(12) STANDARD PATENT (11) Application No. **AU 2015364245 B2**
(19) AUSTRALIAN PATENT OFFICE

(54) Title
Chimeric antigen receptors and methods of use thereof

(51) International Patent Classification(s)
C07K 14/705 (2006.01) ***C07K 14/735*** (2006.01)
C07K 14/725 (2006.01) ***C07K 19/00*** (2006.01)

(21) Application No: **2015364245** (22) Date of Filing: **2015.12.21**

(87) WIPO No: **WO16/100985**

(30) Priority Data

(31) Number	(32) Date	(33) Country
62/094,625	**2014.12.19**	**US**
62/252,083	**2015.11.06**	**US**

(43) Publication Date: **2016.06.23**
(44) Accepted Journal Date: **2020.04.02**

(71) Applicant(s)
Dana-Farber Cancer Institute, Inc.

(72) Inventor(s)
Marasco, Wayne A.

(74) Agent / Attorney
Spruson & Ferguson, GPO Box 3898, Sydney, NSW, 2001, AU

(56) Related Art
CARPENTER R. O. ET AL, "B-cell Maturation Antigen Is a Promising Target for Adoptive T-cell Therapy of Multiple Myeloma", CLINICAL CANCER RESEARCH, 2013, vol. 19, no. 8, pages 2048 - 2060
WO 2013154760 A1
ZHONG, X-S. ET AL, "Chimeric Antigen Receptors Combining 4-1BB and CD28 Signaling Domains Augment PI3kinase/AKT/Bcl-XL Activation and CD8+ T Cell-mediated Tumor Eradication", MOLECULAR THERAPY, 2010, vol. 18, no. 2, , pages 413 - 420
WO 2014011988 A2

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
23 June 2016 (23.06.2016)

WIPO | PCT

(10) International Publication Number
WO 2016/100985 A3

(51) International Patent Classification:
C07K 14/705 (2006.01) *C07K 14/735* (2006.01)
C07K 19/00 (2006.01) *C07K 14/725* (2006.01)

(21) International Application Number:
PCT/US2015/067225

(22) International Filing Date:
21 December 2015 (21.12.2015)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
62/094,625 19 December 2014 (19.12.2014) US
62/252,083 6 November 2015 (06.11.2015) US

(71) Applicant: **DANA-FARBER CANCER INSTITUTE, INC.** [US/US]; 450 Brookline Avenue, Boston, MA 02215 (US).

(72) Inventor: **MARASCO, Wayne, A.**; 43 Rice Street, Wellesley, MA 02481 (US).

(74) Agents: **ELRIFI, Ivor** et al.; Cooley LLP, 1299 Pennsylvania Avenue, Suite 700, Washington, DC 20004 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

— *with sequence listing part of description (Rule 5.2(a))*

(88) Date of publication of the international search report:
18 August 2016

WO 2016/100985 A3

(54) Title: CHIMERIC ANTIGEN RECEPTORS AND METHODS OF USE THEREOF

(57) Abstract: The present invention provides chimeric antigen receptors, cells expressing same and methods of using same for treatment various disorders such as cancer.

CHIMERIC ANTIGEN RECEPTORS AND METHODS OF USE THEREOF

RELATED APPLICATIONS

[0001] This application claims priority to, and the benefit of U.S. Provisional Application number 62/094,625 filed on December 19, 2014, and U.S. Provisional Application number 62/252,083 filed on November 6, 2015, the contents of each of which are hereby incorporated in their entireties.

INCORPORATION-BY-REFERENCE OF SEQUENCE LISTING

[0002] The contents of the text file named, "Omnibus Sequence Listing for filing with DFCI-102_001WO_ST25", which was created on December 21, 2015, are hereby incorporated by reference in their entirety.

FIELD OF THE INVENTION

[0003] The present invention relates generally to chimeric antigen receptor cells for and methods of using same for treatment cancer and other disorders.

GOVERNMENT INTEREST

[0004] This invention was made with government support under [ ] awarded by the []. The government has certain rights in the invention.

BACKGROUND OF THE INVENTION

[0005] T lymphocytes recognize specific antigens through interaction of the T cell receptor (TCR) with short peptides presented by major histocompatibility complex (MHC) class I or II molecules. For initial activation and clonal expansion, naive T cells are dependent on professional antigen-presenting cells (APCs) that provide additional co-stimulatory signals. TCR activation in the absence of co-stimulation can result in unresponsiveness and clonal anergy. To bypass immunization, different approaches for the derivation of cytotoxic effector cells with grafted recognition specificity have been developed. Chimeric antigen receptors (CARs) have been constructed that consist of binding domains derived from natural ligands or antibodies specific for cell-surface

components of the TCR-associated CD3 complex. Upon antigen binding, such chimeric antigen receptors link to endogenous signaling pathways in the effector cell and generate activating signals similar to those initiated by the TCR complex. Since the first reports on chimeric antigen receptors, this concept has steadily been refined and the molecular design of chimeric receptors has been optimized. Aided by advances in recombinant antibody technology, chimeric antigen receptors targeted to a wide variety of antigens on the surface of cancer cells and of cells infected by human immunodeficiency virus (HIV) have been generated.

SUMMARY OF THE INVENTION

[0006] In various aspects the invention provides a chimeric antigen receptor (CAR) having an intracellular signaling domain, a transmembrane domain and an extracellular domain.

[0007] In some aspects the transmembrane domain further includes a stