly Leu Leu Asp Asp
1 5 10

<210> 3949
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3949
gcg agt cgg ggt gga tct tct cgc cgg tac ggt atg ggc gtc 42
Ala Ser Arg Gly Gly Ser Ser Arg Arg Tyr Gly Met Gly Val
1 5 10

<210> 3950
<211> 48

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3950
gtg aaa ttg aag ggc att ggc gct atg tgg acg tac gct atg gac gtc 48
Val Lys Leu Lys Gly Ile Gly Ala Met Trp Thr Tyr Ala Met Asp Val
1 5 10 15

<210> 3951
<211> 54
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3951
gcg aga gat cag ggc tac ggt gat tac gac tat ccc aga gac tgg atc 48
Ala Arg Asp Gln Gly Tyr Gly Asp Tyr Asp Tyr Pro Arg Asp Trp Ile
1 5 10 15

gaa ccc 54
Glu Pro

<210> 3952
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3952
gcg agc gtc cga gac ctc gtc agt ggc acc act tac tac tat cac tac 48
Ala Ser Val Arg Asp Leu Val Ser Gly Thr Thr Tyr Tyr Tyr His Tyr
1 5 10 15

<210> 3953
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3953

gcg aga tac ggt gac tac tcc ttt gac ccc 30
Ala Arg Tyr Gly Asp Tyr Ser Phe Asp Pro
1 5 10

<210> 3954
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3954
gcg aga gtc gta gac aca gtt ttg gca gac ttt gac tac 39
Ala Arg Val Val Asp Thr Val Leu Ala Asp Phe Asp Tyr
1 5 10

<210> 3955
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3955
gcg cga tca ggg ggc ttt ggc tgg tca agg gac ctt gac tac 42
Ala Arg Ser Gly Gly Phe Gly Trp Ser Arg Asp Leu Asp Tyr
1 5 10

<210> 3956
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3956
gcg aga cat gga ttt tgg agt ggc ccc ata ccc gac gct ttt gat atc 48
Ala Arg His Gly Phe Trp Ser Gly Pro Ile Pro Asp Ala Phe Asp Ile
1 5 10 15

<210> 3957
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3957
gcg cac gaa gac tat ggt tcg ggg aat ggt aat tac 36
Ala His Glu Asp Tyr Gly Ser Gly Asn Gly Asn Tyr
1 5 10

<210> 3958
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3958
gcg aga gac cgc gac agt ggc tac gag agg aat tgt ctc gac ccc 45
Ala Arg Asp Arg Asp Ser Gly Tyr Glu Arg Asn Cys Leu Asp Pro
1 5 10 15

<210> 3959
<211> 66
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3959
gcg agg ggg gcc cct tat ggt tcg cga att tat tat gat tac gac tcc 48
Ala Arg Gly Ala Pro Tyr Gly Ser Arg Ile Tyr Tyr Asp Tyr Asp Ser
1 5 10 15

tac cat ggt atg gac gtc 66
Tyr His Gly Met Asp Val
20

<210> 3960
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3960
gcg aga gga aag ttt gac tgg ttc cct cgt gtg tcc tcc ttt gac tac 48
Ala Arg Gly Lys Phe Asp Trp Phe Pro Arg Val Ser Ser Phe Asp Tyr
1 5 10 15

<210> 3961
<211> 39

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3961
gcg gcc gcc tat tat att gat act agc ggc ttt gac tac 39
Ala Ala Ala Tyr Tyr Ile Asp Thr Ser Gly Phe Asp Tyr
1 5 10

<210> 3962
<211> 54
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3962
gcg aaa gga cgg acg tat agc aat aac tgg tta ttt cac tgg tac ttc 48
Ala Lys Gly Arg Thr Tyr Ser Asn Asn Trp Leu Phe His Trp Tyr Phe
1 5 10 15

gat ctc 54
Asp Leu

<210> 3963
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3963
gcg aga gtt ttt agt acg ata ttt cat ggg gtc gac ccc 39
Ala Arg Val Phe Ser Thr Ile Phe His Gly Val Asp Pro
1 5 10

<210> 3964
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3964

gcg aga cac tta agc agt ggc gaa tac cac tac ggt ttg gac gtc 45
Ala Arg His Leu Ser Ser Gly Glu Tyr His Tyr Gly Leu Asp Val
1 5 10 15

<210> 3965
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3965
gcg aaa gga aag ggt ata gtg gga gcc acc ttt gac tac 39
Ala Lys Gly Lys Gly Ile Val Gly Ala Thr Phe Asp Tyr
1 5 10

<210> 3966
<211> 54
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3966
gcg aga gat gcg cta gat ttt gac tgg tta ttg tca gcc ggg ggc ttt 48
Ala Arg Asp Ala Leu Asp Phe Asp Trp Leu Leu Ser Ala Gly Gly Phe
1 5 10 15

gac tac 54
Asp Tyr

<210> 3967
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3967
gcg aga cta ctt gtg ggg ggt gct ttt gat atc 33
Ala Arg Leu Leu Val Gly Gly Ala Phe Asp Ile
1 5 10

<210> 3968
<211> 54
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3968
acc cca gga tct tgt agt ggt ggt agc tgc tac tcc ggc gat gct ttt 48
Thr Pro Gly Ser Cys Ser Gly Gly Ser Cys Tyr Ser Gly Asp Ala Phe
1 5 10 15

gat atc 54
Asp Ile

<210> 3969
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3969
gcg aga gag tcc ctt gat agt gcc tca tat agt acc atc gca cat 45
Ala Arg Glu Ser Leu Asp Ser Ala Ser Tyr Ser Thr Ile Ala His
1 5 10 15

<210> 3970
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3970
gcg aga gat cga gga ggc aac agc tgg ctt gat gtt ttt gat atg 45
Ala Arg Asp Arg Gly Gly Asn Ser Trp Leu Asp Val Phe Asp Met
1 5 10 15

<210> 3971
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3971
gcg aga tcc ccc gcc gcc ttt ggc tca gag agt tac ttt gac tcc 45
Ala Arg Ser Pro Ala Ala Phe Gly Ser Glu Ser Tyr Phe Asp Ser

1 5 10 15

<210> 3972
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3972
gcg aaa gat ctt cta gag gac cca tac ttc ggg gac tta ttg ttt gac 48
Ala Lys Asp Leu Leu Glu Asp Pro Tyr Phe Gly Asp Leu Leu Phe Asp
1 5 10 15

tac 51
Tyr

<210> 3973
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3973
gtg agg acc ccc gct gtt ggc acc gac cct gac tac 36
Val Arg Thr Pro Ala Val Gly Thr Asp Pro Asp Tyr
1 5 10

<210> 3974
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 3974
tcg agt ggg ggg tcc aca tcg atg gtt ggg aga tac 36
Ser Ser Gly Gly Ser Thr Ser Met Val Gly Arg Tyr
1 5 10

<210> 3975
<211> 42
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3975
gca cgg atg acc cca ttc aag ttt gga cta tgc cct gac tac 42
Ala Arg Met Thr Pro Phe Lys Phe Gly Leu Cys Pro Asp Tyr
1 5 10

<210> 3976
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3976
gcg aga gta gtg gtg gta ggt aca gac tac ggt atg gac gtc 42
Ala Arg Val Val Val Val Gly Thr Asp Tyr Gly Met Asp Val
1 5 10

<210> 3977
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3977
gcg aga gat caa gga ctg gag agg gct aac tgg ttc gac ccc 42
Ala Arg Asp Gln Gly Leu Glu Arg Ala Asn Trp Phe Asp Pro
1 5 10

<210> 3978
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3978
gca aga ggt gtc cgc cac ttt gac tac 27
Ala Arg Gly Val Arg His Phe Asp Tyr
1 5

<210> 3979
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3979
gcg aga gag tca cct tta act gtc gtc ttt gac tac 36
Ala Arg Glu Ser Pro Leu Thr Val Val Phe Asp Tyr
1 5 10

<210> 3980
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3980
gcg agg gaa tcc tca gca gct ggt tat gac tac 33
Ala Arg Glu Ser Ser Ala Ala Gly Tyr Asp Tyr
1 5 10

<210> 3981
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3981
gcg aga aag ctt atg tct ggc ata gtg tct cgg ggc tgg ttc gac ccc 48
Ala Arg Lys Leu Met Ser Gly Ile Val Ser Arg Gly Trp Phe Asp Pro
1 5 10 15

<210> 3982
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3982
gcg aga gat cgc ggt gac tac gtt acc cac tgg ttc gac ccc 42
Ala Arg Asp Arg Gly Asp Tyr Val Thr His Trp Phe Asp Pro
1 5 10

<210> 3983
<211> 39

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3983
gcg aga cat agg gtt ggc gac agc ccg gga ctc cac tac 39
Ala Arg His Arg Val Gly Asp Ser Pro Gly Leu His Tyr
1 5 10

<210> 3984
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3984
gcg agc cct ata gca gtg gct gcc ccc ttt gcc tac 36
Ala Ser Pro Ile Ala Val Ala Ala Pro Phe Ala Tyr
1 5 10

<210> 3985
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3985
gtg aag gat tat ctt gct gtt ggt ggg acc tac tac gac tac ttt gac 48
Val Lys Asp Tyr Leu Ala Val Gly Gly Thr Tyr Tyr Asp Tyr Phe Asp
1 5 10 15

tac 51
Tyr

<210> 3986
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3986

gcg aga cat gac tac cgt aac tac ttt gac tac 33
Ala Arg His Asp Tyr Arg Asn Tyr Phe Asp Tyr
1 5 10

<210> 3987
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3987
gcg acc cca ccg tct cga tat ggt gga aac tac tac gca gac tac 45
Ala Thr Pro Pro Ser Arg Tyr Gly Gly Asn Tyr Tyr Ala Asp Tyr
1 5 10 15

<210> 3988
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3988
gcg aga caa ggg ccg aca gta gcg att gac ttc 33
Ala Arg Gln Gly Pro Thr Val Ala Ile Asp Phe
1 5 10

<210> 3989
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3989
gcg aga cgg ggt aga gag ttt gat tac 27
Ala Arg Arg Gly Arg Glu Phe Asp Tyr
1 5

<210> 3990
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3990
gcg atc cag gaa aaa cgg gaa ctg caa cta cgt cga gaa cta gat aac 48
Ala Ile Gln Glu Lys Arg Glu Leu Gln Leu Arg Arg Glu Leu Asp Asn
1 5 10 15

tac 51
Tyr

<210> 3991
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3991
gcg aga gta ttt cga tac ggt atg gac gtc 30
Ala Arg Val Phe Arg Tyr Gly Met Asp Val
1 5 10

<210> 3992
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3992
gcg atc aaa gaa ggc tac ggt ctt tca gac 30
Ala Ile Lys Glu Gly Tyr Gly Leu Ser Asp
1 5 10

<210> 3993
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3993
gcg aaa gag gat ggc tac act caa aat ttt gac tac 36
Ala Lys Glu Asp Gly Tyr Thr Gln Asn Phe Asp Tyr
1 5 10

<210> 3994
<211> 42

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3994
gcg aga gtt ctg gac ttt tat gga agt agt gtc cta gac tac 42
Ala Arg Val Leu Asp Phe Tyr Gly Ser Ser Val Leu Asp Tyr
1 5 10

<210> 3995
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3995
gcg aga gat cgg ccc ggg gac tac 24
Ala Arg Asp Arg Pro Gly Asp Tyr
1 5

<210> 3996
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3996
gcg aga gat ctt ggt gtg gga tct act acc tac 33
Ala Arg Asp Leu Gly Val Gly Ser Thr Thr Tyr
1 5 10

<210> 3997
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3997
gtg aaa gat ttg gag gtt tct ata ggt cac aat ttt gac ttt 42
Val Lys Asp Leu Glu Val Ser Ile Gly His Asn Phe Asp Phe
1 5 10

<210> 3998
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3998
gcg aga gat agg ggg gta gtg gtg gta gct gct acc cct tac tac tac 48
Ala Arg Asp Arg Gly Val Val Val Val Ala Ala Thr Pro Tyr Tyr Tyr
1 5 10 15

ggt atg gac gtc 60
Gly Met Asp Val
20

<210> 3999
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 3999
gta cac gca cga gat gac tac ggt gac tcc gct tgg tca act ggg cct 48
Val His Ala Arg Asp Asp Tyr Gly Asp Ser Ala Trp Ser Thr Gly Pro
1 5 10 15

gtc 51
Val

<210> 4000
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4000
gga cac aga cgt ctg tta agg ggg gtt act act act gtc tat ttc gac 48
Gly His Arg Arg Leu Leu Arg Gly Val Thr Thr Thr Val Tyr Phe Asp
1 5 10 15

ccc 51
Pro

<210> 4001
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4001
gcg aga gga ggg gag ctg ctg ggc gga ttc ggc tac agt ggt atg gac 48
Ala Arg Gly Gly Glu Leu Leu Gly Gly Phe Gly Tyr Ser Gly Met Asp
1 5 10 15

gtc 51
Val

<210> 4002
<211> 57
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4002
gcg cat tat tat tat gat agt agt ggt tat tac caa aac gct gaa tac 48
Ala His Tyr Tyr Tyr Asp Ser Ser Gly Tyr Tyr Gln Asn Ala Glu Tyr
1 5 10 15

ttc cag tac 57
Phe Gln Tyr

<210> 4003
<211> 63
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4003
gcg aga acc cag tgg ggg acc gat gta gag gca acg aat ccc tac tac 48
Ala Arg Thr Gln Trp Gly Thr Asp Val Glu Ala Thr Asn Pro Tyr Tyr
1 5 10 15

tat ttc atg gac gtc 63
Tyr Phe Met Asp Val
20

<210> 4004
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4004
gcg cga gat cag agt gga gct gac aga ttt gac tcc 36
Ala Arg Asp Gln Ser Gly Ala Asp Arg Phe Asp Ser
1 5 10

<210> 4005
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4005
gcg aga tct tcg aag tgg acg gac tgg cat ttt gac tac 39
Ala Arg Ser Ser Lys Trp Thr Asp Trp His Phe Asp Tyr
1 5 10

<210> 4006
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4006
gcg aga gat ctc gac gaa ata aat agt tct tgg ctc gac ccc 42
Ala Arg Asp Leu Asp Glu Ile Asn Ser Ser Trp Leu Asp Pro
1 5 10

<210> 4007
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4007
gcg aaa cgc ccc acc gct gga aac agc tat ggt gga tac tac ttt gac 48
Ala Lys Arg Pro Thr Ala Gly Asn Ser Tyr Gly Gly Tyr Tyr Phe Asp

1 5 10 15

cat 51
His

<210> 4008
<211> 57
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 4008
gcg aga cgg ggc gaa gtc ggg act atg gtt cgg gtt ttc cga aag ccg 48
Ala Arg Arg Gly Glu Val Gly Thr Met Val Arg Val Phe Arg Lys Pro
1 5 10 15

ttt gac tac 57
Phe Asp Tyr

<210> 4009
<211> 54
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 4009
gcg aca acc tcg act atg cca atg cct act aga ggg aga gac tgg ttc 48
Ala Thr Thr Ser Thr Met Pro Met Pro Thr Arg Gly Arg Asp Trp Phe
1 5 10 15

gac ccc 54
Asp Pro

<210> 4010
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 4010
gcg ggt gcc cac ggt gac tac ggt ctt gac tat 33
Ala Gly Ala His Gly Asp Tyr Gly Leu Asp Tyr

1 5 10

<210> 4011
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 4011
gcg aga cat cag cag aag tat agc ccc att tcc ccg ctt gac tac 45
Ala Arg His Gln Gln Lys Tyr Ser Pro Ile Ser Pro Leu Asp Tyr
1 5 10 15

<210> 4012
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 4012
gca aaa gac gca cgc ctg gct tat tat ggt atg gac gtc 39
Ala Lys Asp Ala Arg Leu Ala Tyr Tyr Gly Met Asp Val
1 5 10

<210> 4013
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 4013
gcg aga cac tcg agt ggt tat tca gaa ctt gcc tac 36
Ala Arg His Ser Ser Gly Tyr Ser Glu Leu Ala Tyr
1 5 10

<210> 4014
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 4014

gcg aga gtc cac aat tgg gac ttc tac tac ggt atg gac gtc 42
Ala Arg Val His Asn Trp Asp Phe Tyr Tyr Gly Met Asp Val
1 5 10

<210> 4015
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4015
act aga gag agg ccc cct aat tgt gga tct agc tgc ccc gag acc 45
Thr Arg Glu Arg Pro Pro Asn Cys Gly Ser Ser Cys Pro Glu Thr
1 5 10 15

<210> 4016
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4016
gcg aga gtc ggg aca tct cat tgg tac tct gat tct 36
Ala Arg Val Gly Thr Ser His Trp Tyr Ser Asp Ser
1 5 10

<210> 4017
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4017
gcg aga gac gag ggg cga aga gag ggc gcc 30
Ala Arg Asp Glu Gly Arg Arg Glu Gly Ala
1 5 10

<210> 4018
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4018
gcg aga gat atc gcg ctg gga cgg ggc ggt atg gac gtc 39
Ala Arg Asp Ile Ala Leu Gly Arg Gly Gly Met Asp Val
1 5 10

<210> 4019
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4019
gcg aga cat aga acg ggc caa tat tac tat aat agt 36
Ala Arg His Arg Thr Gly Gln Tyr Tyr Tyr Asn Ser
1 5 10

<210> 4020
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4020
gcg gcg tcc ggc tac ggt gac cac gtg gcc tac 33
Ala Ala Ser Gly Tyr Gly Asp His Val Ala Tyr
1 5 10

<210> 4021
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4021
gcg aga ggg aat gga cct aag agt ggg aag tac tcg gac ttt gac tac 48
Ala Arg Gly Asn Gly Pro Lys Ser Gly Lys Tyr Ser Asp Phe Asp Tyr
1 5 10 15

<210> 4022
<211> 30
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4022
gcg aga gat aag tcc tgg tac ttt gac tac 30
Ala Arg Asp Lys Ser Trp Tyr Phe Asp Tyr
1 5 10

<210> 4023
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4023
gcg aga tcc acc gct agt agt ggt tat tat gat gct ttt gat atc 45
Ala Arg Ser Thr Ala Ser Ser Gly Tyr Tyr Asp Ala Phe Asp Ile
1 5 10 15

<210> 4024
<211> 66
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4024
gcg aga gat cgt cga gag tat agc agc tcg tcc cgg cct tca tat cac 48
Ala Arg Asp Arg Arg Glu Tyr Ser Ser Ser Ser Arg Pro Ser Tyr His
1 5 10 15

tac tac tac atg gac gtc 66
Tyr Tyr Tyr Met Asp Val
20

<210> 4025
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4025
gcg tcc cga tat aga agc ccg tcc ggt gct ttt gac atc 39
Ala Ser Arg Tyr Arg Ser Pro Ser Gly Ala Phe Asp Ile
1 5 10

<210> 4026
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4026
acc aga gga gca gtg gcc gac tac 24
Thr Arg Gly Ala Val Ala Asp Tyr
1 5

<210> 4027
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4027
gcg acc tcc cac gga gga cta gtg cct ggc ggc gaa aac tac 42
Ala Thr Ser His Gly Gly Leu Val Pro Gly Gly Glu Asn Tyr
1 5 10

<210> 4028
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4028
gtg aga gag gag ttt gga gtg gtt cgt gga cct aat ccc ttt gat gtc 48
Val Arg Glu Glu Phe Gly Val Val Arg Gly Pro Asn Pro Phe Asp Val
1 5 10 15

<210> 4029
<211> 57
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4029
gcg aaa acc cgt tct tat agt tcc gct gac act act cgt ccc aat gcc 48
Ala Lys Thr Arg Ser Tyr Ser Ser Ala Asp Thr Thr Arg Pro Asn Ala

1 5 10 15

ccg ggc tac 57
Pro Gly Tyr

<210> 4030
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 4030
gcg aaa gat ggc caa act gga act aca acc cca tac ttt gac tac 45
Ala Lys Asp Gly Gln Thr Gly Thr Thr Thr Pro Tyr Phe Asp Tyr
1 5 10 15

<210> 4031
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 4031
gcg aga gcc ggg gct gag ggc gtt gac tat 30
Ala Arg Ala Gly Ala Glu Gly Val Asp Tyr
1 5 10

<210> 4032
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 4032
gcg aga cga tcc gat aaa gca gtg cct ggg acc ttt gac cag 42
Ala Arg Arg Ser Asp Lys Ala Val Pro Gly Thr Phe Asp Gln
1 5 10

<210> 4033
<211> 45
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4033
gca cac agg ggg gga aag aac cct cgt tat tgg tac ttc gat ctc 45
Ala His Arg Gly Gly Lys Asn Pro Arg Tyr Trp Tyr Phe Asp Leu
1 5 10 15

<210> 4034
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4034
gcg aga ggg gag ggg ggg gaa tta tgg gcc ttt gac tac 39
Ala Arg Gly Glu Gly Gly Glu Leu Trp Ala Phe Asp Tyr
1 5 10

<210> 4035
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4035
gcg aga gag ggg ctt cgt ctg gca cgt ggc tgg ttt cac ccc 42
Ala Arg Glu Gly Leu Arg Leu Ala Arg Gly Trp Phe His Pro
1 5 10

<210> 4036
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4036
gcg aga gat ttt gat gat ggc tac gac atc cgt tac 36
Ala Arg Asp Phe Asp Asp Gly Tyr Asp Ile Arg Tyr
1 5 10

<210> 4037
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4037
gtg aaa tca cca gtg gcc gca aat gat gct ttt gat atc 39
Val Lys Ser Pro Val Ala Ala Asn Asp Ala Phe Asp Ile
1 5 10

<210> 4038
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4038
gcg aga gtg tct gtg gcc gcc cca acg tgc ttg gac tac 39
Ala Arg Val Ser Val Ala Ala Pro Thr Cys Leu Asp Tyr
1 5 10

<210> 4039
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4039
gcg aga cat tca ggg cac gat cag ttg ccg cta gac ttt gac aac 45
Ala Arg His Ser Gly His Asp Gln Leu Pro Leu Asp Phe Asp Asn
1 5 10 15

<210> 4040
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4040
gca gga gga gga agt caa gtg gac ttc 27
Ala Gly Gly Gly Ser Gln Val Asp Phe
1 5

<210> 4041
<211> 51

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4041
gca cac aga ttc ggg aga ggg gtg tcc tac tac tac tac ggt atg gac 48
Ala His Arg Phe Gly Arg Gly Val Ser Tyr Tyr Tyr Tyr Gly Met Asp
1 5 10 15

gtc 51
Val

<210> 4042
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4042
gcg aaa gat agt ggg agc aac gac gac atg gac gtc 36
Ala Lys Asp Ser Gly Ser Asn Asp Asp Met Asp Val
1 5 10

<210> 4043
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4043
gcg aga aga ggt ttt tac tac tac tac ggt atg gac gtc 39
Ala Arg Arg Gly Phe Tyr Tyr Tyr Tyr Gly Met Asp Val
1 5 10

<210> 4044
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4044

gcg agt ctc ctc ggg ggc gat cct gac tac 30
Ala Ser Leu Leu Gly Gly Asp Pro Asp Tyr
1 5 10

<210> 4045
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 4045
gca cgg atg caa ata gtg gct acg aca cag acc tac tac tac tac tac 48
Ala Arg Met Gln Ile Val Ala Thr Thr Gln Thr Tyr Tyr Tyr Tyr Tyr
1 5 10 15

ggt atg gac gtc 60
Gly Met Asp Val
20

<210> 4046
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 4046
gcg aga gcg ggc tac gat ctt ttc ggc tgg ttc gac ccc 39
Ala Arg Ala Gly Tyr Asp Leu Phe Gly Trp Phe Asp Pro
1 5 10

<210> 4047
<211> 57
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 4047
gcg aaa ccc aac tcc cct ttc act ggc agt gga agt ttc cac aac tac 48
Ala Lys Pro Asn Ser Pro Phe Thr Gly Ser Gly Ser Phe His Asn Tyr
1 5 10 15

ttt gac tac 57
Phe Asp Tyr

<210> 4048
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4048
gcg agt ccc gtt cga ccc 18
Ala Ser Pro Val Arg Pro
1 5

<210> 4049
<211> 63
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4049
gcg aga gga ttt tgt gat ctt ccc gcc tgt tat ccc gta cct caa tac 48
Ala Arg Gly Phe Cys Asp Leu Pro Ala Cys Tyr Pro Val Pro Gln Tyr
1 5 10 15

aac tgg ttc gac ccc 63
Asn Trp Phe Asp Pro
20

<210> 4050
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4050
gcg cga tat agt ggg agc tac cct ttg ggc ttt gac tac 39
Ala Arg Tyr Ser Gly Ser Tyr Pro Leu Gly Phe Asp Tyr
1 5 10

<210> 4051
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4051
gcg aga cat gaa ggt gct ttt gat atc 27
Ala Arg His Glu Gly Ala Phe Asp Ile
1 5

<210> 4052
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4052
acc aca gat ctt gcg gtg act acg cga ttt gac tac 36
Thr Thr Asp Leu Ala Val Thr Thr Arg Phe Asp Tyr
1 5 10

<210> 4053
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4053
gcg aga agc aca cgt aca gac gct ttg gac gtc 33
Ala Arg Ser Thr Arg Thr Asp Ala Leu Asp Val
1 5 10

<210> 4054
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4054
gct aaa aat gac gag atg gac ttt aag ggc tat gac tac 39
Ala Lys Asn Asp Glu Met Asp Phe Lys Gly Tyr Asp Tyr
1 5 10

<210> 4055
<211> 27
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4055
gcg aga ggg gag tta tta ttc gac cac 27
Ala Arg Gly Glu Leu Leu Phe Asp His
1 5

<210> 4056
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4056
gct aga gaa tct acg gtg gtt ctt gac ttc 30
Ala Arg Glu Ser Thr Val Val Leu Asp Phe
1 5 10

<210> 4057
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4057
gcg aaa agg tca aca gca gtg ggg gac ttc gac ccc 36
Ala Lys Arg Ser Thr Ala Val Gly Asp Phe Asp Pro
1 5 10

<210> 4058
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4058
gcg cgg ggg ccg tcc aac tgg aac ggg ggt ccg gag cac atg gac gtc 48
Ala Arg Gly Pro Ser Asn Trp Asn Gly Gly Pro Glu His Met Asp Val
1 5 10 15

<210> 4059
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4059
gcg aga gat ttt gac tac 18
Ala Arg Asp Phe Asp Tyr
1 5

<210> 4060
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4060
gcg aga gat ccc tat ggt tcg ggg acg gtc tgg ttc gac ccc 42
Ala Arg Asp Pro Tyr Gly Ser Gly Thr Val Trp Phe Asp Pro
1 5 10

<210> 4061
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4061
gcg aaa act gag tac act ttt ttg agt ggc tcc gac tac tac cag tac 48
Ala Lys Thr Glu Tyr Thr Phe Leu Ser Gly Ser Asp Tyr Tyr Gln Tyr
1 5 10 15

ggt atg gac gtc 60
Gly Met Asp Val
20

<210> 4062
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-H3 region

<400> 4062
gcg aga cgg ggg tta ttg cgt ggg agc aac gag gga agg ttt gac tac 48
Ala Arg Arg Gly Leu Leu Arg Gly Ser Asn Glu Gly Arg Phe Asp Tyr

1 5 10 15

<210> 4063
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 4063
act aga cgc ggc agt gcc tgg acg gac ccc tac tac acg gac gtc 45
Thr Arg Arg Gly Ser Ala Trp Thr Asp Pro Tyr Tyr Thr Asp Val
1 5 10 15

<210> 4064
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 4064
gcg aga gat gat gtc cct agg ggt tat gac tac 33
Ala Arg Asp Asp Val Pro Arg Gly Tyr Asp Tyr
1 5 10

<210> 4065
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-H3 region

<400> 4065
gcg aga gag tac att gta ccc ttc tac ggt atg gac gtc 39
Ala Arg Glu Tyr Ile Val Pro Phe Tyr Gly Met Asp Val
1 5 10

<210> 4066
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4066

caa cag act aac act ttc ccc ctc act 27
Gln Gln Thr Asn Thr Phe Pro Leu Thr
1 5

<210> 4067
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4067
caa cag agt tac agt acc cct ccg cgt 27
Gln Gln Ser Tyr Ser Thr Pro Pro Arg
1 5

<210> 4068
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4068
caa cag tct aac agt ttc ccc ggg act 27
Gln Gln Ser Asn Ser Phe Pro Gly Thr
1 5

<210> 4069
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4069
gca gca tgg gag gac agc ctg agt ggt ccg gtg 33
Ala Ala Trp Glu Asp Ser Leu Ser Gly Pro Val
1 5 10

<210> 4070
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4070
aac tcc cgg gac agg agt ggt tat gtc 27
Asn Ser Arg Asp Arg Ser Gly Tyr Val
1 5

<210> 4071
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4071
cag gtg tgg gat aat ggt cat tct cat tgg gtg 33
Gln Val Trp Asp Asn Gly His Ser His Trp Val
1 5 10

<210> 4072
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4072
caa cag agt tac aga atg cct tgc agt 27
Gln Gln Ser Tyr Arg Met Pro Cys Ser
1 5

<210> 4073
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4073
cag cag tat ggt agc tca cct ccc atc acc 30
Gln Gln Tyr Gly Ser Ser Pro Pro Ile Thr
1 5 10

<210> 4074
<211> 27
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4074
cag tct tat gat aca acc aat gtg ata 27
Gln Ser Tyr Asp Thr Thr Asn Val Ile
1 5

<210> 4075
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4075
caa cag tat gat agt tca ccc ttc act 27
Gln Gln Tyr Asp Ser Ser Pro Phe Thr
1 5

<210> 4076
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4076
gga aca tgg gat gac aac ctg agt gct gta 30
Gly Thr Trp Asp Asp Asn Leu Ser Ala Val
1 5 10

<210> 4077
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4077
ctg caa ggt aca cac tgg cct ccg acg 27
Leu Gln Gly Thr His Trp Pro Pro Thr
1 5

<210> 4078
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4078
gca gca tgg gat gac aat gtg agt ggt cct ggc 33
Ala Ala Trp Asp Asp Asn Val Ser Gly Pro Gly
1 5 10

<210> 4079
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4079
gca aca tgg gat gac agc ctg aat ggt ccg gtg 33
Ala Thr Trp Asp Asp Ser Leu Asn Gly Pro Val
1 5 10

<210> 4080
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4080
cag cag tat aat aac tgg tgg acg 24
Gln Gln Tyr Asn Asn Trp Trp Thr
1 5

<210> 4081
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4081
cag caa tat ggt agt ttt cgg tac act 27
Gln Gln Tyr Gly Ser Phe Arg Tyr Thr
1 5

<210> 4082
<211> 30

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4082
caa tca gca gac agc agt gat act tat gtg 30
Gln Ser Ala Asp Ser Ser Asp Thr Tyr Val
1 5 10

<210> 4083
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4083
cag cag cgt agc aac tgg cct ctc act 27
Gln Gln Arg Ser Asn Trp Pro Leu Thr
1 5

<210> 4084
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4084
cag cag ggt agc aac tgg ttg gcg ctc act 30
Gln Gln Gly Ser Asn Trp Leu Ala Leu Thr
1 5 10

<210> 4085
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4085
caa cag tat tat att aac cct cgg acg 27
Gln Gln Tyr Tyr Ile Asn Pro Arg Thr
1 5

<210> 4086
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4086
cag caa tat tat agt act ccg tac act 27
Gln Gln Tyr Tyr Ser Thr Pro Tyr Thr
1 5

<210> 4087
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4087
caa cag agt ttc aac acc gtg ctc act 27
Gln Gln Ser Phe Asn Thr Val Leu Thr
1 5

<210> 4088
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4088
agc tca tat aca atc acc agc acg ctt tgg gtg 33
Ser Ser Tyr Thr Ile Thr Ser Thr Leu Trp Val
1 5 10

<210> 4089
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4089
gca gca tgg gat gac agc ctg agt ggt ccg gta 33
Ala Ala Trp Asp Asp Ser Leu Ser Gly Pro Val

1 5 10

<210> 4090
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4090
cag cag act tac agt aat cct tgg acg 27
Gln Gln Thr Tyr Ser Asn Pro Trp Thr
1 5

<210> 4091
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4091
caa cag act tac agt cac cct cgc acg 27
Gln Gln Thr Tyr Ser His Pro Arg Thr
1 5

<210> 4092
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4092
cag tcc tat gac agc agc ctg agt ggt tat gtc 33
Gln Ser Tyr Asp Ser Ser Leu Ser Gly Tyr Val
1 5 10

<210> 4093
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4093

cag gtg tgg gat agt agt agt gat cat tat gtc 33
Gln Val Trp Asp Ser Ser Ser Asp His Tyr Val
1 5 10

<210> 4094
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4094
caa cag act agc agt ttc cct cga act 27
Gln Gln Thr Ser Ser Phe Pro Arg Thr
1 5

<210> 4095
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4095
caa tca gta gac att act tct act tgg gtg 30
Gln Ser Val Asp Ile Thr Ser Thr Trp Val
1 5 10

<210> 4096
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4096
agc tca tat ata agt agc ctc act tat gtg ctg 33
Ser Ser Tyr Ile Ser Ser Leu Thr Tyr Val Leu
1 5 10

<210> 4097
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4097
gga aca tgg gat agt agc ctg agt gtt ggg gtg 33
Gly Thr Trp Asp Ser Ser Leu Ser Val Gly Val
1 5 10

<210> 4098
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4098
atg caa ggt aca cac tgg ccg atc acc 27
Met Gln Gly Thr His Trp Pro Ile Thr
1 5

<210> 4099
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4099
cag cag tat gat agc tca tcg tgg acg 27
Gln Gln Tyr Asp Ser Ser Ser Trp Thr
1 5

<210> 4100
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4100
cag tcg tat gac agc agc ctg aga ggt gtg gtg 33
Gln Ser Tyr Asp Ser Ser Leu Arg Gly Val Val
1 5 10

<210> 4101
<211> 27
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4101
caa cag agt tac agt acc cct cgg acg 27
Gln Gln Ser Tyr Ser Thr Pro Arg Thr
1 5

<210> 4102
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4102
cag caa tat tat agc act ccg tgg acg 27
Gln Gln Tyr Tyr Ser Thr Pro Trp Thr
1 5

<210> 4103
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4103
cag tcc tat gac agc ggc ctg agt ggt tcg aag gtg gtc 39
Gln Ser Tyr Asp Ser Gly Leu Ser Gly Ser Lys Val Val
1 5 10

<210> 4104
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4104
cag tct tat gat ctc agc act tgg gtg 27
Gln Ser Tyr Asp Leu Ser Thr Trp Val
1 5

<210> 4105
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4105
cac cag agt tac agt acc tct ctc act 27
His Gln Ser Tyr Ser Thr Ser Leu Thr
1 5

<210> 4106
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4106
cag gtg tgg gat agt agt agt gat cat tgg gtg 33
Gln Val Trp Asp Ser Ser Ser Asp His Trp Val
1 5 10

<210> 4107
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4107
agc tca tat aca agc agc agc act cag gta 30
Ser Ser Tyr Thr Ser Ser Ser Thr Gln Val
1 5 10

<210> 4108
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4108
caa cag agt tac agt acc cct aag acg 27
Gln Gln Ser Tyr Ser Thr Pro Lys Thr
1 5

<210> 4109
<211> 30

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4109
caa cag ttt aat act tac cct ctg tac acc 30
Gln Gln Phe Asn Thr Tyr Pro Leu Tyr Thr
1 5 10

<210> 4110
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4110
gac tcc cgg gac agc agt ggt aac ctc gtg gta 33
Asp Ser Arg Asp Ser Ser Gly Asn Leu Val Val
1 5 10

<210> 4111
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4111
caa cag act aac agt ttc ccc cgg act 27
Gln Gln Thr Asn Ser Phe Pro Arg Thr
1 5

<210> 4112
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4112
caa cag agt tac agt gtc cct ccg tgg acg 30
Gln Gln Ser Tyr Ser Val Pro Pro Trp Thr
1 5 10

<210> 4113
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4113
cag caa tat ggt agc tca cct cgg tac act 30
Gln Gln Tyr Gly Ser Ser Pro Arg Tyr Thr
1 5 10

<210> 4114
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4114
cag cag tat ggt agc gcg tgg acg 24
Gln Gln Tyr Gly Ser Ala Trp Thr
1 5

<210> 4115
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4115
cag cag cgt gcc aac tgg cct cct atc acc 30
Gln Gln Arg Ala Asn Trp Pro Pro Ile Thr
1 5 10

<210> 4116
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4116
caa cag tat aat agt tac ccg tgg acg 27
Gln Gln Tyr Asn Ser Tyr Pro Trp Thr

1 5

<210> 4117
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4117
cag gtg tgg gat agt agt agt gat cat tat gtg gta 36
Gln Val Trp Asp Ser Ser Ser Asp His Tyr Val Val
1 5 10

<210> 4118
<211> 30
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4118
cag cag cgt agc aac tgg cct ccg ctc act 30
Gln Gln Arg Ser Asn Trp Pro Pro Leu Thr
1 5 10

<210> 4119
<211> 27
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4119
atg caa gct cta caa act ccc tac act 27
Met Gln Ala Leu Gln Thr Pro Tyr Thr
1 5

<210> 4120
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4120

caa cag tat aat agt tat tcg acg 24
Gln Gln Tyr Asn Ser Tyr Ser Thr
1 5

<210> 4121
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4121
ttg cta tat atg ggc agt ggc att tcg gtt 30
Leu Leu Tyr Met Gly Ser Gly Ile Ser Val
1 5 10

<210> 4122
<211> 30
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4122
cag cac tat ggt gcc tca ccg ccg tgg acg 30
Gln His Tyr Gly Ala Ser Pro Pro Trp Thr
1 5 10

<210> 4123
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4123
cag gtg tgg gat agt aat aat gat cac cgg gag gtg 36
Gln Val Trp Asp Ser Asn Asn Asp His Arg Glu Val
1 5 10

<210> 4124
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4124
caa cag tat gat agt tat cct ctc tct 27
Gln Gln Tyr Asp Ser Tyr Pro Leu Ser
1 5

<210> 4125
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4125
cta caa cat gat aat ttc ccg tac act 27
Leu Gln His Asp Asn Phe Pro Tyr Thr
1 5

<210> 4126
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4126
cag caa tac ggc agt tca ccg ctc acc 27
Gln Gln Tyr Gly Ser Ser Pro Leu Thr
1 5

<210> 4127
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4127
tac tca aca gac agc agt ggt aat cat ggg gtg 33
Tyr Ser Thr Asp Ser Ser Gly Asn His Gly Val
1 5 10

<210> 4128
<211> 27
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4128
atg caa gct cta caa act cct aac act 27
Met Gln Ala Leu Gln Thr Pro Asn Thr
1 5

<210> 4129
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4129
aac tca tat tca agc agc agc act ctt tat gtc 33
Asn Ser Tyr Ser Ser Ser Ser Thr Leu Tyr Val
1 5 10

<210> 4130
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4130
caa caa cat agc aac tgg cct gag ctc act 30
Gln Gln His Ser Asn Trp Pro Glu Leu Thr
1 5 10

<210> 4131
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4131
agc tcg tat aga agc agc ggc gtt tat gtc 30
Ser Ser Tyr Arg Ser Ser Gly Val Tyr Val
1 5 10

<210> 4132
<211> 27
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4132
atg caa agt ata cac ctt ccg tac act 27
Met Gln Ser Ile His Leu Pro Tyr Thr
1 5

<210> 4133
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4133
cac cag tat ggt ggc tca cct cca aac act 30
His Gln Tyr Gly Gly Ser Pro Pro Asn Thr
1 5 10

<210> 4134
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4134
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Gln Gln Leu Asn Ser Tyr Pro Pro Leu Thr
1 5 10

<210> 4135
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4135
gca aca tgg gat agc agc ctg act gct ggg gtg 33
Ala Thr Trp Asp Ser Ser Leu Thr Ala Gly Val
1 5 10

<210> 4136
<211> 27

<212> DNA
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<220>
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CDR-L3 region

<400> 4136
cag cag cgt agc gcc tgg cct atc act 27
Gln Gln Arg Ser Ala Trp Pro Ile Thr
1 5

<210> 4137
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4137
cag cag tat ggt agc tca cgg aag ctc act 30
Gln Gln Tyr Gly Ser Ser Arg Lys Leu Thr
1 5 10

<210> 4138
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4138
caa cac tat gac agt tat ccg tgg acg 27
Gln His Tyr Asp Ser Tyr Pro Trp Thr
1 5

<210> 4139
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4139
tgt tcc cgg gac agc agt ggt aac cct tgg gta 33
Cys Ser Arg Asp Ser Ser Gly Asn Pro Trp Val
1 5 10

<210> 4140
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4140
caa cag agt tac agc acg tcg ctc act 27
Gln Gln Ser Tyr Ser Thr Ser Leu Thr
1 5

<210> 4141
<211> 33
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4141
cag cag tat gat agc tca cct ccc atg tac act 33
Gln Gln Tyr Asp Ser Ser Pro Pro Met Tyr Thr
1 5 10

<210> 4142
<211> 36
<212> DNA
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<220>
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CDR-L3 region

<400> 4142
gga aca tgg gat agc agc ctg agt cct ggg ggg gta 36
Gly Thr Trp Asp Ser Ser Leu Ser Pro Gly Gly Val
1 5 10

<210> 4143
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4143
caa cag agt tac aat gcc cgg acg 24
Gln Gln Ser Tyr Asn Ala Arg Thr

1 5

<210> 4144
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4144
cag caa tat tat gat act gct ccg ctc act 30
Gln Gln Tyr Tyr Asp Thr Ala Pro Leu Thr
1 5 10

<210> 4145
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4145
cag cag tat agt aaa tgg ccc atc acc 27
Gln Gln Tyr Ser Lys Trp Pro Ile Thr
1 5

<210> 4146
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4146
caa cag act tac act acc cct agg acg 27
Gln Gln Thr Tyr Thr Thr Pro Arg Thr
1 5

<210> 4147
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4147

cag tcc tat gac agc cgc ctg agt ggt gtg gta 33
Gln Ser Tyr Asp Ser Arg Leu Ser Gly Val Val
1 5 10

<210> 4148
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4148
cag cag tat act acc agg cct ctc act 27
Gln Gln Tyr Thr Thr Arg Pro Leu Thr
1 5

<210> 4149
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4149
caa cag cgg agc aag tgg cct ctc act 27
Gln Gln Arg Ser Lys Trp Pro Leu Thr
1 5

<210> 4150
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4150
gca aca tgg gat gac agc ctg ggt ggc cgt gtg gtt 36
Ala Thr Trp Asp Asp Ser Leu Gly Gly Arg Val Val
1 5 10

<210> 4151
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4151
atg caa cgt ata gag ttt cct ttc act 27
Met Gln Arg Ile Glu Phe Pro Phe Thr
1 5

<210> 4152
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4152
cag gcg tgg gac agc agc act gcg gta 27
Gln Ala Trp Asp Ser Ser Thr Ala Val
1 5

<210> 4153
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4153
cag tcg tgg gac agt agt tct gtg cta 27
Gln Ser Trp Asp Ser Ser Ser Val Leu
1 5

<210> 4154
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4154
cag caa tat tat ggt cgt cta ttc act 27
Gln Gln Tyr Tyr Gly Arg Leu Phe Thr
1 5

<210> 4155
<211> 33
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4155
cag cag cgt agc aac tgg cct ccg agg ctc cct 33
Gln Gln Arg Ser Asn Trp Pro Pro Arg Leu Pro
1 5 10

<210> 4156
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4156
cag cag cgt agc aac tgg cct ccg tac act 30
Gln Gln Arg Ser Asn Trp Pro Pro Tyr Thr
1 5 10

<210> 4157
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4157
atg caa gct cta caa act ccg tac act 27
Met Gln Ala Leu Gln Thr Pro Tyr Thr
1 5

<210> 4158
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4158
caa cac tat gat agt tat att gga acg 27
Gln His Tyr Asp Ser Tyr Ile Gly Thr
1 5

<210> 4159
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4159
gga aca tgg gat agc agt ttg ggt ggc gga gtg 33
Gly Thr Trp Asp Ser Ser Leu Gly Gly Gly Val
1 5 10

<210> 4160
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4160
cag cag cgt agc aac tgg cct ccg tac act 30
Gln Gln Arg Ser Asn Trp Pro Pro Tyr Thr
1 5 10

<210> 4161
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4161
atg gaa gct gaa caa act ccg ggg act 27
Met Glu Ala Glu Gln Thr Pro Gly Thr
1 5

<210> 4162
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4162
agc tca tat aca agc agc acc act gtg ctt 30
Ser Ser Tyr Thr Ser Ser Thr Thr Val Leu
1 5 10

<210> 4163
<211> 30

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4163
atg caa ggt aca cac tgg cct ccg atc acc 30
Met Gln Gly Thr His Trp Pro Pro Ile Thr
1 5 10

<210> 4164
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4164
cac cag act tac agt acc cgg ctc act 27
His Gln Thr Tyr Ser Thr Arg Leu Thr
1 5

<210> 4165
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4165
caa cag tat gat aat ctc ccg ctc act 27
Gln Gln Tyr Asp Asn Leu Pro Leu Thr
1 5

<210> 4166
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4166
cag gtg tgg gat agc agt agt gat cct tgg gtg 33
Gln Val Trp Asp Ser Ser Ser Asp Pro Trp Val
1 5 10

<210> 4167
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4167
caa caa ctg aat agt tac cct ccg gtc acc 30
Gln Gln Leu Asn Ser Tyr Pro Pro Val Thr
1 5 10

<210> 4168
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4168
caa cag agt tac agt acc ccg tac act 27
Gln Gln Ser Tyr Ser Thr Pro Tyr Thr
1 5

<210> 4169
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4169
caa cag tat agt agt tct tct cca aga acg 30
Gln Gln Tyr Ser Ser Ser Ser Pro Arg Thr
1 5 10

<210> 4170
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4170
atg caa agt tta caa ctt ccg att acc 27
Met Gln Ser Leu Gln Leu Pro Ile Thr

1 5

<210> 4171
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4171
caa cag agt tac agt acc cgt tta ctc act 30
Gln Gln Ser Tyr Ser Thr Arg Leu Leu Thr
1 5 10

<210> 4172
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4172
cag tcc ttt gac agc agc ctg aga ggt tat gtc 33
Gln Ser Phe Asp Ser Ser Leu Arg Gly Tyr Val
1 5 10

<210> 4173
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4173
cag cac cgt atc acc tgg cct ccc ctg atc acc 33
Gln His Arg Ile Thr Trp Pro Pro Leu Ile Thr
1 5 10

<210> 4174
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4174

cag caa tat gct tat gta ccg atc acc 27
Gln Gln Tyr Ala Tyr Val Pro Ile Thr
1 5

<210> 4175
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4175
cag caa tat tat agt att ccc ctc act 27
Gln Gln Tyr Tyr Ser Ile Pro Leu Thr
1 5

<210> 4176
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4176
cag cag tat ggt agc tca ccc ctg tgg 27
Gln Gln Tyr Gly Ser Ser Pro Leu Trp
1 5

<210> 4177
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4177
agc tca tat aca agc agc agc act caa gtc 30
Ser Ser Tyr Thr Ser Ser Ser Thr Gln Val
1 5 10

<210> 4178
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4178
tac tca aca gac agc agt ggt aat cat agg gtg 33
Tyr Ser Thr Asp Ser Ser Gly Asn His Arg Val
1 5 10

<210> 4179
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4179
cag cag tat aat aac tgg cct cag tac act 30
Gln Gln Tyr Asn Asn Trp Pro Gln Tyr Thr
1 5 10

<210> 4180
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4180
cag cac ttt cgt agc tca cct ccc acg tac act 33
Gln His Phe Arg Ser Ser Pro Pro Thr Tyr Thr
1 5 10

<210> 4181
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4181
agc tca tat tca agg acc acc act ctc gta 30
Ser Ser Tyr Ser Arg Thr Thr Thr Leu Val
1 5 10

<210> 4182
<211> 36
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4182
cag tcc tat gac agc ggc ctg agt gct cct tgg gtg 36
Gln Ser Tyr Asp Ser Gly Leu Ser Ala Pro Trp Val
1 5 10

<210> 4183
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4183
cag caa tat ggt aac tca cct ccc act 27
Gln Gln Tyr Gly Asn Ser Pro Pro Thr
1 5

<210> 4184
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4184
gca acc tgg gat gac gac ctg agt ggt ccg gtc 33
Ala Thr Trp Asp Asp Asp Leu Ser Gly Pro Val
1 5 10

<210> 4185
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4185
cta caa cat gat act ttc cct ctg acg 27
Leu Gln His Asp Thr Phe Pro Leu Thr
1 5

<210> 4186
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4186
caa cag tat aat agt tat tcg tgg acg 27
Gln Gln Tyr Asn Ser Tyr Ser Trp Thr
1 5

<210> 4187
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4187
caa cac ctt act agt ttc ccg tac act 27
Gln His Leu Thr Ser Phe Pro Tyr Thr
1 5

<210> 4188
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4188
ggc tcc cgg gac agt agt ggt aac cct tct gtc 33
Gly Ser Arg Asp Ser Ser Gly Asn Pro Ser Val
1 5 10

<210> 4189
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4189
cag cag cgt agc aac tgg ctg tac act 27
Gln Gln Arg Ser Asn Trp Leu Tyr Thr
1 5

<210> 4190
<211> 36

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4190
cag gtg tgg gat agt agt agt gat cat caa gag gta 36
Gln Val Trp Asp Ser Ser Ser Asp His Gln Glu Val
1 5 10

<210> 4191
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4191
tgc tca tat gca cct agt aac act tat gtc 30
Cys Ser Tyr Ala Pro Ser Asn Thr Tyr Val
1 5 10

<210> 4192
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4192
cag cag cgt agc aac tgg cct ctc act 27
Gln Gln Arg Ser Asn Trp Pro Leu Thr
1 5

<210> 4193
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4193
aac tcc cga gac agc agt gct cat gac cat ctg tta 36
Asn Ser Arg Asp Ser Ser Ala His Asp His Leu Leu
1 5 10

<210> 4194
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4194
caa cac ttt ggt gac tca ccc ttg tac att 30
Gln His Phe Gly Asp Ser Pro Leu Tyr Ile
1 5 10

<210> 4195
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4195
cag gtg tgg gac agc agt act gcg gtg 27
Gln Val Trp Asp Ser Ser Thr Ala Val
1 5

<210> 4196
<211> 33
<212> DNA
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<220>
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CDR-L3 region

<400> 4196
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Gln Val Trp Asp Ser Ser Ser Asp His Val Val
1 5 10

<210> 4197
<211> 33
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4197
caa tca gca gac agc agt ggt ttt tat gtg gta 33
Gln Ser Ala Asp Ser Ser Gly Phe Tyr Val Val

1 5 10

<210> 4198
<211> 27
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4198
caa tca gca gac agc agt agt ccc gtg 27
Gln Ser Ala Asp Ser Ser Ser Pro Val
1 5

<210> 4199
<211> 30
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4199
tac tca aca gac agt agg gct acc ggg gtt 30
Tyr Ser Thr Asp Ser Arg Ala Thr Gly Val
1 5 10

<210> 4200
<211> 27
<212> DNA
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<220>
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<400> 4200
caa cag agt tac agt acc cct cag acg 27
Gln Gln Ser Tyr Ser Thr Pro Gln Thr
1 5

<210> 4201
<211> 27
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4201

caa cag tat gaa aat ctc ccg ctc act 27
Gln Gln Tyr Glu Asn Leu Pro Leu Thr
1 5

<210> 4202
<211> 27
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4202
caa cag ttt gat aat ctc ccg ctc act 27
Gln Gln Phe Asp Asn Leu Pro Leu Thr
1 5

<210> 4203
<211> 30
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4203
tcc tca tat gca ggc agc tac act tgg gtg 30
Ser Ser Tyr Ala Gly Ser Tyr Thr Trp Val
1 5 10

<210> 4204
<211> 27
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4204
cag gcg tgg gac agc agc act gtg gta 27
Gln Ala Trp Asp Ser Ser Thr Val Val
1 5

<210> 4205
<211> 33
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4205
gga aca tgg gat agc agc ctg ggt gct tat gtc 33
Gly Thr Trp Asp Ser Ser Leu Gly Ala Tyr Val
1 5 10

<210> 4206
<211> 24
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4206
cag cag tat ggt agc tca ctc act 24
Gln Gln Tyr Gly Ser Ser Leu Thr
1 5

<210> 4207
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4207
cag cag tat ggt agc tca cct ctc act 27
Gln Gln Tyr Gly Ser Ser Pro Leu Thr
1 5

<210> 4208
<211> 30
<212> DNA
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<220>
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<400> 4208
agc tca tat aca agc agc agg agt ctg gtg 30
Ser Ser Tyr Thr Ser Ser Arg Ser Leu Val
1 5 10

<210> 4209
<211> 27
<212> DNA
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<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4209
caa cag act tac agc acc ccg tgg acg 27
Gln Gln Thr Tyr Ser Thr Pro Trp Thr
1 5

<210> 4210
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4210
caa caa tat aat aat tgg ctc act 24
Gln Gln Tyr Asn Asn Trp Leu Thr
1 5

<210> 4211
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4211
tac tct acg cct gac aac aat ggg gtg 27
Tyr Ser Thr Pro Asp Asn Asn Gly Val
1 5

<210> 4212
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4212
agc tca tat aca acc tcc aac agt gtg gtg 30
Ser Ser Tyr Thr Thr Ser Asn Ser Val Val
1 5 10

<210> 4213
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4213
cag cag tat gat aac tca cct ctc act 27
Gln Gln Tyr Asp Asn Ser Pro Leu Thr
1 5

<210> 4214
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4214
cag caa tat tgg ggt act ccg tac act 27
Gln Gln Tyr Trp Gly Thr Pro Tyr Thr
1 5

<210> 4215
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4215
cag tcc tat gac agt ggc ctg ggg gtg gta 30
Gln Ser Tyr Asp Ser Gly Leu Gly Val Val
1 5 10

<210> 4216
<211> 30
<212> DNA
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<220>
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CDR-L3 region

<400> 4216
agc tca tat gca ggc atc aac aat ttg gtt 30
Ser Ser Tyr Ala Gly Ile Asn Asn Leu Val
1 5 10

<210> 4217
<211> 27

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4217
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Gln Gln Tyr Asn Ser Tyr Ser Gln Thr
1 5

<210> 4218
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4218
cag cag tat act gac tgg ccg tac act 27
Gln Gln Tyr Thr Asp Trp Pro Tyr Thr
1 5

<210> 4219
<211> 24
<212> DNA
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<220>
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CDR-L3 region

<400> 4219
cag acc tgg ggc act gtt ggc gtg 24
Gln Thr Trp Gly Thr Val Gly Val
1 5

<210> 4220
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4220
cag cag tat ggt agc tca ccg tgg acg 27
Gln Gln Tyr Gly Ser Ser Pro Trp Thr
1 5

<210> 4221
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4221
cag tct tat gac agc agc ctg agt ggt tat gtc 33
Gln Ser Tyr Asp Ser Ser Leu Ser Gly Tyr Val
1 5 10

<210> 4222
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4222
cag tgt ttt gac acc agc ctg act gca aag gtg 33
Gln Cys Phe Asp Thr Ser Leu Thr Ala Lys Val
1 5 10

<210> 4223
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4223
atg caa gct cta caa gtt cct cgg acg 27
Met Gln Ala Leu Gln Val Pro Arg Thr
1 5

<210> 4224
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4224
caa caa ctt aat agt tac ccg ctc act 27
Gln Gln Leu Asn Ser Tyr Pro Leu Thr

1 5

<210> 4225
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
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<400> 4225
gca gca tgg gat gac agc ctg agt ggt ccg gtg 33
Ala Ala Trp Asp Asp Ser Leu Ser Gly Pro Val
1 5 10

<210> 4226
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4226
atg caa gct ctg caa act ccg tgg acg 27
Met Gln Ala Leu Gln Thr Pro Trp Thr
1 5

<210> 4227
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4227
aac tcc cgg gac agc agt gat gac cat ctg gaa gta 36
Asn Ser Arg Asp Ser Ser Asp Asp His Leu Glu Val
1 5 10

<210> 4228
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4228

caa cag tat aat agt tac ccg agg acg 27
Gln Gln Tyr Asn Ser Tyr Pro Arg Thr
1 5

<210> 4229
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4229
cag caa tat ttt act act cct cgc acg 27
Gln Gln Tyr Phe Thr Thr Pro Arg Thr
1 5

<210> 4230
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4230
gca gca tgg gat gac ggc ctg ggt ggc ctt tat gtg 36
Ala Ala Trp Asp Asp Gly Leu Gly Gly Leu Tyr Val
1 5 10

<210> 4231
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4231
caa cag tat aat agg ggg tcc act 24
Gln Gln Tyr Asn Arg Gly Ser Thr
1 5

<210> 4232
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4232
cag gtg tgg gac agg aat agt cat cgt gtg att 33
Gln Val Trp Asp Arg Asn Ser His Arg Val Ile
1 5 10

<210> 4233
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4233
cag tcc tat gac aac agt ctg agt gct tgg gtg 33
Gln Ser Tyr Asp Asn Ser Leu Ser Ala Trp Val
1 5 10

<210> 4234
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4234
aac tcc cgg gac agc agt ggt aac cat tgg gtg 33
Asn Ser Arg Asp Ser Ser Gly Asn His Trp Val
1 5 10

<210> 4235
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4235
agc tca tat ata agg agc agc act cct gtg gta 33
Ser Ser Tyr Ile Arg Ser Ser Thr Pro Val Val
1 5 10

<210> 4236
<211> 27
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4236
cag cag tat tat gat act ccc tac act 27
Gln Gln Tyr Tyr Asp Thr Pro Tyr Thr
1 5

<210> 4237
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4237
agc tca tat aca agc agc agc act ctg gtg 30
Ser Ser Tyr Thr Ser Ser Ser Thr Leu Val
1 5 10

<210> 4238
<211> 24
<212> DNA
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<220>
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CDR-L3 region

<400> 4238
caa cag tat gat aat ctc tgg acg 24
Gln Gln Tyr Asp Asn Leu Trp Thr
1 5

<210> 4239
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4239
cag gtg tgg gat agt agt agt gat cat ctt tat gtc 36
Gln Val Trp Asp Ser Ser Ser Asp His Leu Tyr Val
1 5 10

<210> 4240
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4240
cac cag tat ggt agc tca cca agg acg 27
His Gln Tyr Gly Ser Ser Pro Arg Thr
1 5

<210> 4241
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4241
gga aca tgg gac agc agc ctg act ggt ggt ttt gtc 36
Gly Thr Trp Asp Ser Ser Leu Thr Gly Gly Phe Val
1 5 10

<210> 4242
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4242
cag gtg tgg gac act tct aat gat gtg ggg gtg 33
Gln Val Trp Asp Thr Ser Asn Asp Val Gly Val
1 5 10

<210> 4243
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4243
cag cag tat ggt agc tca cct ccg act 27
Gln Gln Tyr Gly Ser Ser Pro Pro Thr
1 5

<210> 4244
<211> 30

<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4244
tgc tca tat gca ggt agt agc aat tgg gtg 30
Cys Ser Tyr Ala Gly Ser Ser Asn Trp Val
1 5 10

<210> 4245
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4245
atg caa ggt aca cac tgg tcc gct 24
Met Gln Gly Thr His Trp Ser Ala
1 5

<210> 4246
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4246
gca gca tgg gat gac agc ctg agt ggt cag gtg 33
Ala Ala Trp Asp Asp Ser Leu Ser Gly Gln Val
1 5 10

<210> 4247
<211> 30
<212> DNA
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<220>
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CDR-L3 region

<400> 4247
aac tcc cgg gac agc agt ggt aac cat gtc 30
Asn Ser Arg Asp Ser Ser Gly Asn His Val
1 5 10

<210> 4248
<211> 24
<212> DNA
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<220>
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CDR-L3 region

<400> 4248
caa cag agt tac agt act ccc acc 24
Gln Gln Ser Tyr Ser Thr Pro Thr
1 5

<210> 4249
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4249
cag gtg tgg gaa agt ggt ggt gat cat ccg gtg 33
Gln Val Trp Glu Ser Gly Gly Asp His Pro Val
1 5 10

<210> 4250
<211> 27
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4250
cta cag cat aat aat tac ccg ttg acg 27
Leu Gln His Asn Asn Tyr Pro Leu Thr
1 5

<210> 4251
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4251
caa cag tat aat agt tat ccg tac act 27
Gln Gln Tyr Asn Ser Tyr Pro Tyr Thr

1 5

<210> 4252
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4252
atg caa gct cta cag atc ccc cgg acg 27
Met Gln Ala Leu Gln Ile Pro Arg Thr
1 5

<210> 4253
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4253
cag gcg tgg gac agc aac gtc cat gtc 27
Gln Ala Trp Asp Ser Asn Val His Val
1 5

<210> 4254
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4254
tac tca aca gac agc agt ggt aat gtc tgg gtg 33
Tyr Ser Thr Asp Ser Ser Gly Asn Val Trp Val
1 5 10

<210> 4255
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4255

aac tcc cgg gac agc agt ggt aac ctt tat gtc 33
Asn Ser Arg Asp Ser Ser Gly Asn Leu Tyr Val
1 5 10

<210> 4256
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4256
cag caa tat tat agt agt cct ctc act 27
Gln Gln Tyr Tyr Ser Ser Pro Leu Thr
1 5

<210> 4257
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4257
atg caa gct cta caa act ccc ccg tac act 30
Met Gln Ala Leu Gln Thr Pro Pro Tyr Thr
1 5 10

<210> 4258
<211> 30
<212> DNA
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<220>
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CDR-L3 region

<400> 4258
agc tca tat aca agc agc agc act tgg gtg 30
Ser Ser Tyr Thr Ser Ser Ser Thr Trp Val
1 5 10

<210> 4259
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4259
cag caa agt tac agt act ccg tac acc 27
Gln Gln Ser Tyr Ser Thr Pro Tyr Thr
1 5

<210> 4260
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4260
tgc tca tat gca ggt agt agc act cct tgg gtg 33
Cys Ser Tyr Ala Gly Ser Ser Thr Pro Trp Val
1 5 10

<210> 4261
<211> 33
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4261
tac tca cca gac agc agt ggt aat gtt tgg gtg 33
Tyr Ser Pro Asp Ser Ser Gly Asn Val Trp Val
1 5 10

<210> 4262
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4262
cag tcc cgg ggc act 15
Gln Ser Arg Gly Thr
1 5

<210> 4263
<211> 27
<212> DNA
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<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4263
cag cag tat ggt agc tca cat tac act 27
Gln Gln Tyr Gly Ser Ser His Tyr Thr
1 5

<210> 4264
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4264
cag gtg tgg gat agt agt agt gat cat cct tgg gtg 36
Gln Val Trp Asp Ser Ser Ser Asp His Pro Trp Val
1 5 10

<210> 4265
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4265
tgc tcg tat aga agt agt acg gct ccc gtg gtc 33
Cys Ser Tyr Arg Ser Ser Thr Ala Pro Val Val
1 5 10

<210> 4266
<211> 27
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4266
cag caa tat ttt agt act ccg tgg acg 27
Gln Gln Tyr Phe Ser Thr Pro Trp Thr
1 5

<210> 4267
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4267
cag gtg tgg gat ggt tat agt gat cca ttg gta 33
Gln Val Trp Asp Gly Tyr Ser Asp Pro Leu Val
1 5 10

<210> 4268
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4268
caa cag agt tac tat acc cct ccc act 27
Gln Gln Ser Tyr Tyr Thr Pro Pro Thr
1 5

<210> 4269
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4269
gca gca tgg gat gac agc ctg aat ggg ctt tgg gtg 36
Ala Ala Trp Asp Asp Ser Leu Asn Gly Leu Trp Val
1 5 10

<210> 4270
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4270
cag tct tct gac agc aac aat cat gtg gtc 30
Gln Ser Ser Asp Ser Asn Asn His Val Val
1 5 10

<210> 4271
<211> 33

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4271
cag tcc tat gac agc agc ctg agt ggt gtg cta 33
Gln Ser Tyr Asp Ser Ser Leu Ser Gly Val Leu
1 5 10

<210> 4272
<211> 27
<212> DNA
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<220>
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CDR-L3 region

<400> 4272
caa cag agt tac agt acc ccc ttc act 27
Gln Gln Ser Tyr Ser Thr Pro Phe Thr
1 5

<210> 4273
<211> 27
<212> DNA
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<220>
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CDR-L3 region

<400> 4273
caa cag tat gat agt ctc cct ctc act 27
Gln Gln Tyr Asp Ser Leu Pro Leu Thr
1 5

<210> 4274
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
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CDR-L3 region

<400> 4274
cag tac tat ggt ggc tca ccg gga ttc act 30
Gln Tyr Tyr Gly Gly Ser Pro Gly Phe Thr
1 5 10

<210> 4275
<211> 30
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4275
tgc tca tat gca ggt agt agc act tat gtc 30
Cys Ser Tyr Ala Gly Ser Ser Thr Tyr Val
1 5 10

<210> 4276
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4276
cag gag tat gtt aaa tca cct gga ttc gct 30
Gln Glu Tyr Val Lys Ser Pro Gly Phe Ala
1 5 10

<210> 4277
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4277
cag cag tat ggt act tca cct cag acg 27
Gln Gln Tyr Gly Thr Ser Pro Gln Thr
1 5

<210> 4278
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4278
atg ttg tat atg ggt agt ggc att tcg ctc 30
Met Leu Tyr Met Gly Ser Gly Ile Ser Leu

1 5 10

<210> 4279
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4279
cag tcc aat gac atc agc ctg agt ggt tct gtg gta 36
Gln Ser Asn Asp Ile Ser Leu Ser Gly Ser Val Val
1 5 10

<210> 4280
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4280
caa tcc tat gac aat agc ctg agt ggg ggg gtg 33
Gln Ser Tyr Asp Asn Ser Leu Ser Gly Gly Val
1 5 10

<210> 4281
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4281
cag cag ttt gat att tca ccc ttc act 27
Gln Gln Phe Asp Ile Ser Pro Phe Thr
1 5

<210> 4282
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4282

agc tca tat aca agc agc agc tcc ttg gtg 30
Ser Ser Tyr Thr Ser Ser Ser Ser Leu Val
1 5 10

<210> 4283
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4283
tgc tca ttt aca ggt act agc act ttt gtc 30
Cys Ser Phe Thr Gly Thr Ser Thr Phe Val
1 5 10

<210> 4284
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4284
cag caa tat tat agt act ccg tac act 27
Gln Gln Tyr Tyr Ser Thr Pro Tyr Thr
1 5

<210> 4285
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4285
gca aca tgg gat gac agc ctg aat gga ggg gtg 33
Ala Thr Trp Asp Asp Ser Leu Asn Gly Gly Val
1 5 10

<210> 4286
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4286
tgg ctc atc tct ggt ggt gcc cct gta 27
Trp Leu Ile Ser Gly Gly Ala Pro Val
1 5

<210> 4287
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4287
cag tcc ttt gac agc agc ctg agt cgt tct gtc 33
Gln Ser Phe Asp Ser Ser Leu Ser Arg Ser Val
1 5 10

<210> 4288
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4288
cag cag cgt aac aac tgg cct atc act 27
Gln Gln Arg Asn Asn Trp Pro Ile Thr
1 5

<210> 4289
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4289
cta caa gat tac aat tac cct ccg acg 27
Leu Gln Asp Tyr Asn Tyr Pro Pro Thr
1 5

<210> 4290
<211> 33
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4290
aac tcc cgg gac agc agc ggt cac cat tgg gtg 33
Asn Ser Arg Asp Ser Ser Gly His His Trp Val
1 5 10

<210> 4291
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4291
cag caa tat tat tct act cca tac act 27
Gln Gln Tyr Tyr Ser Thr Pro Tyr Thr
1 5

<210> 4292
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4292
atg caa ggt gca cac tgg cct cca atc acc 30
Met Gln Gly Ala His Trp Pro Pro Ile Thr
1 5 10

<210> 4293
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4293
tac tca aca gac act att gga aat tgg gtg 30
Tyr Ser Thr Asp Thr Ile Gly Asn Trp Val
1 5 10

<210> 4294
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4294
cag gtg tgg gat agt agt agt gat cat tgg att 33
Gln Val Trp Asp Ser Ser Ser Asp His Trp Ile
1 5 10

<210> 4295
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4295
caa cag agt tac agt ccc cct ctc act 27
Gln Gln Ser Tyr Ser Pro Pro Leu Thr
1 5

<210> 4296
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4296
cag cat tat agt gac tgg cga gca ctc act 30
Gln His Tyr Ser Asp Trp Arg Ala Leu Thr
1 5 10

<210> 4297
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4297
caa caa tat tat ggt cct ctg tgg acg 27
Gln Gln Tyr Tyr Gly Pro Leu Trp Thr
1 5

<210> 4298
<211> 33

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4298
caa tca gca gac agc agt ctt act tat tgg ctc 33
Gln Ser Ala Asp Ser Ser Leu Thr Tyr Trp Leu
1 5 10

<210> 4299
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4299
caa caa tat tcc gat tac tcc act 24
Gln Gln Tyr Ser Asp Tyr Ser Thr
1 5

<210> 4300
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4300
cac caa tat tat act act cct ttc act 27
His Gln Tyr Tyr Thr Thr Pro Phe Thr
1 5

<210> 4301
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4301
cag gcg tgg gac agc agc act gca gaa 27
Gln Ala Trp Asp Ser Ser Thr Ala Glu
1 5

<210> 4302
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4302
gtg aca tgg gat gac gac ctg cat ggt tgg gtg 33
Val Thr Trp Asp Asp Asp Leu His Gly Trp Val
1 5 10

<210> 4303
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4303
gca acg tgg gat agc agc ctg cgt gct ggc cct gta gta 39
Ala Thr Trp Asp Ser Ser Leu Arg Ala Gly Pro Val Val
1 5 10

<210> 4304
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4304
caa cag tac aat gct tac ccg gtc act 27
Gln Gln Tyr Asn Ala Tyr Pro Val Thr
1 5

<210> 4305
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4305
caa caa tat tat agt act ccg tgg acg 27
Gln Gln Tyr Tyr Ser Thr Pro Trp Thr

1 5

<210> 4306
<211> 27
<212> DNA
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<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4306
cag caa tat tat agt cct cct ctc act 27
Gln Gln Tyr Tyr Ser Pro Pro Leu Thr
1 5

<210> 4307
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
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<400> 4307
tgc tca tat aca agc agc ctc act tat gtc 30
Cys Ser Tyr Thr Ser Ser Leu Thr Tyr Val
1 5 10

<210> 4308
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4308
atg caa ggt aca cac tgg ccg tac act 27
Met Gln Gly Thr His Trp Pro Tyr Thr
1 5

<210> 4309
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4309

cag gcg tgg gac agc agc act tat gtc 27
Gln Ala Trp Asp Ser Ser Thr Tyr Val
1 5

<210> 4310
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4310
cag cag tat ggt ggc tca cct cta ttc act 30
Gln Gln Tyr Gly Gly Ser Pro Leu Phe Thr
1 5 10

<210> 4311
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4311
cag acg tgg gac agc agc act gtg ata 27
Gln Thr Trp Asp Ser Ser Thr Val Ile
1 5

<210> 4312
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4312
atg caa gct cta caa act ccg tac act 27
Met Gln Ala Leu Gln Thr Pro Tyr Thr
1 5

<210> 4313
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4313
gga aca tgg gat agc agt ctg agt gct ggc gtc 33
Gly Thr Trp Asp Ser Ser Leu Ser Ala Gly Val
1 5 10

<210> 4314
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4314
caa cag tat aat agt tat tgg acg 24
Gln Gln Tyr Asn Ser Tyr Trp Thr
1 5

<210> 4315
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4315
caa cag tat aat agt tat ccg tgg acg 27
Gln Gln Tyr Asn Ser Tyr Pro Trp Thr
1 5

<210> 4316
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4316
cag tcc tat gac agc agc ctg agt ggt tca ggg gtg 36
Gln Ser Tyr Asp Ser Ser Leu Ser Gly Ser Gly Val
1 5 10

<210> 4317
<211> 30
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4317
caa tca gca gac agc agt ggt act tat gtc 30
Gln Ser Ala Asp Ser Ser Gly Thr Tyr Val
1 5 10

<210> 4318
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4318
caa cag gct cac ggt ttc cca atc act 27
Gln Gln Ala His Gly Phe Pro Ile Thr
1 5

<210> 4319
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4319
cag cag tat aat agc tgg ccc gct 24
Gln Gln Tyr Asn Ser Trp Pro Ala
1 5

<210> 4320
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4320
caa cag agt tac aat acc ccg tac act 27
Gln Gln Ser Tyr Asn Thr Pro Tyr Thr
1 5

<210> 4321
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4321
caa cag agt tac aat acc ccg ctc act 27
Gln Gln Ser Tyr Asn Thr Pro Leu Thr
1 5

<210> 4322
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4322
cag cag tat ggt agc tca cct ccg aac agt 30
Gln Gln Tyr Gly Ser Ser Pro Pro Asn Ser
1 5 10

<210> 4323
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4323
cag gtg tgg gat agt agt agt gat cat ccg gta 33
Gln Val Trp Asp Ser Ser Ser Asp His Pro Val
1 5 10

<210> 4324
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4324
cag tct tat gat agc aac act cat tgg gtg 30
Gln Ser Tyr Asp Ser Asn Thr His Trp Val
1 5 10

<210> 4325
<211> 27

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4325
atg caa gct cta gaa act cct cgc act 27
Met Gln Ala Leu Glu Thr Pro Arg Thr
1 5

<210> 4326
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4326
caa cag tat aat agt tat tcg acg 24
Gln Gln Tyr Asn Ser Tyr Ser Thr
1 5

<210> 4327
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4327
atg caa gct cta caa cct ccg tac act 27
Met Gln Ala Leu Gln Pro Pro Tyr Thr
1 5

<210> 4328
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4328
caa cag agt tac agt acc cct ccg tgg acg 30
Gln Gln Ser Tyr Ser Thr Pro Pro Trp Thr
1 5 10

<210> 4329
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4329
cag caa tat tat ctt gtt ccc gtc acc 27
Gln Gln Tyr Tyr Leu Val Pro Val Thr
1 5

<210> 4330
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4330
gca gca tgg gat gac agc ctg agt ggc cct tat gtc 36
Ala Ala Trp Asp Asp Ser Leu Ser Gly Pro Tyr Val
1 5 10

<210> 4331
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4331
agc tca tat gca ggc agc aac aat ttt tat gtc 33
Ser Ser Tyr Ala Gly Ser Asn Asn Phe Tyr Val
1 5 10

<210> 4332
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody
CDR-L3 region

<400> 4332
cag tcc tat gac agc agc ctg agt ggt tca atg ata 36
Gln Ser Tyr Asp Ser Ser Leu Ser Gly Ser Met Ile

1 5 10

<210> 4333
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4333
atg att tgg tca agc ctt gtg gta 24
Met Ile Trp Ser Ser Leu Val Val
1 5

<210> 4334
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4334
atg caa gct cta caa act ccg tgg acg 27
Met Gln Ala Leu Gln Thr Pro Trp Thr
1 5

<210> 4335
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4335
cta caa aat tac aat tac cct tgg acg 27
Leu Gln Asn Tyr Asn Tyr Pro Trp Thr
1 5

<210> 4336
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide encoding artificial human antibody CDR-L3 region

<400> 4336

atg caa ggt ata cac ctt cct agg act 27
Met Gln Gly Ile His Leu Pro Arg Thr
1 5

<210> 4337
<211> 263
<212> PRT
<213> Homo sapiens

<220>
<223> RSPO1 (NCBI Accession: NP_001229837)

<400> 4337
Met Arg Leu Gly Leu Cys Val Val Ala Leu Val Leu Ser Trp Thr His
1 5 10 15

Leu Thr Ile Ser Ser Arg Gly Ile Lys Gly Lys Arg Gln Arg Arg Ile
20 25 30

Ser Ala Glu Gly Ser Gln Ala Cys Ala Lys Gly Cys Glu Leu Cys Ser
35 40 45

Glu Val Asn Gly Cys Leu Lys Cys Ser Pro Lys Leu Phe Ile Leu Leu
50 55 60

Glu Arg Asn Asp Ile Arg Gln Val Gly Val Cys Leu Pro Ser Cys Pro
65 70 75 80

Pro Gly Tyr Phe Asp Ala Arg Asn Pro Asp Met Asn Lys Cys Ile Lys
85 90 95

Cys Lys Ile Glu His Cys Glu Ala Cys Phe Ser His Asn Phe Cys Thr
100 105 110

Lys Cys Lys Glu Gly Leu Tyr Leu His Lys Gly Arg Cys Tyr Pro Ala
115 120 125

Cys Pro Glu Gly Ser Ser Ala Ala Asn Gly Thr Met Glu Cys Ser Ser
130 135 140

Pro Ala Gln Cys Glu Met Ser Glu Trp Ser Pro Trp Gly Pro Cys Ser
145 150 155 160

Lys Lys Gln Gln Leu Cys Gly Phe Arg Arg Gly Ser Glu Glu Arg Thr
165 170 175

Arg Arg Val Leu His Ala Pro Val Gly Asp His Ala Ala Cys Ser Asp
180 185 190

Thr Lys Glu Thr Arg Arg Cys Thr Val Arg Arg Val Pro Cys Pro Glu
195 200 205

Gly Gln Lys Arg Arg Lys Gly Gly Gln Gly Arg Arg Glu Asn Ala Asn
210 215 220

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Arg Asn Leu Ala Arg Lys Glu Ser Lys Glu Ala Gly Ala Gly Ser Arg
225                 230                 235                 240

Arg Arg Lys Gly Gln Gln Gln Gln Gln Gln Gln Gly Thr Val Gly Pro
                245                 250                 255

Leu Thr Ser Ala Gly Pro Ala
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<210> 4338
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<213> Homo sapiens

<220>
<223> ZDHHC1 (NCBI Accession: NP_037436)

<400> 4338

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Met Tyr Lys Met Asn Ile Cys Asn Lys Pro Ser Asn Lys Thr Ala Pro
1               5                   10                  15

Glu Lys Ser Val Trp Thr Ala Pro Ala Gln Pro Ser Gly Pro Ser Pro
            20                  25                  30

Glu Leu Gln Gly Gln Arg Ser Arg Arg Asn Gly Trp Ser Trp Pro Pro
        35                  40                  45

His Pro Leu Gln Ile Val Ala Trp Leu Leu Tyr Leu Phe Phe Ala Val
    50                  55                  60

Ile Gly Phe Gly Ile Leu Val Pro Leu Leu Pro His His Trp Val Pro
65                  70                  75                  80

Ala Gly Tyr Ala Cys Met Gly Ala Ile Phe Ala Gly His Leu Val Val
                85                  90                  95

His Leu Thr Ala Val Ser Ile Asp Pro Ala Asp Ala Asn Val Arg Asp
            100                 105                 110

Lys Ser Tyr Ala Gly Pro Leu Pro Ile Phe Asn Arg Ser Gln His Ala
        115                 120                 125

His Val Ile Glu Asp Leu His Cys Asn Leu Cys Asn Val Asp Val Ser
    130                 135                 140

Ala Arg Ser Lys His Cys Ser Ala Cys Asn Lys Cys Val Cys Gly Phe
145                 150                 155                 160

Asp His His Cys Lys Trp Leu Asn Asn Cys Val Gly Glu Arg Asn Tyr
                165                 170                 175

Arg Leu Phe Leu His Ser Val Ala Ser Ala Leu Leu Gly Val Leu Leu
            180                 185                 190
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Leu Val Leu Val Ala Thr Tyr Val Phe Val Glu Phe Phe Val Asn Pro
        195                 200                 205

Met Arg Leu Arg Thr Asn Arg His Phe Glu Val Leu Lys Asn His Thr
    210                 215                 220

Asp Val Trp Phe Val Phe Leu Pro Ala Ala Pro Val Glu Thr Gln Ala
225                 230                 235                 240

Pro Ala Ile Leu Ala Leu Ala Ala Leu Leu Ile Leu Leu Gly Leu Leu
                245                 250                 255

Ser Thr Ala Leu Leu Gly His Leu Leu Cys Phe His Ile Tyr Leu Met
            260                 265                 270

Trp His Lys Leu Thr Thr Tyr Glu Tyr Ile Val Gln His Arg Pro Pro
        275                 280                 285

Gln Glu Ala Lys Gly Val His Arg Glu Leu Glu Ser Cys Pro Pro Lys
    290                 295                 300

Met Arg Pro Ile Gln Glu Met Glu Phe Tyr Met Arg Thr Phe Arg His
305                 310                 315                 320

Met Arg Pro Glu Pro Pro Gly Gln Ala Gly Pro Ala Ala Val Asn Ala
                325                 330                 335

Lys His Ser Arg Pro Ala Ser Pro Asp Pro Thr Pro Gly Arg Arg Asp
            340                 345                 350

Cys Ala Gly Pro Pro Val Gln Val Glu Trp Asp Arg Lys Lys Pro Leu
        355                 360                 365

Pro Trp Arg Ser Pro Leu Leu Leu Leu Ala Met Trp Gly Pro Gln Ala
    370                 375                 380

Pro Pro Cys Leu Cys Arg Lys Arg Gly Arg Gly Ala Cys Ile Lys Cys
385                 390                 395                 400

Glu Arg Leu Arg Pro Arg Ile Arg Arg Arg Gly Leu Gly Pro Pro Ala
                405                 410                 415

Ala Ala Pro Ala Arg Arg Arg Ile Pro Arg Thr Pro Ala Leu Cys Thr
            420                 425                 430

Pro Leu Ala Leu Pro Ala Pro Thr Thr Arg Arg Arg Gln Ser Pro Trp
        435                 440                 445

Thr Arg Phe Gln Trp Arg Arg Arg Ala Trp Ala Ala Pro Leu Trp Pro
    450                 455                 460

Pro Arg Gly Ala Gly Ala Asp Ser Pro Arg Trp Arg Gly Arg Arg Val
465                 470                 475                 480
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Arg Pro Pro Phe Ser
485

<210> 4339
<211> 462
<212> PRT
<213> Homo sapiens

<220>
<223> RXRA (NCBI Accession: NP_002948)

<400> 4339
Met Asp Thr Lys His Phe Leu Pro Leu Asp Phe Ser Thr Gln Val Asn
1 5 10 15

Ser Ser Leu Thr Ser Pro Thr Gly Arg Gly Ser Met Ala Ala Pro Ser
20 25 30

Leu His Pro Ser Leu Gly Pro Gly Ile Gly Ser Pro Gly Gln Leu His
35 40 45

Ser Pro Ile Ser Thr Leu Ser Ser Pro Ile Asn Gly Met Gly Pro Pro
50 55 60

Phe Ser Val Ile Ser Ser Pro Met Gly Pro His Ser Met Ser Val Pro
65 70 75 80

Thr Thr Pro Thr Leu Gly Phe Ser Thr Gly Ser Pro Gln Leu Ser Ser
85 90 95

Pro Met Asn Pro Val Ser Ser Ser Glu Asp Ile Lys Pro Pro Leu Gly
100 105 110

Leu Asn Gly Val Leu Lys Val Pro Ala His Pro Ser Gly Asn Met Ala
115 120 125

Ser Phe Thr Lys His Ile Cys Ala Ile Cys Gly Asp Arg Ser Ser Gly
130 135 140

Lys His Tyr Gly Val Tyr Ser Cys Glu Gly Cys Lys Gly Phe Phe Lys
145 150 155 160

Arg Thr Val Arg Lys Asp Leu Thr Tyr Thr Cys Arg Asp Asn Lys Asp
165 170 175

Cys Leu Ile Asp Lys Arg Gln Arg Asn Arg Cys Gln Tyr Cys Arg Tyr
180 185 190

Gln Lys Cys Leu Ala Met Gly Met Lys Arg Glu Ala Val Gln Glu Glu
195 200 205

Arg Gln Arg Gly Lys Asp Arg Asn Glu Asn Glu Val Glu Ser Thr Ser
210 215 220

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Ser Ala Asn Glu Asp Met Pro Val Glu Arg Ile Leu Glu Ala Glu Leu
225                 230                 235                 240

Ala Val Glu Pro Lys Thr Glu Thr Tyr Val Glu Ala Asn Met Gly Leu
                245                 250                 255

Asn Pro Ser Ser Pro Asn Asp Pro Val Thr Asn Ile Cys Gln Ala Ala
            260                 265                 270

Asp Lys Gln Leu Phe Thr Leu Val Glu Trp Ala Lys Arg Ile Pro His
        275                 280                 285

Phe Ser Glu Leu Pro Leu Asp Asp Gln Val Ile Leu Leu Arg Ala Gly
    290                 295                 300

Trp Asn Glu Leu Leu Ile Ala Ser Phe Ser His Arg Ser Ile Ala Val
305                 310                 315                 320

Lys Asp Gly Ile Leu Leu Ala Thr Gly Leu His Val His Arg Asn Ser
                325                 330                 335

Ala His Ser Ala Gly Val Gly Ala Ile Phe Asp Arg Val Leu Thr Glu
            340                 345                 350

Leu Val Ser Lys Met Arg Asp Met Gln Met Asp Lys Thr Glu Leu Gly
        355                 360                 365

Cys Leu Arg Ala Ile Val Leu Phe Asn Pro Asp Ser Lys Gly Leu Ser
    370                 375                 380

Asn Pro Ala Glu Val Glu Ala Leu Arg Glu Lys Val Tyr Ala Ser Leu
385                 390                 395                 400

Glu Ala Tyr Cys Lys His Lys Tyr Pro Glu Gln Pro Gly Arg Phe Ala
                405                 410                 415

Lys Leu Leu Leu Arg Leu Pro Ala Leu Arg Ser Ile Gly Leu Lys Cys
            420                 425                 430

Leu Glu His Leu Phe Phe Phe Lys Leu Ile Gly Asp Thr Pro Ile Asp
        435                 440                 445

Thr Phe Leu Met Glu Met Leu Glu Ala Pro His Gln Met Thr
    450                 455                 460
```

<210> 4340
<211> 463
<212> PRT
<213> Homo sapiens

<220>
<223> RXRG (NCBI Accession: NP_008848)

<400> 4340
Met Tyr Gly Asn Tyr Ser His Phe Met Lys Phe Pro Ala Gly Tyr Gly
1   5   10   15

Gly Ser Pro Gly His Thr Gly Ser Thr Ser Met Ser Pro Ser Ala Ala
            20   25   30

Leu Ser Thr Gly Lys Pro Met Asp Ser His Pro Ser Tyr Thr Asp Thr
        35   40   45

Pro Val Ser Ala Pro Arg Thr Leu Ser Ala Val Gly Thr Pro Leu Asn
    50   55   60

Ala Leu Gly Ser Pro Tyr Arg Val Ile Thr Ser Ala Met Gly Pro Pro
65   70   75   80

Ser Gly Ala Leu Ala Ala Pro Pro Gly Ile Asn Leu Val Ala Pro Pro
                85   90   95

Ser Ser Gln Leu Asn Val Val Asn Ser Val Ser Ser Ser Glu Asp Ile
            100   105   110

Lys Pro Leu Pro Gly Leu Pro Gly Ile Gly Asn Met Asn Tyr Pro Ser
        115   120   125

Thr Ser Pro Gly Ser Leu Val Lys His Ile Cys Ala Ile Cys Gly Asp
    130   135   140

Arg Ser Ser Gly Lys His Tyr Gly Val Tyr Ser Cys Glu Gly Cys Lys
145   150   155   160

Gly Phe Phe Lys Arg Thr Ile Arg Lys Asp Leu Ile Tyr Thr Cys Arg
                165   170   175

Asp Asn Lys Asp Cys Leu Ile Asp Lys Arg Gln Arg Asn Arg Cys Gln
            180   185   190

Tyr Cys Arg Tyr Gln Lys Cys Leu Val Met Gly Met Lys Arg Glu Ala
        195   200   205

Val Gln Glu Glu Arg Gln Arg Ser Arg Glu Arg Ala Glu Ser Glu Ala
    210   215   220

Glu Cys Ala Thr Ser Gly His Glu Asp Met Pro Val Glu Arg Ile Leu
225   230   235   240

Glu Ala Glu Leu Ala Val Glu Pro Lys Thr Glu Ser Tyr Gly Asp Met
                245   250   255

Asn Met Glu Asn Ser Thr Asn Asp Pro Val Thr Asn Ile Cys His Ala
            260   265   270

Ala Asp Lys Gln Leu Phe Thr Leu Val Glu Trp Ala Lys Arg Ile Pro
        275   280   285

```
His Phe Ser Asp Leu Thr Leu Glu Asp Gln Val Ile Leu Leu Arg Ala
    290                 295                 300

Gly Trp Asn Glu Leu Leu Ile Ala Ser Phe Ser His Arg Ser Val Ser
305                 310                 315                 320

Val Gln Asp Gly Ile Leu Leu Ala Thr Gly Leu His Val His Arg Ser
                325                 330                 335

Ser Ala His Ser Ala Gly Val Gly Ser Ile Phe Asp Arg Val Leu Thr
            340                 345                 350

Glu Leu Val Ser Lys Met Lys Asp Met Gln Met Asp Lys Ser Glu Leu
        355                 360                 365

Gly Cys Leu Arg Ala Ile Val Leu Phe Asn Pro Asp Ala Lys Gly Leu
    370                 375                 380

Ser Asn Pro Ser Glu Val Glu Thr Leu Arg Glu Lys Val Tyr Ala Thr
385                 390                 395                 400

Leu Glu Ala Tyr Thr Lys Gln Lys Tyr Pro Glu Gln Pro Gly Arg Phe
                405                 410                 415

Ala Lys Leu Leu Leu Arg Leu Pro Ala Leu Arg Ser Ile Gly Leu Lys
            420                 425                 430

Cys Leu Glu His Leu Phe Phe Phe Lys Leu Ile Gly Asp Thr Pro Ile
        435                 440                 445

Asp Thr Phe Leu Met Glu Met Leu Glu Thr Pro Leu Gln Ile Thr
    450                 455                 460

<210> 4341
<211> 183
<212> PRT
<213> Homo sapiens

<220>
<223> TMEM154 (NCBI Accession: NP_689893)

<400> 4341
Met Gln Ala Pro Arg Ala Ala Leu Val Phe Ala Leu Val Ile Ala Leu
1               5                   10                  15

Val Pro Val Gly Arg Gly Asn Tyr Glu Glu Leu Glu Asn Ser Gly Asp
            20                  25                  30

Thr Thr Val Glu Ser Glu Arg Pro Asn Lys Val Thr Ile Pro Ser Thr
        35                  40                  45

Phe Ala Ala Val Thr Ile Lys Glu Thr Leu Asn Ala Asn Ile Asn Ser
    50                  55                  60
```

```
Thr Asn Phe Ala Pro Asp Glu Asn Gln Leu Glu Phe Ile Leu Met Val
65                  70                  75                  80

Leu Ile Pro Leu Ile Leu Leu Val Leu Leu Leu Leu Phe Val Val Phe
                85                  90                  95

Leu Ala Thr Tyr Tyr Lys Arg Lys Arg Thr Lys Gln Glu Pro Ser Ser
            100                 105                 110

Gln Gly Ser Gln Ser Ala Leu Gln Thr Tyr Glu Leu Gly Ser Glu Asn
        115                 120                 125

Val Lys Val Pro Ile Phe Glu Glu Asp Thr Pro Ser Val Met Glu Ile
    130                 135                 140

Glu Met Glu Glu Leu Asp Lys Trp Met Asn Ser Met Asn Arg Asn Ala
145                 150                 155                 160

Asp Phe Glu Cys Leu Pro Thr Leu Lys Glu Glu Lys Glu Ser Asn His
                165                 170                 175

Asn Pro Ser Asp Ser Glu Ser
            180

<210> 4342
<211> 136
<212> PRT
<213> Homo sapiens

<220>
<223> SNAPIN (NCBI Accession: NP_036569)

<400> 4342
Met Ala Gly Ala Gly Ser Ala Ala Val Ser Gly Ala Gly Thr Pro Val
1               5                   10                  15

Ala Gly Pro Thr Gly Arg Asp Leu Phe Ala Glu Gly Leu Leu Glu Phe
            20                  25                  30

Leu Arg Pro Ala Val Gln Gln Leu Asp Ser His Val His Ala Val Arg
        35                  40                  45

Glu Ser Gln Val Glu Leu Arg Glu Gln Ile Asp Asn Leu Ala Thr Glu
    50                  55                  60

Leu Cys Arg Ile Asn Glu Asp Gln Lys Val Ala Leu Asp Leu Asp Pro
65                  70                  75                  80

Tyr Val Lys Lys Leu Leu Asn Ala Arg Arg Arg Val Val Leu Val Asn
                85                  90                  95

Asn Ile Leu Gln Asn Ala Gln Glu Arg Leu Arg Arg Leu Asn His Ser
            100                 105                 110
```

```
Val Ala Lys Glu Thr Ala Arg Arg Arg Ala Met Leu Asp Ser Gly Ile
        115                 120                 125

Tyr Pro Pro Gly Ser Pro Gly Lys
    130                 135

<210> 4343
<211> 847
<212> PRT
<213> Homo sapiens

<220>
<223> PYGL (NCBI Accession: NP_002854)

<400> 4343
Met Ala Lys Pro Leu Thr Asp Gln Glu Lys Arg Arg Gln Ile Ser Ile
1               5                   10                  15

Arg Gly Ile Val Gly Val Glu Asn Val Ala Glu Leu Lys Lys Ser Phe
            20                  25                  30

Asn Arg His Leu His Phe Thr Leu Val Lys Asp Arg Asn Val Ala Thr
        35                  40                  45

Thr Arg Asp Tyr Tyr Phe Ala Leu Ala His Thr Val Arg Asp His Leu
    50                  55                  60

Val Gly Arg Trp Ile Arg Thr Gln Gln His Tyr Tyr Asp Lys Cys Pro
65                  70                  75                  80

Lys Arg Val Tyr Tyr Leu Ser Leu Glu Phe Tyr Met Gly Arg Thr Leu
                85                  90                  95

Gln Asn Thr Met Ile Asn Leu Gly Leu Gln Asn Ala Cys Asp Glu Ala
            100                 105                 110

Ile Tyr Gln Leu Gly Leu Asp Ile Glu Glu Leu Glu Glu Ile Glu Glu
        115                 120                 125

Asp Ala Gly Leu Gly Asn Gly Gly Leu Gly Arg Leu Ala Ala Cys Phe
    130                 135                 140

Leu Asp Ser Met Ala Thr Leu Gly Leu Ala Ala Tyr Gly Tyr Gly Ile
145                 150                 155                 160

Arg Tyr Glu Tyr Gly Ile Phe Asn Gln Lys Ile Arg Asp Gly Trp Gln
                165                 170                 175

Val Glu Glu Ala Asp Asp Trp Leu Arg Tyr Gly Asn Pro Trp Glu Lys
            180                 185                 190

Ser Arg Pro Glu Phe Met Leu Pro Val His Phe Tyr Gly Lys Val Glu
        195                 200                 205
```

```
His Thr Asn Thr Gly Thr Lys Trp Ile Asp Thr Gln Val Val Leu Ala
    210                 215                 220

Leu Pro Tyr Asp Thr Pro Val Pro Gly Tyr Met Asn Asn Thr Val Asn
225                 230                 235                 240

Thr Met Arg Leu Trp Ser Ala Arg Ala Pro Asn Asp Phe Asn Leu Arg
                245                 250                 255

Asp Phe Asn Val Gly Asp Tyr Ile Gln Ala Val Leu Asp Arg Asn Leu
            260                 265                 270

Ala Glu Asn Ile Ser Arg Val Leu Tyr Pro Asn Asp Asn Phe Phe Glu
        275                 280                 285

Gly Lys Glu Leu Arg Leu Lys Gln Glu Tyr Phe Val Val Ala Ala Thr
    290                 295                 300

Leu Gln Asp Ile Ile Arg Arg Phe Lys Ala Ser Lys Phe Gly Ser Thr
305                 310                 315                 320

Arg Gly Ala Gly Thr Val Phe Asp Ala Phe Pro Asp Gln Val Ala Ile
                325                 330                 335

Gln Leu Asn Asp Thr His Pro Ala Leu Ala Ile Pro Glu Leu Met Arg
            340                 345                 350

Ile Phe Val Asp Ile Glu Lys Leu Pro Trp Ser Lys Ala Trp Glu Leu
        355                 360                 365

Thr Gln Lys Thr Phe Ala Tyr Thr Asn His Thr Val Leu Pro Glu Ala
    370                 375                 380

Leu Glu Arg Trp Pro Val Asp Leu Val Glu Lys Leu Leu Pro Arg His
385                 390                 395                 400

Leu Glu Ile Ile Tyr Glu Ile Asn Gln Lys His Leu Asp Arg Ile Val
                405                 410                 415

Ala Leu Phe Pro Lys Asp Val Asp Arg Leu Arg Arg Met Ser Leu Ile
            420                 425                 430

Glu Glu Glu Gly Ser Lys Arg Ile Asn Met Ala His Leu Cys Ile Val
        435                 440                 445

Gly Ser His Ala Val Asn Gly Val Ala Lys Ile His Ser Asp Ile Val
    450                 455                 460

Lys Thr Lys Val Phe Lys Asp Phe Ser Glu Leu Glu Pro Asp Lys Phe
465                 470                 475                 480

Gln Asn Lys Thr Asn Gly Ile Thr Pro Arg Arg Trp Leu Leu Leu Cys
                485                 490                 495
```

```
Asn Pro Gly Leu Ala Glu Leu Ile Ala Glu Lys Ile Gly Glu Asp Tyr
            500                 505                 510

Val Lys Asp Leu Ser Gln Leu Thr Lys Leu His Ser Phe Leu Gly Asp
        515                 520                 525

Asp Val Phe Leu Arg Glu Leu Ala Lys Val Lys Gln Glu Asn Lys Leu
    530                 535                 540

Lys Phe Ser Gln Phe Leu Glu Thr Glu Tyr Lys Val Lys Ile Asn Pro
545                 550                 555                 560

Ser Ser Met Phe Asp Val Gln Val Lys Arg Ile His Glu Tyr Lys Arg
                565                 570                 575

Gln Leu Leu Asn Cys Leu His Val Ile Thr Met Tyr Asn Arg Ile Lys
            580                 585                 590

Lys Asp Pro Lys Lys Leu Phe Val Pro Arg Thr Val Ile Ile Gly Gly
        595                 600                 605

Lys Ala Ala Pro Gly Tyr His Met Ala Lys Met Ile Ile Lys Leu Ile
    610                 615                 620

Thr Ser Val Ala Asp Val Val Asn Asn Asp Pro Met Val Gly Ser Lys
625                 630                 635                 640

Leu Lys Val Ile Phe Leu Glu Asn Tyr Arg Val Ser Leu Ala Glu Lys
                645                 650                 655

Val Ile Pro Ala Thr Asp Leu Ser Glu Gln Ile Ser Thr Ala Gly Thr
            660                 665                 670

Glu Ala Ser Gly Thr Gly Asn Met Lys Phe Met Leu Asn Gly Ala Leu
        675                 680                 685

Thr Ile Gly Thr Met Asp Gly Ala Asn Val Glu Met Ala Glu Glu Ala
    690                 695                 700

Gly Glu Glu Asn Leu Phe Ile Phe Gly Met Arg Ile Asp Asp Val Ala
705                 710                 715                 720

Ala Leu Asp Lys Lys Gly Tyr Glu Ala Lys Glu Tyr Tyr Glu Ala Leu
                725                 730                 735

Pro Glu Leu Lys Leu Val Ile Asp Gln Ile Asp Asn Gly Phe Phe Ser
            740                 745                 750

Pro Lys Gln Pro Asp Leu Phe Lys Asp Ile Ile Asn Met Leu Phe Tyr
        755                 760                 765

His Asp Arg Phe Lys Val Phe Ala Asp Tyr Glu Ala Tyr Val Lys Cys
    770                 775                 780
```

```
Gln Asp Lys Val Ser Gln Leu Tyr Met Asn Pro Lys Ala Trp Asn Thr
785                 790                 795                 800

Met Val Leu Lys Asn Ile Ala Ala Ser Gly Lys Phe Ser Ser Asp Arg
                805                 810                 815

Thr Ile Lys Glu Tyr Ala Gln Asn Ile Trp Asn Val Glu Pro Ser Asp
            820                 825                 830

Leu Lys Ile Ser Leu Ser Asn Glu Ser Asn Lys Val Asn Gly Asn
        835                 840                 845
```

<210> 4344
<211> 328
<212> PRT
<213> Homo sapiens

<220>
<223> RCN3 (NCBI Accession: NP_065701)

<400> 4344

```
Met Met Trp Arg Pro Ser Val Leu Leu Leu Leu Leu Leu Arg His
1               5                   10                  15

Gly Ala Gln Gly Lys Pro Ser Pro Asp Ala Gly Pro His Gly Gln Gly
            20                  25                  30

Arg Val His Gln Ala Ala Pro Leu Ser Asp Ala Pro His Asp Asp Ala
        35                  40                  45

His Gly Asn Phe Gln Tyr Asp His Glu Ala Phe Leu Gly Arg Glu Val
    50                  55                  60

Ala Lys Glu Phe Asp Gln Leu Thr Pro Glu Glu Ser Gln Ala Arg Leu
65                  70                  75                  80

Gly Arg Ile Val Asp Arg Met Asp Arg Ala Gly Asp Gly Asp Gly Trp
                85                  90                  95

Val Ser Leu Ala Glu Leu Arg Ala Trp Ile Ala His Thr Gln Gln Arg
            100                 105                 110

His Ile Arg Asp Ser Val Ser Ala Ala Trp Asp Thr Tyr Asp Thr Asp
        115                 120                 125

Arg Asp Gly Arg Val Gly Trp Glu Glu Leu Arg Asn Ala Thr Tyr Gly
    130                 135                 140

His Tyr Ala Pro Gly Glu Glu Phe His Asp Val Glu Asp Ala Glu Thr
145                 150                 155                 160

Tyr Lys Lys Met Leu Ala Arg Asp Glu Arg Arg Phe Arg Val Ala Asp
                165                 170                 175
```

```
Gln Asp Gly Asp Ser Met Ala Thr Arg Glu Glu Leu Thr Ala Phe Leu
            180                 185                 190

His Pro Glu Glu Phe Pro His Met Arg Asp Ile Val Ile Ala Glu Thr
        195                 200                 205

Leu Glu Asp Leu Asp Arg Asn Lys Asp Gly Tyr Val Gln Val Glu Glu
    210                 215                 220

Tyr Ile Ala Asp Leu Tyr Ser Ala Glu Pro Gly Glu Glu Glu Pro Ala
225                 230                 235                 240

Trp Val Gln Thr Glu Arg Gln Gln Phe Arg Asp Phe Arg Asp Leu Asn
                245                 250                 255

Lys Asp Gly His Leu Asp Gly Ser Glu Val Gly His Trp Val Leu Pro
            260                 265                 270

Pro Ala Gln Asp Gln Pro Leu Val Glu Ala Asn His Leu Leu His Glu
        275                 280                 285

Ser Asp Thr Asp Lys Asp Gly Arg Leu Ser Lys Ala Glu Ile Leu Gly
    290                 295                 300

Asn Trp Asn Met Phe Val Gly Ser Gln Ala Thr Asn Tyr Gly Glu Asp
305                 310                 315                 320

Leu Thr Arg His His Asp Glu Leu
                325
```

<210> 4345
<211> 421
<212> PRT
<213> Homo sapiens

<220>
<223> SYT12 (NCBI Accession: XP_011543649)

<400> 4345

```
Met Ala Val Asp Val Ala Glu Tyr His Leu Ser Val Ile Lys Ser Pro
1               5                   10                  15

Pro Gly Trp Glu Val Gly Val Tyr Ala Ala Gly Ala Leu Ala Leu Leu
            20                  25                  30

Gly Ile Ala Ala Val Ser Leu Trp Lys Leu Trp Thr Ser Gly Ser Phe
        35                  40                  45

Pro Ser Pro Ser Pro Phe Pro Asn Tyr Asp Tyr Arg Tyr Leu Gln Gln
    50                  55                  60

Lys Tyr Gly Glu Ser Cys Ala Glu Ala Arg Glu Lys Arg Val Pro Ala
65                  70                  75                  80
```

```
Trp Asn Ala Gln Arg Ala Ser Thr Arg Gly Pro Pro Ser Arg Lys Gly
                85                  90                  95

Ser Leu Ser Ile Glu Asp Thr Phe Glu Ser Ile Ser Glu Leu Gly Pro
            100                 105                 110

Leu Glu Leu Met Gly Arg Glu Leu Asp Leu Ala Pro Tyr Gly Thr Leu
        115                 120                 125

Arg Lys Ser Gln Ser Ala Asp Ser Leu Asn Ser Ile Ser Ser Val Ser
    130                 135                 140

Asn Thr Phe Gly Gln Asp Phe Thr Leu Gly Gln Val Glu Val Ser Met
145                 150                 155                 160

Glu Tyr Asp Thr Ala Ser His Thr Leu Asn Val Ala Val Met Gln Gly
                165                 170                 175

Lys Asp Leu Leu Glu Arg Glu Glu Ala Ser Phe Glu Ser Cys Phe Met
            180                 185                 190

Arg Val Ser Leu Leu Pro Asp Glu Gln Ile Val Gly Ile Ser Arg Ile
        195                 200                 205

Gln Arg Asn Ala Tyr Ser Ile Phe Phe Asp Glu Lys Phe Ser Ile Pro
    210                 215                 220

Leu Asp Pro Thr Ala Leu Glu Glu Lys Ser Leu Arg Phe Ser Val Phe
225                 230                 235                 240

Gly Ile Asp Glu Asp Glu Arg Asn Val Ser Thr Gly Val Val Glu Leu
                245                 250                 255

Lys Leu Ser Val Leu Asp Leu Pro Leu Gln Pro Phe Ser Gly Trp Leu
            260                 265                 270

Tyr Leu Gln Asp Gln Asn Lys Ala Ala Asp Ala Val Gly Glu Ile Leu
        275                 280                 285

Leu Ser Leu Ser Tyr Leu Pro Thr Ala Glu Arg Leu Thr Val Val Val
    290                 295                 300

Val Lys Ala Lys Asn Leu Ile Trp Thr Asn Asp Lys Thr Thr Ala Asp
305                 310                 315                 320

Pro Phe Val Lys Val Tyr Leu Leu Gln Asp Gly Arg Lys Met Ser Lys
                325                 330                 335

Lys Lys Thr Ala Val Lys Arg Asp Asp Pro Asn Pro Val Phe Asn Glu
            340                 345                 350

Ala Met Ile Phe Ser Val Pro Ala Ile Val Leu Gln Asp Leu Ser Leu
        355                 360                 365
```

```
Arg Val Thr Val Ala Glu Ser Ser Ser Asp Gly Arg Gly Asp Asn Val
    370                 375                 380

Gly His Val Ile Ile Gly Pro Ser Ala Ser Gly Met Gly Thr Thr His
385                 390                 395                 400

Trp Asn Gln Met Leu Ala Thr Leu Arg Arg Pro Val Ser Met Trp His
                405                 410                 415

Ala Val Arg Arg Asn
            420
```

<210> 4346
<211> 390
<212> PRT
<213> Homo sapiens

<220>
<223> Nr2f6 (NCBI Accession: NP_005225)

<400> 4346

```
Met Ala Met Val Thr Gly Gly Trp Gly Asp Pro Gly Gly Asp Thr Asn
1               5                   10                  15

Gly Val Asp Lys Ala Gly Gly Ser Tyr Pro Arg Ala Thr Glu Asp Asp
            20                  25                  30

Ser Ala Ser Pro Pro Gly Ala Thr Ser Asp Ala Glu Pro Gly Asp Glu
        35                  40                  45

Glu Arg Pro Gly Leu Gln Val Asp Cys Val Val Cys Gly Asp Lys Ser
    50                  55                  60

Ser Gly Lys His Tyr Gly Val Phe Thr Cys Glu Gly Cys Lys Ser Phe
65                  70                  75                  80

Phe Lys Arg Ser Ile Arg Arg Asn Leu Ser Tyr Thr Cys Arg Ser Asn
                85                  90                  95

Arg Asp Cys Gln Ile Asp Gln His His Arg Asn Gln Cys Gln Tyr Cys
            100                 105                 110

Arg Leu Lys Lys Cys Phe Arg Val Gly Met Arg Lys Glu Ala Val Gln
        115                 120                 125

Arg Gly Arg Ile Pro His Ala Leu Pro Gly Pro Ala Ala Cys Ser Pro
    130                 135                 140

Pro Gly Ala Thr Gly Val Glu Pro Phe Thr Gly Pro Pro Val Ser Glu
145                 150                 155                 160

Leu Ile Ala Gln Leu Leu Arg Ala Glu Pro Tyr Pro Ala Ala Gly Arg
                165                 170                 175
```

```
Phe Gly Gly Gly Gly Ala Val Leu Gly Ile Asp Asn Val Cys Glu Leu
            180                 185                 190

Ala Ala Arg Leu Leu Phe Ser Thr Val Glu Trp Ala Arg His Ala Pro
        195                 200                 205

Phe Phe Pro Glu Leu Pro Ala Ala Asp Gln Val Ala Leu Leu Arg Leu
    210                 215                 220

Ser Trp Ser Glu Leu Phe Val Leu Asn Ala Ala Gln Ala Ala Leu Pro
225                 230                 235                 240

Leu His Thr Ala Pro Leu Leu Ala Ala Ala Gly Leu His Ala Ala Pro
                245                 250                 255

Met Ala Ala Glu Arg Ala Val Ala Phe Met Asp Gln Val Arg Ala Phe
            260                 265                 270

Gln Glu Gln Val Asp Lys Leu Gly Arg Leu Gln Val Asp Ala Ala Glu
        275                 280                 285

Tyr Gly Cys Leu Lys Ala Ile Ala Leu Phe Thr Pro Asp Ala Cys Gly
    290                 295                 300

Leu Ser Asp Pro Ala His Val Glu Ser Leu Gln Glu Lys Ala Gln Val
305                 310                 315                 320

Ala Leu Thr Glu Tyr Val Arg Ala Gln Tyr Pro Ser Gln Pro Gln Arg
                325                 330                 335

Phe Gly Arg Leu Leu Leu Arg Leu Pro Ala Leu Arg Ala Val Pro Ala
            340                 345                 350

Ser Leu Ile Ser Gln Leu Phe Phe Met Arg Leu Val Gly Lys Thr Pro
        355                 360                 365

Ile Glu Thr Leu Ile Arg Asp Met Leu Leu Ser Gly Ser Thr Phe Asn
    370                 375                 380

Trp Pro Tyr Gly Ser Gly
385                 390

<210> 4347
<211> 828
<212> PRT
<213> Homo sapiens

<220>
<223> PPP1R13L (NCBI Accession: NP_006654)

<400> 4347
Met Asp Ser Glu Ala Phe Gln Ser Ala Arg Asp Phe Leu Asp Met Asn
1               5                   10                  15
```

```
Phe Gln Ser Leu Ala Met Lys His Met Asp Leu Lys Gln Met Glu Leu
            20                  25                  30

Asp Thr Ala Ala Ala Lys Val Asp Glu Leu Thr Lys Gln Leu Glu Ser
        35                  40                  45

Leu Trp Ser Asp Ser Pro Ala Pro Pro Gly Pro Gln Ala Gly Pro Pro
    50                  55                  60

Ser Arg Pro Pro Arg Tyr Ser Ser Ser Ser Ile Pro Glu Pro Phe Gly
65                  70                  75                  80

Ser Arg Gly Ser Pro Arg Lys Ala Ala Thr Asp Gly Ala Asp Thr Pro
                85                  90                  95

Phe Gly Arg Ser Glu Ser Ala Pro Thr Leu His Pro Tyr Ser Pro Leu
            100                 105                 110

Ser Pro Lys Gly Arg Pro Ser Ser Pro Arg Thr Pro Leu Tyr Leu Gln
        115                 120                 125

Pro Asp Ala Tyr Gly Ser Leu Asp Arg Ala Thr Ser Pro Arg Pro Arg
    130                 135                 140

Ala Phe Asp Gly Ala Gly Ser Ser Leu Gly Arg Ala Pro Ser Pro Arg
145                 150                 155                 160

Pro Gly Pro Gly Pro Leu Arg Gln Gln Gly Pro Pro Thr Pro Phe Asp
                165                 170                 175

Phe Leu Gly Arg Ala Gly Ser Pro Arg Gly Ser Pro Leu Ala Glu Gly
            180                 185                 190

Pro Gln Ala Phe Phe Ser Glu Arg Gly Pro Ser Pro Arg Pro Pro Ala
        195                 200                 205

Thr Ala Tyr Asp Ala Pro Ala Ser Ala Phe Gly Ser Ser Leu Leu Gly
    210                 215                 220

Ser Gly Gly Ser Ala Phe Ala Pro Pro Leu Arg Ala Gln Asp Asp Leu
225                 230                 235                 240

Thr Leu Arg Arg Arg Pro Pro Lys Ala Trp Asn Glu Ser Asp Leu Asp
                245                 250                 255

Val Ala Tyr Glu Lys Lys Pro Ser Gln Thr Ala Ser Tyr Glu Arg Leu
            260                 265                 270

Asp Val Phe Ala Arg Pro Ala Ser Pro Ser Leu Gln Leu Leu Pro Trp
        275                 280                 285

Arg Glu Ser Ser Leu Asp Gly Leu Gly Gly Thr Gly Lys Asp Asn Leu
    290                 295                 300
```

```
Thr Ser Ala Thr Leu Pro Arg Asn Tyr Lys Val Ser Pro Leu Ala Ser
305                 310                 315                 320

Asp Arg Arg Ser Asp Ala Gly Ser Tyr Arg Arg Ser Leu Gly Ser Ala
                325                 330                 335

Gly Pro Ser Gly Thr Leu Pro Arg Ser Trp Gln Pro Val Ser Arg Ile
            340                 345                 350

Pro Met Pro Pro Ser Ser Pro Gln Pro Arg Gly Ala Pro Arg Gln Arg
        355                 360                 365

Pro Ile Pro Leu Ser Met Ile Phe Lys Leu Gln Asn Ala Phe Trp Glu
    370                 375                 380

His Gly Ala Ser Arg Ala Met Leu Pro Gly Ser Pro Leu Phe Thr Arg
385                 390                 395                 400

Ala Pro Pro Pro Lys Leu Gln Pro Gln Pro Gln Pro Gln Pro Gln Pro
                405                 410                 415

Gln Ser Gln Pro Gln Pro Gln Leu Pro Pro Gln Pro Gln Thr Gln Pro
            420                 425                 430

Gln Thr Pro Thr Pro Ala Pro Gln His Pro Gln Gln Thr Trp Pro Pro
        435                 440                 445

Val Asn Glu Gly Pro Pro Lys Pro Pro Thr Glu Leu Glu Pro Glu Pro
    450                 455                 460

Glu Ile Glu Gly Leu Leu Thr Pro Val Leu Glu Ala Gly Asp Val Asp
465                 470                 475                 480

Glu Gly Pro Val Ala Arg Pro Leu Ser Pro Thr Arg Leu Gln Pro Ala
                485                 490                 495

Leu Pro Pro Glu Ala Gln Ser Val Pro Glu Leu Glu Glu Val Ala Arg
            500                 505                 510

Val Leu Ala Glu Ile Pro Arg Pro Leu Lys Arg Arg Gly Ser Met Glu
        515                 520                 525

Gln Ala Pro Ala Val Ala Leu Pro Pro Thr His Lys Lys Gln Tyr Gln
    530                 535                 540

Gln Ile Ile Ser Arg Leu Phe His Arg His Gly Gly Pro Gly Pro Gly
545                 550                 555                 560

Gly Pro Glu Pro Glu Leu Ser Pro Ile Thr Glu Gly Ser Glu Ala Arg
                565                 570                 575

Ala Gly Pro Pro Ala Pro Ala Pro Pro Ala Pro Ile Pro Pro Pro Ala
            580                 585                 590
```

```
Pro Ser Gln Ser Ser Pro Pro Glu Gln Pro Gln Ser Met Glu Met Arg
        595                 600                 605

Ser Val Leu Arg Lys Ala Gly Ser Pro Arg Lys Ala Arg Arg Ala Arg
    610                 615                 620

Leu Asn Pro Leu Val Leu Leu Leu Asp Ala Ala Leu Thr Gly Glu Leu
625                 630                 635                 640

Glu Val Val Gln Gln Ala Val Lys Glu Met Asn Asp Pro Ser Gln Pro
                645                 650                 655

Asn Glu Glu Gly Ile Thr Ala Leu His Asn Ala Ile Cys Gly Ala Asn
            660                 665                 670

Tyr Ser Ile Val Asp Phe Leu Ile Thr Ala Gly Ala Asn Val Asn Ser
        675                 680                 685

Pro Asp Ser His Gly Trp Thr Pro Leu His Cys Ala Ala Ser Cys Asn
    690                 695                 700

Asp Thr Val Ile Cys Met Ala Leu Val Gln His Gly Ala Ala Ile Phe
705                 710                 715                 720

Ala Thr Thr Leu Ser Asp Gly Ala Thr Ala Phe Glu Lys Cys Asp Pro
                725                 730                 735

Tyr Arg Glu Gly Tyr Ala Asp Cys Ala Thr Tyr Leu Ala Asp Val Glu
            740                 745                 750

Gln Ser Met Gly Leu Met Asn Ser Gly Ala Val Tyr Ala Leu Trp Asp
        755                 760                 765

Tyr Ser Ala Glu Phe Gly Asp Glu Leu Ser Phe Arg Glu Gly Glu Ser
    770                 775                 780

Val Thr Val Leu Arg Arg Asp Gly Pro Glu Glu Thr Asp Trp Trp Trp
785                 790                 795                 800

Ala Ala Leu His Gly Gln Glu Gly Tyr Val Pro Arg Asn Tyr Phe Gly
                805                 810                 815

Leu Phe Pro Arg Val Lys Pro Gln Arg Ser Lys Val
            820                 825

<210> 4348
<211> 317
<212> PRT
<213> Homo sapiens

<220>
<223> OR6Q1 (NCBI Accession: NP_001005186)
```

<400> 4348
Met Gln Pro Tyr Thr Lys Asn Trp Thr Gln Val Thr Glu Phe Val Met
1   5   10   15

Met Gly Phe Ala Gly Ile His Glu Ala His Leu Leu Phe Phe Ile Leu
            20   25   30

Phe Leu Thr Met Tyr Leu Phe Thr Leu Val Glu Asn Leu Ala Ile Ile
        35   40   45

Leu Val Val Gly Leu Asp His Arg Leu Arg Arg Pro Met Tyr Phe Phe
    50   55   60

Leu Thr His Leu Ser Cys Leu Glu Ile Trp Tyr Thr Ser Val Thr Val
65   70   75   80

Pro Lys Met Leu Ala Gly Phe Ile Gly Val Asp Gly Gly Lys Asn Ile
                85   90   95

Ser Tyr Ala Asp Cys Leu Ser Gln Leu Phe Ile Phe Thr Phe Leu Gly
            100   105   110

Ala Thr Glu Cys Phe Leu Leu Ala Ala Met Ala Tyr Asp Arg Tyr Val
        115   120   125

Ala Ile Cys Met Pro Leu His Tyr Gly Ala Phe Val Ser Trp Gly Thr
    130   135   140

Cys Ile Arg Leu Ala Ala Ala Cys Trp Leu Val Gly Phe Leu Thr Pro
145   150   155   160

Ile Leu Pro Ile Tyr Leu Leu Ser Gln Leu Thr Phe Tyr Gly Pro Asn
                165   170   175

Val Ile Asp His Phe Ser Cys Asp Ala Ser Pro Leu Leu Ala Leu Ser
            180   185   190

Cys Ser Asp Val Thr Trp Lys Glu Thr Val Asp Phe Leu Val Ser Leu
        195   200   205

Ala Val Leu Leu Ala Ser Ser Met Val Ile Ala Val Ser Tyr Gly Asn
    210   215   220

Ile Val Trp Thr Leu Leu His Ile Arg Ser Ala Ala Glu Arg Trp Lys
225   230   235   240

Ala Phe Ser Thr Cys Ala Ala His Leu Thr Val Val Ser Leu Phe Tyr
                245   250   255

Gly Thr Leu Phe Phe Met Tyr Val Gln Thr Lys Val Thr Ser Ser Ile
            260   265   270

Asn Phe Asn Lys Val Val Ser Val Phe Tyr Ser Val Val Thr Pro Met
        275   280   285

```
Leu Asn Pro Leu Ile Tyr Ser Leu Arg Asn Lys Glu Val Lys Gly Ala
    290                 295                 300

Leu Gly Arg Val Phe Ser Leu Asn Phe Trp Lys Gly Gln
305                 310                 315

<210> 4349
<211> 180
<212> PRT
<213> Homo sapiens

<220>
<223> CTAG1A (NCBI Accession: NP_640343)

<400> 4349
Met Gln Ala Glu Gly Arg Gly Thr Gly Gly Ser Thr Gly Asp Ala Asp
1               5                   10                  15

Gly Pro Gly Gly Pro Gly Ile Pro Asp Gly Pro Gly Gly Asn Ala Gly
            20                  25                  30

Gly Pro Gly Glu Ala Gly Ala Thr Gly Gly Arg Gly Pro Arg Gly Ala
        35                  40                  45

Gly Ala Ala Arg Ala Ser Gly Pro Gly Gly Gly Ala Pro Arg Gly Pro
    50                  55                  60

His Gly Gly Ala Ala Ser Gly Leu Asn Gly Cys Cys Arg Cys Gly Ala
65                  70                  75                  80

Arg Gly Pro Glu Ser Arg Leu Leu Glu Phe Tyr Leu Ala Met Pro Phe
                85                  90                  95

Ala Thr Pro Met Glu Ala Glu Leu Ala Arg Arg Ser Leu Ala Gln Asp
            100                 105                 110

Ala Pro Pro Leu Pro Val Pro Gly Val Leu Leu Lys Glu Phe Thr Val
        115                 120                 125

Ser Gly Asn Ile Leu Thr Ile Arg Leu Thr Ala Ala Asp His Arg Gln
    130                 135                 140

Leu Gln Leu Ser Ile Ser Ser Cys Leu Gln Gln Leu Ser Leu Leu Met
145                 150                 155                 160

Trp Ile Thr Gln Cys Phe Leu Pro Val Phe Leu Ala Gln Pro Pro Ser
                165                 170                 175

Gly Gln Arg Arg
            180

<210> 4350
<211> 365
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<212> PRT
<213> Homo sapiens

<220>
<223> HTR1E (NCBI Accession: NP_000856)

<400> 4350
```
Met Asn Ile Thr Asn Cys Thr Thr Glu Ala Ser Met Ala Ile Arg Pro
1               5                  10                  15

Lys Thr Ile Thr Glu Lys Met Leu Ile Cys Met Thr Leu Val Val Ile
            20                  25                  30

Thr Thr Leu Thr Thr Leu Leu Asn Leu Ala Val Ile Met Ala Ile Gly
        35                  40                  45

Thr Thr Lys Lys Leu His Gln Pro Ala Asn Tyr Leu Ile Cys Ser Leu
    50                  55                  60

Ala Val Thr Asp Leu Leu Val Ala Val Leu Val Met Pro Leu Ser Ile
65                  70                  75                  80

Ile Tyr Ile Val Met Asp Arg Trp Lys Leu Gly Tyr Phe Leu Cys Glu
                85                  90                  95

Val Trp Leu Ser Val Asp Met Thr Cys Cys Thr Cys Ser Ile Leu His
            100                 105                 110

Leu Cys Val Ile Ala Leu Asp Arg Tyr Trp Ala Ile Thr Asn Ala Ile
        115                 120                 125

Glu Tyr Ala Arg Lys Arg Thr Ala Lys Arg Ala Ala Leu Met Ile Leu
    130                 135                 140

Thr Val Trp Thr Ile Ser Ile Phe Ile Ser Met Pro Pro Leu Phe Trp
145                 150                 155                 160

Arg Ser His Arg Arg Leu Ser Pro Pro Pro Ser Gln Cys Thr Ile Gln
                165                 170                 175

His Asp His Val Ile Tyr Thr Ile Tyr Ser Thr Leu Gly Ala Phe Tyr
            180                 185                 190

Ile Pro Leu Thr Leu Ile Leu Ile Leu Tyr Tyr Arg Ile Tyr His Ala
        195                 200                 205

Ala Lys Ser Leu Tyr Gln Lys Arg Gly Ser Ser Arg His Leu Ser Asn
    210                 215                 220

Arg Ser Thr Asp Ser Gln Asn Ser Phe Ala Ser Cys Lys Leu Thr Gln
225                 230                 235                 240

Thr Phe Cys Val Ser Asp Phe Ser Thr Ser Asp Pro Thr Thr Glu Phe
                245                 250                 255
```

```
Glu Lys Phe His Ala Ser Ile Arg Ile Pro Pro Phe Asp Asn Asp Leu
            260                 265                 270

Asp His Pro Gly Glu Arg Gln Gln Ile Ser Ser Thr Arg Glu Arg Lys
        275                 280                 285

Ala Ala Arg Ile Leu Gly Leu Ile Leu Gly Ala Phe Ile Leu Ser Trp
    290                 295                 300

Leu Pro Phe Phe Ile Lys Glu Leu Ile Val Gly Leu Ser Ile Tyr Thr
305                 310                 315                 320

Val Ser Ser Glu Val Ala Asp Phe Leu Thr Trp Leu Gly Tyr Val Asn
                325                 330                 335

Ser Leu Ile Asn Pro Leu Leu Tyr Thr Ser Phe Asn Glu Asp Phe Lys
            340                 345                 350

Leu Ala Phe Lys Lys Leu Ile Arg Cys Arg Glu His Thr
        355                 360                 365

<210> 4351
<211> 362
<212> PRT
<213> Homo sapiens

<220>
<223> MFAP3 (NCBI Accession: NP_001229265)

<400> 4351
Met Lys Leu His Cys Cys Leu Phe Thr Leu Val Ala Ser Ile Ile Val
1               5                   10                  15

Pro Ala Ala Phe Val Leu Glu Asp Val Asp Phe Asp Gln Met Val Ser
            20                  25                  30

Leu Glu Ala Asn Arg Ser Ser Tyr Asn Ala Ser Phe Pro Ser Ser Phe
        35                  40                  45

Glu Leu Ser Ala Ser Ser His Ser Asp Asp Asp Val Ile Ile Ala Lys
    50                  55                  60

Glu Gly Thr Ser Val Ser Ile Glu Cys Leu Leu Thr Ala Ser His Tyr
65                  70                  75                  80

Glu Asp Val His Trp His Asn Ser Lys Gly Gln Gln Leu Asp Gly Arg
                85                  90                  95

Ser Arg Gly Gly Lys Trp Leu Val Ser Asp Asn Phe Leu Asn Ile Thr
            100                 105                 110

Asn Val Ala Phe Asp Asp Arg Gly Leu Tyr Thr Cys Phe Val Thr Ser
        115                 120                 125
```

```
Pro Ile Arg Ala Ser Tyr Ser Val Thr Leu Arg Val Ile Phe Thr Ser
    130                 135                 140

Gly Asp Met Ser Val Tyr Tyr Met Ile Val Cys Leu Ile Ala Phe Thr
145                 150                 155                 160

Ile Thr Leu Ile Leu Asn Val Thr Arg Leu Cys Met Met Ser Ser His
                165                 170                 175

Leu Arg Lys Thr Glu Lys Ala Ile Asn Glu Phe Phe Arg Thr Glu Gly
            180                 185                 190

Ala Glu Lys Leu Gln Lys Ala Phe Glu Ile Ala Lys Arg Ile Pro Ile
        195                 200                 205

Ile Thr Ser Ala Lys Thr Leu Glu Leu Ala Lys Val Thr Gln Phe Lys
    210                 215                 220

Thr Met Glu Phe Ala Arg Tyr Ile Glu Glu Leu Ala Arg Ser Val Pro
225                 230                 235                 240

Leu Pro Pro Leu Ile Leu Asn Cys Arg Ala Phe Val Glu Glu Met Phe
                245                 250                 255

Glu Ala Val Arg Val Asp Asp Pro Asp Asp Leu Gly Glu Arg Ile Lys
            260                 265                 270

Glu Arg Pro Ala Leu Asn Ala Gln Gly Gly Ile Tyr Val Ile Asn Pro
        275                 280                 285

Glu Met Gly Arg Ser Asn Ser Pro Gly Gly Asp Ser Asp Asp Gly Ser
    290                 295                 300

Leu Asn Glu Gln Gly Gln Glu Ile Ala Val Gln Val Ser Val His Leu
305                 310                 315                 320

Gln Ser Glu Thr Lys Ser Ile Asp Thr Glu Ser Gln Gly Ser Ser His
                325                 330                 335

Phe Ser Pro Pro Asp Asp Ile Gly Ser Ala Glu Ser Asn Cys Asn Tyr
            340                 345                 350

Lys Asp Gly Ala Tyr Glu Asn Cys Gln Leu
        355                 360

<210> 4352
<211> 308
<212> PRT
<213> Homo sapiens

<220>
<223> HABP4 (NCBI Accession: NP_055097)
```

<400> 4352
Met Lys Gly Ala Leu Gly Ser Pro Val Ala Ala Ala Gly Ala Ala Met
1   5   10   15

Gln Glu Ser Phe Gly Cys Val Val Ala Asn Arg Phe His Gln Leu Leu
            20   25   30

Asp Asp Glu Ser Asp Pro Phe Asp Ile Leu Arg Glu Ala Glu Arg Arg
        35   40   45

Arg Gln Gln Gln Leu Gln Arg Lys Arg Arg Asp Glu Ala Ala Ala Ala
    50   55   60

Ala Gly Ala Gly Pro Arg Gly Gly Arg Ser Pro Ala Gly Ala Ser Gly
65   70   75   80

His Arg Ala Gly Ala Gly Gly Arg Arg Glu Ser Gln Lys Glu Arg Lys
                85   90   95

Ser Leu Pro Ala Pro Val Ala Gln Arg Pro Asp Ser Pro Gly Gly Gly
            100   105   110

Leu Gln Ala Pro Gly Gln Lys Arg Thr Pro Arg Arg Gly Glu Gln Gln
        115   120   125

Gly Trp Asn Asp Ser Arg Gly Pro Glu Gly Met Leu Glu Arg Ala Glu
    130   135   140

Arg Arg Ser Tyr Arg Glu Tyr Arg Pro Tyr Glu Thr Glu Arg Gln Ala
145   150   155   160

Asp Phe Thr Ala Glu Lys Phe Pro Asp Glu Lys Val Pro Glu Leu Glu
                165   170   175

Val Glu Glu Glu Thr Gln Val Gln Glu Met Thr Leu Asp Glu Trp Lys
            180   185   190

Asn Leu Gln Glu Gln Thr Arg Pro Lys Pro Glu Phe Asn Ile Arg Lys
        195   200   205

Pro Glu Ser Thr Val Pro Ser Lys Ala Val Val Ile His Lys Ser Lys
    210   215   220

Tyr Arg Asp Asp Met Val Lys Asp Asp Tyr Glu Asp Asp Ser His Val
225   230   235   240

Phe Arg Lys Pro Ala Asn Asp Ile Thr Ser Gln Leu Glu Ile Asn Phe
                245   250   255

Gly Asn Leu Pro Arg Pro Gly Arg Gly Ala Arg Gly Gly Thr Arg Gly
            260   265   270

Gly Arg Gly Arg Ile Arg Arg Ala Glu Asn Tyr Gly Pro Arg Ala Glu
        275   280   285

Val Val Met Gln Asp Val Ala Pro Asn Pro Asp Asp Pro Glu Asp Phe
290 295 300

Pro Ala Leu Ser
305

<210> 4353
<211> 141
<212> PRT
<213> Homo sapiens

<220>
<223> BC025996.2_frag (NCBI Accession: NR_003675)

<400> 4353
Met Asp Ile Pro Val Pro Ser Ser Phe Asn Asp Val Gly Gln Asp Trp
1 5 10 15

Arg Leu Arg His Phe Val Asp Gln Met Trp Tyr Glu Arg Glu Val Thr
20 25 30

Phe Leu Glu Gln Trp Thr Gln Asp Leu His Thr Arg Val Val Leu Arg
35 40 45

Ile Val Ser Ala His Ser Tyr Ala Ile Val Trp Val Asn Gly Val Asp
50 55 60

Ala Leu Glu His Glu Gly Ser Thr Ser Pro Leu Thr Pro Thr Ser Val
65 70 75 80

Ala Cys Ser Arg Trp Gly Pro Cys Pro Pro Ala Ser Ala Ser Leu Ser
85 90 95

Pro Ser Ala Thr Cys Ser Ser Pro Pro Pro Cys His Gln Gly Ala Ser
100 105 110

Ser Thr Trp Pro Thr Pro Pro Arg Gly Tyr His Pro Ala Ser Thr Ala
115 120 125

Asp Thr His Leu Arg Val Pro Pro Arg Gly Ala Leu His
130 135 140

<210> 4354
<211> 340
<212> PRT
<213> Homo sapiens

<220>
<223> DUSP12 (NCBI Accession: NP_009171)

<400> 4354
Met Leu Glu Ala Pro Gly Pro Ser Asp Gly Cys Glu Leu Ser Asn Pro
1 5 10 15

```
Ser Ala Ser Arg Val Ser Cys Ala Gly Gln Met Leu Glu Val Gln Pro
            20                  25                  30

Gly Leu Tyr Phe Gly Gly Ala Ala Ala Val Ala Glu Pro Asp His Leu
        35                  40                  45

Arg Glu Ala Gly Ile Thr Ala Val Leu Thr Val Asp Ser Glu Glu Pro
    50                  55                  60

Ser Phe Lys Ala Gly Pro Gly Val Glu Asp Leu Trp Arg Leu Phe Val
65                  70                  75                  80

Pro Ala Leu Asp Lys Pro Glu Thr Asp Leu Leu Ser His Leu Asp Arg
                85                  90                  95

Cys Val Ala Phe Ile Gly Gln Ala Arg Ala Glu Gly Arg Ala Val Leu
            100                 105                 110

Val His Cys His Ala Gly Val Ser Arg Ser Val Ala Ile Ile Thr Ala
        115                 120                 125

Phe Leu Met Lys Thr Asp Gln Leu Pro Phe Glu Lys Ala Tyr Glu Lys
    130                 135                 140

Leu Gln Ile Leu Lys Pro Glu Ala Lys Met Asn Glu Gly Phe Glu Trp
145                 150                 155                 160

Gln Leu Lys Leu Tyr Gln Ala Met Gly Tyr Glu Val Asp Thr Ser Ser
                165                 170                 175

Ala Ile Tyr Lys Gln Tyr Arg Leu Gln Lys Val Thr Glu Lys Tyr Pro
            180                 185                 190

Glu Leu Gln Asn Leu Pro Gln Glu Leu Phe Ala Val Asp Pro Thr Thr
        195                 200                 205

Val Ser Gln Gly Leu Lys Asp Glu Val Leu Tyr Lys Cys Arg Lys Cys
    210                 215                 220

Arg Arg Ser Leu Phe Arg Ser Ser Ser Ile Leu Asp His Arg Glu Gly
225                 230                 235                 240

Ser Gly Pro Ile Ala Phe Ala His Lys Arg Met Thr Pro Ser Ser Met
                245                 250                 255

Leu Thr Thr Gly Arg Gln Ala Gln Cys Thr Ser Tyr Phe Ile Glu Pro
            260                 265                 270

Val Gln Trp Met Glu Ser Ala Leu Leu Gly Val Met Asp Gly Gln Leu
        275                 280                 285

Leu Cys Pro Lys Cys Ser Ala Lys Leu Gly Ser Phe Asn Trp Tyr Gly
    290                 295                 300
```

Glu Gln Cys Ser Cys Gly Arg Trp Ile Thr Pro Ala Phe Gln Ile His
305 310 315 320

Lys Asn Arg Val Asp Glu Met Lys Ile Leu Pro Val Leu Gly Ser Gln
325 330 335

Thr Gly Lys Ile
340

<210> 4355
<211> 892
<212> PRT
<213> Homo sapiens

<220>
<223> ACTN1 (NCBI Accession: NP_001093)

<400> 4355
Met Asp His Tyr Asp Ser Gln Gln Thr Asn Asp Tyr Met Gln Pro Glu
1 5 10 15

Glu Asp Trp Asp Arg Asp Leu Leu Leu Asp Pro Ala Trp Glu Lys Gln
20 25 30

Gln Arg Lys Thr Phe Thr Ala Trp Cys Asn Ser His Leu Arg Lys Ala
35 40 45

Gly Thr Gln Ile Glu Asn Ile Glu Glu Asp Phe Arg Asp Gly Leu Lys
50 55 60

Leu Met Leu Leu Leu Glu Val Ile Ser Gly Glu Arg Leu Ala Lys Pro
65 70 75 80

Glu Arg Gly Lys Met Arg Val His Lys Ile Ser Asn Val Asn Lys Ala
85 90 95

Leu Asp Phe Ile Ala Ser Lys Gly Val Lys Leu Val Ser Ile Gly Ala
100 105 110

Glu Glu Ile Val Asp Gly Asn Val Lys Met Thr Leu Gly Met Ile Trp
115 120 125

Thr Ile Ile Leu Arg Phe Ala Ile Gln Asp Ile Ser Val Glu Glu Thr
130 135 140

Ser Ala Lys Glu Gly Leu Leu Leu Trp Cys Gln Arg Lys Thr Ala Pro
145 150 155 160

Tyr Lys Asn Val Asn Ile Gln Asn Phe His Ile Ser Trp Lys Asp Gly
165 170 175

Leu Gly Phe Cys Ala Leu Ile His Arg His Arg Pro Glu Leu Ile Asp
180 185 190

```
Tyr Gly Lys Leu Arg Lys Asp Asp Pro Leu Thr Asn Leu Asn Thr Ala
        195                 200                 205

Phe Asp Val Ala Glu Lys Tyr Leu Asp Ile Pro Lys Met Leu Asp Ala
    210                 215                 220

Glu Asp Ile Val Gly Thr Ala Arg Pro Asp Glu Lys Ala Ile Met Thr
225                 230                 235                 240

Tyr Val Ser Ser Phe Tyr His Ala Phe Ser Gly Ala Gln Lys Ala Glu
                245                 250                 255

Thr Ala Ala Asn Arg Ile Cys Lys Val Leu Ala Val Asn Gln Glu Asn
            260                 265                 270

Glu Gln Leu Met Glu Asp Tyr Glu Lys Leu Ala Ser Asp Leu Leu Glu
        275                 280                 285

Trp Ile Arg Arg Thr Ile Pro Trp Leu Glu Asn Arg Val Pro Glu Asn
    290                 295                 300

Thr Met His Ala Met Gln Gln Lys Leu Glu Asp Phe Arg Asp Tyr Arg
305                 310                 315                 320

Arg Leu His Lys Pro Pro Lys Val Gln Glu Lys Cys Gln Leu Glu Ile
                325                 330                 335

Asn Phe Asn Thr Leu Gln Thr Lys Leu Arg Leu Ser Asn Arg Pro Ala
            340                 345                 350

Phe Met Pro Ser Glu Gly Arg Met Val Ser Asp Ile Asn Asn Ala Trp
        355                 360                 365

Gly Cys Leu Glu Gln Val Glu Lys Gly Tyr Glu Glu Trp Leu Leu Asn
    370                 375                 380

Glu Ile Arg Arg Leu Glu Arg Leu Asp His Leu Ala Glu Lys Phe Arg
385                 390                 395                 400

Gln Lys Ala Ser Ile His Glu Ala Trp Thr Asp Gly Lys Glu Ala Met
                405                 410                 415

Leu Arg Gln Lys Asp Tyr Glu Thr Ala Thr Leu Ser Glu Ile Lys Ala
            420                 425                 430

Leu Leu Lys Lys His Glu Ala Phe Glu Ser Asp Leu Ala Ala His Gln
        435                 440                 445

Asp Arg Val Glu Gln Ile Ala Ala Ile Ala Gln Glu Leu Asn Glu Leu
    450                 455                 460

Asp Tyr Tyr Asp Ser Pro Ser Val Asn Ala Arg Cys Gln Lys Ile Cys
465                 470                 475                 480
```

```
Asp Gln Trp Asp Asn Leu Gly Ala Leu Thr Gln Lys Arg Arg Glu Ala
                485                 490                 495

Leu Glu Arg Thr Glu Lys Leu Leu Glu Thr Ile Asp Gln Leu Tyr Leu
            500                 505                 510

Glu Tyr Ala Lys Arg Ala Ala Pro Phe Asn Asn Trp Met Glu Gly Ala
        515                 520                 525

Met Glu Asp Leu Gln Asp Thr Phe Ile Val His Thr Ile Glu Glu Ile
    530                 535                 540

Gln Gly Leu Thr Thr Ala His Glu Gln Phe Lys Ala Thr Leu Pro Asp
545                 550                 555                 560

Ala Asp Lys Glu Arg Leu Ala Ile Leu Gly Ile His Asn Glu Val Ser
                565                 570                 575

Lys Ile Val Gln Thr Tyr His Val Asn Met Ala Gly Thr Asn Pro Tyr
            580                 585                 590

Thr Thr Ile Thr Pro Gln Glu Ile Asn Gly Lys Trp Asp His Val Arg
        595                 600                 605

Gln Leu Val Pro Arg Arg Asp Gln Ala Leu Thr Glu Glu His Ala Arg
    610                 615                 620

Gln Gln His Asn Glu Arg Leu Arg Lys Gln Phe Gly Ala Gln Ala Asn
625                 630                 635                 640

Val Ile Gly Pro Trp Ile Gln Thr Lys Met Glu Glu Ile Gly Arg Ile
                645                 650                 655

Ser Ile Glu Met His Gly Thr Leu Glu Asp Gln Leu Ser His Leu Arg
            660                 665                 670

Gln Tyr Glu Lys Ser Ile Val Asn Tyr Lys Pro Lys Ile Asp Gln Leu
        675                 680                 685

Glu Gly Asp His Gln Leu Ile Gln Glu Ala Leu Ile Phe Asp Asn Lys
    690                 695                 700

His Thr Asn Tyr Thr Met Glu His Ile Arg Val Gly Trp Glu Gln Leu
705                 710                 715                 720

Leu Thr Thr Ile Ala Arg Thr Ile Asn Glu Val Glu Asn Gln Ile Leu
                725                 730                 735

Thr Arg Asp Ala Lys Gly Ile Ser Gln Glu Gln Met Asn Glu Phe Arg
            740                 745                 750

Ala Ser Phe Asn His Phe Asp Arg Asp His Ser Gly Thr Leu Gly Pro
        755                 760                 765
```

```
Glu Glu Phe Lys Ala Cys Leu Ile Ser Leu Gly Tyr Asp Ile Gly Asn
    770                 775                 780

Asp Pro Gln Gly Glu Ala Glu Phe Ala Arg Ile Met Ser Ile Val Asp
785                 790                 795                 800

Pro Asn Arg Leu Gly Val Val Thr Phe Gln Ala Phe Ile Asp Phe Met
                805                 810                 815

Ser Arg Glu Thr Ala Asp Thr Asp Thr Ala Asp Gln Val Met Ala Ser
            820                 825                 830

Phe Lys Ile Leu Ala Gly Asp Lys Asn Tyr Ile Thr Met Asp Glu Leu
        835                 840                 845

Arg Arg Glu Leu Pro Pro Asp Gln Ala Glu Tyr Cys Ile Ala Arg Met
    850                 855                 860

Ala Pro Tyr Thr Gly Pro Asp Ser Val Pro Gly Ala Leu Asp Tyr Met
865                 870                 875                 880

Ser Phe Ser Thr Ala Leu Tyr Gly Glu Ser Asp Leu
                885                 890
```

<210> 4356
<211> 545
<212> PRT
<213> Homo sapiens

<220>
<223> ZKSCAN4 (NCBI Accession: XP_005249152)

<400> 4356

```
Met Ala Arg Glu Pro Arg Lys Asn Ala Ala Leu Asp Ala Gln Ser Ala
1               5                   10                  15

Glu Asp Gln Thr Gly Leu Leu Thr Val Lys Val Glu Lys Glu Glu Ala
            20                  25                  30

Ser Ala Leu Thr Ala Glu Val Arg Ala Pro Cys Ser Pro Ala Arg Gly
        35                  40                  45

Pro Glu Arg Ser Arg Gln Arg Phe Arg Gly Phe Arg Tyr Pro Glu Ala
    50                  55                  60

Ala Gly Pro Arg Glu Ala Leu Ser Arg Leu Arg Glu Leu Cys Gly Gln
65                  70                  75                  80

Trp Leu Gln Pro Glu Met His Ser Lys Glu Gln Ile Leu Glu Leu Leu
                85                  90                  95

Val Leu Glu Gln Phe Leu Thr Ile Leu Pro Gly Asn Leu Gln Ser Trp
            100                 105                 110
```

```
Val Arg Glu Gln His Pro Glu Ser Gly Glu Glu Val Val Val Leu Leu
        115                 120                 125

Glu Tyr Leu Glu Arg Gln Leu Asp Glu Pro Ala Pro Gln Val Pro Val
    130                 135                 140

Gly Asp Gln Gly Gln Glu Leu Leu Cys Cys Lys Met Ala Leu Leu Thr
145                 150                 155                 160

Gln Thr Gln Gly Ser Gln Ser Ser Gln Cys Gln Pro Met Lys Ala Leu
                165                 170                 175

Phe Lys His Glu Ser Leu Gly Ser Gln Pro Leu His Asp Arg Val Leu
            180                 185                 190

Gln Val Pro Gly Leu Ala Gln Gly Gly Cys Cys Arg Glu Asp Ala Met
        195                 200                 205

Val Ala Ser Arg Leu Thr Pro Gly Ser Gln Gly Leu Leu Lys Met Glu
    210                 215                 220

Asp Val Ala Leu Thr Leu Thr Pro Gly Trp Thr Gln Leu Asp Ser Ser
225                 230                 235                 240

Gln Val Asn Leu Tyr Arg Asp Glu Lys Gln Glu Asn His Ser Ser Leu
                245                 250                 255

Val Ser Leu Gly Gly Glu Ile Gln Thr Lys Ser Arg Asp Leu Pro Pro
            260                 265                 270

Val Lys Lys Leu Pro Glu Lys Glu His Gly Lys Ile Cys His Leu Arg
        275                 280                 285

Glu Asp Ile Ala Gln Ile Pro Thr His Ala Glu Ala Gly Glu Gln Glu
    290                 295                 300

Gly Arg Leu Gln Arg Lys Gln Lys Asn Ala Ile Gly Ser Arg Arg His
305                 310                 315                 320

Tyr Cys His Glu Cys Gly Lys Ser Phe Ala Gln Ser Ser Gly Leu Thr
                325                 330                 335

Lys His Arg Arg Ile His Thr Gly Glu Lys Pro Tyr Glu Cys Glu Asp
            340                 345                 350

Cys Gly Lys Thr Phe Ile Gly Ser Ser Ala Leu Val Ile His Gln Arg
        355                 360                 365

Val His Thr Gly Glu Lys Pro Tyr Glu Cys Glu Glu Cys Gly Lys Val
    370                 375                 380

Phe Ser His Ser Ser Asn Leu Ile Lys His Gln Arg Thr His Thr Gly
385                 390                 395                 400
```

Glu Lys Pro Tyr Glu Cys Asp Asp Cys Gly Lys Thr Phe Ser Gln Ser
405 410 415

Cys Ser Leu Leu Glu His His Lys Ile His Thr Gly Glu Lys Pro Tyr
420 425 430

Gln Cys Asn Met Cys Gly Lys Ala Phe Arg Arg Asn Ser His Leu Leu
435 440 445

Arg His Gln Arg Ile His Gly Asp Lys Asn Val Gln Asn Pro Glu His
450 455 460

Gly Glu Ser Trp Glu Ser Gln Gly Arg Thr Glu Ser Gln Trp Glu Asn
465 470 475 480

Thr Glu Ala Pro Val Ser Tyr Lys Cys Asn Glu Cys Glu Arg Ser Phe
485 490 495

Thr Arg Asn Arg Ser Leu Ile Glu His Gln Lys Ile His Thr Gly Glu
500 505 510

Lys Pro Tyr Gln Cys Asp Thr Cys Gly Lys Gly Phe Thr Arg Thr Ser
515 520 525

Tyr Leu Val Gln His Gln Arg Ser His Val Gly Lys Lys Thr Leu Ser
530 535 540

Gln
545

<210> 4357
<211> 448
<212> PRT
<213> Homo sapiens

<220>
<223> PNMA5 (NCBI Accession: NP_001096620)

<400> 4357
Met Ala Leu Thr Leu Leu Glu Asp Trp Cys Lys Gly Met Asp Met Asp
1 5 10 15

Pro Arg Lys Ala Leu Leu Ile Val Gly Ile Pro Met Glu Cys Ser Glu
20 25 30

Val Glu Ile Gln Asp Thr Val Lys Ala Gly Leu Gln Pro Leu Cys Ala
35 40 45

Tyr Arg Val Leu Gly Arg Met Phe Arg Arg Glu Asp Asn Ala Lys Ala
50 55 60

Val Phe Ile Glu Leu Ala Asp Thr Val Asn Tyr Thr Thr Leu Pro Ser
65 70 75 80

```
His Ile Pro Gly Lys Gly Gly Ser Trp Glu Val Val Val Lys Pro Arg
                85                  90                  95

Asn Pro Asp Asp Glu Phe Leu Ser Arg Leu Asn Tyr Phe Leu Lys Asp
            100                 105                 110

Glu Gly Arg Ser Met Thr Asp Val Ala Arg Ala Leu Gly Cys Cys Ser
        115                 120                 125

Leu Pro Ala Glu Ser Leu Asp Ala Glu Val Met Pro Gln Val Arg Ser
    130                 135                 140

Pro Pro Leu Glu Pro Pro Lys Glu Ser Met Trp Tyr Arg Lys Leu Lys
145                 150                 155                 160

Val Phe Ser Gly Thr Ala Ser Pro Ser Pro Gly Glu Glu Thr Phe Glu
                165                 170                 175

Asp Trp Leu Glu Gln Val Thr Glu Ile Met Pro Ile Trp Gln Val Ser
            180                 185                 190

Glu Val Glu Lys Arg Arg Arg Leu Leu Glu Ser Leu Arg Gly Pro Ala
        195                 200                 205

Leu Ser Ile Met Arg Val Leu Gln Ala Asn Asn Asp Ser Ile Thr Val
    210                 215                 220

Glu Gln Cys Leu Asp Ala Leu Lys Gln Ile Phe Gly Asp Lys Glu Asp
225                 230                 235                 240

Phe Gly Ala Ser Gln Phe Arg Phe Leu Gln Thr Ser Pro Lys Ile Gly
                245                 250                 255

Glu Lys Val Ser Thr Phe Leu Leu Arg Leu Glu Pro Leu Leu Gln Lys
            260                 265                 270

Ala Val His Lys Ser Pro Leu Ser Val Arg Ser Thr Asp Met Ile Arg
        275                 280                 285

Leu Lys His Leu Leu Ala Arg Val Ala Met Thr Pro Ala Leu Arg Gly
    290                 295                 300

Lys Leu Glu Leu Leu Asp Gln Arg Gly Cys Pro Pro Asn Phe Leu Glu
305                 310                 315                 320

Leu Met Lys Leu Ile Arg Asp Glu Glu Glu Trp Glu Asn Thr Glu Ala
                325                 330                 335

Val Met Lys Asn Lys Glu Lys Pro Ser Gly Arg Gly Arg Gly Ala Ser
            340                 345                 350

Gly Arg Gln Ala Arg Ala Glu Ala Ser Val Ser Ala Pro Gln Ala Thr
        355                 360                 365
```

```
Val Gln Ala Arg Ser Phe Ser Asp Ser Ser Pro Gln Thr Ile Gln Gly
    370                 375                 380

Gly Leu Pro Pro Leu Val Lys Arg Arg Arg Leu Leu Gly Ser Glu Ser
385                 390                 395                 400

Thr Arg Gly Glu Asp His Gly Gln Ala Thr Tyr Pro Lys Ala Glu Asn
                405                 410                 415

Gln Thr Pro Gly Arg Glu Gly Pro Gln Ala Ala Gly Glu Glu Leu Gly
            420                 425                 430

Asn Glu Ala Gly Ala Gly Ala Met Ser His Pro Lys Pro Trp Glu Thr
        435                 440                 445

<210> 4358
<211> 621
<212> PRT
<213> Homo sapiens

<220>
<223> KLHL40 (NCBI Accession: NP_689606)

<400> 4358
Met Ala Leu Gly Leu Glu Gln Ala Glu Glu Gln Arg Leu Tyr Gln Gln
1               5                   10                  15

Thr Leu Leu Gln Asp Gly Leu Lys Asp Met Leu Asp His Gly Lys Phe
            20                  25                  30

Leu Asp Cys Val Val Arg Ala Gly Glu Arg Glu Phe Pro Cys His Arg
        35                  40                  45

Leu Val Leu Ala Ala Cys Ser Pro Tyr Phe Arg Ala Arg Phe Leu Ala
    50                  55                  60

Glu Pro Glu Arg Ala Gly Glu Leu His Leu Glu Glu Val Ser Pro Asp
65                  70                  75                  80

Val Val Ala Gln Val Leu His Tyr Leu Tyr Thr Ser Glu Ile Ala Leu
                85                  90                  95

Asp Glu Ala Ser Val Gln Asp Leu Phe Ala Ala Ala His Arg Phe Gln
            100                 105                 110

Ile Pro Ser Ile Phe Thr Ile Cys Val Ser Phe Leu Gln Lys Arg Leu
        115                 120                 125

Cys Leu Ser Asn Cys Leu Ala Val Phe Arg Leu Gly Leu Leu Leu Asp
    130                 135                 140

Cys Ala Arg Leu Ala Val Ala Ala Arg Asp Phe Ile Cys Ala His Phe
145                 150                 155                 160
```

```
Thr Leu Val Ala Arg Asp Ala Asp Phe Leu Gly Leu Ser Ala Asp Glu
                165                 170                 175

Leu Ile Ala Ile Ile Ser Ser Asp Gly Leu Asn Val Glu Lys Glu Glu
            180                 185                 190

Ala Val Phe Glu Ala Val Met Arg Trp Ala Gly Ser Gly Asp Ala Glu
        195                 200                 205

Ala Gln Ala Glu Arg Gln Arg Ala Leu Pro Thr Val Phe Glu Ser Val
    210                 215                 220

Arg Cys Arg Leu Leu Pro Arg Ala Phe Leu Glu Ser Arg Val Glu Arg
225                 230                 235                 240

His Pro Leu Val Arg Ala Gln Pro Glu Leu Leu Arg Lys Val Gln Met
                245                 250                 255

Val Lys Asp Ala His Glu Gly Arg Ile Thr Thr Leu Arg Lys Lys Lys
            260                 265                 270

Lys Gly Lys Asp Gly Ala Gly Ala Lys Glu Ala Asp Lys Gly Thr Ser
        275                 280                 285

Lys Ala Lys Ala Glu Glu Asp Glu Glu Ala Glu Arg Ile Leu Pro Gly
    290                 295                 300

Ile Leu Asn Asp Thr Leu Arg Phe Gly Met Phe Leu Gln Asp Leu Ile
305                 310                 315                 320

Phe Met Ile Ser Glu Glu Gly Ala Val Ala Tyr Asp Pro Ala Ala Asn
                325                 330                 335

Glu Cys Tyr Cys Ala Ser Leu Ser Ser Gln Val Pro Lys Asn His Val
            340                 345                 350

Ser Leu Val Thr Lys Glu Asn Gln Val Phe Val Ala Gly Gly Leu Phe
        355                 360                 365

Tyr Asn Glu Asp Asn Lys Glu Asp Pro Met Ser Ala Tyr Phe Leu Gln
    370                 375                 380

Phe Asp His Leu Asp Ser Glu Trp Leu Gly Met Pro Pro Leu Pro Ser
385                 390                 395                 400

Pro Arg Cys Leu Phe Gly Leu Gly Glu Ala Leu Asn Ser Ile Tyr Val
                405                 410                 415

Val Gly Gly Arg Glu Ile Lys Asp Gly Glu Arg Cys Leu Asp Ser Val
            420                 425                 430

Met Cys Tyr Asp Arg Leu Ser Phe Lys Trp Gly Glu Ser Asp Pro Leu
        435                 440                 445
```

```
Pro Tyr Val Val Tyr Gly His Thr Val Leu Ser His Met Asp Leu Val
    450                 455                 460

Tyr Val Ile Gly Gly Lys Gly Ser Asp Arg Lys Cys Leu Asn Lys Met
465                 470                 475                 480

Cys Val Tyr Asp Pro Lys Lys Phe Glu Trp Lys Glu Leu Ala Pro Met
                485                 490                 495

Gln Thr Ala Arg Ser Leu Phe Gly Ala Thr Val His Asp Gly Arg Ile
            500                 505                 510

Ile Val Ala Ala Gly Val Thr Asp Thr Gly Leu Thr Ser Ser Ala Glu
        515                 520                 525

Val Tyr Ser Ile Thr Asp Asn Lys Trp Ala Pro Phe Glu Ala Phe Pro
    530                 535                 540

Gln Glu Arg Ser Ser Leu Ser Leu Val Ser Leu Val Gly Thr Leu Tyr
545                 550                 555                 560

Ala Ile Gly Gly Phe Ala Thr Leu Glu Thr Glu Ser Gly Glu Leu Val
                565                 570                 575

Pro Thr Glu Leu Asn Asp Ile Trp Arg Tyr Asn Glu Glu Glu Lys Lys
            580                 585                 590

Trp Glu Gly Val Leu Arg Glu Ile Ala Tyr Ala Ala Gly Ala Thr Phe
        595                 600                 605

Leu Pro Val Arg Leu Asn Val Leu Arg Leu Thr Lys Met
    610                 615                 620

<210> 4359
<211> 552
<212> PRT
<213> Homo sapiens

<220>
<223> MPP2 (NCBI Accession: NP_005365)

<400> 4359
Met Pro Val Ala Ala Thr Asn Ser Glu Thr Ala Met Gln Gln Val Leu
1               5                   10                  15

Asp Asn Leu Gly Ser Leu Pro Ser Ala Thr Gly Ala Ala Glu Leu Asp
            20                  25                  30

Leu Ile Phe Leu Arg Gly Ile Met Glu Ser Pro Ile Val Arg Ser Leu
        35                  40                  45

Ala Lys Ala His Glu Arg Leu Glu Glu Thr Lys Leu Glu Ala Val Arg
    50                  55                  60
```

```
Asp Asn Asn Leu Glu Leu Val Gln Glu Ile Leu Arg Asp Leu Ala Gln
65                  70                  75                  80

Leu Ala Glu Gln Ser Ser Thr Ala Ala Glu Leu Ala His Ile Leu Gln
                85                  90                  95

Glu Pro His Phe Gln Ser Leu Leu Glu Thr His Asp Ser Val Ala Ser
            100                 105                 110

Lys Thr Tyr Glu Thr Pro Pro Pro Ser Pro Gly Leu Asp Pro Thr Phe
        115                 120                 125

Ser Asn Gln Pro Val Pro Pro Asp Ala Val Arg Met Val Gly Ile Arg
    130                 135                 140

Lys Thr Ala Gly Glu His Leu Gly Val Thr Phe Arg Val Glu Gly Gly
145                 150                 155                 160

Glu Leu Val Ile Ala Arg Ile Leu His Gly Gly Met Val Ala Gln Gln
                165                 170                 175

Gly Leu Leu His Val Gly Asp Ile Ile Lys Glu Val Asn Gly Gln Pro
            180                 185                 190

Val Gly Ser Asp Pro Arg Ala Leu Gln Glu Leu Leu Arg Asn Ala Ser
        195                 200                 205

Gly Ser Val Ile Leu Lys Ile Leu Pro Ser Tyr Gln Glu Pro His Leu
    210                 215                 220

Pro Arg Gln Val Phe Val Lys Cys His Phe Asp Tyr Asp Pro Ala Arg
225                 230                 235                 240

Asp Ser Leu Ile Pro Cys Lys Glu Ala Gly Leu Arg Phe Asn Ala Gly
                245                 250                 255

Asp Leu Leu Gln Ile Val Asn Gln Asp Asp Ala Asn Trp Trp Gln Ala
            260                 265                 270

Cys His Val Glu Gly Gly Ser Ala Gly Leu Ile Pro Ser Gln Leu Leu
        275                 280                 285

Glu Glu Lys Arg Lys Ala Phe Val Lys Arg Asp Leu Glu Leu Thr Pro
    290                 295                 300

Asn Ser Gly Thr Leu Cys Gly Ser Leu Ser Gly Lys Lys Lys Lys Arg
305                 310                 315                 320

Met Met Tyr Leu Thr Thr Lys Asn Ala Glu Phe Asp Arg His Glu Leu
                325                 330                 335

Leu Ile Tyr Glu Glu Val Ala Arg Met Pro Pro Phe Arg Arg Lys Thr
            340                 345                 350
```

```
Leu Val Leu Ile Gly Ala Gln Gly Val Gly Arg Arg Ser Leu Lys Asn
        355                 360                 365

Lys Leu Ile Met Trp Asp Pro Asp Arg Tyr Gly Thr Thr Val Pro Tyr
    370                 375                 380

Thr Ser Arg Arg Pro Lys Asp Ser Glu Arg Glu Gly Gln Gly Tyr Ser
385                 390                 395                 400

Phe Val Ser Arg Gly Glu Met Glu Ala Asp Val Arg Ala Gly Arg Tyr
                405                 410                 415

Leu Glu His Gly Glu Tyr Glu Gly Asn Leu Tyr Gly Thr Arg Ile Asp
            420                 425                 430

Ser Ile Arg Gly Val Val Ala Ala Gly Lys Val Cys Val Leu Asp Val
        435                 440                 445

Asn Pro Gln Ala Val Lys Val Leu Arg Thr Ala Glu Phe Val Pro Tyr
    450                 455                 460

Val Val Phe Ile Glu Ala Pro Asp Phe Glu Thr Leu Arg Ala Met Asn
465                 470                 475                 480

Arg Ala Ala Leu Glu Ser Gly Ile Ser Thr Lys Gln Leu Thr Glu Ala
                485                 490                 495

Asp Leu Arg Arg Thr Val Glu Glu Ser Ser Arg Ile Gln Arg Gly Tyr
            500                 505                 510

Gly His Tyr Phe Asp Leu Cys Leu Val Asn Ser Asn Leu Glu Arg Thr
        515                 520                 525

Phe Arg Glu Leu Gln Thr Ala Met Glu Lys Leu Arg Thr Glu Pro Gln
    530                 535                 540

Trp Val Pro Val Ser Trp Val Tyr
545                 550

<210> 4360
<211> 526
<212> PRT
<213> Homo sapiens

<220>
<223> BTN1A1 (NCBI Accession: NP_001723)

<400> 4360
Met Ala Val Phe Pro Ser Ser Gly Leu Pro Arg Cys Leu Leu Thr Leu
1               5                   10                  15

Ile Leu Leu Gln Leu Pro Lys Leu Asp Ser Ala Pro Phe Asp Val Ile
            20                  25                  30
```

```
Gly Pro Pro Glu Pro Ile Leu Ala Val Val Gly Glu Asp Ala Glu Leu
        35                  40                  45

Pro Cys Arg Leu Ser Pro Asn Ala Ser Ala Glu His Leu Glu Leu Arg
    50                  55                  60

Trp Phe Arg Lys Lys Val Ser Pro Ala Val Leu Val His Arg Asp Gly
65                  70                  75                  80

Arg Glu Gln Glu Ala Glu Gln Met Pro Glu Tyr Arg Gly Arg Ala Thr
                85                  90                  95

Leu Val Gln Asp Gly Ile Ala Lys Gly Arg Val Ala Leu Arg Ile Arg
            100                 105                 110

Gly Val Arg Val Ser Asp Asp Gly Glu Tyr Thr Cys Phe Phe Arg Glu
        115                 120                 125

Asp Gly Ser Tyr Glu Glu Ala Leu Val His Leu Lys Val Ala Ala Leu
    130                 135                 140

Gly Ser Asp Pro His Ile Ser Met Gln Val Gln Glu Asn Gly Glu Ile
145                 150                 155                 160

Cys Leu Glu Cys Thr Ser Val Gly Trp Tyr Pro Glu Pro Gln Val Gln
                165                 170                 175

Trp Arg Thr Ser Lys Gly Glu Lys Phe Pro Ser Thr Ser Glu Ser Arg
            180                 185                 190

Asn Pro Asp Glu Glu Gly Leu Phe Thr Val Ala Ala Ser Val Ile Ile
        195                 200                 205

Arg Asp Thr Ser Ala Lys Asn Val Ser Cys Tyr Ile Gln Asn Leu Leu
    210                 215                 220

Leu Gly Gln Glu Lys Lys Val Glu Ile Ser Ile Pro Ala Ser Ser Leu
225                 230                 235                 240

Pro Arg Leu Thr Pro Trp Ile Val Ala Val Ala Val Ile Leu Met Val
                245                 250                 255

Leu Gly Leu Leu Thr Ile Gly Ser Ile Phe Phe Thr Trp Arg Leu Tyr
            260                 265                 270

Asn Glu Arg Pro Arg Glu Arg Arg Asn Glu Phe Ser Ser Lys Glu Arg
        275                 280                 285

Leu Leu Glu Glu Leu Lys Trp Lys Lys Ala Thr Leu His Ala Val Asp
    290                 295                 300

Val Thr Leu Asp Pro Asp Thr Ala His Pro His Leu Phe Leu Tyr Glu
305                 310                 315                 320
```

Asp Ser Lys Ser Val Arg Leu Glu Asp Ser Arg Gln Lys Leu Pro Glu
325 330 335

Lys Thr Glu Arg Phe Asp Ser Trp Pro Cys Val Leu Gly Arg Glu Thr
340 345 350

Phe Thr Ser Gly Arg His Tyr Trp Glu Val Glu Val Gly Asp Arg Thr
355 360 365

Asp Trp Ala Ile Gly Val Cys Arg Glu Asn Val Met Lys Lys Gly Phe
370 375 380

Asp Pro Met Thr Pro Glu Asn Gly Phe Trp Ala Val Glu Leu Tyr Gly
385 390 395 400

Asn Gly Tyr Trp Ala Leu Thr Pro Leu Arg Thr Pro Leu Pro Leu Ala
405 410 415

Gly Pro Pro Arg Arg Val Gly Ile Phe Leu Asp Tyr Glu Ser Gly Asp
420 425 430

Ile Ser Phe Tyr Asn Met Asn Asp Gly Ser Asp Ile Tyr Thr Phe Ser
435 440 445

Asn Val Thr Phe Ser Gly Pro Leu Arg Pro Phe Phe Cys Leu Trp Ser
450 455 460

Ser Gly Lys Lys Pro Leu Thr Ile Cys Pro Ile Ala Asp Gly Pro Glu
465 470 475 480

Arg Val Thr Val Ile Ala Asn Ala Gln Asp Leu Ser Lys Glu Ile Pro
485 490 495

Leu Ser Pro Met Gly Glu Asp Ser Ala Pro Arg Asp Ala Asp Thr Leu
500 505 510

His Ser Lys Leu Ile Pro Thr Gln Pro Ser Gln Gly Ala Pro
515 520 525

<210> 4361
<211> 241
<212> PRT
<213> Homo sapiens

<220>
<223> PEX11G (NCBI Accession: NP_542393)

<400> 4361
Met Ala Ser Leu Ser Gly Leu Ala Ser Ala Leu Glu Ser Tyr Arg Gly
1 5 10 15

Arg Asp Arg Leu Ile Arg Val Leu Gly Tyr Cys Cys Gln Leu Val Gly
20 25 30

```
Gly Val Leu Val Glu Gln Cys Pro Ala Arg Ser Glu Val Gly Thr Arg
        35                  40                  45

Leu Leu Val Val Ser Thr Gln Leu Ser His Cys Arg Thr Ile Leu Arg
    50                  55                  60

Leu Phe Asp Asp Leu Ala Met Phe Val Tyr Thr Lys Gln Tyr Gly Leu
65                  70                  75                  80

Gly Ala Gln Glu Glu Asp Ala Phe Val Arg Cys Val Ser Val Leu Gly
                85                  90                  95

Asn Leu Ala Asp Gln Leu Tyr Tyr Pro Cys Glu His Val Ala Trp Ala
            100                 105                 110

Ala Asp Ala Arg Val Leu His Val Asp Ser Ser Arg Trp Trp Thr Leu
        115                 120                 125

Ser Thr Thr Leu Trp Ala Leu Ser Leu Leu Leu Gly Val Ala Arg Ser
    130                 135                 140

Leu Trp Met Leu Leu Lys Leu Arg Gln Arg Leu Arg Ser Pro Thr Ala
145                 150                 155                 160

Pro Phe Thr Ser Pro Leu Pro Arg Gly Lys Arg Arg Ala Met Glu Ala
                165                 170                 175

Gln Met Gln Ser Glu Ala Leu Ser Leu Leu Ser Asn Leu Ala Asp Leu
            180                 185                 190

Ala Asn Ala Val His Trp Leu Pro Arg Gly Val Leu Trp Ala Gly Arg
        195                 200                 205

Phe Pro Pro Trp Leu Val Gly Leu Met Gly Thr Ile Ser Ser Ile Leu
    210                 215                 220

Ser Met Tyr Gln Ala Ala Arg Ala Gly Gly Gln Ala Glu Ala Thr Thr
225                 230                 235                 240

Pro
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<210> 4362
<211> 575
<212> PRT
<213> Homo sapiens

<220>
<223> ZNF8 (NCBI Accession: NP_066575)

<400> 4362

```
Met Asp Pro Glu Asp Glu Gly Val Ala Gly Val Met Ser Val Gly Pro
1               5                   10                  15
```

```
Pro Ala Ala Arg Leu Gln Glu Pro Val Thr Phe Arg Asp Val Ala Val
            20                  25                  30

Asp Phe Thr Gln Glu Glu Trp Gly Gln Leu Asp Pro Thr Gln Arg Ile
        35                  40                  45

Leu Tyr Arg Asp Val Met Leu Glu Thr Phe Gly His Leu Leu Ser Ile
    50                  55                  60

Gly Pro Glu Leu Pro Lys Pro Glu Val Ile Ser Gln Leu Glu Gln Gly
65                  70                  75                  80

Thr Glu Leu Trp Val Ala Glu Arg Gly Thr Thr Gln Gly Cys His Pro
                85                  90                  95

Ala Trp Glu Pro Arg Ser Glu Ser Gln Ala Ser Arg Lys Glu Glu Gly
            100                 105                 110

Leu Pro Glu Glu Glu Pro Ser His Val Thr Gly Arg Glu Gly Phe Pro
        115                 120                 125

Thr Asp Ala Pro Tyr Pro Thr Thr Leu Gly Lys Asp Arg Glu Cys Gln
    130                 135                 140

Ser Gln Ser Leu Ala Leu Lys Glu Gln Asn Asn Leu Lys Gln Leu Glu
145                 150                 155                 160

Phe Gly Leu Lys Glu Ala Pro Val Gln Asp Gln Gly Tyr Lys Thr Leu
                165                 170                 175

Arg Leu Arg Glu Asn Cys Val Leu Ser Ser Ser Pro Asn Pro Phe Pro
            180                 185                 190

Glu Ile Ser Arg Gly Glu Tyr Leu Tyr Thr Tyr Asp Ser Gln Ile Thr
        195                 200                 205

Asp Ser Glu His Asn Ser Ser Leu Val Ser Gln Gln Thr Gly Ser Pro
    210                 215                 220

Gly Lys Gln Pro Gly Glu Asn Ser Asp Cys His Arg Asp Ser Ser Gln
225                 230                 235                 240

Ala Ile Pro Ile Thr Glu Leu Thr Lys Ser Gln Val Gln Asp Lys Pro
                245                 250                 255

Tyr Lys Cys Thr Asp Cys Gly Lys Ser Phe Asn His Asn Ala His Leu
            260                 265                 270

Thr Val His Lys Arg Ile His Thr Gly Glu Arg Pro Tyr Met Cys Lys
        275                 280                 285

Glu Cys Gly Lys Ala Phe Ser Gln Asn Ser Ser Leu Val Gln His Glu
    290                 295                 300
```

```
Arg Ile His Thr Gly Asp Lys Pro Tyr Lys Cys Ala Glu Cys Gly Lys
305                 310                 315                 320

Ser Phe Cys His Ser Thr His Leu Thr Val His Arg Arg Ile His Thr
                325                 330                 335

Gly Glu Lys Pro Tyr Glu Cys Gln Asp Cys Gly Arg Ala Phe Asn Gln
            340                 345                 350

Asn Ser Ser Leu Gly Arg His Lys Arg Thr His Thr Gly Glu Lys Pro
        355                 360                 365

Tyr Thr Cys Ser Val Cys Gly Lys Ser Phe Ser Arg Thr Thr Cys Leu
    370                 375                 380

Phe Leu His Leu Arg Thr His Thr Glu Glu Arg Pro Tyr Glu Cys Asn
385                 390                 395                 400

His Cys Gly Lys Gly Phe Arg His Ser Ser Ser Leu Ala Gln His Gln
                405                 410                 415

Arg Lys His Ala Gly Glu Lys Pro Phe Glu Cys Arg Gln Arg Leu Ile
            420                 425                 430

Phe Glu Gln Thr Pro Ala Leu Thr Lys His Glu Trp Thr Glu Ala Leu
        435                 440                 445

Gly Cys Asp Pro Pro Leu Ser Gln Asp Glu Arg Thr His Arg Ser Asp
    450                 455                 460

Arg Pro Phe Lys Cys Asn Gln Cys Gly Lys Cys Phe Ile Gln Ser Ser
465                 470                 475                 480

His Leu Ile Arg His Gln Ile Thr His Thr Arg Glu Glu Gln Pro His
                485                 490                 495

Gly Arg Ser Arg Arg Arg Glu Gln Ser Ser Ser Arg Asn Ser His Leu
            500                 505                 510

Val Gln His Gln His Pro Asn Ser Arg Lys Ser Ser Ala Gly Gly Ala
        515                 520                 525

Lys Ala Gly Gln Pro Glu Ser Arg Ala Leu Ala Leu Phe Asp Ile Gln
    530                 535                 540

Lys Ile Met Gln Glu Lys Asn Pro Val His Val Ile Gly Val Glu Glu
545                 550                 555                 560

Pro Ser Val Gly Ala Ser Met Leu Phe Asp Ile Arg Glu Ser Thr
                565                 570                 575
```

<210> 4363
<211> 733

<212> PRT
<213> Homo sapiens

<220>
<223> SATB2 (NCBI Accession: NP_056080)

<400> 4363
```
Met Glu Arg Arg Ser Glu Ser Pro Cys Leu Arg Asp Ser Pro Asp Arg
1               5                  10                  15

Arg Ser Gly Ser Pro Asp Val Lys Gly Pro Pro Pro Val Lys Val Ala
            20                  25                  30

Arg Leu Glu Gln Asn Gly Ser Pro Met Gly Ala Arg Gly Arg Pro Asn
        35                  40                  45

Gly Ala Val Ala Lys Ala Val Gly Gly Leu Met Ile Pro Val Phe Cys
    50                  55                  60

Val Val Glu Gln Leu Asp Gly Ser Leu Glu Tyr Asp Asn Arg Glu Glu
65                  70                  75                  80

His Ala Glu Phe Val Leu Val Arg Lys Asp Val Leu Phe Ser Gln Leu
                85                  90                  95

Val Glu Thr Ala Leu Leu Ala Leu Gly Tyr Ser His Ser Ser Ala Ala
            100                 105                 110

Gln Ala Gln Gly Ile Ile Lys Leu Gly Arg Trp Asn Pro Leu Pro Leu
        115                 120                 125

Ser Tyr Val Thr Asp Ala Pro Asp Ala Thr Val Ala Asp Met Leu Gln
    130                 135                 140

Asp Val Tyr His Val Val Thr Leu Lys Ile Gln Leu Gln Ser Cys Ser
145                 150                 155                 160

Lys Leu Glu Asp Leu Pro Ala Glu Gln Trp Asn His Ala Thr Val Arg
                165                 170                 175

Asn Ala Leu Lys Glu Leu Leu Lys Glu Met Asn Gln Ser Thr Leu Ala
            180                 185                 190

Lys Glu Cys Pro Leu Ser Gln Ser Met Ile Ser Ser Ile Val Asn Ser
        195                 200                 205

Thr Tyr Tyr Ala Asn Val Ser Ala Thr Lys Cys Gln Glu Phe Gly Arg
    210                 215                 220

Trp Tyr Lys Lys Tyr Lys Lys Ile Lys Val Glu Arg Val Glu Arg Glu
225                 230                 235                 240

Asn Leu Ser Asp Tyr Cys Val Leu Gly Gln Arg Pro Met His Leu Pro
                245                 250                 255
```

```
Asn Met Asn Gln Leu Ala Ser Leu Gly Lys Thr Asn Glu Gln Ser Pro
            260                 265                 270

His Ser Gln Ile His His Ser Thr Pro Ile Arg Asn Gln Val Pro Ala
        275                 280                 285

Leu Gln Pro Ile Met Ser Pro Gly Leu Leu Ser Pro Gln Leu Ser Pro
    290                 295                 300

Gln Leu Val Arg Gln Gln Ile Ala Met Ala His Leu Ile Asn Gln Gln
305                 310                 315                 320

Ile Ala Val Ser Arg Leu Leu Ala His Gln His Pro Gln Ala Ile Asn
                325                 330                 335

Gln Gln Phe Leu Asn His Pro Pro Ile Pro Arg Ala Val Lys Pro Glu
            340                 345                 350

Pro Thr Asn Ser Ser Val Glu Val Ser Pro Asp Ile Tyr Gln Gln Val
        355                 360                 365

Arg Asp Glu Leu Lys Arg Ala Ser Val Ser Gln Ala Val Phe Ala Arg
    370                 375                 380

Val Ala Phe Asn Arg Thr Gln Gly Leu Leu Ser Glu Ile Leu Arg Lys
385                 390                 395                 400

Glu Glu Asp Pro Arg Thr Ala Ser Gln Ser Leu Leu Val Asn Leu Arg
                405                 410                 415

Ala Met Gln Asn Phe Leu Asn Leu Pro Glu Val Glu Arg Asp Arg Ile
            420                 425                 430

Tyr Gln Asp Glu Arg Glu Arg Ser Met Asn Pro Asn Val Ser Met Val
        435                 440                 445

Ser Ser Ala Ser Ser Ser Pro Ser Ser Ser Arg Thr Pro Gln Ala Lys
    450                 455                 460

Thr Ser Thr Pro Thr Thr Asp Leu Pro Ile Lys Val Asp Gly Ala Asn
465                 470                 475                 480

Ile Asn Ile Thr Ala Ala Ile Tyr Asp Glu Ile Gln Gln Glu Met Lys
                485                 490                 495

Arg Ala Lys Val Ser Gln Ala Leu Phe Ala Lys Val Ala Ala Asn Lys
            500                 505                 510

Ser Gln Gly Trp Leu Cys Glu Leu Leu Arg Trp Lys Glu Asn Pro Ser
        515                 520                 525

Pro Glu Asn Arg Thr Leu Trp Glu Asn Leu Cys Thr Ile Arg Arg Phe
    530                 535                 540
```

```
Leu Asn Leu Pro Gln His Glu Arg Asp Val Ile Tyr Glu Glu Glu Ser
545                 550                 555                 560

Arg His His His Ser Glu Arg Met Gln His Val Val Gln Leu Pro Pro
                565                 570                 575

Glu Pro Val Gln Val Leu His Arg Gln Gln Ser Gln Pro Ala Lys Glu
            580                 585                 590

Ser Ser Pro Pro Arg Glu Glu Ala Pro Pro Pro Pro Pro Pro Thr Glu
        595                 600                 605

Asp Ser Cys Ala Lys Lys Pro Arg Ser Arg Thr Lys Ile Ser Leu Glu
    610                 615                 620

Ala Leu Gly Ile Leu Gln Ser Phe Ile His Asp Val Gly Leu Tyr Pro
625                 630                 635                 640

Asp Gln Glu Ala Ile His Thr Leu Ser Ala Gln Leu Asp Leu Pro Lys
                645                 650                 655

His Thr Ile Ile Lys Phe Phe Gln Asn Gln Arg Tyr His Val Lys His
            660                 665                 670

His Gly Lys Leu Lys Glu His Leu Gly Ser Ala Val Asp Val Ala Glu
        675                 680                 685

Tyr Lys Asp Glu Glu Leu Leu Thr Glu Ser Glu Glu Asn Asp Ser Glu
    690                 695                 700

Glu Gly Ser Glu Glu Met Tyr Lys Val Glu Ala Glu Glu Glu Asn Ala
705                 710                 715                 720

Asp Lys Ser Lys Ala Ala Pro Ala Glu Ile Asp Gln Arg
                725                 730

<210> 4364
<211> 290
<212> PRT
<213> Homo sapiens

<220>
<223> GDAP1 (NCBI Accession: NP_001035808)

<400> 4364
Met Arg Leu Asn Ser Thr Gly Glu Val Pro Val Leu Ile His Gly Glu
1               5                   10                  15

Asn Ile Ile Cys Glu Ala Thr Gln Ile Ile Asp Tyr Leu Glu Gln Thr
            20                  25                  30

Phe Leu Asp Glu Arg Thr Pro Arg Leu Met Pro Asp Lys Glu Ser Met
        35                  40                  45
```

```
Tyr Tyr Pro Arg Val Gln His Tyr Arg Glu Leu Leu Asp Ser Leu Pro
    50                  55                  60

Met Asp Ala Tyr Thr His Gly Cys Ile Leu His Pro Glu Leu Thr Val
65                  70                  75                  80

Asp Ser Met Ile Pro Ala Tyr Ala Thr Thr Arg Ile Arg Ser Gln Ile
                85                  90                  95

Gly Asn Thr Glu Ser Glu Leu Lys Lys Leu Ala Glu Glu Asn Pro Asp
            100                 105                 110

Leu Gln Glu Ala Tyr Ile Ala Lys Gln Lys Arg Leu Lys Ser Lys Leu
        115                 120                 125

Leu Asp His Asp Asn Val Lys Tyr Leu Lys Lys Ile Leu Asp Glu Leu
    130                 135                 140

Glu Lys Val Leu Asp Gln Val Glu Thr Glu Leu Gln Arg Arg Asn Glu
145                 150                 155                 160

Glu Thr Pro Glu Glu Gly Gln Gln Pro Trp Leu Cys Gly Glu Ser Phe
                165                 170                 175

Thr Leu Ala Asp Val Ser Leu Ala Val Thr Leu His Arg Leu Lys Phe
            180                 185                 190

Leu Gly Phe Ala Arg Arg Asn Trp Gly Asn Gly Lys Arg Pro Asn Leu
        195                 200                 205

Glu Thr Tyr Tyr Glu Arg Val Leu Lys Arg Lys Thr Phe Asn Lys Val
    210                 215                 220

Leu Gly His Val Asn Asn Ile Leu Ile Ser Ala Val Leu Pro Thr Ala
225                 230                 235                 240

Phe Arg Val Ala Lys Lys Arg Ala Pro Lys Val Leu Gly Thr Thr Leu
                245                 250                 255

Val Val Gly Leu Leu Ala Gly Val Gly Tyr Phe Ala Phe Met Leu Phe
            260                 265                 270

Arg Lys Arg Leu Gly Ser Met Ile Leu Ala Phe Arg Pro Arg Pro Asn
        275                 280                 285

Tyr Phe
    290

<210> 4365
<211> 734
<212> PRT
<213> Homo sapiens
```

<220>
<223> CTNNAL1 (NCBI Accession: NP_003789)

<400> 4365
Met Ala Ala Ser Pro Gly Pro Ala Gly Val Gly Gly Ala Gly Ala Val
1   5   10   15

Tyr Gly Ser Gly Ser Ser Gly Phe Ala Leu Asp Ser Gly Leu Glu Ile
            20   25   30

Lys Thr Arg Ser Val Glu Gln Thr Leu Leu Pro Leu Val Ser Gln Ile
        35   40   45

Thr Thr Leu Ile Asn His Lys Asp Asn Thr Lys Lys Ser Asp Lys Thr
    50   55   60

Leu Gln Ala Ile Gln Arg Val Gly Gln Ala Val Asn Leu Ala Val Gly
65   70   75   80

Arg Phe Val Lys Val Gly Glu Ala Ile Ala Asn Glu Asn Trp Asp Leu
                85   90   95

Lys Glu Glu Ile Asn Ile Ala Cys Ile Glu Ala Lys Gln Ala Gly Glu
            100   105   110

Thr Ile Ala Ala Leu Thr Asp Ile Thr Asn Leu Asn His Leu Glu Ser
        115   120   125

Asp Gly Gln Ile Thr Ile Phe Thr Asp Lys Thr Gly Val Ile Lys Ala
    130   135   140

Ala Arg Leu Leu Leu Ser Ser Val Thr Lys Val Leu Leu Leu Ala Asp
145   150   155   160

Arg Val Val Ile Lys Gln Ile Ile Thr Ser Arg Asn Lys Val Leu Ala
                165   170   175

Thr Met Glu Arg Leu Glu Lys Val Asn Ser Phe Gln Glu Phe Val Gln
            180   185   190

Ile Phe Ser Gln Phe Gly Asn Glu Met Val Glu Phe Ala His Leu Ser
        195   200   205

Gly Asp Arg Gln Asn Asp Leu Lys Asp Glu Lys Lys Lys Ala Lys Met
    210   215   220

Ala Ala Ala Arg Ala Val Leu Glu Lys Cys Thr Met Met Leu Leu Thr
225   230   235   240

Ala Ser Lys Thr Cys Leu Arg His Pro Asn Cys Glu Ser Ala His Lys
                245   250   255

Asn Lys Glu Gly Val Phe Asp Arg Met Lys Val Ala Leu Asp Lys Val
            260   265   270

```
Ile Glu Ile Val Thr Asp Cys Lys Pro Asn Gly Glu Thr Asp Ile Ser
        275                 280                 285

Ser Ile Ser Ile Phe Thr Gly Ile Lys Glu Phe Lys Met Asn Ile Glu
    290                 295                 300

Ala Leu Arg Glu Asn Leu Tyr Phe Gln Ser Lys Glu Asn Leu Ser Val
305                 310                 315                 320

Thr Leu Glu Val Ile Leu Glu Arg Met Glu Asp Phe Thr Asp Ser Ala
                325                 330                 335

Tyr Thr Ser His Glu His Arg Glu Arg Ile Leu Glu Leu Ser Thr Gln
            340                 345                 350

Ala Arg Met Glu Leu Gln Gln Leu Ile Ser Val Trp Ile Gln Ala Gln
        355                 360                 365

Ser Lys Lys Thr Lys Ser Ile Ala Glu Glu Leu Glu Leu Ser Ile Leu
    370                 375                 380

Lys Ile Ser His Ser Leu Asn Glu Leu Lys Lys Glu Leu His Ser Thr
385                 390                 395                 400

Ala Thr Gln Leu Ala Ala Asp Leu Leu Lys Tyr His Ala Asp His Val
                405                 410                 415

Val Leu Lys Ala Leu Lys Leu Thr Gly Val Glu Gly Asn Leu Glu Ala
            420                 425                 430

Leu Ala Glu Tyr Ala Cys Lys Leu Ser Glu Gln Lys Glu Gln Leu Val
        435                 440                 445

Glu Thr Cys Arg Leu Leu Arg His Ile Ser Gly Thr Glu Pro Leu Glu
    450                 455                 460

Ile Thr Cys Ile His Ala Glu Glu Thr Phe Gln Val Thr Gly Gln Gln
465                 470                 475                 480

Ile Ile Ser Ala Ala Glu Thr Leu Thr Leu His Pro Ser Ser Lys Ile
                485                 490                 495

Ala Lys Glu Asn Leu Asp Val Phe Cys Glu Ala Trp Glu Ser Gln Ile
            500                 505                 510

Ser Asp Met Ser Thr Leu Leu Arg Glu Ile Asn Asp Val Phe Glu Gly
        515                 520                 525

Arg Arg Gly Glu Lys Tyr Gly Tyr Leu Ser Leu Pro Lys Pro Met Lys
    530                 535                 540

Asn Asn Ala Asn Leu Lys Ser Leu Lys Pro Asp Lys Pro Asp Ser Glu
545                 550                 555                 560
```

```
Glu Gln Ala Lys Ile Ala Lys Leu Gly Leu Lys Leu Gly Leu Leu Thr
                565                 570                 575

Ser Asp Ala Asp Cys Glu Ile Glu Lys Trp Glu Asp Gln Glu Asn Glu
            580                 585                 590

Ile Val Gln Tyr Gly Arg Asn Met Ser Ser Met Ala Tyr Ser Leu Tyr
        595                 600                 605

Leu Phe Thr Arg Gly Glu Gly Pro Leu Lys Thr Ser Gln Asp Leu Ile
    610                 615                 620

His Gln Leu Glu Val Phe Ala Ala Glu Gly Leu Lys Leu Thr Ser Ser
625                 630                 635                 640

Val Gln Ala Phe Ser Lys Gln Leu Lys Asp Asp Asp Lys Leu Met Leu
                645                 650                 655

Leu Leu Glu Ile Asn Lys Leu Ile Pro Leu Cys His Gln Leu Gln Thr
            660                 665                 670

Val Thr Lys Thr Ser Leu Gln Asn Lys Val Phe Leu Lys Val Asp Lys
        675                 680                 685

Cys Ile Thr Lys Thr Arg Ser Met Met Ala Leu Leu Val Gln Leu Leu
    690                 695                 700

Ser Leu Cys Tyr Lys Leu Leu Lys Lys Leu Gln Met Glu Asn Asn Gly
705                 710                 715                 720

Trp Val Ser Val Thr Asn Lys Asp Thr Met Asp Ser Lys Thr
                725                 730

<210> 4366
<211> 622
<212> PRT
<213> Homo sapiens

<220>
<223> FANCG (NCBI Accession: NP_004620)

<400> 4366
Met Ser Arg Gln Thr Thr Ser Val Gly Ser Ser Cys Leu Asp Leu Trp
1               5                   10                  15

Arg Glu Lys Asn Asp Arg Leu Val Arg Gln Ala Lys Val Ala Gln Asn
            20                  25                  30

Ser Gly Leu Thr Leu Arg Arg Gln Gln Leu Ala Gln Asp Ala Leu Glu
        35                  40                  45

Gly Leu Arg Gly Leu Leu His Ser Leu Gln Gly Leu Pro Ala Ala Val
    50                  55                  60
```

```
Pro Val Leu Pro Leu Glu Leu Thr Val Thr Cys Asn Phe Ile Ile Leu
65                  70                  75                  80

Arg Ala Ser Leu Ala Gln Gly Phe Thr Glu Asp Gln Ala Gln Asp Ile
                85                  90                  95

Gln Arg Ser Leu Glu Arg Val Leu Glu Thr Gln Glu Gln Gln Gly Pro
            100                 105                 110

Arg Leu Glu Gln Gly Leu Arg Glu Leu Trp Asp Ser Val Leu Arg Ala
        115                 120                 125

Ser Cys Leu Leu Pro Glu Leu Leu Ser Ala Leu His Arg Leu Val Gly
    130                 135                 140

Leu Gln Ala Ala Leu Trp Leu Ser Ala Asp Arg Leu Gly Asp Leu Ala
145                 150                 155                 160

Leu Leu Leu Glu Thr Leu Asn Gly Ser Gln Ser Gly Ala Ser Lys Asp
                165                 170                 175

Leu Leu Leu Leu Leu Lys Thr Trp Ser Pro Pro Ala Glu Glu Leu Asp
            180                 185                 190

Ala Pro Leu Thr Leu Gln Asp Ala Gln Gly Leu Lys Asp Val Leu Leu
        195                 200                 205

Thr Ala Phe Ala Tyr Arg Gln Gly Leu Gln Glu Leu Ile Thr Gly Asn
    210                 215                 220

Pro Asp Lys Ala Leu Ser Ser Leu His Glu Ala Ala Ser Gly Leu Cys
225                 230                 235                 240

Pro Arg Pro Val Leu Val Gln Val Tyr Thr Ala Leu Gly Ser Cys His
                245                 250                 255

Arg Lys Met Gly Asn Pro Gln Arg Ala Leu Leu Tyr Leu Val Ala Ala
            260                 265                 270

Leu Lys Glu Gly Ser Ala Trp Gly Pro Pro Leu Leu Glu Ala Ser Arg
        275                 280                 285

Leu Tyr Gln Gln Leu Gly Asp Thr Thr Ala Glu Leu Glu Ser Leu Glu
    290                 295                 300

Leu Leu Val Glu Ala Leu Asn Val Pro Cys Ser Ser Lys Ala Pro Gln
305                 310                 315                 320

Phe Leu Ile Glu Val Glu Leu Leu Leu Pro Pro Pro Asp Leu Ala Ser
                325                 330                 335

Pro Leu His Cys Gly Thr Gln Ser Gln Thr Lys His Ile Leu Ala Ser
            340                 345                 350
```

```
Arg Cys Leu Gln Thr Gly Arg Ala Gly Asp Ala Ala Glu His Tyr Leu
        355                 360                 365

Asp Leu Leu Ala Leu Leu Leu Asp Ser Ser Glu Pro Arg Phe Ser Pro
    370                 375                 380

Pro Pro Ser Pro Pro Gly Pro Cys Met Pro Glu Val Phe Leu Glu Ala
385                 390                 395                 400

Ala Val Ala Leu Ile Gln Ala Gly Arg Ala Gln Asp Ala Leu Thr Leu
                405                 410                 415

Cys Glu Glu Leu Leu Ser Arg Thr Ser Ser Leu Leu Pro Lys Met Ser
            420                 425                 430

Arg Leu Trp Glu Asp Ala Arg Lys Gly Thr Lys Glu Leu Pro Tyr Cys
        435                 440                 445

Pro Leu Trp Val Ser Ala Thr His Leu Leu Gln Gly Gln Ala Trp Val
    450                 455                 460

Gln Leu Gly Ala Gln Lys Val Ala Ile Ser Glu Phe Ser Arg Cys Leu
465                 470                 475                 480

Glu Leu Leu Phe Arg Ala Thr Pro Glu Glu Lys Glu Gln Gly Ala Ala
                485                 490                 495

Phe Asn Cys Glu Gln Gly Cys Lys Ser Asp Ala Ala Leu Gln Gln Leu
            500                 505                 510

Arg Ala Ala Ala Leu Ile Ser Arg Gly Leu Glu Trp Val Ala Ser Gly
        515                 520                 525

Gln Asp Thr Lys Ala Leu Gln Asp Phe Leu Leu Ser Val Gln Met Cys
    530                 535                 540

Pro Gly Asn Arg Asp Thr Tyr Phe His Leu Leu Gln Thr Leu Lys Arg
545                 550                 555                 560

Leu Asp Arg Arg Asp Glu Ala Thr Ala Leu Trp Trp Arg Leu Glu Ala
                565                 570                 575

Gln Thr Lys Gly Ser His Glu Asp Ala Leu Trp Ser Leu Pro Leu Tyr
            580                 585                 590

Leu Glu Ser Tyr Leu Ser Trp Ile Arg Pro Ser Asp Arg Asp Ala Phe
        595                 600                 605

Leu Glu Glu Phe Arg Thr Ser Leu Pro Lys Ser Cys Asp Leu
    610                 615                 620

<210> 4367
<211> 670
```

<212> PRT
<213> Homo sapiens

<220>
<223> DDX18 (NCBI Accession: NP_006764)

<400> 4367
Met Ser His Leu Pro Met Lys Leu Leu Arg Lys Lys Ile Glu Lys Arg
1   5   10   15

Asn Leu Lys Leu Arg Gln Arg Asn Leu Lys Phe Gln Gly Ala Ser Asn
            20   25   30

Leu Thr Leu Ser Glu Thr Gln Asn Gly Asp Val Ser Glu Glu Thr Met
        35   40   45

Gly Ser Arg Lys Val Lys Lys Ser Lys Gln Lys Pro Met Asn Val Gly
    50   55   60

Leu Ser Glu Thr Gln Asn Gly Gly Met Ser Gln Glu Ala Val Gly Asn
65   70   75   80

Ile Lys Val Thr Lys Ser Pro Gln Lys Ser Thr Val Leu Ser Asn Gly
                85   90   95

Glu Ala Ala Met Gln Ser Ser Asn Ser Glu Ser Lys Lys Lys Lys Lys
            100   105   110

Lys Lys Arg Lys Met Val Asn Asp Ala Glu Pro Asp Thr Lys Lys Ala
        115   120   125

Lys Thr Glu Asn Lys Gly Lys Ser Glu Glu Glu Ser Ala Glu Thr Thr
    130   135   140

Lys Glu Thr Glu Asn Asn Val Glu Lys Pro Asp Asn Asp Glu Asp Glu
145   150   155   160

Ser Glu Val Pro Ser Leu Pro Leu Gly Leu Thr Gly Ala Phe Glu Asp
                165   170   175

Thr Ser Phe Ala Ser Leu Cys Asn Leu Val Asn Glu Asn Thr Leu Lys
            180   185   190

Ala Ile Lys Glu Met Gly Phe Thr Asn Met Thr Glu Ile Gln His Lys
        195   200   205

Ser Ile Arg Pro Leu Leu Glu Gly Arg Asp Leu Leu Ala Ala Ala Lys
    210   215   220

Thr Gly Ser Gly Lys Thr Leu Ala Phe Leu Ile Pro Ala Val Glu Leu
225   230   235   240

Ile Val Lys Leu Arg Phe Met Pro Arg Asn Gly Thr Gly Val Leu Ile
                245   250   255

```
Leu Ser Pro Thr Arg Glu Leu Ala Met Gln Thr Phe Gly Val Leu Lys
            260                 265                 270

Glu Leu Met Thr His His Val His Thr Tyr Gly Leu Ile Met Gly Gly
        275                 280                 285

Ser Asn Arg Ser Ala Glu Ala Gln Lys Leu Gly Asn Gly Ile Asn Ile
    290                 295                 300

Ile Val Ala Thr Pro Gly Arg Leu Leu Asp His Met Gln Asn Thr Pro
305                 310                 315                 320

Gly Phe Met Tyr Lys Asn Leu Gln Cys Leu Val Ile Asp Glu Ala Asp
                325                 330                 335

Arg Ile Leu Asp Val Gly Phe Glu Glu Glu Leu Lys Gln Ile Ile Lys
            340                 345                 350

Leu Leu Pro Thr Arg Arg Gln Thr Met Leu Phe Ser Ala Thr Gln Thr
        355                 360                 365

Arg Lys Val Glu Asp Leu Ala Arg Ile Ser Leu Lys Lys Glu Pro Leu
    370                 375                 380

Tyr Val Gly Val Asp Asp Asp Lys Ala Asn Ala Thr Val Asp Gly Leu
385                 390                 395                 400

Glu Gln Gly Tyr Val Val Cys Pro Ser Glu Lys Arg Phe Leu Leu Leu
                405                 410                 415

Phe Thr Phe Leu Lys Lys Asn Arg Lys Lys Lys Leu Met Val Phe Phe
            420                 425                 430

Ser Ser Cys Met Ser Val Lys Tyr His Tyr Glu Leu Leu Asn Tyr Ile
        435                 440                 445

Asp Leu Pro Val Leu Ala Ile His Gly Lys Gln Lys Gln Asn Lys Arg
    450                 455                 460

Thr Thr Thr Phe Phe Gln Phe Cys Asn Ala Asp Ser Gly Thr Leu Leu
465                 470                 475                 480

Cys Thr Asp Val Ala Ala Arg Gly Leu Asp Ile Pro Glu Val Asp Trp
                485                 490                 495

Ile Val Gln Tyr Asp Pro Pro Asp Asp Pro Lys Glu Tyr Ile His Arg
            500                 505                 510

Val Gly Arg Thr Ala Arg Gly Leu Asn Gly Arg Gly His Ala Leu Leu
        515                 520                 525

Ile Leu Arg Pro Glu Glu Leu Gly Phe Leu Arg Tyr Leu Lys Gln Ser
    530                 535                 540
```

```
Lys Val Pro Leu Ser Glu Phe Asp Phe Ser Trp Ser Lys Ile Ser Asp
545                 550                 555                 560

Ile Gln Ser Gln Leu Glu Lys Leu Ile Glu Lys Asn Tyr Phe Leu His
                565                 570                 575

Lys Ser Ala Gln Glu Ala Tyr Lys Ser Tyr Ile Arg Ala Tyr Asp Ser
            580                 585                 590

His Ser Leu Lys Gln Ile Phe Asn Val Asn Asn Leu Asn Leu Pro Gln
        595                 600                 605

Val Ala Leu Ser Phe Gly Phe Lys Val Pro Pro Phe Val Asp Leu Asn
    610                 615                 620

Val Asn Ser Asn Glu Gly Lys Gln Lys Lys Arg Gly Gly Gly Gly Gly
625                 630                 635                 640

Phe Gly Tyr Gln Lys Thr Lys Lys Val Glu Lys Ser Lys Ile Phe Lys
                645                 650                 655

His Ile Ser Lys Lys Ser Ser Asp Ser Arg Gln Phe Ser His
            660                 665                 670

<210> 4368
<211> 288
<212> PRT
<213> Homo sapiens

<220>
<223> STX1A (NCBI Accession: NP_004594)

<400> 4368
Met Lys Asp Arg Thr Gln Glu Leu Arg Thr Ala Lys Asp Ser Asp Asp
1               5                   10                  15

Asp Asp Asp Val Ala Val Thr Val Asp Arg Asp Arg Phe Met Asp Glu
            20                  25                  30

Phe Phe Glu Gln Val Glu Glu Ile Arg Gly Phe Ile Asp Lys Ile Ala
        35                  40                  45

Glu Asn Val Glu Glu Val Lys Arg Lys His Ser Ala Ile Leu Ala Ser
    50                  55                  60

Pro Asn Pro Asp Glu Lys Thr Lys Glu Glu Leu Glu Glu Leu Met Ser
65                  70                  75                  80

Asp Ile Lys Lys Thr Ala Asn Lys Val Arg Ser Lys Leu Lys Ser Ile
                85                  90                  95

Glu Gln Ser Ile Glu Gln Glu Glu Gly Leu Asn Arg Ser Ser Ala Asp
            100                 105                 110
```

```
Leu Arg Ile Arg Lys Thr Gln His Ser Thr Leu Ser Arg Lys Phe Val
        115                 120                 125

Glu Val Met Ser Glu Tyr Asn Ala Thr Gln Ser Asp Tyr Arg Glu Arg
    130                 135                 140

Cys Lys Gly Arg Ile Gln Arg Gln Leu Glu Ile Thr Gly Arg Thr Thr
145                 150                 155                 160

Thr Ser Glu Glu Leu Glu Asp Met Leu Glu Ser Gly Asn Pro Ala Ile
                165                 170                 175

Phe Ala Ser Gly Ile Ile Met Asp Ser Ser Ile Ser Lys Gln Ala Leu
            180                 185                 190

Ser Glu Ile Glu Thr Arg His Ser Glu Ile Ile Lys Leu Glu Asn Ser
        195                 200                 205

Ile Arg Glu Leu His Asp Met Phe Met Asp Met Ala Met Leu Val Glu
    210                 215                 220

Ser Gln Gly Glu Met Ile Asp Arg Ile Glu Tyr Asn Val Glu His Ala
225                 230                 235                 240

Val Asp Tyr Val Glu Arg Ala Val Ser Asp Thr Lys Lys Ala Val Lys
                245                 250                 255

Tyr Gln Ser Lys Ala Arg Arg Lys Lys Ile Met Ile Ile Ile Cys Cys
            260                 265                 270

Val Ile Leu Gly Ile Val Ile Ala Ser Thr Val Gly Gly Ile Phe Ala
        275                 280                 285

<210> 4369
<211> 209
<212> PRT
<213> Homo sapiens

<220>
<223> GMNN (NCBI Accession: NP_056979)

<400> 4369
Met Asn Pro Ser Met Lys Gln Lys Gln Glu Glu Ile Lys Glu Asn Ile
1               5                   10                  15

Lys Asn Ser Ser Val Pro Arg Arg Thr Leu Lys Met Ile Gln Pro Ser
            20                  25                  30

Ala Ser Gly Ser Leu Val Gly Arg Glu Asn Glu Leu Ser Ala Gly Leu
        35                  40                  45

Ser Lys Arg Lys His Arg Asn Asp His Leu Thr Ser Thr Thr Ser Ser
    50                  55                  60
```

```
Pro Gly Val Ile Val Pro Glu Ser Ser Glu Asn Lys Asn Leu Gly Gly
65                  70                  75                  80

Val Thr Gln Glu Ser Phe Asp Leu Met Ile Lys Glu Asn Pro Ser Ser
                85                  90                  95

Gln Tyr Trp Lys Glu Val Ala Glu Lys Arg Arg Lys Ala Leu Tyr Glu
            100                 105                 110

Ala Leu Lys Glu Asn Glu Lys Leu His Lys Glu Ile Glu Gln Lys Asp
        115                 120                 125

Asn Glu Ile Ala Arg Leu Lys Lys Glu Asn Lys Glu Leu Ala Glu Val
    130                 135                 140

Ala Glu His Val Gln Tyr Met Ala Glu Leu Ile Glu Arg Leu Asn Gly
145                 150                 155                 160

Glu Pro Leu Asp Asn Phe Glu Ser Leu Asp Asn Gln Glu Phe Asp Ser
                165                 170                 175

Glu Glu Glu Thr Val Glu Asp Ser Leu Val Glu Asp Ser Glu Ile Gly
            180                 185                 190

Thr Cys Ala Glu Gly Thr Val Ser Ser Ser Thr Asp Ala Lys Pro Cys
        195                 200                 205

Ile
```

<210> 4370
<211> 561
<212> PRT
<213> Homo sapiens

<220>
<223> UBQLN1 (NCBI Accession: NP_444295)

<400> 4370

```
Met Ala Glu Ser Gly Glu Ser Gly Gly Pro Pro Gly Ser Gln Asp Ser
1               5                   10                  15

Ala Ala Gly Ala Glu Gly Ala Gly Ala Pro Ala Ala Ala Ala Ser Ala
            20                  25                  30

Glu Pro Lys Ile Met Lys Val Thr Val Lys Thr Pro Lys Glu Lys Glu
        35                  40                  45

Glu Phe Ala Val Pro Glu Asn Ser Ser Val Gln Gln Phe Lys Glu Glu
    50                  55                  60

Ile Ser Lys Arg Phe Lys Ser His Thr Asp Gln Leu Val Leu Ile Phe
65                  70                  75                  80
```

```
Ala Gly Lys Ile Leu Lys Asp Gln Asp Thr Leu Ser Gln His Gly Ile
                85                  90                  95

His Asp Gly Leu Thr Val His Leu Val Ile Lys Thr Gln Asn Arg Pro
            100                 105                 110

Gln Asp His Ser Ala Gln Gln Thr Asn Thr Ala Gly Ser Asn Val Thr
        115                 120                 125

Thr Ser Ser Thr Pro Asn Ser Asn Ser Thr Ser Gly Ser Ala Thr Ser
    130                 135                 140

Asn Pro Phe Gly Leu Gly Gly Leu Gly Gly Leu Ala Gly Leu Ser Ser
145                 150                 155                 160

Leu Gly Leu Asn Thr Thr Asn Phe Ser Glu Leu Gln Ser Gln Met Gln
                165                 170                 175

Arg Gln Leu Leu Ser Asn Pro Glu Met Met Val Gln Ile Met Glu Asn
            180                 185                 190

Pro Phe Val Gln Ser Met Leu Ser Asn Pro Asp Leu Met Arg Gln Leu
        195                 200                 205

Ile Met Ala Asn Pro Gln Met Gln Gln Leu Ile Gln Arg Asn Pro Glu
    210                 215                 220

Ile Ser His Met Leu Asn Asn Pro Asp Ile Met Arg Gln Thr Leu Glu
225                 230                 235                 240

Leu Ala Arg Asn Pro Ala Met Met Gln Glu Met Met Arg Asn Gln Asp
                245                 250                 255

Arg Ala Leu Ser Asn Leu Glu Ser Ile Pro Gly Gly Tyr Asn Ala Leu
            260                 265                 270

Arg Arg Met Tyr Thr Asp Ile Gln Glu Pro Met Leu Ser Ala Ala Gln
        275                 280                 285

Glu Gln Phe Gly Gly Asn Pro Phe Ala Ser Leu Val Ser Asn Thr Ser
    290                 295                 300

Ser Gly Glu Gly Ser Gln Pro Ser Arg Thr Glu Asn Arg Asp Pro Leu
305                 310                 315                 320

Pro Asn Pro Trp Ala Pro Gln Thr Ser Gln Ser Ser Ser Ala Ser Ser
                325                 330                 335

Gly Thr Ala Ser Thr Val Gly Gly Thr Thr Gly Ser Thr Ala Ser Gly
            340                 345                 350

Thr Ser Gly Gln Ser Thr Thr Ala Pro Asn Leu Val Pro Gly Val Gly
        355                 360                 365
```

```
Ala Ser Met Phe Asn Thr Pro Gly Met Gln Ser Leu Leu Gln Gln Ile
    370                 375                 380

Thr Glu Asn Pro Gln Leu Met Gln Asn Met Leu Ser Ala Pro Tyr Met
385                 390                 395                 400

Arg Ser Met Met Gln Ser Leu Ser Gln Asn Pro Asp Leu Ala Ala Gln
                405                 410                 415

Met Gln Asn Pro Asp Thr Leu Ser Ala Met Ser Asn Pro Arg Ala Met
            420                 425                 430

Gln Ala Leu Leu Gln Ile Gln Gln Gly Leu Gln Thr Leu Ala Thr Glu
        435                 440                 445

Ala Pro Gly Leu Ile Pro Gly Phe Thr Pro Gly Leu Gly Ala Leu Gly
    450                 455                 460

Ser Thr Gly Gly Ser Ser Gly Thr Asn Gly Ser Asn Ala Thr Pro Ser
465                 470                 475                 480

Glu Asn Thr Ser Pro Thr Ala Gly Thr Thr Glu Pro Gly His Gln Gln
                485                 490                 495

Phe Ile Gln Gln Met Leu Gln Ala Leu Ala Gly Val Asn Pro Gln Leu
            500                 505                 510

Gln Asn Pro Glu Val Arg Phe Gln Gln Gln Leu Glu Gln Leu Ser Ala
        515                 520                 525

Met Gly Phe Leu Asn Arg Glu Ala Asn Leu Gln Ala Leu Ile Ala Thr
    530                 535                 540

Gly Gly Asp Ile Asn Ala Ala Ile Glu Arg Leu Leu Gly Ser Gln Pro
545                 550                 555                 560

Ser
```

<210> 4371
<211> 475
<212> PRT
<213> Homo sapiens

<220>
<223> CNDP2 (NCBI Accession: NP_060705)

<400> 4371

```
Met Ala Ala Leu Thr Thr Leu Phe Lys Tyr Ile Asp Glu Asn Gln Asp
1               5                   10                  15

Arg Tyr Ile Lys Lys Leu Ala Lys Trp Val Ala Ile Gln Ser Val Ser
            20                  25                  30
```

```
Ala Trp Pro Glu Lys Arg Gly Glu Ile Arg Arg Met Met Glu Val Ala
        35                  40                  45

Ala Ala Asp Val Lys Gln Leu Gly Gly Ser Val Glu Leu Val Asp Ile
    50                  55                  60

Gly Lys Gln Lys Leu Pro Asp Gly Ser Glu Ile Pro Leu Pro Pro Ile
65                  70                  75                  80

Leu Leu Gly Arg Leu Gly Ser Asp Pro Gln Lys Lys Thr Val Cys Ile
                85                  90                  95

Tyr Gly His Leu Asp Val Gln Pro Ala Ala Leu Glu Asp Gly Trp Asp
            100                 105                 110

Ser Glu Pro Phe Thr Leu Val Glu Arg Asp Gly Lys Leu Tyr Gly Arg
        115                 120                 125

Gly Ser Thr Asp Asp Lys Gly Pro Val Ala Gly Trp Ile Asn Ala Leu
    130                 135                 140

Glu Ala Tyr Gln Lys Thr Gly Gln Glu Ile Pro Val Asn Val Arg Phe
145                 150                 155                 160

Cys Leu Glu Gly Met Glu Glu Ser Gly Ser Glu Gly Leu Asp Glu Leu
                165                 170                 175

Ile Phe Ala Arg Lys Asp Thr Phe Phe Lys Asp Val Asp Tyr Val Cys
            180                 185                 190

Ile Ser Asp Asn Tyr Trp Leu Gly Lys Lys Lys Pro Cys Ile Thr Tyr
        195                 200                 205

Gly Leu Arg Gly Ile Cys Tyr Phe Phe Ile Glu Val Glu Cys Ser Asn
    210                 215                 220

Lys Asp Leu His Ser Gly Val Tyr Gly Gly Ser Val His Glu Ala Met
225                 230                 235                 240

Thr Asp Leu Ile Leu Leu Met Gly Ser Leu Val Asp Lys Arg Gly Asn
                245                 250                 255

Ile Leu Ile Pro Gly Ile Asn Glu Ala Val Ala Ala Val Thr Glu Glu
            260                 265                 270

Glu His Lys Leu Tyr Asp Asp Ile Asp Phe Asp Ile Glu Glu Phe Ala
        275                 280                 285

Lys Asp Val Gly Ala Gln Ile Leu Leu His Ser His Lys Lys Asp Ile
    290                 295                 300

Leu Met His Arg Trp Arg Tyr Pro Ser Leu Ser Leu His Gly Ile Glu
305                 310                 315                 320
```

Gly Ala Phe Ser Gly Ser Gly Ala Lys Thr Val Ile Pro Arg Lys Val
325 330 335

Val Gly Lys Phe Ser Ile Arg Leu Val Pro Asn Met Thr Pro Glu Val
340 345 350

Val Gly Glu Gln Val Thr Ser Tyr Leu Thr Lys Lys Phe Ala Glu Leu
355 360 365

Arg Ser Pro Asn Glu Phe Lys Val Tyr Met Gly His Gly Gly Lys Pro
370 375 380

Trp Val Ser Asp Phe Ser His Pro His Tyr Leu Ala Gly Arg Arg Ala
385 390 395 400

Met Lys Thr Val Phe Gly Val Glu Pro Asp Leu Thr Arg Glu Gly Gly
405 410 415

Ser Ile Pro Val Thr Leu Thr Phe Gln Glu Ala Thr Gly Lys Asn Val
420 425 430

Met Leu Leu Pro Val Gly Ser Ala Asp Asp Gly Ala His Ser Gln Asn
435 440 445

Glu Lys Leu Asn Arg Tyr Asn Tyr Ile Glu Gly Thr Lys Met Leu Ala
450 455 460

Ala Tyr Leu Tyr Glu Val Ser Gln Leu Lys Asp
465 470 475

<210> 4372
<211> 497
<212> PRT
<213> Homo sapiens

<220>
<223> XIAP (NCBI Accession: NP_001191330)

<400> 4372
Met Thr Phe Asn Ser Phe Glu Gly Ser Lys Thr Cys Val Pro Ala Asp
1 5 10 15

Ile Asn Lys Glu Glu Glu Phe Val Glu Glu Phe Asn Arg Leu Lys Thr
20 25 30

Phe Ala Asn Phe Pro Ser Gly Ser Pro Val Ser Ala Ser Thr Leu Ala
35 40 45

Arg Ala Gly Phe Leu Tyr Thr Gly Glu Gly Asp Thr Val Arg Cys Phe
50 55 60

Ser Cys His Ala Ala Val Asp Arg Trp Gln Tyr Gly Asp Ser Ala Val
65 70 75 80

```
Gly Arg His Arg Lys Val Ser Pro Asn Cys Arg Phe Ile Asn Gly Phe
               85                  90                  95

Tyr Leu Glu Asn Ser Ala Thr Gln Ser Thr Asn Ser Gly Ile Gln Asn
            100                 105                 110

Gly Gln Tyr Lys Val Glu Asn Tyr Leu Gly Ser Arg Asp His Phe Ala
        115                 120                 125

Leu Asp Arg Pro Ser Glu Thr His Ala Asp Tyr Leu Leu Arg Thr Gly
    130                 135                 140

Gln Val Val Asp Ile Ser Asp Thr Ile Tyr Pro Arg Asn Pro Ala Met
145                 150                 155                 160

Tyr Ser Glu Glu Ala Arg Leu Lys Ser Phe Gln Asn Trp Pro Asp Tyr
               165                 170                 175

Ala His Leu Thr Pro Arg Glu Leu Ala Ser Ala Gly Leu Tyr Tyr Thr
            180                 185                 190

Gly Ile Gly Asp Gln Val Gln Cys Phe Cys Cys Gly Gly Lys Leu Lys
        195                 200                 205

Asn Trp Glu Pro Cys Asp Arg Ala Trp Ser Glu His Arg Arg His Phe
    210                 215                 220

Pro Asn Cys Phe Phe Val Leu Gly Arg Asn Leu Asn Ile Arg Ser Glu
225                 230                 235                 240

Ser Asp Ala Val Ser Ser Asp Arg Asn Phe Pro Asn Ser Thr Asn Leu
               245                 250                 255

Pro Arg Asn Pro Ser Met Ala Asp Tyr Glu Ala Arg Ile Phe Thr Phe
            260                 265                 270

Gly Thr Trp Ile Tyr Ser Val Asn Lys Glu Gln Leu Ala Arg Ala Gly
        275                 280                 285

Phe Tyr Ala Leu Gly Glu Gly Asp Lys Val Lys Cys Phe His Cys Gly
    290                 295                 300

Gly Gly Leu Thr Asp Trp Lys Pro Ser Glu Asp Pro Trp Glu Gln His
305                 310                 315                 320

Ala Lys Trp Tyr Pro Gly Cys Lys Tyr Leu Leu Glu Gln Lys Gly Gln
               325                 330                 335

Glu Tyr Ile Asn Asn Ile His Leu Thr His Ser Leu Glu Glu Cys Leu
            340                 345                 350

Val Arg Thr Thr Glu Lys Thr Pro Ser Leu Thr Arg Arg Ile Asp Asp
        355                 360                 365
```

```
Thr Ile Phe Gln Asn Pro Met Val Gln Glu Ala Ile Arg Met Gly Phe
    370                 375                 380

Ser Phe Lys Asp Ile Lys Lys Ile Met Glu Glu Lys Ile Gln Ile Ser
385                 390                 395                 400

Gly Ser Asn Tyr Lys Ser Leu Glu Val Leu Val Ala Asp Leu Val Asn
                405                 410                 415

Ala Gln Lys Asp Ser Met Gln Asp Glu Ser Ser Gln Thr Ser Leu Gln
            420                 425                 430

Lys Glu Ile Ser Thr Glu Glu Gln Leu Arg Arg Leu Gln Glu Glu Lys
        435                 440                 445

Leu Cys Lys Ile Cys Met Asp Arg Asn Ile Ala Ile Val Phe Val Pro
    450                 455                 460

Cys Gly His Leu Val Thr Cys Lys Gln Cys Ala Glu Ala Val Asp Lys
465                 470                 475                 480

Cys Pro Met Cys Tyr Thr Val Ile Thr Phe Lys Gln Lys Ile Phe Met
                485                 490                 495

Ser
```

<210> 4373
<211> 354
<212> PRT
<213> Homo sapiens

<220>
<223> SDCCAG3 (NCBI Accession: NP_006634)

<400> 4373

```
Met Cys Tyr Val Pro Ser Pro Val Leu Ala Ser Val Gly Asp Thr Asp
1               5                   10                  15

Asp Arg Phe Glu Asp Leu Glu Glu Ala Asn Pro Phe Ser Phe Arg Glu
            20                  25                  30

Phe Leu Lys Thr Lys Asn Leu Gly Leu Ser Lys Glu Asp Pro Ala Ser
        35                  40                  45

Arg Ile Tyr Ala Lys Glu Ala Ser Arg His Ser Leu Gly Leu Asp His
    50                  55                  60

Asn Ser Pro Pro Ser Gln Thr Gly Gly Tyr Gly Leu Glu Tyr Gln Gln
65                  70                  75                  80

Pro Phe Phe Glu Asp Pro Thr Gly Ala Gly Asp Leu Leu Asp Gly Glu
                85                  90                  95
```

```
Glu Asp Glu Asp Thr Gly Trp Ser Gly Ala Tyr Leu Pro Ser Ala Ile
            100                 105                 110

Glu Gln Thr His Pro Glu Arg Val Pro Ala Gly Thr Ser Pro Cys Ser
        115                 120                 125

Thr Tyr Leu Ser Phe Phe Ser Thr Pro Ser Glu Leu Ala Gly Pro Glu
    130                 135                 140

Ser Leu Pro Ser Trp Ala Leu Ser Asp Thr Asp Ser Arg Val Ser Pro
145                 150                 155                 160

Ala Ser Pro Ala Gly Ser Pro Ser Ala Asp Phe Ala Val His Gly Glu
                165                 170                 175

Ser Leu Gly Asp Arg His Leu Arg Thr Leu Gln Ile Ser Tyr Asp Ala
            180                 185                 190

Leu Lys Asp Glu Asn Ser Lys Leu Arg Arg Lys Leu Asn Glu Val Gln
        195                 200                 205

Ser Phe Ser Glu Ala Gln Thr Glu Met Val Arg Thr Leu Glu Arg Lys
    210                 215                 220

Leu Glu Ala Lys Met Ile Lys Glu Glu Ser Asp Tyr His Asp Leu Glu
225                 230                 235                 240

Ser Val Val Gln Gln Val Glu Gln Asn Leu Glu Leu Met Thr Lys Arg
                245                 250                 255

Ala Val Lys Ala Glu Asn His Val Val Lys Leu Lys Gln Glu Ile Ser
            260                 265                 270

Leu Leu Gln Ala Gln Val Ser Asn Phe Gln Arg Glu Asn Glu Ala Leu
        275                 280                 285

Arg Cys Gly Gln Gly Ala Ser Leu Thr Val Val Lys Gln Asn Ala Asp
    290                 295                 300

Val Ala Leu Gln Asn Leu Arg Val Val Met Asn Ser Ala Gln Ala Ser
305                 310                 315                 320

Ile Lys Gln Leu Val Ser Gly Ala Glu Thr Leu Asn Leu Val Ala Glu
                325                 330                 335

Ile Leu Lys Ser Ile Asp Arg Ile Ser Glu Ile Lys Asp Glu Glu Glu
            340                 345                 350

Asp Ser
```

<210> 4374
<211> 224

<212> PRT
<213> Homo sapiens

<220>
<223> CHMP4B (NCBI Accession: NP_789782)

<400> 4374
Met Ser Val Phe Gly Lys Leu Phe Gly Ala Gly Gly Gly Lys Ala Gly
1   5   10   15

Lys Gly Gly Pro Thr Pro Gln Glu Ala Ile Gln Arg Leu Arg Asp Thr
            20   25   30

Glu Glu Met Leu Ser Lys Lys Gln Glu Phe Leu Glu Lys Lys Ile Glu
        35   40   45

Gln Glu Leu Thr Ala Ala Lys Lys His Gly Thr Lys Asn Lys Arg Ala
    50   55   60

Ala Leu Gln Ala Leu Lys Arg Lys Lys Arg Tyr Glu Lys Gln Leu Ala
65   70   75   80

Gln Ile Asp Gly Thr Leu Ser Thr Ile Glu Phe Gln Arg Glu Ala Leu
                85   90   95

Glu Asn Ala Asn Thr Asn Thr Glu Val Leu Lys Asn Met Gly Tyr Ala
            100   105   110

Ala Lys Ala Met Lys Ala Ala His Asp Asn Met Asp Ile Asp Lys Val
        115   120   125

Asp Glu Leu Met Gln Asp Ile Ala Asp Gln Gln Glu Leu Ala Glu Glu
    130   135   140

Ile Ser Thr Ala Ile Ser Lys Pro Val Gly Phe Gly Glu Glu Phe Asp
145   150   155   160

Glu Asp Glu Leu Met Ala Glu Leu Glu Glu Leu Glu Gln Glu Glu Leu
                165   170   175

Asp Lys Asn Leu Leu Glu Ile Ser Gly Pro Glu Thr Val Pro Leu Pro
            180   185   190

Asn Val Pro Ser Ile Ala Leu Pro Ser Lys Pro Ala Lys Lys Lys Glu
        195   200   205

Glu Glu Asp Asp Asp Met Lys Glu Leu Glu Asn Trp Ala Gly Ser Met
    210   215   220

<210> 4375
<211> 470
<212> PRT
<213> Homo sapiens

<220>
<223> GYG2 (NCBI Accession: NP_003909)

<400> 4375
Met Ser Val Thr Asp Gln Ala Phe Val Thr Leu Ala Thr Asn Asp Ile
1   5   10   15

Tyr Cys Gln Gly Ala Leu Val Leu Gly Gln Ser Leu Arg Arg His Arg
            20   25   30

Leu Thr Arg Lys Leu Val Val Leu Ile Thr Pro Gln Val Ser Ser Leu
        35   40   45

Leu Arg Val Ile Leu Ser Lys Val Phe Asp Glu Val Ile Glu Val Asn
    50   55   60

Leu Ile Asp Ser Ala Asp Tyr Ile His Leu Ala Phe Leu Lys Arg Pro
65   70   75   80

Glu Leu Gly Leu Thr Leu Thr Lys Leu His Cys Trp Thr Leu Thr His
                85   90   95

Tyr Ser Lys Cys Val Phe Leu Asp Ala Asp Thr Leu Val Leu Ser Asn
            100   105   110

Val Asp Glu Leu Phe Asp Arg Gly Glu Phe Ser Ala Ala Pro Asp Pro
        115   120   125

Gly Trp Pro Asp Cys Phe Asn Ser Gly Val Phe Val Phe Gln Pro Ser
    130   135   140

Leu His Thr His Lys Leu Leu Leu Gln His Ala Met Glu His Gly Ser
145   150   155   160

Phe Asp Gly Ala Asp Gln Gly Leu Leu Asn Ser Phe Phe Arg Asn Trp
                165   170   175

Ser Thr Thr Asp Ile His Lys His Leu Pro Phe Ile Tyr Asn Leu Ser
            180   185   190

Ser Asn Thr Met Tyr Thr Tyr Ser Pro Ala Phe Lys Gln Phe Gly Ser
        195   200   205

Ser Ala Lys Val Val His Phe Leu Gly Ser Met Lys Pro Trp Asn Tyr
    210   215   220

Lys Tyr Asn Pro Gln Ser Gly Ser Val Leu Glu Gln Gly Ser Val Ser
225   230   235   240

Ser Ser Gln His Gln Ala Ala Phe Leu His Leu Trp Trp Thr Val Tyr
                245   250   255

Gln Asn Asn Val Leu Pro Leu Tyr Lys Ser Val Gln Ala Gly Glu Ala
            260   265   270

```
Arg Ala Ser Pro Gly His Thr Leu Cys Arg Ser Asp Val Gly Gly Pro
        275                 280                 285

Cys Ala Asp Ser Ala Ser Gly Val Gly Glu Pro Cys Glu Asn Ser Thr
    290                 295                 300

Pro Ser Ala Gly Val Pro Cys Ala Asn Ser Pro Leu Gly Ser Asn Gln
305                 310                 315                 320

Pro Ala Gln Gly Leu Pro Glu Pro Thr Gln Ile Val Asp Glu Thr Leu
                325                 330                 335

Ser Leu Pro Glu Gly Arg Arg Ser Glu Asp Met Ile Ala Cys Pro Glu
            340                 345                 350

Thr Glu Thr Pro Ala Val Ile Thr Cys Asp Pro Leu Ser Gln Pro Ser
        355                 360                 365

Pro Gln Pro Ala Asp Phe Thr Glu Thr Glu Thr Ile Leu Gln Pro Ala
    370                 375                 380

Asn Lys Val Glu Ser Val Ser Ser Glu Glu Thr Phe Glu Pro Ser Gln
385                 390                 395                 400

Glu Leu Pro Ala Glu Ala Leu Arg Asp Pro Ser Leu Gln Asp Ala Leu
                405                 410                 415

Glu Val Asp Leu Ala Val Ser Val Ser Gln Ile Ser Ile Glu Glu Lys
            420                 425                 430

Val Lys Glu Leu Ser Pro Glu Glu Glu Arg Arg Lys Trp Glu Glu Gly
        435                 440                 445

Arg Ile Asp Tyr Met Gly Lys Asp Ala Phe Ala Arg Ile Gln Glu Lys
    450                 455                 460

Leu Asp Arg Phe Leu Gln
465                 470

<210> 4376
<211> 195
<212> PRT
<213> Homo sapiens

<220>
<223> EGFEM1P (NCBI Accession: NR_021485)

<400> 4376
Met Asp Glu Leu Arg Trp Tyr His Ile Thr Val Cys Leu Asp His Ile
1               5                   10                  15

Phe Gly His Asn Cys Ser Leu Ser Cys Lys Asp Cys Met Asn Gly Gly
            20                  25                  30
```

```
Lys Cys Gln Glu Gly Lys Ser Glu Cys Ser Cys Pro Ala Gly Cys Arg
        35                  40                  45

Val Ile Leu Cys Asn Glu Asn Cys Leu Glu Gly Ala Tyr Gly Ala Gly
    50                  55                  60

Cys Thr Ser Glu Cys Gln Cys Val Glu Glu Asn Thr Leu Glu Cys Ser
65                  70                  75                  80

Ala Lys Asn Gly Ser Cys Thr Cys Lys Ser Gly Tyr Gln Gly Asn Arg
                85                  90                  95

Cys Gln Lys Asp Gly Leu Trp Gly Pro Glu Gly Trp Phe Ser Ser Ala
            100                 105                 110

Pro Cys Glu Asn Gly Gly Gln Cys Asn Lys Lys Thr Gly Asn Cys Asp
        115                 120                 125

Cys Thr Pro Asp Tyr Thr Arg Lys Ser Cys Thr Ile Leu Arg Cys Ile
    130                 135                 140

Ser Leu Thr Asn Leu Ala Leu Ser Arg Arg Ser Ser Pro Met Lys Tyr
145                 150                 155                 160

Gln Gln Asn Val Ser Ser His Arg Glu Val Arg Gln Arg Gln Gln Cys
                165                 170                 175

Ser Ser Asp Arg Pro Phe Lys Lys Leu Leu Cys Lys Phe Ser Phe Lys
            180                 185                 190

Ile Gly Met
        195

<210> 4377
<211> 911
<212> PRT
<213> Homo sapiens

<220>
<223> ACTN4 (NCBI Accession: NP_004915)

<400> 4377
Met Val Asp Tyr His Ala Ala Asn Gln Ser Tyr Gln Tyr Gly Pro Ser
1               5                   10                  15

Ser Ala Gly Asn Gly Ala Gly Gly Gly Gly Ser Met Gly Asp Tyr Met
            20                  25                  30

Ala Gln Glu Asp Asp Trp Asp Arg Asp Leu Leu Leu Asp Pro Ala Trp
        35                  40                  45

Glu Lys Gln Gln Arg Lys Thr Phe Thr Ala Trp Cys Asn Ser His Leu
    50                  55                  60
```

```
Arg Lys Ala Gly Thr Gln Ile Glu Asn Ile Asp Glu Asp Phe Arg Asp
65                  70                  75                  80

Gly Leu Lys Leu Met Leu Leu Leu Glu Val Ile Ser Gly Glu Arg Leu
                85                  90                  95

Pro Lys Pro Glu Arg Gly Lys Met Arg Val His Lys Ile Asn Asn Val
            100                 105                 110

Asn Lys Ala Leu Asp Phe Ile Ala Ser Lys Gly Val Lys Leu Val Ser
        115                 120                 125

Ile Gly Ala Glu Glu Ile Val Asp Gly Asn Ala Lys Met Thr Leu Gly
    130                 135                 140

Met Ile Trp Thr Ile Ile Leu Arg Phe Ala Ile Gln Asp Ile Ser Val
145                 150                 155                 160

Glu Glu Thr Ser Ala Lys Glu Gly Leu Leu Leu Trp Cys Gln Arg Lys
                165                 170                 175

Thr Ala Pro Tyr Lys Asn Val Asn Val Gln Asn Phe His Ile Ser Trp
            180                 185                 190

Lys Asp Gly Leu Ala Phe Asn Ala Leu Ile His Arg His Arg Pro Glu
        195                 200                 205

Leu Ile Glu Tyr Asp Lys Leu Arg Lys Asp Asp Pro Val Thr Asn Leu
    210                 215                 220

Asn Asn Ala Phe Glu Val Ala Glu Lys Tyr Leu Asp Ile Pro Lys Met
225                 230                 235                 240

Leu Asp Ala Glu Asp Ile Val Asn Thr Ala Arg Pro Asp Glu Lys Ala
                245                 250                 255

Ile Met Thr Tyr Val Ser Ser Phe Tyr His Ala Phe Ser Gly Ala Gln
            260                 265                 270

Lys Ala Glu Thr Ala Ala Asn Arg Ile Cys Lys Val Leu Ala Val Asn
        275                 280                 285

Gln Glu Asn Glu His Leu Met Glu Asp Tyr Glu Lys Leu Ala Ser Asp
    290                 295                 300

Leu Leu Glu Trp Ile Arg Arg Thr Ile Pro Trp Leu Glu Asp Arg Val
305                 310                 315                 320

Pro Gln Lys Thr Ile Gln Glu Met Gln Gln Lys Leu Glu Asp Phe Arg
                325                 330                 335

Asp Tyr Arg Arg Val His Lys Pro Pro Lys Val Gln Glu Lys Cys Gln
            340                 345                 350
```

```
Leu Glu Ile Asn Phe Asn Thr Leu Gln Thr Lys Leu Arg Leu Ser Asn
        355                 360                 365

Arg Pro Ala Phe Met Pro Ser Glu Gly Lys Met Val Ser Asp Ile Asn
    370                 375                 380

Asn Gly Trp Gln His Leu Glu Gln Ala Glu Lys Gly Tyr Glu Glu Trp
385                 390                 395                 400

Leu Leu Asn Glu Ile Arg Arg Leu Glu Arg Leu Asp His Leu Ala Glu
                405                 410                 415

Lys Phe Arg Gln Lys Ala Ser Ile His Glu Ala Trp Thr Asp Gly Lys
            420                 425                 430

Glu Ala Met Leu Lys His Arg Asp Tyr Glu Thr Ala Thr Leu Ser Asp
        435                 440                 445

Ile Lys Ala Leu Ile Arg Lys His Glu Ala Phe Glu Ser Asp Leu Ala
    450                 455                 460

Ala His Gln Asp Arg Val Glu Gln Ile Ala Ala Ile Ala Gln Glu Leu
465                 470                 475                 480

Asn Glu Leu Asp Tyr Tyr Asp Ser His Asn Val Asn Thr Arg Cys Gln
                485                 490                 495

Lys Ile Cys Asp Gln Trp Asp Ala Leu Gly Ser Leu Thr His Ser Arg
            500                 505                 510

Arg Glu Ala Leu Glu Lys Thr Glu Lys Gln Leu Glu Ala Ile Asp Gln
        515                 520                 525

Leu His Leu Glu Tyr Ala Lys Arg Ala Ala Pro Phe Asn Asn Trp Met
    530                 535                 540

Glu Ser Ala Met Glu Asp Leu Gln Asp Met Phe Ile Val His Thr Ile
545                 550                 555                 560

Glu Glu Ile Glu Gly Leu Ile Ser Ala His Asp Gln Phe Lys Ser Thr
                565                 570                 575

Leu Pro Asp Ala Asp Arg Glu Arg Glu Ala Ile Leu Ala Ile His Lys
            580                 585                 590

Glu Ala Gln Arg Ile Ala Glu Ser Asn His Ile Lys Leu Ser Gly Ser
        595                 600                 605

Asn Pro Tyr Thr Thr Val Thr Pro Gln Ile Ile Asn Ser Lys Trp Glu
    610                 615                 620

Lys Val Gln Gln Leu Val Pro Lys Arg Asp His Ala Leu Leu Glu Glu
625                 630                 635                 640
```

```
Gln Ser Lys Gln Gln Ser Asn Glu His Leu Arg Arg Gln Phe Ala Ser
                645                 650                 655

Gln Ala Asn Val Val Gly Pro Trp Ile Gln Thr Lys Met Glu Glu Ile
            660                 665                 670

Gly Arg Ile Ser Ile Glu Met Asn Gly Thr Leu Glu Asp Gln Leu Ser
        675                 680                 685

His Leu Lys Gln Tyr Glu Arg Ser Ile Val Asp Tyr Lys Pro Asn Leu
    690                 695                 700

Asp Leu Leu Glu Gln Gln His Gln Leu Ile Gln Glu Ala Leu Ile Phe
705                 710                 715                 720

Asp Asn Lys His Thr Asn Tyr Thr Met Glu His Ile Arg Val Gly Trp
                725                 730                 735

Glu Gln Leu Leu Thr Thr Ile Ala Arg Thr Ile Asn Glu Val Glu Asn
            740                 745                 750

Gln Ile Leu Thr Arg Asp Ala Lys Gly Ile Ser Gln Glu Gln Met Gln
        755                 760                 765

Glu Phe Arg Ala Ser Phe Asn His Phe Asp Lys Asp His Gly Gly Ala
    770                 775                 780

Leu Gly Pro Glu Glu Phe Lys Ala Cys Leu Ile Ser Leu Gly Tyr Asp
785                 790                 795                 800

Val Glu Asn Asp Arg Gln Gly Glu Ala Glu Phe Asn Arg Ile Met Ser
                805                 810                 815

Leu Val Asp Pro Asn His Ser Gly Leu Val Thr Phe Gln Ala Phe Ile
            820                 825                 830

Asp Phe Met Ser Arg Glu Thr Thr Asp Thr Asp Thr Ala Asp Gln Val
        835                 840                 845

Ile Ala Ser Phe Lys Val Leu Ala Gly Asp Lys Asn Phe Ile Thr Ala
    850                 855                 860

Glu Glu Leu Arg Arg Glu Leu Pro Pro Asp Gln Ala Glu Tyr Cys Ile
865                 870                 875                 880

Ala Arg Met Ala Pro Tyr Gln Gly Pro Asp Ala Val Pro Gly Ala Leu
                885                 890                 895

Asp Tyr Lys Ser Phe Ser Thr Ala Leu Tyr Gly Glu Ser Asp Leu
            900                 905                 910
```

<210> 4378
<211> 756

<212> PRT
<213> Homo sapiens

<220>
<223> PLCD1 (NCBI Accession: NP_006216)

<400> 4378
Met Asp Ser Gly Arg Asp Phe Leu Thr Leu His Gly Leu Gln Asp Asp
1   5   10   15

Glu Asp Leu Gln Ala Leu Leu Lys Gly Ser Gln Leu Leu Lys Val Lys
            20   25   30

Ser Ser Ser Trp Arg Arg Glu Arg Phe Tyr Lys Leu Gln Glu Asp Cys
        35   40   45

Lys Thr Ile Trp Gln Glu Ser Arg Lys Val Met Arg Thr Pro Glu Ser
    50   55   60

Gln Leu Phe Ser Ile Glu Asp Ile Gln Glu Val Arg Met Gly His Arg
65   70   75   80

Thr Glu Gly Leu Glu Lys Phe Ala Arg Asp Val Pro Glu Asp Arg Cys
                85   90   95

Phe Ser Ile Val Phe Lys Asp Gln Arg Asn Thr Leu Asp Leu Ile Ala
            100   105   110

Pro Ser Pro Ala Asp Ala Gln His Trp Val Leu Gly Leu His Lys Ile
        115   120   125

Ile His His Ser Gly Ser Met Asp Gln Arg Gln Lys Leu Gln His Trp
    130   135   140

Ile His Ser Cys Leu Arg Lys Ala Asp Lys Asn Lys Asp Asn Lys Met
145   150   155   160

Ser Phe Lys Glu Leu Gln Asn Phe Leu Lys Glu Leu Asn Ile Gln Val
                165   170   175

Asp Asp Ser Tyr Ala Arg Lys Ile Phe Arg Glu Cys Asp His Ser Gln
            180   185   190

Thr Asp Ser Leu Glu Asp Glu Glu Ile Glu Ala Phe Tyr Lys Met Leu
        195   200   205

Thr Gln Arg Val Glu Ile Asp Arg Thr Phe Ala Glu Ala Ala Gly Ser
    210   215   220

Gly Glu Thr Leu Ser Val Asp Gln Leu Val Thr Phe Leu Gln His Gln
225   230   235   240

Gln Arg Glu Glu Ala Ala Gly Pro Ala Leu Ala Leu Ser Leu Ile Glu
                245   250   255

```
Arg Tyr Glu Pro Ser Glu Thr Ala Lys Ala Gln Arg Gln Met Thr Lys
            260                 265                 270

Asp Gly Phe Leu Met Tyr Leu Leu Ser Ala Asp Gly Ser Ala Phe Ser
        275                 280                 285

Leu Ala His Arg Arg Val Tyr Gln Asp Met Gly Gln Pro Leu Ser His
    290                 295                 300

Tyr Leu Val Ser Ser Ser His Asn Thr Tyr Leu Leu Glu Asp Gln Leu
305                 310                 315                 320

Ala Gly Pro Ser Ser Thr Glu Ala Tyr Ile Arg Ala Leu Cys Lys Gly
                325                 330                 335

Cys Arg Cys Leu Glu Leu Asp Cys Trp Asp Gly Pro Asn Gln Glu Pro
            340                 345                 350

Ile Ile Tyr His Gly Tyr Thr Phe Thr Ser Lys Ile Leu Phe Cys Asp
        355                 360                 365

Val Leu Arg Ala Ile Arg Asp Tyr Ala Phe Lys Ala Ser Pro Tyr Pro
    370                 375                 380

Val Ile Leu Ser Leu Glu Asn His Cys Thr Leu Glu Gln Gln Arg Val
385                 390                 395                 400

Met Ala Arg His Leu His Ala Ile Leu Gly Pro Met Leu Leu Asn Arg
                405                 410                 415

Pro Leu Asp Gly Val Thr Asn Ser Leu Pro Ser Pro Glu Gln Leu Lys
            420                 425                 430

Gly Lys Ile Leu Leu Lys Gly Lys Lys Leu Gly Gly Leu Leu Pro Pro
        435                 440                 445

Gly Gly Glu Gly Gly Pro Glu Ala Thr Val Val Ser Asp Glu Asp Glu
    450                 455                 460

Ala Ala Glu Met Glu Asp Glu Ala Val Arg Ser Arg Val Gln His Lys
465                 470                 475                 480

Pro Lys Glu Asp Lys Leu Arg Leu Ala Gln Glu Leu Ser Asp Met Val
                485                 490                 495

Ile Tyr Cys Lys Ser Val His Phe Gly Gly Phe Ser Ser Pro Gly Thr
            500                 505                 510

Pro Gly Gln Ala Phe Tyr Glu Met Ala Ser Phe Ser Glu Asn Arg Ala
        515                 520                 525

Leu Arg Leu Leu Gln Glu Ser Gly Asn Gly Phe Val Arg His Asn Val
    530                 535                 540
```

```
Gly His Leu Ser Arg Ile Tyr Pro Ala Gly Trp Arg Thr Asp Ser Ser
545                 550                 555                 560

Asn Tyr Ser Pro Val Glu Met Trp Asn Gly Gly Cys Gln Ile Val Ala
                565                 570                 575

Leu Asn Phe Gln Thr Pro Gly Pro Glu Met Asp Val Tyr Gln Gly Arg
            580                 585                 590

Phe Gln Asp Asn Gly Ala Cys Gly Tyr Val Leu Lys Pro Ala Phe Leu
        595                 600                 605

Arg Asp Pro Asn Gly Thr Phe Asn Pro Arg Ala Leu Ala Gln Gly Pro
    610                 615                 620

Trp Trp Ala Arg Lys Arg Leu Asn Ile Arg Val Ile Ser Gly Gln Gln
625                 630                 635                 640

Leu Pro Lys Val Asn Lys Asn Lys Asn Ser Ile Val Asp Pro Lys Val
                645                 650                 655

Thr Val Glu Ile His Gly Val Ser Arg Asp Val Ala Ser Arg Gln Thr
            660                 665                 670

Ala Val Ile Thr Asn Asn Gly Phe Asn Pro Trp Trp Asp Thr Glu Phe
        675                 680                 685

Ala Phe Glu Val Val Val Pro Asp Leu Ala Leu Ile Arg Phe Leu Val
    690                 695                 700

Glu Asp Tyr Asp Ala Ser Ser Lys Asn Asp Phe Ile Gly Gln Ser Thr
705                 710                 715                 720

Ile Pro Leu Asn Ser Leu Lys Gln Gly Tyr Arg His Val His Leu Met
                725                 730                 735

Ser Lys Asn Gly Asp Gln His Pro Ser Ala Thr Leu Phe Val Lys Ile
            740                 745                 750

Ser Leu Gln Asp
        755

<210> 4379
<211> 582
<212> PRT
<213> Homo sapiens

<220>
<223> ZNF326 (NCBI Accession: NP_892021)

<400> 4379
Met Asp Phe Glu Asp Asp Tyr Thr His Ser Ala Cys Arg Asn Thr Tyr
1               5                   10                  15
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```
Gln Gly Phe Asn Gly Met Asp Arg Asp Tyr Gly Pro Gly Ser Tyr Gly
            20                  25                  30

Gly Met Asp Arg Asp Tyr Gly His Gly Ser Tyr Gly Gly Gln Arg Ser
        35                  40                  45

Met Asp Ser Tyr Leu Asn Gln Ser Tyr Gly Met Asp Asn His Ser Gly
    50                  55                  60

Gly Gly Gly Gly Ser Arg Phe Gly Pro Tyr Glu Ser Tyr Asp Ser Arg
65                  70                  75                  80

Ser Ser Leu Gly Gly Arg Asp Leu Tyr Arg Ser Gly Tyr Gly Phe Asn
                85                  90                  95

Glu Pro Glu Gln Ser Arg Phe Gly Gly Ser Tyr Gly Gly Arg Phe Glu
            100                 105                 110

Ser Ser Tyr Arg Asn Ser Leu Asp Ser Phe Gly Gly Arg Asn Gln Gly
        115                 120                 125

Gly Ser Ser Trp Glu Ala Pro Tyr Ser Arg Ser Lys Leu Arg Pro Gly
    130                 135                 140

Phe Met Glu Asp Arg Gly Arg Glu Asn Tyr Ser Ser Tyr Ser Ser Phe
145                 150                 155                 160

Ser Ser Pro His Met Lys Pro Ala Pro Val Gly Ser Arg Gly Arg Gly
                165                 170                 175

Thr Pro Ala Tyr Pro Glu Ser Thr Phe Gly Ser Arg Asn Tyr Asp Ala
            180                 185                 190

Phe Gly Gly Pro Ser Thr Gly Arg Gly Arg Gly Arg Gly His Met Gly
        195                 200                 205

Asp Phe Gly Ser Ile His Arg Pro Gly Ile Val Val Asp Tyr Gln Asn
    210                 215                 220

Lys Ser Thr Asn Val Thr Val Ala Ala Ala Arg Gly Ile Lys Arg Lys
225                 230                 235                 240

Met Met Gln Pro Phe Asn Lys Pro Ser Gly Thr Phe Ile Lys Lys Pro
                245                 250                 255

Lys Leu Ala Lys Pro Met Glu Lys Ile Ser Leu Ser Lys Ser Pro Thr
            260                 265                 270

Lys Thr Asp Pro Lys Asn Glu Glu Glu Glu Lys Arg Arg Ile Glu Ala
        275                 280                 285

Arg Arg Glu Lys Gln Arg Arg Arg Arg Glu Lys Asn Ser Glu Lys Tyr
    290                 295                 300
```

```
Gly Asp Gly Tyr Arg Met Ala Phe Thr Cys Ser Phe Cys Lys Phe Arg
305                 310                 315                 320

Thr Phe Glu Glu Lys Asp Ile Glu Leu His Leu Glu Ser Ser Ser His
                325                 330                 335

Gln Glu Thr Leu Asp His Ile Gln Lys Gln Thr Lys Phe Asp Lys Val
            340                 345                 350

Val Met Glu Phe Leu His Glu Cys Met Val Asn Lys Phe Lys Lys Thr
        355                 360                 365

Ser Ile Arg Lys Gln Gln Thr Asn Asn Gln Thr Glu Val Val Lys Ile
    370                 375                 380

Ile Glu Lys Asp Val Met Glu Gly Val Thr Val Asp Asp His Met Met
385                 390                 395                 400

Lys Val Glu Thr Val His Cys Ser Ala Cys Ser Val Tyr Ile Pro Ala
                405                 410                 415

Leu His Ser Ser Val Gln Gln His Leu Lys Ser Pro Asp His Ile Lys
            420                 425                 430

Gly Lys Gln Ala Tyr Lys Glu Gln Ile Lys Arg Glu Ser Val Leu Thr
        435                 440                 445

Ala Thr Ser Ile Leu Asn Asn Pro Ile Val Lys Ala Arg Tyr Glu Arg
    450                 455                 460

Phe Val Lys Gly Glu Asn Ser Phe Glu Ile Gln Asp His Ser Gln Asp
465                 470                 475                 480

Gln Gln Ile Glu Gly Asp Glu Glu Asp Glu Glu Lys Ile Asp Glu Pro
                485                 490                 495

Ile Glu Glu Glu Glu Asp Glu Asp Glu Glu Glu Glu Ala Glu Glu Val
            500                 505                 510

Gly Glu Val Glu Glu Val Glu Glu Val Glu Glu Val Arg Glu Gly Gly
        515                 520                 525

Ile Glu Gly Glu Gly Asn Ile Gln Gly Val Gly Glu Gly Gly Glu Val
    530                 535                 540

Gly Val Val Gly Glu Val Glu Gly Val Gly Glu Val Glu Glu Val Glu
545                 550                 555                 560

Glu Leu Glu Glu Glu Thr Ala Lys Glu Glu Pro Ala Asp Phe Pro Val
                565                 570                 575

Glu Gln Pro Glu Glu Asn
            580
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<210> 4380
<211> 92
<212> PRT
<213> Homo sapiens

<220>
<223> LN608403.1_frag

<400> 4380
Met Val Thr Val Arg Ala Ser Leu Gln Ser Glu Phe Val Cys Leu Ile
1   5   10   15

Leu Ser Asp Thr Ser Asp Ala Val Lys Gln Gly Gln Ser Gly Ser Trp
            20   25   30

Ile Val Thr Thr His Ala Asp Ile Lys Gln Thr Leu Pro Ser Gly Thr
        35   40   45

Glu Gly Thr Thr Val Thr Arg Asn Cys Cys Pro Phe Ile Pro Gly Phe
    50   55   60

Arg Arg Leu Tyr Gln Lys Glu Trp Lys Met Leu Val Gly Ser Lys Ile
65   70   75   80

Glu Thr Ala Ser Glu Asp Trp Phe Cys Thr Lys Pro
                85   90

<210> 4381
<211> 55
<212> PRT
<213> Homo sapiens

<220>
<223> JPX_frag

<400> 4381
Met His Glu Gln Thr Glu Asn Phe His Lys Glu Ile Lys Asp Asn Lys
1   5   10   15

Lys Tyr Lys Val Glu Glu Tyr Asn Asn Trp Thr Gln Lys Phe Asn Val
            20   25   30

Ser Asn Arg Arg Ile Asp Glu Ala Glu Glu Arg Ala Ile Lys Leu Val
        35   40   45

Asp Arg Pro Leu Glu Ile Met
    50   55

<210> 4382
<211> 170
<212> PRT
<213> Homo sapiens

<220>
<223> OBP2A (NCBI Accession: NP_055397)

<400> 4382
Met Lys Thr Leu Phe Leu Gly Val Thr Leu Gly Leu Ala Ala Ala Leu
1   5   10   15

Ser Phe Thr Leu Glu Glu Glu Asp Ile Thr Gly Thr Trp Tyr Val Lys
            20   25   30

Ala Met Val Val Asp Lys Asp Phe Pro Glu Asp Arg Arg Pro Arg Lys
        35   40   45

Val Ser Pro Val Lys Val Thr Ala Leu Gly Gly Gly Asn Leu Glu Ala
    50   55   60

Thr Phe Thr Phe Met Arg Glu Asp Arg Cys Ile Gln Lys Lys Ile Leu
65   70   75   80

Met Arg Lys Thr Glu Glu Pro Gly Lys Phe Ser Ala Tyr Gly Gly Arg
                85   90   95

Lys Leu Ile Tyr Leu Gln Glu Leu Pro Gly Thr Asp Asp Tyr Val Phe
            100   105   110

Tyr Cys Lys Asp Gln Arg Arg Gly Gly Leu Arg Tyr Met Gly Lys Leu
        115   120   125

Val Gly Arg Asn Pro Asn Thr Asn Leu Glu Ala Leu Glu Glu Phe Lys
    130   135   140

Lys Leu Val Gln His Lys Gly Leu Ser Glu Glu Asp Ile Phe Met Pro
145   150   155   160

Leu Gln Thr Gly Ser Cys Val Leu Glu His
                165   170

<210> 4383
<211> 1184
<212> PRT
<213> Homo sapiens

<220>
<223> MYT1L (NCBI Accession: NP_055840)

<400> 4383
Met Glu Val Asp Thr Glu Glu Lys Arg His Arg Thr Arg Ser Lys Gly
1   5   10   15

Val Arg Val Pro Val Glu Pro Ala Ile Gln Glu Leu Phe Ser Cys Pro
            20   25   30

Thr Pro Gly Cys Asp Gly Ser Gly His Val Ser Gly Lys Tyr Ala Arg
        35   40   45

```
His Arg Ser Val Tyr Gly Cys Pro Leu Ala Lys Lys Arg Lys Thr Gln
    50                  55                  60

Asp Lys Gln Pro Gln Glu Pro Ala Pro Lys Arg Lys Pro Phe Ala Val
65                  70                  75                  80

Lys Ala Asp Ser Ser Ser Val Asp Glu Cys Asp Asp Ser Asp Gly Thr
                85                  90                  95

Glu Asp Met Asp Glu Lys Glu Glu Asp Glu Gly Glu Glu Tyr Ser Glu
            100                 105                 110

Asp Asn Asp Glu Pro Gly Asp Glu Asp Glu Glu Asp Glu Glu Gly Asp
        115                 120                 125

Arg Glu Glu Glu Glu Glu Ile Glu Glu Glu Asp Glu Asp Asp Asp Glu
    130                 135                 140

Asp Gly Glu Asp Val Glu Asp Glu Glu Glu Glu Glu Glu Glu Glu Glu
145                 150                 155                 160

Glu Glu Glu Glu Glu Glu Glu Asn Glu Asp His Gln Met Asn Cys His
                165                 170                 175

Asn Thr Arg Ile Met Gln Asp Thr Glu Lys Asp Asp Asn Asn Asn Asp
            180                 185                 190

Glu Tyr Asp Asn Tyr Asp Glu Leu Val Ala Lys Ser Leu Leu Asn Leu
        195                 200                 205

Gly Lys Ile Ala Glu Asp Ala Ala Tyr Arg Ala Arg Thr Glu Ser Glu
    210                 215                 220

Met Asn Ser Asn Thr Ser Asn Ser Leu Glu Asp Asp Ser Asp Lys Asn
225                 230                 235                 240

Glu Asn Leu Gly Arg Lys Ser Glu Leu Ser Leu Asp Leu Asp Ser Asp
                245                 250                 255

Val Val Arg Glu Thr Val Asp Ser Leu Lys Leu Leu Ala Gln Gly His
            260                 265                 270

Gly Val Val Leu Ser Glu Asn Met Asn Asp Arg Asn Tyr Ala Asp Ser
        275                 280                 285

Met Ser Gln Gln Asp Ser Arg Asn Met Asn Tyr Val Met Leu Gly Lys
    290                 295                 300

Pro Met Asn Asn Gly Leu Met Glu Lys Met Val Glu Glu Ser Asp Glu
305                 310                 315                 320

Glu Val Cys Leu Ser Ser Leu Glu Cys Leu Arg Asn Gln Cys Phe Asp
                325                 330                 335
```

```
Leu Ala Arg Lys Leu Ser Glu Thr Asn Pro Gln Glu Arg Asn Pro Gln
            340                 345                 350

Gln Asn Met Asn Ile Arg Gln His Val Arg Pro Glu Glu Asp Phe Pro
        355                 360                 365

Gly Arg Thr Pro Asp Arg Asn Tyr Ser Asp Met Leu Asn Leu Met Arg
    370                 375                 380

Leu Glu Glu Gln Leu Ser Pro Arg Ser Arg Val Phe Ala Ser Cys Ala
385                 390                 395                 400

Lys Glu Asp Gly Cys His Glu Arg Asp Asp Asp Thr Thr Ser Val Asn
                405                 410                 415

Ser Asp Arg Ser Glu Glu Val Phe Asp Met Thr Lys Gly Asn Leu Thr
            420                 425                 430

Leu Leu Glu Lys Ala Ile Ala Leu Glu Thr Glu Arg Ala Lys Ala Met
        435                 440                 445

Arg Glu Lys Met Ala Met Glu Ala Gly Arg Arg Asp Asn Met Arg Ser
    450                 455                 460

Tyr Glu Asp Gln Ser Pro Arg Gln Leu Pro Gly Glu Asp Arg Lys Pro
465                 470                 475                 480

Lys Ser Ser Asp Ser His Val Lys Lys Pro Tyr Tyr Asp Pro Ser Arg
                485                 490                 495

Thr Glu Lys Lys Glu Ser Lys Cys Pro Thr Pro Gly Cys Asp Gly Thr
            500                 505                 510

Gly His Val Thr Gly Leu Tyr Pro His His Arg Ser Leu Ser Gly Cys
        515                 520                 525

Pro His Lys Asp Arg Val Pro Pro Glu Ile Leu Ala Met His Glu Ser
    530                 535                 540

Val Leu Lys Cys Pro Thr Pro Gly Cys Thr Gly Arg Gly His Val Asn
545                 550                 555                 560

Ser Asn Arg Asn Ser His Arg Ser Leu Ser Gly Cys Pro Ile Ala Ala
                565                 570                 575

Ala Glu Lys Leu Ala Lys Ala Gln Glu Lys His Gln Ser Cys Asp Val
            580                 585                 590

Ser Lys Ser Ser Gln Ala Ser Asp Arg Val Leu Arg Pro Met Cys Phe
        595                 600                 605

Val Lys Gln Leu Glu Ile Pro Gln Tyr Gly Tyr Arg Asn Asn Val Pro
    610                 615                 620
```

```
Thr Thr Thr Pro Arg Ser Asn Leu Ala Lys Glu Leu Glu Lys Tyr Ser
625                 630                 635                 640

Lys Thr Ser Phe Glu Tyr Asn Ser Tyr Asp Asn His Thr Tyr Gly Lys
                645                 650                 655

Arg Ala Ile Ala Pro Lys Val Gln Thr Arg Asp Ile Ser Pro Lys Gly
            660                 665                 670

Tyr Asp Asp Ala Lys Arg Tyr Cys Lys Asp Pro Ser Pro Ser Ser Ser
        675                 680                 685

Ser Thr Ser Ser Tyr Ala Pro Ser Ser Ser Ser Asn Leu Ser Cys Gly
    690                 695                 700

Gly Gly Ser Ser Ala Ser Ser Thr Cys Ser Lys Ser Ser Phe Asp Tyr
705                 710                 715                 720

Thr His Asp Met Glu Ala Ala His Met Ala Ala Thr Ala Ile Leu Asn
                725                 730                 735

Leu Ser Thr Arg Cys Arg Glu Met Pro Gln Asn Leu Ser Thr Lys Pro
            740                 745                 750

Gln Asp Leu Cys Ala Thr Arg Asn Pro Asp Met Glu Val Asp Glu Asn
        755                 760                 765

Gly Thr Leu Asp Leu Ser Met Asn Lys Gln Arg Pro Arg Asp Ser Cys
    770                 775                 780

Cys Pro Ile Leu Thr Pro Leu Glu Pro Met Ser Pro Gln Gln Gln Ala
785                 790                 795                 800

Val Met Asn Asn Arg Cys Phe Gln Leu Gly Glu Gly Asp Cys Trp Asp
                805                 810                 815

Leu Pro Val Asp Tyr Thr Lys Met Lys Pro Arg Arg Ile Asp Glu Asp
            820                 825                 830

Glu Ser Lys Asp Ile Thr Pro Glu Asp Leu Asp Pro Phe Gln Glu Ala
        835                 840                 845

Leu Glu Glu Arg Arg Tyr Pro Gly Glu Val Thr Ile Pro Ser Pro Lys
    850                 855                 860

Pro Lys Tyr Pro Gln Cys Lys Glu Ser Lys Lys Asp Leu Ile Thr Leu
865                 870                 875                 880

Ser Gly Cys Pro Leu Ala Asp Lys Ser Ile Arg Ser Met Leu Ala Thr
                885                 890                 895

Ser Ser Gln Glu Leu Lys Cys Pro Thr Pro Gly Cys Asp Gly Ser Gly
            900                 905                 910
```

```
His Ile Thr Gly Asn Tyr Ala Ser His Arg Ser Leu Ser Gly Cys Pro
        915                 920                 925

Arg Ala Lys Lys Ser Gly Ile Arg Ile Ala Gln Ser Lys Glu Asp Lys
    930                 935                 940

Glu Asp Gln Glu Pro Ile Arg Cys Pro Val Pro Gly Cys Asp Gly Gln
945                 950                 955                 960

Gly His Ile Thr Gly Lys Tyr Ala Ser His Arg Ser Ala Ser Gly Cys
                965                 970                 975

Pro Leu Ala Ala Lys Arg Gln Lys Asp Gly Tyr Leu Asn Gly Ser Gln
            980                 985                 990

Phe Ser Trp Lys Ser Val Lys Thr Glu Gly Met Ser Cys Pro Thr Pro
        995                 1000                1005

Gly Cys Asp Gly Ser Gly His Val Ser Gly Ser Phe Leu Thr His Arg
    1010                1015                1020

Ser Leu Ser Gly Cys Pro Arg Ala Thr Ser Ala Met Lys Lys Ala Lys
1025                1030                1035                1040

Leu Ser Gly Glu Gln Met Leu Thr Ile Lys Gln Arg Ala Ser Asn Gly
                1045                1050                1055

Ile Glu Asn Asp Glu Glu Ile Lys Gln Leu Asp Glu Glu Ile Lys Glu
            1060                1065                1070

Leu Asn Glu Ser Asn Ser Gln Met Glu Ala Asp Met Ile Lys Leu Arg
        1075                1080                1085

Thr Gln Ile Thr Thr Met Glu Ser Asn Leu Lys Thr Ile Glu Glu Glu
    1090                1095                1100

Asn Lys Val Ile Glu Gln Gln Asn Glu Ser Leu Leu His Glu Leu Ala
1105                1110                1115                1120

Asn Leu Ser Gln Ser Leu Ile His Ser Leu Ala Asn Ile Gln Leu Pro
                1125                1130                1135

His Met Asp Pro Ile Asn Glu Gln Asn Phe Asp Ala Tyr Val Thr Thr
            1140                1145                1150

Leu Thr Glu Met Tyr Thr Asn Gln Asp Arg Tyr Gln Ser Pro Glu Asn
        1155                1160                1165

Lys Ala Leu Leu Glu Asn Ile Lys Gln Ala Val Arg Gly Ile Gln Val
    1170                1175                1180
```

<210> 4384
<211> 102

<212> PRT
<213> Homo sapiens

<220>
<223> HSPE1 (NCBI Accession: NP_002148)

<400> 4384
Met Ala Gly Gln Ala Phe Arg Lys Phe Leu Pro Leu Phe Asp Arg Val
1   5   10   15

Leu Val Glu Arg Ser Ala Ala Glu Thr Val Thr Lys Gly Gly Ile Met
            20   25   30

Leu Pro Glu Lys Ser Gln Gly Lys Val Leu Gln Ala Thr Val Val Ala
        35   40   45

Val Gly Ser Gly Ser Lys Gly Lys Gly Gly Glu Ile Gln Pro Val Ser
    50   55   60

Val Lys Val Gly Asp Lys Val Leu Leu Pro Glu Tyr Gly Gly Thr Lys
65   70   75   80

Val Val Leu Asp Asp Lys Asp Tyr Phe Leu Phe Arg Asp Gly Asp Ile
                85   90   95

Leu Gly Lys Tyr Val Asp
            100

<210> 4385
<211> 624
<212> PRT
<213> Homo sapiens

<220>
<223> KEAP1 (NCBI Accession: NP_987096)

<400> 4385
Met Gln Pro Asp Pro Arg Pro Ser Gly Ala Gly Ala Cys Cys Arg Phe
1   5   10   15

Leu Pro Leu Gln Ser Gln Cys Pro Glu Gly Ala Gly Asp Ala Val Met
            20   25   30

Tyr Ala Ser Thr Glu Cys Lys Ala Glu Val Thr Pro Ser Gln His Gly
        35   40   45

Asn Arg Thr Phe Ser Tyr Thr Leu Glu Asp His Thr Lys Gln Ala Phe
    50   55   60

Gly Ile Met Asn Glu Leu Arg Leu Ser Gln Gln Leu Cys Asp Val Thr
65   70   75   80

Leu Gln Val Lys Tyr Gln Asp Ala Pro Ala Ala Gln Phe Met Ala His
                85   90   95

```
Lys Val Val Leu Ala Ser Ser Ser Pro Val Phe Lys Ala Met Phe Thr
            100                 105                 110

Asn Gly Leu Arg Glu Gln Gly Met Glu Val Val Ser Ile Glu Gly Ile
        115                 120                 125

His Pro Lys Val Met Glu Arg Leu Ile Glu Phe Ala Tyr Thr Ala Ser
    130                 135                 140

Ile Ser Met Gly Glu Lys Cys Val Leu His Val Met Asn Gly Ala Val
145                 150                 155                 160

Met Tyr Gln Ile Asp Ser Val Val Arg Ala Cys Ser Asp Phe Leu Val
                165                 170                 175

Gln Gln Leu Asp Pro Ser Asn Ala Ile Gly Ile Ala Asn Phe Ala Glu
            180                 185                 190

Gln Ile Gly Cys Val Glu Leu His Gln Arg Ala Arg Glu Tyr Ile Tyr
        195                 200                 205

Met His Phe Gly Glu Val Ala Lys Gln Glu Glu Phe Phe Asn Leu Ser
    210                 215                 220

His Cys Gln Leu Val Thr Leu Ile Ser Arg Asp Asp Leu Asn Val Arg
225                 230                 235                 240

Cys Glu Ser Glu Val Phe His Ala Cys Ile Asn Trp Val Lys Tyr Asp
                245                 250                 255

Cys Glu Gln Arg Arg Phe Tyr Val Gln Ala Leu Leu Arg Ala Val Arg
            260                 265                 270

Cys His Ser Leu Thr Pro Asn Phe Leu Gln Met Gln Leu Gln Lys Cys
        275                 280                 285

Glu Ile Leu Gln Ser Asp Ser Arg Cys Lys Asp Tyr Leu Val Lys Ile
    290                 295                 300

Phe Glu Glu Leu Thr Leu His Lys Pro Thr Gln Val Met Pro Cys Arg
305                 310                 315                 320

Ala Pro Lys Val Gly Arg Leu Ile Tyr Thr Ala Gly Gly Tyr Phe Arg
                325                 330                 335

Gln Ser Leu Ser Tyr Leu Glu Ala Tyr Asn Pro Ser Asp Gly Thr Trp
            340                 345                 350

Leu Arg Leu Ala Asp Leu Gln Val Pro Arg Ser Gly Leu Ala Gly Cys
        355                 360                 365

Val Val Gly Gly Leu Leu Tyr Ala Val Gly Gly Arg Asn Asn Ser Pro
    370                 375                 380
```

```
Asp Gly Asn Thr Asp Ser Ser Ala Leu Asp Cys Tyr Asn Pro Met Thr
385                 390                 395                 400

Asn Gln Trp Ser Pro Cys Ala Pro Met Ser Val Pro Arg Asn Arg Ile
                405                 410                 415

Gly Val Gly Val Ile Asp Gly His Ile Tyr Ala Val Gly Gly Ser His
            420                 425                 430

Gly Cys Ile His His Asn Ser Val Glu Arg Tyr Glu Pro Glu Arg Asp
        435                 440                 445

Glu Trp His Leu Val Ala Pro Met Leu Thr Arg Arg Ile Gly Val Gly
    450                 455                 460

Val Ala Val Leu Asn Arg Leu Leu Tyr Ala Val Gly Gly Phe Asp Gly
465                 470                 475                 480

Thr Asn Arg Leu Asn Ser Ala Glu Cys Tyr Tyr Pro Glu Arg Asn Glu
                485                 490                 495

Trp Arg Met Ile Thr Ala Met Asn Thr Ile Arg Ser Gly Ala Gly Val
            500                 505                 510

Cys Val Leu His Asn Cys Ile Tyr Ala Ala Gly Gly Tyr Asp Gly Gln
        515                 520                 525

Asp Gln Leu Asn Ser Val Glu Arg Tyr Asp Val Glu Thr Glu Thr Trp
    530                 535                 540

Thr Phe Val Ala Pro Met Lys His Arg Arg Ser Ala Leu Gly Ile Thr
545                 550                 555                 560

Val His Gln Gly Arg Ile Tyr Val Leu Gly Gly Tyr Asp Gly His Thr
                565                 570                 575

Phe Leu Asp Ser Val Glu Cys Tyr Asp Pro Asp Thr Asp Thr Trp Ser
            580                 585                 590

Glu Val Thr Arg Met Thr Ser Gly Arg Ser Gly Val Gly Val Ala Val
        595                 600                 605

Thr Met Glu Pro Cys Arg Lys Gln Ile Asp Gln Gln Asn Cys Thr Cys
    610                 615                 620
```

<210> 4386
<211> 391
<212> PRT
<213> Homo sapiens

<220>
<223> NAP1L1 (NCBI Accession: NP_631946)

<400> 4386
Met Ala Asp Ile Asp Asn Lys Glu Gln Ser Glu Leu Asp Gln Asp Leu
1   5   10   15

Asp Asp Val Glu Glu Val Glu Glu Glu Glu Thr Gly Glu Glu Thr Lys
            20   25   30

Leu Lys Ala Arg Gln Leu Thr Val Gln Met Met Gln Asn Pro Gln Ile
        35   40   45

Leu Ala Ala Leu Gln Glu Arg Leu Asp Gly Leu Val Glu Thr Pro Thr
    50   55   60

Gly Tyr Ile Glu Ser Leu Pro Arg Val Val Lys Arg Arg Val Asn Ala
65   70   75   80

Leu Lys Asn Leu Gln Val Lys Cys Ala Gln Ile Glu Ala Lys Phe Tyr
                85   90   95

Glu Glu Val His Asp Leu Glu Arg Lys Tyr Ala Val Leu Tyr Gln Pro
            100   105   110

Leu Phe Asp Lys Arg Phe Glu Ile Ile Asn Ala Ile Tyr Glu Pro Thr
        115   120   125

Glu Glu Glu Cys Glu Trp Lys Pro Asp Glu Glu Asp Glu Ile Ser Glu
    130   135   140

Glu Leu Lys Glu Lys Ala Lys Ile Glu Asp Glu Lys Lys Asp Glu Glu
145   150   155   160

Lys Glu Asp Pro Lys Gly Ile Pro Glu Phe Trp Leu Thr Val Phe Lys
                165   170   175

Asn Val Asp Leu Leu Ser Asp Met Val Gln Glu His Asp Glu Pro Ile
            180   185   190

Leu Lys His Leu Lys Asp Ile Lys Val Lys Phe Ser Asp Ala Gly Gln
        195   200   205

Pro Met Ser Phe Val Leu Glu Phe His Phe Glu Pro Asn Glu Tyr Phe
    210   215   220

Thr Asn Glu Val Leu Thr Lys Thr Tyr Arg Met Arg Ser Glu Pro Asp
225   230   235   240

Asp Ser Asp Pro Phe Ser Phe Asp Gly Pro Glu Ile Met Gly Cys Thr
                245   250   255

Gly Cys Gln Ile Asp Trp Lys Lys Gly Lys Asn Val Thr Leu Lys Thr
            260   265   270

Ile Lys Lys Lys Gln Lys His Lys Gly Arg Gly Thr Val Arg Thr Val
        275   280   285

```
Thr Lys Thr Val Ser Asn Asp Ser Phe Phe Asn Phe Phe Ala Pro Pro
    290                 295                 300

Glu Val Pro Glu Ser Gly Asp Leu Asp Asp Asp Ala Glu Ala Ile Leu
305                 310                 315                 320

Ala Ala Asp Phe Glu Ile Gly His Phe Leu Arg Glu Arg Ile Ile Pro
                325                 330                 335

Arg Ser Val Leu Tyr Phe Thr Gly Glu Ala Ile Glu Asp Asp Asp Asp
            340                 345                 350

Asp Tyr Asp Glu Glu Gly Glu Glu Ala Asp Glu Glu Gly Glu Glu Glu
        355                 360                 365

Gly Asp Glu Glu Asn Asp Pro Asp Tyr Asp Pro Lys Lys Asp Gln Asn
    370                 375                 380

Pro Ala Glu Cys Lys Gln Gln
385                 390

<210> 4387
<211> 335
<212> PRT
<213> Homo sapiens

<220>
<223> NDE1 (NCBI Accession: NP_001137451)

<400> 4387
Met Glu Asp Ser Gly Lys Thr Phe Ser Ser Glu Glu Glu Glu Ala Asn
1               5                   10                  15

Tyr Trp Lys Asp Leu Ala Met Thr Tyr Lys Gln Arg Ala Glu Asn Thr
            20                  25                  30

Gln Glu Glu Leu Arg Glu Phe Gln Glu Gly Ser Arg Glu Tyr Glu Ala
        35                  40                  45

Glu Leu Glu Thr Gln Leu Gln Gln Ile Glu Thr Arg Asn Arg Asp Leu
    50                  55                  60

Leu Ser Glu Asn Asn Arg Leu Arg Met Glu Leu Glu Thr Ile Lys Glu
65                  70                  75                  80

Lys Phe Glu Val Gln His Ser Glu Gly Tyr Arg Gln Ile Ser Ala Leu
                85                  90                  95

Glu Asp Asp Leu Ala Gln Thr Lys Ala Ile Lys Asp Gln Leu Gln Lys
            100                 105                 110

Tyr Ile Arg Glu Leu Glu Gln Ala Asn Asp Asp Leu Glu Arg Ala Lys
        115                 120                 125
```

```
Arg Ala Thr Ile Met Ser Leu Glu Asp Phe Glu Gln Arg Leu Asn Gln
    130                 135                 140

Ala Ile Glu Arg Asn Ala Phe Leu Glu Ser Glu Leu Asp Glu Lys Glu
145                 150                 155                 160

Asn Leu Leu Glu Ser Val Gln Arg Leu Lys Asp Glu Ala Arg Asp Leu
                165                 170                 175

Arg Gln Glu Leu Ala Val Gln Gln Lys Gln Glu Lys Pro Arg Thr Pro
            180                 185                 190

Met Pro Ser Ser Val Glu Ala Glu Arg Thr Asp Thr Ala Val Gln Ala
        195                 200                 205

Thr Gly Ser Val Pro Ser Thr Pro Ile Ala His Arg Gly Pro Ser Ser
    210                 215                 220

Ser Leu Asn Thr Pro Gly Ser Phe Arg Arg Gly Leu Asp Asp Ser Thr
225                 230                 235                 240

Gly Gly Thr Pro Leu Thr Pro Ala Ala Arg Ile Ser Ala Leu Asn Ile
                245                 250                 255

Val Gly Asp Leu Leu Arg Lys Val Gly Ala Leu Glu Ser Lys Leu Ala
            260                 265                 270

Ser Cys Arg Asn Leu Val Tyr Asp Gln Ser Pro Asn Arg Thr Gly Gly
        275                 280                 285

Pro Ala Ser Gly Arg Ser Ser Lys Asn Arg Asp Gly Gly Glu Arg Arg
    290                 295                 300

Pro Ser Ser Thr Ser Val Pro Leu Gly Asp Lys Gly Leu Asp Thr Ser
305                 310                 315                 320

Cys Arg Trp Leu Ser Lys Ser Thr Thr Arg Ser Ser Ser Ser Cys
                325                 330                 335

<210> 4388
<211> 349
<212> PRT
<213> Homo sapiens

<220>
<223> TRUB1 (NCBI Accession: NP_631908)

<400> 4388
Met Ala Ala Ser Glu Ala Ala Val Val Ser Ser Pro Ser Leu Lys Thr
1               5                   10                  15

Asp Thr Ser Pro Val Leu Glu Thr Ala Gly Thr Val Ala Ala Met Ala
            20                  25                  30
```

```
Ala Thr Pro Ser Ala Arg Ala Ala Ala Ala Val Val Ala Ala Ala Ala
        35                  40                  45

Arg Thr Gly Ser Glu Ala Arg Val Ser Lys Ala Ala Leu Ala Thr Lys
    50                  55                  60

Leu Leu Ser Leu Ser Gly Val Phe Ala Val His Lys Pro Lys Gly Pro
65                  70                  75                  80

Thr Ser Ala Glu Leu Leu Asn Arg Leu Lys Glu Lys Leu Leu Ala Glu
                85                  90                  95

Ala Gly Met Pro Ser Pro Glu Trp Thr Lys Arg Lys Lys Gln Thr Leu
            100                 105                 110

Lys Ile Gly His Gly Gly Thr Leu Asp Ser Ala Ala Arg Gly Val Leu
        115                 120                 125

Val Val Gly Ile Gly Ser Gly Thr Lys Met Leu Thr Ser Met Leu Ser
    130                 135                 140

Gly Ser Lys Arg Tyr Thr Ala Ile Gly Glu Leu Gly Lys Ala Thr Asp
145                 150                 155                 160

Thr Leu Asp Ser Thr Gly Arg Val Thr Glu Glu Lys Pro Tyr Asp Lys
                165                 170                 175

Ile Thr Gln Glu Asp Ile Glu Gly Ile Leu Gln Lys Phe Thr Gly Asn
            180                 185                 190

Ile Met Gln Val Pro Pro Leu Tyr Ser Ala Leu Lys Lys Asp Gly Gln
        195                 200                 205

Arg Leu Ser Thr Leu Met Lys Arg Gly Glu Val Val Glu Ala Lys Pro
    210                 215                 220

Ala Arg Pro Val Thr Val Tyr Ser Ile Ser Leu Gln Lys Phe Gln Pro
225                 230                 235                 240

Pro Phe Phe Thr Leu Asp Val Glu Cys Gly Gly Gly Phe Tyr Ile Arg
                245                 250                 255

Ser Leu Val Ser Asp Ile Gly Lys Glu Leu Ser Ser Cys Ala Asn Val
            260                 265                 270

Leu Glu Leu Thr Arg Thr Lys Gln Gly Pro Phe Thr Leu Glu Glu His
        275                 280                 285

Ala Leu Pro Glu Asp Lys Trp Thr Ile Asp Asp Ile Ala Gln Ser Leu
    290                 295                 300

Glu His Cys Ser Ser Leu Phe Pro Ala Glu Leu Ala Leu Lys Lys Ser
305                 310                 315                 320
```

```
Lys Pro Glu Ser Asn Glu Gln Val Leu Ser Cys Glu Tyr Ile Thr Leu
                325                 330                 335

Asn Glu Pro Lys Arg Glu Asp Asp Val Ile Lys Thr Cys
            340                 345
```

<210> 4389
<211> 514
<212> PRT
<213> Homo sapiens

<220>
<223> IMPDH2 (NCBI Accession: NP_000875)

<400> 4389

```
Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp
1               5                   10                  15

Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr
            20                  25                  30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln
        35                  40                  45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
    50                  55                  60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
65                  70                  75                  80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
                85                  90                  95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Glu Gln
            100                 105                 110

Gly Phe Ile Thr Asp Pro Val Val Leu Ser Pro Lys Asp Arg Val Arg
        115                 120                 125

Asp Val Phe Glu Ala Lys Ala Arg His Gly Phe Cys Gly Ile Pro Ile
    130                 135                 140

Thr Asp Thr Gly Arg Met Gly Ser Arg Leu Val Gly Ile Ile Ser Ser
145                 150                 155                 160

Arg Asp Ile Asp Phe Leu Lys Glu Glu Glu His Asp Cys Phe Leu Glu
                165                 170                 175

Glu Ile Met Thr Lys Arg Glu Asp Leu Val Val Ala Pro Ala Gly Ile
            180                 185                 190

Thr Leu Lys Glu Ala Asn Glu Ile Leu Gln Arg Ser Lys Lys Gly Lys
        195                 200                 205
```

```
Leu Pro Ile Val Asn Glu Asp Asp Glu Leu Val Ala Ile Ile Ala Arg
    210                 215                 220

Thr Asp Leu Lys Lys Asn Arg Asp Tyr Pro Leu Ala Ser Lys Asp Ala
225                 230                 235                 240

Lys Lys Gln Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp
                245                 250                 255

Lys Tyr Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val
            260                 265                 270

Leu Asp Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys
        275                 280                 285

Tyr Ile Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val
    290                 295                 300

Val Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala
305                 310                 315                 320

Leu Arg Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val
                325                 330                 335

Leu Ala Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu
            340                 345                 350

Tyr Ala Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln
        355                 360                 365

Asn Val Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val
    370                 375                 380

Met Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr
385                 390                 395                 400

Phe Phe Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser
                405                 410                 415

Leu Asp Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser
            420                 425                 430

Glu Ala Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln
        435                 440                 445

Asp Lys Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile
    450                 455                 460

Gln His Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg
465                 470                 475                 480

Ala Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser
                485                 490                 495
```

```
Ala Gln Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg
            500                 505                 510

Leu Phe
```

<210> 4390
<211> 329
<212> PRT
<213> Homo sapiens

<220>
<223> PLSCR4 (NCBI Accession: XP_011511333)

<400> 4390

```
Met Ser Gly Val Val Pro Thr Ala Pro Glu Gln Pro Ala Gly Glu Met
1               5                   10                  15

Glu Asn Gln Thr Lys Pro Pro Asp Pro Arg Pro Asp Ala Pro Pro Glu
            20                  25                  30

Tyr Ser Ser His Phe Leu Pro Gly Pro Pro Gly Thr Ala Val Pro Pro
        35                  40                  45

Pro Thr Gly Tyr Pro Gly Gly Leu Pro Met Gly Tyr Tyr Ser Pro Gln
    50                  55                  60

Gln Pro Ser Thr Phe Pro Leu Tyr Gln Pro Val Gly Gly Ile His Pro
65                  70                  75                  80

Val Arg Tyr Gln Pro Gly Lys Tyr Pro Met Pro Asn Gln Ser Val Pro
                85                  90                  95

Ile Thr Trp Met Pro Gly Pro Thr Pro Met Ala Asn Cys Pro Pro Gly
            100                 105                 110

Leu Glu Tyr Leu Val Gln Leu Asp Asn Ile His Val Leu Gln His Phe
        115                 120                 125

Glu Pro Leu Glu Met Met Thr Cys Phe Glu Thr Asn Asn Arg Tyr Asp
    130                 135                 140

Ile Lys Asn Asn Ser Asp Gln Met Val Tyr Val Val Thr Glu Asp Thr
145                 150                 155                 160

Asp Asp Phe Thr Arg Asn Ala Tyr Arg Thr Leu Arg Pro Phe Val Leu
                165                 170                 175

Arg Val Thr Asp Cys Met Gly Arg Glu Ile Met Thr Met Gln Arg Pro
            180                 185                 190

Phe Arg Cys Thr Cys Cys Cys Phe Cys Cys Pro Ser Ala Arg Gln Glu
        195                 200                 205
```

```
Leu Glu Val Gln Cys Pro Pro Gly Val Thr Ile Gly Phe Val Ala Glu
    210                 215                 220

His Trp Asn Leu Cys Arg Ala Val Tyr Ser Ile Gln Asn Glu Lys Lys
225                 230                 235                 240

Glu Asn Val Met Arg Val Arg Gly Pro Cys Ser Thr Tyr Gly Cys Gly
                245                 250                 255

Ser Asp Ser Val Phe Glu Val Lys Ser Leu Asp Gly Ile Ser Asn Ile
            260                 265                 270

Gly Ser Ile Ile Arg Lys Trp Asn Gly Leu Leu Ser Ala Met Ala Asp
        275                 280                 285

Ala Asp His Phe Asp Ile His Phe Pro Leu Asp Leu Asp Val Lys Met
    290                 295                 300

Lys Ala Met Ile Phe Gly Ala Cys Phe Leu Ile Asp Phe Met Tyr Phe
305                 310                 315                 320

Glu Arg Ser Pro Pro Gln Arg Ser Arg
                325
```

<210> 4391
<211> 642
<212> PRT
<213> Homo sapiens

<220>
<223> IVNS1ABP (NCBI Accession: NP_006460)

<400> 4391

```
Met Ile Pro Asn Gly Tyr Leu Met Phe Glu Asp Glu Asn Phe Ile Glu
1               5                   10                  15

Ser Ser Val Ala Lys Leu Asn Ala Leu Arg Lys Ser Gly Gln Phe Cys
            20                  25                  30

Asp Val Arg Leu Gln Val Cys Gly His Glu Met Leu Ala His Arg Ala
        35                  40                  45

Val Leu Ala Cys Cys Ser Pro Tyr Leu Phe Glu Ile Phe Asn Ser Asp
    50                  55                  60

Ser Asp Pro His Gly Ile Ser His Val Lys Phe Asp Asp Leu Asn Pro
65                  70                  75                  80

Glu Ala Val Glu Val Leu Leu Asn Tyr Ala Tyr Thr Ala Gln Leu Lys
                85                  90                  95

Ala Asp Lys Glu Leu Val Lys Asp Val Tyr Ser Ala Ala Lys Lys Leu
            100                 105                 110
```

```
Lys Met Asp Arg Val Lys Gln Val Cys Gly Asp Tyr Leu Leu Ser Arg
        115                 120                 125

Met Asp Val Thr Ser Cys Ile Ser Tyr Arg Asn Phe Ala Ser Cys Met
    130                 135                 140

Gly Asp Ser Arg Leu Leu Asn Lys Val Asp Ala Tyr Ile Gln Glu His
145                 150                 155                 160

Leu Leu Gln Ile Ser Glu Glu Glu Glu Phe Leu Lys Leu Pro Arg Leu
                165                 170                 175

Lys Leu Glu Val Met Leu Glu Asp Asn Val Cys Leu Pro Ser Asn Gly
            180                 185                 190

Lys Leu Tyr Thr Lys Val Ile Asn Trp Val Gln Arg Ser Ile Trp Glu
        195                 200                 205

Asn Gly Asp Ser Leu Glu Glu Leu Met Gly Glu Val Gln Thr Leu Tyr
    210                 215                 220

Tyr Ser Ala Asp His Lys Leu Leu Asp Gly Asn Leu Leu Asp Gly Gln
225                 230                 235                 240

Ala Glu Val Phe Gly Ser Asp Asp Asp His Ile Gln Phe Val Gln Lys
                245                 250                 255

Lys Pro Pro Arg Glu Asn Gly His Lys Gln Ile Ser Ser Ser Ser Thr
            260                 265                 270

Gly Cys Leu Ser Ser Pro Asn Ala Thr Val Gln Ser Pro Lys His Glu
        275                 280                 285

Trp Lys Ile Val Ala Ser Glu Lys Thr Ser Asn Asn Thr Tyr Leu Cys
    290                 295                 300

Leu Ala Val Leu Asp Gly Ile Phe Cys Val Ile Phe Leu His Gly Arg
305                 310                 315                 320

Asn Ser Pro Gln Ser Ser Pro Thr Ser Thr Pro Lys Leu Ser Lys Ser
                325                 330                 335

Leu Ser Phe Glu Met Gln Gln Asp Glu Leu Ile Glu Lys Pro Met Ser
            340                 345                 350

Pro Met Gln Tyr Ala Arg Ser Gly Leu Gly Thr Ala Glu Met Asn Gly
        355                 360                 365

Lys Leu Ile Ala Ala Gly Gly Tyr Asn Arg Glu Glu Cys Leu Arg Thr
    370                 375                 380

Val Glu Cys Tyr Asn Pro His Thr Asp His Trp Ser Phe Leu Ala Pro
385                 390                 395                 400
```

```
Met Arg Thr Pro Arg Ala Arg Phe Gln Met Ala Val Leu Met Gly Gln
                405                 410                 415

Leu Tyr Val Val Gly Gly Ser Asn Gly His Ser Asp Asp Leu Ser Cys
            420                 425                 430

Gly Glu Met Tyr Asp Ser Asn Ile Asp Asp Trp Ile Pro Val Pro Glu
        435                 440                 445

Leu Arg Thr Asn Arg Cys Asn Ala Gly Val Cys Ala Leu Asn Gly Lys
    450                 455                 460

Leu Tyr Ile Val Gly Gly Ser Asp Pro Tyr Gly Gln Lys Gly Leu Lys
465                 470                 475                 480

Asn Cys Asp Val Phe Asp Pro Val Thr Lys Leu Trp Thr Ser Cys Ala
                485                 490                 495

Pro Leu Asn Ile Arg Arg His Gln Ser Ala Val Cys Glu Leu Gly Gly
            500                 505                 510

Tyr Leu Tyr Ile Ile Gly Gly Ala Glu Ser Trp Asn Cys Leu Asn Thr
        515                 520                 525

Val Glu Arg Tyr Asn Pro Glu Asn Asn Thr Trp Thr Leu Ile Ala Pro
    530                 535                 540

Met Asn Val Ala Arg Arg Gly Ala Gly Val Ala Val Leu Asn Gly Lys
545                 550                 555                 560

Leu Phe Val Cys Gly Gly Phe Asp Gly Ser His Ala Ile Ser Cys Val
                565                 570                 575

Glu Met Tyr Asp Pro Thr Arg Asn Glu Trp Lys Met Met Gly Asn Met
            580                 585                 590

Thr Ser Pro Arg Ser Asn Ala Gly Ile Ala Thr Val Gly Asn Thr Ile
        595                 600                 605

Tyr Ala Val Gly Gly Phe Asp Gly Asn Glu Phe Leu Asn Thr Val Glu
    610                 615                 620

Val Tyr Asn Leu Glu Ser Asn Glu Trp Ser Pro Tyr Thr Lys Ile Phe
625                 630                 635                 640

Gln Phe
```

<210> 4392
<211> 716
<212> PRT
<213> Homo sapiens

<220>
<223> DVL3 (NCBI Accession: NP_004414)

<400> 4392
Met Gly Glu Thr Lys Ile Ile Tyr His Leu Asp Gly Gln Glu Thr Pro
1   5   10   15

Tyr Leu Val Lys Leu Pro Leu Pro Ala Glu Arg Val Thr Leu Ala Asp
            20   25   30

Phe Lys Gly Val Leu Gln Arg Pro Ser Tyr Lys Phe Phe Phe Lys Ser
        35   40   45

Met Asp Asp Asp Phe Gly Val Val Lys Glu Glu Ile Ser Asp Asp Asn
    50   55   60

Ala Lys Leu Pro Cys Phe Asn Gly Arg Val Val Ser Trp Leu Val Ser
65   70   75   80

Ala Glu Gly Ser His Pro Asp Pro Ala Pro Phe Cys Ala Asp Asn Pro
                85   90   95

Ser Glu Leu Pro Pro Pro Met Glu Arg Thr Gly Gly Ile Gly Asp Ser
            100   105   110

Arg Pro Pro Ser Phe His Pro His Ala Gly Gly Gly Ser Gln Glu Asn
        115   120   125

Leu Asp Asn Asp Thr Glu Thr Asp Ser Leu Val Ser Ala Gln Arg Glu
    130   135   140

Arg Pro Arg Arg Arg Asp Gly Pro Glu His Ala Thr Arg Leu Asn Gly
145   150   155   160

Thr Ala Lys Gly Glu Arg Arg Arg Glu Pro Gly Gly Tyr Asp Ser Ser
                165   170   175

Ser Thr Leu Met Ser Ser Glu Leu Glu Thr Thr Ser Phe Phe Asp Ser
            180   185   190

Asp Glu Asp Asp Ser Thr Ser Arg Phe Ser Ser Ser Thr Glu Gln Ser
        195   200   205

Ser Ala Ser Arg Leu Met Arg Arg His Lys Arg Arg Arg Arg Lys Gln
    210   215   220

Lys Val Ser Arg Ile Glu Arg Ser Ser Ser Phe Ser Ser Ile Thr Asp
225   230   235   240

Ser Thr Met Ser Leu Asn Ile Ile Thr Val Thr Leu Asn Met Glu Lys
                245   250   255

Tyr Asn Phe Leu Gly Ile Ser Ile Val Gly Gln Ser Asn Glu Arg Gly
            260   265   270

```
Asp Gly Gly Ile Tyr Ile Gly Ser Ile Met Lys Gly Gly Ala Val Ala
        275                 280                 285

Ala Asp Gly Arg Ile Glu Pro Gly Asp Met Leu Leu Gln Val Asn Glu
    290                 295                 300

Ile Asn Phe Glu Asn Met Ser Asn Asp Asp Ala Val Arg Val Leu Arg
305                 310                 315                 320

Glu Ile Val His Lys Pro Gly Pro Ile Thr Leu Thr Val Ala Lys Cys
                325                 330                 335

Trp Asp Pro Ser Pro Arg Gly Cys Phe Thr Leu Pro Arg Ser Glu Pro
            340                 345                 350

Ile Arg Pro Ile Asp Pro Ala Ala Trp Val Ser His Thr Ala Ala Met
        355                 360                 365

Thr Gly Thr Phe Pro Ala Tyr Gly Met Ser Pro Ser Leu Ser Thr Ile
    370                 375                 380

Thr Ser Thr Ser Ser Ser Ile Thr Ser Ser Ile Pro Asp Thr Glu Arg
385                 390                 395                 400

Leu Asp Asp Phe His Leu Ser Ile His Ser Asp Met Ala Ala Ile Val
                405                 410                 415

Lys Ala Met Ala Ser Pro Glu Ser Gly Leu Glu Val Arg Asp Arg Met
            420                 425                 430

Leu Leu Lys Ile Thr Ile Pro Asn Ala Phe Ile Gly Ser Asp Val Val
        435                 440                 445

Asp Trp Leu Tyr His Asn Val Glu Gly Phe Thr Asp Arg Arg Glu Ala
    450                 455                 460

Arg Lys Tyr Ala Ser Asn Leu Leu Lys Ala Gly Phe Ile Arg His Thr
465                 470                 475                 480

Val Asn Lys Ile Thr Phe Ser Glu Gln Cys Tyr Tyr Ile Phe Gly Asp
                485                 490                 495

Leu Cys Gly Asn Met Ala Asn Leu Ser Leu His Asp His Asp Gly Ser
            500                 505                 510

Ser Gly Ala Ser Asp Gln Asp Thr Leu Ala Pro Leu Pro His Pro Gly
        515                 520                 525

Ala Ala Pro Trp Pro Met Ala Phe Pro Tyr Gln Tyr Pro Pro Pro Pro
    530                 535                 540

His Pro Tyr Asn Pro His Pro Gly Phe Pro Glu Leu Gly Tyr Ser Tyr
545                 550                 555                 560
```

Gly Gly Gly Ser Ala Ser Ser Gln His Ser Glu Gly Ser Arg Ser Ser
565 570 575

Gly Ser Asn Arg Ser Gly Ser Asp Arg Arg Lys Glu Lys Asp Pro Lys
580 585 590

Ala Gly Asp Ser Lys Ser Gly Gly Ser Gly Ser Glu Ser Asp His Thr
595 600 605

Thr Arg Ser Ser Leu Arg Gly Pro Arg Glu Arg Ala Pro Ser Glu Arg
610 615 620

Ser Gly Pro Ala Ala Ser Glu His Ser His Arg Ser His His Ser Leu
625 630 635 640

Ala Ser Ser Leu Arg Ser His His Thr His Pro Ser Tyr Gly Pro Pro
645 650 655

Gly Val Pro Pro Leu Tyr Gly Pro Pro Met Leu Met Met Pro Pro Pro
660 665 670

Pro Ala Ala Met Gly Pro Pro Gly Ala Pro Pro Gly Arg Asp Leu Ala
675 680 685

Ser Val Pro Pro Glu Leu Thr Ala Ser Arg Gln Ser Phe Arg Met Ala
690 695 700

Met Gly Asn Pro Ser Glu Phe Phe Val Asp Val Met
705 710 715

<210> 4393
<211> 412
<212> PRT
<213> Homo sapiens

<220>
<223> ZNF260 (NCBI Accession: NP_001012774)

<400> 4393
Met Ile Gly Met Leu Glu Ser Leu Gln His Glu Ser Asp Leu Leu Gln
1 5 10 15

His Asp Gln Ile His Thr Gly Glu Lys Pro Tyr Glu Cys Asn Glu Cys
20 25 30

Arg Lys Thr Phe Ser Leu Lys Gln Asn Leu Val Glu His Lys Lys Met
35 40 45

His Thr Gly Glu Lys Ser His Glu Cys Thr Glu Cys Gly Lys Val Cys
50 55 60

Ser Arg Val Ser Ser Leu Thr Leu His Leu Arg Ser His Thr Gly Lys
65 70 75 80

```
Lys Ala Tyr Lys Cys Asn Lys Cys Gly Lys Ala Phe Ser Gln Lys Glu
                85                  90                  95

Asn Phe Leu Ser His Gln Lys His His Thr Gly Glu Lys Pro Tyr Glu
            100                 105                 110

Cys Glu Lys Val Ser Ile Gln Met Pro Thr Ile Ile Arg His Gln Lys
        115                 120                 125

Asn His Thr Gly Thr Lys Pro Tyr Ala Cys Lys Glu Cys Gly Lys Ala
    130                 135                 140

Phe Asn Gly Lys Ala Tyr Leu Thr Glu His Glu Lys Ile His Thr Gly
145                 150                 155                 160

Glu Lys Pro Phe Glu Cys Asn Gln Cys Gly Arg Ala Phe Ser Gln Lys
                165                 170                 175

Gln Tyr Leu Ile Lys His Gln Asn Ile His Thr Gly Lys Lys Pro Phe
            180                 185                 190

Lys Cys Ser Glu Cys Gly Lys Ala Phe Ser Gln Lys Glu Asn Leu Ile
        195                 200                 205

Ile His Gln Arg Ile His Thr Gly Glu Lys Pro Tyr Glu Cys Lys Gly
    210                 215                 220

Cys Gly Lys Ala Phe Ile Gln Lys Ser Ser Leu Ile Arg His Gln Arg
225                 230                 235                 240

Ser His Thr Gly Glu Lys Pro Tyr Thr Cys Lys Glu Cys Gly Lys Ala
                245                 250                 255

Phe Ser Gly Lys Ser Asn Leu Thr Glu His Glu Lys Ile His Ile Gly
            260                 265                 270

Glu Lys Pro Tyr Lys Cys Asn Glu Cys Gly Thr Ile Phe Arg Gln Lys
        275                 280                 285

Gln Tyr Leu Ile Lys His His Asn Ile His Thr Gly Glu Lys Pro Tyr
    290                 295                 300

Glu Cys Asn Lys Cys Gly Lys Ala Phe Ser Arg Ile Thr Ser Leu Ile
305                 310                 315                 320

Val His Val Arg Ile His Thr Gly Asp Lys Pro Tyr Glu Cys Lys Val
                325                 330                 335

Cys Gly Lys Ala Phe Cys Gln Ser Ser Ser Leu Thr Val His Met Arg
            340                 345                 350

Ser His Thr Gly Glu Lys Pro Tyr Gly Cys Asn Glu Cys Gly Lys Ala
        355                 360                 365
```

```
Phe Ser Gln Phe Ser Thr Leu Ala Leu His Met Arg Ile His Thr Gly
    370                 375                 380

Glu Lys Pro Tyr Gln Cys Ser Glu Cys Gly Lys Ala Phe Ser Gln Lys
385                 390                 395                 400

Ser His His Ile Arg His Gln Arg Ile His Thr His
                405                 410
```

<210> 4394
<211> 574
<212> PRT
<213> Homo sapiens

<220>
<223> SNX33 (NCBI Accession: NP_695003)

<400> 4394

```
Met Ala Leu Lys Gly Arg Ala Leu Tyr Asp Phe His Ser Glu Asn Lys
1               5                   10                  15

Glu Glu Ile Ser Ile Gln Gln Asp Glu Asp Leu Val Ile Phe Ser Glu
            20                  25                  30

Thr Ser Leu Asp Gly Trp Leu Gln Gly Gln Asn Ser Arg Gly Glu Thr
        35                  40                  45

Gly Leu Phe Pro Ala Ser Tyr Val Glu Ile Val Arg Ser Gly Ile Ser
    50                  55                  60

Thr Asn His Ala Asp Tyr Ser Ser Ser Pro Ala Gly Ser Pro Gly Ala
65                  70                  75                  80

Gln Val Ser Leu Tyr Asn Ser Pro Ser Val Ala Ser Pro Ala Arg Ser
                85                  90                  95

Gly Gly Gly Ser Gly Phe Leu Ser Asn Gln Gly Ser Phe Glu Glu Asp
            100                 105                 110

Asp Asp Asp Asp Trp Asp Asp Trp Asp Asp Gly Cys Thr Val Val Glu
        115                 120                 125

Glu Pro Arg Ala Gly Gly Leu Gly Thr Asn Gly His Pro Pro Leu Asn
    130                 135                 140

Leu Ser Tyr Pro Gly Ala Tyr Pro Ser Gln His Met Ala Phe Arg Pro
145                 150                 155                 160

Lys Pro Pro Leu Glu Arg Gln Asp Ser Leu Ala Ser Ala Lys Arg Gly
                165                 170                 175

Ser Val Val Gly Arg Asn Leu Asn Arg Phe Ser Cys Phe Val Arg Ser
            180                 185                 190
```

```
Gly Val Glu Ala Phe Ile Leu Gly Asp Val Pro Met Met Ala Lys Ile
        195                 200                 205

Ala Glu Thr Tyr Ser Ile Glu Met Gly Pro Arg Gly Pro Gln Trp Lys
    210                 215                 220

Ala Asn Pro His Pro Phe Ala Cys Ser Val Glu Asp Pro Thr Lys Gln
225                 230                 235                 240

Thr Lys Phe Lys Gly Ile Lys Ser Tyr Ile Ser Tyr Lys Leu Thr Pro
                245                 250                 255

Thr His Ala Ala Ser Pro Val Tyr Arg Arg Tyr Lys His Phe Asp Trp
            260                 265                 270

Leu Tyr Asn Arg Leu Leu His Lys Phe Thr Val Ile Ser Val Pro His
        275                 280                 285

Leu Pro Glu Lys Gln Ala Thr Gly Arg Phe Glu Glu Asp Phe Ile Glu
    290                 295                 300

Lys Arg Lys Arg Arg Leu Ile Leu Trp Met Asp His Met Thr Ser His
305                 310                 315                 320

Pro Val Leu Ser Gln Tyr Glu Gly Phe Gln His Phe Leu Ser Cys Leu
                325                 330                 335

Asp Asp Lys Gln Trp Lys Met Gly Lys Arg Arg Ala Glu Lys Asp Glu
            340                 345                 350

Met Val Gly Ala Ser Phe Leu Leu Thr Phe Gln Ile Pro Thr Glu His
        355                 360                 365

Gln Asp Leu Gln Asp Val Glu Asp Arg Val Asp Thr Phe Lys Ala Phe
    370                 375                 380

Ser Lys Lys Met Asp Asp Ser Val Leu Gln Leu Ser Thr Val Ala Ser
385                 390                 395                 400

Glu Leu Val Arg Lys His Val Gly Gly Phe Arg Lys Glu Phe Gln Lys
                405                 410                 415

Leu Gly Ser Ala Phe Gln Ala Ile Ser His Ser Phe Gln Met Asp Pro
            420                 425                 430

Pro Phe Cys Ser Glu Ala Leu Asn Ser Ala Ile Ser His Thr Gly Arg
        435                 440                 445

Thr Tyr Glu Ala Ile Gly Glu Met Phe Ala Glu Gln Pro Lys Asn Asp
    450                 455                 460

Leu Phe Gln Met Leu Asp Thr Leu Ser Leu Tyr Gln Gly Leu Leu Ser
465                 470                 475                 480
```

Asn Phe Pro Asp Ile Ile His Leu Gln Lys Gly Ala Phe Ala Lys Val
485 490 495

Lys Glu Ser Gln Arg Met Ser Asp Glu Gly Arg Met Val Gln Asp Glu
500 505 510

Ala Asp Gly Ile Arg Arg Arg Cys Arg Val Val Gly Phe Ala Leu Gln
515 520 525

Ala Glu Met Asn His Phe His Gln Arg Arg Glu Leu Asp Phe Lys His
530 535 540

Met Met Gln Asn Tyr Leu Arg Gln Gln Ile Leu Phe Tyr Gln Arg Val
545 550 555 560

Gly Gln Gln Leu Glu Lys Thr Leu Arg Met Tyr Asp Asn Leu
565 570

<210> 4395
<211> 190
<212> PRT
<213> Homo sapiens

<220>
<223> HN1L (NCBI Accession: NP_653171)

<400> 4395
Met Phe Gln Val Pro Asp Ser Glu Gly Gly Arg Ala Gly Ser Arg Ala
1 5 10 15

Met Lys Pro Pro Gly Gly Glu Ser Ser Asn Leu Phe Gly Ser Pro Glu
20 25 30

Glu Ala Thr Pro Ser Ser Arg Pro Asn Arg Met Ala Ser Asn Ile Phe
35 40 45

Gly Pro Thr Glu Glu Pro Gln Asn Ile Pro Lys Arg Thr Asn Pro Pro
50 55 60

Gly Gly Lys Gly Ser Gly Ile Phe Asp Glu Ser Thr Pro Val Gln Thr
65 70 75 80

Arg Gln His Leu Asn Pro Pro Gly Gly Lys Thr Ser Asp Ile Phe Gly
85 90 95

Ser Pro Val Thr Ala Thr Ser Arg Leu Ala His Pro Asn Lys Pro Lys
100 105 110

Asp His Val Phe Leu Cys Glu Gly Glu Glu Pro Lys Ser Asp Leu Lys
115 120 125

Ala Ala Arg Ser Ile Pro Ala Gly Ala Glu Pro Gly Glu Lys Gly Ser
130 135 140

```
Ala Arg Lys Ala Gly Pro Ala Lys Glu Gln Glu Pro Met Pro Thr Val
145                 150                 155                 160

Asp Ser His Glu Pro Arg Leu Gly Pro Arg Pro Arg Ser His Asn Lys
                165                 170                 175

Val Leu Asn Pro Pro Gly Gly Lys Ser Ser Ile Ser Phe Tyr
            180                 185                 190
```

<210> 4396
<211> 208
<212> PRT
<213> Homo sapiens

<220>
<223> THEM6 (NCBI Accession: NP_057731)

<400> 4396

```
Met Leu Gly Leu Leu Val Ala Leu Leu Ala Leu Gly Leu Ala Val Phe
1               5                   10                  15

Ala Leu Leu Asp Val Trp Tyr Leu Val Arg Leu Pro Cys Ala Val Leu
            20                  25                  30

Arg Ala Arg Leu Leu Gln Pro Arg Val Arg Asp Leu Leu Ala Glu Gln
        35                  40                  45

Arg Phe Pro Gly Arg Val Leu Pro Ser Asp Leu Asp Leu Leu Leu His
    50                  55                  60

Met Asn Asn Ala Arg Tyr Leu Arg Glu Ala Asp Phe Ala Arg Val Ala
65                  70                  75                  80

His Leu Thr Arg Cys Gly Val Leu Gly Ala Leu Arg Gln Leu Arg Ala
                85                  90                  95

His Thr Val Leu Ala Ala Ser Cys Ala Arg His Arg Arg Ser Leu Arg
            100                 105                 110

Leu Leu Glu Pro Phe Glu Val Arg Thr Arg Leu Leu Gly Trp Asp Asp
        115                 120                 125

Arg Ala Phe Tyr Leu Glu Ala Arg Phe Val Ser Leu Arg Asp Gly Phe
    130                 135                 140

Val Cys Ala Leu Leu Arg Phe Arg Gln His Leu Leu Gly Thr Ser Pro
145                 150                 155                 160

Glu Arg Val Val Gln His Leu Cys Gln Arg Arg Val Glu Pro Pro Glu
                165                 170                 175

Leu Pro Ala Asp Leu Gln His Trp Ile Ser Tyr Asn Glu Ala Ser Ser
            180                 185                 190
```

```
Gln Leu Leu Arg Met Glu Ser Gly Leu Ser Asp Val Thr Lys Asp Gln
        195                 200                 205

<210> 4397
<211> 349
<212> PRT
<213> Homo sapiens

<220>
<223> KHDRBS2 (NCBI Accession: NP_689901)

<400> 4397
Met Glu Glu Glu Lys Tyr Leu Pro Glu Leu Met Ala Glu Lys Asp Ser
1               5                   10                  15

Leu Asp Pro Ser Phe Val His Ala Ser Arg Leu Leu Ala Glu Glu Ile
            20                  25                  30

Glu Lys Phe Gln Gly Ser Asp Gly Lys Lys Glu Asp Glu Glu Lys Lys
        35                  40                  45

Tyr Leu Asp Val Ile Ser Asn Lys Asn Ile Lys Leu Ser Glu Arg Val
    50                  55                  60

Leu Ile Pro Val Lys Gln Tyr Pro Lys Phe Asn Phe Val Gly Lys Leu
65                  70                  75                  80

Leu Gly Pro Arg Gly Asn Ser Leu Lys Arg Leu Gln Glu Glu Thr Gly
                85                  90                  95

Ala Lys Met Ser Ile Leu Gly Lys Gly Ser Met Arg Asp Lys Ala Lys
            100                 105                 110

Glu Glu Glu Leu Arg Lys Ser Gly Glu Ala Lys Tyr Ala His Leu Ser
        115                 120                 125

Asp Glu Leu His Val Leu Ile Glu Val Phe Ala Pro Pro Gly Glu Ala
    130                 135                 140

Tyr Ser Arg Met Ser His Ala Leu Glu Glu Ile Lys Lys Phe Leu Val
145                 150                 155                 160

Pro Asp Tyr Asn Asp Glu Ile Arg Gln Glu Gln Leu Arg Glu Leu Ser
                165                 170                 175

Tyr Leu Asn Gly Ser Glu Asp Ser Gly Arg Gly Arg Gly Ile Arg Gly
            180                 185                 190

Arg Gly Ile Arg Ile Ala Pro Thr Ala Pro Ser Arg Gly Arg Gly Gly
        195                 200                 205

Ala Ile Pro Pro Pro Pro Pro Pro Gly Arg Gly Val Leu Thr Pro Arg
    210                 215                 220
```

```
Gly Ser Thr Val Thr Arg Gly Ala Leu Pro Val Pro Pro Val Ala Arg
225                 230                 235                 240

Gly Val Pro Thr Pro Arg Ala Arg Gly Ala Pro Thr Val Pro Gly Tyr
                245                 250                 255

Arg Ala Pro Pro Pro Pro Ala His Glu Ala Tyr Glu Glu Tyr Gly Tyr
            260                 265                 270

Asp Asp Gly Tyr Gly Gly Glu Tyr Asp Asp Gln Thr Tyr Glu Thr Tyr
        275                 280                 285

Asp Asn Ser Tyr Ala Thr Gln Thr Gln Ser Val Pro Glu Tyr Tyr Asp
    290                 295                 300

Tyr Gly His Gly Val Ser Glu Asp Ala Tyr Asp Ser Tyr Ala Pro Glu
305                 310                 315                 320

Glu Trp Ala Thr Thr Ser Ser Ser Leu Lys Ala Pro Pro Gln Arg Ser
                325                 330                 335

Ala Arg Gly Gly Tyr Arg Glu His Pro Tyr Gly Arg Tyr
            340                 345

<210> 4398
<211> 255
<212> PRT
<213> Homo sapiens

<220>
<223> C1QL3 (NCBI Accession: NP_001010908)

<400> 4398
Met Val Leu Leu Leu Val Ile Leu Ile Pro Val Leu Val Ser Ser Ala
1               5                   10                  15

Gly Thr Ser Ala His Tyr Glu Met Leu Gly Thr Cys Arg Met Val Cys
            20                  25                  30

Asp Pro Tyr Gly Gly Thr Lys Ala Pro Ser Thr Ala Ala Thr Pro Asp
        35                  40                  45

Arg Gly Leu Met Gln Ser Leu Pro Thr Phe Ile Gln Gly Pro Lys Gly
    50                  55                  60

Glu Ala Gly Arg Pro Gly Lys Ala Gly Pro Arg Gly Pro Pro Gly Glu
65                  70                  75                  80

Pro Gly Pro Pro Gly Pro Met Gly Pro Pro Gly Glu Lys Gly Glu Pro
                85                  90                  95

Gly Arg Gln Gly Leu Pro Gly Pro Pro Gly Ala Pro Gly Leu Asn Ala
            100                 105                 110
```

```
Ala Gly Ala Ile Ser Ala Ala Thr Tyr Ser Thr Val Pro Lys Ile Ala
        115                 120                 125

Phe Tyr Ala Gly Leu Lys Arg Gln His Glu Gly Tyr Glu Val Leu Lys
    130                 135                 140

Phe Asp Asp Val Val Thr Asn Leu Gly Asn His Tyr Asp Pro Thr Thr
145                 150                 155                 160

Gly Lys Phe Thr Cys Ser Ile Pro Gly Ile Tyr Phe Phe Thr Tyr His
                165                 170                 175

Val Leu Met Arg Gly Gly Asp Gly Thr Ser Met Trp Ala Asp Leu Cys
            180                 185                 190

Lys Asn Asn Gln Val Arg Ala Ser Ala Ile Ala Gln Asp Ala Asp Gln
        195                 200                 205

Asn Tyr Asp Tyr Ala Ser Asn Ser Val Val Leu His Leu Glu Pro Gly
    210                 215                 220

Asp Glu Val Tyr Ile Lys Leu Asp Gly Gly Lys Ala His Gly Gly Asn
225                 230                 235                 240

Asn Asn Lys Tyr Ser Thr Phe Ser Gly Phe Ile Ile Tyr Ala Asp
                245                 250                 255

<210> 4399
<211> 154
<212> PRT
<213> Homo sapiens

<220>
<223> PPP1R27 (NCBI Accession: NP_001007534)

<400> 4399
Met Pro Ser Arg Thr Ala Arg Tyr Ala Arg Tyr Ser Pro Arg Gln Arg
1               5                   10                  15

Arg Arg Arg Met Leu Ala Asp Arg Ser Val Arg Phe Pro Asn Asp Val
            20                  25                  30

Leu Phe Leu Asp His Ile Arg Gln Gly Asp Leu Glu Gln Val Gly Arg
        35                  40                  45

Phe Ile Arg Thr Arg Lys Val Ser Leu Ala Thr Ile His Pro Ser Gly
    50                  55                  60

Leu Ala Ala Leu His Glu Ala Val Leu Ser Gly Asn Leu Glu Cys Val
65                  70                  75                  80

Lys Leu Leu Val Lys Tyr Gly Ala Asp Ile His Gln Arg Asp Glu Ala
                85                  90                  95
```

Gly Trp Thr Pro Leu His Ile Ala Cys Ser Asp Gly Tyr Pro Asp Ile
100 105 110

Ala Arg Tyr Leu Ile Ser Leu Gly Ala Asp Arg Asp Ala Thr Asn Asp
115 120 125

Asp Gly Asp Leu Pro Ser Asp Leu Ile Asp Pro Asp Tyr Lys Glu Leu
130 135 140

Val Glu Leu Phe Lys Gly Thr Thr Met Asp
145 150

<210> 4400
<211> 299
<212> PRT
<213> Homo sapiens

<220>
<223> DNASE1L2 (NCBI Accession: NP_001365)

<400> 4400
Met Gly Gly Pro Arg Ala Leu Leu Ala Ala Leu Trp Ala Leu Glu Ala
1 5 10 15

Ala Gly Thr Ala Ala Leu Arg Ile Gly Ala Phe Asn Ile Gln Ser Phe
20 25 30

Gly Asp Ser Lys Val Ser Asp Pro Ala Cys Gly Ser Ile Ile Ala Lys
35 40 45

Ile Leu Ala Gly Tyr Asp Leu Ala Leu Val Gln Glu Val Arg Asp Pro
50 55 60

Asp Leu Ser Ala Val Ser Ala Leu Met Glu Gln Ile Asn Ser Val Ser
65 70 75 80

Glu His Glu Tyr Ser Phe Val Ser Ser Gln Pro Leu Gly Arg Asp Gln
85 90 95

Tyr Lys Glu Met Tyr Leu Phe Val Tyr Arg Lys Asp Ala Val Ser Val
100 105 110

Val Asp Thr Tyr Leu Tyr Pro Asp Pro Glu Asp Val Phe Ser Arg Glu
115 120 125

Pro Phe Val Val Lys Phe Ser Ala Pro Gly Thr Gly Glu Arg Ala Pro
130 135 140

Pro Leu Pro Ser Arg Arg Ala Leu Thr Pro Pro Pro Leu Pro Ala Ala
145 150 155 160

Ala Gln Asn Leu Val Leu Ile Pro Leu His Ala Ala Pro His Gln Ala
165 170 175

```
Val Ala Glu Ile Asp Ala Leu Tyr Asp Val Tyr Leu Asp Val Ile Asp
            180                 185                 190

Lys Trp Gly Thr Asp Asp Met Leu Phe Leu Gly Asp Phe Asn Ala Asp
        195                 200                 205

Cys Ser Tyr Val Arg Ala Gln Asp Trp Ala Ala Ile Arg Leu Arg Ser
    210                 215                 220

Ser Glu Val Phe Lys Trp Leu Ile Pro Asp Ser Ala Asp Thr Thr Val
225                 230                 235                 240

Gly Asn Ser Asp Cys Ala Tyr Asp Arg Ile Val Ala Cys Gly Ala Arg
                245                 250                 255

Leu Arg Arg Ser Leu Lys Pro Gln Ser Ala Thr Val His Asp Phe Gln
            260                 265                 270

Glu Glu Phe Gly Leu Asp Gln Thr Gln Ala Leu Ala Ile Ser Asp His
        275                 280                 285

Phe Pro Val Glu Val Thr Leu Lys Phe His Arg
    290                 295

<210> 4401
<211> 358
<212> PRT
<213> Homo sapiens

<220>
<223> ESYT2_frag (NCBI Accession: NP_001354702)

<400> 4401
Met Ser Val Gly His Lys Ala Gln Glu Ser Lys Ile Arg Tyr Lys Thr
1               5                   10                  15

Asn Glu Pro Val Trp Glu Glu Asn Phe Thr Phe Phe Ile His Asn Pro
            20                  25                  30

Lys Arg Gln Asp Leu Glu Val Glu Val Arg Asp Glu Gln His Gln Cys
        35                  40                  45

Ser Leu Gly Asn Leu Lys Val Pro Leu Ser Gln Leu Leu Thr Ser Glu
    50                  55                  60

Asp Met Thr Val Ser Gln Arg Phe Gln Leu Ser Asn Ser Gly Pro Asn
65                  70                  75                  80

Ser Thr Ile Lys Met Lys Ile Ala Leu Arg Val Leu His Leu Glu Lys
                85                  90                  95

Arg Glu Arg Pro Pro Asp His Gln His Ser Ala Gln Val Lys Arg Pro
            100                 105                 110
```

```
Ser Val Ser Lys Glu Gly Arg Lys Thr Ser Ile Lys Ser His Met Ser
        115                 120                 125

Gly Ser Pro Gly Pro Gly Gly Ser Asn Thr Ala Pro Ser Thr Pro Val
    130                 135                 140

Ile Gly Gly Ser Asp Lys Pro Gly Met Glu Glu Lys Ala Gln Pro Pro
145                 150                 155                 160

Glu Ala Gly Pro Gln Gly Leu His Asp Leu Gly Arg Ser Ser Ser Ser
                165                 170                 175

Leu Leu Ala Ser Pro Gly His Ile Ser Val Lys Glu Pro Thr Pro Ser
            180                 185                 190

Ile Ala Ser Asp Ile Ser Leu Pro Ile Ala Thr Gln Glu Leu Arg Gln
        195                 200                 205

Arg Leu Arg Gln Leu Glu Asn Gly Thr Thr Leu Gly Gln Ser Pro Leu
    210                 215                 220

Gly Gln Ile Gln Leu Thr Ile Arg His Ser Ser Gln Arg Asn Lys Leu
225                 230                 235                 240

Ile Val Val Val His Ala Cys Arg Asn Leu Ile Ala Phe Ser Glu Asp
                245                 250                 255

Gly Ser Asp Pro Tyr Val Arg Met Tyr Leu Leu Pro Asp Lys Arg Arg
            260                 265                 270

Ser Gly Arg Arg Lys Thr His Val Ser Lys Lys Thr Leu Asn Pro Val
        275                 280                 285

Phe Asp Gln Ser Phe Asp Phe Ser Val Ser Leu Pro Glu Val Gln Arg
    290                 295                 300

Arg Thr Leu Asp Val Ala Val Lys Asn Ser Gly Gly Phe Leu Ser Lys
305                 310                 315                 320

Asp Lys Gly Leu Leu Gly Lys Val Leu Val Ala Leu Ala Ser Glu Glu
                325                 330                 335

Leu Ala Lys Gly Trp Thr Gln Trp Tyr Asp Leu Thr Glu Asp Gly Thr
            340                 345                 350

Arg Pro Gln Ala Met Thr
        355

<210> 4402
<211> 89
<212> PRT
<213> Homo sapiens
```

<220>
<223> CCL18 (NCBI Accession: NP_002979)

<400> 4402
Met Lys Gly Leu Ala Ala Ala Leu Leu Val Leu Val Cys Thr Met Ala
1   5   10   15

Leu Cys Ser Cys Ala Gln Val Gly Thr Asn Lys Glu Leu Cys Cys Leu
            20   25   30

Val Tyr Thr Ser Trp Gln Ile Pro Gln Lys Phe Ile Val Asp Tyr Ser
        35   40   45

Glu Thr Ser Pro Gln Cys Pro Lys Pro Gly Val Ile Leu Leu Thr Lys
    50   55   60

Arg Gly Arg Gln Ile Cys Ala Asp Pro Asn Lys Lys Trp Val Gln Lys
65   70   75   80

Tyr Ile Ser Asp Leu Lys Leu Asn Ala
                85

<210> 4403
<211> 526
<212> PRT
<213> Homo sapiens

<220>
<223> HOMEZ (NCBI Accession: NP_065885)

<400> 4403
Met Pro Pro Asn Lys Glu Ala Ser Gly Leu Ser Ser Ser Pro Ala Gly
1   5   10   15

Leu Ile Cys Leu Pro Pro Ile Ser Glu Glu Leu Gln Leu Val Trp Thr
            20   25   30

Gln Ala Ala Gln Thr Ser Glu Leu Asp Ser Asn Glu His Leu Leu Lys
        35   40   45

Thr Phe Ser Tyr Phe Pro Tyr Pro Ser Leu Ala Asp Ile Ala Leu Leu
    50   55   60

Cys Leu Arg Tyr Gly Leu Gln Met Glu Lys Val Lys Thr Trp Phe Met
65   70   75   80

Ala Gln Arg Leu Arg Cys Gly Ile Ser Trp Ser Ser Glu Glu Ile Glu
                85   90   95

Glu Thr Arg Ala Arg Val Val Tyr Arg Arg Asp Gln Leu His Phe Lys
            100   105   110

Ser Leu Leu Ser Phe Thr His His Ala Gly Arg Pro Pro Glu Glu Val
        115   120   125

```
Pro Pro Pro Pro Val Pro Ala Pro Glu Gln Val Gly Ile Gly Ile Gly
    130                 135                 140

Pro Pro Thr Leu Ser Lys Pro Thr Gln Thr Lys Gly Leu Lys Val Glu
145                 150                 155                 160

Pro Glu Glu Pro Ser Gln Met Pro Pro Leu Pro Gln Ser His Gln Lys
                165                 170                 175

Leu Lys Glu Ser Leu Met Thr Pro Gly Ser Gly Ala Phe Pro Tyr Gln
            180                 185                 190

Ser Asp Phe Trp Gln His Leu Gln Ser Ser Gly Leu Ser Lys Glu Gln
        195                 200                 205

Ala Gly Arg Gly Pro Asn Gln Ser His Gly Ile Gly Thr Ala Ser Trp
    210                 215                 220

Asn His Ser Thr Thr Val Pro Gln Pro Gln Ala Arg Asp Lys Pro Pro
225                 230                 235                 240

Pro Ile Ala Leu Ile Ala Ser Ser Cys Lys Glu Glu Ser Ala Ser Ser
                245                 250                 255

Val Thr Pro Ser Ser Ser Ser Thr Ser Ser Ser Phe Gln Val Leu Ala
            260                 265                 270

Asn Gly Ala Thr Ala Ala Ser Lys Pro Leu Gln Pro Leu Gly Cys Val
        275                 280                 285

Pro Gln Ser Val Ser Pro Ser Glu Gln Ala Leu Pro Pro His Leu Glu
    290                 295                 300

Pro Ala Trp Pro Gln Gly Leu Arg His Asn Ser Val Pro Gly Arg Val
305                 310                 315                 320

Gly Pro Thr Glu Tyr Leu Ser Pro Asp Met Gln Arg Gln Arg Lys Thr
                325                 330                 335

Lys Arg Lys Thr Lys Glu Gln Leu Ala Ile Leu Lys Ser Phe Phe Leu
            340                 345                 350

Gln Cys Gln Trp Ala Arg Arg Glu Asp Tyr Gln Lys Leu Glu Gln Ile
        355                 360                 365

Thr Gly Leu Pro Arg Pro Glu Ile Ile Gln Trp Phe Gly Asp Thr Arg
    370                 375                 380

Tyr Ala Leu Lys His Gly Gln Leu Lys Trp Phe Arg Asp Asn Ala Val
385                 390                 395                 400

Pro Gly Ala Pro Ser Phe Gln Asp Pro Ala Ile Pro Thr Pro Pro Pro
                405                 410                 415
```

```
Ser Thr Arg Ser Leu Asn Glu Arg Ala Glu Thr Pro Pro Leu Pro Ile
            420                 425                 430

Pro Pro Pro Pro Pro Asp Ile Gln Pro Leu Glu Arg Tyr Trp Ala Ala
        435                 440                 445

His Gln Gln Leu Arg Glu Thr Asp Ile Pro Gln Leu Ser Gln Ala Ser
    450                 455                 460

Arg Leu Ser Thr Gln Gln Val Leu Asp Trp Phe Asp Ser Arg Leu Pro
465                 470                 475                 480

Gln Pro Ala Glu Val Val Val Cys Leu Asp Glu Glu Glu Glu Glu Glu
                485                 490                 495

Glu Glu Glu Leu Pro Glu Asp Asp Glu Glu Glu Glu Glu Glu Glu Glu
            500                 505                 510

Glu Asp Asp Asp Asp Asp Asp Asp Asp Val Ile Ile Gln Asp
        515                 520                 525
```

<210> 4404
<211> 520
<212> PRT
<213> Homo sapiens

<220>
<223> BAIAP2 (NCBI Accession: NP_006331)

<400> 4404

```
Met Ser Leu Ser Arg Ser Glu Glu Met His Arg Leu Thr Glu Asn Val
1               5                   10                  15

Tyr Lys Thr Ile Met Glu Gln Phe Asn Pro Ser Leu Arg Asn Phe Ile
            20                  25                  30

Ala Met Gly Lys Asn Tyr Glu Lys Ala Leu Ala Gly Val Thr Tyr Ala
        35                  40                  45

Ala Lys Gly Tyr Phe Asp Ala Leu Val Lys Met Gly Glu Leu Ala Ser
    50                  55                  60

Glu Ser Gln Gly Ser Lys Glu Leu Gly Asp Val Leu Phe Gln Met Ala
65                  70                  75                  80

Glu Val His Arg Gln Ile Gln Asn Gln Leu Glu Glu Met Leu Lys Ser
                85                  90                  95

Phe His Asn Glu Leu Leu Thr Gln Leu Glu Gln Lys Val Glu Leu Asp
            100                 105                 110

Ser Arg Tyr Leu Ser Ala Ala Leu Lys Lys Tyr Gln Thr Glu Gln Arg
        115                 120                 125
```

```
Ser Lys Gly Asp Ala Leu Asp Lys Cys Gln Ala Glu Leu Lys Lys Leu
    130                 135                 140

Arg Lys Lys Ser Gln Gly Ser Lys Asn Pro Gln Lys Tyr Ser Asp Lys
145                 150                 155                 160

Glu Leu Gln Tyr Ile Asp Ala Ile Ser Asn Lys Gln Gly Glu Leu Glu
                165                 170                 175

Asn Tyr Val Ser Asp Gly Tyr Lys Thr Ala Leu Thr Glu Glu Arg Arg
            180                 185                 190

Arg Phe Cys Phe Leu Val Glu Lys Gln Cys Ala Val Ala Lys Asn Ser
        195                 200                 205

Ala Ala Tyr His Ser Lys Gly Lys Glu Leu Leu Ala Gln Lys Leu Pro
    210                 215                 220

Leu Trp Gln Gln Ala Cys Ala Asp Pro Ser Lys Ile Pro Glu Arg Ala
225                 230                 235                 240

Val Gln Leu Met Gln Gln Val Ala Ser Asn Gly Ala Thr Leu Pro Ser
                245                 250                 255

Ala Leu Ser Ala Ser Lys Ser Asn Leu Val Ile Ser Asp Pro Ile Pro
            260                 265                 270

Gly Ala Lys Pro Leu Pro Val Pro Pro Glu Leu Ala Pro Phe Val Gly
        275                 280                 285

Arg Met Ser Ala Gln Glu Ser Thr Pro Ile Met Asn Gly Val Thr Gly
    290                 295                 300

Pro Asp Gly Glu Asp Tyr Ser Pro Trp Ala Asp Arg Lys Ala Ala Gln
305                 310                 315                 320

Pro Lys Ser Leu Ser Pro Pro Gln Ser Gln Ser Lys Leu Ser Asp Ser
                325                 330                 335

Tyr Ser Asn Thr Leu Pro Val Arg Lys Ser Val Thr Pro Lys Asn Ser
            340                 345                 350

Tyr Ala Thr Thr Glu Asn Lys Thr Leu Pro Arg Ser Ser Ser Met Ala
        355                 360                 365

Ala Gly Leu Glu Arg Asn Gly Arg Met Arg Val Lys Ala Ile Phe Ser
    370                 375                 380

His Ala Ala Gly Asp Asn Ser Thr Leu Leu Ser Phe Lys Glu Gly Asp
385                 390                 395                 400

Leu Ile Thr Leu Leu Val Pro Glu Ala Arg Asp Gly Trp His Tyr Gly
                405                 410                 415
```

```
Glu Ser Glu Lys Thr Lys Met Arg Gly Trp Phe Pro Phe Ser Tyr Thr
            420                 425                 430

Arg Val Leu Asp Ser Asp Gly Ser Asp Arg Leu His Met Ser Leu Gln
        435                 440                 445

Gln Gly Lys Ser Ser Ser Thr Gly Asn Leu Leu Asp Lys Asp Asp Leu
    450                 455                 460

Ala Ile Pro Pro Pro Asp Tyr Gly Ala Ala Ser Arg Ala Phe Pro Ala
465                 470                 475                 480

Gln Thr Ala Ser Gly Phe Lys Gln Arg Pro Tyr Ser Val Ala Val Pro
                485                 490                 495

Ala Phe Ser Gln Gly Leu Asp Asp Tyr Gly Ala Arg Ser Met Ser Ser
            500                 505                 510

Ala Asp Val Glu Val Ala Arg Phe
        515                 520
```

<210> 4405
<211> 469
<212> PRT
<213> Homo sapiens

<220>
<223> RUFY3 (NCBI Accession: NP_055776)

<400> 4405

```
Met Ser Ala Leu Thr Pro Pro Thr Asp Met Pro Thr Pro Thr Thr Asp
1               5                   10                  15

Lys Ile Thr Gln Ala Ala Met Glu Thr Ile Tyr Leu Cys Lys Phe Arg
            20                  25                  30

Val Ser Met Asp Gly Glu Trp Leu Cys Leu Arg Glu Leu Asp Asp Ile
        35                  40                  45

Ser Leu Thr Pro Asp Pro Glu Pro Thr His Glu Asp Pro Asn Tyr Leu
    50                  55                  60

Met Ala Asn Glu Arg Met Asn Leu Met Asn Met Ala Lys Leu Ser Ile
65                  70                  75                  80

Lys Gly Leu Ile Glu Ser Ala Leu Asn Leu Gly Arg Thr Leu Asp Ser
                85                  90                  95

Asp Tyr Ala Pro Leu Gln Gln Phe Phe Val Val Met Glu His Cys Leu
            100                 105                 110

Lys His Gly Leu Lys Ala Lys Lys Thr Phe Leu Gly Gln Asn Lys Ser
        115                 120                 125
```

```
Phe Trp Gly Pro Leu Glu Leu Val Glu Lys Leu Val Pro Glu Ala Ala
    130                 135                 140

Glu Ile Thr Ala Ser Val Lys Asp Leu Pro Gly Leu Lys Thr Pro Val
145                 150                 155                 160

Gly Arg Gly Arg Ala Trp Leu Arg Leu Ala Leu Met Gln Lys Lys Leu
                165                 170                 175

Ser Glu Tyr Met Lys Ala Leu Ile Asn Lys Lys Glu Leu Leu Ser Glu
            180                 185                 190

Phe Tyr Glu Pro Asn Ala Leu Met Met Glu Glu Glu Gly Ala Ile Ile
        195                 200                 205

Ala Gly Leu Leu Val Gly Leu Asn Val Ile Asp Ala Asn Phe Cys Met
    210                 215                 220

Lys Gly Glu Asp Leu Asp Ser Gln Val Gly Val Ile Asp Phe Ser Met
225                 230                 235                 240

Tyr Leu Lys Asp Gly Asn Ser Ser Lys Gly Thr Glu Gly Asp Gly Gln
                245                 250                 255

Ile Thr Ala Ile Leu Asp Gln Lys Asn Tyr Val Glu Glu Leu Asn Arg
            260                 265                 270

His Leu Asn Ala Thr Val Asn Asn Leu Gln Ala Lys Val Asp Ala Leu
        275                 280                 285

Glu Lys Ser Asn Thr Lys Leu Thr Glu Glu Leu Ala Val Ala Asn Asn
    290                 295                 300

Arg Ile Ile Thr Leu Gln Glu Glu Met Glu Arg Val Lys Glu Glu Ser
305                 310                 315                 320

Ser Tyr Ile Leu Glu Ser Asn Arg Lys Gly Pro Lys Gln Asp Arg Thr
                325                 330                 335

Ala Glu Gly Gln Ala Leu Ser Glu Ala Arg Lys His Leu Lys Glu Glu
            340                 345                 350

Thr Gln Leu Arg Leu Asp Val Glu Lys Glu Leu Glu Met Gln Ile Ser
        355                 360                 365

Met Arg Gln Glu Met Glu Leu Ala Met Lys Met Leu Glu Lys Asp Val
    370                 375                 380

Cys Glu Lys Gln Asp Ala Leu Val Ser Leu Arg Gln Gln Leu Asp Asp
385                 390                 395                 400

Leu Arg Ala Leu Lys His Glu Leu Ala Phe Lys Leu Gln Ser Ser Asp
                405                 410                 415
```

Leu Gly Val Lys Gln Lys Ser Glu Leu Asn Ser Arg Leu Glu Glu Lys
            420   425   430

Thr Asn Gln Met Ala Ala Thr Ile Lys Gln Leu Glu Gln Ser Glu Lys
        435   440   445

Asp Leu Val Lys Gln Ala Lys Thr Leu Asn Ser Ala Ala Asn Lys Leu
    450   455   460

Ile Pro Lys His His
465

<210> 4406
<211> 402
<212> PRT
<213> Homo sapiens

<220>
<223> LHX5 (NCBI Accession: NP_071758)

<400> 4406
Met Met Val His Cys Ala Gly Cys Glu Arg Pro Ile Leu Asp Arg Phe
1   5   10   15

Leu Leu Asn Val Leu Asp Arg Ala Trp His Ile Lys Cys Val Gln Cys
            20   25   30

Cys Glu Cys Lys Thr Asn Leu Ser Glu Lys Cys Phe Ser Arg Glu Gly
        35   40   45

Lys Leu Tyr Cys Lys Asn Asp Phe Phe Arg Arg Phe Gly Thr Lys Cys
    50   55   60

Ala Gly Cys Ala Gln Gly Ile Ser Pro Ser Asp Leu Val Arg Lys Ala
65   70   75   80

Arg Ser Lys Val Phe His Leu Asn Cys Phe Thr Cys Met Val Cys Asn
                85   90   95

Lys Gln Leu Ser Thr Gly Glu Glu Leu Tyr Val Ile Asp Glu Asn Lys
            100   105   110

Phe Val Cys Lys Asp Asp Tyr Leu Ser Ser Ser Ser Leu Lys Glu Gly
        115   120   125

Ser Leu Asn Ser Val Ser Ser Cys Thr Asp Arg Ser Leu Ser Pro Asp
    130   135   140

Leu Gln Asp Ala Leu Gln Asp Asp Pro Lys Glu Thr Asp Asn Ser Thr
145   150   155   160

Ser Ser Asp Lys Glu Thr Ala Asn Asn Glu Asn Glu Glu Gln Asn Ser
                165   170   175

```
Gly Thr Lys Arg Arg Gly Pro Arg Thr Thr Ile Lys Ala Lys Gln Leu
            180                 185                 190

Glu Thr Leu Lys Ala Ala Phe Ala Ala Thr Pro Lys Pro Thr Arg His
        195                 200                 205

Ile Arg Glu Gln Leu Ala Gln Glu Thr Gly Leu Asn Met Arg Val Ile
    210                 215                 220

Gln Val Trp Phe Gln Asn Arg Arg Ser Lys Glu Arg Arg Met Lys Gln
225                 230                 235                 240

Leu Ser Ala Leu Gly Ala Arg Arg His Ala Phe Phe Arg Ser Pro Arg
                245                 250                 255

Arg Met Arg Pro Leu Gly Gly Arg Leu Asp Glu Ser Glu Met Leu Gly
            260                 265                 270

Ser Thr Pro Tyr Thr Tyr Tyr Gly Asp Tyr Gln Gly Asp Tyr Tyr Ala
        275                 280                 285

Pro Gly Ser Asn Tyr Asp Phe Phe Ala His Gly Pro Pro Ser Gln Ala
    290                 295                 300

Gln Ser Pro Ala Asp Ser Ser Phe Leu Ala Ala Ser Gly Pro Gly Ser
305                 310                 315                 320

Thr Pro Leu Gly Ala Leu Glu Pro Pro Leu Ala Gly Pro His Ala Ala
                325                 330                 335

Asp Asn Pro Arg Phe Thr Asp Met Ile Ser His Pro Asp Thr Pro Ser
            340                 345                 350

Pro Glu Pro Gly Leu Pro Gly Thr Leu His Pro Met Pro Gly Glu Val
        355                 360                 365

Phe Ser Gly Gly Pro Ser Pro Pro Phe Pro Met Ser Gly Thr Ser Gly
    370                 375                 380

Tyr Ser Gly Pro Leu Ser His Pro Asn Pro Glu Leu Asn Glu Ala Ala
385                 390                 395                 400

Val Trp


<210> 4407
<211> 217
<212> PRT
<213> Homo sapiens

<220>
<223> GRB2 (NCBI Accession: NP_002077)
```

<400> 4407
Met Glu Ala Ile Ala Lys Tyr Asp Phe Lys Ala Thr Ala Asp Asp Glu
1   5   10   15

Leu Ser Phe Lys Arg Gly Asp Ile Leu Lys Val Leu Asn Glu Glu Cys
            20   25   30

Asp Gln Asn Trp Tyr Lys Ala Glu Leu Asn Gly Lys Asp Gly Phe Ile
        35   40   45

Pro Lys Asn Tyr Ile Glu Met Lys Pro His Pro Trp Phe Phe Gly Lys
    50   55   60

Ile Pro Arg Ala Lys Ala Glu Glu Met Leu Ser Lys Gln Arg His Asp
65   70   75   80

Gly Ala Phe Leu Ile Arg Glu Ser Glu Ser Ala Pro Gly Asp Phe Ser
                85   90   95

Leu Ser Val Lys Phe Gly Asn Asp Val Gln His Phe Lys Val Leu Arg
            100   105   110

Asp Gly Ala Gly Lys Tyr Phe Leu Trp Val Val Lys Phe Asn Ser Leu
        115   120   125

Asn Glu Leu Val Asp Tyr His Arg Ser Thr Ser Val Ser Arg Asn Gln
    130   135   140

Gln Ile Phe Leu Arg Asp Ile Glu Gln Val Pro Gln Gln Pro Thr Tyr
145   150   155   160

Val Gln Ala Leu Phe Asp Phe Asp Pro Gln Glu Asp Gly Glu Leu Gly
                165   170   175

Phe Arg Arg Gly Asp Phe Ile His Val Met Asp Asn Ser Asp Pro Asn
            180   185   190

Trp Trp Lys Gly Ala Cys His Gly Gln Thr Gly Met Phe Pro Arg Asn
        195   200   205

Tyr Val Thr Pro Val Asn Arg Asn Val
    210   215

<210> 4408
<211> 497
<212> PRT
<213> Homo sapiens

<220>
<223> TH (NCBI Accession: NP_000351)

<400> 4408
Met Pro Thr Pro Asp Ala Thr Thr Pro Gln Ala Lys Gly Phe Arg Arg
1   5   10   15

```
Ala Val Ser Glu Leu Asp Ala Lys Gln Ala Glu Ala Ile Met Ser Pro
            20                  25                  30

Arg Phe Ile Gly Arg Arg Gln Ser Leu Ile Glu Asp Ala Arg Lys Glu
        35                  40                  45

Arg Glu Ala Ala Val Ala Ala Ala Ala Ala Ala Val Pro Ser Glu Pro
    50                  55                  60

Gly Asp Pro Leu Glu Ala Val Ala Phe Glu Glu Lys Glu Gly Lys Ala
65                  70                  75                  80

Met Leu Asn Leu Leu Phe Ser Pro Arg Ala Thr Lys Pro Ser Ala Leu
                85                  90                  95

Ser Arg Ala Val Lys Val Phe Glu Thr Phe Glu Ala Lys Ile His His
            100                 105                 110

Leu Glu Thr Arg Pro Ala Gln Arg Pro Arg Ala Gly Gly Pro His Leu
        115                 120                 125

Glu Tyr Phe Val Arg Leu Glu Val Arg Arg Gly Asp Leu Ala Ala Leu
    130                 135                 140

Leu Ser Gly Val Arg Gln Val Ser Glu Asp Val Arg Ser Pro Ala Gly
145                 150                 155                 160

Pro Lys Val Pro Trp Phe Pro Arg Lys Val Ser Glu Leu Asp Lys Cys
                165                 170                 175

His His Leu Val Thr Lys Phe Asp Pro Asp Leu Asp Leu Asp His Pro
            180                 185                 190

Gly Phe Ser Asp Gln Val Tyr Arg Gln Arg Arg Lys Leu Ile Ala Glu
        195                 200                 205

Ile Ala Phe Gln Tyr Arg His Gly Asp Pro Ile Pro Arg Val Glu Tyr
    210                 215                 220

Thr Ala Glu Glu Ile Ala Thr Trp Lys Glu Val Tyr Thr Thr Leu Lys
225                 230                 235                 240

Gly Leu Tyr Ala Thr His Ala Cys Gly Glu His Leu Glu Ala Phe Ala
                245                 250                 255

Leu Leu Glu Arg Phe Ser Gly Tyr Arg Glu Asp Asn Ile Pro Gln Leu
            260                 265                 270

Glu Asp Val Ser Arg Phe Leu Lys Glu Arg Thr Gly Phe Gln Leu Arg
        275                 280                 285

Pro Val Ala Gly Leu Leu Ser Ala Arg Asp Phe Leu Ala Ser Leu Ala
    290                 295                 300
```

```
Phe Arg Val Phe Gln Cys Thr Gln Tyr Ile Arg His Ala Ser Ser Pro
305                 310                 315                 320

Met His Ser Pro Glu Pro Asp Cys Cys His Glu Leu Leu Gly His Val
                325                 330                 335

Pro Met Leu Ala Asp Arg Thr Phe Ala Gln Phe Ser Gln Asp Ile Gly
            340                 345                 350

Leu Ala Ser Leu Gly Ala Ser Asp Glu Glu Ile Glu Lys Leu Ser Thr
        355                 360                 365

Leu Tyr Trp Phe Thr Val Glu Phe Gly Leu Cys Lys Gln Asn Gly Glu
    370                 375                 380

Val Lys Ala Tyr Gly Ala Gly Leu Leu Ser Ser Tyr Gly Glu Leu Leu
385                 390                 395                 400

His Cys Leu Ser Glu Glu Pro Glu Ile Arg Ala Phe Asp Pro Glu Ala
                405                 410                 415

Ala Ala Val Gln Pro Tyr Gln Asp Gln Thr Tyr Gln Ser Val Tyr Phe
            420                 425                 430

Val Ser Glu Ser Phe Ser Asp Ala Lys Asp Lys Leu Arg Ser Tyr Ala
        435                 440                 445

Ser Arg Ile Gln Arg Pro Phe Ser Val Lys Phe Asp Pro Tyr Thr Leu
    450                 455                 460

Ala Ile Asp Val Leu Asp Ser Pro Gln Ala Val Arg Arg Ser Leu Glu
465                 470                 475                 480

Gly Val Gln Asp Glu Leu Asp Thr Leu Ala His Ala Leu Ser Ala Ile
                485                 490                 495

Gly
```

<210> 4409
<211> 367
<212> PRT
<213> Homo sapiens

<220>
<223> LRRC28 (NCBI Accession: NP_653199)

<400> 4409

```
Met Ala Ser Glu Leu Cys Lys Thr Ile Ser Val Ala Arg Leu Glu Lys
1               5                   10                  15

His Lys Asn Leu Phe Leu Asn Tyr Arg Asn Leu His His Phe Pro Leu
            20                  25                  30
```

```
Glu Leu Leu Lys Asp Glu Gly Leu Gln Tyr Leu Glu Arg Leu Tyr Met
        35                  40                  45

Lys Arg Asn Ser Leu Thr Ser Leu Pro Glu Asn Leu Ala Gln Lys Leu
    50                  55                  60

Pro Asn Leu Val Glu Leu Tyr Leu His Ser Asn Asn Ile Val Val Val
65                  70                  75                  80

Pro Glu Ala Ile Gly Ser Leu Val Lys Leu Gln Cys Leu Asp Leu Ser
                85                  90                  95

Asp Asn Ala Leu Glu Ile Val Cys Pro Glu Ile Gly Arg Leu Arg Ala
            100                 105                 110

Leu Arg His Leu Arg Leu Ala Asn Asn Gln Leu Gln Phe Leu Pro Pro
        115                 120                 125

Glu Val Gly Asp Leu Lys Glu Leu Gln Thr Leu Asp Ile Ser Thr Asn
    130                 135                 140

Arg Leu Leu Thr Leu Pro Glu Arg Leu His Met Cys Leu Ser Leu Gln
145                 150                 155                 160

Tyr Leu Thr Val Asp Arg Asn Arg Leu Trp Tyr Val Pro Arg His Leu
                165                 170                 175

Cys Gln Leu Pro Ser Leu Asn Glu Leu Ser Met Ala Gly Asn Arg Leu
            180                 185                 190

Ala Phe Leu Pro Leu Asp Leu Gly Arg Ser Arg Glu Leu Gln Tyr Val
        195                 200                 205

Tyr Val Asp Asn Asn Ile His Leu Lys Gly Leu Pro Ser Tyr Leu Tyr
    210                 215                 220

Asn Lys Val Ile Gly Cys Ser Gly Cys Gly Ala Pro Ile Gln Val Ser
225                 230                 235                 240

Glu Val Lys Leu Leu Ser Phe Ser Ser Gly Gln Arg Thr Val Phe Leu
                245                 250                 255

Pro Ala Glu Val Lys Ala Ile Gly Thr Glu His Asp His Val Leu Pro
            260                 265                 270

Leu Gln Glu Leu Ala Met Arg Gly Leu Tyr His Thr Tyr His Ser Leu
        275                 280                 285

Leu Lys Asp Leu Asn Phe Leu Ser Pro Ile Ser Leu Pro Arg Ser Leu
    290                 295                 300

Leu Glu Leu Leu His Cys Pro Leu Gly His Cys His Arg Cys Ser Glu
305                 310                 315                 320
```

Pro Met Phe Thr Ile Val Tyr Pro Lys Leu Phe Pro Leu Arg Glu Thr
325 330 335

Pro Met Ala Gly Leu His Gln Trp Lys Thr Thr Val Ser Phe Val Ala
340 345 350

Tyr Cys Cys Ser Thr Gln Cys Leu Gln Thr Phe Asp Leu Leu Ser
355 360 365

<210> 4410
<211> 139
<212> PRT
<213> Homo sapiens

<220>
<223> SPATA33 (NCBI Accession: NP_694570)

<400> 4410
Met Val Thr His Ala Ala Gly Ala Arg Thr Phe Cys Glu Glu Gln Lys
1 5 10 15

Lys Gly Ser Thr Tyr Ser Val Pro Lys Ser Lys Glu Lys Leu Met Glu
20 25 30

Lys His Ser Gln Glu Ala Arg Gln Ala Asp Arg Glu Ser Glu Lys Pro
35 40 45

Val Asp Ser Leu His Pro Gly Ala Gly Thr Ala Lys His Pro Pro Pro
50 55 60

Ala Ala Ser Leu Glu Glu Lys Pro Asp Val Lys Gln Lys Ser Ser Arg
65 70 75 80

Lys Lys Val Val Val Pro Gln Ile Ile Ile Thr Arg Ala Ser Asn Glu
85 90 95

Thr Leu Val Ser Cys Ser Ser Ser Gly Ser Asp Gln Gln Arg Thr Ile
100 105 110

Arg Glu Pro Glu Asp Trp Gly Pro Tyr Arg Arg His Arg Asn Pro Ser
115 120 125

Thr Ala Asp Ala Tyr Asn Ser His Leu Lys Glu
130 135

<210> 4411
<211> 939
<212> PRT
<213> Homo sapiens

<220>
<223> ATP2C1 (NCBI Accession: NP_001001485)

<400> 4411
Met Lys Val Ala Arg Phe Gln Lys Ile Pro Asn Gly Glu Asn Glu Thr
1   5   10   15

Met Ile Pro Val Leu Thr Ser Lys Lys Ala Ser Glu Leu Pro Val Ser
            20   25   30

Glu Val Ala Ser Ile Leu Gln Ala Asp Leu Gln Asn Gly Leu Asn Lys
        35   40   45

Cys Glu Val Ser His Arg Arg Ala Phe His Gly Trp Asn Glu Phe Asp
    50   55   60

Ile Ser Glu Asp Glu Pro Leu Trp Lys Lys Tyr Ile Ser Gln Phe Lys
65   70   75   80

Asn Pro Leu Ile Met Leu Leu Leu Ala Ser Ala Val Ile Ser Val Leu
                85   90   95

Met His Gln Phe Asp Asp Ala Val Ser Ile Thr Val Ala Ile Leu Ile
            100   105   110

Val Val Thr Val Ala Phe Val Gln Glu Tyr Arg Ser Glu Lys Ser Leu
        115   120   125

Glu Glu Leu Ser Lys Leu Val Pro Pro Glu Cys His Cys Val Arg Glu
    130   135   140

Gly Lys Leu Glu His Thr Leu Ala Arg Asp Leu Val Pro Gly Asp Thr
145   150   155   160

Val Cys Leu Ser Val Gly Asp Arg Val Pro Ala Asp Leu Arg Leu Phe
                165   170   175

Glu Ala Val Asp Leu Ser Ile Asp Glu Ser Ser Leu Thr Gly Glu Thr
            180   185   190

Thr Pro Cys Ser Lys Val Thr Ala Pro Gln Pro Ala Ala Thr Asn Gly
        195   200   205

Asp Leu Ala Ser Arg Ser Asn Ile Ala Phe Met Gly Thr Leu Val Arg
    210   215   220

Cys Gly Lys Ala Lys Gly Val Val Ile Gly Thr Gly Glu Asn Ser Glu
225   230   235   240

Phe Gly Glu Val Phe Lys Met Met Gln Ala Glu Glu Ala Pro Lys Thr
                245   250   255

Pro Leu Gln Lys Ser Met Asp Leu Leu Gly Lys Gln Leu Ser Phe Tyr
            260   265   270

Ser Phe Gly Ile Ile Gly Ile Ile Met Leu Val Gly Trp Leu Leu Gly
        275   280   285

```
Lys Asp Ile Leu Glu Met Phe Thr Ile Ser Val Ser Leu Ala Val Ala
    290                 295                 300

Ala Ile Pro Glu Gly Leu Pro Ile Val Val Thr Val Thr Leu Ala Leu
305                 310                 315                 320

Gly Val Met Arg Met Val Lys Lys Arg Ala Ile Val Lys Lys Leu Pro
                325                 330                 335

Ile Val Glu Thr Leu Gly Cys Cys Asn Val Ile Cys Ser Asp Lys Thr
            340                 345                 350

Gly Thr Leu Thr Lys Asn Glu Met Thr Val Thr His Ile Phe Thr Ser
        355                 360                 365

Asp Gly Leu His Ala Glu Val Thr Gly Val Gly Tyr Asn Gln Phe Gly
    370                 375                 380

Glu Val Ile Val Asp Gly Asp Val Val His Gly Phe Tyr Asn Pro Ala
385                 390                 395                 400

Val Ser Arg Ile Val Glu Ala Gly Cys Val Cys Asn Asp Ala Val Ile
                405                 410                 415

Arg Asn Asn Thr Leu Met Gly Lys Pro Thr Glu Gly Ala Leu Ile Ala
            420                 425                 430

Leu Ala Met Lys Met Gly Leu Asp Gly Leu Gln Gln Asp Tyr Ile Arg
        435                 440                 445

Lys Ala Glu Tyr Pro Phe Ser Ser Glu Gln Lys Trp Met Ala Val Lys
    450                 455                 460

Cys Val His Arg Thr Gln Gln Asp Arg Pro Glu Ile Cys Phe Met Lys
465                 470                 475                 480

Gly Ala Tyr Glu Gln Val Ile Lys Tyr Cys Thr Thr Tyr Gln Ser Lys
                485                 490                 495

Gly Gln Thr Leu Thr Leu Thr Gln Gln Gln Arg Asp Val Tyr Gln Gln
            500                 505                 510

Glu Lys Ala Arg Met Gly Ser Ala Gly Leu Arg Val Leu Ala Leu Ala
        515                 520                 525

Ser Gly Pro Glu Leu Gly Gln Leu Thr Phe Leu Gly Leu Val Gly Ile
    530                 535                 540

Ile Asp Pro Pro Arg Thr Gly Val Lys Glu Ala Val Thr Thr Leu Ile
545                 550                 555                 560

Ala Ser Gly Val Ser Ile Lys Met Ile Thr Gly Asp Ser Gln Glu Thr
                565                 570                 575
```

```
Ala Val Ala Ile Ala Ser Arg Leu Gly Leu Tyr Ser Lys Thr Ser Gln
            580                 585                 590

Ser Val Ser Gly Glu Glu Ile Asp Ala Met Asp Val Gln Gln Leu Ser
        595                 600                 605

Gln Ile Val Pro Lys Val Ala Val Phe Tyr Arg Ala Ser Pro Arg His
    610                 615                 620

Lys Met Lys Ile Ile Lys Ser Leu Gln Lys Asn Gly Ser Val Val Ala
625                 630                 635                 640

Met Thr Gly Asp Gly Val Asn Asp Ala Val Ala Leu Lys Ala Ala Asp
                645                 650                 655

Ile Gly Val Ala Met Gly Gln Thr Gly Thr Asp Val Cys Lys Glu Ala
            660                 665                 670

Ala Asp Met Ile Leu Val Asp Asp Asp Phe Gln Thr Ile Met Ser Ala
        675                 680                 685

Ile Glu Glu Gly Lys Gly Ile Tyr Asn Asn Ile Lys Asn Phe Val Arg
    690                 695                 700

Phe Gln Leu Ser Thr Ser Ile Ala Ala Leu Thr Leu Ile Ser Leu Ala
705                 710                 715                 720

Thr Leu Met Asn Phe Pro Asn Pro Leu Asn Ala Met Gln Ile Leu Trp
                725                 730                 735

Ile Asn Ile Ile Met Asp Gly Pro Pro Ala Gln Ser Leu Gly Val Glu
            740                 745                 750

Pro Val Asp Lys Asp Val Ile Arg Lys Pro Pro Arg Asn Trp Lys Asp
        755                 760                 765

Ser Ile Leu Thr Lys Asn Leu Ile Leu Lys Ile Leu Val Ser Ser Ile
    770                 775                 780

Ile Ile Val Cys Gly Thr Leu Phe Val Phe Trp Arg Glu Leu Arg Asp
785                 790                 795                 800

Asn Val Ile Thr Pro Arg Asp Thr Thr Met Thr Phe Thr Cys Phe Val
                805                 810                 815

Phe Phe Asp Met Phe Asn Ala Leu Ser Ser Arg Ser Gln Thr Lys Ser
            820                 825                 830

Val Phe Glu Ile Gly Leu Cys Ser Asn Arg Met Phe Cys Tyr Ala Val
        835                 840                 845

Leu Gly Ser Ile Met Gly Gln Leu Leu Val Ile Tyr Phe Pro Pro Leu
    850                 855                 860
```

```
Gln Lys Val Phe Gln Thr Glu Ser Leu Ser Ile Leu Asp Leu Leu Phe
865                 870                 875                 880

Leu Leu Gly Leu Thr Ser Ser Val Cys Ile Val Ala Glu Ile Ile Lys
                885                 890                 895

Lys Val Glu Arg Ser Arg Glu Lys Ile Gln Lys His Val Trp Leu Trp
            900                 905                 910

Glu Arg Ser Gly Gln Gln Leu Val Glu Ile His Pro His Leu Glu Thr
        915                 920                 925

Gly Leu Pro Leu Thr Glu Asp Val Ser Cys Val
    930                 935

<210> 4412
<211> 1034
<212> PRT
<213> Homo sapiens

<220>
<223> TSHZ2 (NCBI Accession: NP_775756)

<400> 4412
Met Pro Arg Arg Lys Gln Gln Ala Pro Lys Arg Ala Ala Gly Tyr Ala
1               5                   10                  15

Gln Glu Glu Gln Leu Lys Glu Glu Glu Glu Ile Lys Glu Glu Glu Glu
            20                  25                  30

Glu Glu Asp Ser Gly Ser Val Ala Gln Leu Gln Gly Gly Asn Asp Thr
        35                  40                  45

Gly Thr Asp Glu Glu Leu Glu Thr Gly Pro Glu Gln Lys Gly Cys Phe
    50                  55                  60

Ser Tyr Gln Asn Ser Pro Gly Ser His Leu Ser Asn Gln Asp Ala Glu
65                  70                  75                  80

Asn Glu Ser Leu Leu Ser Asp Ala Ser Asp Gln Val Ser Asp Ile Lys
                85                  90                  95

Ser Val Cys Gly Arg Asp Ala Ser Asp Lys Lys Ala His Thr His Val
            100                 105                 110

Arg Leu Pro Asn Glu Ala His Asn Cys Met Asp Lys Met Thr Ala Val
        115                 120                 125

Tyr Ala Asn Ile Leu Ser Asp Ser Tyr Trp Ser Gly Leu Gly Leu Gly
    130                 135                 140

Phe Lys Leu Ser Asn Ser Glu Arg Arg Asn Cys Asp Thr Arg Asn Gly
145                 150                 155                 160
```

```
Ser Asn Lys Ser Asp Phe Asp Trp His Gln Asp Ala Leu Ser Lys Ser
                165                 170                 175

Leu Gln Gln Asn Leu Pro Ser Arg Ser Val Ser Lys Pro Ser Leu Phe
            180                 185                 190

Ser Ser Val Gln Leu Tyr Arg Gln Ser Ser Lys Met Cys Gly Thr Val
        195                 200                 205

Phe Thr Gly Ala Ser Arg Phe Arg Cys Arg Gln Cys Ser Ala Ala Tyr
    210                 215                 220

Asp Thr Leu Val Glu Leu Thr Val His Met Asn Glu Thr Gly His Tyr
225                 230                 235                 240

Gln Asp Asp Asn Arg Lys Lys Asp Lys Leu Arg Pro Thr Ser Tyr Ser
                245                 250                 255

Lys Pro Arg Lys Arg Ala Phe Gln Asp Met Asp Lys Glu Asp Ala Gln
            260                 265                 270

Lys Val Leu Lys Cys Met Phe Cys Gly Asp Ser Phe Asp Ser Leu Gln
        275                 280                 285

Asp Leu Ser Val His Met Ile Lys Thr Lys His Tyr Gln Lys Val Pro
    290                 295                 300

Leu Lys Glu Pro Val Pro Thr Ile Ser Ser Lys Met Val Thr Pro Ala
305                 310                 315                 320

Lys Lys Arg Val Phe Asp Val Asn Arg Pro Cys Ser Pro Asp Ser Thr
                325                 330                 335

Thr Gly Ser Phe Ala Asp Ser Phe Ser Ser Gln Lys Asn Ala Asn Leu
            340                 345                 350

Gln Leu Ser Ser Asn Asn Arg Tyr Gly Tyr Gln Asn Gly Ala Ser Tyr
        355                 360                 365

Thr Trp Gln Phe Glu Ala Cys Lys Ser Gln Ile Leu Lys Cys Met Glu
    370                 375                 380

Cys Gly Ser Ser His Asp Thr Leu Gln Gln Leu Thr Thr His Met Met
385                 390                 395                 400

Val Thr Gly His Phe Leu Lys Val Thr Ser Ser Ala Ser Lys Lys Gly
                405                 410                 415

Lys Gln Leu Val Leu Asp Pro Leu Ala Val Glu Lys Met Gln Ser Leu
            420                 425                 430

Ser Glu Ala Pro Asn Ser Asp Ser Leu Ala Pro Lys Pro Ser Ser Asn
        435                 440                 445
```

```
Ser Ala Ser Asp Cys Thr Ala Ser Thr Thr Glu Leu Lys Lys Glu Ser
    450                 455                 460

Lys Lys Glu Arg Pro Glu Glu Thr Ser Lys Asp Glu Lys Val Val Lys
465                 470                 475                 480

Ser Glu Asp Tyr Glu Asp Pro Leu Gln Lys Pro Leu Asp Pro Thr Ile
                485                 490                 495

Lys Tyr Gln Tyr Leu Arg Glu Glu Asp Leu Glu Asp Gly Ser Lys Gly
            500                 505                 510

Gly Gly Asp Ile Leu Lys Ser Leu Glu Asn Thr Val Thr Thr Ala Ile
        515                 520                 525

Asn Lys Ala Gln Asn Gly Ala Pro Ser Trp Ser Ala Tyr Pro Ser Ile
    530                 535                 540

His Ala Ala Tyr Gln Leu Ser Glu Gly Thr Lys Pro Pro Leu Pro Met
545                 550                 555                 560

Gly Ser Gln Val Leu Gln Ile Arg Pro Asn Leu Thr Asn Lys Leu Arg
                565                 570                 575

Pro Ile Ala Pro Lys Trp Lys Val Met Pro Leu Val Ser Met Pro Thr
            580                 585                 590

His Leu Ala Pro Tyr Thr Gln Val Lys Lys Glu Ser Glu Asp Lys Asp
        595                 600                 605

Glu Ala Val Lys Glu Cys Gly Lys Glu Ser Pro His Glu Glu Ala Ser
    610                 615                 620

Ser Phe Ser His Ser Glu Gly Asp Ser Phe Arg Lys Ser Glu Thr Pro
625                 630                 635                 640

Pro Glu Ala Lys Lys Thr Glu Leu Gly Pro Leu Lys Glu Glu Glu Lys
                645                 650                 655

Leu Met Lys Glu Gly Ser Glu Lys Glu Lys Pro Gln Pro Leu Glu Pro
            660                 665                 670

Thr Ser Ala Leu Ser Asn Gly Cys Ala Leu Ala Asn His Ala Pro Ala
        675                 680                 685

Leu Pro Cys Ile Asn Pro Leu Ser Ala Leu Gln Ser Val Leu Asn Asn
    690                 695                 700

His Leu Gly Lys Ala Thr Glu Pro Leu Arg Ser Pro Ser Cys Ser Ser
705                 710                 715                 720

Pro Ser Ser Ser Thr Ile Ser Met Phe His Lys Ser Asn Leu Asn Val
                725                 730                 735
```

```
Met Asp Lys Pro Val Leu Ser Pro Ala Ser Thr Arg Ser Ala Ser Val
            740                 745                 750

Ser Arg Arg Tyr Leu Phe Glu Asn Ser Asp Gln Pro Ile Asp Leu Thr
        755                 760                 765

Lys Ser Lys Ser Lys Lys Ala Glu Ser Ser Gln Ala Gln Ser Cys Met
    770                 775                 780

Ser Pro Pro Gln Lys His Ala Leu Ser Asp Ile Ala Asp Met Val Lys
785                 790                 795                 800

Val Leu Pro Lys Ala Thr Thr Pro Lys Pro Ala Ser Ser Ser Arg Val
                805                 810                 815

Pro Pro Met Lys Leu Glu Met Asp Val Arg Arg Phe Glu Asp Val Ser
            820                 825                 830

Ser Glu Val Ser Thr Leu His Lys Arg Lys Gly Arg Gln Ser Asn Trp
        835                 840                 845

Asn Pro Gln His Leu Leu Ile Leu Gln Ala Gln Phe Ala Ser Ser Leu
    850                 855                 860

Phe Gln Thr Ser Glu Gly Lys Tyr Leu Leu Ser Asp Leu Gly Pro Gln
865                 870                 875                 880

Glu Arg Met Gln Ile Ser Lys Phe Thr Gly Leu Ser Met Thr Thr Ile
                885                 890                 895

Ser His Trp Leu Ala Asn Val Lys Tyr Gln Leu Arg Lys Thr Gly Gly
            900                 905                 910

Thr Lys Phe Leu Lys Asn Met Asp Lys Gly His Pro Ile Phe Tyr Cys
        915                 920                 925

Ser Asp Cys Ala Ser Gln Phe Arg Thr Pro Ser Thr Tyr Ile Ser His
    930                 935                 940

Leu Glu Ser His Leu Gly Phe Gln Met Lys Asp Met Thr Arg Leu Ser
945                 950                 955                 960

Val Asp Gln Gln Ser Lys Val Glu Gln Glu Ile Ser Arg Val Ser Ser
                965                 970                 975

Ala Gln Arg Ser Pro Glu Thr Ile Ala Ala Glu Glu Asp Thr Asp Ser
            980                 985                 990

Lys Phe Lys Cys Lys Leu Cys Cys Arg Thr Phe Val Ser Lys His Ala
        995                 1000                1005

Val Lys Leu His Leu Ser Lys Thr His Ser Lys Ser Pro Glu His His
    1010                1015                1020
```

Ser Gln Phe Val Thr Asp Val Asp Glu Glu
1025 1030

<210> 4413
<211> 252
<212> PRT
<213> Homo sapiens

<220>
<223> C4BPB (NCBI Accession: NP_000707)

<400> 4413
Met Phe Phe Trp Cys Ala Cys Cys Leu Met Val Ala Trp Arg Val Ser
1 5 10 15

Ala Ser Asp Ala Glu His Cys Pro Glu Leu Pro Pro Val Asp Asn Ser
20 25 30

Ile Phe Val Ala Lys Glu Val Glu Gly Gln Ile Leu Gly Thr Tyr Val
35 40 45

Cys Ile Lys Gly Tyr His Leu Val Gly Lys Lys Thr Leu Phe Cys Asn
50 55 60

Ala Ser Lys Glu Trp Asp Asn Thr Thr Thr Glu Cys Arg Leu Gly His
65 70 75 80

Cys Pro Asp Pro Val Leu Val Asn Gly Glu Phe Ser Ser Ser Gly Pro
85 90 95

Val Asn Val Ser Asp Lys Ile Thr Phe Met Cys Asn Asp His Tyr Ile
100 105 110

Leu Lys Gly Ser Asn Arg Ser Gln Cys Leu Glu Asp His Thr Trp Ala
115 120 125

Pro Pro Phe Pro Ile Cys Lys Ser Arg Asp Cys Asp Pro Pro Gly Asn
130 135 140

Pro Val His Gly Tyr Phe Glu Gly Asn Asn Phe Thr Leu Gly Ser Thr
145 150 155 160

Ile Ser Tyr Tyr Cys Glu Asp Arg Tyr Tyr Leu Val Gly Val Gln Glu
165 170 175

Gln Gln Cys Val Asp Gly Glu Trp Ser Ser Ala Leu Pro Val Cys Lys
180 185 190

Leu Ile Gln Glu Ala Pro Lys Pro Glu Cys Glu Lys Ala Leu Leu Ala
195 200 205

Phe Gln Glu Ser Lys Asn Leu Cys Glu Ala Met Glu Asn Phe Met Gln
210 215 220

Gln Leu Lys Glu Ser Gly Met Thr Met Glu Glu Leu Lys Tyr Ser Leu
225 230 235 240

Glu Leu Lys Lys Ala Glu Leu Lys Ala Lys Leu Leu
245 250

<210> 4414
<211> 275
<212> PRT
<213> Homo sapiens

<220>
<223> NCCRP1 (NCBI Accession: NP_001001414)

<400> 4414
Met Glu Glu Val Arg Glu Gly His Ala Leu Gly Gly Gly Met Glu Ala
1 5 10 15

Asp Gly Pro Ala Ser Leu Gln Glu Leu Pro Pro Ser Pro Arg Ser Pro
20 25 30

Ser Pro Pro Pro Ser Pro Pro Pro Leu Pro Ser Pro Pro Ser Leu Pro
35 40 45

Ser Pro Ala Ala Pro Glu Ala Pro Glu Leu Pro Glu Pro Ala Gln Pro
50 55 60

Ser Glu Ala His Ala Arg Gln Leu Leu Leu Glu Glu Trp Gly Pro Leu
65 70 75 80

Ser Gly Gly Leu Glu Leu Pro Gln Arg Leu Thr Trp Lys Leu Leu Leu
85 90 95

Leu Arg Arg Pro Leu Tyr Arg Asn Leu Leu Arg Ser Pro Asn Pro Glu
100 105 110

Gly Ile Asn Ile Tyr Glu Pro Ala Pro Pro Thr Gly Pro Thr Gln Arg
115 120 125

Pro Leu Glu Thr Leu Gly Asn Phe Arg Gly Trp Tyr Ile Arg Thr Glu
130 135 140

Lys Leu Gln Gln Asn Gln Ser Trp Thr Val Lys Gln Gln Cys Val Asp
145 150 155 160

Leu Leu Ala Glu Gly Leu Trp Glu Glu Leu Leu Asp Asp Glu Gln Pro
165 170 175

Ala Ile Thr Val Met Asp Trp Phe Glu Asp Ser Arg Leu Asp Ala Cys
180 185 190

Val Tyr Glu Leu His Val Trp Leu Leu Ala Ala Asp Arg Arg Thr Val
195 200 205

```
Ile Ala Gln His His Val Ala Pro Arg Thr Ser Gly Arg Gly Pro Pro
    210                 215                 220

Gly Arg Trp Val Gln Val Ser His Val Phe Arg His Tyr Gly Pro Gly
225                 230                 235                 240

Val Arg Phe Ile His Phe Leu His Lys Ala Lys Asn Arg Met Glu Pro
                245                 250                 255

Gly Gly Leu Arg Arg Thr Arg Val Thr Asp Ser Ser Val Ser Val Gln
            260                 265                 270

Leu Arg Glu
        275
```

<210> 4415
<211> 550
<212> PRT
<213> Homo sapiens

<220>
<223> CCDC102A (NCBI Accession: XP_011521771)

<400> 4415

```
Met Ser His Gly Pro Ser Pro Arg Leu Ala Glu Ser Pro Gln Leu Ser
1               5                   10                  15

Lys Gly Ser Leu Leu Thr Ile Leu Gly Ser Pro Ser Pro Glu Arg Met
            20                  25                  30

Gly Pro Ala Asp Ser Leu Pro Pro Thr Pro Pro Ser Gly Thr Pro Ser
        35                  40                  45

Pro Gly Pro Pro Pro Ala Leu Pro Leu Pro Pro Ala Pro Ala Leu Leu
    50                  55                  60

Ala Asp Gly Asp Trp Glu Ser Arg Glu Glu Leu Arg Leu Arg Glu Leu
65                  70                  75                  80

Glu Glu Ala Arg Ala Arg Ala Ala Gln Met Glu Lys Thr Met Arg Trp
                85                  90                  95

Trp Ser Asp Cys Thr Ala Asn Trp Arg Glu Lys Trp Ser Lys Val Arg
            100                 105                 110

Ala Glu Arg Asn Arg Ala Arg Glu Glu Val Arg Gln Leu Arg Gln Arg
        115                 120                 125

Leu Asp Ala Leu Thr Lys Glu Leu Ala Gly Ala Arg Arg Glu Arg Gln
    130                 135                 140

Glu Ala Gln Gly Glu Cys Glu Ala Arg Gly Arg Glu Leu Ala Arg Leu
145                 150                 155                 160
```

```
Arg Gly Ala Arg Gly Val Ala Asp Gln Thr Arg Asp Gly Pro Glu Pro
                165                 170                 175

Glu Ala Glu Arg Glu Pro Val Arg Asp Val Gly Ser Glu Arg Pro Pro
            180                 185                 190

Gly Ser Gln Glu Leu Glu Leu Val Glu Ser Leu Leu Lys Ser Met Pro
        195                 200                 205

Glu Glu Ser Glu Asp Cys Trp Glu Ala Arg Ser Leu Gly Ala Gly Gly
    210                 215                 220

Pro Arg Gly Ser Ser Gly Arg Gln Glu Arg Ser Arg Leu Pro Trp Glu
225                 230                 235                 240

Asp Thr Ala Ala Thr Glu Glu Glu Ala Ser Lys Leu Thr Ala Leu Arg
                245                 250                 255

Leu Arg Leu Asp Glu Ser Gln Lys Val Leu Leu Lys Glu Arg Glu Asp
            260                 265                 270

Lys Leu Ala Leu Ser Arg Asn Ile Glu Lys Leu Glu Gly Glu Leu Ser
        275                 280                 285

Gln Trp Lys Ile Lys Tyr Glu Glu Leu Ser Lys Thr Lys Gln Glu Met
    290                 295                 300

Leu Lys Gln Leu Ser Ile Leu Lys Glu Ala His Gln Asp Glu Leu Gly
305                 310                 315                 320

Arg Met Ser Glu Asp Leu Glu Asp Glu Leu Gly Ala Arg Ser Ser Met
                325                 330                 335

Asp Arg Lys Met Ala Glu Leu Arg Gly Glu Met Glu Arg Leu Gln Ala
            340                 345                 350

Glu Asn Ala Ala Glu Trp Gly Arg Arg Glu Arg Leu Glu Thr Glu Lys
        355                 360                 365

Leu Gly Leu Glu Arg Glu Asn Lys Lys Leu Arg Ala Gln Val Gly Asp
    370                 375                 380

Leu Glu Glu Ala Leu Ala Arg Arg Arg Arg Gln Thr Ala Ser Ala Leu
385                 390                 395                 400

Asp Cys Asp Leu Arg Ala Ser Gln Ala Ala Leu Phe Glu Lys Asn Lys
                405                 410                 415

Glu Leu Ala Asp Leu Lys His Val His Gly Lys Leu Lys Lys Gln Phe
            420                 425                 430

Gln Glu Lys Val Ala Glu Leu Ala His Ala Asn Arg Arg Val Glu Gln
        435                 440                 445
```

```
His Glu Ala Glu Val Lys Lys Leu Arg Leu Arg Val Glu Glu Leu Lys
    450                 455                 460

Lys Glu Leu Ala Gln Ala Glu Asp Glu Leu Asp Glu Ala His Asn Gln
465                 470                 475                 480

Ala Arg Lys Leu Gln Arg Ser Leu Asp Glu Gln Thr Glu Gln Ser Glu
                485                 490                 495

Asn Leu Gln Val Gln Leu Glu His Leu Gln Ser Arg Leu Arg Arg Gln
            500                 505                 510

Gln Gln Asn Ala Pro Leu Phe Gly Lys Ile Arg Ser Ala Arg Phe Gly
        515                 520                 525

Thr Glu Glu Ala Glu Asp Gly Thr Ser Asp Leu Asp Glu Asp Glu Asp
    530                 535                 540

Leu Gln Ile Gln Val Ala
545                 550
```

<210> 4416
<211> 593
<212> PRT
<213> Homo sapiens

<220>
<223> RBM47 (NCBI Accession: XP_005248166)

<400> 4416

```
Met Thr Ala Glu Asp Ser Thr Ala Ala Met Ser Ser Asp Ser Ala Ala
1               5                   10                  15

Gly Ser Ser Ala Lys Val Pro Glu Gly Val Ala Gly Ala Pro Asn Glu
            20                  25                  30

Ala Ala Leu Leu Ala Leu Met Glu Arg Thr Gly Tyr Ser Met Val Gln
        35                  40                  45

Glu Asn Gly Gln Arg Lys Tyr Gly Gly Pro Pro Pro Gly Trp Glu Gly
    50                  55                  60

Pro His Pro Gln Arg Gly Cys Glu Val Phe Val Gly Lys Ile Pro Arg
65                  70                  75                  80

Asp Val Tyr Glu Asp Glu Leu Val Pro Val Phe Glu Ala Val Gly Arg
                85                  90                  95

Ile Tyr Glu Leu Arg Leu Met Met Asp Phe Asp Gly Lys Asn Arg Gly
            100                 105                 110

Tyr Ala Phe Val Met Tyr Cys His Lys His Glu Ala Lys Arg Ala Val
        115                 120                 125
```

```
Arg Glu Leu Asn Asn Tyr Glu Ile Arg Pro Gly Arg Leu Leu Gly Val
    130                 135                 140

Cys Cys Ser Val Asp Asn Cys Arg Leu Phe Ile Gly Gly Ile Pro Lys
145                 150                 155                 160

Met Lys Lys Arg Glu Glu Ile Leu Glu Glu Ile Ala Lys Val Thr Glu
                165                 170                 175

Gly Val Leu Asp Val Ile Val Tyr Ala Ser Ala Ala Asp Lys Met Lys
            180                 185                 190

Asn Arg Gly Phe Ala Phe Val Glu Tyr Glu Ser His Arg Ala Ala Ala
        195                 200                 205

Met Ala Arg Arg Lys Leu Met Pro Gly Arg Ile Gln Leu Trp Gly His
    210                 215                 220

Gln Ile Ala Val Asp Trp Ala Glu Pro Glu Ile Asp Val Asp Glu Asp
225                 230                 235                 240

Val Met Glu Thr Val Lys Ile Leu Tyr Val Arg Asn Leu Met Ile Glu
                245                 250                 255

Thr Thr Glu Asp Thr Ile Lys Lys Ser Phe Gly Gln Phe Asn Pro Gly
            260                 265                 270

Cys Val Glu Arg Val Lys Lys Ile Arg Asp Tyr Ala Phe Val His Phe
        275                 280                 285

Thr Ser Arg Glu Asp Ala Val His Ala Met Asn Asn Leu Asn Gly Thr
    290                 295                 300

Glu Leu Glu Gly Ser Cys Leu Glu Val Thr Leu Ala Lys Pro Val Asp
305                 310                 315                 320

Lys Glu Gln Tyr Ser Arg Tyr Gln Lys Ala Ala Arg Gly Gly Gly Ala
                325                 330                 335

Ala Glu Ala Ala Gln Gln Pro Ser Tyr Val Tyr Ser Cys Asp Pro Tyr
            340                 345                 350

Thr Leu Ala Tyr Tyr Gly Tyr Pro Tyr Asn Ala Leu Ile Gly Pro Asn
        355                 360                 365

Arg Asp Tyr Phe Val Lys Ala Gly Ser Ile Arg Gly Arg Gly Arg Gly
    370                 375                 380

Ala Ala Gly Asn Arg Ala Pro Gly Pro Arg Gly Ser Tyr Leu Gly Gly
385                 390                 395                 400

Tyr Ser Ala Gly Arg Gly Ile Tyr Ser Arg Tyr His Glu Gly Lys Gly
                405                 410                 415
```

```
Lys Gln Gln Glu Lys Gly Tyr Glu Leu Val Pro Asn Leu Glu Ile Pro
            420                 425                 430

Thr Val Asn Pro Val Ala Ile Lys Pro Gly Thr Val Ala Ile Pro Ala
        435                 440                 445

Ile Gly Ala Gln Tyr Ser Met Phe Pro Ala Ala Pro Ala Pro Lys Met
    450                 455                 460

Ile Glu Asp Gly Lys Ile His Thr Val Glu His Met Ile Ser Pro Ile
465                 470                 475                 480

Ala Val Gln Pro Asp Pro Ala Ser Ala Ala Ala Ala Ala Ala Ala Ala
                485                 490                 495

Ala Ala Ala Ala Ala Ala Val Ile Pro Thr Val Ser Thr Pro Pro Pro
            500                 505                 510

Phe Gln Gly Arg Pro Ile Thr Pro Val Tyr Thr Val Ala Pro Asn Val
        515                 520                 525

Gln Arg Ile Pro Thr Ala Gly Ile Tyr Gly Ala Ser Tyr Val Pro Phe
    530                 535                 540

Ala Ala Pro Ala Thr Ala Thr Ile Ala Thr Leu Gln Lys Asn Ala Ala
545                 550                 555                 560

Ala Ala Ala Ala Val Tyr Gly Gly Tyr Ala Gly Tyr Ile Pro Gln Ala
                565                 570                 575

Phe Pro Ala Ala Ala Ile Gln Val Pro Ile Pro Asp Val Tyr Gln Thr
            580                 585                 590

Tyr
```

<210> 4417
<211> 282
<212> PRT
<213> Homo sapiens

<220>
<223> RAD1 (NCBI Accession: NP_002844)

<400> 4417

```
Met Pro Leu Leu Thr Gln Gln Ile Gln Asp Glu Asp Asp Gln Tyr Ser
1               5                   10                  15

Leu Val Ala Ser Leu Asp Asn Val Arg Asn Leu Ser Thr Ile Leu Lys
            20                  25                  30

Ala Ile His Phe Arg Glu His Ala Thr Cys Phe Ala Thr Lys Asn Gly
        35                  40                  45
```

```
Ile Lys Val Thr Val Glu Asn Ala Lys Cys Val Gln Ala Asn Ala Phe
    50                  55                  60

Ile Gln Ala Gly Ile Phe Gln Glu Phe Lys Val Gln Glu Glu Ser Val
65                  70                  75                  80

Thr Phe Arg Ile Asn Leu Thr Val Leu Leu Asp Cys Leu Ser Ile Phe
                85                  90                  95

Gly Ser Ser Pro Met Pro Gly Thr Leu Thr Ala Leu Arg Met Cys Tyr
            100                 105                 110

Gln Gly Tyr Gly Tyr Pro Leu Met Leu Phe Leu Glu Glu Gly Gly Val
        115                 120                 125

Val Thr Val Cys Lys Ile Asn Thr Gln Glu Pro Glu Glu Thr Leu Asp
    130                 135                 140

Phe Asp Phe Cys Ser Thr Asn Val Ile Asn Lys Ile Ile Leu Gln Ser
145                 150                 155                 160

Glu Gly Leu Arg Glu Ala Phe Ser Glu Leu Asp Met Thr Ser Glu Val
                165                 170                 175

Leu Gln Ile Thr Met Ser Pro Asp Lys Pro Tyr Phe Arg Leu Ser Thr
            180                 185                 190

Phe Gly Asn Ala Gly Ser Ser His Leu Asp Tyr Pro Lys Asp Ser Asp
        195                 200                 205

Leu Met Glu Ala Phe His Cys Asn Gln Thr Gln Val Asn Arg Tyr Lys
    210                 215                 220

Ile Ser Leu Leu Lys Pro Ser Thr Lys Ala Leu Val Leu Ser Cys Lys
225                 230                 235                 240

Val Ser Ile Arg Thr Asp Asn Arg Gly Phe Leu Ser Leu Gln Tyr Met
                245                 250                 255

Ile Arg Asn Glu Asp Gly Gln Ile Cys Phe Val Glu Tyr Tyr Cys Cys
            260                 265                 270

Pro Asp Glu Glu Val Pro Glu Ser Glu Ser
        275                 280
```

<210> 4418
<211> 436
<212> PRT
<213> Homo sapiens

<220>
<223> MTUS1 (NCBI Accession: NP_001001924)

<400> 4418
Met Leu Leu Ser Pro Lys Phe Ser Leu Ser Thr Ile His Ile Arg Leu
1   5   10   15

Thr Ala Lys Gly Leu Leu Arg Asn Leu Arg Leu Pro Ser Gly Phe Arg
            20   25   30

Arg Ser Thr Val Val Phe His Thr Val Glu Lys Ser Arg Gln Lys Asn
        35   40   45

Pro Arg Ser Leu Cys Ile Gln Pro Gln Thr Ala Pro Asp Ala Leu Pro
    50   55   60

Pro Glu Lys Thr Leu Glu Leu Thr Gln Tyr Lys Thr Lys Cys Glu Asn
65   70   75   80

Gln Ser Gly Phe Ile Leu Gln Leu Lys Gln Leu Leu Ala Cys Gly Asn
                85   90   95

Thr Lys Phe Glu Ala Leu Thr Val Val Ile Gln His Leu Leu Ser Glu
            100   105   110

Arg Glu Glu Ala Leu Lys Gln His Lys Thr Leu Ser Gln Glu Leu Val
        115   120   125

Asn Leu Arg Gly Glu Leu Val Thr Ala Ser Thr Thr Cys Glu Lys Leu
    130   135   140

Glu Lys Ala Arg Asn Glu Leu Gln Thr Val Tyr Glu Ala Phe Val Gln
145   150   155   160

Gln His Gln Ala Glu Lys Thr Glu Arg Glu Asn Arg Leu Lys Glu Phe
                165   170   175

Tyr Thr Arg Glu Tyr Glu Lys Leu Arg Asp Thr Tyr Ile Glu Glu Ala
            180   185   190

Glu Lys Tyr Lys Met Gln Leu Gln Glu Gln Phe Asp Asn Leu Asn Ala
        195   200   205

Ala His Glu Thr Ser Lys Leu Glu Ile Glu Ala Ser His Ser Glu Lys
    210   215   220

Leu Glu Leu Leu Lys Lys Ala Tyr Glu Ala Ser Leu Ser Glu Ile Lys
225   230   235   240

Lys Gly His Glu Ile Glu Lys Lys Ser Leu Glu Asp Leu Leu Ser Glu
                245   250   255

Lys Gln Glu Ser Leu Glu Lys Gln Ile Asn Asp Leu Lys Ser Glu Asn
            260   265   270

Asp Ala Leu Asn Glu Lys Leu Lys Ser Glu Glu Gln Lys Arg Arg Ala
        275   280   285

```
Arg Glu Lys Ala Asn Leu Lys Asn Pro Gln Ile Met Tyr Leu Glu Gln
    290                 295                 300

Glu Leu Glu Ser Leu Lys Ala Val Leu Glu Ile Lys Asn Glu Lys Leu
305                 310                 315                 320

His Gln Gln Asp Ile Lys Leu Met Lys Met Glu Lys Leu Val Asp Asn
                325                 330                 335

Asn Thr Ala Leu Val Asp Lys Leu Lys Arg Phe Gln Gln Glu Asn Glu
            340                 345                 350

Glu Leu Lys Ala Arg Met Asp Lys His Met Ala Ile Ser Arg Gln Leu
        355                 360                 365

Ser Thr Glu Gln Ala Val Leu Gln Glu Ser Leu Glu Lys Glu Ser Lys
    370                 375                 380

Val Asn Lys Arg Leu Ser Met Glu Asn Glu Glu Leu Leu Trp Lys Leu
385                 390                 395                 400

His Asn Gly Asp Leu Cys Ser Pro Lys Arg Ser Pro Thr Ser Ser Ala
                405                 410                 415

Ile Pro Leu Gln Ser Pro Arg Asn Ser Gly Ser Phe Pro Ser Pro Ser
            420                 425                 430

Ile Ser Pro Arg
        435
```

<210> 4419
<211> 423
<212> PRT
<213> Homo sapiens

<220>
<223> GPR83 (NCBI Accession: NP_057624)

<400> 4419

```
Met Val Pro His Leu Leu Leu Leu Cys Leu Leu Pro Leu Val Arg Ala
1               5                   10                  15

Thr Glu Pro His Glu Gly Arg Ala Asp Glu Gln Ser Ala Glu Ala Ala
            20                  25                  30

Leu Ala Val Pro Asn Ala Ser His Phe Phe Ser Trp Asn Asn Tyr Thr
        35                  40                  45

Phe Ser Asp Trp Gln Asn Phe Val Gly Arg Arg Arg Tyr Gly Ala Glu
    50                  55                  60

Ser Gln Asn Pro Thr Val Lys Ala Leu Leu Ile Val Ala Tyr Ser Phe
65                  70                  75                  80
```

```
Ile Ile Val Phe Ser Leu Phe Gly Asn Val Leu Val Cys His Val Ile
                85                  90                  95

Phe Lys Asn Gln Arg Met His Ser Ala Thr Ser Leu Phe Ile Val Asn
            100                 105                 110

Leu Ala Val Ala Asp Ile Met Ile Thr Leu Leu Asn Thr Pro Phe Thr
        115                 120                 125

Leu Val Arg Phe Val Asn Ser Thr Trp Ile Phe Gly Lys Gly Met Cys
    130                 135                 140

His Val Ser Arg Phe Ala Gln Tyr Cys Ser Leu His Val Ser Ala Leu
145                 150                 155                 160

Thr Leu Thr Ala Ile Ala Val Asp Arg His Gln Val Ile Met His Pro
                165                 170                 175

Leu Lys Pro Arg Ile Ser Ile Thr Lys Gly Val Ile Tyr Ile Ala Val
            180                 185                 190

Ile Trp Thr Met Ala Thr Phe Phe Ser Leu Pro His Ala Ile Cys Gln
        195                 200                 205

Lys Leu Phe Thr Phe Lys Tyr Ser Glu Asp Ile Val Arg Ser Leu Cys
    210                 215                 220

Leu Pro Asp Phe Pro Glu Pro Ala Asp Leu Phe Trp Lys Tyr Leu Asp
225                 230                 235                 240

Leu Ala Thr Phe Ile Leu Leu Tyr Ile Leu Pro Leu Leu Ile Ile Ser
                245                 250                 255

Val Ala Tyr Ala Arg Val Ala Lys Lys Leu Trp Leu Cys Asn Met Ile
            260                 265                 270

Gly Asp Val Thr Thr Glu Gln Tyr Phe Ala Leu Arg Arg Lys Lys Lys
        275                 280                 285

Lys Thr Ile Lys Met Leu Met Leu Val Val Val Leu Phe Ala Leu Cys
    290                 295                 300

Trp Phe Pro Leu Asn Cys Tyr Val Leu Leu Leu Ser Ser Lys Val Ile
305                 310                 315                 320

Arg Thr Asn Asn Ala Leu Tyr Phe Ala Phe His Trp Phe Ala Met Ser
                325                 330                 335

Ser Thr Cys Tyr Asn Pro Phe Ile Tyr Cys Trp Leu Asn Glu Asn Phe
            340                 345                 350

Arg Ile Glu Leu Lys Ala Leu Leu Ser Met Cys Gln Arg Pro Pro Lys
        355                 360                 365
```

```
Pro Gln Glu Asp Arg Gln Pro Ser Pro Val Pro Ser Phe Arg Val Ala
    370                 375                 380

Trp Thr Glu Lys Asn Asp Gly Gln Arg Ala Pro Leu Ala Asn Asn Leu
385                 390                 395                 400

Leu Pro Thr Ser Gln Leu Gln Ser Gly Lys Thr Asp Leu Ser Ser Val
                405                 410                 415

Glu Pro Ile Val Thr Met Ser
            420
```

<210> 4420
<211> 461
<212> PRT
<213> Homo sapiens

<220>
<223> CDS1 (NCBI Accession: NP_001254)

<400> 4420

```
Met Leu Glu Leu Arg His Arg Gly Ser Cys Pro Gly Pro Arg Glu Ala
1               5                   10                  15

Val Ser Pro Pro His Arg Glu Gly Glu Ala Ala Gly Gly Asp His Glu
            20                  25                  30

Thr Glu Ser Thr Ser Asp Lys Glu Thr Asp Ile Asp Asp Arg Tyr Gly
        35                  40                  45

Asp Leu Asp Ser Arg Thr Asp Ser Asp Ile Pro Glu Ile Pro Pro Ser
    50                  55                  60

Ser Asp Arg Thr Pro Glu Ile Leu Lys Lys Ala Leu Ser Gly Leu Ser
65                  70                  75                  80

Ser Arg Trp Lys Asn Trp Trp Ile Arg Gly Ile Leu Thr Leu Thr Met
                85                  90                  95

Ile Ser Leu Phe Phe Leu Ile Ile Tyr Met Gly Ser Phe Met Leu Met
            100                 105                 110

Leu Leu Val Leu Gly Ile Gln Val Lys Cys Phe His Glu Ile Ile Thr
        115                 120                 125

Ile Gly Tyr Arg Val Tyr His Ser Tyr Asp Leu Pro Trp Phe Arg Thr
    130                 135                 140

Leu Ser Trp Tyr Phe Leu Leu Cys Val Asn Tyr Phe Phe Tyr Gly Glu
145                 150                 155                 160

Thr Val Ala Asp Tyr Phe Ala Thr Phe Val Gln Arg Glu Glu Gln Leu
                165                 170                 175
```

```
Gln Phe Leu Ile Arg Tyr His Arg Phe Ile Ser Phe Ala Leu Tyr Leu
            180                 185                 190

Ala Gly Phe Cys Met Phe Val Leu Ser Leu Val Lys Lys His Tyr Arg
        195                 200                 205

Leu Gln Phe Tyr Met Phe Ala Trp Thr His Val Thr Leu Leu Ile Thr
    210                 215                 220

Val Thr Gln Ser His Leu Val Ile Gln Asn Leu Phe Glu Gly Met Ile
225                 230                 235                 240

Trp Phe Leu Val Pro Ile Ser Ser Val Ile Cys Asn Asp Ile Thr Ala
                245                 250                 255

Tyr Leu Phe Gly Phe Phe Phe Gly Arg Thr Pro Leu Ile Lys Leu Ser
            260                 265                 270

Pro Lys Lys Thr Trp Glu Gly Phe Ile Gly Gly Phe Phe Ser Thr Val
        275                 280                 285

Val Phe Gly Phe Ile Ala Ala Tyr Val Leu Ser Lys Tyr Gln Tyr Phe
    290                 295                 300

Val Cys Pro Val Glu Tyr Arg Ser Asp Val Asn Ser Phe Val Thr Glu
305                 310                 315                 320

Cys Glu Pro Ser Glu Leu Phe Gln Leu Gln Thr Tyr Ser Leu Pro Pro
                325                 330                 335

Phe Leu Lys Ala Val Leu Arg Gln Glu Arg Val Ser Leu Tyr Pro Phe
            340                 345                 350

Gln Ile His Ser Ile Ala Leu Ser Thr Phe Ala Ser Leu Ile Gly Pro
        355                 360                 365

Phe Gly Gly Phe Phe Ala Ser Gly Phe Lys Arg Ala Phe Lys Ile Lys
    370                 375                 380

Asp Phe Ala Asn Thr Ile Pro Gly His Gly Gly Ile Met Asp Arg Phe
385                 390                 395                 400

Asp Cys Gln Tyr Leu Met Ala Thr Phe Val His Val Tyr Ile Thr Ser
                405                 410                 415

Phe Ile Arg Gly Pro Asn Pro Ser Lys Val Leu Gln Gln Leu Leu Val
            420                 425                 430

Leu Gln Pro Glu Gln Gln Leu Asn Ile Tyr Lys Thr Leu Lys Thr His
        435                 440                 445

Leu Ile Glu Lys Gly Ile Leu Gln Pro Thr Leu Lys Val
    450                 455                 460
```

<210> 4421
<211> 541
<212> PRT
<213> Homo sapiens

<220>
<223> DNAAF3 (NCBI Accession: NP_001243644)

<400> 4421
Met Thr Thr Pro Ala Gly Ser Gly Ser Gly Phe Gly Ser Val Ser Trp
1   5   10   15

Trp Gly Leu Ser Pro Ala Leu Asp Leu Gln Ala Glu Ser Pro Pro Val
            20   25   30

Asp Pro Asp Ser Gln Ala Asp Thr Val His Ser Asn Pro Glu Leu Asp
        35   40   45

Val Leu Leu Leu Gly Ser Val Asp Gly Arg His Leu Leu Arg Thr Leu
    50   55   60

Ser Arg Ala Lys Phe Trp Pro Arg Arg Arg Phe Asn Phe Phe Val Leu
65   70   75   80

Glu Asn Asn Leu Glu Ala Val Ala Arg His Met Leu Ile Phe Ser Leu
                85   90   95

Ala Leu Glu Glu Pro Glu Lys Met Gly Leu Gln Glu Arg Ser Glu Thr
            100   105   110

Phe Leu Glu Val Trp Gly Asn Ala Leu Leu Arg Pro Pro Val Ala Ala
        115   120   125

Phe Val Arg Ala Gln Ala Asp Leu Leu Ala His Leu Val Pro Glu Pro
    130   135   140

Asp Arg Leu Glu Glu Gln Leu Pro Trp Leu Ser Leu Arg Ala Leu Lys
145   150   155   160

Phe Arg Glu Arg Asp Ala Leu Glu Ala Val Phe Arg Phe Trp Ala Gly
                165   170   175

Gly Glu Lys Gly Pro Gln Ala Phe Pro Met Ser Arg Leu Trp Asp Ser
            180   185   190

Arg Leu Arg His Tyr Leu Gly Ser Arg Tyr Asp Ala Arg Arg Gly Val
        195   200   205

Ser Asp Trp Asp Leu Arg Met Lys Leu His Asp Arg Gly Ala Gln Val
    210   215   220

Ile His Pro Gln Glu Phe Arg Arg Trp Arg Asp Thr Gly Val Ala Phe
225   230   235   240

```
Glu Leu Arg Asp Ser Ser Ala Tyr His Val Pro Asn Arg Thr Leu Ala
                245                 250                 255

Ser Gly Arg Leu Leu Ser Tyr Arg Gly Glu Arg Val Ala Ala Arg Gly
            260                 265                 270

Tyr Trp Gly Asp Ile Ala Thr Gly Pro Phe Val Ala Phe Gly Ile Glu
        275                 280                 285

Ala Asp Asp Glu Ser Leu Leu Arg Thr Ser Asn Gly Gln Pro Val Lys
    290                 295                 300

Thr Ala Gly Glu Ile Thr Gln His Asn Val Thr Glu Leu Leu Arg Asp
305                 310                 315                 320

Val Ala Ala Trp Gly Arg Ala Arg Ala Thr Gly Gly Asp Leu Glu Glu
                325                 330                 335

Gln Gln His Ala Glu Gly Ser Pro Glu Pro Gly Thr Pro Ala Ala Pro
            340                 345                 350

Thr Pro Glu Ser Phe Thr Val His Phe Leu Pro Leu Asn Ser Ala Gln
        355                 360                 365

Thr Leu His His Lys Ser Cys Tyr Asn Gly Arg Phe Gln Leu Leu Tyr
    370                 375                 380

Val Ala Cys Gly Met Val His Leu Leu Ile Pro Glu Leu Gly Ala Cys
385                 390                 395                 400

Val Ala Pro Gly Gly Asn Leu Ile Val Glu Leu Ala Arg Tyr Leu Val
                405                 410                 415

Asp Val Arg Gln Glu Gln Leu Gln Gly Phe Asn Thr Arg Val Arg Glu
            420                 425                 430

Leu Ala Gln Ala Ala Gly Phe Ala Pro Gln Thr Gly Ala Arg Pro Ser
        435                 440                 445

Glu Thr Phe Ala Arg Phe Cys Lys Ser Gln Glu Ser Ala Leu Gly Asn
    450                 455                 460

Thr Val Pro Ala Val Glu Pro Gly Thr Pro Pro Leu Asp Ile Leu Ala
465                 470                 475                 480

Gln Pro Leu Glu Ala Ser Asn Pro Ala Leu Glu Gly Leu Thr Gln Pro
                485                 490                 495

Leu Gln Gly Gly Thr Pro His Cys Glu Pro Cys Gln Leu Pro Ser Glu
            500                 505                 510

Ser Pro Gly Ser Leu Ser Glu Val Leu Ala Gln Pro Gln Gly Ala Leu
        515                 520                 525
```

Ala Pro Pro Asn Cys Glu Ser Asp Ser Lys Thr Gly Val
    530   535   540

<210> 4422
<211> 537
<212> PRT
<213> Homo sapiens

<220>
<223> CPNE1 (NCBI Accession: NP_690903)

<400> 4422
Met Ala His Cys Val Thr Leu Val Gln Leu Ser Ile Ser Cys Asp His
1   5   10   15

Leu Ile Asp Lys Asp Ile Gly Ser Lys Ser Asp Pro Leu Cys Val Leu
            20   25   30

Leu Gln Asp Val Gly Gly Gly Ser Trp Ala Glu Leu Gly Arg Thr Glu
        35   40   45

Arg Val Arg Asn Cys Ser Ser Pro Glu Phe Ser Lys Thr Leu Gln Leu
    50   55   60

Glu Tyr Arg Phe Glu Thr Val Gln Lys Leu Arg Phe Gly Ile Tyr Asp
65   70   75   80

Ile Asp Asn Lys Thr Pro Glu Leu Arg Asp Asp Asp Phe Leu Gly Gly
                85   90   95

Ala Glu Cys Ser Leu Gly Gln Ile Val Ser Ser Gln Val Leu Thr Leu
            100   105   110

Pro Leu Met Leu Lys Pro Gly Lys Pro Ala Gly Arg Gly Thr Ile Thr
        115   120   125

Val Ser Ala Gln Glu Leu Lys Asp Asn Arg Val Val Thr Met Glu Val
    130   135   140

Glu Ala Arg Asn Leu Asp Lys Lys Asp Phe Leu Gly Lys Ser Asp Pro
145   150   155   160

Phe Leu Glu Phe Phe Arg Gln Gly Asp Gly Lys Trp His Leu Val Tyr
                165   170   175

Arg Ser Glu Val Ile Lys Asn Asn Leu Asn Pro Thr Trp Lys Arg Phe
            180   185   190

Ser Val Pro Val Gln His Phe Cys Gly Gly Asn Pro Ser Thr Pro Ile
        195   200   205

Gln Val Gln Cys Ser Asp Tyr Asp Ser Asp Gly Ser His Asp Leu Ile
    210   215   220

```
Gly Thr Phe His Thr Ser Leu Ala Gln Leu Gln Ala Val Pro Ala Glu
225                 230                 235                 240

Phe Glu Cys Ile His Pro Glu Lys Gln Gln Lys Lys Lys Ser Tyr Lys
                245                 250                 255

Asn Ser Gly Thr Ile Arg Val Lys Ile Cys Arg Val Glu Thr Glu Tyr
            260                 265                 270

Ser Phe Leu Asp Tyr Val Met Gly Gly Cys Gln Ile Asn Phe Thr Val
        275                 280                 285

Gly Val Asp Phe Thr Gly Ser Asn Gly Asp Pro Ser Ser Pro Asp Ser
    290                 295                 300

Leu His Tyr Leu Ser Pro Thr Gly Val Asn Glu Tyr Leu Met Ala Leu
305                 310                 315                 320

Trp Ser Val Gly Ser Val Val Gln Asp Tyr Asp Ser Asp Lys Leu Phe
                325                 330                 335

Pro Ala Phe Gly Phe Gly Ala Gln Val Pro Pro Asp Trp Gln Val Ser
            340                 345                 350

His Glu Phe Ala Leu Asn Phe Asn Pro Ser Asn Pro Tyr Cys Ala Gly
        355                 360                 365

Ile Gln Gly Ile Val Asp Ala Tyr Arg Gln Ala Leu Pro Gln Val Arg
    370                 375                 380

Leu Tyr Gly Pro Thr Asn Phe Ala Pro Ile Ile Asn His Val Ala Arg
385                 390                 395                 400

Phe Ala Ala Gln Ala Ala His Gln Gly Thr Ala Ser Gln Tyr Phe Met
                405                 410                 415

Leu Leu Leu Leu Thr Asp Gly Ala Val Thr Asp Val Glu Ala Thr Arg
            420                 425                 430

Glu Ala Val Val Arg Ala Ser Asn Leu Pro Met Ser Val Ile Ile Val
        435                 440                 445

Gly Val Gly Gly Ala Asp Phe Glu Ala Met Glu Gln Leu Asp Ala Asp
    450                 455                 460

Gly Gly Pro Leu His Thr Arg Ser Gly Gln Ala Ala Ala Arg Asp Ile
465                 470                 475                 480

Val Gln Phe Val Pro Tyr Arg Arg Phe Gln Asn Ala Pro Arg Glu Ala
                485                 490                 495

Leu Ala Gln Thr Val Leu Ala Glu Val Pro Thr Gln Leu Val Ser Tyr
            500                 505                 510
```

Phe Arg Ala Gln Gly Trp Ala Pro Leu Lys Pro Leu Pro Pro Ser Ala
515 520 525

Lys Asp Pro Ala Gln Ala Pro Gln Ala
530 535

<210> 4423
<211> 580
<212> PRT
<213> Homo sapiens

<220>
<223> ADCK5 (NCBI Accession: NP_777582)

<400> 4423
Met Trp Arg Pro Val Gln Leu Cys His Phe His Ser Ala Leu Leu His
1 5 10 15

Arg Arg Gln Lys Pro Trp Pro Ser Pro Ala Val Phe Phe Arg Arg Asn
20 25 30

Val Arg Gly Leu Pro Pro Arg Phe Ser Ser Pro Thr Pro Leu Trp Arg
35 40 45

Lys Val Leu Ser Thr Ala Val Val Gly Ala Pro Leu Leu Leu Gly Ala
50 55 60

Arg Tyr Val Met Ala Glu Ala Arg Glu Lys Arg Arg Met Arg Leu Val
65 70 75 80

Val Asp Gly Met Gly Arg Phe Gly Arg Ser Leu Lys Val Gly Leu Gln
85 90 95

Ile Ser Leu Asp Tyr Trp Trp Cys Thr Asn Val Val Leu Arg Gly Val
100 105 110

Glu Glu Asn Ser Pro Gly Tyr Leu Glu Val Met Ser Ala Cys His Gln
115 120 125

Arg Ala Ala Asp Ala Leu Val Ala Gly Ala Ile Ser Asn Gly Gly Leu
130 135 140

Tyr Val Lys Leu Gly Gln Gly Leu Cys Ser Phe Asn His Leu Leu Pro
145 150 155 160

Pro Glu Tyr Thr Arg Thr Leu Arg Val Leu Glu Asp Arg Ala Leu Lys
165 170 175

Arg Gly Phe Gln Glu Val Asp Glu Leu Phe Leu Glu Asp Phe Gln Ala
180 185 190

Leu Pro His Glu Leu Phe Gln Glu Phe Asp Tyr Gln Pro Ile Ala Ala
195 200 205

```
Ala Ser Leu Ala Gln Val His Arg Ala Lys Leu His Asp Gly Thr Ser
    210                 215                 220

Val Ala Val Lys Val Gln Tyr Ile Asp Leu Arg Asp Arg Phe Asp Gly
225                 230                 235                 240

Asp Ile His Thr Leu Glu Leu Leu Leu Arg Leu Val Glu Val Met His
                245                 250                 255

Pro Ser Phe Gly Phe Ser Trp Val Leu Gln Asp Leu Lys Gly Thr Leu
            260                 265                 270

Ala Gln Glu Leu Asp Phe Glu Asn Glu Gly Arg Asn Ala Glu Arg Cys
        275                 280                 285

Ala Arg Glu Leu Ala His Phe Pro Tyr Val Val Val Pro Arg Val His
    290                 295                 300

Trp Asp Lys Ser Ser Lys Arg Val Leu Thr Ala Asp Phe Cys Ala Gly
305                 310                 315                 320

Cys Lys Val Asn Asp Val Glu Ala Ile Arg Ser Gln Gly Leu Ala Val
                325                 330                 335

His Asp Ile Ala Glu Lys Leu Ile Lys Ala Phe Ala Glu Gln Ile Phe
            340                 345                 350

Tyr Thr Gly Phe Ile His Ser Asp Pro His Pro Gly Asn Val Leu Val
        355                 360                 365

Arg Lys Gly Pro Asp Gly Lys Ala Glu Leu Val Leu Leu Asp His Gly
    370                 375                 380

Leu Tyr Gln Phe Leu Glu Glu Lys Asp Arg Ala Ala Leu Cys Gln Leu
385                 390                 395                 400

Trp Arg Ala Ile Ile Leu Arg Asp Asp Ala Ala Met Arg Ala His Ala
                405                 410                 415

Ala Ala Leu Gly Val Gln Asp Tyr Leu Leu Phe Ala Glu Met Leu Met
            420                 425                 430

Gln Arg Pro Val Arg Leu Gly Gln Leu Trp Gly Ser His Leu Leu Ser
        435                 440                 445

Arg Glu Glu Ala Ala Tyr Met Val Asp Met Ala Arg Glu Arg Phe Glu
    450                 455                 460

Ala Val Met Ala Val Leu Arg Glu Leu Pro Arg Pro Met Leu Leu Val
465                 470                 475                 480

Leu Arg Asn Ile Asn Thr Val Arg Ala Ile Asn Val Ala Leu Gly Ala
                485                 490                 495
```

```
Pro Val Asp Arg Tyr Phe Leu Met Ala Lys Arg Ala Val Arg Gly Trp
            500                 505                 510

Ser Arg Leu Ala Gly Ala Thr Tyr Arg Gly Val Tyr Gly Thr Ser Leu
        515                 520                 525

Leu Arg His Ala Lys Val Val Trp Glu Met Leu Lys Phe Glu Val Ala
    530                 535                 540

Leu Arg Leu Glu Thr Leu Ala Met Arg Leu Thr Ala Leu Leu Ala Arg
545                 550                 555                 560

Ala Leu Val His Leu Ser Leu Val Pro Pro Ala Glu Glu Leu Tyr Gln
                565                 570                 575

Tyr Leu Glu Thr
            580

<210> 4424
<211> 175
<212> PRT
<213> Homo sapiens

<220>
<223> CRYAB (NCBI Accession: NP_001276736)

<400> 4424
Met Asp Ile Ala Ile His His Pro Trp Ile Arg Arg Pro Phe Phe Pro
1               5                   10                  15

Phe His Ser Pro Ser Arg Leu Phe Asp Gln Phe Phe Gly Glu His Leu
            20                  25                  30

Leu Glu Ser Asp Leu Phe Pro Thr Ser Thr Ser Leu Ser Pro Phe Tyr
        35                  40                  45

Leu Arg Pro Pro Ser Phe Leu Arg Ala Pro Ser Trp Phe Asp Thr Gly
    50                  55                  60

Leu Ser Glu Met Arg Leu Glu Lys Asp Arg Phe Ser Val Asn Leu Asp
65                  70                  75                  80

Val Lys His Phe Ser Pro Glu Glu Leu Lys Val Lys Val Leu Gly Asp
                85                  90                  95

Val Ile Glu Val His Gly Lys His Glu Glu Arg Gln Asp Glu His Gly
            100                 105                 110

Phe Ile Ser Arg Glu Phe His Arg Lys Tyr Arg Ile Pro Ala Asp Val
        115                 120                 125

Asp Pro Leu Thr Ile Thr Ser Ser Leu Ser Ser Asp Gly Val Leu Thr
    130                 135                 140
```

```
Val Asn Gly Pro Arg Lys Gln Val Ser Gly Pro Glu Arg Thr Ile Pro
145                 150                 155                 160

Ile Thr Arg Glu Glu Lys Pro Ala Val Thr Ala Ala Pro Lys Lys
                165                 170                 175
```

<210> 4425
<211> 486
<212> PRT
<213> Homo sapiens

<220>
<223> HCLS1 (NCBI Accession: NP_005326)

<400> 4425

```
Met Trp Lys Ser Val Val Gly His Asp Val Ser Val Ser Val Glu Thr
1               5                   10                  15

Gln Gly Asp Asp Trp Asp Thr Asp Pro Asp Phe Val Asn Asp Ile Ser
            20                  25                  30

Glu Lys Glu Gln Arg Trp Gly Ala Lys Thr Ile Glu Gly Ser Gly Arg
        35                  40                  45

Thr Glu His Ile Asn Ile His Gln Leu Arg Asn Lys Val Ser Glu Glu
    50                  55                  60

His Asp Val Leu Arg Lys Lys Glu Met Glu Ser Gly Pro Lys Ala Ser
65                  70                  75                  80

His Gly Tyr Gly Gly Arg Phe Gly Val Glu Arg Asp Arg Met Asp Lys
                85                  90                  95

Ser Ala Val Gly His Glu Tyr Val Ala Glu Val Glu Lys His Ser Ser
            100                 105                 110

Gln Thr Asp Ala Ala Lys Gly Phe Gly Gly Lys Tyr Gly Val Glu Arg
        115                 120                 125

Asp Arg Ala Asp Lys Ser Ala Val Gly Phe Asp Tyr Lys Gly Glu Val
    130                 135                 140

Glu Lys His Thr Ser Gln Lys Asp Tyr Ser Arg Gly Phe Gly Gly Arg
145                 150                 155                 160

Tyr Gly Val Glu Lys Asp Lys Trp Asp Lys Ala Ala Leu Gly Tyr Asp
                165                 170                 175

Tyr Lys Gly Glu Thr Glu Lys His Glu Ser Gln Arg Asp Tyr Ala Lys
            180                 185                 190

Gly Phe Gly Gly Gln Tyr Gly Ile Gln Lys Asp Arg Val Asp Lys Ser
        195                 200                 205
```

```
Ala Val Gly Phe Asn Glu Met Glu Ala Pro Thr Thr Ala Tyr Lys Lys
    210                 215                 220

Thr Thr Pro Ile Glu Ala Ala Ser Ser Gly Ala Arg Gly Leu Lys Ala
225                 230                 235                 240

Lys Phe Glu Ser Met Ala Glu Glu Lys Arg Lys Arg Glu Glu Glu Glu
                245                 250                 255

Lys Ala Gln Gln Val Ala Arg Arg Gln Gln Glu Arg Lys Ala Val Thr
            260                 265                 270

Lys Arg Ser Pro Glu Ala Pro Gln Pro Val Ile Ala Met Glu Glu Pro
        275                 280                 285

Ala Val Pro Ala Pro Leu Pro Lys Lys Ile Ser Ser Glu Ala Trp Pro
    290                 295                 300

Pro Val Gly Thr Pro Pro Ser Ser Glu Ser Glu Pro Val Arg Thr Ser
305                 310                 315                 320

Arg Glu His Pro Val Pro Leu Leu Pro Ile Arg Gln Thr Leu Pro Glu
                325                 330                 335

Asp Asn Glu Glu Pro Pro Ala Leu Pro Pro Arg Thr Leu Glu Gly Leu
            340                 345                 350

Gln Val Glu Glu Glu Pro Val Tyr Glu Ala Glu Pro Glu Pro Glu Pro
        355                 360                 365

Glu Pro Glu Pro Glu Pro Glu Asn Asp Tyr Glu Asp Val Glu Glu Met
    370                 375                 380

Asp Arg His Glu Gln Glu Asp Glu Pro Glu Gly Asp Tyr Glu Glu Val
385                 390                 395                 400

Leu Glu Pro Glu Asp Ser Ser Phe Ser Ser Ala Leu Ala Gly Ser Ser
                405                 410                 415

Gly Cys Pro Ala Gly Ala Gly Ala Gly Ala Val Ala Leu Gly Ile Ser
            420                 425                 430

Ala Val Ala Leu Tyr Asp Tyr Gln Gly Glu Gly Ser Asp Glu Leu Ser
        435                 440                 445

Phe Asp Pro Asp Asp Val Ile Thr Asp Ile Glu Met Val Asp Glu Gly
    450                 455                 460

Trp Trp Arg Gly Arg Cys His Gly His Phe Gly Leu Phe Pro Ala Asn
465                 470                 475                 480

Tyr Val Lys Leu Leu Glu
                485
```

<210> 4426
<211> 316
<212> PRT
<213> Homo sapiens

<220>
<223> AKR1B1 (NCBI Accession: NP_001619)

<400> 4426
Met Ala Ser Arg Leu Leu Leu Asn Asn Gly Ala Lys Met Pro Ile Leu
1   5   10   15

Gly Leu Gly Thr Trp Lys Ser Pro Pro Gly Gln Val Thr Glu Ala Val
            20   25   30

Lys Val Ala Ile Asp Val Gly Tyr Arg His Ile Asp Cys Ala His Val
        35   40   45

Tyr Gln Asn Glu Asn Glu Val Gly Val Ala Ile Gln Glu Lys Leu Arg
    50   55   60

Glu Gln Val Val Lys Arg Glu Glu Leu Phe Ile Val Ser Lys Leu Trp
65   70   75   80

Cys Thr Tyr His Glu Lys Gly Leu Val Lys Gly Ala Cys Gln Lys Thr
                85   90   95

Leu Ser Asp Leu Lys Leu Asp Tyr Leu Asp Leu Tyr Leu Ile His Trp
            100   105   110

Pro Thr Gly Phe Lys Pro Gly Lys Glu Phe Phe Pro Leu Asp Glu Ser
        115   120   125

Gly Asn Val Val Pro Ser Asp Thr Asn Ile Leu Asp Thr Trp Ala Ala
    130   135   140

Met Glu Glu Leu Val Asp Glu Gly Leu Val Lys Ala Ile Gly Ile Ser
145   150   155   160

Asn Phe Asn His Leu Gln Val Glu Met Ile Leu Asn Lys Pro Gly Leu
                165   170   175

Lys Tyr Lys Pro Ala Val Asn Gln Ile Glu Cys His Pro Tyr Leu Thr
            180   185   190

Gln Glu Lys Leu Ile Gln Tyr Cys Gln Ser Lys Gly Ile Val Val Thr
        195   200   205

Ala Tyr Ser Pro Leu Gly Ser Pro Asp Arg Pro Trp Ala Lys Pro Glu
    210   215   220

Asp Pro Ser Leu Leu Glu Asp Pro Arg Ile Lys Ala Ile Ala Ala Lys
225   230   235   240

```
His Asn Lys Thr Thr Ala Gln Val Leu Ile Arg Phe Pro Met Gln Arg
                245                 250                 255

Asn Leu Val Val Ile Pro Lys Ser Val Thr Pro Glu Arg Ile Ala Glu
            260                 265                 270

Asn Phe Lys Val Phe Asp Phe Glu Leu Ser Ser Gln Asp Met Thr Thr
        275                 280                 285

Leu Leu Ser Tyr Asn Arg Asn Trp Arg Val Cys Ala Leu Leu Ser Cys
    290                 295                 300

Thr Ser His Lys Asp Tyr Pro Phe His Glu Glu Phe
305                 310                 315
```

<210> 4427
<211> 361
<212> PRT
<213> Homo sapiens

<220>
<223> SURF6 (NCBI Accession: NP_006744)

<400> 4427

```
Met Ala Ser Leu Leu Ala Lys Asp Ala Tyr Leu Gln Ser Leu Ala Lys
1               5                   10                  15

Lys Ile Cys Ser His Ser Ala Pro Glu Gln Gln Ala Arg Thr Arg Ala
            20                  25                  30

Gly Lys Thr Gln Gly Ser Glu Thr Ala Gly Pro Pro Lys Lys Lys Arg
        35                  40                  45

Lys Lys Thr Gln Lys Lys Phe Arg Lys Arg Glu Glu Lys Ala Ala Glu
    50                  55                  60

His Lys Ala Lys Ser Leu Gly Glu Lys Ser Pro Ala Ala Ser Gly Ala
65                  70                  75                  80

Arg Arg Pro Glu Ala Ala Lys Glu Glu Ala Ala Trp Ala Ser Ser Ser
                85                  90                  95

Ala Gly Asn Pro Ala Asp Gly Leu Ala Thr Glu Pro Glu Ser Val Phe
            100                 105                 110

Ala Leu Asp Val Leu Arg Gln Arg Leu His Glu Lys Ile Gln Glu Ala
        115                 120                 125

Arg Gly Gln Gly Ser Ala Lys Glu Leu Ser Pro Ala Ala Leu Glu Lys
    130                 135                 140

Arg Arg Arg Arg Lys Gln Glu Arg Asp Arg Lys Lys Arg Lys Arg Lys
145                 150                 155                 160
```

```
Glu Leu Arg Ala Lys Glu Lys Ala Arg Lys Ala Glu Glu Ala Thr Glu
                165                 170                 175

Ala Gln Glu Val Val Glu Ala Thr Pro Glu Gly Ala Cys Thr Glu Pro
            180                 185                 190

Arg Glu Pro Pro Gly Leu Ile Phe Asn Lys Val Glu Val Ser Glu Asp
        195                 200                 205

Glu Pro Ala Ser Lys Ala Gln Arg Arg Lys Glu Lys Arg Gln Arg Val
    210                 215                 220

Lys Gly Asn Leu Thr Pro Leu Thr Gly Arg Asn Tyr Arg Gln Leu Leu
225                 230                 235                 240

Glu Arg Leu Gln Ala Arg Gln Ser Arg Leu Asp Glu Leu Arg Gly Gln
                245                 250                 255

Asp Glu Gly Lys Ala Gln Glu Leu Glu Ala Lys Met Lys Trp Thr Asn
            260                 265                 270

Leu Leu Tyr Lys Ala Glu Gly Val Lys Ile Arg Asp Asp Glu Arg Leu
        275                 280                 285

Leu Gln Glu Ala Leu Lys Arg Lys Glu Lys Arg Arg Ala Gln Arg Gln
    290                 295                 300

Arg Arg Trp Glu Lys Arg Thr Ala Gly Val Val Glu Lys Met Gln Gln
305                 310                 315                 320

Arg Gln Asp Arg Arg Arg Gln Asn Leu Arg Arg Lys Lys Ala Ala Arg
                325                 330                 335

Ala Glu Arg Arg Leu Leu Arg Ala Arg Lys Lys Gly Arg Ile Leu Pro
            340                 345                 350

Gln Asp Leu Glu Arg Ala Gly Leu Val
        355                 360

<210> 4428
<211> 261
<212> PRT
<213> Homo sapiens

<220>
<223> PCNA (NCBI Accession: NP_002583)

<400> 4428
Met Phe Glu Ala Arg Leu Val Gln Gly Ser Ile Leu Lys Lys Val Leu
1               5                   10                  15

Glu Ala Leu Lys Asp Leu Ile Asn Glu Ala Cys Trp Asp Ile Ser Ser
            20                  25                  30
```

```
Ser Gly Val Asn Leu Gln Ser Met Asp Ser Ser His Val Ser Leu Val
        35                  40                  45

Gln Leu Thr Leu Arg Ser Glu Gly Phe Asp Thr Tyr Arg Cys Asp Arg
    50                  55                  60

Asn Leu Ala Met Gly Val Asn Leu Thr Ser Met Ser Lys Ile Leu Lys
65                  70                  75                  80

Cys Ala Gly Asn Glu Asp Ile Ile Thr Leu Arg Ala Glu Asp Asn Ala
                85                  90                  95

Asp Thr Leu Ala Leu Val Phe Glu Ala Pro Asn Gln Glu Lys Val Ser
            100                 105                 110

Asp Tyr Glu Met Lys Leu Met Asp Leu Asp Val Glu Gln Leu Gly Ile
        115                 120                 125

Pro Glu Gln Glu Tyr Ser Cys Val Val Lys Met Pro Ser Gly Glu Phe
    130                 135                 140

Ala Arg Ile Cys Arg Asp Leu Ser His Ile Gly Asp Ala Val Val Ile
145                 150                 155                 160

Ser Cys Ala Lys Asp Gly Val Lys Phe Ser Ala Ser Gly Glu Leu Gly
                165                 170                 175

Asn Gly Asn Ile Lys Leu Ser Gln Thr Ser Asn Val Asp Lys Glu Glu
            180                 185                 190

Glu Ala Val Thr Ile Glu Met Asn Glu Pro Val Gln Leu Thr Phe Ala
        195                 200                 205

Leu Arg Tyr Leu Asn Phe Phe Thr Lys Ala Thr Pro Leu Ser Ser Thr
    210                 215                 220

Val Thr Leu Ser Met Ser Ala Asp Val Pro Leu Val Val Glu Tyr Lys
225                 230                 235                 240

Ile Ala Asp Met Gly His Leu Lys Tyr Tyr Leu Ala Pro Lys Ile Glu
                245                 250                 255

Asp Glu Glu Gly Ser
            260
```

<210> 4429
<211> 92
<212> PRT
<213> Homo sapiens

<220>
<223> S100B (NCBI Accession: NP_006263)

<400> 4429
Met Ser Glu Leu Glu Lys Ala Met Val Ala Leu Ile Asp Val Phe His
1   5   10   15

Gln Tyr Ser Gly Arg Glu Gly Asp Lys His Lys Leu Lys Lys Ser Glu
            20   25   30

Leu Lys Glu Leu Ile Asn Asn Glu Leu Ser His Phe Leu Glu Glu Ile
        35   40   45

Lys Glu Gln Glu Val Val Asp Lys Val Met Glu Thr Leu Asp Asn Asp
    50   55   60

Gly Asp Gly Glu Cys Asp Phe Gln Glu Phe Met Ala Phe Val Ala Met
65   70   75   80

Val Thr Thr Ala Cys His Glu Phe Phe Glu His Glu
                85   90

<210> 4430
<211> 586
<212> PRT
<213> Homo sapiens

<220>
<223> CHEK2 (NCBI Accession: NP_001005735)

<400> 4430
Met Ser Arg Glu Ser Asp Val Glu Ala Gln Gln Ser His Gly Ser Ser
1   5   10   15

Ala Cys Ser Gln Pro His Gly Ser Val Thr Gln Ser Gln Gly Ser Ser
            20   25   30

Ser Gln Ser Gln Gly Ile Ser Ser Ser Ser Thr Ser Thr Met Pro Asn
        35   40   45

Ser Ser Gln Ser Ser His Ser Ser Ser Gly Thr Leu Ser Ser Leu Glu
    50   55   60

Thr Val Ser Thr Gln Glu Leu Tyr Ser Ile Pro Glu Asp Gln Glu Pro
65   70   75   80

Glu Asp Gln Glu Pro Glu Glu Pro Thr Pro Ala Pro Trp Ala Arg Leu
                85   90   95

Trp Ala Leu Gln Asp Gly Phe Ala Asn Leu Glu Thr Glu Ser Gly His
            100   105   110

Val Thr Gln Ser Asp Leu Glu Leu Leu Leu Ser Ser Asp Pro Pro Ala
        115   120   125

Ser Ala Ser Gln Ser Ala Gly Ile Arg Gly Val Arg His His Pro Arg
    130   135   140

```
Pro Val Cys Ser Leu Lys Cys Val Asn Asp Asn Tyr Trp Phe Gly Arg
145                 150                 155                 160

Asp Lys Ser Cys Glu Tyr Cys Phe Asp Glu Pro Leu Leu Lys Arg Thr
                165                 170                 175

Asp Lys Tyr Arg Thr Tyr Ser Lys Lys His Phe Arg Ile Phe Arg Glu
            180                 185                 190

Val Gly Pro Lys Asn Ser Tyr Ile Ala Tyr Ile Glu Asp His Ser Gly
        195                 200                 205

Asn Gly Thr Phe Val Asn Thr Glu Leu Val Gly Lys Gly Lys Arg Arg
    210                 215                 220

Pro Leu Asn Asn Asn Ser Glu Ile Ala Leu Ser Leu Ser Arg Asn Lys
225                 230                 235                 240

Val Phe Val Phe Phe Asp Leu Thr Val Asp Asp Gln Ser Val Tyr Pro
                245                 250                 255

Lys Ala Leu Arg Asp Glu Tyr Ile Met Ser Lys Thr Leu Gly Ser Gly
            260                 265                 270

Ala Cys Gly Glu Val Lys Leu Ala Phe Glu Arg Lys Thr Cys Lys Lys
        275                 280                 285

Val Ala Ile Lys Ile Ile Ser Lys Arg Lys Phe Ala Ile Gly Ser Ala
    290                 295                 300

Arg Glu Ala Asp Pro Ala Leu Asn Val Glu Thr Glu Ile Glu Ile Leu
305                 310                 315                 320

Lys Lys Leu Asn His Pro Cys Ile Ile Lys Ile Lys Asn Phe Phe Asp
                325                 330                 335

Ala Glu Asp Tyr Tyr Ile Val Leu Glu Leu Met Glu Gly Gly Glu Leu
            340                 345                 350

Phe Asp Lys Val Val Gly Asn Lys Arg Leu Lys Glu Ala Thr Cys Lys
        355                 360                 365

Leu Tyr Phe Tyr Gln Met Leu Leu Ala Val Gln Tyr Leu His Glu Asn
    370                 375                 380

Gly Ile Ile His Arg Asp Leu Lys Pro Glu Asn Val Leu Leu Ser Ser
385                 390                 395                 400

Gln Glu Glu Asp Cys Leu Ile Lys Ile Thr Asp Phe Gly His Ser Lys
                405                 410                 415

Ile Leu Gly Glu Thr Ser Leu Met Arg Thr Leu Cys Gly Thr Pro Thr
            420                 425                 430
```

```
Tyr Leu Ala Pro Glu Val Leu Val Ser Val Gly Thr Ala Gly Tyr Asn
        435                 440                 445

Arg Ala Val Asp Cys Trp Ser Leu Gly Val Ile Leu Phe Ile Cys Leu
    450                 455                 460

Ser Gly Tyr Pro Pro Phe Ser Glu His Arg Thr Gln Val Ser Leu Lys
465                 470                 475                 480

Asp Gln Ile Thr Ser Gly Lys Tyr Asn Phe Ile Pro Glu Val Trp Ala
                485                 490                 495

Glu Val Ser Glu Lys Ala Leu Asp Leu Val Lys Lys Leu Leu Val Val
            500                 505                 510

Asp Pro Lys Ala Arg Phe Thr Thr Glu Glu Ala Leu Arg His Pro Trp
        515                 520                 525

Leu Gln Asp Glu Asp Met Lys Arg Lys Phe Gln Asp Leu Leu Ser Glu
    530                 535                 540

Glu Asn Glu Ser Thr Ala Leu Pro Gln Val Leu Ala Gln Pro Ser Thr
545                 550                 555                 560

Ser Arg Lys Arg Pro Arg Glu Gly Glu Ala Glu Gly Ala Glu Thr Thr
                565                 570                 575

Lys Arg Pro Ala Val Cys Ala Ala Val Leu
            580                 585

<210> 4431
<211> 343
<212> PRT
<213> Homo sapiens

<220>
<223> ANKRD53 (NCBI Accession: NP_079209)

<400> 4431
Met Ala Ser Ala Gly Ser Thr Ala Arg Arg Ala Gly Ser Gly Ser Trp
1               5                   10                  15

His Ser Glu Arg Gly Glu Gly Arg Gly Ala Arg Pro Gln Pro Thr Pro
            20                  25                  30

Ser Gly Ser Met Gln Gln Ala Asn Lys Val Ser Leu Lys Ala Thr Trp
        35                  40                  45

Thr Asp Ala Glu Ser Lys Gln Pro Ser Gln Pro Leu Pro Asp Leu Ala
    50                  55                  60

Asp His Leu Ser Ala Gln Ala Thr Ala Leu Ala Arg Pro Arg Arg Pro
65                  70                  75                  80
```

```
Ala Ser Leu Thr Pro Pro Arg Ala Asp Pro Ser Pro Ser Lys Glu Ser
                85                  90                  95

Asp Gln Thr Ala Ile Asp Gln Thr Ala Ile Gly Ser Tyr Tyr Gln Leu
            100                 105                 110

Phe Ala Ala Ala Val Gly Asn Val Glu Trp Leu Arg Phe Cys Leu Asn
        115                 120                 125

Gln Ser Leu Arg Glu Ile Pro Thr Asp Asp Lys Gly Phe Thr Ala Ile
    130                 135                 140

His Phe Ala Ala Gln Trp Gly Lys Leu Ala Cys Leu Gln Val Leu Val
145                 150                 155                 160

Glu Glu Tyr Lys Phe Pro Val Asp Leu Leu Thr Asn Asn Ser Gln Thr
                165                 170                 175

Pro Leu His Leu Val Ile His Arg Asp Asn Thr Thr Val Ala Leu Pro
            180                 185                 190

Cys Ile Tyr Tyr Leu Leu Glu Lys Gly Ala Asp Leu Asn Ala Gln Thr
        195                 200                 205

Cys Asn Gly Ser Thr Pro Leu His Leu Ala Ala Arg Asp Gly Leu Leu
    210                 215                 220

Asp Cys Val Lys Val Leu Val Gln Ser Gly Ala Asn Val His Ala Gln
225                 230                 235                 240

Asp Ala Met Gly Tyr Lys Pro Ile Asp Phe Cys Lys Ile Trp Asn His
                245                 250                 255

Arg Ala Cys Ala Arg Phe Leu Lys Asp Ala Met Trp Lys Lys Asp Lys
            260                 265                 270

Lys Asp Phe Ala Arg Glu Met Thr Lys Met Lys Met Phe Lys Ser Gln
        275                 280                 285

Leu Thr Leu Met Glu His Asn Tyr Leu Ile Glu Tyr Gln Gly Gln Gly
    290                 295                 300

Cys Ser Val His Phe Pro Phe Ala Phe Ser Pro Ile Thr Pro Glu Thr
305                 310                 315                 320

Leu Leu Trp Gln Asp Ile Ser Leu Leu Ser Asp Cys Gly Phe Leu Trp
                325                 330                 335

Arg Arg Arg Glu Leu Ser Phe
            340
```

<210> 4432
<211> 409

<212> PRT
<213> Homo sapiens

<220>
<223> KLRG2 (NCBI Accession: NP_940910)

<400> 4432
Met Glu Glu Ser Trp Glu Ala Ala Pro Gly Gly Gln Ala Gly Ala Glu
1   5   10   15

Leu Pro Met Glu Pro Val Gly Ser Leu Val Pro Thr Leu Glu Gln Pro
            20   25   30

Gln Val Pro Ala Lys Val Arg Gln Pro Glu Gly Pro Glu Ser Ser Pro
        35   40   45

Ser Pro Ala Gly Ala Val Glu Lys Ala Ala Gly Ala Gly Leu Glu Pro
    50   55   60

Ser Ser Lys Lys Lys Pro Pro Ser Pro Arg Pro Gly Ser Pro Arg Val
65   70   75   80

Pro Pro Leu Ser Leu Gly Tyr Gly Val Cys Pro Glu Pro Pro Ser Pro
                85   90   95

Gly Pro Ala Leu Val Lys Leu Pro Arg Asn Gly Glu Ala Pro Gly Ala
            100   105   110

Glu Pro Ala Pro Ser Ala Trp Ala Pro Met Glu Leu Gln Val Asp Val
        115   120   125

Arg Val Lys Pro Val Gly Ala Ala Gly Gly Ser Ser Thr Pro Ser Pro
    130   135   140

Arg Pro Ser Thr Arg Phe Leu Lys Val Pro Val Pro Glu Ser Pro Ala
145   150   155   160

Phe Ser Arg His Ala Asp Pro Ala His Gln Leu Leu Leu Arg Ala Pro
                165   170   175

Ser Gln Gly Gly Thr Trp Gly Arg Arg Ser Pro Leu Ala Ala Ala Arg
            180   185   190

Thr Glu Ser Gly Cys Asp Ala Glu Gly Arg Ala Ser Pro Ala Glu Gly
        195   200   205

Ser Ala Gly Ser Pro Gly Ser Pro Thr Cys Cys Arg Cys Lys Glu Leu
    210   215   220

Gly Leu Glu Lys Glu Asp Ala Ala Leu Leu Pro Arg Ala Gly Leu Asp
225   230   235   240

Gly Asp Glu Lys Leu Pro Arg Ala Val Thr Leu Thr Gly Leu Pro Met
                245   250   255

```
Tyr Val Lys Ser Leu Tyr Trp Ala Leu Ala Phe Met Ala Val Leu Leu
            260                 265                 270

Ala Val Ser Gly Val Val Ile Val Val Leu Ala Ser Arg Ala Gly Ala
        275                 280                 285

Arg Cys Gln Gln Cys Pro Pro Gly Trp Val Leu Ser Glu Glu His Cys
    290                 295                 300

Tyr Tyr Phe Ser Ala Glu Ala Gln Ala Trp Glu Ala Ser Gln Ala Phe
305                 310                 315                 320

Cys Ser Ala Tyr His Ala Thr Leu Pro Leu Leu Ser His Thr Gln Asp
                325                 330                 335

Phe Leu Gly Arg Tyr Pro Val Ser Arg His Ser Trp Val Gly Ala Trp
            340                 345                 350

Arg Gly Pro Gln Gly Trp His Trp Ile Asp Glu Ala Pro Leu Pro Pro
        355                 360                 365

Gln Leu Leu Pro Glu Asp Gly Glu Asp Asn Leu Asp Ile Asn Cys Gly
    370                 375                 380

Ala Leu Glu Glu Gly Thr Leu Val Ala Ala Asn Cys Ser Thr Pro Arg
385                 390                 395                 400

Pro Trp Val Cys Ala Lys Gly Thr Gln
                405
```

<210> 4433
<211> 493
<212> PRT
<213> Homo sapiens

<220>
<223> TRIM35 (NCBI Accession: NP_741983)

<400> 4433

```
Met Glu Arg Ser Pro Asp Val Ser Pro Gly Pro Ser Arg Ser Phe Lys
1               5                   10                  15

Glu Glu Leu Leu Cys Ala Val Cys Tyr Asp Pro Phe Arg Asp Ala Val
            20                  25                  30

Thr Leu Arg Cys Gly His Asn Phe Cys Arg Gly Cys Val Ser Arg Cys
        35                  40                  45

Trp Glu Val Gln Val Ser Pro Thr Cys Pro Val Cys Lys Asp Arg Ala
    50                  55                  60

Ser Pro Ala Asp Leu Arg Thr Asn His Thr Leu Asn Asn Leu Val Glu
65                  70                  75                  80
```

```
Lys Leu Leu Arg Glu Glu Ala Glu Gly Ala Arg Trp Thr Ser Tyr Arg
                85                  90                  95

Phe Ser Arg Val Cys Arg Leu His Arg Gly Gln Leu Ser Leu Phe Cys
            100                 105                 110

Leu Glu Asp Lys Glu Leu Leu Cys Cys Ser Cys Gln Ala Asp Pro Arg
        115                 120                 125

His Gln Gly His Arg Val Gln Pro Val Lys Asp Thr Ala His Asp Phe
    130                 135                 140

Arg Ala Lys Cys Arg Asn Met Glu His Ala Leu Arg Glu Lys Ala Lys
145                 150                 155                 160

Ala Phe Trp Ala Met Arg Arg Ser Tyr Glu Ala Ile Ala Lys His Asn
                165                 170                 175

Gln Val Glu Ala Ala Trp Leu Glu Gly Arg Ile Arg Gln Glu Phe Asp
            180                 185                 190

Lys Leu Arg Glu Phe Leu Arg Val Glu Glu Gln Ala Ile Leu Asp Ala
        195                 200                 205

Met Ala Glu Glu Thr Arg Gln Lys Gln Leu Leu Ala Asp Glu Lys Met
    210                 215                 220

Lys Gln Leu Thr Glu Glu Thr Glu Val Leu Ala His Glu Ile Glu Arg
225                 230                 235                 240

Leu Gln Met Glu Met Lys Glu Asp Asp Val Ser Phe Leu Met Lys His
                245                 250                 255

Lys Ser Arg Lys Arg Arg Leu Phe Cys Thr Met Glu Pro Glu Pro Val
            260                 265                 270

Gln Pro Gly Met Leu Ile Asp Val Cys Lys Tyr Leu Gly Ser Leu Gln
        275                 280                 285

Tyr Arg Val Trp Lys Lys Met Leu Ala Ser Val Glu Ser Val Pro Phe
    290                 295                 300

Ser Phe Asp Pro Asn Thr Ala Ala Gly Trp Leu Ser Val Ser Asp Asp
305                 310                 315                 320

Leu Thr Ser Val Thr Asn His Gly Tyr Arg Val Gln Val Glu Asn Pro
                325                 330                 335

Glu Arg Phe Ser Ser Ala Pro Cys Leu Leu Gly Ser Arg Val Phe Ser
            340                 345                 350

Gln Gly Ser His Ala Trp Glu Val Ala Leu Gly Gly Leu Gln Ser Trp
        355                 360                 365
```

```
Arg Val Gly Val Val Arg Val Arg Gln Asp Ser Gly Ala Glu Gly His
    370                 375                 380

Ser His Ser Cys Tyr His Asp Thr Arg Ser Gly Phe Trp Tyr Val Cys
385                 390                 395                 400

Arg Thr Gln Gly Val Glu Gly Asp His Cys Val Thr Ser Asp Pro Ala
                405                 410                 415

Thr Ser Pro Leu Val Leu Ala Ile Pro Arg Arg Leu Arg Val Glu Leu
            420                 425                 430

Glu Cys Glu Glu Gly Glu Leu Ser Phe Tyr Asp Ala Glu Arg His Cys
        435                 440                 445

His Leu Tyr Thr Phe His Ala Arg Phe Gly Glu Val Arg Pro Tyr Phe
    450                 455                 460

Tyr Leu Gly Gly Ala Arg Gly Ala Gly Pro Pro Glu Pro Leu Arg Ile
465                 470                 475                 480

Cys Pro Leu His Ile Ser Val Lys Glu Glu Leu Asp Gly
                485                 490
```

<210> 4434
<211> 673
<212> PRT
<213> Homo sapiens

<220>
<223> FXR2 (NCBI Accession: NP_004851)

<400> 4434

```
Met Gly Gly Leu Ala Ser Gly Gly Asp Val Glu Pro Gly Leu Pro Val
1               5                   10                  15

Glu Val Arg Gly Ser Asn Gly Ala Phe Tyr Lys Gly Phe Val Lys Asp
            20                  25                  30

Val His Glu Asp Ser Val Thr Ile Phe Phe Glu Asn Asn Trp Gln Ser
        35                  40                  45

Glu Arg Gln Ile Pro Phe Gly Asp Val Arg Leu Pro Pro Pro Ala Asp
    50                  55                  60

Tyr Asn Lys Glu Ile Thr Glu Gly Asp Glu Val Glu Val Tyr Ser Arg
65                  70                  75                  80

Ala Asn Glu Gln Glu Pro Cys Gly Trp Trp Leu Ala Arg Val Arg Met
                85                  90                  95

Met Lys Gly Asp Phe Tyr Val Ile Glu Tyr Ala Ala Cys Asp Ala Thr
            100                 105                 110
```

```
Tyr Asn Glu Ile Val Thr Leu Glu Arg Leu Arg Pro Val Asn Pro Asn
        115                 120                 125

Pro Leu Ala Thr Lys Gly Ser Phe Phe Lys Val Thr Met Ala Val Pro
    130                 135                 140

Glu Asp Leu Arg Glu Ala Cys Ser Asn Glu Asn Val His Lys Glu Phe
145                 150                 155                 160

Lys Lys Ala Leu Gly Ala Asn Cys Ile Phe Leu Asn Ile Thr Asn Ser
                165                 170                 175

Glu Leu Phe Ile Leu Ser Thr Thr Glu Ala Pro Val Lys Arg Ala Ser
            180                 185                 190

Leu Leu Gly Asp Met His Phe Arg Ser Leu Arg Thr Lys Leu Leu Leu
        195                 200                 205

Met Ser Arg Asn Glu Glu Ala Thr Lys His Leu Glu Thr Ser Lys Gln
    210                 215                 220

Leu Ala Ala Ala Phe Gln Glu Glu Phe Thr Val Arg Glu Asp Leu Met
225                 230                 235                 240

Gly Leu Ala Ile Gly Thr His Gly Ala Asn Ile His Gln Ala Arg Lys
                245                 250                 255

Val Pro Gly Val Thr Ala Ile Glu Leu Gly Glu Glu Thr Cys Thr Phe
            260                 265                 270

Arg Ile Tyr Gly Glu Thr Pro Glu Ala Cys Arg Gln Ala Arg Ser Tyr
        275                 280                 285

Leu Glu Phe Ser Glu Asp Ser Val Gln Val Pro Arg Asn Leu Val Gly
    290                 295                 300

Lys Val Ile Gly Lys Asn Gly Lys Val Ile Gln Glu Ile Val Asp Lys
305                 310                 315                 320

Ser Gly Val Val Arg Val Arg Val Glu Gly Asp Asn Asp Lys Lys Asn
                325                 330                 335

Pro Arg Glu Glu Gly Met Val Pro Phe Ile Phe Val Gly Thr Arg Glu
            340                 345                 350

Asn Ile Ser Asn Ala Gln Ala Leu Leu Glu Tyr His Leu Ser Tyr Leu
        355                 360                 365

Gln Glu Val Glu Gln Leu Arg Leu Glu Arg Leu Gln Ile Asp Glu Gln
    370                 375                 380

Leu Arg Gln Ile Gly Leu Gly Phe Arg Pro Pro Gly Ser Gly Arg Gly
385                 390                 395                 400
```

```
Ser Gly Gly Ser Asp Lys Ala Gly Tyr Ser Thr Asp Glu Ser Ser Ser
                405                 410                 415

Ser Ser Leu His Ala Thr Arg Thr Tyr Gly Gly Ser Tyr Gly Gly Arg
            420                 425                 430

Gly Arg Gly Arg Arg Thr Gly Gly Pro Ala Tyr Gly Pro Ser Ser Asp
        435                 440                 445

Val Ser Thr Ala Ser Glu Thr Glu Ser Glu Lys Arg Glu Glu Pro Asn
    450                 455                 460

Arg Ala Gly Pro Gly Asp Arg Asp Pro Pro Thr Arg Gly Glu Glu Ser
465                 470                 475                 480

Arg Arg Arg Pro Thr Gly Gly Arg Gly Arg Gly Pro Pro Pro Ala Pro
                485                 490                 495

Arg Pro Thr Ser Arg Tyr Asn Ser Ser Ser Ile Ser Ser Val Leu Lys
            500                 505                 510

Asp Pro Asp Ser Asn Pro Tyr Ser Leu Leu Asp Thr Ser Glu Pro Glu
        515                 520                 525

Pro Pro Val Asp Ser Glu Pro Gly Glu Pro Pro Pro Ala Ser Ala Arg
    530                 535                 540

Arg Arg Arg Ser Arg Arg Arg Arg Thr Asp Glu Asp Arg Thr Val Met
545                 550                 555                 560

Asp Gly Gly Leu Glu Ser Asp Gly Pro Asn Met Thr Glu Asn Gly Leu
                565                 570                 575

Glu Asp Glu Ser Arg Pro Gln Arg Arg Asn Arg Ser Arg Arg Arg Arg
            580                 585                 590

Asn Arg Gly Asn Arg Thr Asp Gly Ser Ile Ser Gly Asp Arg Gln Pro
        595                 600                 605

Val Thr Val Ala Asp Tyr Ile Ser Arg Ala Glu Ser Gln Ser Arg Gln
    610                 615                 620

Arg Pro Pro Leu Glu Arg Thr Lys Pro Ser Glu Asp Ser Leu Ser Gly
625                 630                 635                 640

Gln Lys Gly Asp Ser Val Ser Lys Leu Pro Lys Gly Pro Ser Glu Asn
                645                 650                 655

Gly Glu Leu Ser Ala Pro Leu Glu Leu Gly Ser Met Val Asn Gly Val
            660                 665                 670

Ser
```

<210> 4435
<211> 346
<212> PRT
<213> Homo sapiens

<220>
<223> ANXA1 (NCBI Accession: NP_000691)

<400> 4435
Met Ala Met Val Ser Glu Phe Leu Lys Gln Ala Trp Phe Ile Glu Asn
1   5   10   15

Glu Glu Gln Glu Tyr Val Gln Thr Val Lys Ser Ser Lys Gly Gly Pro
            20   25   30

Gly Ser Ala Val Ser Pro Tyr Pro Thr Phe Asn Pro Ser Ser Asp Val
        35   40   45

Ala Ala Leu His Lys Ala Ile Met Val Lys Gly Val Asp Glu Ala Thr
    50   55   60

Ile Ile Asp Ile Leu Thr Lys Arg Asn Asn Ala Gln Arg Gln Gln Ile
65   70   75   80

Lys Ala Ala Tyr Leu Gln Glu Thr Gly Lys Pro Leu Asp Glu Thr Leu
                85   90   95

Lys Lys Ala Leu Thr Gly His Leu Glu Glu Val Val Leu Ala Leu Leu
            100   105   110

Lys Thr Pro Ala Gln Phe Asp Ala Asp Glu Leu Arg Ala Ala Met Lys
        115   120   125

Gly Leu Gly Thr Asp Glu Asp Thr Leu Ile Glu Ile Leu Ala Ser Arg
    130   135   140

Thr Asn Lys Glu Ile Arg Asp Ile Asn Arg Val Tyr Arg Glu Glu Leu
145   150   155   160

Lys Arg Asp Leu Ala Lys Asp Ile Thr Ser Asp Thr Ser Gly Asp Phe
                165   170   175

Arg Asn Ala Leu Leu Ser Leu Ala Lys Gly Asp Arg Ser Glu Asp Phe
            180   185   190

Gly Val Asn Glu Asp Leu Ala Asp Ser Asp Ala Arg Ala Leu Tyr Glu
        195   200   205

Ala Gly Glu Arg Arg Lys Gly Thr Asp Val Asn Val Phe Asn Thr Ile
    210   215   220

Leu Thr Thr Arg Ser Tyr Pro Gln Leu Arg Arg Val Phe Gln Lys Tyr
225   230   235   240

```
Thr Lys Tyr Ser Lys His Asp Met Asn Lys Val Leu Asp Leu Glu Leu
                245                 250                 255

Lys Gly Asp Ile Glu Lys Cys Leu Thr Ala Ile Val Lys Cys Ala Thr
            260                 265                 270

Ser Lys Pro Ala Phe Phe Ala Glu Lys Leu His Gln Ala Met Lys Gly
        275                 280                 285

Val Gly Thr Arg His Lys Ala Leu Ile Arg Ile Met Val Ser Arg Ser
    290                 295                 300

Glu Ile Asp Met Asn Asp Ile Lys Ala Phe Tyr Gln Lys Met Tyr Gly
305                 310                 315                 320

Ile Ser Leu Cys Gln Ala Ile Leu Asp Glu Thr Lys Gly Asp Tyr Glu
                325                 330                 335

Lys Ile Leu Val Ala Leu Cys Gly Gly Asn
            340                 345
```

<210> 4436
<211> 754
<212> PRT
<213> Homo sapiens

<220>
<223> ZNF287 (NCBI Accession: NP_065704)

<400> 4436

```
Met Asn Ser Ser Ser Arg Ser Gln Ile Leu Leu Arg Trp Lys Ser Asp
1               5                   10                  15

Lys Ala Gln Ser Gly Pro Tyr Asn Val Glu Lys Glu Ile Leu Thr Ser
            20                  25                  30

Arg Phe Leu Arg Asp Thr Glu Thr Cys Arg Gln Asn Phe Arg Asn Phe
        35                  40                  45

Pro Tyr Pro Asp Leu Ala Gly Pro Arg Lys Ala Leu Ser Gln Leu Arg
    50                  55                  60

Glu Leu Cys Leu Lys Trp Leu Arg Pro Glu Ile His Ser Lys Glu Gln
65                  70                  75                  80

Ile Leu Glu Leu Leu Val Leu Glu Gln Phe Leu Thr Ile Leu Pro Gly
                85                  90                  95

Glu Val Arg Thr Trp Val Lys Ser Gln Tyr Pro Glu Ser Ser Glu Glu
            100                 105                 110

Ala Val Thr Leu Val Glu Asp Leu Thr Gln Ile Leu Glu Glu Glu Ala
        115                 120                 125
```

```
Pro Gln Asn Ser Thr Leu Ser Gln Asp Thr Pro Glu Glu Asp Pro Arg
    130                 135                 140

Gly Lys His Ala Phe Gln Thr Gly Trp Leu Asn Asp Leu Val Thr Lys
145                 150                 155                 160

Glu Ser Met Thr Phe Lys Asp Val Ala Val Asp Ile Thr Gln Glu Asp
                165                 170                 175

Trp Glu Leu Met Arg Pro Val Gln Lys Glu Leu Tyr Lys Thr Val Thr
            180                 185                 190

Leu Gln Asn Tyr Trp Asn Met Val Ser Leu Gly Leu Thr Val Tyr Arg
        195                 200                 205

Pro Thr Val Ile Pro Ile Leu Glu Glu Pro Trp Met Val Ile Lys Glu
    210                 215                 220

Ile Leu Glu Gly Pro Ser Pro Glu Trp Glu Thr Lys Ala Gln Ala Cys
225                 230                 235                 240

Thr Pro Val Glu Asp Met Ser Lys Leu Thr Lys Glu Glu Thr His Thr
                245                 250                 255

Ile Lys Leu Glu Asp Ser Tyr Asp Tyr Asp Asp Arg Leu Glu Arg Arg
            260                 265                 270

Gly Lys Gly Gly Phe Trp Lys Ile His Thr Asp Glu Arg Gly Phe Ser
        275                 280                 285

Leu Lys Ser Val Leu Ser Gln Glu Tyr Asp Pro Thr Glu Glu Cys Leu
    290                 295                 300

Ser Lys Tyr Asp Ile Tyr Arg Asn Asn Phe Glu Lys His Ser Asn Leu
305                 310                 315                 320

Ile Val Gln Phe Asp Thr Gln Leu Asp Asn Lys Thr Ser Val Tyr Asn
                325                 330                 335

Glu Gly Arg Ala Thr Phe Asn His Val Ser Tyr Gly Ile Val His Arg
            340                 345                 350

Lys Ile Leu Pro Gly Glu Lys Pro Tyr Lys Cys Asn Val Cys Gly Lys
        355                 360                 365

Lys Phe Arg Lys Tyr Pro Ser Leu Leu Lys His Gln Ser Thr His Ala
    370                 375                 380

Lys Glu Lys Ser Tyr Glu Cys Glu Glu Cys Gly Lys Glu Phe Arg His
385                 390                 395                 400

Ile Ser Ser Leu Ile Ala His Gln Arg Met His Thr Gly Glu Lys Pro
                405                 410                 415
```

```
Tyr Glu Cys His Gln Cys Gly Lys Ala Phe Ser Gln Arg Ala His Leu
            420                 425                 430

Thr Ile His Gln Arg Ile His Thr Gly Glu Lys Pro Tyr Lys Cys Asp
        435                 440                 445

Asp Cys Gly Lys Asp Phe Ser Gln Arg Ala His Leu Thr Ile His Gln
    450                 455                 460

Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Leu Glu Cys Gly Lys
465                 470                 475                 480

Thr Phe Ser His Ser Ser Ser Leu Ile Asn His Gln Arg Val His Thr
                485                 490                 495

Gly Glu Lys Pro Tyr Ile Cys Asn Glu Cys Gly Lys Thr Phe Ser Gln
            500                 505                 510

Ser Thr His Leu Leu Gln His Gln Lys Ile His Thr Gly Lys Lys Pro
        515                 520                 525

Tyr Lys Cys Asn Glu Cys Trp Lys Val Phe Ser Gln Ser Thr Tyr Leu
    530                 535                 540

Ile Arg His Gln Arg Ile His Ser Gly Glu Lys Cys Tyr Lys Cys Asn
545                 550                 555                 560

Glu Cys Gly Lys Ala Phe Ala His Ser Ser Thr Leu Ile Gln His Gln
                565                 570                 575

Thr Thr His Thr Gly Glu Lys Ser Tyr Ile Cys Asn Ile Cys Gly Lys
            580                 585                 590

Ala Phe Ser Gln Ser Ala Asn Leu Thr Gln His His Arg Thr His Thr
        595                 600                 605

Gly Glu Lys Pro Tyr Lys Cys Ser Val Cys Gly Lys Ala Phe Ser Gln
    610                 615                 620

Ser Val His Leu Thr Gln His Gln Arg Ile His Asn Gly Glu Lys Pro
625                 630                 635                 640

Phe Lys Cys Asn Ile Cys Gly Lys Ala Tyr Arg Gln Gly Ala Asn Leu
                645                 650                 655

Thr Gln His Gln Arg Ile His Thr Gly Glu Lys Pro Tyr Lys Cys Asn
            660                 665                 670

Glu Cys Gly Lys Ala Phe Ile Tyr Ser Ser Ser Leu Asn Gln His Gln
        675                 680                 685

Arg Thr His Thr Gly Glu Arg Pro Tyr Lys Cys Asn Glu Cys Asp Lys
    690                 695                 700
```

```
Asp Phe Ser Gln Arg Thr Cys Leu Ile Gln His Gln Arg Ile His Thr
705                 710                 715                 720

Gly Glu Lys Pro Tyr Ala Cys Arg Ile Cys Gly Lys Thr Phe Thr Gln
                725                 730                 735

Ser Thr Asn Leu Ile Gln His Gln Arg Val His Thr Gly Ala Lys His
            740                 745                 750

Arg Asn


<210> 4437
<211> 213
<212> PRT
<213> Homo sapiens

<220>
<223> FAM177A1 (NCBI Accession: NP_001072987)

<400> 4437
Met Asp Gln Glu Pro Val Gly Gly Val Glu Arg Gly Glu Ala Val Ala
1               5                   10                  15

Ala Ser Gly Ala Ala Ala Ala Ala Ala Phe Gly Glu Ser Ala Gly Gln
            20                  25                  30

Met Ser Asn Glu Arg Gly Phe Glu Asn Val Glu Leu Gly Val Ile Gly
        35                  40                  45

Lys Lys Lys Lys Val Pro Arg Arg Val Ile His Phe Val Ser Gly Glu
    50                  55                  60

Thr Met Glu Glu Tyr Ser Thr Asp Glu Asp Glu Val Asp Gly Leu Glu
65                  70                  75                  80

Lys Lys Asp Val Leu Pro Thr Val Asp Pro Thr Lys Leu Thr Trp Gly
                85                  90                  95

Pro Tyr Leu Trp Phe Tyr Met Leu Arg Ala Ala Thr Ser Thr Leu Ser
            100                 105                 110

Val Cys Asp Phe Leu Gly Glu Lys Ile Ala Ser Val Leu Gly Ile Ser
        115                 120                 125

Thr Pro Lys Tyr Gln Tyr Ala Ile Asp Glu Tyr Tyr Arg Met Lys Lys
    130                 135                 140

Glu Glu Glu Glu Glu Glu Glu Glu Asn Arg Met Ser Glu Glu Ala Glu
145                 150                 155                 160

Lys Gln Tyr Gln Gln Asn Lys Leu Gln Thr Asp Ser Ile Val Gln Thr
                165                 170                 175
```

```
Asp Gln Pro Glu Thr Val Ile Ser Ser Ser Phe Val Asn Val Asn Phe
            180                 185                 190

Glu Met Glu Gly Asp Ser Glu Val Ile Met Glu Ser Lys Gln Asn Pro
        195                 200                 205

Val Ser Val Pro Pro
    210
```

<210> 4438
<211> 244
<212> PRT
<213> Homo sapiens

<220>
<223> QDPR (NCBI Accession: NP_000311)

<400> 4438

```
Met Ala Ala Ala Ala Ala Ala Gly Glu Ala Arg Arg Val Leu Val Tyr
1               5                   10                  15

Gly Gly Arg Gly Ala Leu Gly Ser Arg Cys Val Gln Ala Phe Arg Ala
            20                  25                  30

Arg Asn Trp Trp Val Ala Ser Val Asp Val Val Glu Asn Glu Glu Ala
        35                  40                  45

Ser Ala Ser Ile Ile Val Lys Met Thr Asp Ser Phe Thr Glu Gln Ala
    50                  55                  60

Asp Gln Val Thr Ala Glu Val Gly Lys Leu Leu Gly Glu Glu Lys Val
65                  70                  75                  80

Asp Ala Ile Leu Cys Val Ala Gly Gly Trp Ala Gly Gly Asn Ala Lys
                85                  90                  95

Ser Lys Ser Leu Phe Lys Asn Cys Asp Leu Met Trp Lys Gln Ser Ile
            100                 105                 110

Trp Thr Ser Thr Ile Ser Ser His Leu Ala Thr Lys His Leu Lys Glu
        115                 120                 125

Gly Gly Leu Leu Thr Leu Ala Gly Ala Lys Ala Ala Leu Asp Gly Thr
    130                 135                 140

Pro Gly Met Ile Gly Tyr Gly Met Ala Lys Gly Ala Val His Gln Leu
145                 150                 155                 160

Cys Gln Ser Leu Ala Gly Lys Asn Ser Gly Met Pro Pro Gly Ala Ala
                165                 170                 175

Ala Ile Ala Val Leu Pro Val Thr Leu Asp Thr Pro Met Asn Arg Lys
            180                 185                 190
```

```
Ser Met Pro Glu Ala Asp Phe Ser Ser Trp Thr Pro Leu Glu Phe Leu
        195                 200                 205

Val Glu Thr Phe His Asp Trp Ile Thr Gly Lys Asn Arg Pro Ser Ser
    210                 215                 220

Gly Ser Leu Ile Gln Val Val Thr Thr Glu Gly Arg Thr Glu Leu Thr
225                 230                 235                 240

Pro Ala Tyr Phe


<210> 4439
<211> 194
<212> PRT
<213> Homo sapiens

<220>
<223> BC031259.1_frag

<400> 4439
Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser
1               5                   10                  15

His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu
            20                  25                  30

Val His Asn Ala Lys Thr Lys Pro Trp Glu Glu Gln Tyr Asn Ser Thr
        35                  40                  45

Tyr His Val Val Ser Val Leu Thr Val Val His Gln Asn Trp Leu Asn
    50                  55                  60

Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Gln Ala Pro
65                  70                  75                  80

Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Gln Pro Arg Glu Pro Gln
                85                  90                  95

Val Tyr Thr Leu Pro Pro Ser Gln Lys Met Thr Lys Asn Gln Val Thr
            100                 105                 110

Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu
        115                 120                 125

Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
    130                 135                 140

Met Leu Asp Ser Asn Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val
145                 150                 155                 160

Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met
                165                 170                 175
```

```
His Glu Gly Leu Gln Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser
            180                 185                 190

Pro Gly
```

<210> 4440
<211> 264
<212> PRT
<213> Homo sapiens

<220>
<223> METTL21C (NCBI Accession: NP_001010977)

<400> 4440

```
Met Asp Val Cys Leu Ser Ser Ala Gln Gln Pro Gly Arg Arg Gly Glu
1               5                   10                  15

Gly Leu Ser Ser Pro Gly Gly Trp Leu Glu Ala Glu Lys Lys Gly Ala
            20                  25                  30

Pro Gln Lys Asp Ser Thr Gly Gly Val Leu Glu Glu Ser Asn Lys Ile
        35                  40                  45

Glu Pro Ser Leu His Ser Leu Gln Lys Phe Val Pro Thr Asp Tyr Ala
    50                  55                  60

Ser Tyr Thr Gln Glu His Tyr Arg Phe Ala Gly Lys Glu Ile Val Ile
65                  70                  75                  80

Gln Glu Ser Ile Glu Ser Tyr Gly Ala Val Val Trp Pro Gly Ala Met
                85                  90                  95

Ala Leu Cys Gln Tyr Leu Glu Glu His Ala Glu Glu Leu Asn Phe Gln
            100                 105                 110

Asp Ala Lys Ile Leu Glu Ile Gly Ala Gly Pro Gly Leu Val Ser Ile
        115                 120                 125

Val Ala Ser Ile Leu Gly Ala Gln Val Thr Ala Thr Asp Leu Pro Asp
    130                 135                 140

Val Leu Gly Asn Leu Gln Tyr Asn Leu Leu Lys Asn Thr Leu Gln Cys
145                 150                 155                 160

Thr Ala His Leu Pro Glu Val Lys Glu Leu Val Trp Gly Glu Asp Leu
                165                 170                 175

Asp Lys Asn Phe Pro Lys Ser Ala Phe Tyr Tyr Asp Tyr Val Leu Ala
            180                 185                 190

Ser Asp Val Val Tyr His His Tyr Phe Leu Asp Lys Leu Leu Thr Thr
        195                 200                 205
```

Met Val Tyr Leu Ser Gln Pro Gly Thr Val Leu Leu Trp Ala Asn Lys
210 215 220

Phe Arg Phe Ser Thr Asp Tyr Glu Phe Leu Asp Lys Phe Lys Gln Val
225 230 235 240

Phe Asp Thr Thr Leu Leu Ala Glu Tyr Pro Glu Ser Ser Val Lys Leu
245 250 255

Phe Lys Gly Ile Leu Lys Trp Asp
260

<210> 4441
<211> 344
<212> PRT
<213> Homo sapiens

<220>
<223> HMBS (NCBI Accession: XP_005271589)

<400> 4441
Met Arg Val Ile Arg Val Gly Thr Arg Lys Ser Gln Leu Ala Arg Ile
1 5 10 15

Gln Thr Asp Ser Val Val Ala Thr Leu Lys Ala Ser Tyr Pro Gly Leu
20 25 30

Gln Phe Glu Ile Ile Ala Met Ser Thr Thr Gly Asp Lys Ile Leu Asp
35 40 45

Thr Ala Leu Ser Lys Ile Gly Glu Lys Ser Leu Phe Thr Lys Glu Leu
50 55 60

Glu His Ala Leu Glu Lys Asn Glu Val Asp Leu Val Val His Ser Leu
65 70 75 80

Lys Asp Leu Pro Thr Val Leu Pro Pro Gly Phe Thr Ile Gly Ala Ile
85 90 95

Cys Lys Arg Glu Asn Pro His Asp Ala Val Val Phe His Pro Lys Phe
100 105 110

Val Gly Lys Thr Leu Glu Thr Leu Pro Glu Lys Ser Val Val Gly Thr
115 120 125

Ser Ser Leu Arg Arg Ala Ala Gln Leu Gln Arg Lys Phe Pro His Leu
130 135 140

Glu Phe Arg Ser Ile Arg Gly Asn Leu Asn Thr Arg Leu Arg Lys Leu
145 150 155 160

Asp Glu Gln Gln Glu Phe Ser Ala Ile Ile Leu Ala Thr Ala Gly Leu
165 170 175

```
Gln Arg Met Gly Trp His Asn Arg Val Gly Gln Ile Leu His Pro Glu
            180                 185                 190

Glu Cys Met Tyr Ala Val Gly Gln Gly Ala Leu Gly Val Glu Val Arg
        195                 200                 205

Ala Lys Asp Gln Asp Ile Leu Asp Leu Val Gly Val Leu His Asp Pro
    210                 215                 220

Glu Thr Leu Leu Arg Cys Ile Ala Glu Arg Ala Phe Leu Arg His Leu
225                 230                 235                 240

Glu Gly Gly Cys Ser Val Pro Val Ala Val His Thr Ala Met Lys Asp
                245                 250                 255

Gly Gln Leu Tyr Leu Thr Gly Gly Val Trp Ser Leu Asp Gly Ser Asp
            260                 265                 270

Ser Ile Gln Glu Thr Met Gln Ala Thr Ile His Val Pro Ala Gln His
        275                 280                 285

Glu Asp Gly Pro Glu Asp Asp Pro Gln Leu Val Gly Ile Thr Ala Arg
    290                 295                 300

Asn Ile Pro Arg Gly Pro Gln Leu Ala Ala Gln Asn Leu Gly Ile Ser
305                 310                 315                 320

Leu Ala Asn Leu Leu Leu Ser Lys Gly Ala Lys Asn Ile Leu Asp Val
                325                 330                 335

Ala Arg Gln Leu Asn Asp Ala His
            340

<210> 4442
<211> 717
<212> PRT
<213> Homo sapiens

<220>
<223> HOOK2 (NCBI Accession: NP_001093646)

<400> 4442
Met Ser Val Asp Lys Ala Glu Leu Cys Gly Ser Leu Leu Thr Trp Leu
1               5                   10                  15

Gln Thr Phe His Val Pro Ser Pro Cys Ala Ser Pro Gln Asp Leu Ser
            20                  25                  30

Ser Gly Leu Ala Val Ala Tyr Val Leu Asn Gln Ile Asp Pro Ser Trp
        35                  40                  45

Phe Asn Glu Ala Trp Leu Gln Gly Ile Ser Glu Asp Pro Gly Pro Asn
    50                  55                  60
```

```
Trp Lys Leu Lys Val Ser Asn Leu Lys Met Val Leu Arg Ser Leu Val
65                  70                  75                  80

Glu Tyr Ser Gln Asp Val Leu Ala His Pro Val Ser Glu Glu His Leu
                85                  90                  95

Pro Asp Val Ser Leu Ile Gly Glu Phe Ser Asp Pro Ala Glu Leu Gly
            100                 105                 110

Lys Leu Leu Gln Leu Val Leu Gly Cys Ala Ile Ser Cys Glu Lys Lys
        115                 120                 125

Gln Asp His Ile Gln Arg Ile Met Thr Leu Glu Glu Ser Val Gln His
    130                 135                 140

Val Val Met Glu Ala Ile Gln Glu Leu Met Thr Lys Asp Thr Pro Asp
145                 150                 155                 160

Ser Leu Ser Pro Glu Thr Tyr Gly Asn Phe Asp Ser Gln Ser Arg Arg
                165                 170                 175

Tyr Tyr Phe Leu Ser Glu Glu Ala Glu Glu Gly Asp Glu Leu Gln Gln
            180                 185                 190

Arg Cys Leu Asp Leu Glu Arg Gln Leu Met Leu Leu Ser Glu Glu Lys
        195                 200                 205

Gln Ser Leu Ala Gln Glu Asn Ala Gly Leu Arg Glu Arg Met Gly Arg
    210                 215                 220

Pro Glu Gly Glu Gly Thr Pro Gly Leu Thr Ala Lys Lys Leu Leu Leu
225                 230                 235                 240

Leu Gln Ser Gln Leu Glu Gln Leu Gln Glu Glu Asn Phe Arg Leu Glu
                245                 250                 255

Ser Gly Arg Glu Asp Glu Arg Leu Arg Cys Ala Glu Leu Glu Arg Glu
            260                 265                 270

Val Ala Glu Leu Gln His Arg Asn Gln Ala Leu Thr Ser Leu Ala Gln
        275                 280                 285

Glu Ala Gln Ala Leu Lys Asp Glu Met Asp Glu Leu Arg Gln Ser Ser
    290                 295                 300

Glu Arg Ala Gly Gln Leu Glu Ala Thr Leu Thr Ser Cys Arg Arg Arg
305                 310                 315                 320

Leu Gly Glu Leu Arg Glu Leu Arg Arg Gln Val Arg Gln Leu Glu Glu
                325                 330                 335

Arg Asn Ala Gly His Ala Glu Arg Thr Arg Gln Leu Glu Asp Glu Leu
            340                 345                 350
```

```
Arg Arg Ala Gly Ser Leu Arg Ala Gln Leu Glu Ala Gln Arg Arg Gln
        355                 360                 365

Val Gln Glu Leu Gln Gly Gln Arg Gln Glu Glu Ala Met Lys Ala Glu
    370                 375                 380

Lys Trp Leu Phe Glu Cys Arg Asn Leu Glu Glu Lys Tyr Glu Ser Val
385                 390                 395                 400

Thr Lys Glu Lys Glu Arg Leu Leu Ala Glu Arg Asp Ser Leu Arg Glu
                405                 410                 415

Ala Asn Glu Glu Leu Arg Cys Ala Gln Leu Gln Pro Arg Gly Leu Thr
            420                 425                 430

Gln Ala Asp Pro Ser Leu Asp Pro Thr Ser Thr Pro Val Asp Asn Leu
        435                 440                 445

Ala Ala Glu Ile Leu Pro Ala Glu Leu Arg Glu Thr Leu Leu Arg Leu
    450                 455                 460

Gln Leu Glu Asn Lys Arg Leu Cys Arg Gln Glu Ala Ala Asp Arg Glu
465                 470                 475                 480

Arg Gln Glu Glu Leu Gln Arg Gln Leu Glu Asp Ala Asn Arg Ala Arg
                485                 490                 495

His Gly Leu Glu Thr Gln His Arg Leu Asn Gln Gln Gln Leu Ser Glu
            500                 505                 510

Leu Arg Ala Gln Val Glu Asp Leu Gln Lys Ala Leu Gln Glu Gln Gly
        515                 520                 525

Gly Lys Thr Glu Asp Ser Ile Leu Leu Lys Arg Lys Leu Glu Glu His
    530                 535                 540

Leu Gln Lys Leu His Glu Ala Asp Leu Glu Leu Gln Arg Lys Arg Glu
545                 550                 555                 560

Tyr Ile Glu Glu Leu Glu Pro Pro Thr Asp Ser Ser Thr Ala Arg Arg
                565                 570                 575

Ile Glu Glu Leu Gln His Asn Leu Gln Lys Lys Asp Ala Asp Leu Arg
            580                 585                 590

Ala Met Glu Glu Arg Tyr Arg Arg Tyr Val Asp Lys Ala Arg Met Val
        595                 600                 605

Met Gln Thr Met Glu Pro Lys Gln Arg Pro Ala Ala Gly Ala Pro Pro
    610                 615                 620

Glu Leu His Ser Leu Arg Thr Gln Leu Arg Glu Arg Asp Val Arg Ile
625                 630                 635                 640
```

```
Arg His Leu Glu Met Asp Phe Glu Lys Ser Arg Ser Gln Arg Glu Gln
                645                 650                 655

Glu Glu Lys Leu Leu Ile Ser Ala Trp Tyr Asn Met Gly Met Ala Leu
            660                 665                 670

Gln Gln Arg Ala Gly Glu Glu Arg Ala Pro Ala His Ala Gln Ser Phe
        675                 680                 685

Leu Ala Gln Gln Arg Leu Ala Thr Asn Ser Arg Arg Gly Pro Leu Gly
    690                 695                 700

Arg Leu Ala Ser Leu Asn Leu Arg Pro Thr Asp Lys His
705                 710                 715

<210> 4443
<211> 490
<212> PRT
<213> Homo sapiens

<220>
<223> Q6ir13_frag

<400> 4443
Met Phe Ile Gly Ala Thr Phe Cys Ala Pro Arg Gly Ala Ser Ala Ser
1               5                   10                  15

Arg Ala Tyr Val Pro Thr Ala Trp Lys Asn Leu Pro Ala Thr Ser Glu
            20                  25                  30

Thr Phe Pro Ala Thr Ser Arg Val Phe Pro Ser Thr Ser His Phe Gln
        35                  40                  45

Pro Ala Ser Ser Asn Ala Phe Arg Gly Pro Ser Ala Ala Ser Glu Ser
    50                  55                  60

Pro Lys Ser Leu Pro Phe Ala Leu Gln Asp Pro Tyr Ala Cys Val Glu
65                  70                  75                  80

Ala Leu Pro Ala Val Pro Trp Val Pro Tyr Pro Asp Gly Asn Ala Ser
                85                  90                  95

Ser Ala Cys Lys Ser Val Pro Ala Ile Leu Met Val Ala Ala Ala Ala
            100                 105                 110

Pro Gln Ala Ser Ala Thr Ala Ala Glu Ala Ser Lys Ser Ser Glu Pro
        115                 120                 125

Pro Arg Arg Pro Gly Lys Ala Thr Arg Lys Lys Lys His Leu Glu Pro
    130                 135                 140

Lys Glu Asp Asn Cys Gly His Arg Leu Ser Ser Arg Asp Trp Arg Gly
145                 150                 155                 160
```

```
Pro Arg Thr Trp Gly Asn Pro Ser His Ser Asp Trp Glu Ile Gln Arg
                165                 170                 175

Ala Met Gln Leu Leu Gly Asp Arg Glu Ser Leu Tyr Thr Pro Gln Gly
            180                 185                 190

Leu Asn Asp Trp Gly Cys Pro Asn Thr Ser Arg Met Pro Arg Ser Leu
        195                 200                 205

Glu Gly Pro Ser Thr Ser Arg Asp Gln Glu Phe Cys Gly Asp Ser Gly
    210                 215                 220

Gly Ser Gln Thr Trp Met Ala Ser Glu Val Pro Ser Val Ser Arg Gly
225                 230                 235                 240

Ser Ser Ala Ala Gln Glu Asp Pro Asp Arg Glu Ser Gln Pro Leu Ser
                245                 250                 255

Pro Leu Asp Glu Arg Ala Asn Ala Leu Val Gln Phe Leu Leu Val Lys
            260                 265                 270

Asp Gln Ala Lys Val Pro Val Gln Leu Ser Glu Met Val Asn Val Val
        275                 280                 285

Ile Arg Glu Tyr Lys Asp Asp Ser Leu Asp Ile Ile Asn Arg Ala Asn
    290                 295                 300

Thr Lys Leu Glu Cys Thr Phe Gly Cys Gln Leu Lys Glu Val Asp Thr
305                 310                 315                 320

Lys Thr His Thr Tyr Ile Ile Val Asn Lys Met Ala Tyr Pro Gln Cys
                325                 330                 335

Asn Leu Leu Ala Ser Tyr Leu Glu Arg Pro Lys Phe Ser Leu Leu Met
            340                 345                 350

Val Val Leu Ser Leu Ile Phe Met Lys Gly Tyr Cys Ile Arg Glu Asn
        355                 360                 365

Leu Leu Phe Ser Phe Leu Phe Gln Leu Gly Leu Asp Val Gln Glu Thr
    370                 375                 380

Ser Gly Leu Phe Arg Ile Thr Lys Lys Leu Ile Thr Ser Val Phe Val
385                 390                 395                 400

Arg His Arg Tyr Leu Glu Tyr Arg Gln Ile Pro Phe Thr Glu Pro Ala
                405                 410                 415

Glu Tyr Glu Leu Leu Trp Gly Pro Arg Ala Phe Leu Glu Thr Asn Arg
            420                 425                 430

Val His Ile Leu Arg Phe Leu Ala Ala Leu Tyr Glu Asn Gln Pro Gln
        435                 440                 445
```

```
Ile Trp Ser Cys Gln Tyr Leu Asp Ser Leu Ala Glu Leu Glu Tyr Lys
    450                 455                 460

Asp Ala Asn Ala Ala Ala Glu Glu Ser His Asp Ser Asp Asp Asp Ala
465                 470                 475                 480

His Asp Pro Thr Ser Ser Pro His Pro His
                485                 490

<210> 4444
<211> 164
<212> PRT
<213> Homo sapiens

<220>
<223> SRSF3 (NCBI Accession: NP_003008)

<400> 4444
Met His Arg Asp Ser Cys Pro Leu Asp Cys Lys Val Tyr Val Gly Asn
1               5                   10                  15

Leu Gly Asn Asn Gly Asn Lys Thr Glu Leu Glu Arg Ala Phe Gly Tyr
            20                  25                  30

Tyr Gly Pro Leu Arg Ser Val Trp Val Ala Arg Asn Pro Pro Gly Phe
        35                  40                  45

Ala Phe Val Glu Phe Glu Asp Pro Arg Asp Ala Ala Asp Ala Val Arg
    50                  55                  60

Glu Leu Asp Gly Arg Thr Leu Cys Gly Cys Arg Val Arg Val Glu Leu
65                  70                  75                  80

Ser Asn Gly Glu Lys Arg Ser Arg Asn Arg Gly Pro Pro Pro Ser Trp
                85                  90                  95

Gly Arg Arg Pro Arg Asp Asp Tyr Arg Arg Arg Ser Pro Pro Pro Arg
            100                 105                 110

Arg Arg Ser Pro Arg Arg Arg Ser Phe Ser Arg Ser Arg Ser Arg Ser
        115                 120                 125

Leu Ser Arg Asp Arg Arg Arg Glu Arg Ser Leu Ser Arg Glu Arg Asn
    130                 135                 140

His Lys Pro Ser Arg Ser Phe Ser Arg Ser Arg Ser Arg Ser Arg Ser
145                 150                 155                 160

Asn Glu Arg Lys


<210> 4445
<211> 620
```

<212> PRT
<213> Homo sapiens

<220>
<223> RANBP10 (NCBI Accession: NP_065901)

<400> 4445
Met Ala Ala Ala Thr Ala Asp Pro Gly Ala Gly Asn Pro Gln Pro Gly
1   5   10   15

Asp Ser Ser Gly Gly Gly Ala Gly Gly Gly Leu Pro Ser Pro Gly Glu
            20   25   30

Gln Glu Leu Ser Arg Arg Leu Gln Arg Leu Tyr Pro Ala Val Asn Gln
        35   40   45

Gln Glu Thr Pro Leu Pro Arg Ser Trp Ser Pro Lys Asp Lys Tyr Asn
    50   55   60

Tyr Ile Gly Leu Ser Gln Gly Asn Leu Arg Val His Tyr Lys Gly His
65   70   75   80

Gly Lys Asn His Lys Asp Ala Ala Ser Val Arg Ala Thr His Pro Ile
                85   90   95

Pro Ala Ala Cys Gly Ile Tyr Tyr Phe Glu Val Lys Ile Val Ser Lys
            100   105   110

Gly Arg Asp Gly Tyr Met Gly Ile Gly Leu Ser Ala Gln Gly Val Asn
        115   120   125

Met Asn Arg Leu Pro Gly Trp Asp Lys His Ser Tyr Gly Tyr His Gly
    130   135   140

Asp Asp Gly His Ser Phe Cys Ser Ser Gly Thr Gly Gln Pro Tyr Gly
145   150   155   160

Pro Thr Phe Thr Thr Gly Asp Val Ile Gly Cys Cys Val Asn Leu Ile
                165   170   175

Asn Gly Thr Cys Phe Tyr Thr Lys Asn Gly His Ser Leu Gly Ile Ala
            180   185   190

Phe Thr Asp Leu Pro Ala Asn Leu Tyr Pro Thr Val Gly Leu Gln Thr
        195   200   205

Pro Gly Glu Ile Val Asp Ala Asn Phe Gly Gln Gln Pro Phe Leu Phe
    210   215   220

Asp Ile Glu Asp Tyr Met Arg Glu Trp Arg Ala Lys Val Gln Gly Thr
225   230   235   240

Val His Cys Phe Pro Ile Ser Ala Arg Leu Gly Glu Trp Gln Ala Val
                245   250   255

```
Leu Gln Asn Met Val Ser Ser Tyr Leu Val His His Gly Tyr Cys Ala
            260                 265                 270

Thr Ala Thr Ala Phe Ala Arg Met Thr Glu Thr Pro Ile Gln Glu Glu
        275                 280                 285

Gln Ala Ser Ile Lys Asn Arg Gln Lys Ile Gln Lys Leu Val Leu Glu
    290                 295                 300

Gly Arg Val Gly Glu Ala Ile Glu Thr Thr Gln Arg Phe Tyr Pro Gly
305                 310                 315                 320

Leu Leu Glu His Asn Pro Asn Leu Leu Phe Met Leu Lys Cys Arg Gln
                325                 330                 335

Phe Val Glu Met Val Asn Gly Thr Asp Ser Glu Val Arg Ser Leu Ser
            340                 345                 350

Ser Arg Ser Pro Lys Ser Gln Asp Ser Tyr Pro Gly Ser Pro Ser Leu
        355                 360                 365

Ser Pro Arg His Gly Pro Ser Ser Ser His Met His Asn Thr Gly Ala
    370                 375                 380

Asp Ser Pro Ser Cys Ser Asn Gly Val Ala Ser Thr Lys Ser Lys Gln
385                 390                 395                 400

Asn His Ser Lys Tyr Pro Ala Pro Ser Ser Ser Ser Ser Ser Ser Ser
                405                 410                 415

Ser Ser Ser Ser Ser Ser Pro Ser Ser Val Asn Tyr Ser Glu Ser Asn
            420                 425                 430

Ser Thr Asp Ser Thr Lys Ser Gln His His Ser Ser Thr Ser Asn Gln
        435                 440                 445

Glu Thr Ser Asp Ser Glu Met Glu Met Glu Ala Glu His Tyr Pro Asn
    450                 455                 460

Gly Val Leu Gly Ser Met Ser Thr Arg Ile Val Asn Gly Ala Tyr Lys
465                 470                 475                 480

His Glu Asp Leu Gln Thr Asp Glu Ser Ser Met Asp Asp Arg His Pro
                485                 490                 495

Arg Arg Gln Leu Cys Gly Gly Asn Gln Ala Ala Thr Glu Arg Ile Ile
            500                 505                 510

Leu Phe Gly Arg Glu Leu Gln Ala Leu Ser Glu Gln Leu Gly Arg Glu
        515                 520                 525

Tyr Gly Lys Asn Leu Ala His Thr Glu Met Leu Gln Asp Ala Phe Ser
    530                 535                 540
```

```
Leu Leu Ala Tyr Ser Asp Pro Trp Ser Cys Pro Val Gly Gln Gln Leu
545                 550                 555                 560

Asp Pro Ile Gln Arg Glu Pro Val Cys Ala Ala Leu Asn Ser Ala Ile
                565                 570                 575

Leu Glu Ser Gln Asn Leu Pro Lys Gln Pro Pro Leu Met Leu Ala Leu
            580                 585                 590

Gly Gln Ala Ser Glu Cys Leu Arg Leu Met Ala Arg Ala Gly Leu Gly
        595                 600                 605

Ser Cys Ser Phe Ala Arg Val Asp Asp Tyr Leu His
    610                 615                 620

<210> 4446
<211> 329
<212> PRT
<213> Homo sapiens

<220>
<223> WNT9B (NCBI Accession: NM_001320458)

<400> 4446
Met Arg Pro Pro Pro Ala Leu Ala Leu Ala Gly Leu Cys Leu Leu Ala
1               5                   10                  15

Leu Pro Ala Ala Ala Ala Ser Tyr Phe Gly Leu Thr Gly Arg Glu Val
            20                  25                  30

Leu Thr Pro Phe Pro Gly Leu Gly Thr Ala Ala Ala Pro Ala Gln Gly
        35                  40                  45

Gly Ala His Leu Lys Gln Cys Asp Leu Leu Lys Leu Ser Arg Arg Gln
    50                  55                  60

Lys Gln Leu Cys Arg Arg Glu Pro Gly Leu Ala Glu Thr Leu Arg Asp
65                  70                  75                  80

Ala Ala His Leu Gly Leu Leu Glu Cys Gln Phe Gln Phe Arg His Glu
                85                  90                  95

Arg Trp Asn Cys Ser Leu Glu Gly Arg Thr Gly Leu Leu Lys Arg Gly
            100                 105                 110

Phe Lys Glu Thr Ala Phe Leu Tyr Ala Val Ser Ser Ala Ala Leu Thr
        115                 120                 125

His Thr Leu Ala Arg Ala Cys Ser Ala Gly Arg Met Glu Arg Cys Thr
    130                 135                 140

Cys Asp Asp Ser Pro Gly Leu Glu Ser Arg Gln Ala Trp Gln Trp Gly
145                 150                 155                 160
```

```
Val Cys Gly Asp Asn Leu Lys Tyr Ser Thr Lys Phe Leu Ser Asn Phe
                165                 170                 175

Leu Gly Ser Lys Arg Gly Asn Lys Asp Leu Arg Ala Arg Ala Asp Ala
            180                 185                 190

His Asn Thr His Val Gly Ile Lys Ala Val Lys Ser Gly Leu Arg Thr
        195                 200                 205

Thr Cys Lys Cys His Gly Val Ser Gly Ser Cys Ala Val Arg Thr Cys
    210                 215                 220

Trp Lys Gln Leu Ser Pro Phe Arg Glu Thr Gly Gln Val Leu Lys Leu
225                 230                 235                 240

Arg Tyr Asp Ser Ala Val Lys Val Ser Ser Ala Thr Asn Glu Ala Leu
                245                 250                 255

Gly Arg Leu Glu Leu Trp Ala Pro Ala Arg Gln Gly Ser Leu Thr Lys
            260                 265                 270

Gly Leu Ala Pro Arg Ser Gly Asp Leu Val Tyr Met Glu Asp Ser Pro
        275                 280                 285

Ser Phe Cys Arg Pro Ser Lys Tyr Ser Pro Gly Thr Ala Gly Trp Ser
    290                 295                 300

Ala Val Ala Arg Ser Gln Leu Ile Thr Thr Ser Thr Ser Arg Ile Gln
305                 310                 315                 320

Ala Ile Leu Pro Ser Gln Leu Pro Glu
                325

<210> 4447
<211> 624
<212> PRT
<213> Homo sapiens

<220>
<223> UBQLN2 (NCBI Accession: NP_038472)

<400> 4447
Met Ala Glu Asn Gly Glu Ser Ser Gly Pro Pro Arg Pro Ser Arg Gly
1               5                   10                  15

Pro Ala Ala Ala Gln Gly Ser Ala Ala Ala Pro Ala Glu Pro Lys Ile
            20                  25                  30

Ile Lys Val Thr Val Lys Thr Pro Lys Glu Lys Glu Glu Phe Ala Val
        35                  40                  45

Pro Glu Asn Ser Ser Val Gln Gln Phe Lys Glu Ala Ile Ser Lys Arg
    50                  55                  60
```

```
Phe Lys Ser Gln Thr Asp Gln Leu Val Leu Ile Phe Ala Gly Lys Ile
65                  70                  75                  80

Leu Lys Asp Gln Asp Thr Leu Ile Gln His Gly Ile His Asp Gly Leu
                85                  90                  95

Thr Val His Leu Val Ile Lys Ser Gln Asn Arg Pro Gln Gly Gln Ser
            100                 105                 110

Thr Gln Pro Ser Asn Ala Ala Gly Thr Asn Thr Thr Ser Ala Ser Thr
        115                 120                 125

Pro Arg Ser Asn Ser Thr Pro Ile Ser Thr Asn Ser Asn Pro Phe Gly
    130                 135                 140

Leu Gly Ser Leu Gly Gly Leu Ala Gly Leu Ser Ser Leu Gly Leu Ser
145                 150                 155                 160

Ser Thr Asn Phe Ser Glu Leu Gln Ser Gln Met Gln Gln Gln Leu Met
                165                 170                 175

Ala Ser Pro Glu Met Met Ile Gln Ile Met Glu Asn Pro Phe Val Gln
            180                 185                 190

Ser Met Leu Ser Asn Pro Asp Leu Met Arg Gln Leu Ile Met Ala Asn
        195                 200                 205

Pro Gln Met Gln Gln Leu Ile Gln Arg Asn Pro Glu Ile Ser His Leu
    210                 215                 220

Leu Asn Asn Pro Asp Ile Met Arg Gln Thr Leu Glu Ile Ala Arg Asn
225                 230                 235                 240

Pro Ala Met Met Gln Glu Met Met Arg Asn Gln Asp Leu Ala Leu Ser
                245                 250                 255

Asn Leu Glu Ser Ile Pro Gly Gly Tyr Asn Ala Leu Arg Arg Met Tyr
            260                 265                 270

Thr Asp Ile Gln Glu Pro Met Leu Asn Ala Ala Gln Glu Gln Phe Gly
        275                 280                 285

Gly Asn Pro Phe Ala Ser Val Gly Ser Ser Ser Ser Ser Gly Glu Gly
    290                 295                 300

Thr Gln Pro Ser Arg Thr Glu Asn Arg Asp Pro Leu Pro Asn Pro Trp
305                 310                 315                 320

Ala Pro Pro Pro Ala Thr Gln Ser Ser Ala Thr Thr Ser Thr Thr Thr
                325                 330                 335

Ser Thr Gly Ser Gly Ser Gly Asn Ser Ser Ser Asn Ala Thr Gly Asn
            340                 345                 350
```

```
Thr Val Ala Ala Ala Asn Tyr Val Ala Ser Ile Phe Ser Thr Pro Gly
        355                 360                 365

Met Gln Ser Leu Leu Gln Gln Ile Thr Glu Asn Pro Gln Leu Ile Gln
    370                 375                 380

Asn Met Leu Ser Ala Pro Tyr Met Arg Ser Met Met Gln Ser Leu Ser
385                 390                 395                 400

Gln Asn Pro Asp Leu Ala Ala Gln Met Met Leu Asn Ser Pro Leu Phe
                405                 410                 415

Thr Ala Asn Pro Gln Leu Gln Glu Gln Met Arg Pro Gln Leu Pro Ala
            420                 425                 430

Phe Leu Gln Gln Met Gln Asn Pro Asp Thr Leu Ser Ala Met Ser Asn
        435                 440                 445

Pro Arg Ala Met Gln Ala Leu Met Gln Ile Gln Gln Gly Leu Gln Thr
    450                 455                 460

Leu Ala Thr Glu Ala Pro Gly Leu Ile Pro Ser Phe Thr Pro Gly Val
465                 470                 475                 480

Gly Val Gly Val Leu Gly Thr Ala Ile Gly Pro Val Gly Pro Val Thr
                485                 490                 495

Pro Ile Gly Pro Ile Gly Pro Ile Val Pro Phe Thr Pro Ile Gly Pro
            500                 505                 510

Ile Gly Pro Ile Gly Pro Thr Gly Pro Ala Ala Pro Pro Gly Ser Thr
        515                 520                 525

Gly Ser Gly Gly Pro Thr Gly Pro Thr Val Ser Ser Ala Ala Pro Ser
    530                 535                 540

Glu Thr Thr Ser Pro Thr Ser Glu Ser Gly Pro Asn Gln Gln Phe Ile
545                 550                 555                 560

Gln Gln Met Val Gln Ala Leu Ala Gly Ala Asn Ala Pro Gln Leu Pro
                565                 570                 575

Asn Pro Glu Val Arg Phe Gln Gln Gln Leu Glu Gln Leu Asn Ala Met
            580                 585                 590

Gly Phe Leu Asn Arg Glu Ala Asn Leu Gln Ala Leu Ile Ala Thr Gly
        595                 600                 605

Gly Asp Ile Asn Ala Ala Ile Glu Arg Leu Leu Gly Ser Gln Pro Ser
    610                 615                 620
```

<210> 4448
<211> 655

<212> PRT
<213> Homo sapiens

<220>
<223> UBQLN3 (NCBI Accession: NP_001334025)

<400> 4448
Met Ala Lys Gly Gly Glu Ala Leu Pro Gln Gly Ser Pro Ala Pro Val
1   5   10   15

Gln Asp Pro His Leu Ile Lys Val Thr Val Lys Thr Pro Lys Asp Lys
            20   25   30

Glu Asp Phe Ser Val Thr Asp Thr Cys Thr Ile Gln Gln Leu Lys Glu
        35   40   45

Glu Ile Ser Gln Arg Phe Lys Ala His Pro Asp Gln Leu Val Leu Ile
    50   55   60

Phe Ala Gly Lys Ile Leu Lys Asp Pro Asp Ser Leu Ala Gln Cys Gly
65   70   75   80

Val Arg Asp Gly Leu Thr Val His Leu Val Ile Lys Arg Gln His Arg
                85   90   95

Ala Met Gly Asn Glu Cys Pro Ala Ala Ser Val Pro Thr Gln Gly Pro
            100   105   110

Ser Pro Gly Ser Leu Pro Gln Pro Ser Ser Ile Tyr Pro Ala Asp Gly
        115   120   125

Pro Pro Ala Phe Ser Leu Gly Leu Leu Thr Gly Leu Ser Arg Leu Gly
    130   135   140

Leu Ala Tyr Arg Gly Phe Pro Asp Gln Pro Ser Ser Leu Met Arg Gln
145   150   155   160

His Val Ser Val Pro Glu Phe Val Thr Gln Leu Ile Asp Asp Pro Phe
                165   170   175

Ile Pro Gly Leu Leu Ser Asn Thr Gly Leu Val Arg Gln Leu Val Leu
            180   185   190

Asp Asn Pro His Met Gln Gln Leu Ile Gln His Asn Pro Glu Ile Gly
        195   200   205

His Ile Leu Asn Asn Pro Glu Ile Met Arg Gln Thr Leu Glu Phe Leu
    210   215   220

Arg Asn Pro Ala Met Met Gln Glu Met Ile Arg Ser Gln Asp Arg Val
225   230   235   240

Leu Ser Asn Leu Glu Ser Ile Pro Gly Gly Tyr Asn Val Leu Cys Thr
                245   250   255

```
Met Tyr Thr Asp Ile Met Asp Pro Met Leu Asn Ala Val Gln Glu Gln
            260                 265                 270

Phe Gly Gly Asn Pro Phe Ala Thr Ala Thr Thr Asp Asn Ala Thr Thr
        275                 280                 285

Thr Thr Ser Gln Pro Ser Arg Met Glu Asn Cys Asp Pro Leu Pro Asn
    290                 295                 300

Pro Trp Thr Ser Thr His Gly Gly Ser Gly Ser Arg Gln Gly Arg Gln
305                 310                 315                 320

Asp Gly Asp Gln Asp Ala Pro Asp Ile Arg Asn Arg Phe Pro Asn Phe
                325                 330                 335

Leu Gly Ile Ile Arg Leu Tyr Asp Tyr Leu Gln Gln Leu His Glu Asn
            340                 345                 350

Pro Gln Ser Leu Gly Thr Tyr Leu Gln Gly Thr Ala Ser Ala Leu Ser
        355                 360                 365

Gln Ser Gln Glu Pro Pro Pro Ser Val Asn Arg Val Pro Pro Ser Ser
    370                 375                 380

Pro Ser Ser Gln Glu Pro Gly Ser Gly Gln Pro Leu Pro Glu Glu Ser
385                 390                 395                 400

Val Ala Ile Lys Gly Arg Ser Ser Cys Pro Ala Phe Leu Arg Tyr Pro
                405                 410                 415

Thr Glu Asn Ser Thr Gly Gln Gly Gly Asp Gln Asp Gly Ala Gly Lys
            420                 425                 430

Ser Ser Thr Gly His Ser Thr Asn Leu Pro Asp Leu Val Ser Gly Leu
        435                 440                 445

Gly Asp Ser Ala Asn Arg Val Pro Phe Ala Pro Leu Ser Phe Ser Pro
    450                 455                 460

Thr Ala Ala Ile Pro Gly Ile Pro Glu Pro Pro Trp Leu Pro Ser Pro
465                 470                 475                 480

Ala Tyr Pro Arg Ser Leu Arg Pro Asp Gly Met Asn Pro Ala Pro Gln
                485                 490                 495

Leu Gln Asp Glu Ile Gln Pro Gln Leu Pro Leu Leu Met His Leu Gln
            500                 505                 510

Ala Ala Met Ala Asn Pro Arg Ala Leu Gln Ala Leu Arg Gln Ile Glu
        515                 520                 525

Gln Gly Leu Gln Val Leu Ala Thr Glu Ala Pro Arg Leu Leu Leu Trp
    530                 535                 540
```

```
Phe Met Pro Cys Leu Ala Gly Thr Gly Ser Val Ala Gly Gly Ile Glu
545                 550                 555                 560

Ser Arg Glu Asp Pro Leu Met Ser Glu Asp Pro Leu Pro Asn Pro Pro
                565                 570                 575

Pro Glu Val Phe Pro Ala Leu Asp Ser Ala Glu Leu Gly Phe Leu Ser
            580                 585                 590

Pro Pro Phe Leu His Met Leu Gln Asp Leu Val Ser Thr Asn Pro Gln
        595                 600                 605

Gln Leu Gln Pro Glu Ala His Phe Gln Val Gln Leu Glu Gln Leu Arg
    610                 615                 620

Ser Met Gly Phe Leu Asn Arg Glu Ala Asn Leu Gln Ala Leu Ile Ala
625                 630                 635                 640

Thr Gly Gly Asp Val Asp Ala Ala Val Glu Lys Leu Arg Gln Ser
                645                 650                 655

<210> 4449
<211> 166
<212> PRT
<213> Homo sapiens

<220>
<223> AGR3 (NCBI Accession: NP_789783)

<400> 4449
Met Met Leu His Ser Ala Leu Gly Leu Cys Leu Leu Leu Val Thr Val
1               5                   10                  15

Ser Ser Asn Leu Ala Ile Ala Ile Lys Lys Glu Lys Arg Pro Pro Gln
            20                  25                  30

Thr Leu Ser Arg Gly Trp Gly Asp Asp Ile Thr Trp Val Gln Thr Tyr
        35                  40                  45

Glu Glu Gly Leu Phe Tyr Ala Gln Lys Ser Lys Lys Pro Leu Met Val
    50                  55                  60

Ile His His Leu Glu Asp Cys Gln Tyr Ser Gln Ala Leu Lys Lys Val
65                  70                  75                  80

Phe Ala Gln Asn Glu Glu Ile Gln Glu Met Ala Gln Asn Lys Phe Ile
                85                  90                  95

Met Leu Asn Leu Met His Glu Thr Thr Asp Lys Asn Leu Ser Pro Asp
            100                 105                 110

Gly Gln Tyr Val Pro Arg Ile Met Phe Val Asp Pro Ser Leu Thr Val
        115                 120                 125
```

```
Arg Ala Asp Ile Ala Gly Arg Tyr Ser Asn Arg Leu Tyr Thr Tyr Glu
    130                 135                 140

Pro Arg Asp Leu Pro Leu Leu Ile Glu Asn Met Lys Lys Ala Leu Arg
145                 150                 155                 160

Leu Ile Gln Ser Glu Leu
                165
```

<210> 4450
<211> 298
<212> PRT
<213> Homo sapiens

<220>
<223> BIRC7 (NCBI Accession: NP_647478)

<400> 4450

```
Met Gly Pro Lys Asp Ser Ala Lys Cys Leu His Arg Gly Pro Gln Pro
1               5                   10                  15

Ser His Trp Ala Ala Gly Asp Gly Pro Thr Gln Glu Arg Cys Gly Pro
            20                  25                  30

Arg Ser Leu Gly Ser Pro Val Leu Gly Leu Asp Thr Cys Arg Ala Trp
        35                  40                  45

Asp His Val Asp Gly Gln Ile Leu Gly Gln Leu Arg Pro Leu Thr Glu
    50                  55                  60

Glu Glu Glu Glu Glu Gly Ala Gly Ala Thr Leu Ser Arg Gly Pro Ala
65                  70                  75                  80

Phe Pro Gly Met Gly Ser Glu Glu Leu Arg Leu Ala Ser Phe Tyr Asp
                85                  90                  95

Trp Pro Leu Thr Ala Glu Val Pro Pro Glu Leu Leu Ala Ala Ala Gly
            100                 105                 110

Phe Phe His Thr Gly His Gln Asp Lys Val Arg Cys Phe Phe Cys Tyr
        115                 120                 125

Gly Gly Leu Gln Ser Trp Lys Arg Gly Asp Asp Pro Trp Thr Glu His
    130                 135                 140

Ala Lys Trp Phe Pro Ser Cys Gln Phe Leu Leu Arg Ser Lys Gly Arg
145                 150                 155                 160

Asp Phe Val His Ser Val Gln Glu Thr His Ser Gln Leu Leu Gly Ser
                165                 170                 175

Trp Asp Pro Trp Glu Glu Pro Glu Asp Ala Ala Pro Val Ala Pro Ser
            180                 185                 190
```

```
Val Pro Ala Ser Gly Tyr Pro Glu Leu Pro Thr Pro Arg Arg Glu Val
        195                 200                 205

Gln Ser Glu Ser Ala Gln Glu Pro Gly Gly Val Ser Pro Ala Glu Ala
    210                 215                 220

Gln Arg Ala Trp Trp Val Leu Glu Pro Pro Gly Ala Arg Asp Val Glu
225                 230                 235                 240

Ala Gln Leu Arg Arg Leu Gln Glu Glu Arg Thr Cys Lys Val Cys Leu
                245                 250                 255

Asp Arg Ala Val Ser Ile Val Phe Val Pro Cys Gly His Leu Val Cys
            260                 265                 270

Ala Glu Cys Ala Pro Gly Leu Gln Leu Cys Pro Ile Cys Arg Ala Pro
        275                 280                 285

Val Arg Ser Arg Val Arg Thr Phe Leu Ser
    290                 295
```

<210> 4451
<211> 348
<212> PRT
<213> Homo sapiens

<220>
<223> MTUS2 (NCBI Accession: NP_056048)

<400> 4451

```
Met Gly His Cys Cys Cys Lys Pro Tyr Asn Cys Leu Gln Cys Leu Asp
1               5                   10                  15

Lys Thr Asn Glu Ser Ala Leu Val Lys Glu Lys Glu Leu Ser Ile Glu
            20                  25                  30

Leu Ala Asn Ile Arg Asp Glu Val Ala Phe His Thr Ala Lys Cys Glu
        35                  40                  45

Lys Leu Gln Lys Glu Lys Glu Glu Leu Glu Arg Arg Phe Glu Asp Glu
    50                  55                  60

Val Lys Arg Leu Gly Trp Gln Gln Gln Ala Glu Leu Gln Glu Leu Glu
65                  70                  75                  80

Glu Arg Leu Gln Leu Gln Phe Glu Ala Glu Met Ala Arg Leu Gln Glu
                85                  90                  95

Glu His Gly Asp Gln Leu Leu Ser Ile Arg Cys Gln His Gln Glu Gln
            100                 105                 110

Val Glu Asp Leu Thr Ala Ser His Asp Ala Ala Leu Leu Glu Met Glu
        115                 120                 125
```

```
Asn Asn His Thr Val Ala Ile Thr Ile Leu Gln Asp Asp His Asp His
    130                 135                 140

Lys Val Gln Glu Leu Met Ser Thr His Glu Leu Glu Lys Lys Glu Leu
145                 150                 155                 160

Glu Glu Asn Phe Glu Lys Leu Arg Leu Ser Leu Gln Asp Gln Val Asp
                165                 170                 175

Thr Leu Thr Phe Gln Ser Gln Ser Leu Arg Asp Arg Ala Arg Arg Phe
            180                 185                 190

Glu Glu Ala Leu Arg Lys Asn Thr Glu Glu Gln Leu Glu Ile Ala Leu
        195                 200                 205

Ala Pro Tyr Gln His Leu Glu Glu Asp Met Lys Ser Leu Lys Gln Val
    210                 215                 220

Leu Glu Met Lys Asn Gln Gln Ile His Glu Gln Glu Lys Lys Ile Leu
225                 230                 235                 240

Glu Leu Glu Lys Leu Ala Glu Lys Asn Ile Ile Leu Glu Glu Lys Ile
                245                 250                 255

Gln Val Leu Gln Gln Gln Asn Glu Asp Leu Lys Ala Arg Ile Asp Gln
            260                 265                 270

Asn Thr Val Val Thr Arg Gln Leu Ser Glu Glu Asn Ala Asn Leu Gln
        275                 280                 285

Glu Tyr Val Glu Lys Glu Thr Gln Glu Lys Lys Arg Leu Ser Arg Thr
    290                 295                 300

Asn Glu Glu Leu Leu Trp Lys Leu Gln Thr Gly Asp Pro Thr Ser Pro
305                 310                 315                 320

Ile Lys Leu Ser Pro Thr Ser Pro Val Tyr Arg Gly Ser Ser Ser Gly
                325                 330                 335

Pro Ser Ser Pro Ala Arg Val Ser Thr Thr Pro Arg
            340                 345

<210> 4452
<211> 475
<212> PRT
<213> Homo sapiens

<220>
<223> ZNF296 (NCBI Accession: NP_660331)

<400> 4452
Met Ser Arg Arg Lys Ala Gly Ser Ala Pro Arg Arg Val Glu Pro Ala
1               5                   10                  15
```

```
Pro Ala Ala Asn Pro Asp Asp Glu Met Glu Met Gln Asp Leu Val Ile
            20                  25                  30

Glu Leu Lys Pro Glu Pro Asp Ala Gln Pro Gln Gln Ala Pro Arg Leu
        35                  40                  45

Gly Pro Phe Ser Pro Lys Glu Val Ser Ser Ala Gly Arg Phe Gly Gly
    50                  55                  60

Glu Pro His His Ser Pro Gly Pro Met Pro Ala Gly Ala Ala Leu Leu
65                  70                  75                  80

Ala Leu Gly Pro Arg Asn Pro Trp Thr Leu Trp Thr Pro Leu Thr Pro
                85                  90                  95

Asn Tyr Pro Asp Arg Gln Pro Trp Thr Asp Lys His Pro Asp Leu Leu
            100                 105                 110

Thr Cys Gly Arg Cys Leu Gln Thr Phe Pro Leu Glu Ala Ile Thr Ala
        115                 120                 125

Phe Met Asp His Lys Lys Leu Gly Cys Gln Leu Phe Arg Gly Pro Ser
    130                 135                 140

Arg Gly Gln Gly Ser Glu Arg Glu Glu Leu Lys Ala Leu Ser Cys Leu
145                 150                 155                 160

Arg Cys Gly Lys Gln Phe Thr Val Ala Trp Lys Leu Leu Arg His Ala
                165                 170                 175

Gln Trp Asp His Gly Leu Ser Ile Tyr Gln Thr Glu Ser Glu Ala Pro
            180                 185                 190

Glu Ala Pro Leu Leu Gly Leu Ala Glu Val Ala Ala Ala Val Ser Ala
        195                 200                 205

Val Val Gly Pro Ala Ala Glu Ala Lys Ser Pro Arg Ala Ser Gly Ser
    210                 215                 220

Gly Leu Thr Arg Arg Ser Pro Thr Cys Pro Val Cys Lys Lys Thr Leu
225                 230                 235                 240

Ser Ser Phe Ser Asn Leu Lys Val His Met Arg Ser His Thr Gly Glu
                245                 250                 255

Arg Pro Tyr Ala Cys Asp Gln Cys Pro Tyr Ala Cys Ala Gln Ser Ser
            260                 265                 270

Lys Leu Asn Arg His Lys Lys Thr His Arg Gln Val Pro Pro Gln Ser
        275                 280                 285

Pro Leu Met Ala Asp Thr Ser Gln Glu Gln Ala Ser Ala Ala Pro Pro
    290                 295                 300
```

```
Glu Pro Ala Val His Ala Ala Ala Pro Thr Ser Thr Leu Pro Cys Ser
305                 310                 315                 320

Gly Gly Glu Gly Ala Gly Ala Ala Ala Thr Ala Gly Val Gln Glu Pro
                325                 330                 335

Gly Ala Pro Gly Ser Gly Ala Gln Ala Gly Pro Gly Gly Asp Thr Trp
            340                 345                 350

Gly Ala Ile Thr Thr Glu Gln Arg Thr Asp Pro Ala Asn Ser Gln Lys
        355                 360                 365

Ala Ser Pro Lys Lys Met Pro Lys Ser Gly Gly Lys Ser Arg Gly Pro
    370                 375                 380

Gly Gly Ser Cys Glu Phe Cys Gly Lys His Phe Thr Asn Ser Ser Asn
385                 390                 395                 400

Leu Thr Val His Arg Arg Ser His Thr Gly Glu Arg Pro Tyr Thr Cys
                405                 410                 415

Glu Phe Cys Asn Tyr Ala Cys Ala Gln Ser Ser Lys Leu Asn Arg His
            420                 425                 430

Arg Arg Met His Gly Met Thr Pro Gly Ser Thr Arg Phe Glu Cys Pro
        435                 440                 445

His Cys His Val Pro Phe Gly Leu Arg Ala Thr Leu Asp Lys His Leu
    450                 455                 460

Arg Gln Lys His Pro Glu Ala Ala Gly Glu Ala
465                 470                 475

<210> 4453
<211> 875
<212> PRT
<213> Homo sapiens

<220>
<223> PDE5A (NCBI Accession: NP_001074)

<400> 4453
Met Glu Arg Ala Gly Pro Ser Phe Gly Gln Gln Arg Gln Gln Gln Gln
1               5                   10                  15

Pro Gln Gln Gln Lys Gln Gln Gln Arg Asp Gln Asp Ser Val Glu Ala
            20                  25                  30

Trp Leu Asp Gly His Trp Asp Phe Thr Phe Ser Tyr Phe Val Arg Lys
        35                  40                  45

Ala Thr Arg Glu Met Val Asn Ala Trp Phe Ala Glu Arg Val His Thr
    50                  55                  60
```

```
Ile Pro Val Cys Lys Glu Gly Ile Arg Gly His Thr Glu Ser Cys Ser
65                  70                  75                  80

Cys Pro Leu Gln Gln Ser Pro Arg Ala Asp Asn Ser Val Pro Gly Thr
                85                  90                  95

Pro Thr Arg Lys Ile Ser Ala Ser Glu Phe Asp Arg Pro Leu Arg Pro
            100                 105                 110

Ile Val Val Lys Asp Ser Glu Gly Thr Val Ser Phe Leu Ser Asp Ser
        115                 120                 125

Glu Lys Lys Glu Gln Met Pro Leu Thr Pro Pro Arg Phe Asp His Asp
    130                 135                 140

Glu Gly Asp Gln Cys Ser Arg Leu Leu Glu Leu Val Lys Asp Ile Ser
145                 150                 155                 160

Ser His Leu Asp Val Thr Ala Leu Cys His Lys Ile Phe Leu His Ile
                165                 170                 175

His Gly Leu Ile Ser Ala Asp Arg Tyr Ser Leu Phe Leu Val Cys Glu
            180                 185                 190

Asp Ser Ser Asn Asp Lys Phe Leu Ile Ser Arg Leu Phe Asp Val Ala
        195                 200                 205

Glu Gly Ser Thr Leu Glu Glu Val Ser Asn Asn Cys Ile Arg Leu Glu
    210                 215                 220

Trp Asn Lys Gly Ile Val Gly His Val Ala Ala Leu Gly Glu Pro Leu
225                 230                 235                 240

Asn Ile Lys Asp Ala Tyr Glu Asp Pro Arg Phe Asn Ala Glu Val Asp
                245                 250                 255

Gln Ile Thr Gly Tyr Lys Thr Gln Ser Ile Leu Cys Met Pro Ile Lys
            260                 265                 270

Asn His Arg Glu Glu Val Val Gly Val Ala Gln Ala Ile Asn Lys Lys
        275                 280                 285

Ser Gly Asn Gly Gly Thr Phe Thr Glu Lys Asp Glu Lys Asp Phe Ala
    290                 295                 300

Ala Tyr Leu Ala Phe Cys Gly Ile Val Leu His Asn Ala Gln Leu Tyr
305                 310                 315                 320

Glu Thr Ser Leu Leu Glu Asn Lys Arg Asn Gln Val Leu Leu Asp Leu
                325                 330                 335

Ala Ser Leu Ile Phe Glu Glu Gln Gln Ser Leu Glu Val Ile Leu Lys
            340                 345                 350
```

```
Lys Ile Ala Ala Thr Ile Ile Ser Phe Met Gln Val Gln Lys Cys Thr
        355                 360                 365

Ile Phe Ile Val Asp Glu Asp Cys Ser Asp Ser Phe Ser Ser Val Phe
    370                 375                 380

His Met Glu Cys Glu Glu Leu Glu Lys Ser Ser Asp Thr Leu Thr Arg
385                 390                 395                 400

Glu His Asp Ala Asn Lys Ile Asn Tyr Met Tyr Ala Gln Tyr Val Lys
                405                 410                 415

Asn Thr Met Glu Pro Leu Asn Ile Pro Asp Val Ser Lys Asp Lys Arg
            420                 425                 430

Phe Pro Trp Thr Thr Glu Asn Thr Gly Asn Val Asn Gln Gln Cys Ile
        435                 440                 445

Arg Ser Leu Leu Cys Thr Pro Ile Lys Asn Gly Lys Lys Asn Lys Val
    450                 455                 460

Ile Gly Val Cys Gln Leu Val Asn Lys Met Glu Glu Asn Thr Gly Lys
465                 470                 475                 480

Val Lys Pro Phe Asn Arg Asn Asp Glu Gln Phe Leu Glu Ala Phe Val
                485                 490                 495

Ile Phe Cys Gly Leu Gly Ile Gln Asn Thr Gln Met Tyr Glu Ala Val
            500                 505                 510

Glu Arg Ala Met Ala Lys Gln Met Val Thr Leu Glu Val Leu Ser Tyr
        515                 520                 525

His Ala Ser Ala Ala Glu Glu Glu Thr Arg Glu Leu Gln Ser Leu Ala
    530                 535                 540

Ala Ala Val Val Pro Ser Ala Gln Thr Leu Lys Ile Thr Asp Phe Ser
545                 550                 555                 560

Phe Ser Asp Phe Glu Leu Ser Asp Leu Glu Thr Ala Leu Cys Thr Ile
                565                 570                 575

Arg Met Phe Thr Asp Leu Asn Leu Val Gln Asn Phe Arg Met Lys His
            580                 585                 590

Glu Val Leu Cys Arg Trp Ile Leu Ser Val Lys Lys Asn Tyr Arg Lys
        595                 600                 605

Asn Val Ala Tyr His Asn Trp Arg His Ala Phe Asn Thr Ala Gln Cys
    610                 615                 620

Met Phe Ala Ala Leu Lys Ala Gly Lys Ile Gln Asn Lys Leu Thr Asp
625                 630                 635                 640
```

```
Leu Glu Ile Leu Ala Leu Leu Ile Ala Ala Leu Ser His Asp Leu Asp
                645                 650                 655

His Arg Gly Val Asn Asn Ser Tyr Ile Gln Arg Ser Glu His Pro Leu
            660                 665                 670

Ala Gln Leu Tyr Cys His Ser Ile Met Glu His His His Phe Asp Gln
        675                 680                 685

Cys Leu Met Ile Leu Asn Ser Pro Gly Asn Gln Ile Leu Ser Gly Leu
    690                 695                 700

Ser Ile Glu Glu Tyr Lys Thr Thr Leu Lys Ile Ile Lys Gln Ala Ile
705                 710                 715                 720

Leu Ala Thr Asp Leu Ala Leu Tyr Ile Lys Arg Arg Gly Glu Phe Phe
                725                 730                 735

Glu Leu Ile Arg Lys Asn Gln Phe Asn Leu Glu Asp Pro His Gln Lys
            740                 745                 750

Glu Leu Phe Leu Ala Met Leu Met Thr Ala Cys Asp Leu Ser Ala Ile
        755                 760                 765

Thr Lys Pro Trp Pro Ile Gln Gln Arg Ile Ala Glu Leu Val Ala Thr
    770                 775                 780

Glu Phe Phe Asp Gln Gly Asp Arg Glu Arg Lys Glu Leu Asn Ile Glu
785                 790                 795                 800

Pro Thr Asp Leu Met Asn Arg Glu Lys Lys Asn Lys Ile Pro Ser Met
                805                 810                 815

Gln Val Gly Phe Ile Asp Ala Ile Cys Leu Gln Leu Tyr Glu Ala Leu
            820                 825                 830

Thr His Val Ser Glu Asp Cys Phe Pro Leu Leu Asp Gly Cys Arg Lys
        835                 840                 845

Asn Arg Gln Lys Trp Gln Ala Leu Ala Glu Gln Gln Glu Lys Met Leu
    850                 855                 860

Ile Asn Gly Glu Ser Gly Gln Ala Lys Arg Asn
865                 870                 875

<210> 4454
<211> 419
<212> PRT
<213> Homo sapiens

<220>
<223> EP400NL (NCBI Accession: NR_003290)
```

<400> 4454
Met Gln His Val Ser Ser Ser Gln Ser Ser Gln Arg His Val Gln Trp
1   5   10   15

Pro Gly Ala Cys Pro Gly Ala Gly Glu Glu Gln Pro Ala Cys Ser Gln
            20   25   30

Pro Ser Leu Pro Leu Thr Leu Pro Ser Pro Ser His Gln Leu Gln Gln
        35   40   45

Leu Met Val Gln Thr Gln Ser Pro Thr Gln Pro Ser Pro Gly Pro Gly
    50   55   60

Gln Ala Leu Gln Asn Val Arg Ala Gly Ala Pro Gly Pro Gly Leu Gly
65   70   75   80

Leu Cys Ser Ser Ser Pro Thr Gly Asp Phe Val Asp Ala Ser Val Leu
                85   90   95

Val Arg Gln Ile Ser Leu Ser Pro Ser Ser Gly Gly His Phe Val Phe
            100   105   110

Gln Asp Gly Ser Gly Leu Thr Gln Ile Ala Gln Gly Ala Gln Val Gln
        115   120   125

Leu Gln His Pro Gly Thr Pro Ile Thr Val Arg Glu Arg Arg Pro Ser
    130   135   140

Gln Pro His Thr Gln Ser Gly Gly Thr Ile His His Leu Gly Pro Gln
145   150   155   160

Ser Pro Ala Ala Ala Gly Gly Ala Gly Leu Gln Pro Leu Ala Ser Pro
                165   170   175

Ser His Ile Thr Thr Ala Asn Leu Pro Pro Gln Ile Ser Ser Ile Ile
            180   185   190

Gln Gly Gln Leu Val Gln Gln Gln Gln Val Leu Gln Gly Pro Pro Leu
        195   200   205

Pro Arg Pro Leu Gly Phe Glu Arg Thr Pro Gly Val Leu Leu Pro Gly
    210   215   220

Ala Gly Gly Ala Ala Gly Phe Gly Met Thr Ser Pro Pro Pro Pro Thr
225   230   235   240

Ser Pro Ser Arg Thr Ala Val Pro Pro Gly Leu Ser Ser Leu Pro Leu
                245   250   255

Thr Ser Val Gly Asn Thr Gly Met Lys Lys Val Pro Lys Lys Leu Glu
            260   265   270

Glu Ile Pro Pro Ala Ser Pro Glu Met Ala Gln Met Arg Lys Gln Cys
        275   280   285

```
Leu Asp Tyr His His Gln Glu Met Gln Ala Leu Lys Glu Val Phe Lys
    290                 295                 300

Glu Tyr Leu Ile Glu Leu Phe Phe Leu Gln His Phe Gln Gly Asn Met
305                 310                 315                 320

Met Asp Phe Leu Ala Phe Lys Glu Arg Leu Tyr Gly Pro Leu Gln Ala
                325                 330                 335

Tyr Leu Arg Gln Asn Asp Leu Asp Ile Glu Glu Glu Glu Glu Glu His
            340                 345                 350

Phe Glu Val Ile Asn Asp Glu Val Lys Val Val Ala Arg Lys His Gly
        355                 360                 365

Gln Pro Gly Thr Pro Val Ala Ile Ala Thr Gln Leu Pro Pro Arg Thr
    370                 375                 380

Ser Ala Ala Phe Pro Ala Gln Gln Gln Pro Leu Gln Val Leu Ser Asp
385                 390                 395                 400

Gly Ser Thr Val Gln Leu Pro Arg Leu Ser Ser Leu Gly Phe Glu Asp
                405                 410                 415

Ser Met Cys
```

<210> 4455
<211> 233
<212> PRT
<213> Homo sapiens

<220>
<223> BCL2L1 (NCBI Accession: NP_001182)

<400> 4455

```
Met Ser Gln Ser Asn Arg Glu Leu Val Val Asp Phe Leu Ser Tyr Lys
1               5                   10                  15

Leu Ser Gln Lys Gly Tyr Ser Trp Ser Gln Phe Ser Asp Val Glu Glu
            20                  25                  30

Asn Arg Thr Glu Ala Pro Glu Gly Thr Glu Ser Glu Met Glu Thr Pro
        35                  40                  45

Ser Ala Ile Asn Gly Asn Pro Ser Trp His Leu Ala Asp Ser Pro Ala
    50                  55                  60

Val Asn Gly Ala Thr Gly His Ser Ser Ser Leu Asp Ala Arg Glu Val
65                  70                  75                  80

Ile Pro Met Ala Ala Val Lys Gln Ala Leu Arg Glu Ala Gly Asp Glu
                85                  90                  95
```

Phe Glu Leu Arg Tyr Arg Arg Ala Phe Ser Asp Leu Thr Ser Gln Leu
100 105 110

His Ile Thr Pro Gly Thr Ala Tyr Gln Ser Phe Glu Gln Val Val Asn
115 120 125

Glu Leu Phe Arg Asp Gly Val Asn Trp Gly Arg Ile Val Ala Phe Phe
130 135 140

Ser Phe Gly Gly Ala Leu Cys Val Glu Ser Val Asp Lys Glu Met Gln
145 150 155 160

Val Leu Val Ser Arg Ile Ala Ala Trp Met Ala Thr Tyr Leu Asn Asp
165 170 175

His Leu Glu Pro Trp Ile Gln Glu Asn Gly Gly Trp Asp Thr Phe Val
180 185 190

Glu Leu Tyr Gly Asn Asn Ala Ala Ala Glu Ser Arg Lys Gly Gln Glu
195 200 205

Arg Phe Asn Arg Trp Phe Leu Thr Gly Met Thr Val Ala Gly Val Val
210 215 220

Leu Leu Gly Ser Leu Phe Ser Arg Lys
225 230

<210> 4456
<211> 273
<212> PRT
<213> Homo sapiens

<220>
<223> ARGLU1 (NCBI Accession: NP_060481)

<400> 4456
Met Gly Arg Ser Arg Ser Arg Ser Ser Ser Arg Ser Lys His Thr Lys
1 5 10 15

Ser Ser Lys His Asn Lys Lys Arg Ser Arg Ser Arg Ser Arg Ser Arg
20 25 30

Asp Lys Glu Arg Val Arg Lys Arg Ser Lys Ser Arg Glu Ser Lys Arg
35 40 45

Asn Arg Arg Arg Glu Ser Arg Ser Arg Ser Arg Ser Thr Asn Thr Ala
50 55 60

Val Ser Arg Arg Glu Arg Asp Arg Glu Arg Ala Ser Ser Pro Pro Asp
65 70 75 80

Arg Ile Asp Ile Phe Gly Arg Thr Val Ser Lys Arg Ser Ser Leu Asp
85 90 95

```
Glu Lys Gln Lys Arg Glu Glu Glu Glu Lys Lys Ala Glu Phe Glu Arg
            100                 105                 110

Gln Arg Lys Ile Arg Gln Gln Glu Ile Glu Glu Lys Leu Ile Glu Glu
        115                 120                 125

Glu Thr Ala Arg Arg Val Glu Glu Leu Val Ala Lys Arg Val Glu Glu
    130                 135                 140

Glu Leu Glu Lys Arg Lys Asp Glu Ile Glu Arg Glu Val Leu Arg Arg
145                 150                 155                 160

Val Glu Glu Ala Lys Arg Ile Met Glu Lys Gln Leu Leu Glu Glu Leu
                165                 170                 175

Glu Arg Gln Arg Gln Ala Glu Leu Ala Ala Gln Lys Ala Arg Glu Glu
            180                 185                 190

Glu Glu Arg Ala Lys Arg Glu Glu Leu Glu Arg Ile Leu Glu Glu Asn
        195                 200                 205

Asn Arg Lys Ile Ala Glu Ala Gln Ala Lys Leu Ala Glu Glu Gln Leu
    210                 215                 220

Arg Ile Val Glu Glu Gln Arg Lys Ile His Glu Glu Arg Met Lys Leu
225                 230                 235                 240

Glu Gln Glu Arg Gln Arg Gln Gln Lys Glu Glu Gln Lys Ile Ile Leu
                245                 250                 255

Gly Lys Gly Lys Ser Arg Pro Lys Leu Ser Phe Ser Leu Lys Thr Gln
            260                 265                 270

Asp


<210> 4457
<211> 490
<212> PRT
<213> Homo sapiens

<220>
<223> SASS6 (NCBI Accession: NP_001291758)

<400> 4457
Met Gln Ser Leu Asp Asp Ala Thr Lys Gln Leu Asp Phe Thr Arg Lys
1               5                   10                  15

Thr Leu Ala Glu Lys Lys Gln Glu Leu Asp Lys Leu Arg Asn Glu Trp
            20                  25                  30

Ala Ser His Thr Ala Ala Leu Thr Asn Lys His Ser Gln Glu Leu Thr
        35                  40                  45
```

```
Asn Glu Lys Glu Lys Ala Leu Gln Ala Gln Val Gln Tyr Gln Gln Gln
    50                  55                  60

His Glu Gln Gln Lys Lys Asp Leu Glu Ile Leu His Gln Gln Asn Ile
65                  70                  75                  80

His Gln Leu Gln Asn Arg Leu Ser Glu Leu Glu Val Ala Asn Lys Asp
                85                  90                  95

Leu Thr Glu Arg Lys Tyr Lys Gly Asp Ser Thr Ile Arg Glu Leu Lys
            100                 105                 110

Ala Lys Leu Ser Gly Val Glu Glu Glu Leu Gln Arg Thr Lys Gln Glu
        115                 120                 125

Val Leu Ser Leu Arg Arg Glu Asn Ser Thr Leu Asp Val Glu Cys His
    130                 135                 140

Glu Lys Glu Lys His Val Asn Gln Leu Gln Thr Lys Val Ala Val Leu
145                 150                 155                 160

Glu Gln Glu Ile Lys Asp Lys Asp Gln Leu Val Leu Arg Thr Lys Glu
                165                 170                 175

Ala Phe Asp Thr Ile Gln Glu Gln Lys Val Val Leu Glu Glu Asn Gly
            180                 185                 190

Glu Lys Asn Gln Val Gln Leu Gly Lys Leu Glu Ala Thr Ile Lys Ser
        195                 200                 205

Leu Ser Ala Glu Leu Leu Lys Ala Asn Glu Ile Ile Lys Lys Leu Gln
    210                 215                 220

Gly Asp Leu Lys Thr Leu Met Gly Lys Leu Lys Leu Lys Asn Thr Val
225                 230                 235                 240

Thr Ile Gln Gln Glu Lys Leu Leu Ala Glu Lys Glu Glu Lys Leu Gln
                245                 250                 255

Lys Glu Gln Lys Glu Leu Gln Asp Val Gly Gln Ser Leu Arg Ile Lys
            260                 265                 270

Glu Gln Glu Val Cys Lys Leu Gln Glu Gln Leu Glu Ala Thr Val Lys
        275                 280                 285

Lys Leu Glu Glu Ser Lys Gln Leu Leu Lys Asn Asn Glu Lys Leu Ile
    290                 295                 300

Thr Trp Leu Asn Lys Glu Leu Asn Glu Asn Gln Leu Val Arg Lys Gln
305                 310                 315                 320

Asp Val Leu Gly Pro Ser Thr Thr Pro Pro Ala His Ser Ser Ser Asn
                325                 330                 335
```

```
Thr Ile Arg Ser Gly Ile Ser Pro Asn Leu Asn Val Val Asp Gly Arg
            340                 345                 350

Leu Thr Tyr Pro Thr Cys Gly Ile Gly Tyr Pro Val Ser Ser Ala Phe
        355                 360                 365

Ala Phe Gln Asn Thr Phe Pro His Ser Ile Ser Ala Lys Asn Thr Ser
    370                 375                 380

His Pro Gly Ser Gly Thr Lys Val Gln Phe Asn Leu Gln Phe Thr Lys
385                 390                 395                 400

Pro Asn Ala Ser Leu Gly Asp Val Gln Ser Gly Ala Thr Ile Ser Met
                405                 410                 415

Pro Cys Ser Thr Asp Lys Glu Asn Gly Glu Asn Val Gly Leu Glu Ser
            420                 425                 430

Lys Tyr Leu Lys Lys Arg Glu Asp Ser Ile Pro Leu Arg Gly Leu Ser
        435                 440                 445

Gln Asn Leu Phe Ser Asn Ser Asp His Gln Arg Asp Gly Thr Leu Gly
    450                 455                 460

Ala Leu His Thr Ser Ser Lys Pro Thr Ala Leu Pro Ser Ala Ser Ser
465                 470                 475                 480

Ala Tyr Phe Pro Gly Gln Leu Pro Asn Ser
                485                 490

<210> 4458
<211> 377
<212> PRT
<213> Homo sapiens

<220>
<223> PSMD4 (NCBI Accession: NP_002801)

<400> 4458
Met Val Leu Glu Ser Thr Met Val Cys Val Asp Asn Ser Glu Tyr Met
1               5                   10                  15

Arg Asn Gly Asp Phe Leu Pro Thr Arg Leu Gln Ala Gln Gln Asp Ala
            20                  25                  30

Val Asn Ile Val Cys His Ser Lys Thr Arg Ser Asn Pro Glu Asn Asn
        35                  40                  45

Val Gly Leu Ile Thr Leu Ala Asn Asp Cys Glu Val Leu Thr Thr Leu
    50                  55                  60

Thr Pro Asp Thr Gly Arg Ile Leu Ser Lys Leu His Thr Val Gln Pro
65                  70                  75                  80
```

```
Lys Gly Lys Ile Thr Phe Cys Thr Gly Ile Arg Val Ala His Leu Ala
                85                  90                  95

Leu Lys His Arg Gln Gly Lys Asn His Lys Met Arg Ile Ile Ala Phe
            100                 105                 110

Val Gly Ser Pro Val Glu Asp Asn Glu Lys Asp Leu Val Lys Leu Ala
        115                 120                 125

Lys Arg Leu Lys Lys Glu Lys Val Asn Val Asp Ile Ile Asn Phe Gly
    130                 135                 140

Glu Glu Glu Val Asn Thr Glu Lys Leu Thr Ala Phe Val Asn Thr Leu
145                 150                 155                 160

Asn Gly Lys Asp Gly Thr Gly Ser His Leu Val Thr Val Pro Pro Gly
                165                 170                 175

Pro Ser Leu Ala Asp Ala Leu Ile Ser Ser Pro Ile Leu Ala Gly Glu
            180                 185                 190

Gly Gly Ala Met Leu Gly Leu Gly Ala Ser Asp Phe Glu Phe Gly Val
        195                 200                 205

Asp Pro Ser Ala Asp Pro Glu Leu Ala Leu Ala Leu Arg Val Ser Met
    210                 215                 220

Glu Glu Gln Arg Gln Arg Gln Glu Glu Glu Ala Arg Arg Ala Ala Ala
225                 230                 235                 240

Ala Ser Ala Ala Glu Ala Gly Ile Ala Thr Thr Gly Thr Glu Asp Ser
                245                 250                 255

Asp Asp Ala Leu Leu Lys Met Thr Ile Ser Gln Gln Glu Phe Gly Arg
            260                 265                 270

Thr Gly Leu Pro Asp Leu Ser Ser Met Thr Glu Glu Glu Gln Ile Ala
        275                 280                 285

Tyr Ala Met Gln Met Ser Leu Gln Gly Ala Glu Phe Gly Gln Ala Glu
    290                 295                 300

Ser Ala Asp Ile Asp Ala Ser Ser Ala Met Asp Thr Ser Glu Pro Ala
305                 310                 315                 320

Lys Glu Glu Asp Asp Tyr Asp Val Met Gln Asp Pro Glu Phe Leu Gln
                325                 330                 335

Ser Val Leu Glu Asn Leu Pro Gly Val Asp Pro Asn Asn Glu Ala Ile
            340                 345                 350

Arg Asn Ala Met Gly Ser Leu Ala Ser Gln Ala Thr Lys Asp Gly Lys
        355                 360                 365
```

Lys Asp Lys Lys Glu Glu Asp Lys Lys
370 375

<210> 4459
<211> 276
<212> PRT
<213> Homo sapiens

<220>
<223> SLA (NCBI Accession: NP_001039021)

<400> 4459
Met Gly Asn Ser Met Lys Ser Thr Pro Ala Pro Ala Glu Arg Pro Leu
1 5 10 15

Pro Asn Pro Glu Gly Leu Asp Ser Asp Phe Leu Ala Val Leu Ser Asp
20 25 30

Tyr Pro Ser Pro Asp Ile Ser Pro Pro Ile Phe Arg Arg Gly Glu Lys
35 40 45

Leu Arg Val Ile Ser Asp Glu Gly Gly Trp Trp Lys Ala Ile Ser Leu
50 55 60

Ser Thr Gly Arg Glu Ser Tyr Ile Pro Gly Ile Cys Val Ala Arg Val
65 70 75 80

Tyr His Gly Trp Leu Phe Glu Gly Leu Gly Arg Asp Lys Ala Glu Glu
85 90 95

Leu Leu Gln Leu Pro Asp Thr Lys Val Gly Ser Phe Met Ile Arg Glu
100 105 110

Ser Glu Thr Lys Lys Gly Phe Tyr Ser Leu Ser Val Arg His Arg Gln
115 120 125

Val Lys His Tyr Arg Ile Phe Arg Leu Pro Asn Asn Trp Tyr Tyr Ile
130 135 140

Ser Pro Arg Leu Thr Phe Gln Cys Leu Glu Asp Leu Val Asn His Tyr
145 150 155 160

Ser Glu Val Ala Asp Gly Leu Cys Cys Val Leu Thr Thr Pro Cys Leu
165 170 175

Thr Gln Ser Thr Ala Ala Pro Ala Val Arg Ala Ser Ser Ser Pro Val
180 185 190

Thr Leu Arg Gln Lys Thr Val Asp Trp Arg Arg Val Ser Arg Leu Gln
195 200 205

Glu Asp Pro Glu Gly Thr Glu Asn Pro Leu Gly Val Asp Glu Ser Leu
210 215 220

```
Phe Ser Tyr Gly Leu Arg Glu Ser Ile Ala Ser Tyr Leu Ser Leu Thr
225                 230                 235                 240

Ser Glu Asp Asn Thr Ser Phe Asp Arg Lys Lys Lys Ser Ile Ser Leu
                245                 250                 255

Met Tyr Gly Gly Ser Lys Arg Lys Ser Ser Phe Phe Ser Ser Pro Pro
            260                 265                 270

Tyr Phe Glu Asp
        275

<210> 4460
<211> 227
<212> PRT
<213> Homo sapiens

<220>
<223> NUDT21 (NCBI Accession: NP_008937)

<400> 4460
Met Ser Val Val Pro Pro Asn Arg Ser Gln Thr Gly Trp Pro Arg Gly
1               5                   10                  15

Val Thr Gln Phe Gly Asn Lys Tyr Ile Gln Gln Thr Lys Pro Leu Thr
            20                  25                  30

Leu Glu Arg Thr Ile Asn Leu Tyr Pro Leu Thr Asn Tyr Thr Phe Gly
        35                  40                  45

Thr Lys Glu Pro Leu Tyr Glu Lys Asp Ser Ser Val Ala Ala Arg Phe
    50                  55                  60

Gln Arg Met Arg Glu Glu Phe Asp Lys Ile Gly Met Arg Arg Thr Val
65                  70                  75                  80

Glu Gly Val Leu Ile Val His Glu His Arg Leu Pro His Val Leu Leu
                85                  90                  95

Leu Gln Leu Gly Thr Thr Phe Phe Lys Leu Pro Gly Gly Glu Leu Asn
            100                 105                 110

Pro Gly Glu Asp Glu Val Glu Gly Leu Lys Arg Leu Met Thr Glu Ile
        115                 120                 125

Leu Gly Arg Gln Asp Gly Val Leu Gln Asp Trp Val Ile Asp Asp Cys
    130                 135                 140

Ile Gly Asn Trp Trp Arg Pro Asn Phe Glu Pro Pro Gln Tyr Pro Tyr
145                 150                 155                 160

Ile Pro Ala His Ile Thr Lys Pro Lys Glu His Lys Lys Leu Phe Leu
                165                 170                 175
```

```
Val Gln Leu Gln Glu Lys Ala Leu Phe Ala Val Pro Lys Asn Tyr Lys
            180                 185                 190

Leu Val Ala Ala Pro Leu Phe Glu Leu Tyr Asp Asn Ala Pro Gly Tyr
        195                 200                 205

Gly Pro Ile Ile Ser Ser Leu Pro Gln Leu Leu Ser Arg Phe Asn Phe
    210                 215                 220

Ile Tyr Asn
225
```

<210> 4461
<211> 576
<212> PRT
<213> Homo sapiens

<220>
<223> ZNF431 (NCBI Accession: NP_597730)

<400> 4461

```
Met Asp Asp Leu Lys Tyr Gly Val Tyr Pro Leu Lys Glu Ala Ser Gly
1               5                   10                  15

Cys Pro Gly Ala Glu Arg Asn Leu Leu Val Tyr Ser Tyr Phe Glu Lys
            20                  25                  30

Glu Thr Leu Thr Phe Arg Asp Val Ala Ile Glu Phe Ser Leu Glu Glu
        35                  40                  45

Trp Glu Cys Leu Asn Pro Ala Gln Gln Asn Leu Tyr Met Asn Val Met
    50                  55                  60

Leu Glu Asn Tyr Lys Asn Leu Val Phe Leu Gly Val Ala Val Ser Lys
65                  70                  75                  80

Gln Asp Pro Val Thr Cys Leu Glu Gln Glu Lys Glu Pro Trp Asn Met
                85                  90                  95

Lys Arg His Glu Met Val Asp Glu Pro Pro Ala Met Cys Ser Tyr Phe
            100                 105                 110

Thr Lys Asp Leu Trp Pro Glu Gln Asp Ile Lys Asp Ser Phe Gln Gln
        115                 120                 125

Val Ile Leu Arg Arg Tyr Gly Lys Cys Glu His Glu Asn Leu Gln Leu
    130                 135                 140

Arg Lys Gly Ser Ala Ser Val Asp Glu Tyr Lys Val His Lys Glu Gly
145                 150                 155                 160

Tyr Asn Glu Leu Asn Gln Cys Leu Thr Thr Thr Gln Ser Lys Ile Phe
                165                 170                 175
```

```
Pro Cys Asp Lys Tyr Val Lys Val Phe His Lys Phe Leu Asn Ala Asn
            180                 185                 190

Arg His Lys Thr Arg Arg Thr Gly Lys Lys Pro Phe Lys Cys Lys Lys
        195                 200                 205

Cys Gly Lys Ser Phe Cys Met Leu Leu His Leu Ser Gln His Lys Arg
    210                 215                 220

Ile His Ile Arg Glu Asn Ser Tyr Gln Cys Glu Glu Cys Gly Lys Ala
225                 230                 235                 240

Phe Lys Trp Phe Ser Thr Leu Thr Arg His Lys Arg Ile His Thr Gly
                245                 250                 255

Glu Lys Pro Phe Lys Cys Glu Glu Cys Gly Lys Ala Phe Lys Gln Ser
            260                 265                 270

Ser Thr Leu Thr Thr His Lys Ile Ile His Thr Gly Glu Lys Pro Tyr
        275                 280                 285

Arg Cys Glu Glu Cys Gly Lys Ala Phe Asn Arg Ser Ser His Leu Thr
    290                 295                 300

Thr His Lys Ile Ile His Thr Gly Glu Lys Pro Tyr Lys Cys Glu Glu
305                 310                 315                 320

Cys Gly Lys Ala Phe Asn Gln Ser Ser Thr Leu Ser Thr His Lys Phe
                325                 330                 335

Ile His Ala Gly Glu Lys Pro Tyr Lys Cys Glu Glu Cys Asp Lys Ala
            340                 345                 350

Phe Asn Arg Phe Ser Tyr Leu Thr Lys His Lys Ile Ile His Thr Gly
        355                 360                 365

Glu Lys Ser Tyr Lys Cys Glu Glu Cys Gly Lys Gly Phe Asn Trp Ser
    370                 375                 380

Ser Thr Leu Thr Lys His Lys Arg Ile His Thr Gly Glu Lys Pro Tyr
385                 390                 395                 400

Lys Cys Glu Val Cys Gly Lys Ala Phe Asn Glu Ser Ser Asn Leu Thr
                405                 410                 415

Thr His Lys Met Ile His Thr Gly Glu Lys Pro Tyr Lys Cys Glu Glu
            420                 425                 430

Cys Gly Lys Ala Phe Asn Arg Ser Pro Gln Leu Thr Ala His Lys Ile
        435                 440                 445

Ile His Thr Gly Glu Lys Pro Tyr Lys Cys Glu Glu Cys Gly Lys Ala
    450                 455                 460
```

```
Phe Ser Gln Ser Ser Ile Leu Thr Thr His Lys Arg Ile His Thr Gly
465                 470                 475                 480

Glu Lys Pro Tyr Lys Cys Glu Glu Cys Gly Lys Ala Phe Asn Arg Ser
                485                 490                 495

Ser Asn Leu Thr Lys His Lys Ile Ile His Thr Gly Glu Lys Ser Tyr
            500                 505                 510

Lys Cys Glu Glu Cys Gly Lys Ala Phe Asn Gln Ser Ser Thr Leu Thr
        515                 520                 525

Lys His Arg Lys Ile His Thr Arg Gln Lys Pro Tyr Asn Cys Glu Glu
    530                 535                 540

Cys Asp Asn Thr Phe Asn Gln Ser Ser Asn Leu Ile Lys Gln Asn Asn
545                 550                 555                 560

Ser Tyr Trp Arg Glu Thr Leu Gln Met Ser Arg Met Trp Glu Ser Leu
                565                 570                 575
```

<210> 4462
<211> 642
<212> PRT
<213> Homo sapiens

<220>
<223> ZNF699 (NCBI Accession: NP_940937)

<400> 4462

```
Met Glu Glu Glu Arg Lys Thr Ala Glu Leu Gln Lys Asn Arg Ile Gln
1               5                   10                  15

Asp Ser Val Val Phe Glu Asp Val Ala Val Asp Phe Thr Gln Glu Glu
            20                  25                  30

Trp Ala Leu Leu Asp Leu Ala Gln Arg Asn Leu Tyr Arg Asp Val Met
        35                  40                  45

Leu Glu Asn Phe Gln Asn Leu Ala Ser Leu Gly Tyr Pro Leu His Thr
    50                  55                  60

Pro His Leu Ile Ser Gln Trp Glu Gln Glu Glu Asp Leu Gln Thr Val
65                  70                  75                  80

Lys Arg Glu Leu Ile Gln Gly Ile Phe Met Gly Glu His Arg Glu Gly
                85                  90                  95

Phe Glu Thr Gln Leu Lys Thr Asn Glu Ser Val Ala Ser Gln Asp Ile
            100                 105                 110

Cys Gly Glu Lys Ile Ser Asn Glu Gln Lys Ile Val Arg Phe Lys Arg
        115                 120                 125
```

```
Asn Asp Ser Trp Phe Ser Ser Leu His Glu Asn Gln Glu Ser Cys Gly
    130                 135                 140

Ile Asp Tyr Gln Asn Lys Ser His Glu Arg His Leu Arg Asn His Met
145                 150                 155                 160

Val Glu Asn Ile Tyr Glu Cys Tyr Glu Glu Asn Gln Asp Gly Gln Thr
                165                 170                 175

Phe Ser Gln Val Pro Asn Leu Asp Ser Leu Lys Arg Asn Thr Glu Val
            180                 185                 190

Lys Ser Cys Glu Cys His Glu Cys Gly Lys Ala Phe Val Asp His Ser
        195                 200                 205

Ser Leu Lys Ser His Ile Arg Ser His Thr Gly Ser Lys Pro Tyr Gln
    210                 215                 220

Cys Lys Glu Cys Gly Lys Ala Phe His Phe Leu Ala Cys Phe Lys Lys
225                 230                 235                 240

His Met Lys Thr Pro Thr Glu Glu Lys Pro Tyr Glu Cys Lys Glu Cys
                245                 250                 255

Thr Lys Ala Phe Ser Cys Ser Ser Phe Phe Arg Ala His Met Lys Ile
            260                 265                 270

His Ile Gly Lys Thr Asn Tyr Glu Cys Lys Glu Cys Gly Lys Gly Phe
        275                 280                 285

Ser Cys Ser Ser Ser Leu Thr Glu His Lys Arg Ile His Ser Gly Asp
    290                 295                 300

Lys Pro Tyr Glu Cys Lys Glu Cys Gly Lys Ala Phe Ser Cys Ser Ser
305                 310                 315                 320

Ser Leu Ser Lys His Lys Arg Ile His Ser Gly Asp Lys Pro Tyr Glu
                325                 330                 335

Cys Lys Glu Cys Gly Lys Ala Phe Ser Ser Ser Ser His Leu Ile Ile
            340                 345                 350

His Ile Arg Ile His Thr Gly Glu Lys Pro Tyr Glu Cys Lys Glu Cys
        355                 360                 365

Gly Lys Ala Phe Ser Glu Ser Ser Lys Leu Thr Val His Gly Arg Thr
    370                 375                 380

His Thr Gly Glu Lys Pro Tyr Lys Cys Lys Glu Cys Gly Lys Ala Tyr
385                 390                 395                 400

Asn Cys Pro Ser Ser Leu Ser Ile His Met Arg Lys His Thr Gly Glu
                405                 410                 415
```

```
Lys Pro Tyr Glu Cys Leu Glu Cys Gly Lys Ala Phe Tyr Leu Pro Thr
            420                 425                 430

Ser Leu Asn Thr His Val Lys Asn Gln Ser Arg Glu Lys Pro Tyr Glu
        435                 440                 445

Cys Lys Glu Cys Gly Lys Ala Phe Ser Cys Pro Ser Ser Phe Arg Ala
    450                 455                 460

His Val Arg Asp His Thr Gly Lys Ile Gln Tyr Glu Cys Lys Glu Cys
465                 470                 475                 480

Gly Lys Thr Phe Ser Arg Ser Ser Ser Leu Thr Glu His Leu Arg Thr
                485                 490                 495

His Ser Gly Glu Lys Pro Tyr Glu Cys Lys Glu Cys Gly Lys Ala Phe
            500                 505                 510

Ile Ser Ser Ser His Leu Thr Val His Ile Arg Thr His Thr Gly Glu
        515                 520                 525

Lys Pro Tyr Glu Cys Lys Lys Cys Gly Lys Ala Phe Ile Tyr Pro Ser
    530                 535                 540

Ala Leu Arg Ile His Met Arg Thr His Thr Gly Glu Lys Pro Tyr Glu
545                 550                 555                 560

Cys Lys Glu Cys Gly Lys Ala Phe Arg His Ser Ser Tyr Leu Thr Val
                565                 570                 575

His Ala Arg Met His Thr Gly Glu Lys Pro Phe Glu Cys Leu Glu Cys
            580                 585                 590

Gly Lys Ala Phe Ser Cys Pro Ser Ser Phe Arg Arg His Val Arg Ser
        595                 600                 605

His Thr Gly Glu Lys Pro Tyr Glu Cys Lys Glu Cys Gly Lys Ala Phe
    610                 615                 620

Val Cys Pro Ala Tyr Phe Arg Arg His Val Lys Thr His Thr Arg Glu
625                 630                 635                 640

Asn Ile


<210> 4463
<211> 111
<212> PRT
<213> Homo sapiens

<220>
<223> PAGE2 (NCBI Accession: NP_997222)
```

<400> 4463
Met Ser Glu Leu Leu Arg Ala Arg Ser Gln Ser Ser Glu Arg Gly Asn
1   5   10   15

Asp Gln Glu Ser Ser Gln Pro Val Gly Ser Val Ile Val Gln Glu Pro
            20   25   30

Thr Glu Glu Lys Arg Gln Glu Glu Glu Pro Pro Thr Asp Asn Gln Gly
        35   40   45

Ile Ala Pro Ser Gly Glu Ile Glu Asn Gln Ala Val Pro Ala Phe Gln
    50   55   60

Gly Pro Asp Met Glu Ala Phe Gln Gln Glu Leu Ala Leu Leu Lys Ile
65   70   75   80

Glu Asp Glu Pro Gly Asp Gly Pro Asp Val Arg Glu Gly Ile Met Pro
                85   90   95

Thr Phe Asp Leu Thr Lys Val Leu Glu Ala Gly Asp Ala Gln Pro
            100   105   110

<210> 4464
<211> 96
<212> PRT
<213> Homo sapiens

<220>
<223> KRTAP12-3 (NCBI Accession: NP_941970)

<400> 4464
Met Cys His Thr Ser Cys Ser Pro Ala Cys Gln Pro Thr Cys Cys Ile
1   5   10   15

His Ser Pro Cys Gln Ala Ser Cys Tyr Val Pro Val Ser Cys Gln Ser
            20   25   30

Ser Val Cys Met Pro Val Ser Cys Thr Arg Ile Val Cys Val Ala Pro
        35   40   45

Ser Cys Gln Pro Ser Val Cys Val Pro Val Ser Cys Arg Pro Ile Ile
    50   55   60

Tyr Val Thr Pro Ser Cys Gln Ser Ser Gly Cys Cys Gln Pro Pro Cys
65   70   75   80

Thr Thr Ala Leu Cys Arg Pro Ile Ser Cys Ser Thr Pro Ser Cys Cys
                85   90   95

<210> 4465
<211> 434
<212> PRT
<213> Homo sapiens

<220>
<223> ENO2 (NCBI Accession: NP_001966)

<400> 4465
Met Ser Ile Glu Lys Ile Trp Ala Arg Glu Ile Leu Asp Ser Arg Gly
1   5   10   15

Asn Pro Thr Val Glu Val Asp Leu Tyr Thr Ala Lys Gly Leu Phe Arg
            20   25   30

Ala Ala Val Pro Ser Gly Ala Ser Thr Gly Ile Tyr Glu Ala Leu Glu
        35   40   45

Leu Arg Asp Gly Asp Lys Gln Arg Tyr Leu Gly Lys Gly Val Leu Lys
    50   55   60

Ala Val Asp His Ile Asn Ser Thr Ile Ala Pro Ala Leu Ile Ser Ser
65   70   75   80

Gly Leu Ser Val Val Glu Gln Glu Lys Leu Asp Asn Leu Met Leu Glu
                85   90   95

Leu Asp Gly Thr Glu Asn Lys Ser Lys Phe Gly Ala Asn Ala Ile Leu
            100   105   110

Gly Val Ser Leu Ala Val Cys Lys Ala Gly Ala Ala Glu Arg Glu Leu
        115   120   125

Pro Leu Tyr Arg His Ile Ala Gln Leu Ala Gly Asn Ser Asp Leu Ile
    130   135   140

Leu Pro Val Pro Ala Phe Asn Val Ile Asn Gly Gly Ser His Ala Gly
145   150   155   160

Asn Lys Leu Ala Met Gln Glu Phe Met Ile Leu Pro Val Gly Ala Glu
                165   170   175

Ser Phe Arg Asp Ala Met Arg Leu Gly Ala Glu Val Tyr His Thr Leu
            180   185   190

Lys Gly Val Ile Lys Asp Lys Tyr Gly Lys Asp Ala Thr Asn Val Gly
        195   200   205

Asp Glu Gly Gly Phe Ala Pro Asn Ile Leu Glu Asn Ser Glu Ala Leu
    210   215   220

Glu Leu Val Lys Glu Ala Ile Asp Lys Ala Gly Tyr Thr Glu Lys Ile
225   230   235   240

Val Ile Gly Met Asp Val Ala Ala Ser Glu Phe Tyr Arg Asp Gly Lys
                245   250   255

Tyr Asp Leu Asp Phe Lys Ser Pro Thr Asp Pro Ser Arg Tyr Ile Thr
            260   265   270

```
Gly Asp Gln Leu Gly Ala Leu Tyr Gln Asp Phe Val Arg Asp Tyr Pro
        275                 280                 285

Val Val Ser Ile Glu Asp Pro Phe Asp Gln Asp Asp Trp Ala Ala Trp
    290                 295                 300

Ser Lys Phe Thr Ala Asn Val Gly Ile Gln Ile Val Gly Asp Asp Leu
305                 310                 315                 320

Thr Val Thr Asn Pro Lys Arg Ile Glu Arg Ala Val Glu Glu Lys Ala
                325                 330                 335

Cys Asn Cys Leu Leu Leu Lys Val Asn Gln Ile Gly Ser Val Thr Glu
            340                 345                 350

Ala Ile Gln Ala Cys Lys Leu Ala Gln Glu Asn Gly Trp Gly Val Met
        355                 360                 365

Val Ser His Arg Ser Gly Glu Thr Glu Asp Thr Phe Ile Ala Asp Leu
    370                 375                 380

Val Val Gly Leu Cys Thr Gly Gln Ile Lys Thr Gly Ala Pro Cys Arg
385                 390                 395                 400

Ser Glu Arg Leu Ala Lys Tyr Asn Gln Leu Met Arg Ile Glu Glu Glu
                405                 410                 415

Leu Gly Asp Glu Ala Arg Phe Ala Gly His Asn Phe Arg Asn Pro Ser
            420                 425                 430

Val Leu
```

<210> 4466
<211> 251
<212> PRT
<213> Homo sapiens

<220>
<223> C11orf68 (NCBI Accession: NP_001129107)

<400> 4466

```
Met Glu Pro Gly Glu Glu Leu Glu Glu Glu Gly Ser Pro Gly Gly Arg
1               5                   10                  15

Glu Asp Gly Phe Thr Ala Glu His Leu Ala Ala Glu Ala Met Ala Ala
            20                  25                  30

Asp Met Asp Pro Trp Leu Val Phe Asp Ala Arg Thr Thr Pro Ala Thr
        35                  40                  45

Glu Leu Asp Ala Trp Leu Ala Lys Tyr Pro Pro Ser Gln Val Thr Arg
    50                  55                  60
```

```
Tyr Gly Asp Pro Gly Ser Pro Asn Ser Glu Pro Val Gly Trp Ile Ala
65                  70                  75                  80

Val Tyr Gly Gln Gly Tyr Ser Pro Asn Ser Gly Asp Val Gln Gly Leu
                85                  90                  95

Gln Ala Ala Trp Glu Ala Leu Gln Thr Ser Gly Arg Pro Ile Thr Pro
            100                 105                 110

Gly Thr Leu Arg Gln Leu Ala Ile Thr His His Val Leu Ser Gly Lys
        115                 120                 125

Trp Leu Met His Leu Ala Pro Gly Phe Lys Leu Asp His Ala Trp Ala
    130                 135                 140

Gly Ile Ala Arg Ala Val Val Glu Gly Arg Leu Gln Val Ala Lys Val
145                 150                 155                 160

Ser Pro Arg Ala Lys Glu Gly Gly Arg Gln Val Ile Cys Val Tyr Thr
                165                 170                 175

Asp Asp Phe Thr Asp Arg Leu Gly Val Leu Glu Ala Asp Ser Ala Ile
            180                 185                 190

Arg Ala Ala Gly Ile Lys Cys Leu Leu Thr Tyr Lys Pro Asp Val Tyr
        195                 200                 205

Thr Tyr Leu Gly Ile Tyr Arg Ala Asn Arg Trp His Leu Cys Pro Thr
    210                 215                 220

Leu Tyr Glu Ser Arg Phe Gln Leu Gly Gly Ser Ala Arg Gly Ser Arg
225                 230                 235                 240

Val Leu Asp Arg Ala Asn Asn Val Glu Leu Thr
                245                 250

<210> 4467
<211> 900
<212> PRT
<213> Homo sapiens

<220>
<223> MARS (NCBI Accession: NP_004981)

<400> 4467
Met Arg Leu Phe Val Ser Asp Gly Val Pro Gly Cys Leu Pro Val Leu
1               5                   10                  15

Ala Ala Ala Gly Arg Ala Arg Gly Arg Ala Glu Val Leu Ile Ser Thr
            20                  25                  30

Val Gly Pro Glu Asp Cys Val Val Pro Phe Leu Thr Arg Pro Lys Val
        35                  40                  45
```

```
Pro Val Leu Gln Leu Asp Ser Gly Asn Tyr Leu Phe Ser Thr Ser Ala
    50                  55                  60

Ile Cys Arg Tyr Phe Phe Leu Leu Ser Gly Trp Glu Gln Asp Asp Leu
65                  70                  75                  80

Thr Asn Gln Trp Leu Glu Trp Glu Ala Thr Glu Leu Gln Pro Ala Leu
                85                  90                  95

Ser Ala Ala Leu Tyr Tyr Leu Val Val Gln Gly Lys Lys Gly Glu Asp
            100                 105                 110

Val Leu Gly Ser Val Arg Arg Ala Leu Thr His Ile Asp His Ser Leu
        115                 120                 125

Ser Arg Gln Asn Cys Pro Phe Leu Ala Gly Glu Thr Glu Ser Leu Ala
    130                 135                 140

Asp Ile Val Leu Trp Gly Ala Leu Tyr Pro Leu Leu Gln Asp Pro Ala
145                 150                 155                 160

Tyr Leu Pro Glu Glu Leu Ser Ala Leu His Ser Trp Phe Gln Thr Leu
                165                 170                 175

Ser Thr Gln Glu Pro Cys Gln Arg Ala Ala Glu Thr Val Leu Lys Gln
            180                 185                 190

Gln Gly Val Leu Ala Leu Arg Pro Tyr Leu Gln Lys Gln Pro Gln Pro
        195                 200                 205

Ser Pro Ala Glu Gly Arg Ala Val Thr Asn Glu Pro Glu Glu Glu Glu
    210                 215                 220

Leu Ala Thr Leu Ser Glu Glu Glu Ile Ala Met Ala Val Thr Ala Trp
225                 230                 235                 240

Glu Lys Gly Leu Glu Ser Leu Pro Pro Leu Arg Pro Gln Gln Asn Pro
                245                 250                 255

Val Leu Pro Val Ala Gly Glu Arg Asn Val Leu Ile Thr Ser Ala Leu
            260                 265                 270

Pro Tyr Val Asn Asn Val Pro His Leu Gly Asn Ile Ile Gly Cys Val
        275                 280                 285

Leu Ser Ala Asp Val Phe Ala Arg Tyr Ser Arg Leu Arg Gln Trp Asn
    290                 295                 300

Thr Leu Tyr Leu Cys Gly Thr Asp Glu Tyr Gly Thr Ala Thr Glu Thr
305                 310                 315                 320

Lys Ala Leu Glu Glu Gly Leu Thr Pro Gln Glu Ile Cys Asp Lys Tyr
                325                 330                 335
```

```
His Ile Ile His Ala Asp Ile Tyr Arg Trp Phe Asn Ile Ser Phe Asp
            340                 345                 350

Ile Phe Gly Arg Thr Thr Thr Pro Gln Gln Thr Lys Ile Thr Gln Asp
        355                 360                 365

Ile Phe Gln Gln Leu Leu Lys Arg Gly Phe Val Leu Gln Asp Thr Val
    370                 375                 380

Glu Gln Leu Arg Cys Glu His Cys Ala Arg Phe Leu Ala Asp Arg Phe
385                 390                 395                 400

Val Glu Gly Val Cys Pro Phe Cys Gly Tyr Glu Glu Ala Arg Gly Asp
                405                 410                 415

Gln Cys Asp Lys Cys Gly Lys Leu Ile Asn Ala Val Glu Leu Lys Lys
            420                 425                 430

Pro Gln Cys Lys Val Cys Arg Ser Cys Pro Val Val Gln Ser Ser Gln
        435                 440                 445

His Leu Phe Leu Asp Leu Pro Lys Leu Glu Lys Arg Leu Glu Glu Trp
    450                 455                 460

Leu Gly Arg Thr Leu Pro Gly Ser Asp Trp Thr Pro Asn Ala Gln Phe
465                 470                 475                 480

Ile Thr Arg Ser Trp Leu Arg Asp Gly Leu Lys Pro Arg Cys Ile Thr
                485                 490                 495

Arg Asp Leu Lys Trp Gly Thr Pro Val Pro Leu Glu Gly Phe Glu Asp
            500                 505                 510

Lys Val Phe Tyr Val Trp Phe Asp Ala Thr Ile Gly Tyr Leu Ser Ile
        515                 520                 525

Thr Ala Asn Tyr Thr Asp Gln Trp Glu Arg Trp Trp Lys Asn Pro Glu
    530                 535                 540

Gln Val Asp Leu Tyr Gln Phe Met Ala Lys Asp Asn Val Pro Phe His
545                 550                 555                 560

Ser Leu Val Phe Pro Cys Ser Ala Leu Gly Ala Glu Asp Asn Tyr Thr
                565                 570                 575

Leu Val Ser His Leu Ile Ala Thr Glu Tyr Leu Asn Tyr Glu Asp Gly
            580                 585                 590

Lys Phe Ser Lys Ser Arg Gly Val Gly Val Phe Gly Asp Met Ala Gln
        595                 600                 605

Asp Thr Gly Ile Pro Ala Asp Ile Trp Arg Phe Tyr Leu Leu Tyr Ile
    610                 615                 620
```

```
Arg Pro Glu Gly Gln Asp Ser Ala Phe Ser Trp Thr Asp Leu Leu Leu
625                 630                 635                 640

Lys Asn Asn Ser Glu Leu Leu Asn Asn Leu Gly Asn Phe Ile Asn Arg
                645                 650                 655

Ala Gly Met Phe Val Ser Lys Phe Phe Gly Gly Tyr Val Pro Glu Met
            660                 665                 670

Val Leu Thr Pro Asp Asp Gln Arg Leu Leu Ala His Val Thr Leu Glu
        675                 680                 685

Leu Gln His Tyr His Gln Leu Leu Glu Lys Val Arg Ile Arg Asp Ala
    690                 695                 700

Leu Arg Ser Ile Leu Thr Ile Ser Arg His Gly Asn Gln Tyr Ile Gln
705                 710                 715                 720

Val Asn Glu Pro Trp Lys Arg Ile Lys Gly Ser Glu Ala Asp Arg Gln
                725                 730                 735

Arg Ala Gly Thr Val Thr Gly Leu Ala Val Asn Ile Ala Ala Leu Leu
            740                 745                 750

Ser Val Met Leu Gln Pro Tyr Met Pro Thr Val Ser Ala Thr Ile Gln
        755                 760                 765

Ala Gln Leu Gln Leu Pro Pro Pro Ala Cys Ser Ile Leu Leu Thr Asn
    770                 775                 780

Phe Leu Cys Thr Leu Pro Ala Gly His Gln Ile Gly Thr Val Ser Pro
785                 790                 795                 800

Leu Phe Gln Lys Leu Glu Asn Asp Gln Ile Glu Ser Leu Arg Gln Arg
                805                 810                 815

Phe Gly Gly Gly Gln Ala Lys Thr Ser Pro Lys Pro Ala Val Val Glu
            820                 825                 830

Thr Val Thr Thr Ala Lys Pro Gln Gln Ile Gln Ala Leu Met Asp Glu
        835                 840                 845

Val Thr Lys Gln Gly Asn Ile Val Arg Glu Leu Lys Ala Gln Lys Ala
    850                 855                 860

Asp Lys Asn Glu Val Ala Ala Glu Val Ala Lys Leu Leu Asp Leu Lys
865                 870                 875                 880

Lys Gln Leu Ala Val Ala Glu Gly Lys Pro Pro Glu Ala Pro Lys Gly
                885                 890                 895

Lys Lys Lys Lys
            900
```

<210> 4468
<211> 376
<212> PRT
<213> Homo sapiens

<220>
<223> SERPINB6 (NCBI Accession: NP_001182220)

<400> 4468
Met Asp Val Leu Ala Glu Ala Asn Gly Thr Phe Ala Leu Asn Leu Leu
1   5   10   15

Lys Thr Leu Gly Lys Asp Asn Ser Lys Asn Val Phe Phe Ser Pro Met
            20   25   30

Ser Met Ser Cys Ala Leu Ala Met Val Tyr Met Gly Ala Lys Gly Asn
        35   40   45

Thr Ala Ala Gln Met Ala Gln Ile Leu Ser Phe Asn Lys Ser Gly Gly
    50   55   60

Gly Gly Asp Ile His Gln Gly Phe Gln Ser Leu Leu Thr Glu Val Asn
65   70   75   80

Lys Thr Gly Thr Gln Tyr Leu Leu Arg Val Ala Asn Arg Leu Phe Gly
                85   90   95

Glu Lys Ser Cys Asp Phe Leu Ser Ser Phe Arg Asp Ser Cys Gln Lys
            100   105   110

Phe Tyr Gln Ala Glu Met Glu Glu Leu Asp Phe Ile Ser Ala Val Glu
        115   120   125

Lys Ser Arg Lys His Ile Asn Thr Trp Val Ala Glu Lys Thr Glu Gly
    130   135   140

Lys Ile Ala Glu Leu Leu Ser Pro Gly Ser Val Asp Pro Leu Thr Arg
145   150   155   160

Leu Val Leu Val Asn Ala Val Tyr Phe Arg Gly Asn Trp Asp Glu Gln
                165   170   175

Phe Asp Lys Glu Asn Thr Glu Glu Arg Leu Phe Lys Val Ser Lys Asn
            180   185   190

Glu Glu Lys Pro Val Gln Met Met Phe Lys Gln Ser Thr Phe Lys Lys
        195   200   205

Thr Tyr Ile Gly Glu Ile Phe Thr Gln Ile Leu Val Leu Pro Tyr Val
    210   215   220

Gly Lys Glu Leu Asn Met Ile Ile Met Leu Pro Asp Glu Thr Thr Asp
225   230   235   240

Leu Arg Thr Val Glu Lys Glu Leu Thr Tyr Glu Lys Phe Val Glu Trp
245 250 255

Thr Arg Leu Asp Met Met Asp Glu Glu Glu Val Glu Val Ser Leu Pro
260 265 270

Arg Phe Lys Leu Glu Glu Ser Tyr Asp Met Glu Ser Val Leu Arg Asn
275 280 285

Leu Gly Met Thr Asp Ala Phe Glu Leu Gly Lys Ala Asp Phe Ser Gly
290 295 300

Met Ser Gln Thr Asp Leu Ser Leu Ser Lys Val Val His Lys Ser Phe
305 310 315 320

Val Glu Val Asn Glu Glu Gly Thr Glu Ala Ala Ala Ala Thr Ala Ala
325 330 335

Ile Met Met Met Arg Cys Ala Arg Phe Val Pro Arg Phe Cys Ala Asp
340 345 350

His Pro Phe Leu Phe Phe Ile Gln His Ser Lys Thr Asn Gly Ile Leu
355 360 365

Phe Cys Gly Arg Phe Ser Ser Pro
370 375

<210> 4469
<211> 273
<212> PRT
<213> Homo sapiens

<220>
<223> ERP27 (NCBI Accession: NP_689534)

<400> 4469
Met Glu Ala Ala Pro Ser Arg Phe Met Phe Leu Leu Phe Leu Leu Thr
1 5 10 15

Cys Glu Leu Ala Ala Glu Val Ala Ala Glu Val Glu Lys Ser Ser Asp
20 25 30

Gly Pro Gly Ala Ala Gln Glu Pro Thr Trp Leu Thr Asp Val Pro Ala
35 40 45

Ala Met Glu Phe Ile Ala Ala Thr Glu Val Ala Val Ile Gly Phe Phe
50 55 60

Gln Asp Leu Glu Ile Pro Ala Val Pro Ile Leu His Ser Met Val Gln
65 70 75 80

Lys Phe Pro Gly Val Ser Phe Gly Ile Ser Thr Asp Ser Glu Val Leu
85 90 95

```
Thr His Tyr Asn Ile Thr Gly Asn Thr Ile Cys Leu Phe Arg Leu Val
            100                 105                 110

Asp Asn Glu Gln Leu Asn Leu Glu Asp Glu Asp Ile Glu Ser Ile Asp
        115                 120                 125

Ala Thr Lys Leu Ser Arg Phe Ile Glu Ile Asn Ser Leu His Met Val
    130                 135                 140

Thr Glu Tyr Asn Pro Val Thr Val Ile Gly Leu Phe Asn Ser Val Ile
145                 150                 155                 160

Gln Ile His Leu Leu Leu Ile Met Asn Lys Ala Ser Pro Glu Tyr Glu
                165                 170                 175

Glu Asn Met His Arg Tyr Gln Lys Ala Ala Lys Leu Phe Gln Gly Lys
            180                 185                 190

Ile Leu Phe Ile Leu Val Asp Ser Gly Met Lys Glu Asn Gly Lys Val
        195                 200                 205

Ile Ser Phe Phe Lys Leu Lys Glu Ser Gln Leu Pro Ala Leu Ala Ile
    210                 215                 220

Tyr Gln Thr Leu Asp Asp Glu Trp Asp Thr Leu Pro Thr Ala Glu Val
225                 230                 235                 240

Ser Val Glu His Val Gln Asn Phe Cys Asp Gly Phe Leu Ser Gly Lys
                245                 250                 255

Leu Leu Lys Glu Asn Arg Glu Ser Glu Gly Lys Thr Pro Lys Val Glu
            260                 265                 270

Leu


<210> 4470
<211> 99
<212> PRT
<213> Homo sapiens

<220>
<223> DPY30 (NCBI Accession: NP_001308138)

<400> 4470
Met Glu Pro Glu Gln Met Leu Glu Gly Gln Thr Gln Val Ala Glu Asn
1               5                   10                  15

Pro His Ser Glu Tyr Gly Leu Thr Asp Asn Val Glu Arg Ile Val Glu
            20                  25                  30

Asn Glu Lys Ile Asn Ala Glu Lys Ser Ser Lys Gln Lys Val Asp Leu
        35                  40                  45
```

```
Gln Ser Leu Pro Thr Arg Ala Tyr Leu Asp Gln Thr Val Val Pro Ile
    50                  55                  60

Leu Leu Gln Gly Leu Ala Val Leu Ala Lys Glu Arg Pro Pro Asn Pro
65                  70                  75                  80

Ile Glu Phe Leu Ala Ser Tyr Leu Leu Lys Asn Lys Ala Gln Phe Glu
                85                  90                  95

Asp Arg Asn


<210> 4471
<211> 230
<212> PRT
<213> Homo sapiens

<220>
<223> ROPN1L (NCBI Accession: NP_001188395)

<400> 4471
Met Pro Leu Pro Asp Thr Met Phe Cys Ala Gln Gln Ile His Ile Pro
1               5                   10                  15

Pro Glu Leu Pro Asp Ile Leu Lys Gln Phe Thr Lys Ala Ala Ile Arg
            20                  25                  30

Thr Gln Pro Ala Asp Val Leu Arg Trp Ser Ala Gly Tyr Phe Ser Ala
        35                  40                  45

Leu Ser Arg Gly Asp Pro Leu Pro Val Lys Asp Arg Met Glu Met Pro
    50                  55                  60

Thr Ala Thr Gln Lys Thr Asp Thr Gly Leu Thr Gln Gly Leu Leu Lys
65                  70                  75                  80

Val Leu His Lys Gln Cys His His Lys Arg Tyr Val Glu Leu Thr Asp
                85                  90                  95

Leu Glu Gln Lys Trp Lys Asn Leu Cys Leu Pro Lys Glu Lys Phe Lys
            100                 105                 110

Ala Leu Leu Gln Leu Asp Pro Cys Glu Asn Lys Ile Lys Trp Ile Asn
        115                 120                 125

Phe Leu Ala Leu Gly Cys Ser Met Leu Gly Gly Ser Leu Asn Thr Ala
    130                 135                 140

Leu Lys His Leu Cys Glu Ile Leu Thr Asp Asp Arg Glu Gly Gly Pro
145                 150                 155                 160

Ala Arg Ile Pro Phe Lys Thr Phe Ser Tyr Val Tyr Arg Tyr Leu Ala
                165                 170                 175
```

```
Arg Leu Asp Ser Asp Val Ser Pro Leu Glu Thr Glu Ser Tyr Leu Ala
            180                 185                 190

Ser Leu Lys Glu Asn Ile Asp Ala Arg Lys Asn Gly Met Ile Gly Leu
        195                 200                 205

Ser Asp Phe Phe Phe Pro Lys Arg Lys Leu Leu Glu Ser Ile Glu Asn
    210                 215                 220

Ser Glu Asp Val Gly His
225                 230

<210> 4472
<211> 378
<212> PRT
<213> Homo sapiens

<220>
<223> BTBD8 (NCBI Accession: NP_899065)

<400> 4472
Met Ala Arg Cys Gly Glu Gly Ser Ala Ala Pro Met Val Leu Leu Gly
1               5                   10                  15

Ser Ala Gly Val Cys Ser Lys Gly Leu Gln Arg Lys Gly Pro Cys Glu
            20                  25                  30

Arg Arg Arg Leu Lys Ala Thr Val Ser Glu Gln Leu Ser Gln Asp Leu
        35                  40                  45

Leu Arg Leu Leu Arg Glu Glu Phe His Thr Asp Val Thr Phe Ser Val
    50                  55                  60

Gly Cys Thr Leu Phe Lys Ala His Lys Ala Val Leu Leu Ala Arg Val
65                  70                  75                  80

Pro Asp Phe Tyr Phe His Thr Ile Gly Gln Thr Ser Asn Ser Leu Thr
                85                  90                  95

Asn Gln Glu Pro Ile Ala Val Glu Asn Val Glu Ala Leu Glu Phe Arg
            100                 105                 110

Thr Phe Leu Gln Ile Ile Tyr Ser Ser Asn Arg Asn Ile Lys Asn Tyr
        115                 120                 125

Glu Glu Glu Ile Leu Arg Lys Lys Ile Met Glu Ile Gly Ile Ser Gln
    130                 135                 140

Lys Gln Leu Asp Ile Ser Phe Pro Lys Cys Glu Asn Ser Ser Asp Cys
145                 150                 155                 160

Ser Leu Gln Lys His Glu Ile Pro Glu Asp Ile Ser Asp Arg Asp Asp
                165                 170                 175
```

```
Asp Phe Ile Ser Asn Asp Asn Tyr Asp Leu Glu Pro Ala Ser Glu Leu
            180                 185                 190

Gly Glu Asp Leu Leu Lys Leu Tyr Val Lys Pro Gly Cys Pro Asp Ile
        195                 200                 205

Asp Ile Phe Val Asp Gly Lys Arg Phe Lys Ala His Arg Ala Ile Leu
    210                 215                 220

Ser Ala Arg Ser Ser Tyr Phe Ala Ala Met Leu Ser Gly Cys Trp Ala
225                 230                 235                 240

Glu Ser Ser Gln Glu Tyr Val Thr Leu Gln Gly Ile Ser His Val Glu
                245                 250                 255

Leu Asn Val Met Met His Phe Ile Tyr Gly Gly Thr Leu Asp Ile Pro
            260                 265                 270

Asp Lys Thr Asn Val Gly Gln Ile Leu Asn Met Ala Asp Met Tyr Gly
        275                 280                 285

Leu Glu Gly Leu Lys Glu Val Ala Ile Tyr Ile Leu Arg Arg Asp Tyr
    290                 295                 300

Cys Asn Phe Phe Gln Lys Pro Val Pro Arg Thr Leu Thr Ser Ile Leu
305                 310                 315                 320

Glu Cys Leu Ile Ile Ala His Ser Val Gly Val Glu Ser Leu Phe Ala
                325                 330                 335

Asp Cys Met Lys Trp Ile Val Lys His Phe Ala Arg Phe Trp Ser Glu
            340                 345                 350

Arg Ser Phe Ala Asn Ile Pro Pro Glu Ile Gln Lys Ser Cys Leu Asn
        355                 360                 365

Met Leu Ile Gln Ser Leu Val Asn Ile Thr
    370                 375

<210> 4473
<211> 348
<212> PRT
<213> Homo sapiens

<220>
<223> NCF4 (NCBI Accession: NP_038202)

<400> 4473
Met Ala Val Ala Gln Gln Leu Arg Ala Glu Ser Asp Phe Glu Gln Leu
1               5                   10                  15

Pro Asp Asp Val Ala Ile Ser Ala Asn Ile Ala Asp Ile Glu Glu Lys
            20                  25                  30
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```
Arg Gly Phe Thr Ser His Phe Val Phe Val Ile Glu Val Lys Thr Lys
        35                  40                  45

Gly Gly Ser Lys Tyr Leu Ile Tyr Arg Arg Tyr Arg Gln Phe His Ala
    50                  55                  60

Leu Gln Ser Lys Leu Glu Glu Arg Phe Gly Pro Asp Ser Lys Ser Ser
65                  70                  75                  80

Ala Leu Ala Cys Thr Leu Pro Thr Leu Pro Ala Lys Val Tyr Val Gly
                85                  90                  95

Val Lys Gln Glu Ile Ala Glu Met Arg Ile Pro Ala Leu Asn Ala Tyr
            100                 105                 110

Met Lys Ser Leu Leu Ser Leu Pro Val Trp Val Leu Met Asp Glu Asp
        115                 120                 125

Val Arg Ile Phe Phe Tyr Gln Ser Pro Tyr Asp Ser Glu Gln Val Pro
    130                 135                 140

Gln Ala Leu Arg Arg Leu Arg Pro Arg Thr Arg Lys Val Lys Ser Val
145                 150                 155                 160

Ser Pro Gln Gly Asn Ser Val Asp Arg Met Ala Ala Pro Arg Ala Glu
                165                 170                 175

Ala Leu Phe Asp Phe Thr Gly Asn Ser Lys Leu Glu Leu Asn Phe Lys
            180                 185                 190

Ala Gly Asp Val Ile Phe Leu Leu Ser Arg Ile Asn Lys Asp Trp Leu
        195                 200                 205

Glu Gly Thr Val Arg Gly Ala Thr Gly Ile Phe Pro Leu Ser Phe Val
    210                 215                 220

Lys Ile Leu Lys Asp Phe Pro Glu Glu Asp Asp Pro Thr Asn Trp Leu
225                 230                 235                 240

Arg Cys Tyr Tyr Tyr Glu Asp Thr Ile Ser Thr Ile Lys Ser Val Ala
                245                 250                 255

Trp Glu Gly Gly Ala Cys Pro Ala Phe Leu Pro Ser Leu Arg Pro Pro
            260                 265                 270

Pro Leu Thr Ser Pro Ser His Gly Ser Leu Ser His Ser Lys Ala Pro
        275                 280                 285

Ser Gly Ser Gln Met Ser His Asn Ala Val Thr Ser His Gln Arg Pro
    290                 295                 300

Gly Trp Pro Gly Gln Pro His Ser Pro Phe Pro His Pro Thr Pro His
305                 310                 315                 320
```

```
Phe Gln Pro Asp Ala Ser Leu Leu Gln Pro Val Thr Pro Leu Gly Thr
                325                 330                 335

Ser Arg Trp Arg Lys Ile Ser Ala Ala Leu Pro Tyr
            340                 345

<210> 4474
<211> 519
<212> PRT
<213> Homo sapiens

<220>
<223> TCP11L2 (NCBI Accession: XP_005268824)

<400> 4474
Met Pro Phe Asn Gly Glu Lys Gln Cys Val Gly Glu Asp Gln Pro Ser
1               5                   10                  15

Asp Ser Asp Ser Ser Arg Phe Ser Glu Ser Met Ala Ser Leu Ser Asp
            20                  25                  30

Tyr Glu Cys Ser Arg Gln Ser Phe Ala Ser Asp Ser Ser Ser Lys Ser
        35                  40                  45

Ser Ser Pro Ala Ser Thr Ser Pro Pro Arg Val Val Thr Phe Asp Glu
    50                  55                  60

Val Met Ala Thr Ala Arg Asn Leu Ser Asn Leu Thr Leu Ala His Glu
65                  70                  75                  80

Ile Ala Val Asn Glu Asn Phe Gln Leu Lys Gln Glu Ala Leu Pro Glu
                85                  90                  95

Lys Ser Leu Ala Gly Arg Val Lys His Ile Val His Gln Ala Phe Trp
            100                 105                 110

Asp Val Leu Asp Ser Glu Leu Asn Ala Asp Pro Pro Glu Phe Glu His
        115                 120                 125

Ala Ile Lys Leu Phe Glu Glu Ile Arg Glu Ile Leu Leu Ser Phe Leu
    130                 135                 140

Thr Pro Gly Gly Asn Arg Leu Arg Asn Gln Ile Cys Glu Val Leu Asp
145                 150                 155                 160

Thr Asp Leu Ile Arg Gln Gln Ala Glu His Ser Ala Val Asp Ile Gln
                165                 170                 175

Gly Leu Ala Asn Tyr Val Ile Ser Thr Met Gly Lys Leu Cys Ala Pro
            180                 185                 190

Val Arg Asp Asn Asp Ile Arg Glu Leu Lys Ala Thr Gly Asn Ile Val
        195                 200                 205
```

```
Glu Val Leu Arg Gln Ile Phe His Val Leu Asp Leu Met Gln Met Asp
    210                 215                 220

Met Ala Asn Phe Thr Ile Met Ser Leu Arg Pro His Leu Gln Arg Gln
225                 230                 235                 240

Leu Val Glu Tyr Glu Arg Thr Lys Phe Gln Glu Ile Leu Glu Glu Thr
                245                 250                 255

Pro Ser Ala Leu Asp Gln Thr Thr Glu Trp Ile Lys Glu Ser Val Asn
            260                 265                 270

Glu Glu Leu Phe Ser Leu Ser Glu Ser Ala Leu Thr Pro Gly Ala Glu
        275                 280                 285

Asn Thr Ser Lys Pro Ser Leu Ser Pro Thr Leu Val Leu Asn Asn Ser
    290                 295                 300

Tyr Leu Lys Leu Leu Gln Trp Asp Tyr Gln Lys Lys Glu Leu Pro Glu
305                 310                 315                 320

Thr Leu Met Thr Asp Gly Ala Arg Leu Gln Glu Leu Thr Glu Lys Leu
                325                 330                 335

Asn Gln Leu Lys Ile Ile Ala Cys Leu Ser Leu Ile Thr Asn Asn Met
            340                 345                 350

Val Gly Ala Ile Thr Gly Gly Leu Pro Glu Leu Ala Ser Arg Leu Thr
        355                 360                 365

Arg Ile Ser Ala Val Leu Leu Glu Gly Met Asn Lys Glu Thr Phe Asn
    370                 375                 380

Leu Lys Glu Val Leu Asn Ser Ile Gly Ile Gln Thr Cys Val Glu Val
385                 390                 395                 400

Asn Lys Thr Leu Met Glu Arg Gly Leu Pro Thr Leu Asn Ala Glu Ile
                405                 410                 415

Gln Ala Asn Leu Ile Gly Gln Phe Ser Ser Ile Glu Glu Glu Asp Asn
            420                 425                 430

Pro Ile Trp Ser Leu Ile Asp Lys Arg Ile Lys Leu Tyr Met Arg Arg
        435                 440                 445

Leu Leu Cys Leu Pro Ser Pro Gln Lys Cys Met Pro Pro Met Pro Gly
    450                 455                 460

Gly Leu Ala Val Ile Gln Gln Glu Leu Glu Ala Leu Gly Ser Gln Tyr
465                 470                 475                 480

Ala Asn Ile Val Asn Leu Asn Lys Gln Val Tyr Gly Pro Phe Tyr Ala
                485                 490                 495
```

Asn Ile Leu Arg Lys Leu Leu Phe Asn Glu Glu Ala Met Gly Lys Val
            500   505   510

Asp Ala Ser Pro Pro Thr Asn
        515

<210> 4475
<211> 199
<212> PRT
<213> Homo sapiens

<220>
<223> PLCB2 (NCBI Accession: NP_001271228)

<400> 4475
Met Ser Leu Leu Asn Pro Val Leu Leu Pro Pro Lys Val Lys Ala Tyr
1   5   10   15

Leu Ser Gln Gly Glu Arg Phe Ile Lys Trp Asp Asp Glu Thr Thr Val
            20   25   30

Ala Ser Pro Val Ile Leu Arg Val Asp Pro Lys Gly Tyr Tyr Leu Tyr
        35   40   45

Trp Thr Tyr Gln Ser Lys Glu Met Glu Phe Leu Asp Ile Thr Ser Ile
    50   55   60

Arg Asp Thr Arg Phe Gly Lys Phe Ala Lys Met Pro Lys Ser Gln Lys
65   70   75   80

Leu Arg Asp Val Phe Asn Met Asp Phe Pro Asp Asn Ser Phe Leu Leu
                85   90   95

Lys Thr Leu Thr Val Val Ser Gly Pro Asp Met Val Asp Leu Thr Phe
            100   105   110

His Asn Phe Val Ser Tyr Lys Glu Asn Val Gly Lys Ala Trp Ala Glu
        115   120   125

Asp Val Leu Ala Leu Val Lys His Pro Leu Thr Ala Asn Ala Ser Arg
    130   135   140

Ser Thr Phe Leu Asp Lys Ile Leu Val Lys Leu Lys Met Gln Leu Asn
145   150   155   160

Ser Glu Gly Lys Ile Pro Val Lys Asn Phe Phe Gln Met Phe Pro Ala
                165   170   175

Asp Arg Lys Arg Val Glu Ala Ala Leu Ser Ala Cys His Leu Pro Lys
            180   185   190

Gly Lys Pro Gly Gly Ala Arg
        195

<210> 4476
<211> 327
<212> PRT
<213> Homo sapiens

<220>
<223> MAPRE2 (NCBI Accession: NP_055083)

<400> 4476
Met Pro Gly Pro Thr Gln Thr Leu Ser Pro Asn Gly Glu Asn Asn Asn
1   5   10   15

Asp Ile Ile Gln Asp Asn Asn Gly Thr Ile Ile Pro Phe Arg Lys His
            20   25   30

Thr Val Arg Gly Glu Arg Ser Tyr Ser Trp Gly Met Ala Val Asn Val
        35   40   45

Tyr Ser Thr Ser Ile Thr Gln Glu Thr Met Ser Arg His Asp Ile Ile
    50   55   60

Ala Trp Val Asn Asp Ile Val Ser Leu Asn Tyr Thr Lys Val Glu Gln
65   70   75   80

Leu Cys Ser Gly Ala Ala Tyr Cys Gln Phe Met Asp Met Leu Phe Pro
                85   90   95

Gly Cys Ile Ser Leu Lys Lys Val Lys Phe Gln Ala Lys Leu Glu His
            100   105   110

Glu Tyr Ile His Asn Phe Lys Leu Leu Gln Ala Ser Phe Lys Arg Met
        115   120   125

Asn Val Asp Lys Val Ile Pro Val Glu Lys Leu Val Lys Gly Arg Phe
    130   135   140

Gln Asp Asn Leu Asp Phe Ile Gln Trp Phe Lys Lys Phe Tyr Asp Ala
145   150   155   160

Asn Tyr Asp Gly Lys Glu Tyr Asp Pro Val Glu Ala Arg Gln Gly Gln
                165   170   175

Asp Ala Ile Pro Pro Pro Asp Pro Gly Glu Gln Ile Phe Asn Leu Pro
            180   185   190

Lys Lys Ser His His Ala Asn Ser Pro Thr Ala Gly Ala Ala Lys Ser
        195   200   205

Ser Pro Ala Ala Lys Pro Gly Ser Thr Pro Ser Arg Pro Ser Ser Ala
    210   215   220

Lys Arg Ala Ser Ser Ser Gly Ser Ala Ser Lys Ser Asp Lys Asp Leu
225   230   235   240

Glu Thr Gln Val Ile Gln Leu Asn Glu Gln Val His Ser Leu Lys Leu
245 250 255

Ala Leu Glu Gly Val Glu Lys Glu Arg Asp Phe Tyr Phe Gly Lys Leu
260 265 270

Arg Glu Ile Glu Leu Leu Cys Gln Glu His Gly Gln Glu Asn Asp Asp
275 280 285

Leu Val Gln Arg Leu Met Asp Ile Leu Tyr Ala Ser Glu Glu His Glu
290 295 300

Gly His Thr Glu Glu Pro Glu Ala Glu Glu Gln Ala His Glu Gln Gln
305 310 315 320

Pro Pro Gln Gln Glu Glu Tyr
325

<210> 4477
<211> 631
<212> PRT
<213> Homo sapiens

<220>
<223> DDX53 (NCBI Accession: NP_874358)

<400> 4477
Met Ser His Trp Ala Pro Glu Trp Lys Arg Ala Glu Ala Asn Pro Arg
1 5 10 15

Asp Leu Gly Ala Ser Trp Asp Val Arg Gly Ser Arg Gly Ser Gly Trp
20 25 30

Ser Gly Pro Phe Gly His Gln Gly Pro Arg Ala Ala Gly Ser Arg Glu
35 40 45

Pro Pro Leu Cys Phe Lys Ile Lys Asn Asn Met Val Gly Val Val Ile
50 55 60

Gly Tyr Ser Gly Ser Lys Ile Lys Asp Leu Gln His Ser Thr Asn Thr
65 70 75 80

Lys Ile Gln Ile Ile Asn Gly Glu Ser Glu Ala Lys Val Arg Ile Phe
85 90 95

Gly Asn Arg Glu Met Lys Ala Lys Ala Lys Ala Ala Ile Glu Thr Leu
100 105 110

Ile Arg Lys Gln Glu Ser Tyr Asn Ser Glu Ser Ser Val Asp Asn Ala
115 120 125

Ala Ser Gln Thr Pro Ile Gly Arg Asn Leu Gly Arg Asn Asp Ile Val
130 135 140

```
Gly Glu Ala Glu Pro Leu Ser Asn Trp Asp Arg Ile Arg Ala Ala Val
145                 150                 155                 160

Val Glu Cys Glu Lys Arg Lys Trp Ala Asp Leu Pro Pro Val Lys Lys
                165                 170                 175

Asn Phe Tyr Ile Glu Ser Lys Ala Thr Ser Cys Met Ser Glu Met Gln
            180                 185                 190

Val Ile Asn Trp Arg Lys Glu Asn Phe Asn Ile Thr Cys Asp Asp Leu
        195                 200                 205

Lys Ser Gly Glu Lys Arg Leu Ile Pro Lys Pro Thr Cys Arg Phe Lys
    210                 215                 220

Asp Ala Phe Gln Gln Tyr Pro Asp Leu Leu Lys Ser Ile Ile Arg Val
225                 230                 235                 240

Gly Ile Leu Lys Pro Thr Pro Ile Gln Ser Gln Ala Trp Pro Ile Ile
                245                 250                 255

Leu Gln Gly Ile Asp Leu Ile Val Val Ala Gln Thr Gly Thr Gly Lys
            260                 265                 270

Thr Leu Ser Tyr Leu Met Pro Gly Phe Ile His Leu Asp Ser Gln Pro
        275                 280                 285

Ile Ser Arg Glu Gln Arg Asn Gly Pro Gly Met Leu Val Leu Thr Pro
    290                 295                 300

Thr Arg Glu Leu Ala Leu His Val Glu Ala Glu Cys Ser Lys Tyr Ser
305                 310                 315                 320

Tyr Lys Gly Leu Lys Ser Ile Cys Ile Tyr Gly Gly Arg Asn Arg Asn
                325                 330                 335

Gly Gln Ile Glu Asp Ile Ser Lys Gly Val Asp Ile Ile Ile Ala Thr
            340                 345                 350

Pro Gly Arg Leu Asn Asp Leu Gln Met Asn Asn Ser Val Asn Leu Arg
        355                 360                 365

Ser Ile Thr Tyr Leu Val Ile Asp Glu Ala Asp Lys Met Leu Asp Met
    370                 375                 380

Glu Phe Glu Pro Gln Ile Arg Lys Ile Leu Leu Asp Val Arg Pro Asp
385                 390                 395                 400

Arg Gln Thr Val Met Thr Ser Ala Thr Trp Pro Asp Thr Val Arg Gln
                405                 410                 415

Leu Ala Leu Ser Tyr Leu Lys Asp Pro Met Ile Val Tyr Val Gly Asn
            420                 425                 430
```

```
Leu Asn Leu Val Ala Val Asn Thr Val Lys Gln Asn Ile Ile Val Thr
        435                 440                 445

Thr Glu Lys Glu Lys Arg Ala Leu Thr Gln Glu Phe Val Glu Asn Met
    450                 455                 460

Ser Pro Asn Asp Lys Val Ile Met Phe Val Ser Gln Lys His Ile Ala
465                 470                 475                 480

Asp Asp Leu Ser Ser Asp Phe Asn Ile Gln Gly Ile Ser Ala Glu Ser
                485                 490                 495

Leu His Gly Asn Ser Glu Gln Ser Asp Gln Glu Arg Ala Val Glu Asp
            500                 505                 510

Phe Lys Ser Gly Asn Ile Lys Ile Leu Ile Thr Thr Asp Ile Val Ser
        515                 520                 525

Arg Gly Leu Asp Leu Asn Asp Val Thr His Val Tyr Asn Tyr Asp Phe
    530                 535                 540

Pro Arg Asn Ile Asp Val Tyr Val His Arg Val Gly Tyr Ile Gly Arg
545                 550                 555                 560

Thr Gly Lys Thr Gly Thr Ser Val Thr Leu Ile Thr Gln Arg Asp Ser
                565                 570                 575

Lys Met Ala Gly Glu Leu Ile Lys Ile Leu Asp Arg Ala Asn Gln Ser
            580                 585                 590

Val Pro Glu Asp Leu Val Val Met Ala Glu Gln Tyr Lys Leu Asn Gln
        595                 600                 605

Gln Lys Arg His Arg Glu Thr Arg Ser Arg Glu Pro Gly Gln Arg Arg
    610                 615                 620

Lys Glu Phe Tyr Phe Leu Ser
625                 630
```

<210> 4478
<211> 636
<212> PRT
<213> Homo sapiens

<220>
<223> IL27RA (NCBI Accession: NP_004834)

<400> 4478

```
Met Arg Gly Gly Arg Gly Ala Pro Phe Trp Leu Trp Pro Leu Pro Lys
1               5                   10                  15

Leu Ala Leu Leu Pro Leu Leu Trp Val Leu Phe Gln Arg Thr Arg Pro
            20                  25                  30
```

```
Gln Gly Ser Ala Gly Pro Leu Gln Cys Tyr Gly Val Gly Pro Leu Gly
        35                  40                  45

Asp Leu Asn Cys Ser Trp Glu Pro Leu Gly Asp Leu Gly Ala Pro Ser
    50                  55                  60

Glu Leu His Leu Gln Ser Gln Lys Tyr Arg Ser Asn Lys Thr Gln Thr
65                  70                  75                  80

Val Ala Val Ala Ala Gly Arg Ser Trp Val Ala Ile Pro Arg Glu Gln
                85                  90                  95

Leu Thr Met Ser Asp Lys Leu Leu Val Trp Gly Thr Lys Ala Gly Gln
            100                 105                 110

Pro Leu Trp Pro Pro Val Phe Val Asn Leu Glu Thr Gln Met Lys Pro
        115                 120                 125

Asn Ala Pro Arg Leu Gly Pro Asp Val Asp Phe Ser Glu Asp Asp Pro
    130                 135                 140

Leu Glu Ala Thr Val His Trp Ala Pro Pro Thr Trp Pro Ser His Lys
145                 150                 155                 160

Val Leu Ile Cys Gln Phe His Tyr Arg Arg Cys Gln Glu Ala Ala Trp
                165                 170                 175

Thr Leu Leu Glu Pro Glu Leu Lys Thr Ile Pro Leu Thr Pro Val Glu
            180                 185                 190

Ile Gln Asp Leu Glu Leu Ala Thr Gly Tyr Lys Val Tyr Gly Arg Cys
        195                 200                 205

Arg Met Glu Lys Glu Glu Asp Leu Trp Gly Glu Trp Ser Pro Ile Leu
    210                 215                 220

Ser Phe Gln Thr Pro Pro Ser Ala Pro Lys Asp Val Trp Val Ser Gly
225                 230                 235                 240

Asn Leu Cys Gly Thr Pro Gly Gly Glu Glu Pro Leu Leu Leu Trp Lys
                245                 250                 255

Ala Pro Gly Pro Cys Val Gln Val Ser Tyr Lys Val Trp Phe Trp Val
            260                 265                 270

Gly Gly Arg Glu Leu Ser Pro Glu Gly Ile Thr Cys Cys Cys Ser Leu
        275                 280                 285

Ile Pro Ser Gly Ala Glu Trp Ala Arg Val Ser Ala Val Asn Ala Thr
    290                 295                 300

Ser Trp Glu Pro Leu Thr Asn Leu Ser Leu Val Cys Leu Asp Ser Ala
305                 310                 315                 320
```

```
Ser Ala Pro Arg Ser Val Ala Val Ser Ser Ile Ala Gly Ser Thr Glu
                325                 330                 335

Leu Leu Val Thr Trp Gln Pro Gly Pro Gly Glu Pro Leu Glu His Val
            340                 345                 350

Val Asp Trp Ala Arg Asp Gly Asp Pro Leu Glu Lys Leu Asn Trp Val
        355                 360                 365

Arg Leu Pro Pro Gly Asn Leu Ser Ala Leu Leu Pro Gly Asn Phe Thr
    370                 375                 380

Val Gly Val Pro Tyr Arg Ile Thr Val Thr Ala Val Ser Ala Ser Gly
385                 390                 395                 400

Leu Ala Ser Ala Ser Ser Val Trp Gly Phe Arg Glu Glu Leu Ala Pro
                405                 410                 415

Leu Val Gly Pro Thr Leu Trp Arg Leu Gln Asp Ala Pro Pro Gly Thr
            420                 425                 430

Pro Ala Ile Ala Trp Gly Glu Val Pro Arg His Gln Leu Arg Gly His
        435                 440                 445

Leu Thr His Tyr Thr Leu Cys Ala Gln Ser Gly Thr Ser Pro Ser Val
    450                 455                 460

Cys Met Asn Val Ser Gly Asn Thr Gln Ser Val Thr Leu Pro Asp Leu
465                 470                 475                 480

Pro Trp Gly Pro Cys Glu Leu Trp Val Thr Ala Ser Thr Ile Ala Gly
                485                 490                 495

Gln Gly Pro Pro Gly Pro Ile Leu Arg Leu His Leu Pro Asp Asn Thr
            500                 505                 510

Leu Arg Trp Lys Val Leu Pro Gly Ile Leu Phe Leu Trp Gly Leu Phe
        515                 520                 525

Leu Leu Gly Cys Gly Leu Ser Leu Ala Thr Ser Gly Arg Cys Tyr His
    530                 535                 540

Leu Arg His Lys Val Leu Pro Arg Trp Val Trp Glu Lys Val Pro Asp
545                 550                 555                 560

Pro Ala Asn Ser Ser Ser Gly Gln Pro His Met Glu Gln Val Pro Glu
                565                 570                 575

Ala Gln Pro Leu Gly Asp Leu Pro Ile Leu Glu Val Glu Glu Met Glu
            580                 585                 590

Pro Pro Pro Val Met Glu Ser Ser Gln Pro Ala Gln Ala Thr Ala Pro
        595                 600                 605
```

```
Leu Asp Ser Gly Tyr Glu Lys His Phe Leu Pro Thr Pro Glu Glu Leu
    610                 615                 620

Gly Leu Leu Gly Pro Pro Arg Pro Gln Val Leu Ala
625                 630                 635

<210> 4479
<211> 369
<212> PRT
<213> Homo sapiens

<220>
<223> DHPS (NCBI Accession: NP_001193903)

<400> 4479
Met Glu Gly Ser Leu Glu Arg Glu Ala Pro Ala Gly Ala Leu Ala Ala
1               5                   10                  15

Val Leu Lys His Ser Ser Thr Leu Pro Pro Glu Ser Thr Gln Val Arg
            20                  25                  30

Gly Tyr Asp Phe Asn Arg Gly Val Asn Tyr Arg Ala Leu Leu Glu Ala
        35                  40                  45

Phe Gly Thr Thr Gly Phe Gln Ala Thr Asn Phe Gly Arg Ala Val Gln
    50                  55                  60

Gln Val Asn Ala Met Ile Glu Lys Lys Leu Glu Pro Leu Ser Gln Asp
65                  70                  75                  80

Glu Asp Gln His Ala Asp Leu Thr Gln Ser Arg Arg Pro Leu Thr Ser
                85                  90                  95

Cys Thr Ile Phe Leu Gly Tyr Thr Ser Asn Leu Ile Ser Ser Gly Ile
            100                 105                 110

Arg Glu Thr Ile Arg Tyr Leu Val Gln His Asn Met Val Asp Val Leu
        115                 120                 125

Val Thr Thr Ala Gly Gly Val Glu Glu Asp Leu Ile Lys Cys Leu Ala
    130                 135                 140

Pro Thr Tyr Leu Gly Glu Phe Ser Leu Arg Gly Lys Glu Leu Arg Glu
145                 150                 155                 160

Asn Gly Ile Asn Arg Ile Gly Asn Leu Leu Val Pro Asn Glu Asn Tyr
                165                 170                 175

Cys Lys Phe Glu Asp Trp Leu Met Pro Ile Leu Asp Gln Met Val Met
            180                 185                 190

Glu Gln Asn Thr Glu Gly Val Lys Trp Thr Pro Ser Lys Met Ile Ala
        195                 200                 205
```

```
Arg Leu Gly Lys Glu Ile Asn Asn Pro Glu Ser Val Tyr Tyr Trp Ala
    210                 215                 220

Gln Lys Asn His Ile Pro Val Phe Ser Pro Ala Leu Thr Asp Gly Ser
225                 230                 235                 240

Leu Gly Asp Met Ile Phe Phe His Ser Tyr Lys Asn Pro Gly Leu Val
                245                 250                 255

Leu Asp Ile Val Glu Asp Leu Arg Leu Ile Asn Thr Gln Ala Ile Phe
            260                 265                 270

Ala Lys Cys Thr Gly Met Ile Ile Leu Gly Gly Gly Val Val Lys His
        275                 280                 285

His Ile Ala Asn Ala Asn Leu Met Arg Asn Gly Ala Asp Tyr Ala Val
    290                 295                 300

Tyr Ile Asn Thr Ala Gln Glu Phe Asp Gly Ser Asp Ser Gly Ala Arg
305                 310                 315                 320

Pro Asp Glu Ala Val Ser Trp Gly Lys Ile Arg Val Asp Ala Gln Pro
                325                 330                 335

Val Lys Val Tyr Ala Asp Ala Ser Leu Val Phe Pro Leu Leu Val Ala
            340                 345                 350

Glu Thr Phe Ala Gln Lys Met Asp Ala Phe Met His Glu Lys Asn Glu
        355                 360                 365

Asp
```

<210> 4480
<211> 680
<212> PRT
<213> Homo sapiens

<220>
<223> HEATR3 (NCBI Accession: NP_891552)

<400> 4480

```
Met Gly Lys Ser Arg Thr Lys Arg Phe Lys Arg Pro Gln Phe Ser Pro
1               5                   10                  15

Thr Gly Asp Cys Gln Ala Glu Ala Ala Ala Ala Ala Asn Gly Thr Gly
            20                  25                  30

Gly Glu Glu Asp Asp Gly Pro Ala Ala Glu Leu Leu Glu Lys Leu Gln
        35                  40                  45

His Pro Ser Ala Glu Val Arg Glu Cys Ala Cys Ala Gly Leu Ala Arg
    50                  55                  60
```

```
Leu Val Gln Gln Arg Pro Ala Leu Pro Gly Leu Ala Arg Arg Asp Ala
65                  70                  75                  80

Val Arg Arg Leu Gly Pro Leu Leu Leu Asp Pro Ser Leu Ala Val Arg
                85                  90                  95

Glu Thr Ala Ala Gly Ala Leu Arg Asn Leu Ser Ala Cys Gly Gly Phe
            100                 105                 110

Glu Val Cys Asp Asp Met Val Thr Lys Asp Ile Met Thr Pro Leu Val
        115                 120                 125

Ala Leu Leu Lys Glu Cys Ser Ala Gly Leu Asp Ser Asn Glu Met Ser
    130                 135                 140

Leu Gln Glu Lys Lys Asp Gln Asn Arg Asn Ser Ile Glu Asn Ile Ala
145                 150                 155                 160

Asn Glu Thr Val Asn Val Leu Trp Asn Ile Cys Glu Cys Ser Ser Arg
                165                 170                 175

Ala Val Ser Ile Phe Asn Lys Glu Gly Cys Leu Glu Ile Val Leu Lys
            180                 185                 190

Tyr Leu Ser Arg Phe Pro Thr Asn Val Asp Leu Ala Ile Ser Val Ala
        195                 200                 205

Tyr Cys Leu Gln Thr Val Thr Glu Asp Asn Pro Glu Leu Leu Lys Ser
    210                 215                 220

Phe Ser Ala Thr Ala Leu Asn Met Leu Glu Ser Ala Leu Leu Ser Pro
225                 230                 235                 240

Val Ser Ser Met Glu Ser Leu Leu Leu Lys Thr Leu Val Ala Gly Thr
                245                 250                 255

Ile Trp Asn Leu Lys Asp Ile Ile Pro Cys Lys Ser Gln Ala Glu Ile
            260                 265                 270

Ile Asn Ala Leu Leu Lys Ile Leu Ser Glu Val Leu Gly Met Asp Ala
        275                 280                 285

Gly Glu Met Val Ile Gln Met Lys Glu Ala Glu Thr Gln Arg Leu Lys
    290                 295                 300

Thr Ala Ala Glu Ala Glu Glu Ile Leu Glu Asn Thr Asn Gly Asp Asp
305                 310                 315                 320

Leu Ile Glu Asp Asp Glu Met Glu Gly Ile Ser His Lys Arg Arg Val
                325                 330                 335

Arg Arg Lys Thr Phe Val Ser Asp Leu Leu Pro Pro Thr Asp Lys Glu
            340                 345                 350
```

```
Leu Arg Glu Thr Ile Ala Leu Leu Thr Ala Gln Gln Thr Ala Leu Glu
        355                 360                 365

Ile Ile Val Asn Met Cys Cys Asn Glu Asp Pro Ser Asp Asp Glu Trp
    370                 375                 380

Glu Glu Leu Ser Ser Ser Asp Glu Ser Asp Ala Phe Met Glu Asn Ser
385                 390                 395                 400

Phe Ser Glu Cys Gly Gly Gln Leu Phe Ser Pro Leu Cys Leu Ser His
                405                 410                 415

Glu Val His Thr Ala Leu Thr Asn Tyr Leu Ile Pro Lys Lys Ile Phe
            420                 425                 430

Glu Lys Thr Ala Phe Pro Asn Ser Ile Ala Val Asp Leu Cys Ser Arg
        435                 440                 445

Asn Pro Thr Trp Lys Pro Leu Ile Arg Lys Met Asn Thr Ile Gln Cys
    450                 455                 460

Arg Ala Leu Phe Cys Leu Gln Ser Leu Val Ser Leu Leu Asp Val Glu
465                 470                 475                 480

His Leu Gly Gly Ala Ala Ala Leu Gln Thr Leu Ala Gln His Leu Ser
                485                 490                 495

Gln Leu Leu Phe Ser Gln Pro Asp Phe Ala Lys His Val Asp Phe Leu
            500                 505                 510

Glu Ala Ile Ser Ser Ala Leu Arg Ala Leu Leu Gln Thr Met Ala Ser
        515                 520                 525

Lys Asn Ile Ser Gln Cys Met Thr Pro Asp Gln Leu Met Thr Leu Cys
    530                 535                 540

Lys Ala Gly Ile His Ser Ser Asn Val Gly Val Arg Val Asn Val Val
545                 550                 555                 560

Ser Ile Leu Gly Ile Thr Gly Ser Val Leu Ala Lys Glu Asp Gly Thr
                565                 570                 575

Leu Glu Thr Leu Lys Asn Ile Gly Cys Phe Leu Leu Glu Val Thr Thr
            580                 585                 590

Lys Asp Pro Ser Leu Val Val Ala Gly Glu Ala Leu Asp Ala Leu Phe
        595                 600                 605

Asp Val Phe Ala Asp Gly Lys Glu Ala Glu Arg Ala Ser Ile Gln Ile
    610                 615                 620

Lys Leu Leu Ser Ala Leu Lys Glu Phe Gln Pro Val Phe Lys Met Lys
625                 630                 635                 640
```

Ile Arg Lys Glu Gly Arg Gly Asn Tyr Ser Thr Asp Gln Leu Cys Val
645 650 655

Leu Asp Asn Val Lys Met Asn Leu Arg Arg Phe Ile Ala Tyr Gln Glu
660 665 670

Thr Val Glu Lys Arg Leu Thr Ser
675 680

<210> 4481
<211> 731
<212> PRT
<213> Homo sapiens

<220>
<223> VEZT (NCBI Accession: NP_001339017)

<400> 4481
Met Leu Lys Glu Trp Ala Ile Lys Gln Gly Ile Leu Leu Lys Val Ala
1 5 10 15

Glu Thr Ile Lys Ser Trp Ile Phe Phe Ser Gln Cys Asn Lys Lys Asp
20 25 30

Asp Leu Leu His Lys Leu Asp Ile Gly Phe Arg Leu Asp Ser Leu His
35 40 45

Thr Ile Leu Gln Gln Glu Val Leu Leu Gln Glu Asp Val Glu Leu Ile
50 55 60

Glu Leu Leu Asp Pro Ser Ile Leu Ser Ala Gly Gln Ser Gln Gln Gln
65 70 75 80

Glu Asn Gly His Leu Pro Thr Leu Cys Ser Leu Ala Thr Pro Asn Ile
85 90 95

Trp Asp Leu Ser Met Leu Phe Ala Phe Ile Ser Leu Leu Val Met Leu
100 105 110

Pro Ala Trp Trp Ile Val Ser Ser Trp Leu Val Trp Gly Val Ile Leu
115 120 125

Phe Val Tyr Leu Val Ile Arg Ala Leu Arg Leu Trp Arg Thr Ala Lys
130 135 140

Leu Gln Val Thr Leu Lys Lys Tyr Ser Val His Leu Glu Asp Met Ala
145 150 155 160

Thr Asn Ser Arg Ala Phe Thr Asn Leu Val Arg Lys Ala Leu Arg Leu
165 170 175

Ile Gln Glu Thr Glu Val Ile Ser Arg Gly Phe Thr Leu Val Ser Ala
180 185 190

```
Ala Cys Pro Phe Asn Lys Ala Gly Gln His Pro Ser Gln His Leu Ile
        195                 200                 205

Gly Leu Arg Lys Ala Val Tyr Arg Thr Leu Arg Ala Asn Phe Gln Ala
    210                 215                 220

Ala Arg Leu Ala Thr Leu Tyr Met Leu Lys Asn Tyr Pro Leu Asn Ser
225                 230                 235                 240

Glu Ser Asp Asn Val Thr Asn Tyr Ile Cys Val Val Pro Phe Lys Glu
                245                 250                 255

Leu Gly Leu Gly Leu Ser Glu Glu Gln Ile Ser Glu Glu Glu Ala His
            260                 265                 270

Asn Phe Thr Asp Gly Phe Ser Leu Pro Ala Leu Lys Val Leu Phe Gln
        275                 280                 285

Leu Trp Val Ala Gln Ser Ser Glu Phe Phe Arg Arg Leu Ala Leu Leu
    290                 295                 300

Leu Ser Thr Ala Asn Ser Pro Pro Gly Pro Leu Leu Thr Pro Ala Leu
305                 310                 315                 320

Leu Pro His Arg Ile Leu Ser Asp Val Thr Gln Gly Leu Pro His Ala
                325                 330                 335

His Ser Ala Cys Leu Glu Glu Leu Lys Arg Ser Tyr Glu Phe Tyr Arg
            340                 345                 350

Tyr Phe Glu Thr Gln His Gln Ser Val Pro Gln Cys Leu Ser Lys Thr
        355                 360                 365

Gln Gln Lys Ser Arg Glu Leu Asn Asn Val His Thr Ala Val Arg Ser
    370                 375                 380

Leu Gln Leu His Leu Lys Ala Leu Leu Asn Glu Val Ile Ile Leu Glu
385                 390                 395                 400

Asp Glu Leu Glu Lys Leu Val Cys Thr Lys Glu Thr Gln Glu Leu Val
                405                 410                 415

Ser Glu Ala Tyr Pro Ile Leu Glu Gln Lys Leu Lys Leu Ile Gln Pro
            420                 425                 430

His Val Gln Ala Ser Asn Asn Cys Trp Glu Glu Ala Ile Ser Gln Val
        435                 440                 445

Asp Lys Leu Leu Arg Arg Asn Thr Asp Lys Lys Gly Lys Pro Glu Ile
    450                 455                 460

Ala Cys Glu Asn Pro His Cys Thr Val Val Pro Leu Lys Gln Pro Thr
465                 470                 475                 480
```

```
Leu His Ile Ala Asp Lys Asp Pro Ile Pro Glu Glu Gln Glu Leu Glu
                485                 490                 495

Ala Tyr Val Asp Asp Ile Asp Ile Asp Ser Asp Phe Arg Lys Asp Asp
            500                 505                 510

Phe Tyr Tyr Leu Ser Gln Glu Asp Lys Glu Arg Gln Lys Arg Glu His
        515                 520                 525

Glu Glu Ser Lys Arg Val Leu Gln Glu Leu Lys Ser Val Leu Gly Phe
    530                 535                 540

Lys Ala Ser Glu Ala Glu Arg Gln Lys Trp Lys Gln Leu Leu Phe Ser
545                 550                 555                 560

Asp His Ala Val Leu Lys Ser Leu Ser Pro Val Asp Pro Val Glu Pro
                565                 570                 575

Ile Ser Asn Ser Glu Pro Ser Met Asn Ser Asp Met Gly Lys Val Ser
            580                 585                 590

Lys Asn Asp Thr Glu Glu Glu Ser Asn Lys Ser Ala Thr Thr Asp Asn
        595                 600                 605

Glu Ile Ser Arg Thr Glu Tyr Leu Cys Glu Asn Ala Leu Glu Gly Lys
    610                 615                 620

Asn Lys Asp Asn Ser Ser Asn Glu Val Phe Pro Gln Gly Ala Glu Glu
625                 630                 635                 640

Arg Met Cys Tyr Gln Cys Glu Ser Glu Asp Glu Pro Gln Ala Asp Gly
                645                 650                 655

Ser Gly Leu Thr Thr Ala Pro Pro Thr Pro Arg Asp Ser Leu Gln Pro
            660                 665                 670

Ser Ile Lys Gln Arg Leu Ala Arg Leu Gln Leu Ser Pro Asp Phe Thr
        675                 680                 685

Phe Thr Ala Gly Leu Ala Ala Glu Val Ala Ala Arg Ser Leu Ser Phe
    690                 695                 700

Thr Thr Met Gln Glu Gln Thr Phe Gly Asp Glu Glu Glu Glu Gln Ile
705                 710                 715                 720

Ile Glu Glu Asn Lys Asn Glu Ile Glu Glu Lys
                725                 730
```

<210> 4482
<211> 40
<212> PRT
<213> Homo sapiens

<220>
<223> WDR3 (NCBI Accession: NP_006775)

<400> 4482
Met Gly Leu Thr Lys Gln Tyr Leu Arg Tyr Val Ala Ser Ala Val Phe
1   5   10   15

Gly Val Ile Gly Ser Gln Lys Gly Leu Ala Ser Gln Ala Ser Ser Ser
            20   25   30

Phe Val Phe Phe Ala Thr Glu Phe
        35   40

<210> 4483
<211> 925
<212> PRT
<213> Homo sapiens

<220>
<223> DDX58 (NCBI Accession: NP_055129)

<400> 4483
Met Thr Thr Glu Gln Arg Arg Ser Leu Gln Ala Phe Gln Asp Tyr Ile
1   5   10   15

Arg Lys Thr Leu Asp Pro Thr Tyr Ile Leu Ser Tyr Met Ala Pro Trp
            20   25   30

Phe Arg Glu Glu Glu Val Gln Tyr Ile Gln Ala Glu Lys Asn Asn Lys
        35   40   45

Gly Pro Met Glu Ala Ala Thr Leu Phe Leu Lys Phe Leu Leu Glu Leu
    50   55   60

Gln Glu Glu Gly Trp Phe Arg Gly Phe Leu Asp Ala Leu Asp His Ala
65   70   75   80

Gly Tyr Ser Gly Leu Tyr Glu Ala Ile Glu Ser Trp Asp Phe Lys Lys
                85   90   95

Ile Glu Lys Leu Glu Glu Tyr Arg Leu Leu Leu Lys Arg Leu Gln Pro
            100   105   110

Glu Phe Lys Thr Arg Ile Ile Pro Thr Asp Ile Ile Ser Asp Leu Ser
        115   120   125

Glu Cys Leu Ile Asn Gln Glu Cys Glu Glu Ile Leu Gln Ile Cys Ser
    130   135   140

Thr Lys Gly Met Met Ala Gly Ala Glu Lys Leu Val Glu Cys Leu Leu
145   150   155   160

Arg Ser Asp Lys Glu Asn Trp Pro Lys Thr Leu Lys Leu Ala Leu Glu
                165   170   175

```
Lys Glu Arg Asn Lys Phe Ser Glu Leu Trp Ile Val Glu Lys Gly Ile
            180                 185                 190

Lys Asp Val Glu Thr Glu Asp Leu Glu Asp Lys Met Glu Thr Ser Asp
        195                 200                 205

Ile Gln Ile Phe Tyr Gln Glu Asp Pro Glu Cys Gln Asn Leu Ser Glu
    210                 215                 220

Asn Ser Cys Pro Pro Ser Glu Val Ser Asp Thr Asn Leu Tyr Ser Pro
225                 230                 235                 240

Phe Lys Pro Arg Asn Tyr Gln Leu Glu Leu Ala Leu Pro Ala Met Lys
                245                 250                 255

Gly Lys Asn Thr Ile Ile Cys Ala Pro Thr Gly Cys Gly Lys Thr Phe
            260                 265                 270

Val Ser Leu Leu Ile Cys Glu His His Leu Lys Lys Phe Pro Gln Gly
        275                 280                 285

Gln Lys Gly Lys Val Val Phe Phe Ala Asn Gln Ile Pro Val Tyr Glu
    290                 295                 300

Gln Gln Lys Ser Val Phe Ser Lys Tyr Phe Glu Arg His Gly Tyr Arg
305                 310                 315                 320

Val Thr Gly Ile Ser Gly Ala Thr Ala Glu Asn Val Pro Val Glu Gln
                325                 330                 335

Ile Val Glu Asn Asn Asp Ile Ile Ile Leu Thr Pro Gln Ile Leu Val
            340                 345                 350

Asn Asn Leu Lys Lys Gly Thr Ile Pro Ser Leu Ser Ile Phe Thr Leu
        355                 360                 365

Met Ile Phe Asp Glu Cys His Asn Thr Ser Lys Gln His Pro Tyr Asn
    370                 375                 380

Met Ile Met Phe Asn Tyr Leu Asp Gln Lys Leu Gly Gly Ser Ser Gly
385                 390                 395                 400

Pro Leu Pro Gln Val Ile Gly Leu Thr Ala Ser Val Gly Val Gly Asp
                405                 410                 415

Ala Lys Asn Thr Asp Glu Ala Leu Asp Tyr Ile Cys Lys Leu Cys Ala
            420                 425                 430

Ser Leu Asp Ala Ser Val Ile Ala Thr Val Lys His Asn Leu Glu Glu
        435                 440                 445

Leu Glu Gln Val Val Tyr Lys Pro Gln Lys Phe Phe Arg Lys Val Glu
    450                 455                 460
```

```
Ser Arg Ile Ser Asp Lys Phe Lys Tyr Ile Ile Ala Gln Leu Met Arg
465                 470                 475                 480

Asp Thr Glu Ser Leu Ala Lys Arg Ile Cys Lys Asp Leu Glu Asn Leu
                485                 490                 495

Ser Gln Ile Gln Asn Arg Glu Phe Gly Thr Gln Lys Tyr Glu Gln Trp
            500                 505                 510

Ile Val Thr Val Gln Lys Ala Cys Met Val Phe Gln Met Pro Asp Lys
        515                 520                 525

Asp Glu Glu Ser Arg Ile Cys Lys Ala Leu Phe Leu Tyr Thr Ser His
    530                 535                 540

Leu Arg Lys Tyr Asn Asp Ala Leu Ile Ile Ser Glu His Ala Arg Met
545                 550                 555                 560

Lys Asp Ala Leu Asp Tyr Leu Lys Asp Phe Phe Ser Asn Val Arg Ala
                565                 570                 575

Ala Gly Phe Asp Glu Ile Glu Gln Asp Leu Thr Gln Arg Phe Glu Glu
            580                 585                 590

Lys Leu Gln Glu Leu Glu Ser Val Ser Arg Asp Pro Ser Asn Glu Asn
        595                 600                 605

Pro Lys Leu Glu Asp Leu Cys Phe Ile Leu Gln Glu Glu Tyr His Leu
    610                 615                 620

Asn Pro Glu Thr Ile Thr Ile Leu Phe Val Lys Thr Arg Ala Leu Val
625                 630                 635                 640

Asp Ala Leu Lys Asn Trp Ile Glu Gly Asn Pro Lys Leu Ser Phe Leu
                645                 650                 655

Lys Pro Gly Ile Leu Thr Gly Arg Gly Lys Thr Asn Gln Asn Thr Gly
            660                 665                 670

Met Thr Leu Pro Ala Gln Lys Cys Ile Leu Asp Ala Phe Lys Ala Ser
        675                 680                 685

Gly Asp His Asn Ile Leu Ile Ala Thr Ser Val Ala Asp Glu Gly Ile
    690                 695                 700

Asp Ile Ala Gln Cys Asn Leu Val Ile Leu Tyr Glu Tyr Val Gly Asn
705                 710                 715                 720

Val Ile Lys Met Ile Gln Thr Arg Gly Arg Gly Arg Ala Arg Gly Ser
                725                 730                 735

Lys Cys Phe Leu Leu Thr Ser Asn Ala Gly Val Ile Glu Lys Glu Gln
            740                 745                 750
```

```
Ile Asn Met Tyr Lys Glu Lys Met Met Asn Asp Ser Ile Leu Arg Leu
        755                 760                 765

Gln Thr Trp Asp Glu Ala Val Phe Arg Glu Lys Ile Leu His Ile Gln
    770                 775                 780

Thr His Glu Lys Phe Ile Arg Asp Ser Gln Glu Lys Pro Lys Pro Val
785                 790                 795                 800

Pro Asp Lys Glu Asn Lys Lys Leu Leu Cys Arg Lys Cys Lys Ala Leu
                805                 810                 815

Ala Cys Tyr Thr Ala Asp Val Arg Val Ile Glu Glu Cys His Tyr Thr
            820                 825                 830

Val Leu Gly Asp Ala Phe Lys Glu Cys Phe Val Ser Arg Pro His Pro
        835                 840                 845

Lys Pro Lys Gln Phe Ser Ser Phe Glu Lys Arg Ala Lys Ile Phe Cys
    850                 855                 860

Ala Arg Gln Asn Cys Ser His Asp Trp Gly Ile His Val Lys Tyr Lys
865                 870                 875                 880

Thr Phe Glu Ile Pro Val Ile Lys Ile Glu Ser Phe Val Val Glu Asp
                885                 890                 895

Ile Ala Thr Gly Val Gln Thr Leu Tyr Ser Lys Trp Lys Asp Phe His
            900                 905                 910

Phe Glu Lys Ile Pro Phe Asp Pro Ala Glu Met Ser Lys
        915                 920                 925

<210> 4484
<211> 303
<212> PRT
<213> Homo sapiens

<220>
<223> NUDT22 (NCBI Accession: NP_001122084)

<400> 4484
Met Asp Pro Glu Val Thr Leu Leu Leu Gln Cys Pro Gly Gly Gly Leu
1               5                   10                  15

Pro Gln Glu Gln Ile Gln Ala Glu Leu Ser Pro Ala His Asp Arg Arg
            20                  25                  30

Pro Leu Pro Gly Gly Asp Glu Ala Ile Thr Ala Ile Trp Glu Thr Arg
        35                  40                  45

Leu Lys Ala Gln Pro Trp Leu Phe Asp Ala Pro Lys Phe Arg Leu His
    50                  55                  60
```

```
Ser Ala Thr Leu Ala Pro Ile Gly Ser Arg Gly Pro Gln Leu Leu Leu
65                  70                  75                  80

Arg Leu Gly Leu Thr Ser Tyr Arg Asp Phe Leu Gly Thr Asn Trp Ser
                85                  90                  95

Ser Ser Ala Ala Trp Leu Arg Gln Gln Gly Ala Thr Asp Trp Gly Asp
            100                 105                 110

Thr Gln Ala Tyr Leu Ala Asp Pro Leu Gly Val Gly Ala Ala Leu Ala
        115                 120                 125

Thr Ala Asp Asp Phe Leu Val Phe Leu Arg Arg Ser Arg Gln Val Ala
    130                 135                 140

Glu Ala Pro Gly Leu Val Asp Val Pro Gly Gly His Pro Glu Pro Gln
145                 150                 155                 160

Ala Leu Cys Pro Gly Gly Ser Pro Gln His Gln Asp Leu Ala Gly Gln
                165                 170                 175

Leu Val Val His Glu Leu Phe Ser Ser Val Leu Gln Glu Ile Cys Asp
            180                 185                 190

Glu Val Asn Leu Pro Leu Leu Thr Leu Ser Gln Pro Leu Leu Leu Gly
        195                 200                 205

Ile Ala Arg Asn Glu Thr Ser Ala Gly Arg Ala Ser Ala Glu Phe Tyr
    210                 215                 220

Val Gln Cys Ser Leu Thr Ser Glu Gln Val Arg Lys His Tyr Leu Ser
225                 230                 235                 240

Gly Gly Pro Glu Ala His Glu Ser Thr Gly Ile Phe Phe Val Glu Thr
                245                 250                 255

Gln Asn Val Arg Arg Leu Pro Glu Thr Glu Met Trp Ala Glu Leu Cys
            260                 265                 270

Pro Ser Ala Lys Gly Ala Ile Ile Leu Tyr Asn Arg Val Gln Gly Ser
        275                 280                 285

Pro Thr Gly Ala Ala Leu Gly Ser Pro Ala Leu Leu Pro Pro Leu
    290                 295                 300

<210> 4485
<211> 217
<212> PRT
<213> Homo sapiens

<220>
<223> GCA (NCBI Accession: NP_036330)
```

<400> 4485
Met Ala Tyr Pro Gly Tyr Gly Gly Gly Phe Gly Asn Phe Ser Ile Gln
1   5   10   15

Val Pro Gly Met Gln Met Gly Gln Pro Val Pro Glu Thr Gly Pro Ala
            20   25   30

Ile Leu Leu Asp Gly Tyr Ser Gly Pro Ala Tyr Ser Asp Thr Tyr Ser
        35   40   45

Ser Ala Gly Asp Ser Val Tyr Thr Tyr Phe Ser Ala Val Ala Gly Gln
    50   55   60

Asp Gly Glu Val Asp Ala Glu Glu Leu Gln Arg Cys Leu Thr Gln Ser
65   70   75   80

Gly Ile Asn Gly Thr Tyr Ser Pro Phe Ser Leu Glu Thr Cys Arg Ile
                85   90   95

Met Ile Ala Met Leu Asp Arg Asp His Thr Gly Lys Met Gly Phe Asn
            100   105   110

Ala Phe Lys Glu Leu Trp Ala Ala Leu Asn Ala Trp Lys Glu Asn Phe
        115   120   125

Met Thr Val Asp Gln Asp Gly Ser Gly Thr Val Glu His His Glu Leu
    130   135   140

Arg Gln Ala Ile Gly Leu Met Gly Tyr Arg Leu Ser Pro Gln Thr Leu
145   150   155   160

Thr Thr Ile Val Lys Arg Tyr Ser Lys Asn Gly Arg Ile Phe Phe Asp
                165   170   175

Asp Tyr Val Ala Cys Cys Val Lys Leu Arg Ala Leu Thr Asp Phe Phe
            180   185   190

Arg Lys Arg Asp His Leu Gln Gln Gly Ser Ala Asn Phe Ile Tyr Asp
        195   200   205

Asp Phe Leu Gln Gly Thr Met Ala Ile
    210   215

<210> 4486
<211> 223
<212> PRT
<213> Homo sapiens

<220>
<223> POLR3G (NCBI Accession: NP_001357280)

<400> 4486
Met Ala Gly Asn Lys Gly Arg Gly Arg Ala Ala Tyr Thr Phe Asn Ile
1   5   10   15

```
Glu Ala Val Gly Phe Ser Lys Gly Glu Lys Leu Pro Asp Val Val Leu
            20                  25                  30

Lys Pro Pro Pro Leu Phe Pro Asp Thr Asp Tyr Lys Pro Val Pro Leu
        35                  40                  45

Lys Thr Gly Glu Gly Glu Glu Tyr Met Leu Ala Leu Lys Gln Glu Leu
    50                  55                  60

Arg Glu Thr Met Lys Arg Met Pro Tyr Phe Ile Glu Thr Pro Glu Glu
65                  70                  75                  80

Arg Gln Asp Ile Glu Arg Tyr Ser Lys Arg Tyr Met Lys Val Tyr Lys
                85                  90                  95

Glu Glu Trp Ile Pro Asp Trp Arg Arg Leu Pro Arg Glu Met Met Pro
            100                 105                 110

Arg Asn Lys Cys Lys Lys Ala Gly Pro Lys Pro Lys Lys Ala Lys Asp
        115                 120                 125

Ala Gly Lys Gly Thr Pro Leu Thr Asn Thr Glu Asp Val Leu Lys Lys
    130                 135                 140

Met Glu Glu Leu Glu Lys Arg Gly Asp Gly Glu Lys Ser Asp Glu Glu
145                 150                 155                 160

Asn Glu Glu Lys Glu Gly Ser Lys Glu Lys Ser Lys Glu Gly Asp Asp
                165                 170                 175

Asp Asp Asp Asp Asp Ala Ala Glu Gln Glu Glu Tyr Asp Glu Glu Glu
            180                 185                 190

Gln Glu Glu Glu Asn Asp Tyr Ile Asn Ser Tyr Phe Glu Asp Gly Asp
        195                 200                 205

Asp Phe Gly Ala Asp Ser Asp Asp Asn Met Asp Glu Ala Thr Tyr
    210                 215                 220

<210> 4487
<211> 522
<212> PRT
<213> Homo sapiens

<220>
<223> SNX1 (NCBI Accession: NP_003090)

<400> 4487
Met Ala Ser Gly Gly Gly Gly Cys Ser Ala Ser Glu Arg Leu Pro Pro
1               5                   10                  15

Pro Phe Pro Gly Leu Glu Pro Glu Ser Glu Gly Ala Ala Gly Gly Ser
            20                  25                  30
```

```
Glu Pro Glu Ala Gly Asp Ser Asp Thr Glu Gly Glu Asp Ile Phe Thr
        35                  40                  45

Gly Ala Ala Val Val Ser Lys His Gln Ser Pro Lys Ile Thr Thr Ser
    50                  55                  60

Leu Leu Pro Ile Asn Asn Gly Ser Lys Glu Asn Gly Ile His Glu Glu
65                  70                  75                  80

Gln Asp Gln Glu Pro Gln Asp Leu Phe Ala Asp Ala Thr Val Glu Leu
                85                  90                  95

Ser Leu Asp Ser Thr Gln Asn Asn Gln Lys Lys Val Leu Ala Lys Thr
            100                 105                 110

Leu Ile Ser Leu Pro Pro Gln Glu Ala Thr Asn Ser Ser Lys Pro Gln
        115                 120                 125

Pro Thr Tyr Glu Glu Leu Glu Glu Glu Glu Gln Glu Asp Gln Phe Asp
    130                 135                 140

Leu Thr Val Gly Ile Thr Asp Pro Glu Lys Ile Gly Asp Gly Met Asn
145                 150                 155                 160

Ala Tyr Val Ala Tyr Lys Val Thr Thr Gln Thr Ser Leu Pro Leu Phe
                165                 170                 175

Arg Ser Lys Gln Phe Ala Val Lys Arg Arg Phe Ser Asp Phe Leu Gly
            180                 185                 190

Leu Tyr Glu Lys Leu Ser Glu Lys His Ser Gln Asn Gly Phe Ile Val
        195                 200                 205

Pro Pro Pro Pro Glu Lys Ser Leu Ile Gly Met Thr Lys Val Lys Val
    210                 215                 220

Gly Lys Glu Asp Ser Ser Ser Ala Glu Phe Leu Glu Lys Arg Arg Ala
225                 230                 235                 240

Ala Leu Glu Arg Tyr Leu Gln Arg Ile Val Asn His Pro Thr Met Leu
                245                 250                 255

Gln Asp Pro Asp Val Arg Glu Phe Leu Glu Lys Glu Glu Leu Pro Arg
            260                 265                 270

Ala Val Gly Thr Gln Thr Leu Ser Gly Ala Gly Leu Leu Lys Met Phe
        275                 280                 285

Asn Lys Ala Thr Asp Ala Val Ser Lys Met Thr Ile Lys Met Asn Glu
    290                 295                 300

Ser Asp Ile Trp Phe Glu Glu Lys Leu Gln Glu Val Glu Cys Glu Glu
305                 310                 315                 320
```

```
Gln Arg Leu Arg Lys Leu His Ala Val Val Glu Thr Leu Val Asn His
                325                 330                 335

Arg Lys Glu Leu Ala Leu Asn Thr Ala Gln Phe Ala Lys Ser Leu Ala
            340                 345                 350

Met Leu Gly Ser Ser Glu Asp Asn Thr Ala Leu Ser Arg Ala Leu Ser
        355                 360                 365

Gln Leu Ala Glu Val Glu Glu Lys Ile Glu Gln Leu His Gln Glu Gln
    370                 375                 380

Ala Asn Asn Asp Phe Phe Leu Leu Ala Glu Leu Leu Ser Asp Tyr Ile
385                 390                 395                 400

Arg Leu Leu Ala Ile Val Arg Ala Ala Phe Asp Gln Arg Met Lys Thr
                405                 410                 415

Trp Gln Arg Trp Gln Asp Ala Gln Ala Thr Leu Gln Lys Lys Arg Glu
            420                 425                 430

Ala Glu Ala Arg Leu Leu Trp Ala Asn Lys Pro Asp Lys Leu Gln Gln
        435                 440                 445

Ala Lys Asp Glu Ile Leu Glu Trp Glu Ser Arg Val Thr Gln Tyr Glu
    450                 455                 460

Arg Asp Phe Glu Arg Ile Ser Thr Val Val Arg Lys Glu Val Ile Arg
465                 470                 475                 480

Phe Glu Lys Glu Lys Ser Lys Asp Phe Lys Asn His Val Ile Lys Tyr
                485                 490                 495

Leu Glu Thr Leu Leu Tyr Ser Gln Gln Gln Leu Ala Lys Tyr Trp Glu
            500                 505                 510

Ala Phe Leu Pro Glu Ala Lys Ala Ile Ser
        515                 520

<210> 4488
<211> 154
<212> PRT
<213> Homo sapiens

<220>
<223> AB937783.1_frag (NCBI Accession: NP_001120852)

<400> 4488
Met Lys Lys Glu Glu Leu Lys Gln His Asp Gly Phe Arg Ser Ser Trp
1               5                   10                  15

Lys Glu Thr Thr Asn Thr Asn Ile Phe Glu Thr Arg Tyr Val Thr Ser
            20                  25                  30
```

```
Tyr Tyr Arg Phe Ser Glu Met Lys His Tyr Leu Cys Gly Cys Cys Ala
        35                  40                  45

Ala Phe Asn Asn Val Ala Ile Thr Phe Pro Ile Gln Lys Val Leu Phe
    50                  55                  60

Pro Gln Gln Leu Tyr Gly Ile Lys Thr Gly Asp Ala Ile Leu Gln Leu
65                  70                  75                  80

Arg Thr Asp Gly Phe Arg Asn Leu Tyr Arg Gly Ile Phe Pro Arg Leu
                85                  90                  95

Met Gln Lys Thr Thr Thr Leu Ala Leu Thr Phe Gly Leu Tyr Glu Asp
            100                 105                 110

Leu Ser Tyr Leu Leu His Lys His Val Ser Ala Pro Glu Phe Ala Thr
        115                 120                 125

Cys Gly Val Ala Ala Val Leu Ala Gly Thr Thr Glu Ala Ile Phe Thr
    130                 135                 140

Ser Asp Ile Ala Ser Arg Pro Gln Ala Pro
145                 150

<210> 4489
<211> 534
<212> PRT
<213> Homo sapiens

<220>
<223> PSMD3 (NCBI Accession: NP_002800)

<400> 4489
Met Lys Gln Glu Gly Ser Ala Arg Arg Arg Gly Ala Asp Lys Ala Lys
1               5                   10                  15

Pro Pro Pro Gly Gly Gly Glu Gln Glu Pro Pro Pro Pro Pro Ala Pro
            20                  25                  30

Gln Asp Val Glu Met Lys Glu Glu Ala Ala Thr Gly Gly Gly Ser Thr
        35                  40                  45

Gly Glu Ala Asp Gly Lys Thr Ala Ala Ala Ala Ala Glu His Ser Gln
    50                  55                  60

Arg Glu Leu Asp Thr Val Thr Leu Glu Asp Ile Lys Glu His Val Lys
65                  70                  75                  80

Gln Leu Glu Lys Ala Val Ser Gly Lys Glu Pro Arg Phe Val Leu Arg
                85                  90                  95

Ala Leu Arg Met Leu Pro Ser Thr Ser Arg Arg Leu Asn His Tyr Val
            100                 105                 110
```

```
Leu Tyr Lys Ala Val Gln Gly Phe Phe Thr Ser Asn Asn Ala Thr Arg
        115                 120                 125

Asp Phe Leu Leu Pro Phe Leu Glu Glu Pro Met Asp Thr Glu Ala Asp
    130                 135                 140

Leu Gln Phe Arg Pro Arg Thr Gly Lys Ala Ala Ser Thr Pro Leu Leu
145                 150                 155                 160

Pro Glu Val Glu Ala Tyr Leu Gln Leu Leu Val Val Ile Phe Met Met
                165                 170                 175

Asn Ser Lys Arg Tyr Lys Glu Ala Gln Lys Ile Ser Asp Asp Leu Met
            180                 185                 190

Gln Lys Ile Ser Thr Gln Asn Arg Arg Ala Leu Asp Leu Val Ala Ala
        195                 200                 205

Lys Cys Tyr Tyr Tyr His Ala Arg Val Tyr Glu Phe Leu Asp Lys Leu
    210                 215                 220

Asp Val Val Arg Ser Phe Leu His Ala Arg Leu Arg Thr Ala Thr Leu
225                 230                 235                 240

Arg His Asp Ala Asp Gly Gln Ala Thr Leu Leu Asn Leu Leu Leu Arg
                245                 250                 255

Asn Tyr Leu His Tyr Ser Leu Tyr Asp Gln Ala Glu Lys Leu Val Ser
            260                 265                 270

Lys Ser Val Phe Pro Glu Gln Ala Asn Asn Asn Glu Trp Ala Arg Tyr
        275                 280                 285

Leu Tyr Tyr Thr Gly Arg Ile Lys Ala Ile Gln Leu Glu Tyr Ser Glu
    290                 295                 300

Ala Arg Arg Thr Met Thr Asn Ala Leu Arg Lys Ala Pro Gln His Thr
305                 310                 315                 320

Ala Val Gly Phe Lys Gln Thr Val His Lys Leu Leu Ile Val Val Glu
                325                 330                 335

Leu Leu Leu Gly Glu Ile Pro Asp Arg Leu Gln Phe Arg Gln Pro Ser
            340                 345                 350

Leu Lys Arg Ser Leu Met Pro Tyr Phe Leu Leu Thr Gln Ala Val Arg
        355                 360                 365

Thr Gly Asn Leu Ala Lys Phe Asn Gln Val Leu Asp Gln Phe Gly Glu
    370                 375                 380

Lys Phe Gln Ala Asp Gly Thr Tyr Thr Leu Ile Ile Arg Leu Arg His
385                 390                 395                 400
```

```
Asn Val Ile Lys Thr Gly Val Arg Met Ile Ser Leu Ser Tyr Ser Arg
                405                 410                 415

Ile Ser Leu Ala Asp Ile Ala Gln Lys Leu Gln Leu Asp Ser Pro Glu
            420                 425                 430

Asp Ala Glu Phe Ile Val Ala Lys Ala Ile Arg Asp Gly Val Ile Glu
        435                 440                 445

Ala Ser Ile Asn His Glu Lys Gly Tyr Val Gln Ser Lys Glu Met Ile
    450                 455                 460

Asp Ile Tyr Ser Thr Arg Glu Pro Gln Leu Ala Phe His Gln Arg Ile
465                 470                 475                 480

Ser Phe Cys Leu Asp Ile His Asn Met Ser Val Lys Ala Met Arg Phe
                485                 490                 495

Pro Pro Lys Ser Tyr Asn Lys Asp Leu Glu Ser Ala Glu Glu Arg Arg
            500                 505                 510

Glu Arg Glu Gln Gln Asp Leu Glu Phe Ala Lys Glu Met Ala Glu Asp
        515                 520                 525

Asp Asp Asp Ser Phe Pro
    530
```

<210> 4490
<211> 303
<212> PRT
<213> Homo sapiens

<220>
<223> CRKL (NCBI Accession: NP_005198)

<400> 4490

```
Met Ser Ser Ala Arg Phe Asp Ser Ser Asp Arg Ser Ala Trp Tyr Met
1               5                   10                  15

Gly Pro Val Ser Arg Gln Glu Ala Gln Thr Arg Leu Gln Gly Gln Arg
            20                  25                  30

His Gly Met Phe Leu Val Arg Asp Ser Ser Thr Cys Pro Gly Asp Tyr
        35                  40                  45

Val Leu Ser Val Ser Glu Asn Ser Arg Val Ser His Tyr Ile Ile Asn
    50                  55                  60

Ser Leu Pro Asn Arg Arg Phe Lys Ile Gly Asp Gln Glu Phe Asp His
65                  70                  75                  80

Leu Pro Ala Leu Leu Glu Phe Tyr Lys Ile His Tyr Leu Asp Thr Thr
                85                  90                  95
```

```
Thr Leu Ile Glu Pro Ala Pro Arg Tyr Pro Ser Pro Pro Met Gly Ser
            100                 105                 110

Val Ser Ala Pro Asn Leu Pro Thr Ala Glu Asp Asn Leu Glu Tyr Val
        115                 120                 125

Arg Thr Leu Tyr Asp Phe Pro Gly Asn Asp Ala Glu Asp Leu Pro Phe
    130                 135                 140

Lys Lys Gly Glu Ile Leu Val Ile Ile Glu Lys Pro Glu Glu Gln Trp
145                 150                 155                 160

Trp Ser Ala Arg Asn Lys Asp Gly Arg Val Gly Met Ile Pro Val Pro
                165                 170                 175

Tyr Val Glu Lys Leu Val Arg Ser Ser Pro His Gly Lys His Gly Asn
            180                 185                 190

Arg Asn Ser Asn Ser Tyr Gly Ile Pro Glu Pro Ala His Ala Tyr Ala
        195                 200                 205

Gln Pro Gln Thr Thr Thr Pro Leu Pro Ala Val Ser Gly Ser Pro Gly
    210                 215                 220

Ala Ala Ile Thr Pro Leu Pro Ser Thr Gln Asn Gly Pro Val Phe Ala
225                 230                 235                 240

Lys Ala Ile Gln Lys Arg Val Pro Cys Ala Tyr Asp Lys Thr Ala Leu
                245                 250                 255

Ala Leu Glu Val Gly Asp Ile Val Lys Val Thr Arg Met Asn Ile Asn
            260                 265                 270

Gly Gln Trp Glu Gly Glu Val Asn Gly Arg Lys Gly Leu Phe Pro Phe
        275                 280                 285

Thr His Val Lys Ile Phe Asp Pro Gln Asn Pro Asp Glu Asn Glu
    290                 295                 300

<210> 4491
<211> 296
<212> PRT
<213> Homo sapiens

<220>
<223> FBXO2 (NCBI Accession: NP_036300)

<400> 4491
Met Asp Gly Asp Gly Asp Pro Glu Ser Val Gly Gln Pro Glu Glu Ala
1               5                   10                  15

Ser Pro Glu Glu Gln Pro Glu Glu Ala Ser Ala Glu Glu Glu Arg Pro
            20                  25                  30
```

```
Glu Asp Gln Gln Glu Glu Glu Ala Ala Ala Ala Ala Ala Tyr Leu Asp
        35                  40                  45

Glu Leu Pro Glu Pro Leu Leu Leu Arg Val Leu Ala Ala Leu Pro Ala
    50                  55                  60

Ala Glu Leu Val Gln Ala Cys Arg Leu Val Cys Leu Arg Trp Lys Glu
65                  70                  75                  80

Leu Val Asp Gly Ala Pro Leu Trp Leu Leu Lys Cys Gln Gln Glu Gly
                85                  90                  95

Leu Val Pro Glu Gly Gly Val Glu Glu Glu Arg Asp His Trp Gln Gln
            100                 105                 110

Phe Tyr Phe Leu Ser Lys Arg Arg Arg Asn Leu Leu Arg Asn Pro Cys
        115                 120                 125

Gly Glu Glu Asp Leu Glu Gly Trp Cys Asp Val Glu His Gly Gly Asp
    130                 135                 140

Gly Trp Arg Val Glu Glu Leu Pro Gly Asp Ser Gly Val Glu Phe Thr
145                 150                 155                 160

His Asp Glu Ser Val Lys Lys Tyr Phe Ala Ser Ser Phe Glu Trp Cys
                165                 170                 175

Arg Lys Ala Gln Val Ile Asp Leu Gln Ala Glu Gly Tyr Trp Glu Glu
            180                 185                 190

Leu Leu Asp Thr Thr Gln Pro Ala Ile Val Val Lys Asp Trp Tyr Ser
        195                 200                 205

Gly Arg Ser Asp Ala Gly Cys Leu Tyr Glu Leu Thr Val Lys Leu Leu
    210                 215                 220

Ser Glu His Glu Asn Val Leu Ala Glu Phe Ser Ser Gly Gln Val Ala
225                 230                 235                 240

Val Pro Gln Asp Ser Asp Gly Gly Gly Trp Met Glu Ile Ser His Thr
                245                 250                 255

Phe Thr Asp Tyr Gly Pro Gly Val Arg Phe Val Arg Phe Glu His Gly
            260                 265                 270

Gly Gln Asp Ser Val Tyr Trp Lys Gly Trp Phe Gly Ala Arg Val Thr
        275                 280                 285

Asn Ser Ser Val Trp Val Glu Pro
    290                 295

<210> 4492
<211> 451
```

<212> PRT
<213> Homo sapiens

<220>
<223> TUBG1 (NCBI Accession: NP_001061)

<400> 4492
Met Pro Arg Glu Ile Ile Thr Leu Gln Leu Gly Gln Cys Gly Asn Gln
1   5   10   15

Ile Gly Phe Glu Phe Trp Lys Gln Leu Cys Ala Glu His Gly Ile Ser
            20   25   30

Pro Glu Gly Ile Val Glu Glu Phe Ala Thr Glu Gly Thr Asp Arg Lys
        35   40   45

Asp Val Phe Phe Tyr Gln Ala Asp Asp Glu His Tyr Ile Pro Arg Ala
    50   55   60

Val Leu Leu Asp Leu Glu Pro Arg Val Ile His Ser Ile Leu Asn Ser
65   70   75   80

Pro Tyr Ala Lys Leu Tyr Asn Pro Glu Asn Ile Tyr Leu Ser Glu His
                85   90   95

Gly Gly Gly Ala Gly Asn Asn Trp Ala Ser Gly Phe Ser Gln Gly Glu
            100   105   110

Lys Ile His Glu Asp Ile Phe Asp Ile Ile Asp Arg Glu Ala Asp Gly
        115   120   125

Ser Asp Ser Leu Glu Gly Phe Val Leu Cys His Ser Ile Ala Gly Gly
    130   135   140

Thr Gly Ser Gly Leu Gly Ser Tyr Leu Leu Glu Arg Leu Asn Asp Arg
145   150   155   160

Tyr Pro Lys Lys Leu Val Gln Thr Tyr Ser Val Phe Pro Asn Gln Asp
                165   170   175

Glu Met Ser Asp Val Val Val Gln Pro Tyr Asn Ser Leu Leu Thr Leu
            180   185   190

Lys Arg Leu Thr Gln Asn Ala Asp Cys Val Val Val Leu Asp Asn Thr
        195   200   205

Ala Leu Asn Arg Ile Ala Thr Asp Arg Leu His Ile Gln Asn Pro Ser
    210   215   220

Phe Ser Gln Ile Asn Gln Leu Val Ser Thr Ile Met Ser Ala Ser Thr
225   230   235   240

Thr Thr Leu Arg Tyr Pro Gly Tyr Met Asn Asn Asp Leu Ile Gly Leu
                245   250   255

```
Ile Ala Ser Leu Ile Pro Thr Pro Arg Leu His Phe Leu Met Thr Gly
            260                 265                 270

Tyr Thr Pro Leu Thr Thr Asp Gln Ser Val Ala Ser Val Arg Lys Thr
        275                 280                 285

Thr Val Leu Asp Val Met Arg Arg Leu Leu Gln Pro Lys Asn Val Met
    290                 295                 300

Val Ser Thr Gly Arg Asp Arg Gln Thr Asn His Cys Tyr Ile Ala Ile
305                 310                 315                 320

Leu Asn Ile Ile Gln Gly Glu Val Asp Pro Thr Gln Val His Lys Ser
                325                 330                 335

Leu Gln Arg Ile Arg Glu Arg Lys Leu Ala Asn Phe Ile Pro Trp Gly
            340                 345                 350

Pro Ala Ser Ile Gln Val Ala Leu Ser Arg Lys Ser Pro Tyr Leu Pro
        355                 360                 365

Ser Ala His Arg Val Ser Gly Leu Met Met Ala Asn His Thr Ser Ile
    370                 375                 380

Ser Ser Leu Phe Glu Arg Thr Cys Arg Gln Tyr Asp Lys Leu Arg Lys
385                 390                 395                 400

Arg Glu Ala Phe Leu Glu Gln Phe Arg Lys Glu Asp Met Phe Lys Asp
                405                 410                 415

Asn Phe Asp Glu Met Asp Thr Ser Arg Glu Ile Val Gln Gln Leu Ile
            420                 425                 430

Asp Glu Tyr His Ala Ala Thr Arg Pro Asp Tyr Ile Ser Trp Gly Thr
        435                 440                 445

Gln Glu Gln
    450

<210> 4493
<211> 758
<212> PRT
<213> Homo sapiens

<220>
<223> OXR1 (NCBI Accession: NP_060472)

<400> 4493
Met Ser Phe Gln Lys Pro Lys Gly Thr Ile Glu Tyr Thr Val Glu Ser
1               5                   10                  15

Arg Asp Ser Leu Asn Ser Ile Ala Leu Lys Phe Asp Thr Thr Pro Asn
            20                  25                  30
```

```
Glu Leu Val Gln Leu Asn Lys Leu Phe Ser Arg Ala Val Val Thr Gly
        35                  40                  45

Gln Val Leu Tyr Val Pro Asp Pro Glu Tyr Val Ser Ser Val Glu Ser
    50                  55                  60

Ser Pro Ser Leu Ser Pro Val Ser Pro Leu Ser Pro Thr Ser Ser Glu
65                  70                  75                  80

Ala Glu Phe Asp Lys Thr Thr Asn Pro Asp Val His Pro Thr Glu Ala
                85                  90                  95

Thr Pro Ser Ser Thr Phe Thr Gly Ile Arg Pro Ala Arg Val Val Ser
            100                 105                 110

Ser Thr Ser Glu Glu Glu Glu Ala Phe Thr Glu Lys Phe Leu Lys Ile
        115                 120                 125

Asn Cys Lys Tyr Ile Thr Ser Gly Lys Gly Thr Val Ser Gly Val Leu
    130                 135                 140

Leu Val Thr Pro Asn Asn Ile Met Phe Asp Pro His Lys Asn Asp Pro
145                 150                 155                 160

Leu Val Gln Glu Asn Gly Cys Glu Glu Tyr Gly Ile Met Cys Pro Met
                165                 170                 175

Glu Glu Val Met Ser Ala Ala Met Tyr Lys Glu Ile Leu Asp Ser Lys
            180                 185                 190

Ile Lys Glu Ser Leu Pro Ile Asp Ile Asp Gln Leu Ser Gly Arg Asp
        195                 200                 205

Phe Cys His Ser Lys Lys Met Thr Gly Ser Asn Thr Glu Glu Ile Asp
    210                 215                 220

Ser Arg Ile Arg Asp Ala Gly Asn Asp Ser Ala Ser Thr Ala Pro Arg
225                 230                 235                 240

Ser Thr Glu Glu Ser Leu Ser Glu Asp Val Phe Thr Glu Ser Glu Leu
                245                 250                 255

Ser Pro Ile Arg Glu Glu Leu Val Ser Ser Asp Glu Leu Arg Gln Asp
            260                 265                 270

Lys Ser Ser Gly Ala Ser Ser Glu Ser Val Gln Thr Val Asn Gln Ala
        275                 280                 285

Glu Val Glu Ser Leu Thr Val Lys Ser Glu Ser Thr Gly Thr Pro Gly
    290                 295                 300

His Leu Arg Ser Asp Thr Glu His Ser Thr Asn Glu Val Gly Thr Leu
305                 310                 315                 320
```

```
Cys His Lys Thr Asp Leu Asn Asn Leu Glu Met Ala Ile Lys Glu Asp
                325                 330                 335

Gln Ile Ala Asp Asn Phe Gln Gly Ile Ser Gly Pro Lys Glu Asp Ser
            340                 345                 350

Thr Ser Ile Lys Gly Asn Ser Asp Gln Asp Ser Phe Leu His Glu Asn
        355                 360                 365

Ser Leu His Gln Glu Glu Ser Gln Lys Glu Asn Met Pro Cys Gly Glu
    370                 375                 380

Thr Ala Glu Phe Lys Gln Lys Gln Ser Val Asn Lys Gly Lys Gln Gly
385                 390                 395                 400

Lys Glu Gln Asn Gln Asp Ser Gln Thr Glu Ala Glu Glu Leu Arg Lys
                405                 410                 415

Leu Trp Lys Thr His Thr Met Gln Gln Thr Lys Gln Gln Arg Glu Asn
            420                 425                 430

Ile Gln Gln Val Ser Gln Lys Glu Ala Lys His Lys Ile Thr Ser Ala
        435                 440                 445

Asp Gly His Ile Glu Ser Ser Ala Leu Leu Lys Glu Lys Gln Arg His
    450                 455                 460

Arg Leu His Lys Phe Leu Cys Leu Arg Val Gly Lys Pro Met Arg Lys
465                 470                 475                 480

Thr Phe Val Ser Gln Ala Ser Ala Thr Met Gln Gln Tyr Ala Gln Arg
                485                 490                 495

Asp Lys Lys His Glu Tyr Trp Phe Ala Val Pro Gln Glu Arg Thr Asp
            500                 505                 510

His Leu Tyr Ala Phe Phe Ile Gln Trp Ser Pro Glu Ile Tyr Ala Glu
        515                 520                 525

Asp Thr Gly Glu Tyr Thr Arg Glu Pro Gly Phe Ile Val Val Lys Lys
    530                 535                 540

Ile Glu Glu Ser Glu Thr Ile Glu Asp Ser Ser Asn Gln Ala Ala Ala
545                 550                 555                 560

Arg Glu Trp Glu Ile Thr Thr Arg Glu Asp Ile Asn Ser Lys Gln Val
                565                 570                 575

Ala Thr Val Lys Ala Asp Leu Glu Ser Glu Ser Phe Arg Pro Asn Leu
            580                 585                 590

Ser Asp Pro Ser Glu Leu Leu Leu Pro Asp Gln Ile Glu Lys Leu Thr
        595                 600                 605
```

Lys His Leu Pro Pro Arg Thr Ile Gly Tyr Pro Trp Thr Leu Val Tyr
610 615 620

Gly Thr Gly Lys His Gly Thr Ser Leu Lys Thr Leu Tyr Arg Thr Met
625 630 635 640

Thr Gly Leu Asp Thr Pro Val Leu Met Val Ile Lys Asp Ser Asp Gly
645 650 655

Gln Val Phe Gly Ala Leu Ala Ser Glu Pro Leu Lys Val Ser Asp Gly
660 665 670

Phe Tyr Gly Thr Gly Glu Thr Phe Val Phe Thr Phe Cys Pro Glu Phe
675 680 685

Glu Val Phe Lys Trp Thr Gly Asp Asn Met Phe Phe Ile Lys Gly Asp
690 695 700

Met Asp Ser Leu Ala Phe Gly Gly Gly Gly Gly Glu Phe Ala Leu Trp
705 710 715 720

Leu Asp Gly Asp Leu Tyr His Gly Arg Ser His Ser Cys Lys Thr Phe
725 730 735

Gly Asn Arg Thr Leu Ser Lys Lys Glu Asp Phe Phe Ile Gln Asp Ile
740 745 750

Glu Ile Trp Ala Phe Glu
755

<210> 4494
<211> 165
<212> PRT
<213> Homo sapiens

<220>
<223> ANKRD20A5P (NCBI Accession: NR_040113)

<400> 4494
Met Lys Leu Phe Gly Phe Arg Ser Arg Arg Gly Gln Thr Val Leu Gly
1 5 10 15

Ser Ile Asp His Leu Tyr Thr Gly Ser Gly Tyr Arg Ile Arg Tyr Ser
20 25 30

Glu Leu Gln Lys Ile His Lys Ala Ala Val Lys Gly Asp Ala Ala Glu
35 40 45

Met Glu Arg Cys Leu Ala Arg Arg Ser Gly Asp Leu Asp Ala Leu Asp
50 55 60

Lys Gln His Arg Thr Ala Leu His Leu Ala Cys Ala Ser Gly His Val
65 70 75 80

```
Lys Val Val Thr Leu Leu Val Asn Arg Lys Cys Gln Ile Asp Ile Tyr
                85                  90                  95

Asp Lys Glu Asn Arg Thr Pro Leu Ile Gln Ala Val His Cys Gln Glu
            100                 105                 110

Glu Ala Cys Ala Val Ile Leu Leu Glu His Gly Ala Asn Pro Asn Leu
        115                 120                 125

Lys Asp Ile Tyr Gly Asn Thr Ala Leu His Tyr Ala Val Tyr Ser Glu
    130                 135                 140

Ser Thr Ser Leu Ala Glu Lys Leu Leu Phe His Gly Glu Asn Ile Glu
145                 150                 155                 160

Ala Leu Asp Lys Val
                165

<210> 4495
<211> 757
<212> PRT
<213> Homo sapiens

<220>
<223> KIRREL (NCBI Accession: NP_001164456)

<400> 4495
Met Leu Ser Leu Leu Val Trp Ile Leu Thr Leu Ser Asp Thr Phe Ser
1               5                   10                  15

Gln Gly Thr Gln Thr Arg Phe Ser Gln Glu Pro Ala Asp Gln Thr Val
            20                  25                  30

Val Ala Gly Gln Arg Ala Val Leu Pro Cys Val Leu Leu Asn Tyr Ser
        35                  40                  45

Gly Ile Val Gln Trp Thr Lys Asp Gly Leu Ala Leu Gly Met Gly Gln
    50                  55                  60

Gly Leu Lys Ala Trp Pro Arg Tyr Arg Val Val Gly Ser Ala Asp Ala
65                  70                  75                  80

Gly Gln Tyr Asn Leu Glu Ile Thr Asp Ala Glu Leu Ser Asp Asp Ala
                85                  90                  95

Ser Tyr Glu Cys Gln Ala Thr Glu Ala Ala Leu Arg Ser Arg Arg Ala
            100                 105                 110

Lys Leu Thr Val Leu Ile Pro Pro Glu Asp Thr Arg Ile Asp Gly Gly
        115                 120                 125

Pro Val Ile Leu Leu Gln Ala Gly Thr Pro His Asn Leu Thr Cys Arg
    130                 135                 140
```

```
Ala Phe Asn Ala Lys Pro Ala Ala Thr Ile Ile Trp Phe Arg Asp Gly
145                 150                 155                 160

Thr Gln Gln Glu Gly Ala Val Ala Ser Thr Glu Leu Leu Lys Asp Gly
                165                 170                 175

Lys Arg Glu Thr Thr Val Ser Gln Leu Leu Ile Asn Pro Thr Asp Leu
            180                 185                 190

Asp Ile Gly Arg Val Phe Thr Cys Arg Ser Met Asn Glu Ala Ile Pro
        195                 200                 205

Ser Gly Lys Glu Thr Ser Ile Glu Leu Asp Val His His Pro Pro Thr
    210                 215                 220

Val Thr Leu Ser Ile Glu Pro Gln Thr Val Gln Glu Gly Glu Arg Val
225                 230                 235                 240

Val Phe Thr Cys Gln Ala Thr Ala Asn Pro Glu Ile Leu Gly Tyr Arg
                245                 250                 255

Trp Ala Lys Gly Gly Phe Leu Ile Glu Asp Ala His Glu Ser Arg Tyr
            260                 265                 270

Glu Thr Asn Val Asp Tyr Ser Phe Phe Thr Glu Pro Val Ser Cys Glu
        275                 280                 285

Val His Asn Lys Val Gly Ser Thr Asn Val Ser Thr Leu Val Asn Val
    290                 295                 300

His Phe Ala Pro Arg Ile Val Val Asp Pro Lys Pro Thr Thr Thr Asp
305                 310                 315                 320

Ile Gly Ser Asp Val Thr Leu Thr Cys Val Trp Val Gly Asn Pro Pro
                325                 330                 335

Leu Thr Leu Thr Trp Thr Lys Lys Asp Ser Asn Met Val Leu Ser Asn
            340                 345                 350

Ser Asn Gln Leu Leu Leu Lys Ser Val Thr Gln Ala Asp Ala Gly Thr
        355                 360                 365

Tyr Thr Cys Arg Ala Ile Val Pro Arg Ile Gly Val Ala Glu Arg Glu
    370                 375                 380

Val Pro Leu Tyr Val Asn Gly Pro Pro Ile Ile Ser Ser Glu Ala Val
385                 390                 395                 400

Gln Tyr Ala Val Arg Gly Asp Gly Gly Lys Val Glu Cys Phe Ile Gly
                405                 410                 415

Ser Thr Pro Pro Pro Asp Arg Ile Ala Trp Ala Trp Lys Glu Asn Phe
            420                 425                 430
```

```
Leu Glu Val Gly Thr Leu Glu Arg Tyr Thr Val Glu Arg Thr Asn Ser
        435                 440                 445

Gly Ser Gly Val Leu Ser Thr Leu Thr Ile Asn Asn Val Met Glu Ala
    450                 455                 460

Asp Phe Gln Thr His Tyr Asn Cys Thr Ala Trp Asn Ser Phe Gly Pro
465                 470                 475                 480

Gly Thr Ala Ile Ile Gln Leu Glu Glu Arg Glu Val Leu Pro Val Gly
                485                 490                 495

Ile Ile Ala Gly Ala Thr Ile Gly Ala Ser Ile Leu Leu Ile Phe Phe
            500                 505                 510

Phe Ile Ala Leu Val Phe Phe Leu Tyr Arg Arg Arg Lys Gly Ser Arg
        515                 520                 525

Lys Asp Val Thr Leu Arg Lys Leu Asp Ile Lys Val Glu Thr Val Asn
    530                 535                 540

Arg Glu Pro Leu Thr Met His Ser Asp Arg Glu Asp Asp Thr Ala Ser
545                 550                 555                 560

Val Ser Thr Ala Thr Arg Val Met Lys Ala Ile Tyr Ser Ser Phe Lys
                565                 570                 575

Asp Asp Val Asp Leu Lys Gln Asp Leu Arg Cys Asp Thr Ile Asp Thr
            580                 585                 590

Arg Glu Glu Tyr Glu Met Lys Asp Pro Thr Asn Gly Tyr Tyr Asn Val
        595                 600                 605

Arg Ala His Glu Asp Arg Pro Ser Ser Arg Ala Val Leu Tyr Ala Asp
    610                 615                 620

Tyr Arg Ala Pro Gly Pro Ala Arg Phe Asp Gly Arg Pro Ser Ser Arg
625                 630                 635                 640

Leu Ser His Ser Ser Gly Tyr Ala Gln Leu Asn Thr Tyr Ser Arg Gly
                645                 650                 655

Pro Ala Ser Asp Tyr Gly Pro Glu Pro Thr Pro Pro Gly Pro Ala Ala
            660                 665                 670

Pro Ala Gly Thr Asp Thr Thr Ser Gln Leu Ser Tyr Glu Asn Tyr Glu
        675                 680                 685

Lys Phe Asn Ser His Pro Phe Pro Gly Ala Ala Gly Tyr Pro Thr Tyr
    690                 695                 700

Arg Leu Gly Tyr Pro Gln Ala Pro Pro Ser Gly Leu Glu Arg Thr Pro
705                 710                 715                 720
```

```
Tyr Glu Ala Tyr Asp Pro Ile Gly Lys Tyr Ala Thr Ala Thr Arg Phe
                725                 730                 735

Ser Tyr Thr Ser Gln His Ser Asp Tyr Gly Gln Arg Phe Gln Gln Arg
            740                 745                 750

Met Gln Thr His Val
        755

<210> 4496
<211> 1035
<212> PRT
<213> Homo sapiens

<220>
<223> GIGYF1 (NCBI Accession: XP_005250589)

<400> 4496
Met Ala Ala Glu Thr Leu Asn Phe Gly Pro Glu Trp Leu Arg Ala Leu
1               5                   10                  15

Ser Gly Gly Gly Ser Val Ala Ser Pro Pro Pro Ser Pro Ala Met Pro
            20                  25                  30

Lys Tyr Lys Leu Ala Asp Tyr Arg Tyr Gly Arg Glu Glu Met Leu Ala
        35                  40                  45

Leu Tyr Val Lys Glu Asn Lys Val Pro Glu Glu Leu Gln Asp Lys Glu
    50                  55                  60

Phe Ala Ala Val Leu Gln Asp Glu Pro Leu Gln Pro Leu Ala Leu Glu
65                  70                  75                  80

Pro Leu Thr Glu Glu Glu Gln Arg Asn Phe Ser Leu Ser Val Asn Ser
                85                  90                  95

Val Ala Val Leu Arg Leu Met Gly Lys Gly Ala Gly Pro Pro Leu Ala
            100                 105                 110

Gly Thr Ser Arg Gly Arg Gly Ser Thr Arg Ser Arg Gly Arg Gly Arg
        115                 120                 125

Gly Asp Ser Cys Phe Tyr Gln Arg Ser Ile Glu Glu Gly Asp Gly Ala
    130                 135                 140

Phe Gly Arg Ser Pro Arg Glu Ile Gln Arg Ser Gln Ser Trp Asp Asp
145                 150                 155                 160

Arg Gly Glu Arg Arg Phe Glu Lys Ser Ala Arg Arg Asp Gly Ala Arg
                165                 170                 175

Cys Gly Phe Glu Glu Gly Gly Ala Gly Pro Arg Lys Glu His Ala Arg
            180                 185                 190
```

```
Ser Asp Ser Glu Asn Trp Arg Ser Leu Arg Glu Glu Gln Glu Glu Glu
        195                 200                 205

Glu Glu Gly Ser Trp Arg Leu Gly Ala Gly Pro Arg Arg Asp Gly Asp
    210                 215                 220

Arg Trp Arg Ser Ala Ser Pro Asp Gly Gly Pro Arg Ser Ala Gly Trp
225                 230                 235                 240

Arg Glu His Gly Glu Arg Arg Arg Lys Phe Glu Phe Asp Leu Arg Gly
                245                 250                 255

Asp Arg Gly Gly Cys Gly Glu Glu Glu Gly Arg Gly Gly Gly Gly Ser
            260                 265                 270

Ser His Leu Arg Arg Cys Arg Ala Pro Glu Gly Phe Glu Glu Asp Lys
        275                 280                 285

Asp Gly Leu Pro Glu Trp Cys Leu Asp Asp Glu Asp Glu Glu Met Gly
    290                 295                 300

Thr Phe Asp Ala Ser Gly Ala Phe Leu Pro Leu Lys Lys Gly Pro Lys
305                 310                 315                 320

Glu Pro Ile Pro Glu Glu Gln Glu Leu Asp Phe Gln Gly Leu Glu Glu
                325                 330                 335

Glu Glu Glu Pro Ser Glu Gly Leu Glu Glu Glu Gly Pro Glu Ala Gly
            340                 345                 350

Gly Lys Glu Leu Thr Pro Leu Pro Pro Gln Glu Glu Lys Ser Ser Ser
        355                 360                 365

Pro Ser Pro Leu Pro Thr Leu Gly Pro Leu Trp Gly Thr Asn Gly Asp
    370                 375                 380

Gly Asp Glu Thr Ala Glu Lys Glu Pro Pro Ala Ala Glu Asp Asp Ile
385                 390                 395                 400

Arg Gly Ile Gln Leu Ser Pro Gly Val Gly Ser Ser Ala Gly Pro Pro
                405                 410                 415

Gly Asp Leu Glu Asp Asp Glu Gly Leu Lys His Leu Gln Gln Glu Ala
            420                 425                 430

Glu Lys Leu Val Ala Ser Leu Gln Asp Ser Ser Leu Glu Glu Glu Gln
        435                 440                 445

Phe Thr Ala Ala Met Gln Thr Gln Gly Leu Arg His Ser Ala Ala Ala
    450                 455                 460

Thr Ala Leu Pro Leu Ser His Gly Ala Ala Arg Lys Trp Phe Tyr Lys
465                 470                 475                 480
```

```
Asp Pro Gln Gly Glu Ile Gln Gly Pro Phe Thr Thr Gln Glu Met Ala
                485                 490                 495

Glu Trp Phe Gln Ala Gly Tyr Phe Ser Met Ser Leu Leu Val Lys Arg
            500                 505                 510

Gly Cys Asp Glu Gly Phe Gln Pro Leu Gly Glu Val Ile Lys Met Trp
        515                 520                 525

Gly Arg Val Pro Phe Ala Pro Gly Pro Ser Pro Pro Pro Leu Leu Gly
    530                 535                 540

Asn Met Asp Gln Glu Arg Leu Lys Lys Gln Gln Glu Leu Ala Ala Ala
545                 550                 555                 560

Ala Leu Tyr Gln Gln Leu Gln His Gln Gln Phe Leu Gln Leu Val Ser
                565                 570                 575

Ser Arg Gln Leu Pro Gln Cys Ala Leu Arg Glu Lys Ala Ala Leu Gly
            580                 585                 590

Asp Leu Thr Pro Pro Pro Pro Pro Pro Pro Gln Gln Gln Gln Gln Gln
        595                 600                 605

Leu Thr Ala Phe Leu Gln Gln Leu Gln Ala Leu Lys Pro Pro Arg Gly
    610                 615                 620

Gly Asp Gln Asn Leu Leu Pro Thr Met Ser Arg Ser Leu Ser Val Pro
625                 630                 635                 640

Asp Ser Gly Arg Leu Trp Asp Val His Thr Ser Ala Ser Ser Gln Ser
                645                 650                 655

Gly Gly Glu Ala Ser Leu Trp Asp Ile Pro Ile Asn Ser Ser Thr Gln
            660                 665                 670

Gly Pro Ile Leu Glu Gln Leu Gln Leu Gln His Lys Phe Gln Glu Arg
        675                 680                 685

Arg Glu Val Glu Leu Arg Ala Lys Arg Glu Glu Glu Glu Arg Lys Arg
    690                 695                 700

Arg Glu Glu Lys Arg Arg Gln Gln Gln Gln Glu Glu Gln Lys Arg Arg
705                 710                 715                 720

Gln Glu Glu Glu Glu Leu Phe Arg Arg Lys His Val Arg Gln Gln Glu
                725                 730                 735

Leu Leu Leu Lys Leu Leu Gln Gln Gln Gln Ala Val Pro Val Pro Pro
            740                 745                 750

Ala Pro Ser Ser Pro Pro Pro Leu Trp Ala Gly Leu Ala Lys Gln Gly
        755                 760                 765
```

```
Leu Ser Met Lys Thr Leu Leu Glu Leu Gln Leu Glu Gly Glu Arg Gln
    770                 775                 780

Leu His Lys Gln Pro Pro Pro Arg Glu Pro Ala Arg Ala Gln Ala Pro
785                 790                 795                 800

Asn His Arg Val Gln Leu Gly Gly Leu Gly Thr Ala Pro Leu Asn Gln
                805                 810                 815

Trp Val Ser Glu Ala Gly Pro Leu Trp Gly Gly Pro Asp Lys Ser Gly
            820                 825                 830

Gly Gly Ser Ser Gly Leu Gly Leu Trp Glu Asp Thr Pro Lys Ser Gly
        835                 840                 845

Gly Ser Leu Val Arg Gly Leu Gly Leu Lys Asn Ser Arg Ser Ser Pro
    850                 855                 860

Ser Leu Ser Asp Ser Tyr Ser His Leu Ser Gly Arg Pro Ile Arg Lys
865                 870                 875                 880

Lys Thr Glu Glu Glu Glu Lys Leu Leu Lys Leu Leu Gln Gly Ile Pro
                885                 890                 895

Arg Pro Gln Asp Gly Phe Thr Gln Trp Cys Glu Gln Met Leu His Thr
            900                 905                 910

Leu Ser Ala Thr Gly Ser Leu Asp Val Pro Met Ala Val Ala Ile Leu
        915                 920                 925

Lys Glu Val Glu Ser Pro Tyr Asp Val His Asp Tyr Ile Arg Ser Cys
    930                 935                 940

Leu Gly Asp Thr Leu Glu Ala Lys Glu Phe Ala Lys Gln Phe Leu Glu
945                 950                 955                 960

Arg Arg Ala Lys Gln Lys Ala Ser Gln Gln Arg Gln Gln Gln Gln Glu
                965                 970                 975

Ala Trp Leu Ser Ser Ala Ser Leu Gln Thr Ala Phe Gln Ala Asn His
            980                 985                 990

Ser Thr Lys Leu Gly Pro Gly Glu Gly Ser Lys Ala Lys Arg Arg Ala
        995                 1000                1005

Leu Met Leu His Ser Asp Pro Ser Ile Leu Gly Tyr Ser Leu His Gly
    1010                1015                1020

Ser Ser Gly Glu Ile Glu Ser Val Asp Asp Tyr
1025                1030                1035
```

<210> 4497
<211> 94

<212> PRT
<213> Homo sapiens

<220>
<223> DEFA3 (NCBI Accession: NP_005208)

<400> 4497
Met Arg Thr Leu Ala Ile Leu Ala Ala Ile Leu Leu Val Ala Leu Gln
1   5   10   15

Ala Gln Ala Glu Pro Leu Gln Ala Arg Ala Asp Glu Val Ala Ala Ala
            20   25   30

Pro Glu Gln Ile Ala Ala Asp Ile Pro Glu Val Val Val Ser Leu Ala
        35   40   45

Trp Asp Glu Ser Leu Ala Pro Lys His Pro Gly Ser Arg Lys Asn Met
    50   55   60

Asp Cys Tyr Cys Arg Ile Pro Ala Cys Ile Ala Gly Glu Arg Arg Tyr
65   70   75   80

Gly Thr Cys Ile Tyr Gln Gly Arg Leu Trp Ala Phe Cys Cys
                85   90

<210> 4498
<211> 348
<212> PRT
<213> Homo sapiens

<220>
<223> RSPH14 (NCBI Accession: NP_055248)

<400> 4498
Met Ala His Ser Gln Asn Ser Leu Glu Leu Pro Ile Asn Ile Asn Ala
1   5   10   15

Thr Gln Ile Thr Thr Ala Tyr Gly His Arg Ala Leu Pro Lys Leu Lys
            20   25   30

Glu Glu Leu Gln Ser Glu Asp Leu Gln Thr Arg Gln Lys Ala Leu Met
        35   40   45

Ala Leu Cys Asp Leu Met His Asp Pro Glu Cys Ile Tyr Lys Ala Met
    50   55   60

Asn Ile Gly Cys Met Glu Asn Leu Lys Ala Leu Leu Lys Asp Ser Asn
65   70   75   80

Ser Met Val Arg Ile Lys Thr Thr Glu Val Leu His Ile Thr Ala Ser
                85   90   95

His Ser Val Gly Arg Tyr Ala Phe Leu Glu His Asp Ile Val Leu Ala
            100   105   110

```
Leu Ser Phe Leu Leu Asn Asp Pro Ser Pro Val Cys Arg Gly Asn Leu
        115                 120                 125

Tyr Lys Ala Tyr Met Gln Leu Val Gln Val Pro Arg Gly Ala Gln Glu
    130                 135                 140

Ile Ile Ser Lys Gly Leu Ile Ser Ser Leu Val Trp Lys Leu Gln Val
145                 150                 155                 160

Glu Val Glu Glu Glu Glu Phe Gln Glu Phe Ile Leu Asp Thr Leu Val
                165                 170                 175

Leu Cys Leu Gln Glu Asp Ala Thr Glu Ala Leu Gly Ser Asn Val Val
            180                 185                 190

Leu Val Leu Lys Gln Lys Leu Leu Ser Ala Asn Gln Asn Ile Arg Ser
        195                 200                 205

Lys Ala Ala Arg Ala Leu Leu Asn Val Ser Ile Ser Arg Glu Gly Lys
    210                 215                 220

Lys Gln Val Cys His Phe Asp Val Ile Pro Ile Leu Val His Leu Leu
225                 230                 235                 240

Lys Asp Pro Val Glu His Val Lys Ser Asn Ala Ala Gly Ala Leu Met
                245                 250                 255

Phe Ala Thr Val Ile Thr Glu Gly Lys Tyr Ala Ala Leu Glu Ala Gln
            260                 265                 270

Ala Ile Gly Leu Leu Leu Glu Leu Leu His Ser Pro Met Thr Ile Ala
        275                 280                 285

Arg Leu Asn Ala Thr Lys Ala Leu Thr Met Leu Ala Glu Ala Pro Glu
    290                 295                 300

Gly Arg Lys Ala Leu Gln Thr His Val Pro Thr Phe Arg Ala Met Glu
305                 310                 315                 320

Val Glu Thr Tyr Glu Lys Pro Gln Val Ala Glu Ala Leu Gln Arg Ala
                325                 330                 335

Ala Arg Ile Ala Ile Ser Val Ile Glu Phe Lys Pro
            340                 345

<210> 4499
<211> 99
<212> PRT
<213> Homo sapiens

<220>
<223> CCL2 (NCBI Accession: NP_002973)
```

<400> 4499
Met Lys Val Ser Ala Ala Leu Leu Cys Leu Leu Leu Ile Ala Ala Thr
1   5   10   15

Phe Ile Pro Gln Gly Leu Ala Gln Pro Asp Ala Ile Asn Ala Pro Val
            20   25   30

Thr Cys Cys Tyr Asn Phe Thr Asn Arg Lys Ile Ser Val Gln Arg Leu
        35   40   45

Ala Ser Tyr Arg Arg Ile Thr Ser Ser Lys Cys Pro Lys Glu Ala Val
    50   55   60

Ile Phe Lys Thr Ile Val Ala Lys Glu Ile Cys Ala Asp Pro Lys Gln
65   70   75   80

Lys Trp Val Gln Asp Ser Met Asp His Leu Asp Lys Gln Thr Gln Thr
                85   90   95

Pro Lys Thr

<210> 4500
<211> 233
<212> PRT
<213> Homo sapiens

<220>
<223> KLRC1 (NCBI Accession: NP_998823)

<400> 4500
Met Asp Asn Gln Gly Val Ile Tyr Ser Asp Leu Asn Leu Pro Pro Asn
1   5   10   15

Pro Lys Arg Gln Gln Arg Lys Pro Lys Gly Asn Lys Ser Ser Ile Leu
            20   25   30

Ala Thr Glu Gln Glu Ile Thr Tyr Ala Glu Leu Asn Leu Gln Lys Ala
        35   40   45

Ser Gln Asp Phe Gln Gly Asn Asp Lys Thr Tyr His Cys Lys Asp Leu
    50   55   60

Pro Ser Ala Pro Glu Lys Leu Ile Val Gly Ile Leu Gly Ile Ile Cys
65   70   75   80

Leu Ile Leu Met Ala Ser Val Val Thr Ile Val Val Ile Pro Ser Thr
                85   90   95

Leu Ile Gln Arg His Asn Asn Ser Ser Leu Asn Thr Arg Thr Gln Lys
            100   105   110

Ala Arg His Cys Gly His Cys Pro Glu Glu Trp Ile Thr Tyr Ser Asn
        115   120   125

Ser Cys Tyr Tyr Ile Gly Lys Glu Arg Arg Thr Trp Glu Glu Ser Leu
130 135 140

Leu Ala Cys Thr Ser Lys Asn Ser Ser Leu Leu Ser Ile Asp Asn Glu
145 150 155 160

Glu Glu Met Lys Phe Leu Ser Ile Ile Ser Pro Ser Ser Trp Ile Gly
165 170 175

Val Phe Arg Asn Ser Ser His His Pro Trp Val Thr Met Asn Gly Leu
180 185 190

Ala Phe Lys His Glu Ile Lys Asp Ser Asp Asn Ala Glu Leu Asn Cys
195 200 205

Ala Val Leu Gln Val Asn Arg Leu Lys Ser Ala Gln Cys Gly Ser Ser
210 215 220

Ile Ile Tyr His Cys Lys His Lys Leu
225 230

<210> 4501
<211> 568
<212> PRT
<213> Homo sapiens

<220>
<223> KLHL12 (NCBI Accession: NP_067646)

<400> 4501
Met Gly Gly Ile Met Ala Pro Lys Asp Ile Met Thr Asn Thr His Ala
1 5 10 15

Lys Ser Ile Leu Asn Ser Met Asn Ser Leu Arg Lys Ser Asn Thr Leu
20 25 30

Cys Asp Val Thr Leu Arg Val Glu Gln Lys Asp Phe Pro Ala His Arg
35 40 45

Ile Val Leu Ala Ala Cys Ser Asp Tyr Phe Cys Ala Met Phe Thr Ser
50 55 60

Glu Leu Ser Glu Lys Gly Lys Pro Tyr Val Asp Ile Gln Gly Leu Thr
65 70 75 80

Ala Ser Thr Met Glu Ile Leu Leu Asp Phe Val Tyr Thr Glu Thr Val
85 90 95

His Val Thr Val Glu Asn Val Gln Glu Leu Leu Pro Ala Ala Cys Leu
100 105 110

Leu Gln Leu Lys Gly Val Lys Gln Ala Cys Cys Glu Phe Leu Glu Ser
115 120 125

```
Gln Leu Asp Pro Ser Asn Cys Leu Gly Ile Arg Asp Phe Ala Glu Thr
    130                 135                 140

His Asn Cys Val Asp Leu Met Gln Ala Ala Glu Val Phe Ser Gln Lys
145                 150                 155                 160

His Phe Pro Glu Val Val Gln His Glu Glu Phe Ile Leu Leu Ser Gln
                165                 170                 175

Gly Glu Val Glu Lys Leu Ile Lys Cys Asp Glu Ile Gln Val Asp Ser
            180                 185                 190

Glu Glu Pro Val Phe Glu Ala Val Ile Asn Trp Val Lys His Ala Lys
        195                 200                 205

Lys Glu Arg Glu Glu Ser Leu Pro Asn Leu Leu Gln Tyr Val Arg Met
    210                 215                 220

Pro Leu Leu Thr Pro Arg Tyr Ile Thr Asp Val Ile Asp Ala Glu Pro
225                 230                 235                 240

Phe Ile Arg Cys Ser Leu Gln Cys Arg Asp Leu Val Asp Glu Ala Lys
                245                 250                 255

Lys Phe His Leu Arg Pro Glu Leu Arg Ser Gln Met Gln Gly Pro Arg
            260                 265                 270

Thr Arg Ala Arg Leu Gly Ala Asn Glu Val Leu Leu Val Val Gly Gly
        275                 280                 285

Phe Gly Ser Gln Gln Ser Pro Ile Asp Val Val Glu Lys Tyr Asp Pro
    290                 295                 300

Lys Thr Gln Glu Trp Ser Phe Leu Pro Ser Ile Thr Arg Lys Arg Arg
305                 310                 315                 320

Tyr Val Ala Ser Val Ser Leu His Asp Arg Ile Tyr Val Ile Gly Gly
                325                 330                 335

Tyr Asp Gly Arg Ser Arg Leu Ser Ser Val Glu Cys Leu Asp Tyr Thr
            340                 345                 350

Ala Asp Glu Asp Gly Val Trp Tyr Ser Val Ala Pro Met Asn Val Arg
        355                 360                 365

Arg Gly Leu Ala Gly Ala Thr Thr Leu Gly Asp Met Ile Tyr Val Ser
    370                 375                 380

Gly Gly Phe Asp Gly Ser Arg Arg His Thr Ser Met Glu Arg Tyr Asp
385                 390                 395                 400

Pro Asn Ile Asp Gln Trp Ser Met Leu Gly Asp Met Gln Thr Ala Arg
                405                 410                 415
```

```
Glu Gly Ala Gly Leu Val Val Ala Ser Gly Val Ile Tyr Cys Leu Gly
            420                 425                 430

Gly Tyr Asp Gly Leu Asn Ile Leu Asn Ser Val Glu Lys Tyr Asp Pro
        435                 440                 445

His Thr Gly His Trp Thr Asn Val Thr Pro Met Ala Thr Lys Arg Ser
    450                 455                 460

Gly Ala Gly Val Ala Leu Leu Asn Asp His Ile Tyr Val Val Gly Gly
465                 470                 475                 480

Phe Asp Gly Thr Ala His Leu Ser Ser Val Glu Ala Tyr Asn Ile Arg
                485                 490                 495

Thr Asp Ser Trp Thr Thr Val Thr Ser Met Thr Thr Pro Arg Cys Tyr
            500                 505                 510

Val Gly Ala Thr Val Leu Arg Gly Arg Leu Tyr Ala Ile Ala Gly Tyr
        515                 520                 525

Asp Gly Asn Ser Leu Leu Ser Ser Ile Glu Cys Tyr Asp Pro Ile Ile
    530                 535                 540

Asp Ser Trp Glu Val Val Thr Ser Met Gly Thr Gln Arg Cys Asp Ala
545                 550                 555                 560

Gly Val Cys Val Leu Arg Glu Lys
                565

<210> 4502
<211> 237
<212> PRT
<213> Homo sapiens

<220>
<223> NRL (NCBI Accession: XP_011535104)

<400> 4502
Met Ala Leu Pro Pro Ser Pro Leu Ala Met Glu Tyr Val Asn Asp Phe
1               5                   10                  15

Asp Leu Met Lys Phe Glu Val Lys Arg Glu Pro Ser Glu Gly Arg Pro
            20                  25                  30

Gly Pro Pro Thr Ala Ser Leu Gly Ser Thr Pro Tyr Ser Ser Val Pro
        35                  40                  45

Pro Ser Pro Thr Phe Ser Glu Pro Gly Met Val Gly Ala Thr Glu Gly
    50                  55                  60

Thr Arg Pro Gly Leu Glu Glu Leu Tyr Trp Leu Ala Thr Leu Gln Gln
65                  70                  75                  80
```

```
Gln Leu Gly Ala Gly Glu Ala Leu Gly Leu Ser Pro Glu Glu Ala Met
                85                  90                  95

Glu Leu Leu Gln Gly Gln Gly Pro Val Pro Val Asp Gly Pro His Gly
            100                 105                 110

Tyr Tyr Pro Gly Ser Pro Glu Glu Thr Gly Ala Gln His Val Gln Leu
        115                 120                 125

Ala Glu Arg Phe Ser Asp Ala Ala Leu Val Ser Met Ser Val Arg Glu
    130                 135                 140

Leu Asn Arg Gln Leu Arg Gly Cys Gly Arg Asp Glu Ala Leu Arg Leu
145                 150                 155                 160

Lys Gln Arg Arg Arg Thr Leu Lys Asn Arg Gly Tyr Ala Gln Ala Cys
                165                 170                 175

Arg Ser Lys Arg Leu Gln Gln Arg Arg Gly Leu Glu Ala Glu Arg Ala
            180                 185                 190

Arg Leu Ala Ala Gln Leu Asp Ala Leu Arg Ala Glu Val Ala Arg Leu
        195                 200                 205

Ala Arg Glu Arg Asp Leu Tyr Lys Ala Arg Cys Asp Arg Leu Thr Ser
    210                 215                 220

Ser Gly Pro Gly Ser Gly Asp Pro Ser His Leu Phe Leu
225                 230                 235

<210> 4503
<211> 762
<212> PRT
<213> Homo sapiens

<220>
<223> PLCD4 (NCBI Accession: NP_116115)

<400> 4503
Met Ala Ser Leu Leu Gln Asp Gln Leu Thr Thr Asp Gln Asp Leu Leu
1               5                   10                  15

Leu Met Gln Glu Gly Met Pro Met Arg Lys Val Arg Ser Lys Ser Trp
            20                  25                  30

Lys Lys Leu Arg Tyr Phe Arg Leu Gln Asn Asp Gly Met Thr Val Trp
        35                  40                  45

His Ala Arg Gln Ala Arg Gly Ser Ala Lys Pro Ser Phe Ser Ile Ser
    50                  55                  60

Asp Val Glu Thr Ile Arg Asn Gly His Asp Ser Glu Leu Leu Arg Ser
65                  70                  75                  80
```

```
Leu Ala Glu Glu Leu Pro Leu Glu Gln Gly Phe Thr Ile Val Phe His
                85                  90                  95

Gly Arg Arg Ser Asn Leu Asp Leu Met Ala Asn Ser Val Glu Glu Ala
            100                 105                 110

Gln Ile Trp Met Arg Gly Leu Gln Leu Leu Val Asp Leu Val Thr Ser
        115                 120                 125

Met Asp His Gln Glu Arg Leu Asp Gln Trp Leu Ser Asp Trp Phe Gln
    130                 135                 140

Arg Gly Asp Lys Asn Gln Asp Gly Lys Met Ser Phe Gln Glu Val Gln
145                 150                 155                 160

Arg Leu Leu His Leu Met Asn Val Glu Met Asp Gln Glu Tyr Ala Phe
                165                 170                 175

Ser Leu Phe Gln Ala Ala Asp Thr Ser Gln Ser Gly Thr Leu Glu Gly
            180                 185                 190

Glu Glu Phe Val Gln Phe Tyr Lys Ala Leu Thr Lys Arg Ala Glu Val
        195                 200                 205

Gln Glu Leu Phe Glu Ser Phe Ser Ala Asp Gly Gln Lys Leu Thr Leu
    210                 215                 220

Leu Glu Phe Leu Asp Phe Leu Gln Glu Glu Gln Lys Glu Arg Asp Cys
225                 230                 235                 240

Thr Ser Glu Leu Ala Leu Glu Leu Ile Asp Arg Tyr Glu Pro Ser Asp
                245                 250                 255

Ser Gly Lys Leu Arg His Val Leu Ser Met Asp Gly Phe Leu Ser Tyr
            260                 265                 270

Leu Cys Ser Lys Asp Gly Asp Ile Phe Asn Pro Ala Cys Leu Pro Ile
        275                 280                 285

Tyr Gln Asp Met Thr Gln Pro Leu Asn His Tyr Phe Ile Cys Ser Ser
    290                 295                 300

His Asn Thr Tyr Leu Val Gly Asp Gln Leu Cys Gly Gln Ser Ser Val
305                 310                 315                 320

Glu Gly Tyr Ile Arg Ala Leu Lys Arg Gly Cys Arg Cys Val Glu Val
                325                 330                 335

Asp Val Trp Asp Gly Pro Ser Gly Glu Pro Val Val Tyr His Gly His
            340                 345                 350

Thr Leu Thr Ser Arg Ile Leu Phe Lys Asp Val Val Ala Thr Val Ala
        355                 360                 365
```

```
Gln Tyr Ala Phe Gln Thr Ser Asp Tyr Pro Val Ile Leu Ser Leu Glu
    370                 375                 380

Thr His Cys Ser Trp Glu Gln Gln Gln Thr Met Ala Arg His Leu Thr
385                 390                 395                 400

Glu Ile Leu Gly Glu Gln Leu Leu Ser Thr Thr Leu Asp Gly Val Leu
                405                 410                 415

Pro Thr Gln Leu Pro Ser Pro Glu Glu Leu Arg Arg Lys Ile Leu Val
            420                 425                 430

Lys Gly Lys Lys Leu Thr Leu Glu Glu Asp Leu Glu Tyr Glu Glu Glu
        435                 440                 445

Glu Ala Glu Pro Glu Leu Glu Glu Ser Glu Leu Ala Leu Glu Ser Gln
    450                 455                 460

Phe Glu Thr Glu Pro Glu Pro Gln Glu Gln Asn Leu Gln Asn Lys Asp
465                 470                 475                 480

Lys Lys Lys Lys Ser Lys Pro Ile Leu Cys Pro Ala Leu Ser Ser Leu
                485                 490                 495

Val Ile Tyr Leu Lys Ser Val Ser Phe Arg Ser Phe Thr His Ser Lys
            500                 505                 510

Glu His Tyr His Phe Tyr Glu Ile Ser Ser Phe Ser Glu Thr Lys Ala
        515                 520                 525

Lys Arg Leu Ile Lys Glu Ala Gly Asn Glu Phe Val Gln His Asn Thr
    530                 535                 540

Trp Gln Leu Ser Arg Val Tyr Pro Ser Gly Leu Arg Thr Asp Ser Ser
545                 550                 555                 560

Asn Tyr Asn Pro Gln Glu Leu Trp Asn Ala Gly Cys Gln Met Val Ala
                565                 570                 575

Met Asn Met Gln Thr Ala Gly Leu Glu Met Asp Ile Cys Asp Gly His
            580                 585                 590

Phe Arg Gln Asn Gly Gly Cys Gly Tyr Val Leu Lys Pro Asp Phe Leu
        595                 600                 605

Arg Asp Ile Gln Ser Ser Phe His Pro Glu Lys Pro Ile Ser Pro Phe
    610                 615                 620

Lys Ala Gln Thr Leu Leu Ile Gln Val Ile Ser Gly Gln Gln Leu Pro
625                 630                 635                 640

Lys Val Asp Lys Thr Lys Glu Gly Ser Ile Val Asp Pro Leu Val Lys
                645                 650                 655
```

```
Val Gln Ile Phe Gly Val Arg Leu Asp Thr Ala Arg Gln Glu Thr Asn
            660                 665                 670

Tyr Val Glu Asn Asn Gly Phe Asn Pro Tyr Trp Gly Gln Thr Leu Cys
        675                 680                 685

Phe Arg Val Leu Val Pro Glu Leu Ala Met Leu Arg Phe Val Val Met
    690                 695                 700

Asp Tyr Asp Trp Lys Ser Arg Asn Asp Phe Ile Gly Gln Tyr Thr Leu
705                 710                 715                 720

Pro Trp Thr Cys Met Gln Gln Gly Tyr Arg His Ile His Leu Leu Ser
                725                 730                 735

Lys Asp Gly Ile Ser Leu Arg Pro Ala Ser Ile Phe Val Tyr Ile Cys
            740                 745                 750

Ile Gln Glu Gly Leu Glu Gly Asp Glu Ser
        755                 760
```

<210> 4504
<211> 314
<212> PRT
<213> Homo sapiens

<220>
<223> CCDC74B (NCBI Accession: NP_001245236)

<400> 4504

```
Met Ser Gly Ala Gly Val Ala Ala Gly Thr Arg Pro Pro Ser Ser Pro
1               5                   10                  15

Thr Pro Gly Ser Arg Arg Arg Arg Gln Arg Pro Ser Val Gly Val Gln
            20                  25                  30

Ser Leu Arg Pro Gln Ser Pro Gln Leu Arg Gln Ser Asp Pro Gln Lys
        35                  40                  45

Arg Asn Leu Asp Leu Glu Lys Ser Leu Gln Phe Leu Gln Gln Gln His
    50                  55                  60

Ser Glu Met Leu Ala Lys Leu His Glu Glu Ile Glu His Leu Lys Arg
65                  70                  75                  80

Glu Asn Lys Asp Leu Arg Tyr Lys Leu Ile Met Asn Gln Thr Ser Gln
                85                  90                  95

Lys Lys Asp Ser Leu Ser Thr Ser Ser Phe Gln Ser Val Lys Ser Ile
            100                 105                 110

Ser Asn Ser Gly Lys Ala Arg Pro Gln Pro Gly Ser Phe Asn Lys Gln
        115                 120                 125
```

```
Asp Ser Lys Ala Asp Val Pro Gln Lys Ala Asp Leu Glu Glu Glu Pro
    130                 135                 140

Leu Leu His Asn Ser Lys Leu Asp Lys Val Pro Gly Val Gln Gly Gln
145                 150                 155                 160

Ala Arg Lys Glu Lys Ala Glu Ala Ser Asn Ala Gly Ala Ala Cys Met
                165                 170                 175

Gly Asn Ser Gln His Gln Gly Arg Gln Met Gly Ala Ala Ala His Pro
            180                 185                 190

Pro Met Ile Leu Pro Leu Pro Leu Arg Lys Pro Thr Thr Leu Arg Gln
        195                 200                 205

Cys Glu Val Leu Ile Arg Glu Leu Trp Asn Thr Asn Leu Leu Gln Thr
    210                 215                 220

Gln Glu Leu Gln His Leu Lys Ser Leu Leu Glu Gly Ser Gln Arg Pro
225                 230                 235                 240

Gln Ala Val Pro Glu Glu Ala Ser Phe Pro Arg Asp Gln Glu Ala Thr
                245                 250                 255

His Phe Pro Lys Val Ser Thr Lys Ser Leu Ser Lys Lys Cys Leu Leu
            260                 265                 270

Leu Ser Pro Pro Val Ala Glu Arg Ala Ile Leu Pro Ala Leu Lys Gln
        275                 280                 285

Thr Pro Lys Asn Asn Phe Ala Glu Arg Gln Lys Arg Leu Gln Ala Met
    290                 295                 300

Gln Lys Arg Arg Leu His Arg Ser Val Leu
305                 310

<210> 4505
<211> 359
<212> PRT
<213> Homo sapiens

<220>
<223> HSPBP1 (NCBI Accession: NP_001123578)

<400> 4505
Met Ser Asp Glu Gly Ser Arg Gly Ser Arg Leu Pro Leu Ala Leu Pro
1               5                   10                  15

Pro Ala Ser Gln Gly Cys Ser Ser Gly Gly Gly Gly Gly Gly Ser Ser
            20                  25                  30

Ala Gly Gly Ser Gly Asn Ser Arg Pro Pro Arg Asn Leu Gln Gly Leu
        35                  40                  45
```

```
Leu Gln Met Ala Ile Thr Ala Gly Ser Glu Glu Pro Asp Pro Pro Pro
    50                  55                  60

Glu Pro Met Ser Glu Glu Arg Arg Gln Trp Leu Gln Glu Ala Met Ser
65                  70                  75                  80

Ala Ala Phe Arg Gly Gln Arg Glu Glu Val Glu Gln Met Lys Ser Cys
                85                  90                  95

Leu Arg Val Leu Ser Gln Pro Met Pro Pro Thr Ala Gly Glu Ala Glu
            100                 105                 110

Gln Ala Ala Asp Gln Gln Glu Arg Glu Gly Ala Leu Glu Leu Leu Ala
        115                 120                 125

Asp Leu Cys Glu Asn Met Asp Asn Ala Ala Asp Phe Cys Gln Leu Ser
    130                 135                 140

Gly Met His Leu Leu Val Gly Arg Tyr Leu Glu Ala Gly Ala Ala Gly
145                 150                 155                 160

Leu Arg Trp Arg Ala Ala Gln Leu Ile Gly Thr Cys Ser Gln Asn Val
                165                 170                 175

Ala Ala Ile Gln Glu Gln Val Leu Gly Leu Gly Ala Leu Arg Lys Leu
            180                 185                 190

Leu Arg Leu Leu Asp Arg Asp Ala Cys Asp Thr Val Arg Val Lys Ala
        195                 200                 205

Leu Phe Ala Ile Ser Cys Leu Val Arg Glu Gln Glu Ala Gly Leu Leu
    210                 215                 220

Gln Phe Leu Arg Leu Asp Gly Phe Ser Val Leu Met Arg Ala Met Gln
225                 230                 235                 240

Gln Gln Val Gln Lys Leu Lys Val Lys Ser Ala Phe Leu Leu Gln Asn
                245                 250                 255

Leu Leu Val Gly His Pro Glu His Lys Gly Thr Leu Cys Ser Met Gly
            260                 265                 270

Met Val Gln Gln Leu Val Ala Leu Val Arg Thr Glu His Ser Pro Phe
        275                 280                 285

His Glu His Val Leu Gly Ala Leu Cys Ser Leu Val Thr Asp Phe Pro
    290                 295                 300

Gln Gly Val Arg Glu Cys Arg Glu Pro Glu Leu Gly Leu Glu Glu Leu
305                 310                 315                 320

Leu Arg His Arg Cys Gln Leu Leu Gln Gln His Glu Glu Tyr Gln Glu
                325                 330                 335
```

```
Glu Leu Glu Phe Cys Glu Lys Leu Leu Gln Thr Cys Phe Ser Ser Pro
            340                 345                 350

Ala Asp Asp Ser Met Asp Arg
        355

<210> 4506
<211> 639
<212> PRT
<213> Homo sapiens

<220>
<223> HSPA2 (NCBI Accession: NP_068814)

<400> 4506
Met Ser Ala Arg Gly Pro Ala Ile Gly Ile Asp Leu Gly Thr Thr Tyr
1               5                   10                  15

Ser Cys Val Gly Val Phe Gln His Gly Lys Val Glu Ile Ile Ala Asn
            20                  25                  30

Asp Gln Gly Asn Arg Thr Thr Pro Ser Tyr Val Ala Phe Thr Asp Thr
        35                  40                  45

Glu Arg Leu Ile Gly Asp Ala Ala Lys Asn Gln Val Ala Met Asn Pro
    50                  55                  60

Thr Asn Thr Ile Phe Asp Ala Lys Arg Leu Ile Gly Arg Lys Phe Glu
65                  70                  75                  80

Asp Ala Thr Val Gln Ser Asp Met Lys His Trp Pro Phe Arg Val Val
                85                  90                  95

Ser Glu Gly Gly Lys Pro Lys Val Gln Val Glu Tyr Lys Gly Glu Thr
            100                 105                 110

Lys Thr Phe Phe Pro Glu Glu Ile Ser Ser Met Val Leu Thr Lys Met
        115                 120                 125

Lys Glu Ile Ala Glu Ala Tyr Leu Gly Gly Lys Val His Ser Ala Val
    130                 135                 140

Ile Thr Val Pro Ala Tyr Phe Asn Asp Ser Gln Arg Gln Ala Thr Lys
145                 150                 155                 160

Asp Ala Gly Thr Ile Thr Gly Leu Asn Val Leu Arg Ile Ile Asn Glu
                165                 170                 175

Pro Thr Ala Ala Ala Ile Ala Tyr Gly Leu Asp Lys Lys Gly Cys Ala
            180                 185                 190

Gly Gly Glu Lys Asn Val Leu Ile Phe Asp Leu Gly Gly Gly Thr Phe
        195                 200                 205
```

```
Asp Val Ser Ile Leu Thr Ile Glu Asp Gly Ile Phe Glu Val Lys Ser
    210                 215                 220

Thr Ala Gly Asp Thr His Leu Gly Gly Glu Asp Phe Asp Asn Arg Met
225                 230                 235                 240

Val Ser His Leu Ala Glu Glu Phe Lys Arg Lys His Lys Lys Asp Ile
                245                 250                 255

Gly Pro Asn Lys Arg Ala Val Arg Arg Leu Arg Thr Ala Cys Glu Arg
            260                 265                 270

Ala Lys Arg Thr Leu Ser Ser Ser Thr Gln Ala Ser Ile Glu Ile Asp
        275                 280                 285

Ser Leu Tyr Glu Gly Val Asp Phe Tyr Thr Ser Ile Thr Arg Ala Arg
    290                 295                 300

Phe Glu Glu Leu Asn Ala Asp Leu Phe Arg Gly Thr Leu Glu Pro Val
305                 310                 315                 320

Glu Lys Ala Leu Arg Asp Ala Lys Leu Asp Lys Gly Gln Ile Gln Glu
                325                 330                 335

Ile Val Leu Val Gly Gly Ser Thr Arg Ile Pro Lys Ile Gln Lys Leu
            340                 345                 350

Leu Gln Asp Phe Phe Asn Gly Lys Glu Leu Asn Lys Ser Ile Asn Pro
        355                 360                 365

Asp Glu Ala Val Ala Tyr Gly Ala Ala Val Gln Ala Ala Ile Leu Ile
    370                 375                 380

Gly Asp Lys Ser Glu Asn Val Gln Asp Leu Leu Leu Leu Asp Val Thr
385                 390                 395                 400

Pro Leu Ser Leu Gly Ile Glu Thr Ala Gly Gly Val Met Thr Pro Leu
                405                 410                 415

Ile Lys Arg Asn Thr Thr Ile Pro Thr Lys Gln Thr Gln Thr Phe Thr
            420                 425                 430

Thr Tyr Ser Asp Asn Gln Ser Ser Val Leu Val Gln Val Tyr Glu Gly
        435                 440                 445

Glu Arg Ala Met Thr Lys Asp Asn Asn Leu Leu Gly Lys Phe Asp Leu
    450                 455                 460

Thr Gly Ile Pro Pro Ala Pro Arg Gly Val Pro Gln Ile Glu Val Thr
465                 470                 475                 480

Phe Asp Ile Asp Ala Asn Gly Ile Leu Asn Val Thr Ala Ala Asp Lys
                485                 490                 495
```

Ser Thr Gly Lys Glu Asn Lys Ile Thr Ile Thr Asn Asp Lys Gly Arg
500 505 510

Leu Ser Lys Asp Asp Ile Asp Arg Met Val Gln Glu Ala Glu Arg Tyr
515 520 525

Lys Ser Glu Asp Glu Ala Asn Arg Asp Arg Val Ala Ala Lys Asn Ala
530 535 540

Leu Glu Ser Tyr Thr Tyr Asn Ile Lys Gln Thr Val Glu Asp Glu Lys
545 550 555 560

Leu Arg Gly Lys Ile Ser Glu Gln Asp Lys Asn Lys Ile Leu Asp Lys
565 570 575

Cys Gln Glu Val Ile Asn Trp Leu Asp Arg Asn Gln Met Ala Glu Lys
580 585 590

Asp Glu Tyr Glu His Lys Gln Lys Glu Leu Glu Arg Val Cys Asn Pro
595 600 605

Ile Ile Ser Lys Leu Tyr Gln Gly Gly Pro Gly Gly Gly Ser Gly Gly
610 615 620

Gly Gly Ser Gly Ala Ser Gly Gly Pro Thr Ile Glu Glu Val Asp
625 630 635

<210> 4507
<211> 211
<212> PRT
<213> Homo sapiens

<220>
<223> BAG2 (NCBI Accession: NP_004273)

<400> 4507
Met Ala Gln Ala Lys Ile Asn Ala Lys Ala Asn Glu Gly Arg Phe Cys
1 5 10 15

Arg Ser Ser Ser Met Ala Asp Arg Ser Ser Arg Leu Leu Glu Ser Leu
20 25 30

Asp Gln Leu Glu Leu Arg Val Glu Ala Leu Arg Glu Ala Ala Thr Ala
35 40 45

Val Glu Gln Glu Lys Glu Ile Leu Leu Glu Met Ile His Ser Ile Gln
50 55 60

Asn Ser Gln Asp Met Arg Gln Ile Ser Asp Gly Glu Arg Glu Glu Leu
65 70 75 80

Asn Leu Thr Ala Asn Arg Leu Met Gly Arg Thr Leu Thr Val Glu Val
85 90 95

```
Ser Val Glu Thr Ile Arg Asn Pro Gln Gln Gln Glu Ser Leu Lys His
            100                 105                 110

Ala Thr Arg Ile Ile Asp Glu Val Val Asn Lys Phe Leu Asp Asp Leu
        115                 120                 125

Gly Asn Ala Lys Ser His Leu Met Ser Leu Tyr Ser Ala Cys Ser Ser
    130                 135                 140

Glu Val Pro His Gly Pro Val Asp Gln Lys Phe Gln Ser Ile Val Ile
145                 150                 155                 160

Gly Cys Ala Leu Glu Asp Gln Lys Lys Ile Lys Arg Arg Leu Glu Thr
                165                 170                 175

Leu Leu Arg Asn Ile Glu Asn Ser Asp Lys Ala Ile Lys Leu Leu Glu
            180                 185                 190

His Ser Lys Gly Ala Gly Ser Lys Thr Leu Gln Gln Asn Ala Glu Ser
        195                 200                 205

Arg Phe Asn
    210
```

<210> 4508
<211> 352
<212> PRT
<213> Homo sapiens

<220>
<223> CXCR4 (NCBI Accession: NP_003458)

<400> 4508

```
Met Glu Gly Ile Ser Ile Tyr Thr Ser Asp Asn Tyr Thr Glu Glu Met
1               5                   10                  15

Gly Ser Gly Asp Tyr Asp Ser Met Lys Glu Pro Cys Phe Arg Glu Glu
            20                  25                  30

Asn Ala Asn Phe Asn Lys Ile Phe Leu Pro Thr Ile Tyr Ser Ile Ile
        35                  40                  45

Phe Leu Thr Gly Ile Val Gly Asn Gly Leu Val Ile Leu Val Met Gly
    50                  55                  60

Tyr Gln Lys Lys Leu Arg Ser Met Thr Asp Lys Tyr Arg Leu His Leu
65                  70                  75                  80

Ser Val Ala Asp Leu Leu Phe Val Ile Thr Leu Pro Phe Trp Ala Val
                85                  90                  95

Asp Ala Val Ala Asn Trp Tyr Phe Gly Asn Phe Leu Cys Lys Ala Val
            100                 105                 110
```

```
His Val Ile Tyr Thr Val Asn Leu Tyr Ser Ser Val Leu Ile Leu Ala
        115                 120                 125

Phe Ile Ser Leu Asp Arg Tyr Leu Ala Ile Val His Ala Thr Asn Ser
    130                 135                 140

Gln Arg Pro Arg Lys Leu Leu Ala Glu Lys Val Val Tyr Val Gly Val
145                 150                 155                 160

Trp Ile Pro Ala Leu Leu Leu Thr Ile Pro Asp Phe Ile Phe Ala Asn
                165                 170                 175

Val Ser Glu Ala Asp Asp Arg Tyr Ile Cys Asp Arg Phe Tyr Pro Asn
            180                 185                 190

Asp Leu Trp Val Val Val Phe Gln Phe Gln His Ile Met Val Gly Leu
        195                 200                 205

Ile Leu Pro Gly Ile Val Ile Leu Ser Cys Tyr Cys Ile Ile Ile Ser
    210                 215                 220

Lys Leu Ser His Ser Lys Gly His Gln Lys Arg Lys Ala Leu Lys Thr
225                 230                 235                 240

Thr Val Ile Leu Ile Leu Ala Phe Phe Ala Cys Trp Leu Pro Tyr Tyr
                245                 250                 255

Ile Gly Ile Ser Ile Asp Ser Phe Ile Leu Leu Glu Ile Ile Lys Gln
            260                 265                 270

Gly Cys Glu Phe Glu Asn Thr Val His Lys Trp Ile Ser Ile Thr Glu
        275                 280                 285

Ala Leu Ala Phe Phe His Cys Cys Leu Asn Pro Ile Leu Tyr Ala Phe
    290                 295                 300

Leu Gly Ala Lys Phe Lys Thr Ser Ala Gln His Ala Leu Thr Ser Val
305                 310                 315                 320

Ser Arg Gly Ser Ser Leu Lys Ile Leu Ser Lys Gly Lys Arg Gly Gly
                325                 330                 335

His Ser Ser Val Ser Thr Glu Ser Glu Ser Ser Ser Phe His Ser Ser
            340                 345                 350
```

<210> 4509
<211> 205
<212> PRT
<213> Homo sapiens

<220>
<223> LINC00242 (NCBI Accession: NR_026781)

<400> 4509
Met Met Pro Arg His Leu Leu Pro His Ser Gly Ile Thr Ser Leu Arg
1   5   10   15

Arg Val Pro Arg Arg Arg Leu Pro Ser Arg Arg Arg Glu Asp Phe Arg
            20   25   30

Arg Phe Leu Phe Leu Ser Phe Val Ser Thr Asp Lys Asp Gly Asp Pro
        35   40   45

Thr Gly Gln Ala Ser Pro Ala Val Pro Val Pro His Phe Thr Thr Trp
    50   55   60

Gly Ser Leu Ile Pro Ile Asp Ser Gln Arg Asn Lys Glu Arg Thr Arg
65   70   75   80

Phe Thr Trp Met Asp Gly Pro Pro His Gly Gly Leu Gly Thr Arg Phe
                85   90   95

Ser Gly Arg Gly Ser Ala Ser Leu Thr Ala Pro Pro Gly Arg Cys Phe
            100   105   110

Thr Arg Glu Arg His Pro Val Pro Arg Gln Arg Lys Cys Arg Arg Gln
        115   120   125

His Ser Thr Gly Arg Lys Pro His Cys Gly Thr Arg Ser Ala Ala Pro
    130   135   140

Arg Asn Pro Lys Ser Ile His Lys Arg Ser Phe Ser Ala Lys Ser Leu
145   150   155   160

Lys Asn Lys Thr Arg Asn Glu Ser Pro Pro Val Ser Ala Leu Val Ser
                165   170   175

Arg Thr Lys Thr Gln Pro Gly Gln Leu His Phe Cys Cys Gln Pro Ser
            180   185   190

Ser Ser Gln Ala Pro Ala Ser Arg Arg Ala Lys Gly Arg
        195   200   205

<210> 4510
<211> 794
<212> PRT
<213> Homo sapiens

<220>
<223> STAT5A (NCBI Accession: NP_003143)

<400> 4510
Met Ala Gly Trp Ile Gln Ala Gln Gln Leu Gln Gly Asp Ala Leu Arg
1   5   10   15

Gln Met Gln Val Leu Tyr Gly Gln His Phe Pro Ile Glu Val Arg His
            20   25   30

```
Tyr Leu Ala Gln Trp Ile Glu Ser Gln Pro Trp Asp Ala Ile Asp Leu
        35                  40                  45

Asp Asn Pro Gln Asp Arg Ala Gln Ala Thr Gln Leu Leu Glu Gly Leu
    50                  55                  60

Val Gln Glu Leu Gln Lys Lys Ala Glu His Gln Val Gly Glu Asp Gly
65                  70                  75                  80

Phe Leu Leu Lys Ile Lys Leu Gly His Tyr Ala Thr Gln Leu Gln Lys
                85                  90                  95

Thr Tyr Asp Arg Cys Pro Leu Glu Leu Val Arg Cys Ile Arg His Ile
            100                 105                 110

Leu Tyr Asn Glu Gln Arg Leu Val Arg Glu Ala Asn Asn Cys Ser Ser
        115                 120                 125

Pro Ala Gly Ile Leu Val Asp Ala Met Ser Gln Lys His Leu Gln Ile
    130                 135                 140

Asn Gln Thr Phe Glu Glu Leu Arg Leu Val Thr Gln Asp Thr Glu Asn
145                 150                 155                 160

Glu Leu Lys Lys Leu Gln Gln Thr Gln Glu Tyr Phe Ile Ile Gln Tyr
                165                 170                 175

Gln Glu Ser Leu Arg Ile Gln Ala Gln Phe Ala Gln Leu Ala Gln Leu
            180                 185                 190

Ser Pro Gln Glu Arg Leu Ser Arg Glu Thr Ala Leu Gln Gln Lys Gln
        195                 200                 205

Val Ser Leu Glu Ala Trp Leu Gln Arg Glu Ala Gln Thr Leu Gln Gln
    210                 215                 220

Tyr Arg Val Glu Leu Ala Glu Lys His Gln Lys Thr Leu Gln Leu Leu
225                 230                 235                 240

Arg Lys Gln Gln Thr Ile Ile Leu Asp Asp Glu Leu Ile Gln Trp Lys
                245                 250                 255

Arg Arg Gln Gln Leu Ala Gly Asn Gly Gly Pro Pro Glu Gly Ser Leu
            260                 265                 270

Asp Val Leu Gln Ser Trp Cys Glu Lys Leu Ala Glu Ile Ile Trp Gln
        275                 280                 285

Asn Arg Gln Gln Ile Arg Arg Ala Glu His Leu Cys Gln Gln Leu Pro
    290                 295                 300

Ile Pro Gly Pro Val Glu Glu Met Leu Ala Glu Val Asn Ala Thr Ile
305                 310                 315                 320
```

```
Thr Asp Ile Ile Ser Ala Leu Val Thr Ser Thr Phe Ile Ile Glu Lys
                325                 330                 335

Gln Pro Pro Gln Val Leu Lys Thr Gln Thr Lys Phe Ala Ala Thr Val
            340                 345                 350

Arg Leu Leu Val Gly Gly Lys Leu Asn Val His Met Asn Pro Pro Gln
        355                 360                 365

Val Lys Ala Thr Ile Ile Ser Glu Gln Gln Ala Lys Ser Leu Leu Lys
    370                 375                 380

Asn Glu Asn Thr Arg Asn Glu Cys Ser Gly Glu Ile Leu Asn Asn Cys
385                 390                 395                 400

Cys Val Met Glu Tyr His Gln Ala Thr Gly Thr Leu Ser Ala His Phe
                405                 410                 415

Arg Asn Met Ser Leu Lys Arg Ile Lys Arg Ala Asp Arg Arg Gly Ala
            420                 425                 430

Glu Ser Val Thr Glu Glu Lys Phe Thr Val Leu Phe Glu Ser Gln Phe
        435                 440                 445

Ser Val Gly Ser Asn Glu Leu Val Phe Gln Val Lys Thr Leu Ser Leu
    450                 455                 460

Pro Val Val Val Ile Val His Gly Ser Gln Asp His Asn Ala Thr Ala
465                 470                 475                 480

Thr Val Leu Trp Asp Asn Ala Phe Ala Glu Pro Gly Arg Val Pro Phe
                485                 490                 495

Ala Val Pro Asp Lys Val Leu Trp Pro Gln Leu Cys Glu Ala Leu Asn
            500                 505                 510

Met Lys Phe Lys Ala Glu Val Gln Ser Asn Arg Gly Leu Thr Lys Glu
        515                 520                 525

Asn Leu Val Phe Leu Ala Gln Lys Leu Phe Asn Asn Ser Ser Ser His
    530                 535                 540

Leu Glu Asp Tyr Ser Gly Leu Ser Val Ser Trp Ser Gln Phe Asn Arg
545                 550                 555                 560

Glu Asn Leu Pro Gly Trp Asn Tyr Thr Phe Trp Gln Trp Phe Asp Gly
                565                 570                 575

Val Met Glu Val Leu Lys Lys His His Lys Pro His Trp Asn Asp Gly
            580                 585                 590

Ala Ile Leu Gly Phe Val Asn Lys Gln Gln Ala His Asp Leu Leu Ile
        595                 600                 605
```

```
Asn Lys Pro Asp Gly Thr Phe Leu Leu Arg Phe Ser Asp Ser Glu Ile
    610                 615                 620

Gly Gly Ile Thr Ile Ala Trp Lys Phe Asp Ser Pro Glu Arg Asn Leu
625                 630                 635                 640

Trp Asn Leu Lys Pro Phe Thr Thr Arg Asp Phe Ser Ile Arg Ser Leu
                645                 650                 655

Ala Asp Arg Leu Gly Asp Leu Ser Tyr Leu Ile Tyr Val Phe Pro Asp
            660                 665                 670

Arg Pro Lys Asp Glu Val Phe Ser Lys Tyr Tyr Thr Pro Val Leu Ala
        675                 680                 685

Lys Ala Val Asp Gly Tyr Val Lys Pro Gln Ile Lys Gln Val Val Pro
    690                 695                 700

Glu Phe Val Asn Ala Ser Ala Asp Ala Gly Gly Ser Ser Ala Thr Tyr
705                 710                 715                 720

Met Asp Gln Ala Pro Ser Pro Ala Val Cys Pro Gln Ala Pro Tyr Asn
                725                 730                 735

Met Tyr Pro Gln Asn Pro Asp His Val Leu Asp Gln Asp Gly Glu Phe
            740                 745                 750

Asp Leu Asp Glu Thr Met Asp Val Ala Arg His Val Glu Glu Leu Leu
        755                 760                 765

Arg Arg Pro Met Asp Ser Leu Asp Ser Arg Leu Ser Pro Pro Ala Gly
    770                 775                 780

Leu Phe Thr Ser Ala Arg Gly Ser Leu Ser
785                 790

<210> 4511
<211> 191
<212> PRT
<213> Homo sapiens

<220>
<223> CIB1 (NCBI Accession: NP_006375)

<400> 4511
Met Gly Gly Ser Gly Ser Arg Leu Ser Lys Glu Leu Leu Ala Glu Tyr
1               5                   10                  15

Gln Asp Leu Thr Phe Leu Thr Lys Gln Glu Ile Leu Leu Ala His Arg
            20                  25                  30

Arg Phe Cys Glu Leu Leu Pro Gln Glu Gln Arg Ser Val Glu Ser Ser
        35                  40                  45
```

```
Leu Arg Ala Gln Val Pro Phe Glu Gln Ile Leu Ser Leu Pro Glu Leu
    50                  55                  60

Lys Ala Asn Pro Phe Lys Glu Arg Ile Cys Arg Val Phe Ser Thr Ser
65                  70                  75                  80

Pro Ala Lys Asp Ser Leu Ser Phe Glu Asp Phe Leu Asp Leu Leu Ser
                85                  90                  95

Val Phe Ser Asp Thr Ala Thr Pro Asp Ile Lys Ser His Tyr Ala Phe
            100                 105                 110

Arg Ile Phe Asp Phe Asp Asp Asp Gly Thr Leu Asn Arg Glu Asp Leu
        115                 120                 125

Ser Arg Leu Val Asn Cys Leu Thr Gly Glu Gly Glu Asp Thr Arg Leu
    130                 135                 140

Ser Ala Ser Glu Met Lys Gln Leu Ile Asp Asn Ile Leu Glu Glu Ser
145                 150                 155                 160

Asp Ile Asp Arg Asp Gly Thr Ile Asn Leu Ser Glu Phe Gln His Val
                165                 170                 175

Ile Ser Arg Ser Pro Asp Phe Ala Ser Ser Phe Lys Ile Val Leu
            180                 185                 190

<210> 4512
<211> 514
<212> PRT
<213> Homo sapiens

<220>
<223> TSNARE1 (NCBI Accession: NP_659440)

<400> 4512
Met Ser Tyr Gly Ser Ile Ala Arg Gly Gly Gly Leu Gly Ser Arg Gly
1               5                   10                  15

Pro Phe Gly Gly Pro Ser Arg Gln Gly Cys Gln Pro Leu Glu Cys Ala
            20                  25                  30

Arg Cys Trp Thr Glu Tyr Gly Ile Arg His Phe Pro Cys Pro Ser Pro
        35                  40                  45

Glu Ser Lys Leu Gln Asn Arg Cys Val Gly Lys Asp Gly Glu Gly Asp
    50                  55                  60

Leu Gly Pro Ala Gly Thr Pro Ile Val Pro Arg Ala Arg Lys Arg Gly
65                  70                  75                  80

Pro Gly Val Ala Pro Glu Gly Ser Arg Met Pro Glu Pro Thr Ser Ser
                85                  90                  95
```

```
Pro Thr Ile Gly Pro Arg Lys Asp Ser Ala Ala Gly Pro His Gly Arg
            100                 105                 110

Met Ala Gly Pro Ser Thr Thr Arg Ala Lys Lys Arg Lys Pro Asn Phe
        115                 120                 125

Cys Pro Gln Glu Thr Glu Val Leu Val Ser Lys Val Ser Lys His His
    130                 135                 140

Gln Leu Leu Phe Gly Thr Gly Leu Leu Lys Ala Glu Pro Thr Arg Arg
145                 150                 155                 160

Tyr Arg Val Trp Ser Arg Ile Leu Gln Ala Val Asn Ala Leu Gly Tyr
                165                 170                 175

Cys Arg Arg Asp Val Val Asp Leu Lys His Lys Trp Arg Asp Leu Arg
            180                 185                 190

Ala Val Val Arg Arg Lys Leu Gly Asp Leu Arg Lys Ala Ala His Gly
        195                 200                 205

Pro Ser Pro Gly Ser Gly Lys Pro Gln Ala Leu Ala Leu Thr Pro Val
    210                 215                 220

Glu Gln Val Val Ala Lys Thr Phe Ser Cys Gln Ala Leu Pro Ser Glu
225                 230                 235                 240

Gly Phe Ser Leu Glu Pro Pro Arg Ala Thr Gln Val Asp Pro Cys Asn
                245                 250                 255

Leu Gln Glu Leu Phe Gln Glu Met Ser Ala Asn Val Phe Arg Ile Asn
            260                 265                 270

Ser Ser Val Thr Ser Leu Glu Arg Ser Leu Gln Ser Leu Gly Thr Pro
        275                 280                 285

Ser Asp Thr Gln Glu Leu Arg Asp Ser Leu His Thr Ala Gln Gln Glu
    290                 295                 300

Thr Asn Lys Thr Ile Ala Ala Ser Ala Ser Ser Val Lys Gln Met Ala
305                 310                 315                 320

Glu Leu Leu Arg Ser Ser Cys Pro Gln Glu Arg Leu Gln Gln Glu Arg
                325                 330                 335

Pro Gln Leu Asp Arg Leu Lys Thr Gln Leu Ser Asp Ala Ile Gln Cys
            340                 345                 350

Tyr Gly Val Val Gln Lys Lys Ile Ala Glu Lys Ser Arg Ala Leu Leu
        355                 360                 365

Pro Met Ala Gln Arg Gly Ser Lys Gln Gln Ser Pro Gln Ala Pro Phe
    370                 375                 380
```

```
Ala Glu Leu Ala Asp Asp Glu Lys Val Phe Asn Gly Ser Asp Asn Met
385                 390                 395                 400

Trp Gln Gly Gln Glu Gln Ala Leu Leu Pro Asp Ile Thr Glu Glu Asp
                405                 410                 415

Leu Glu Ala Ile Arg Leu Arg Glu Glu Ala Ile Leu Gln Met Glu Ser
            420                 425                 430

Asn Leu Leu Asp Val Asn Gln Ile Ile Lys Asp Leu Ala Ser Met Val
        435                 440                 445

Ser Glu Gln Gly Glu Ala Val Asp Ser Ile Glu Ala Ser Leu Glu Ala
    450                 455                 460

Ala Ser Ser His Ala Glu Ala Ala Arg Gln Leu Leu Ala Gly Ala Ser
465                 470                 475                 480

Arg His Gln Leu Gln Arg His Lys Ile Lys Cys Cys Phe Leu Ser Ala
                485                 490                 495

Gly Val Thr Ala Leu Leu Val Ile Ile Ile Ile Ile Ala Thr Ser Val
            500                 505                 510

Arg Lys


<210> 4513
<211> 278
<212> PRT
<213> Homo sapiens

<220>
<223> HAUS1 (NCBI Accession: NP_612452)

<400> 4513
Met Glu Pro Gln Glu Glu Arg Glu Thr Gln Val Ala Ala Trp Leu Lys
1               5                   10                  15

Lys Ile Phe Gly Asp His Pro Ile Pro Gln Tyr Glu Val Asn Pro Arg
            20                  25                  30

Thr Thr Glu Ile Leu His His Leu Ser Glu Arg Asn Arg Val Arg Asp
        35                  40                  45

Arg Asp Val Tyr Leu Val Ile Glu Asp Leu Lys Gln Lys Ala Ser Glu
    50                  55                  60

Tyr Glu Ser Glu Ala Lys Tyr Leu Gln Asp Leu Leu Met Glu Ser Val
65                  70                  75                  80

Asn Phe Ser Pro Ala Asn Leu Ser Ser Thr Gly Ser Arg Tyr Leu Asn
                85                  90                  95
```

```
Ala Leu Val Asp Ser Ala Val Ala Leu Glu Thr Lys Asp Thr Ser Leu
            100                 105                 110

Ala Ser Phe Ile Pro Ala Val Asn Asp Leu Thr Ser Asp Leu Phe Arg
        115                 120                 125

Thr Lys Ser Lys Ser Glu Glu Ile Lys Ile Glu Leu Glu Lys Leu Glu
    130                 135                 140

Lys Asn Leu Thr Ala Thr Leu Val Leu Glu Lys Cys Leu Gln Glu Asp
145                 150                 155                 160

Val Lys Lys Ala Glu Leu His Leu Ser Thr Glu Arg Ala Lys Val Asp
                165                 170                 175

Asn Arg Arg Gln Asn Met Asp Phe Leu Lys Ala Lys Ser Glu Glu Phe
            180                 185                 190

Arg Phe Gly Ile Lys Ala Ala Glu Glu Gln Leu Ser Ala Arg Gly Met
        195                 200                 205

Asp Ala Ser Leu Ser His Gln Ser Leu Val Ala Leu Ser Glu Lys Leu
    210                 215                 220

Ala Arg Leu Lys Gln Gln Thr Ile Pro Leu Lys Lys Lys Leu Glu Ser
225                 230                 235                 240

Tyr Leu Asp Leu Met Pro Asn Pro Ser Leu Ala Gln Val Lys Ile Glu
                245                 250                 255

Glu Ala Lys Arg Glu Leu Asp Ser Ile Glu Ala Glu Leu Thr Arg Arg
            260                 265                 270

Val Asp Met Met Glu Leu
        275

<210> 4514
<211> 177
<212> PRT
<213> Homo sapiens

<220>
<223> DYDC1 (NCBI Accession: XP_011537637)

<400> 4514
Met Glu Ser Ile Tyr Leu Gln Lys His Leu Gly Ala Cys Leu Thr Gln
1               5                   10                  15

Gly Leu Ala Glu Val Ala Arg Val Arg Pro Val Asp Pro Ile Glu Tyr
            20                  25                  30

Leu Ala Leu Trp Ile Tyr Lys Tyr Lys Glu Asn Val Thr Met Glu Gln
        35                  40                  45
```

```
Leu Arg Gln Lys Glu Met Ala Lys Leu Glu Arg Glu Arg Glu Leu Ala
    50                  55                  60

Leu Met Glu Gln Glu Met Met Glu Arg Leu Lys Ala Glu Glu Leu Leu
65                  70                  75                  80

Leu Gln Gln Gln Gln Leu Ala Leu Gln Leu Glu Leu Glu Met Gln Glu
                85                  90                  95

Lys Glu Arg Gln Arg Ile Gln Glu Leu Gln Arg Ala Gln Glu Gln Leu
            100                 105                 110

Gly Lys Glu Met Arg Met Asn Met Glu Asn Leu Val Arg Asn Glu Asp
        115                 120                 125

Ile Leu His Ser Glu Glu Ala Thr Leu Asp Ser Gly Lys Thr Leu Ala
    130                 135                 140

Glu Ile Ser Asp Arg Tyr Gly Ala Pro Asn Leu Ser Arg Val Glu Glu
145                 150                 155                 160

Leu Asp Glu Pro Met Phe Ser Asp Ile Ala Leu Asn Ile Asp Gln Asp
                165                 170                 175

Leu
```

<210> 4515
<211> 412
<212> PRT
<213> Homo sapiens

<220>
<223> TGFB3 (NCBI Accession: NP_003230.)

```
<400> 4515
Met Lys Met His Leu Gln Arg Ala Leu Val Val Leu Ala Leu Leu Asn
1               5                   10                  15

Phe Ala Thr Val Ser Leu Ser Leu Ser Thr Cys Thr Thr Leu Asp Phe
            20                  25                  30

Gly His Ile Lys Lys Lys Arg Val Glu Ala Ile Arg Gly Gln Ile Leu
        35                  40                  45

Ser Lys Leu Arg Leu Thr Ser Pro Pro Glu Pro Thr Val Met Thr His
    50                  55                  60

Val Pro Tyr Gln Val Leu Ala Leu Tyr Asn Ser Thr Arg Glu Leu Leu
65                  70                  75                  80

Glu Glu Met His Gly Glu Arg Glu Glu Gly Cys Thr Gln Glu Asn Thr
                85                  90                  95
```

```
Glu Ser Glu Tyr Tyr Ala Lys Glu Ile His Lys Phe Asp Met Ile Gln
            100                 105                 110

Gly Leu Ala Glu His Asn Glu Leu Ala Val Cys Pro Lys Gly Ile Thr
        115                 120                 125

Ser Lys Val Phe Arg Phe Asn Val Ser Ser Val Glu Lys Asn Arg Thr
    130                 135                 140

Asn Leu Phe Arg Ala Glu Phe Arg Val Leu Arg Val Pro Asn Pro Ser
145                 150                 155                 160

Ser Lys Arg Asn Glu Gln Arg Ile Glu Leu Phe Gln Ile Leu Arg Pro
                165                 170                 175

Asp Glu His Ile Ala Lys Gln Arg Tyr Ile Gly Gly Lys Asn Leu Pro
            180                 185                 190

Thr Arg Gly Thr Ala Glu Trp Leu Ser Phe Asp Val Thr Asp Thr Val
        195                 200                 205

Arg Glu Trp Leu Leu Arg Arg Glu Ser Asn Leu Gly Leu Glu Ile Ser
    210                 215                 220

Ile His Cys Pro Cys His Thr Phe Gln Pro Asn Gly Asp Ile Leu Glu
225                 230                 235                 240

Asn Ile His Glu Val Met Glu Ile Lys Phe Lys Gly Val Asp Asn Glu
                245                 250                 255

Asp Asp His Gly Arg Gly Asp Leu Gly Arg Leu Lys Lys Gln Lys Asp
            260                 265                 270

His His Asn Pro His Leu Ile Leu Met Met Ile Pro Pro His Arg Leu
        275                 280                 285

Asp Asn Pro Gly Gln Gly Gly Gln Arg Lys Lys Arg Ala Leu Asp Thr
    290                 295                 300

Asn Tyr Cys Phe Arg Asn Leu Glu Glu Asn Cys Cys Val Arg Pro Leu
305                 310                 315                 320

Tyr Ile Asp Phe Arg Gln Asp Leu Gly Trp Lys Trp Val His Glu Pro
                325                 330                 335

Lys Gly Tyr Tyr Ala Asn Phe Cys Ser Gly Pro Cys Pro Tyr Leu Arg
            340                 345                 350

Ser Ala Asp Thr Thr His Ser Thr Val Leu Gly Leu Tyr Asn Thr Leu
        355                 360                 365

Asn Pro Glu Ala Ser Ala Ser Pro Cys Cys Val Pro Gln Asp Leu Glu
    370                 375                 380
```

```
Pro Leu Thr Ile Leu Tyr Tyr Val Gly Arg Thr Pro Lys Val Glu Gln
385                 390                 395                 400

Leu Ser Asn Met Val Val Lys Ser Cys Lys Cys Ser
                405                 410
```

<210> 4516
<211> 263
<212> PRT
<213> Homo sapiens

<220>
<223> CTRB2 (NCBI Accession: NP_001020371)

<400> 4516

```
Met Ala Phe Leu Trp Leu Leu Ser Cys Trp Ala Leu Leu Gly Thr Thr
1               5                   10                  15

Phe Gly Cys Gly Val Pro Ala Ile His Pro Val Leu Ser Gly Leu Ser
            20                  25                  30

Arg Ile Val Asn Gly Glu Asp Ala Val Pro Gly Ser Trp Pro Trp Gln
        35                  40                  45

Val Ser Leu Gln Asp Lys Thr Gly Phe His Phe Cys Gly Gly Ser Leu
    50                  55                  60

Ile Ser Glu Asp Trp Val Val Thr Ala Ala His Cys Gly Val Arg Thr
65                  70                  75                  80

Ser Asp Val Val Val Ala Gly Glu Phe Asp Gln Gly Ser Asp Glu Glu
                85                  90                  95

Asn Ile Gln Val Leu Lys Ile Ala Lys Val Phe Lys Asn Pro Lys Phe
            100                 105                 110

Ser Ile Leu Thr Val Asn Asn Asp Ile Thr Leu Leu Lys Leu Ala Thr
        115                 120                 125

Pro Ala Arg Phe Ser Gln Thr Val Ser Ala Val Cys Leu Pro Ser Ala
    130                 135                 140

Asp Asp Asp Phe Pro Ala Gly Thr Leu Cys Ala Thr Thr Gly Trp Gly
145                 150                 155                 160

Lys Thr Lys Tyr Asn Ala Asn Lys Thr Pro Asp Lys Leu Gln Gln Ala
                165                 170                 175

Ala Leu Pro Leu Leu Ser Asn Ala Glu Cys Lys Lys Ser Trp Gly Arg
            180                 185                 190

Arg Ile Thr Asp Val Met Ile Cys Ala Gly Ala Ser Gly Val Ser Ser
        195                 200                 205
```

```
Cys Met Gly Asp Ser Gly Gly Pro Leu Val Cys Gln Lys Asp Gly Ala
    210                 215                 220

Trp Thr Leu Val Gly Ile Val Ser Trp Gly Ser Arg Thr Cys Ser Thr
225                 230                 235                 240

Thr Thr Pro Ala Val Tyr Ala Arg Val Ala Lys Leu Ile Pro Trp Val
                245                 250                 255

Gln Lys Ile Leu Ala Ala Asn
            260
```

<210> 4517
<211> 356
<212> PRT
<213> Homo sapiens

<220>
<223> NFKBIB (NCBI Accession: NP_002494)

<400> 4517

```
Met Ala Gly Val Ala Cys Leu Gly Lys Ala Ala Asp Ala Asp Glu Trp
1               5                   10                  15

Cys Asp Ser Gly Leu Gly Ser Leu Gly Pro Asp Ala Ala Ala Pro Gly
            20                  25                  30

Gly Pro Gly Leu Gly Ala Glu Leu Gly Pro Gly Leu Ser Trp Ala Pro
        35                  40                  45

Leu Val Phe Gly Tyr Val Thr Glu Asp Gly Asp Thr Ala Leu His Leu
    50                  55                  60

Ala Val Ile His Gln His Glu Pro Phe Leu Asp Phe Leu Leu Gly Phe
65                  70                  75                  80

Ser Ala Gly Thr Glu Tyr Met Asp Leu Gln Asn Asp Leu Gly Gln Thr
                85                  90                  95

Ala Leu His Leu Ala Ala Ile Leu Gly Glu Thr Ser Thr Val Glu Lys
            100                 105                 110

Leu Tyr Ala Ala Gly Ala Gly Leu Cys Val Ala Glu Arg Arg Gly His
        115                 120                 125

Thr Ala Leu His Leu Ala Cys Arg Val Gly Ala His Ala Cys Ala Arg
    130                 135                 140

Ala Leu Leu Gln Pro Arg Pro Arg Arg Pro Arg Glu Ala Pro Asp Thr
145                 150                 155                 160

Tyr Leu Ala Gln Gly Pro Asp Arg Thr Pro Asp Thr Asn His Thr Pro
                165                 170                 175
```

```
Val Ala Leu Tyr Pro Asp Ser Asp Leu Glu Lys Glu Glu Glu Glu Ser
            180                 185                 190

Glu Glu Asp Trp Lys Leu Gln Leu Glu Ala Glu Asn Tyr Glu Gly His
        195                 200                 205

Thr Pro Leu His Val Ala Val Ile His Lys Asp Val Glu Met Val Arg
    210                 215                 220

Leu Leu Arg Asp Ala Gly Ala Asp Leu Asp Lys Pro Glu Pro Thr Cys
225                 230                 235                 240

Gly Arg Ser Pro Leu His Leu Ala Val Glu Ala Gln Ala Ala Asp Val
                245                 250                 255

Leu Glu Leu Leu Leu Arg Ala Gly Ala Asn Pro Ala Ala Arg Met Tyr
            260                 265                 270

Gly Gly Arg Thr Pro Leu Gly Ser Ala Met Leu Arg Pro Asn Pro Ile
        275                 280                 285

Leu Ala Arg Leu Leu Arg Ala His Gly Ala Pro Glu Pro Glu Gly Glu
    290                 295                 300

Asp Glu Lys Ser Gly Pro Cys Ser Ser Ser Ser Asp Ser Asp Ser Gly
305                 310                 315                 320

Asp Glu Gly Asp Glu Tyr Asp Asp Ile Val Val His Ser Ser Arg Ser
                325                 330                 335

Gln Thr Arg Leu Pro Pro Thr Pro Ala Ser Lys Pro Leu Pro Asp Asp
            340                 345                 350

Pro Arg Pro Val
        355

<210> 4518
<211> 126
<212> PRT
<213> Homo sapiens

<220>
<223> CDK2AP2 (NCBI Accession: NP_005842)

<400> 4518
Met Ser Tyr Lys Pro Ile Ala Pro Ala Pro Ser Ser Thr Pro Gly Ser
1               5                   10                  15

Ser Thr Pro Gly Pro Gly Thr Pro Val Pro Thr Gly Ser Val Pro Ser
            20                  25                  30

Pro Ser Gly Ser Val Pro Gly Ala Gly Ala Pro Phe Arg Pro Leu Phe
        35                  40                  45
```

```
Asn Asp Phe Gly Pro Pro Ser Met Gly Tyr Val Gln Ala Met Lys Pro
    50                  55                  60

Pro Gly Ala Gln Gly Ser Gln Ser Thr Tyr Thr Asp Leu Leu Ser Val
65                  70                  75                  80

Ile Glu Glu Met Gly Lys Glu Ile Arg Pro Thr Tyr Ala Gly Ser Lys
                85                  90                  95

Ser Ala Met Glu Arg Leu Lys Arg Gly Ile Ile His Ala Arg Ala Leu
            100                 105                 110

Val Arg Glu Cys Leu Ala Glu Thr Glu Arg Asn Ala Arg Thr
        115                 120                 125

<210> 4519
<211> 398
<212> PRT
<213> Homo sapiens

<220>
<223> LIPN (NCBI Accession: XP_011538385)

<400> 4519
Met Met Trp Leu Leu Leu Thr Thr Thr Cys Leu Ile Cys Gly Thr Leu
1               5                   10                  15

Asn Ala Gly Gly Phe Leu Asp Leu Glu Asn Glu Val Asn Pro Glu Val
            20                  25                  30

Trp Met Asn Thr Ser Glu Ile Ile Ile Tyr Asn Gly Tyr Pro Ser Glu
        35                  40                  45

Glu Tyr Glu Val Thr Thr Glu Asp Gly Tyr Ile Leu Leu Val Asn Arg
    50                  55                  60

Ile Pro Tyr Gly Arg Thr His Ala Arg Ser Thr Gly Pro Arg Pro Val
65                  70                  75                  80

Val Tyr Met Gln His Ala Leu Phe Ala Asp Asn Ala Tyr Trp Leu Glu
                85                  90                  95

Asn Tyr Ala Asn Gly Ser Leu Gly Phe Leu Leu Ala Asp Ala Gly Tyr
            100                 105                 110

Asp Val Trp Met Gly Asn Ser Arg Gly Asn Thr Trp Ser Arg Arg His
        115                 120                 125

Lys Thr Leu Ser Glu Thr Asp Glu Lys Phe Trp Ala Phe Ser Phe Asp
    130                 135                 140

Glu Met Ala Lys Tyr Asp Leu Pro Gly Val Ile Asp Phe Ile Val Asn
145                 150                 155                 160
```

```
Lys Thr Gly Gln Glu Lys Leu Tyr Phe Ile Gly His Ser Leu Gly Thr
                165                 170                 175

Thr Ile Gly Phe Val Ala Phe Ser Thr Met Pro Glu Leu Ala Gln Arg
            180                 185                 190

Ile Lys Met Asn Phe Ala Leu Gly Pro Thr Ile Ser Phe Lys Tyr Pro
        195                 200                 205

Thr Gly Ile Phe Thr Arg Phe Phe Leu Leu Pro Asn Ser Ile Ile Lys
    210                 215                 220

Ala Val Phe Gly Thr Lys Gly Phe Phe Leu Glu Asp Lys Lys Thr Lys
225                 230                 235                 240

Ile Ala Ser Thr Lys Ile Cys Asn Asn Lys Ile Leu Trp Leu Ile Cys
                245                 250                 255

Ser Glu Phe Met Ser Leu Trp Ala Gly Ser Asn Lys Lys Asn Met Asn
            260                 265                 270

Gln Ser Arg Met Asp Val Tyr Met Ser His Ala Pro Thr Gly Ser Ser
        275                 280                 285

Val His Asn Ile Leu His Ile Lys Gln Leu Tyr His Ser Asp Glu Phe
    290                 295                 300

Arg Ala Tyr Asp Trp Gly Asn Asp Ala Asp Asn Met Lys His Tyr Asn
305                 310                 315                 320

Gln Ser His Pro Pro Ile Tyr Asp Leu Thr Ala Met Lys Val Pro Thr
                325                 330                 335

Ala Ile Trp Ala Gly Gly His Asp Val Leu Val Thr Pro Gln Asp Val
            340                 345                 350

Ala Arg Ile Leu Pro Gln Ile Lys Ser Leu His Tyr Phe Lys Leu Leu
        355                 360                 365

Pro Asp Trp Asn His Phe Asp Phe Val Trp Gly Leu Asp Ala Pro Gln
    370                 375                 380

Arg Met Tyr Ser Glu Ile Ile Ala Leu Met Lys Ala Tyr Ser
385                 390                 395

<210> 4520
<211> 566
<212> PRT
<213> Homo sapiens

<220>
<223> RGS14 (NCBI Accession: NP_006471)
```

<400> 4520
Met Pro Gly Lys Pro Lys His Leu Gly Val Pro Asn Gly Arg Met Val
1   5   10   15

Leu Ala Val Ser Asp Gly Glu Leu Ser Ser Thr Thr Gly Pro Gln Gly
            20   25   30

Gln Gly Glu Gly Arg Gly Ser Ser Leu Ser Ile His Ser Leu Pro Ser
        35   40   45

Gly Pro Ser Ser Pro Phe Pro Thr Glu Glu Gln Pro Val Ala Ser Trp
    50   55   60

Ala Leu Ser Phe Glu Arg Leu Leu Gln Asp Pro Leu Gly Leu Ala Tyr
65   70   75   80

Phe Thr Glu Phe Leu Lys Lys Glu Phe Ser Ala Glu Asn Val Thr Phe
                85   90   95

Trp Lys Ala Cys Glu Arg Phe Gln Gln Ile Pro Ala Ser Asp Thr Gln
            100   105   110

Gln Leu Ala Gln Glu Ala Arg Asn Ile Tyr Gln Glu Phe Leu Ser Ser
        115   120   125

Gln Ala Leu Ser Pro Val Asn Ile Asp Arg Gln Ala Trp Leu Gly Glu
    130   135   140

Glu Val Leu Ala Glu Pro Arg Pro Asp Met Phe Arg Ala Gln Gln Leu
145   150   155   160

Gln Ile Phe Asn Leu Met Lys Phe Asp Ser Tyr Ala Arg Phe Val Lys
                165   170   175

Ser Pro Leu Tyr Arg Glu Cys Leu Leu Ala Glu Ala Glu Gly Arg Pro
            180   185   190

Leu Arg Glu Pro Gly Ser Ser Arg Leu Gly Ser Pro Asp Ala Thr Arg
        195   200   205

Lys Lys Pro Lys Leu Lys Pro Gly Lys Ser Leu Pro Leu Gly Val Glu
    210   215   220

Glu Leu Gly Gln Leu Pro Pro Val Glu Gly Pro Gly Gly Arg Pro Leu
225   230   235   240

Arg Lys Ser Phe Arg Arg Glu Leu Gly Gly Thr Ala Asn Ala Ala Leu
                245   250   255

Arg Arg Glu Ser Gln Gly Ser Leu Asn Ser Ser Ala Ser Leu Asp Leu
            260   265   270

Gly Phe Leu Ala Phe Val Ser Ser Lys Ser Glu Ser His Arg Lys Ser
        275   280   285

```
Leu Gly Ser Thr Glu Gly Glu Ser Glu Ser Arg Pro Gly Lys Tyr Cys
    290                 295                 300

Cys Val Tyr Leu Pro Asp Gly Thr Ala Ser Leu Ala Leu Ala Arg Pro
305                 310                 315                 320

Gly Leu Thr Ile Arg Asp Met Leu Ala Gly Ile Cys Glu Lys Arg Gly
                325                 330                 335

Leu Ser Leu Pro Asp Ile Lys Val Tyr Leu Val Gly Asn Glu Gln Ala
            340                 345                 350

Leu Val Leu Asp Gln Asp Cys Thr Val Leu Ala Asp Gln Glu Val Arg
        355                 360                 365

Leu Glu Asn Arg Ile Thr Phe Glu Leu Glu Leu Thr Ala Leu Glu Arg
    370                 375                 380

Val Val Arg Ile Ser Ala Lys Pro Thr Lys Arg Leu Gln Glu Ala Leu
385                 390                 395                 400

Gln Pro Ile Leu Glu Lys His Gly Leu Ser Pro Leu Glu Val Val Leu
                405                 410                 415

His Arg Pro Gly Glu Lys Gln Pro Leu Asp Leu Gly Lys Leu Val Ser
            420                 425                 430

Ser Val Ala Ala Gln Arg Leu Val Leu Asp Thr Leu Pro Gly Val Lys
        435                 440                 445

Ile Ser Lys Ala Arg Asp Lys Ser Pro Cys Arg Ser Gln Gly Cys Pro
    450                 455                 460

Pro Arg Thr Gln Asp Lys Ala Thr His Pro Pro Pro Ala Ser Pro Ser
465                 470                 475                 480

Ser Leu Val Lys Val Pro Ser Ser Ala Thr Gly Lys Arg Gln Thr Cys
                485                 490                 495

Asp Ile Glu Gly Leu Val Glu Leu Leu Asn Arg Val Gln Ser Ser Gly
            500                 505                 510

Ala His Asp Gln Arg Gly Leu Leu Arg Lys Glu Asp Leu Val Leu Pro
        515                 520                 525

Glu Phe Leu Gln Leu Pro Ala Gln Gly Pro Ser Ser Glu Glu Thr Pro
    530                 535                 540

Pro Gln Thr Lys Ser Ala Ala Gln Pro Ile Gly Gly Ser Leu Asn Ser
545                 550                 555                 560

Thr Thr Asp Ser Ala Leu
                565
```

<210> 4521
<211> 493
<212> PRT
<213> Homo sapiens

<220>
<223> LRRC14 (NCBI Accession: NP_001258965)

<400> 4521
Met His Thr Leu Val Phe Leu Ser Thr Arg Gln Val Leu Gln Cys Gln
1   5   10   15

Pro Ala Ala Cys Gln Ala Leu Pro Leu Leu Pro Arg Glu Leu Phe Pro
            20   25   30

Leu Leu Phe Lys Val Ala Phe Met Asp Lys Lys Thr Val Val Leu Arg
        35   40   45

Glu Leu Val His Thr Trp Pro Phe Pro Leu Leu Ser Phe Gln Gln Leu
    50   55   60

Leu Gln Glu Cys Ala His Cys Ser Arg Ala Leu Leu Gln Glu Arg Pro
65   70   75   80

Ser Thr Glu Ser Met Gln Ala Val Ile Leu Gly Leu Thr Ala Arg Leu
                85   90   95

His Thr Ser Glu Pro Gly Ala Ser Thr Gln Pro Leu Cys Arg Lys His
            100   105   110

Ala Leu Arg Val Leu Asp Met Thr Gly Leu Leu Asp Asp Gly Val Glu
        115   120   125

Gln Asp Pro Gly Thr Met Ser Met Trp Asp Cys Thr Ala Ala Val Ala
    130   135   140

Arg Thr Cys Ile Ala Gln Gln Gln Gly Gly Ala Ala Glu Pro Gly Pro
145   150   155   160

Ala Pro Ile Pro Val Glu Val Arg Val Asp Leu Arg Val Asn Arg Ala
                165   170   175

Ser Tyr Ala Phe Leu Arg Glu Ala Leu Arg Ser Ser Val Gly Ser Pro
            180   185   190

Leu Arg Leu Cys Cys Arg Asp Leu Arg Ala Glu Asp Leu Pro Met Arg
        195   200   205

Asn Thr Val Ala Leu Leu Gln Leu Leu Asp Ala Gly Cys Leu Arg Arg
    210   215   220

Val Asp Leu Arg Phe Asn Asn Leu Gly Leu Arg Gly Leu Ser Val Ile
225   230   235   240

```
Ile Pro His Val Ala Arg Phe Gln His Leu Ala Ser Leu Arg Leu His
                245                 250                 255

Tyr Val His Gly Asp Ser Arg Gln Pro Ser Val Asp Gly Glu Asp Asn
            260                 265                 270

Phe Arg Tyr Phe Leu Ala Gln Met Gly Arg Phe Thr Cys Leu Arg Glu
        275                 280                 285

Leu Ser Met Gly Ser Ser Leu Leu Ser Gly Arg Leu Asp Gln Leu Leu
    290                 295                 300

Ser Thr Leu Gln Ser Pro Leu Glu Ser Leu Glu Leu Ala Phe Cys Ala
305                 310                 315                 320

Leu Leu Pro Glu Asp Leu Arg Phe Leu Ala Arg Ser Pro His Ala Ala
                325                 330                 335

His Leu Lys Lys Leu Asp Leu Ser Gly Asn Asp Leu Ser Gly Ser Gln
            340                 345                 350

Leu Ala Pro Phe Gln Gly Leu Leu Gln Ala Ser Ala Ala Thr Leu Leu
        355                 360                 365

His Leu Glu Leu Thr Glu Cys Gln Leu Ala Asp Thr Gln Leu Leu Ala
    370                 375                 380

Thr Leu Pro Ile Leu Thr Gln Cys Ala Ser Leu Arg Tyr Leu Gly Leu
385                 390                 395                 400

Tyr Gly Asn Pro Leu Ser Met Ala Gly Leu Lys Glu Leu Leu Arg Asp
                405                 410                 415

Ser Val Ala Gln Ala Glu Leu Arg Thr Val Val His Pro Phe Pro Val
            420                 425                 430

Asp Cys Tyr Glu Gly Leu Pro Trp Pro Pro Pro Ala Ser Val Leu Leu
        435                 440                 445

Glu Ala Ser Ile Asn Glu Glu Lys Phe Ala Arg Val Glu Ala Glu Leu
    450                 455                 460

His Gln Leu Leu Leu Ala Ser Gly Arg Ala His Val Leu Trp Thr Thr
465                 470                 475                 480

Asp Ile Tyr Gly Arg Leu Ala Ala Asp Tyr Phe Ser Leu
                485                 490

<210> 4522
<211> 683
<212> PRT
<213> Homo sapiens
```

<220>
<223> TGFBI (NCBI Accession: NP_000349)

<400> 4522
Met Ala Leu Phe Val Arg Leu Leu Ala Leu Ala Leu Ala Leu Ala Leu
1   5   10   15

Gly Pro Ala Ala Thr Leu Ala Gly Pro Ala Lys Ser Pro Tyr Gln Leu
            20   25   30

Val Leu Gln His Ser Arg Leu Arg Gly Arg Gln His Gly Pro Asn Val
        35   40   45

Cys Ala Val Gln Lys Val Ile Gly Thr Asn Arg Lys Tyr Phe Thr Asn
    50   55   60

Cys Lys Gln Trp Tyr Gln Arg Lys Ile Cys Gly Lys Ser Thr Val Ile
65   70   75   80

Ser Tyr Glu Cys Cys Pro Gly Tyr Glu Lys Val Pro Gly Glu Lys Gly
                85   90   95

Cys Pro Ala Ala Leu Pro Leu Ser Asn Leu Tyr Glu Thr Leu Gly Val
            100   105   110

Val Gly Ser Thr Thr Thr Gln Leu Tyr Thr Asp Arg Thr Glu Lys Leu
        115   120   125

Arg Pro Glu Met Glu Gly Pro Gly Ser Phe Thr Ile Phe Ala Pro Ser
    130   135   140

Asn Glu Ala Trp Ala Ser Leu Pro Ala Glu Val Leu Asp Ser Leu Val
145   150   155   160

Ser Asn Val Asn Ile Glu Leu Leu Asn Ala Leu Arg Tyr His Met Val
                165   170   175

Gly Arg Arg Val Leu Thr Asp Glu Leu Lys His Gly Met Thr Leu Thr
            180   185   190

Ser Met Tyr Gln Asn Ser Asn Ile Gln Ile His His Tyr Pro Asn Gly
        195   200   205

Ile Val Thr Val Asn Cys Ala Arg Leu Leu Lys Ala Asp His His Ala
    210   215   220

Thr Asn Gly Val Val His Leu Ile Asp Lys Val Ile Ser Thr Ile Thr
225   230   235   240

Asn Asn Ile Gln Gln Ile Ile Glu Ile Glu Asp Thr Phe Glu Thr Leu
                245   250   255

Arg Ala Ala Val Ala Ala Ser Gly Leu Asn Thr Met Leu Glu Gly Asn
            260   265   270

```
Gly Gln Tyr Thr Leu Leu Ala Pro Thr Asn Glu Ala Phe Glu Lys Ile
        275                 280                 285

Pro Ser Glu Thr Leu Asn Arg Ile Leu Gly Asp Pro Glu Ala Leu Arg
    290                 295                 300

Asp Leu Leu Asn Asn His Ile Leu Lys Ser Ala Met Cys Ala Glu Ala
305                 310                 315                 320

Ile Val Ala Gly Leu Ser Val Glu Thr Leu Glu Gly Thr Thr Leu Glu
                325                 330                 335

Val Gly Cys Ser Gly Asp Met Leu Thr Ile Asn Gly Lys Ala Ile Ile
            340                 345                 350

Ser Asn Lys Asp Ile Leu Ala Thr Asn Gly Val Ile His Tyr Ile Asp
        355                 360                 365

Glu Leu Leu Ile Pro Asp Ser Ala Lys Thr Leu Phe Glu Leu Ala Ala
    370                 375                 380

Glu Ser Asp Val Ser Thr Ala Ile Asp Leu Phe Arg Gln Ala Gly Leu
385                 390                 395                 400

Gly Asn His Leu Ser Gly Ser Glu Arg Leu Thr Leu Leu Ala Pro Leu
                405                 410                 415

Asn Ser Val Phe Lys Asp Gly Thr Pro Pro Ile Asp Ala His Thr Arg
            420                 425                 430

Asn Leu Leu Arg Asn His Ile Ile Lys Asp Gln Leu Ala Ser Lys Tyr
        435                 440                 445

Leu Tyr His Gly Gln Thr Leu Glu Thr Leu Gly Gly Lys Lys Leu Arg
    450                 455                 460

Val Phe Val Tyr Arg Asn Ser Leu Cys Ile Glu Asn Ser Cys Ile Ala
465                 470                 475                 480

Ala His Asp Lys Arg Gly Arg Tyr Gly Thr Leu Phe Thr Met Asp Arg
                485                 490                 495

Val Leu Thr Pro Pro Met Gly Thr Val Met Asp Val Leu Lys Gly Asp
            500                 505                 510

Asn Arg Phe Ser Met Leu Val Ala Ala Ile Gln Ser Ala Gly Leu Thr
        515                 520                 525

Glu Thr Leu Asn Arg Glu Gly Val Tyr Thr Val Phe Ala Pro Thr Asn
    530                 535                 540

Glu Ala Phe Arg Ala Leu Pro Pro Arg Glu Arg Ser Arg Leu Leu Gly
545                 550                 555                 560
```

Asp Ala Lys Glu Leu Ala Asn Ile Leu Lys Tyr His Ile Gly Asp Glu
565 570 575

Ile Leu Val Ser Gly Gly Ile Gly Ala Leu Val Arg Leu Lys Ser Leu
580 585 590

Gln Gly Asp Lys Leu Glu Val Ser Leu Lys Asn Asn Val Val Ser Val
595 600 605

Asn Lys Glu Pro Val Ala Glu Pro Asp Ile Met Ala Thr Asn Gly Val
610 615 620

Val His Val Ile Thr Asn Val Leu Gln Pro Pro Ala Asn Arg Pro Gln
625 630 635 640

Glu Arg Gly Asp Glu Leu Ala Asp Ser Ala Leu Glu Ile Phe Lys Gln
645 650 655

Ala Ser Ala Phe Ser Arg Ala Ser Gln Arg Ser Val Arg Leu Ala Pro
660 665 670

Val Tyr Gln Lys Leu Leu Glu Arg Met Lys His
675 680

<210> 4523
<211> 239
<212> PRT
<213> Homo sapiens

<220>
<223> BCL2 (NCBI Accession: NP_000624)

<400> 4523
Met Ala His Ala Gly Arg Thr Gly Tyr Asp Asn Arg Glu Ile Val Met
1 5 10 15

Lys Tyr Ile His Tyr Lys Leu Ser Gln Arg Gly Tyr Glu Trp Asp Ala
20 25 30

Gly Asp Val Gly Ala Ala Pro Pro Gly Ala Ala Pro Ala Pro Gly Ile
35 40 45

Phe Ser Ser Gln Pro Gly His Thr Pro His Pro Ala Ala Ser Arg Asp
50 55 60

Pro Val Ala Arg Thr Ser Pro Leu Gln Thr Pro Ala Ala Pro Gly Ala
65 70 75 80

Ala Ala Gly Pro Ala Leu Ser Pro Val Pro Pro Val Val His Leu Thr
85 90 95

Leu Arg Gln Ala Gly Asp Asp Phe Ser Arg Arg Tyr Arg Arg Asp Phe
100 105 110

```
Ala Glu Met Ser Ser Gln Leu His Leu Thr Pro Phe Thr Ala Arg Gly
        115                 120                 125

Arg Phe Ala Thr Val Val Glu Glu Leu Phe Arg Asp Gly Val Asn Trp
    130                 135                 140

Gly Arg Ile Val Ala Phe Phe Glu Phe Gly Gly Val Met Cys Val Glu
145                 150                 155                 160

Ser Val Asn Arg Glu Met Ser Pro Leu Val Asp Asn Ile Ala Leu Trp
                165                 170                 175

Met Thr Glu Tyr Leu Asn Arg His Leu His Thr Trp Ile Gln Asp Asn
            180                 185                 190

Gly Gly Trp Asp Ala Phe Val Glu Leu Tyr Gly Pro Ser Met Arg Pro
        195                 200                 205

Leu Phe Asp Phe Ser Trp Leu Ser Leu Lys Thr Leu Leu Ser Leu Ala
    210                 215                 220

Leu Val Gly Ala Cys Ile Thr Leu Gly Ala Tyr Leu Gly His Lys
225                 230                 235

<210> 4524
<211> 472
<212> PRT
<213> Homo sapiens

<220>
<223> DIXDC1 (NCBI Accession: NP_219493)

<400> 4524
Met Gly Gly Thr Gln Val Lys Cys Leu Thr Ser Pro Ser Pro Ile His
1               5                   10                  15

Ser Ala Lys Ser Glu Ser Ile Ile Thr Gln Ser Glu Glu Lys Ala Asp
            20                  25                  30

Phe Val Ile Ile Pro Ala Glu Gly Ile Glu Asn Arg Thr Glu Gly Thr
        35                  40                  45

Asp Ser Pro Leu Ser Arg Asp Trp Arg Pro Gly Ser Pro Gly Thr Tyr
    50                  55                  60

Leu Glu Thr Ser Trp Glu Glu Gln Leu Leu Glu Gln Gln Glu Tyr Leu
65                  70                  75                  80

Glu Lys Glu Met Glu Glu Ala Lys Lys Met Ile Ser Gly Leu Gln Ala
                85                  90                  95

Leu Leu Leu Asn Gly Ser Leu Pro Glu Asp Glu Gln Glu Arg Pro Leu
            100                 105                 110
```

```
Ala Leu Cys Glu Pro Gly Val Asn Pro Glu Glu Gln Leu Ile Ile Ile
        115                 120                 125

Gln Ser Arg Leu Asp Gln Ser Met Glu Glu Asn Gln Asp Leu Lys Lys
    130                 135                 140

Glu Leu Leu Lys Cys Lys Gln Glu Ala Arg Asn Leu Gln Gly Ile Lys
145                 150                 155                 160

Asp Ala Leu Gln Gln Arg Leu Thr Gln Gln Asp Thr Ser Val Leu Gln
                165                 170                 175

Leu Lys Gln Glu Leu Leu Arg Ala Asn Met Asp Lys Asp Glu Leu His
            180                 185                 190

Asn Gln Asn Val Asp Leu Gln Arg Lys Leu Asp Glu Arg Asn Arg Leu
        195                 200                 205

Leu Gly Glu Tyr Lys Lys Glu Leu Gly Gln Lys Asp Arg Leu Leu Gln
    210                 215                 220

Gln His Gln Ala Lys Leu Glu Glu Ala Leu Arg Lys Leu Ser Asp Val
225                 230                 235                 240

Ser Tyr His Gln Val Asp Leu Glu Arg Glu Leu Glu His Lys Asp Val
                245                 250                 255

Leu Leu Ala His Cys Met Lys Arg Glu Ala Asp Glu Ala Thr Asn Tyr
            260                 265                 270

Asn Ser His Asn Ser Gln Ser Asn Gly Phe Leu Leu Pro Thr Ala Gly
        275                 280                 285

Lys Gly Ala Thr Ser Val Ser Asn Arg Gly Thr Ser Asp Leu Gln Leu
    290                 295                 300

Val Arg Asp Ala Leu Arg Ser Leu Arg Asn Ser Phe Ser Gly His Asp
305                 310                 315                 320

Pro Gln His His Thr Ile Asp Ser Leu Glu Gln Gly Ile Ser Ser Leu
                325                 330                 335

Met Glu Arg Leu His Val Met Glu Thr Gln Lys Lys Gln Glu Arg Lys
            340                 345                 350

Val Arg Val Lys Ser Pro Arg Thr Gln Val Gly Ser Glu Tyr Arg Glu
        355                 360                 365

Ser Trp Pro Pro Asn Ser Lys Leu Pro His Ser Gln Ser Ser Pro Thr
    370                 375                 380

Val Ser Ser Thr Cys Thr Lys Val Leu Tyr Phe Thr Asp Arg Ser Leu
385                 390                 395                 400
```

```
Thr Pro Phe Met Val Asn Ile Pro Lys Arg Leu Glu Glu Val Thr Leu
                405                 410                 415

Lys Asp Phe Lys Ala Ala Ile Asp Arg Glu Gly Asn His Arg Tyr His
            420                 425                 430

Phe Lys Ala Leu Asp Pro Glu Phe Gly Thr Val Lys Glu Glu Ile Phe
        435                 440                 445

His Asp Asp Asp Ala Ile Pro Gly Trp Glu Gly Lys Ile Val Ala Trp
    450                 455                 460

Val Glu Glu Asp His Gly Glu Asn
465                 470
```

<210> 4525
<211> 278
<212> PRT
<213> Homo sapiens

<220>
<223> CASP8 (NCBI Accession: NP_001073593)

<400> 4525

```
Met Asp Phe Ser Arg Asn Leu Tyr Asp Ile Gly Glu Gln Leu Asp Ser
1               5                   10                  15

Glu Asp Leu Ala Ser Leu Lys Phe Leu Ser Leu Asp Tyr Ile Pro Gln
            20                  25                  30

Arg Lys Gln Glu Pro Ile Lys Asp Ala Leu Met Leu Phe Gln Arg Leu
        35                  40                  45

Gln Glu Lys Arg Met Leu Glu Glu Ser Asn Leu Ser Phe Leu Lys Glu
    50                  55                  60

Leu Leu Phe Arg Ile Asn Arg Leu Asp Leu Leu Ile Thr Tyr Leu Asn
65                  70                  75                  80

Thr Arg Lys Glu Glu Met Glu Arg Glu Leu Gln Thr Pro Gly Arg Ala
                85                  90                  95

Gln Ile Ser Ala Tyr Arg Val Met Leu Tyr Gln Ile Ser Glu Glu Val
            100                 105                 110

Ser Arg Ser Glu Leu Arg Ser Phe Lys Phe Leu Leu Gln Glu Glu Ile
        115                 120                 125

Ser Lys Cys Lys Leu Asp Asp Asp Met Asn Leu Leu Asp Ile Phe Ile
    130                 135                 140

Glu Met Glu Lys Arg Val Ile Leu Gly Glu Gly Lys Leu Asp Ile Leu
145                 150                 155                 160
```

```
Lys Arg Val Cys Ala Gln Ile Asn Lys Ser Leu Leu Lys Ile Ile Asn
                165                 170                 175

Asp Tyr Glu Glu Phe Ser Lys Gly Glu Glu Leu Cys Gly Val Met Thr
            180                 185                 190

Ile Ser Asp Ser Pro Arg Glu Gln Asp Ser Glu Ser Gln Thr Leu Asp
        195                 200                 205

Lys Val Tyr Gln Met Lys Ser Lys Pro Arg Gly Tyr Cys Leu Ile Ile
    210                 215                 220

Asn Asn His Asn Phe Ala Lys Ala Arg Glu Lys Val Pro Lys Leu His
225                 230                 235                 240

Ser Ile Arg Asp Arg Asn Gly Thr His Leu Asp Ala Gly Ser His Ser
                245                 250                 255

Val Ala Gln Ala Gly Val Gln Trp Cys Asp Leu Gly Ser Leu Gln Pro
            260                 265                 270

Pro Pro Pro Trp Phe Gly
        275

<210> 4526
<211> 622
<212> PRT
<213> Homo sapiens

<220>
<223> PGM2L1 (NCBI Accession: NP_775853)

<400> 4526
Met Ala Glu Asn Thr Glu Gly Asp Leu Asn Ser Asn Leu Pro His Ala
1               5                   10                  15

Pro Tyr His Thr Gly Asp Pro Gln Leu Asp Thr Ala Ile Gly Gln Trp
            20                  25                  30

Leu Arg Trp Asp Lys Asn Pro Lys Thr Lys Glu Gln Ile Glu Asn Leu
        35                  40                  45

Leu Arg Asn Gly Met Asn Lys Glu Leu Arg Asp Arg Leu Cys Cys Arg
    50                  55                  60

Met Thr Phe Gly Thr Ala Gly Leu Arg Ser Ala Met Gly Ala Gly Phe
65                  70                  75                  80

Cys Tyr Ile Asn Asp Leu Thr Val Ile Gln Ser Thr Gln Gly Met Tyr
                85                  90                  95

Lys Tyr Leu Glu Arg Cys Phe Ser Asp Phe Lys Gln Arg Gly Phe Val
            100                 105                 110
```

```
Val Gly Tyr Asp Thr Arg Gly Gln Val Thr Ser Ser Cys Ser Ser Gln
        115                 120                 125

Arg Leu Ala Lys Leu Thr Ala Ala Val Leu Leu Ala Lys Asp Val Pro
    130                 135                 140

Val Tyr Leu Phe Ser Arg Tyr Val Pro Thr Pro Phe Val Pro Tyr Ala
145                 150                 155                 160

Val Gln Lys Leu Lys Ala Val Ala Gly Val Met Ile Thr Ala Ser His
                165                 170                 175

Asn Arg Lys Glu Asp Asn Gly Tyr Lys Val Tyr Trp Glu Thr Gly Ala
            180                 185                 190

Gln Ile Thr Ser Pro His Asp Lys Glu Ile Leu Lys Cys Ile Glu Glu
        195                 200                 205

Cys Val Glu Pro Trp Asn Gly Ser Trp Asn Asp Asn Leu Val Asp Thr
    210                 215                 220

Ser Pro Leu Lys Arg Asp Pro Leu Gln Asp Ile Cys Arg Arg Tyr Met
225                 230                 235                 240

Glu Asp Leu Lys Lys Ile Cys Phe Tyr Arg Glu Leu Asn Ser Lys Thr
                245                 250                 255

Thr Leu Lys Phe Val His Thr Ser Phe His Gly Val Gly His Asp Tyr
            260                 265                 270

Val Gln Leu Ala Phe Lys Val Phe Gly Phe Lys Pro Pro Ile Pro Val
        275                 280                 285

Pro Glu Gln Lys Asp Pro Asp Pro Asp Phe Ser Thr Val Lys Cys Pro
    290                 295                 300

Asn Pro Glu Glu Gly Glu Ser Val Leu Glu Leu Ser Leu Arg Leu Ala
305                 310                 315                 320

Glu Lys Glu Asn Ala Arg Val Val Leu Ala Thr Asp Pro Asp Ala Asp
                325                 330                 335

Arg Leu Ala Ala Ala Glu Leu Gln Glu Asn Gly Cys Trp Lys Val Phe
            340                 345                 350

Thr Gly Asn Glu Leu Ala Ala Leu Phe Gly Trp Trp Met Phe Asp Cys
        355                 360                 365

Trp Lys Lys Asn Lys Ser Arg Asn Ala Asp Val Lys Asn Val Tyr Met
    370                 375                 380

Leu Ala Thr Thr Val Ser Ser Lys Ile Leu Lys Ala Ile Ala Leu Lys
385                 390                 395                 400
```

```
Glu Gly Phe His Phe Glu Glu Thr Leu Pro Gly Phe Lys Trp Ile Gly
                405                 410                 415

Ser Arg Ile Ile Asp Leu Leu Glu Asn Gly Lys Glu Val Leu Phe Ala
            420                 425                 430

Phe Glu Glu Ser Ile Gly Phe Leu Cys Gly Thr Ser Val Leu Asp Lys
        435                 440                 445

Asp Gly Val Ser Ala Ala Val Val Val Ala Glu Met Ala Ser Tyr Leu
    450                 455                 460

Glu Thr Met Asn Ile Thr Leu Lys Gln Gln Leu Val Lys Val Tyr Glu
465                 470                 475                 480

Lys Tyr Gly Tyr His Ile Ser Lys Thr Ser Tyr Phe Leu Cys Tyr Glu
                485                 490                 495

Pro Pro Thr Ile Lys Ser Ile Phe Glu Arg Leu Arg Asn Phe Asp Ser
            500                 505                 510

Pro Lys Glu Tyr Pro Lys Phe Cys Gly Thr Phe Ala Ile Leu His Val
        515                 520                 525

Arg Asp Ile Thr Thr Gly Tyr Asp Ser Ser Gln Pro Asn Lys Lys Ser
    530                 535                 540

Val Leu Pro Val Ser Lys Asn Ser Gln Met Ile Thr Phe Thr Phe Gln
545                 550                 555                 560

Asn Gly Cys Val Ala Thr Leu Arg Thr Ser Gly Thr Glu Pro Lys Ile
                565                 570                 575

Lys Tyr Tyr Ala Glu Met Cys Ala Ser Pro Asp Gln Ser Asp Thr Ala
            580                 585                 590

Leu Leu Glu Glu Glu Leu Lys Lys Leu Ile Asp Ala Leu Ile Glu Asn
        595                 600                 605

Phe Leu Gln Pro Ser Lys Asn Gly Leu Ile Trp Arg Ser Val
    610                 615                 620

<210> 4527
<211> 288
<212> PRT
<213> Homo sapiens

<220>
<223> PDCD1 (NCBI Accession: NP_005009)

<400> 4527
Met Gln Ile Pro Gln Ala Pro Trp Pro Val Val Trp Ala Val Leu Gln
1               5                   10                  15
```

```
Leu Gly Trp Arg Pro Gly Trp Phe Leu Asp Ser Pro Asp Arg Pro Trp
            20                  25                  30

Asn Pro Pro Thr Phe Ser Pro Ala Leu Leu Val Val Thr Glu Gly Asp
        35                  40                  45

Asn Ala Thr Phe Thr Cys Ser Phe Ser Asn Thr Ser Glu Ser Phe Val
    50                  55                  60

Leu Asn Trp Tyr Arg Met Ser Pro Ser Asn Gln Thr Asp Lys Leu Ala
65                  70                  75                  80

Ala Phe Pro Glu Asp Arg Ser Gln Pro Gly Gln Asp Cys Arg Phe Arg
                85                  90                  95

Val Thr Gln Leu Pro Asn Gly Arg Asp Phe His Met Ser Val Val Arg
            100                 105                 110

Ala Arg Arg Asn Asp Ser Gly Thr Tyr Leu Cys Gly Ala Ile Ser Leu
        115                 120                 125

Ala Pro Lys Ala Gln Ile Lys Glu Ser Leu Arg Ala Glu Leu Arg Val
    130                 135                 140

Thr Glu Arg Arg Ala Glu Val Pro Thr Ala His Pro Ser Pro Ser Pro
145                 150                 155                 160

Arg Pro Ala Gly Gln Phe Gln Thr Leu Val Val Gly Val Val Gly Gly
                165                 170                 175

Leu Leu Gly Ser Leu Val Leu Leu Val Trp Val Leu Ala Val Ile Cys
            180                 185                 190

Ser Arg Ala Ala Arg Gly Thr Ile Gly Ala Arg Arg Thr Gly Gln Pro
        195                 200                 205

Leu Lys Glu Asp Pro Ser Ala Val Pro Val Phe Ser Val Asp Tyr Gly
    210                 215                 220

Glu Leu Asp Phe Gln Trp Arg Glu Lys Thr Pro Glu Pro Pro Val Pro
225                 230                 235                 240

Cys Val Pro Glu Gln Thr Glu Tyr Ala Thr Ile Val Phe Pro Ser Gly
                245                 250                 255

Met Gly Thr Ser Ser Pro Ala Arg Arg Gly Ser Ala Asp Gly Pro Arg
            260                 265                 270

Ser Ala Gln Pro Leu Arg Pro Glu Asp Gly His Cys Ser Trp Pro Leu
        275                 280                 285
```

<210> 4528
<211> 328

<212> PRT
<213> Homo sapiens

<220>
<223> GRHPR (NCBI Accession: NP_036335)

<400> 4528
Met Arg Pro Val Arg Leu Met Lys Val Phe Val Thr Arg Arg Ile Pro
1   5   10   15

Ala Glu Gly Arg Val Ala Leu Ala Arg Ala Ala Asp Cys Glu Val Glu
            20   25   30

Gln Trp Asp Ser Asp Glu Pro Ile Pro Ala Lys Glu Leu Glu Arg Gly
        35   40   45

Val Ala Gly Ala His Gly Leu Leu Cys Leu Leu Ser Asp His Val Asp
    50   55   60

Lys Arg Ile Leu Asp Ala Ala Gly Ala Asn Leu Lys Val Ile Ser Thr
65   70   75   80

Met Ser Val Gly Ile Asp His Leu Ala Leu Asp Glu Ile Lys Lys Arg
                85   90   95

Gly Ile Arg Val Gly Tyr Thr Pro Asp Val Leu Thr Asp Thr Thr Ala
            100   105   110

Glu Leu Ala Val Ser Leu Leu Leu Thr Thr Cys Arg Arg Leu Pro Glu
        115   120   125

Ala Ile Glu Glu Val Lys Asn Gly Gly Trp Thr Ser Trp Lys Pro Leu
    130   135   140

Trp Leu Cys Gly Tyr Gly Leu Thr Gln Ser Thr Val Gly Ile Ile Gly
145   150   155   160

Leu Gly Arg Ile Gly Gln Ala Ile Ala Arg Arg Leu Lys Pro Phe Gly
                165   170   175

Val Gln Arg Phe Leu Tyr Thr Gly Arg Gln Pro Arg Pro Glu Glu Ala
            180   185   190

Ala Glu Phe Gln Ala Glu Phe Val Ser Thr Pro Glu Leu Ala Ala Gln
        195   200   205

Ser Asp Phe Ile Val Val Ala Cys Ser Leu Thr Pro Ala Thr Glu Gly
    210   215   220

Leu Cys Asn Lys Asp Phe Phe Gln Lys Met Lys Glu Thr Ala Val Phe
225   230   235   240

Ile Asn Ile Ser Arg Gly Asp Val Val Asn Gln Asp Asp Leu Tyr Gln
                245   250   255

```
Ala Leu Ala Ser Gly Lys Ile Ala Ala Ala Gly Leu Asp Val Thr Ser
            260                 265                 270

Pro Glu Pro Leu Pro Thr Asn His Pro Leu Leu Thr Leu Lys Asn Cys
        275                 280                 285

Val Ile Leu Pro His Ile Gly Ser Ala Thr His Arg Thr Arg Asn Thr
    290                 295                 300

Met Ser Leu Leu Ala Ala Asn Asn Leu Leu Ala Gly Leu Arg Gly Glu
305                 310                 315                 320

Pro Met Pro Ser Glu Leu Lys Leu
                325
```

<210> 4529
<211> 237
<212> PRT
<213> Homo sapiens

<220>
<223> CYB5R2 (NCBI Accession: NP_057313)

<400> 4529

```
Met Asn Ser Arg Arg Arg Glu Pro Ile Thr Leu Gln Asp Pro Glu Ala
1               5                   10                  15

Lys Tyr Pro Leu Pro Leu Ile Glu Lys Glu Lys Ile Ser His Asn Thr
            20                  25                  30

Arg Arg Phe Arg Phe Gly Leu Pro Ser Pro Asp His Val Leu Gly Leu
        35                  40                  45

Pro Val Gly Asn Tyr Val Gln Leu Leu Ala Lys Ile Asp Asn Glu Leu
    50                  55                  60

Val Val Arg Ala Tyr Thr Pro Val Ser Ser Asp Asp Asp Arg Gly Phe
65                  70                  75                  80

Val Asp Leu Ile Ile Lys Ile Tyr Phe Lys Asn Val His Pro Gln Tyr
                85                  90                  95

Pro Glu Gly Gly Lys Met Thr Gln Tyr Leu Glu Asn Met Lys Ile Gly
            100                 105                 110

Glu Thr Ile Phe Phe Arg Gly Pro Arg Gly Arg Leu Phe Tyr His Gly
        115                 120                 125

Pro Gly Asn Leu Gly Ile Arg Pro Asp Gln Thr Ser Glu Pro Lys Lys
    130                 135                 140

Thr Leu Ala Asp His Leu Gly Met Ile Ala Gly Gly Thr Gly Ile Thr
145                 150                 155                 160
```

```
Pro Met Leu Gln Leu Ile Arg His Ile Thr Lys Asp Pro Ser Asp Arg
                165                 170                 175

Thr Arg Met Ser Leu Ile Phe Ala Asn Gln Thr Glu Glu Asp Ile Leu
            180                 185                 190

Val Arg Lys Glu Leu Glu Glu Ile Ala Arg Thr His Pro Asp Gln Phe
        195                 200                 205

Asp Leu Trp Tyr Thr Leu Asp Arg Pro Pro Ile Gly Pro Trp Ser Ala
    210                 215                 220

Glu Gly Ala Thr Leu Leu Ser Asn Ser Ala Gln Phe His
225                 230                 235
```

<210> 4530
<211> 282
<212> PRT
<213> Homo sapiens

<220>
<223> ACBD6 (NCBI Accession: NP_115736)

<400> 4530

```
Met Ala Ser Ser Phe Leu Pro Ala Gly Ala Ile Thr Gly Asp Ser Gly
1               5                   10                  15

Gly Glu Leu Ser Ser Gly Asp Asp Ser Gly Glu Val Glu Phe Pro His
            20                  25                  30

Ser Pro Glu Ile Glu Glu Thr Ser Cys Leu Ala Glu Leu Phe Glu Lys
        35                  40                  45

Ala Ala Ala His Leu Gln Gly Leu Ile Gln Val Ala Ser Arg Glu Gln
    50                  55                  60

Leu Leu Tyr Leu Tyr Ala Arg Tyr Lys Gln Val Lys Val Gly Asn Cys
65                  70                  75                  80

Asn Thr Pro Lys Pro Ser Phe Phe Asp Phe Glu Gly Lys Gln Lys Trp
                85                  90                  95

Glu Ala Trp Lys Ala Leu Gly Asp Ser Ser Pro Ser Gln Ala Met Gln
            100                 105                 110

Glu Tyr Ile Ala Val Val Lys Lys Leu Asp Pro Gly Trp Asn Pro Gln
        115                 120                 125

Ile Pro Glu Lys Lys Gly Lys Glu Ala Asn Thr Gly Phe Gly Gly Pro
    130                 135                 140

Val Ile Ser Ser Leu Tyr His Glu Glu Thr Ile Arg Glu Glu Asp Lys
145                 150                 155                 160
```

```
Asn Ile Phe Asp Tyr Cys Arg Glu Asn Asn Ile Asp His Ile Thr Lys
                165                 170                 175

Ala Ile Lys Ser Lys Asn Val Asp Val Asn Val Lys Asp Glu Glu Gly
            180                 185                 190

Arg Ala Leu Leu His Trp Ala Cys Asp Arg Gly His Lys Glu Leu Val
        195                 200                 205

Thr Val Leu Leu Gln His Arg Ala Asp Ile Asn Cys Gln Asp Asn Glu
    210                 215                 220

Gly Gln Thr Ala Leu His Tyr Ala Ser Ala Cys Glu Phe Leu Asp Ile
225                 230                 235                 240

Val Glu Leu Leu Leu Gln Ser Gly Ala Asp Pro Thr Leu Arg Asp Gln
                245                 250                 255

Asp Gly Cys Leu Pro Glu Glu Val Thr Gly Cys Lys Thr Val Ser Leu
            260                 265                 270

Val Leu Gln Arg His Thr Thr Gly Lys Ala
        275                 280
```

<210> 4531
<211> 301
<212> PRT
<213> Homo sapiens

<220>
<223> PDCL (NCBI Accession: NP_005379)

<400> 4531

```
Met Thr Thr Leu Asp Asp Lys Leu Leu Gly Glu Lys Leu Gln Tyr Tyr
1               5                   10                  15

Tyr Ser Ser Ser Glu Asp Glu Asp Ser Asp His Glu Asp Lys Asp Arg
            20                  25                  30

Gly Arg Cys Ala Pro Ala Ser Ser Ser Val Pro Ala Glu Ala Glu Leu
        35                  40                  45

Ala Gly Glu Gly Ile Ser Val Asn Thr Gly Pro Lys Gly Val Ile Asn
    50                  55                  60

Asp Trp Arg Arg Phe Lys Gln Leu Glu Thr Glu Gln Arg Glu Glu Gln
65                  70                  75                  80

Cys Arg Glu Met Glu Arg Leu Ile Lys Lys Leu Ser Met Thr Cys Arg
                85                  90                  95

Ser His Leu Asp Glu Glu Glu Glu Gln Gln Lys Gln Lys Asp Leu Gln
            100                 105                 110
```

```
Glu Lys Ile Ser Gly Lys Met Thr Leu Lys Glu Phe Ala Ile Met Asn
        115                 120                 125

Glu Asp Gln Asp Asp Glu Glu Phe Leu Gln Gln Tyr Arg Lys Gln Arg
    130                 135                 140

Met Glu Glu Met Arg Gln Gln Leu His Lys Gly Pro Gln Phe Lys Gln
145                 150                 155                 160

Val Phe Glu Ile Ser Ser Gly Glu Gly Phe Leu Asp Met Ile Asp Lys
                165                 170                 175

Glu Gln Lys Ser Ile Val Ile Met Val His Ile Tyr Glu Asp Gly Ile
            180                 185                 190

Pro Gly Thr Glu Ala Met Asn Gly Cys Met Ile Cys Leu Ala Ala Glu
        195                 200                 205

Tyr Pro Ala Val Lys Phe Cys Lys Val Lys Ser Ser Val Ile Gly Ala
    210                 215                 220

Ser Ser Gln Phe Thr Arg Asn Ala Leu Pro Ala Leu Leu Ile Tyr Lys
225                 230                 235                 240

Gly Gly Glu Leu Ile Gly Asn Phe Val Arg Val Thr Asp Gln Leu Gly
                245                 250                 255

Asp Asp Phe Phe Ala Val Asp Leu Glu Ala Phe Leu Gln Glu Phe Gly
            260                 265                 270

Leu Leu Pro Glu Lys Glu Val Leu Val Leu Thr Ser Val Arg Asn Ser
        275                 280                 285

Ala Thr Cys His Ser Glu Asp Ser Asp Leu Glu Ile Asp
    290                 295                 300

<210> 4532
<211> 599
<212> PRT
<213> Homo sapiens

<220>
<223> DDX52 (NCBI Accession: NP_001278405)

<400> 4532
Met Asp Val His Asp Leu Phe Arg Arg Leu Gly Ala Gly Ala Lys Phe
1               5                   10                  15

Asp Thr Arg Arg Phe Ser Ala Asp Ala Ala Arg Phe Gln Ile Gly Lys
            20                  25                  30

Arg Lys Tyr Asp Phe Asp Ser Ser Glu Val Leu Gln Gly Leu Asp Phe
        35                  40                  45
```

```
Phe Gly Asn Lys Lys Ser Val Pro Gly Val Cys Gly Ala Ser Gln Thr
    50                  55                  60

His Gln Lys Pro Gln Asn Gly Glu Lys Lys Glu Glu Ser Leu Thr Glu
65                  70                  75                  80

Arg Lys Arg Glu Gln Ser Lys Lys Lys Arg Lys Thr Met Thr Ser Glu
                85                  90                  95

Ile Ala Ser Gln Glu Glu Gly Ala Thr Ile Gln Trp Met Ser Ser Val
            100                 105                 110

Glu Ala Lys Ile Glu Asp Lys Lys Val Gln Arg Glu Ser Lys Leu Thr
        115                 120                 125

Ser Gly Lys Leu Glu Asn Leu Arg Lys Glu Lys Ile Asn Phe Leu Arg
    130                 135                 140

Asn Lys His Lys Ile His Val Gln Gly Thr Asp Leu Pro Asp Pro Ile
145                 150                 155                 160

Ala Thr Phe Gln Gln Leu Asp Gln Glu Tyr Lys Ile Asn Ser Arg Leu
                165                 170                 175

Leu Gln Asn Ile Leu Asp Ala Gly Phe Gln Met Pro Thr Pro Ile Gln
            180                 185                 190

Met Gln Ala Ile Pro Val Met Leu His Gly Arg Glu Leu Leu Ala Ser
        195                 200                 205

Ala Pro Thr Gly Ser Gly Lys Thr Leu Ala Phe Ser Ile Pro Ile Leu
    210                 215                 220

Met Gln Leu Lys Gln Pro Ala Asn Lys Gly Phe Arg Ala Leu Ile Ile
225                 230                 235                 240

Ser Pro Thr Arg Glu Leu Ala Ser Gln Ile His Arg Glu Leu Ile Lys
                245                 250                 255

Ile Ser Glu Gly Thr Gly Phe Arg Ile His Met Ile His Lys Ala Ala
            260                 265                 270

Val Ala Ala Lys Lys Phe Gly Pro Lys Ser Ser Lys Lys Phe Asp Ile
        275                 280                 285

Leu Val Thr Thr Pro Asn Arg Leu Ile Tyr Leu Leu Lys Gln Asp Pro
    290                 295                 300

Pro Gly Ile Asp Leu Ala Ser Val Glu Trp Leu Val Val Asp Glu Ser
305                 310                 315                 320

Asp Lys Leu Phe Glu Asp Gly Lys Thr Gly Phe Arg Asp Gln Leu Ala
                325                 330                 335
```

```
Ser Ile Phe Leu Ala Cys Thr Ser His Lys Val Arg Arg Ala Met Phe
            340                 345                 350

Ser Ala Thr Phe Ala Tyr Asp Val Glu Gln Trp Cys Lys Leu Asn Leu
        355                 360                 365

Asp Asn Val Ile Ser Val Ser Ile Gly Ala Arg Asn Ser Ala Val Glu
    370                 375                 380

Thr Val Glu Gln Glu Leu Leu Phe Val Gly Ser Glu Thr Gly Lys Leu
385                 390                 395                 400

Leu Ala Val Arg Glu Leu Val Lys Lys Gly Phe Asn Pro Pro Val Leu
                405                 410                 415

Val Phe Val Gln Ser Ile Glu Arg Ala Lys Glu Leu Phe His Glu Leu
            420                 425                 430

Ile Tyr Glu Gly Ile Asn Val Asp Val Ile His Ala Glu Arg Thr Gln
        435                 440                 445

Gln Gln Arg Asp Asn Thr Val His Ser Phe Arg Ala Gly Lys Ile Trp
    450                 455                 460

Val Leu Ile Cys Thr Ala Leu Leu Ala Arg Gly Ile Asp Phe Lys Gly
465                 470                 475                 480

Val Asn Leu Val Ile Asn Tyr Asp Phe Pro Thr Ser Ser Val Glu Tyr
                485                 490                 495

Ile His Arg Ile Gly Arg Thr Gly Arg Ala Gly Asn Lys Gly Lys Ala
            500                 505                 510

Ile Thr Phe Phe Thr Glu Asp Asp Lys Pro Leu Leu Arg Ser Val Ala
        515                 520                 525

Asn Val Ile Gln Gln Ala Gly Cys Pro Val Pro Glu Tyr Ile Lys Gly
    530                 535                 540

Phe Gln Lys Leu Leu Ser Lys Gln Lys Lys Lys Met Ile Lys Lys Pro
545                 550                 555                 560

Leu Glu Arg Glu Ser Ile Ser Thr Thr Pro Lys Cys Phe Leu Glu Lys
                565                 570                 575

Ala Lys Asp Lys Gln Lys Lys Val Thr Gly Gln Asn Ser Lys Lys Lys
            580                 585                 590

Val Ala Leu Glu Asp Lys Ser
        595
```

<210> 4533
<211> 362

<212> PRT
<213> Homo sapiens

<220>
<223> GPR4 (NCBI Accession: NP_005273)

<400> 4533
Met Gly Asn His Thr Trp Glu Gly Cys His Val Asp Ser Arg Val Asp
1   5   10   15

His Leu Phe Pro Pro Ser Leu Tyr Ile Phe Val Ile Gly Val Gly Leu
            20   25   30

Pro Thr Asn Cys Leu Ala Leu Trp Ala Ala Tyr Arg Gln Val Gln Gln
        35   40   45

Arg Asn Glu Leu Gly Val Tyr Leu Met Asn Leu Ser Ile Ala Asp Leu
    50   55   60

Leu Tyr Ile Cys Thr Leu Pro Leu Trp Val Asp Tyr Phe Leu His His
65   70   75   80

Asp Asn Trp Ile His Gly Pro Gly Ser Cys Lys Leu Phe Gly Phe Ile
                85   90   95

Phe Tyr Thr Asn Ile Tyr Ile Ser Ile Ala Phe Leu Cys Cys Ile Ser
            100   105   110

Val Asp Arg Tyr Leu Ala Val Ala His Pro Leu Arg Phe Ala Arg Leu
        115   120   125

Arg Arg Val Lys Thr Ala Val Ala Val Ser Ser Val Val Trp Ala Thr
    130   135   140

Glu Leu Gly Ala Asn Ser Ala Pro Leu Phe His Asp Glu Leu Phe Arg
145   150   155   160

Asp Arg Tyr Asn His Thr Phe Cys Phe Glu Lys Phe Pro Met Glu Gly
                165   170   175

Trp Val Ala Trp Met Asn Leu Tyr Arg Val Phe Val Gly Phe Leu Phe
            180   185   190

Pro Trp Ala Leu Met Leu Leu Ser Tyr Arg Gly Ile Leu Arg Ala Val
        195   200   205

Arg Gly Ser Val Ser Thr Glu Arg Gln Glu Lys Ala Lys Ile Lys Arg
    210   215   220

Leu Ala Leu Ser Leu Ile Ala Ile Val Leu Val Cys Phe Ala Pro Tyr
225   230   235   240

His Val Leu Leu Leu Ser Arg Ser Ala Ile Tyr Leu Gly Arg Pro Trp
                245   250   255

```
Asp Cys Gly Phe Glu Glu Arg Val Phe Ser Ala Tyr His Ser Ser Leu
            260                 265                 270

Ala Phe Thr Ser Leu Asn Cys Val Ala Asp Pro Ile Leu Tyr Cys Leu
        275                 280                 285

Val Asn Glu Gly Ala Arg Ser Asp Val Ala Lys Ala Leu His Asn Leu
    290                 295                 300

Leu Arg Phe Leu Ala Ser Asp Lys Pro Gln Glu Met Ala Asn Ala Ser
305                 310                 315                 320

Leu Thr Leu Glu Thr Pro Leu Thr Ser Lys Arg Asn Ser Thr Ala Lys
                325                 330                 335

Ala Met Thr Gly Ser Trp Ala Ala Thr Pro Pro Ser Gln Gly Asp Gln
            340                 345                 350

Val Gln Leu Lys Met Leu Pro Pro Ala Gln
        355                 360

<210> 4534
<211> 116
<212> PRT
<213> Homo sapiens

<220>
<223> GAGE2A (NCBI Accession: NP_001120684)

<400> 4534
Met Ser Trp Arg Gly Arg Ser Thr Tyr Arg Pro Arg Pro Arg Arg Tyr
1               5                   10                  15

Val Glu Pro Pro Glu Met Ile Gly Pro Met Arg Pro Glu Gln Phe Ser
            20                  25                  30

Asp Glu Val Glu Pro Ala Thr Pro Glu Glu Gly Glu Pro Ala Thr Gln
        35                  40                  45

Arg Gln Asp Pro Ala Ala Ala Gln Glu Gly Gln Asp Glu Gly Ala Ser
    50                  55                  60

Ala Gly Gln Gly Pro Lys Pro Glu Ala His Ser Gln Glu Gln Gly His
65                  70                  75                  80

Pro Gln Thr Gly Cys Glu Cys Glu Asp Gly Pro Asp Gly Gln Glu Met
                85                  90                  95

Asp Pro Pro Asn Pro Glu Glu Val Lys Thr Pro Glu Glu Gly Glu Lys
            100                 105                 110

Gln Ser Gln Cys
        115
```

<210> 4535
<211> 210
<212> PRT
<213> Homo sapiens

<220>
<223> POLR2E (NCBI Accession: NP_002686)

<400> 4535
Met Asp Asp Glu Glu Glu Thr Tyr Arg Leu Trp Lys Ile Arg Lys Thr
1   5   10   15

Ile Met Gln Leu Cys His Asp Arg Gly Tyr Leu Val Thr Gln Asp Glu
            20   25   30

Leu Asp Gln Thr Leu Glu Glu Phe Lys Ala Gln Phe Gly Asp Lys Pro
        35   40   45

Ser Glu Gly Arg Pro Arg Arg Thr Asp Leu Thr Val Leu Val Ala His
    50   55   60

Asn Asp Asp Pro Thr Asp Gln Met Phe Val Phe Phe Pro Glu Glu Pro
65   70   75   80

Lys Val Gly Ile Lys Thr Ile Lys Val Tyr Cys Gln Arg Met Gln Glu
                85   90   95

Glu Asn Ile Thr Arg Ala Leu Ile Val Val Gln Gln Gly Met Thr Pro
            100   105   110

Ser Ala Lys Gln Ser Leu Val Asp Met Ala Pro Lys Tyr Ile Leu Glu
        115   120   125

Gln Phe Leu Gln Gln Glu Leu Leu Ile Asn Ile Thr Glu His Glu Leu
    130   135   140

Val Pro Glu His Val Val Met Thr Lys Glu Glu Val Thr Glu Leu Leu
145   150   155   160

Ala Arg Tyr Lys Leu Arg Glu Asn Gln Leu Pro Arg Ile Gln Ala Gly
                165   170   175

Asp Pro Val Ala Arg Tyr Phe Gly Ile Lys Arg Gly Gln Val Val Lys
            180   185   190

Ile Ile Arg Pro Ser Glu Thr Ala Gly Arg Tyr Ile Thr Tyr Arg Leu
        195   200   205

Val Gln
    210

<210> 4536
<211> 217

<212> PRT
<213> Homo sapiens

<220>
<223> BCL7C (NCBI Accession: NP_004756)

<400> 4536
Met Ala Gly Arg Thr Val Arg Ala Glu Thr Arg Ser Arg Ala Lys Asp
1   5   10   15

Asp Ile Lys Lys Val Met Ala Thr Ile Glu Lys Val Arg Arg Trp Glu
            20   25   30

Lys Arg Trp Val Thr Val Gly Asp Thr Ser Leu Arg Ile Phe Lys Trp
        35   40   45

Val Pro Val Val Asp Pro Gln Glu Glu Glu Arg Arg Arg Ala Gly Gly
    50   55   60

Gly Ala Glu Arg Ser Arg Gly Arg Glu Arg Arg Gly Arg Gly Ala Ser
65   70   75   80

Pro Arg Gly Gly Gly Pro Leu Ile Leu Leu Asp Leu Asn Asp Glu Asn
                85   90   95

Ser Asn Gln Ser Phe His Ser Glu Gly Ser Leu Gln Lys Gly Thr Glu
            100   105   110

Pro Ser Pro Gly Gly Thr Pro Gln Pro Ser Arg Pro Val Ser Pro Ala
        115   120   125

Gly Pro Pro Glu Gly Val Pro Glu Glu Ala Gln Pro Pro Arg Leu Gly
    130   135   140

Gln Glu Arg Asp Pro Gly Gly Ile Thr Ala Gly Ser Thr Asp Glu Pro
145   150   155   160

Pro Met Leu Thr Lys Glu Glu Pro Val Pro Glu Leu Leu Glu Ala Glu
                165   170   175

Ala Pro Glu Ala Tyr Pro Val Phe Glu Pro Val Pro Pro Val Pro Glu
            180   185   190

Ala Ala Gln Gly Asp Thr Glu Asp Ser Glu Gly Ala Pro Pro Leu Lys
        195   200   205

Arg Ile Cys Pro Asn Ala Pro Asp Pro
    210   215

<210> 4537
<211> 597
<212> PRT
<213> Homo sapiens

<220>
<223> UTP6 (NCBI Accession: NP_060898)

<400> 4537
Met Ala Glu Ile Ile Gln Glu Arg Ile Glu Asp Arg Leu Pro Glu Leu
1   5   10   15

Glu Gln Leu Glu Arg Ile Gly Leu Phe Ser His Ala Glu Ile Lys Ala
            20   25   30

Ile Ile Lys Lys Ala Ser Asp Leu Glu Tyr Lys Ile Gln Arg Arg Thr
        35   40   45

Leu Phe Lys Glu Asp Phe Ile Asn Tyr Val Gln Tyr Glu Ile Asn Leu
    50   55   60

Leu Glu Leu Ile Gln Arg Arg Arg Thr Arg Ile Gly Tyr Ser Phe Lys
65   70   75   80

Lys Asp Glu Ile Glu Asn Ser Ile Val His Arg Val Gln Gly Val Phe
                85   90   95

Gln Arg Ala Ser Ala Lys Trp Lys Asp Asp Val Gln Leu Trp Leu Ser
            100   105   110

Tyr Val Ala Phe Cys Lys Lys Trp Ala Thr Lys Thr Arg Leu Ser Lys
        115   120   125

Val Phe Ser Ala Met Leu Ala Ile His Ser Asn Lys Pro Ala Leu Trp
    130   135   140

Ile Met Ala Ala Lys Trp Glu Met Glu Asp Arg Leu Ser Ser Glu Ser
145   150   155   160

Ala Arg Gln Leu Phe Leu Arg Ala Leu Arg Phe His Pro Glu Cys Pro
                165   170   175

Lys Leu Tyr Lys Glu Tyr Phe Arg Met Glu Leu Met His Ala Glu Lys
            180   185   190

Leu Arg Lys Glu Lys Glu Glu Phe Glu Lys Ala Ser Met Asp Val Glu
        195   200   205

Asn Pro Asp Tyr Ser Glu Glu Ile Leu Lys Gly Glu Leu Ala Trp Ile
    210   215   220

Ile Tyr Lys Asn Ser Val Ser Ile Ile Lys Gly Ala Glu Phe His Val
225   230   235   240

Ser Leu Leu Ser Ile Ala Gln Leu Phe Asp Phe Ala Lys Asp Leu Gln
                245   250   255

Lys Glu Ile Tyr Asp Asp Leu Gln Ala Leu His Thr Asp Asp Pro Leu
            260   265   270

```
Thr Trp Asp Tyr Val Ala Arg Arg Glu Leu Glu Ile Glu Ser Gln Thr
        275                 280                 285

Glu Glu Gln Pro Thr Thr Lys Gln Ala Lys Ala Val Glu Val Gly Arg
    290                 295                 300

Lys Glu Glu Arg Cys Cys Ala Val Tyr Glu Glu Ala Val Lys Thr Leu
305                 310                 315                 320

Pro Thr Glu Ala Met Trp Lys Cys Tyr Ile Thr Phe Cys Leu Glu Arg
                325                 330                 335

Phe Thr Lys Lys Ser Asn Ser Gly Phe Leu Arg Gly Lys Arg Leu Glu
            340                 345                 350

Arg Thr Met Thr Val Phe Arg Lys Ala His Glu Leu Lys Leu Leu Ser
        355                 360                 365

Glu Cys Gln Tyr Lys Gln Leu Ser Val Ser Leu Leu Cys Tyr Asn Phe
    370                 375                 380

Leu Arg Glu Ala Leu Glu Val Ala Val Ala Gly Thr Glu Leu Phe Arg
385                 390                 395                 400

Asp Ser Gly Thr Met Trp Gln Leu Lys Leu Gln Val Leu Ile Glu Ser
                405                 410                 415

Lys Ser Pro Asp Ile Ala Met Leu Phe Glu Glu Ala Phe Val His Leu
            420                 425                 430

Lys Pro Gln Val Cys Leu Pro Leu Trp Ile Ser Trp Ala Glu Trp Ser
        435                 440                 445

Glu Gly Ala Lys Ser Gln Glu Asp Thr Glu Ala Val Phe Lys Lys Ala
    450                 455                 460

Leu Leu Ala Val Ile Gly Ala Asp Ser Val Thr Leu Lys Asn Lys Tyr
465                 470                 475                 480

Leu Asp Trp Ala Tyr Arg Ser Gly Gly Tyr Lys Lys Ala Arg Ala Val
                485                 490                 495

Phe Lys Ser Leu Gln Glu Ser Arg Pro Phe Ser Val Asp Phe Phe Arg
            500                 505                 510

Lys Met Ile Gln Phe Glu Lys Glu Gln Glu Ser Cys Asn Met Ala Asn
        515                 520                 525

Ile Arg Glu Tyr Tyr Glu Arg Ala Leu Arg Glu Phe Gly Ser Ala Asp
    530                 535                 540

Ser Asp Leu Trp Met Asp Tyr Met Lys Glu Glu Leu Asn His Pro Leu
545                 550                 555                 560
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Gly Arg Pro Glu Asn Cys Gly Gln Ile Tyr Trp Arg Ala Met Lys Met
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Leu Gln Gly Glu Ser Ala Glu Ala Phe Val Ala Lys His Ala Met His
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Gln Thr Gly His Leu
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Glu Lys Val Asp Pro Lys Asp Tyr Met Phe Ser Gly Leu Lys Asp Glu
35 40 45

Thr Val Gly Arg Leu Pro Gly Thr Val Ala Gly Gln Gln Phe Leu Ile
50 55 60

Gln Asp Cys Glu Asn Cys Asn Ile Tyr Ile Phe Asp His Ser Ala Thr
65 70 75 80

Val Thr Ile Asp Asp Cys Thr Asn Cys Ile Ile Phe Leu Gly Pro Val
85 90 95

Lys Gly Ser Val Phe Phe Arg Asn Cys Arg Asp Cys Lys Cys Thr Leu
100 105 110

Ala Cys Gln Gln Phe Arg Val Arg Asp Cys Arg Lys Leu Glu Val Phe
115 120 125

Leu Cys Cys Ala Thr Gln Pro Ile Ile Glu Ser Ser Ser Asn Ile Lys
130 135 140

Phe Gly Cys Phe Gln Trp Tyr Tyr Pro Glu Leu Ala Phe Gln Phe Lys
145 150 155 160

Asp Ala Gly Leu Ser Ile Phe Asn Asn Thr Trp Ser Asn Ile His Asp
165 170 175

Phe Thr Pro Val Ser Gly Glu Leu Asn Trp Ser Leu Leu Pro Glu Asp
180 185 190

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Ala Val Val Gln Asp Tyr Val Pro Ile Pro Thr Thr Glu Glu Leu Lys
        195                 200                 205

Ala Val Arg Val Ser Thr Glu Ala Asn Arg Ser Ile Val Pro Ile Ser
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Arg Gly Gln Arg Gln Lys Ser Ser Asp Glu Ser Cys Leu Val Val Leu
225                 230                 235                 240

Phe Ala Gly Asp Tyr Thr Ile Ala Asn Ala Arg Lys Leu Ile Asp Glu
                245                 250                 255

Met Val Gly Lys Gly Phe Phe Leu Val Gln Thr Lys Glu Val Ser Met
            260                 265                 270

Lys Ala Glu Asp Ala Gln Arg Val Phe Arg Glu Lys Ala Pro Asp Phe
        275                 280                 285

Leu Pro Leu Leu Asn Lys Gly Pro Val Ile Ala Leu Glu Phe Asn Gly
    290                 295                 300

Asp Gly Ala Val Glu Val Cys Gln Leu Ile Val Asn Glu Ile Phe Asn
305                 310                 315                 320

Gly Thr Lys Met Phe Val Ser Glu Ser Lys Glu Thr Ala Ser Gly Asp
                325                 330                 335

Val Asp Ser Phe Tyr Asn Phe Ala Asp Ile Gln Met Gly Ile
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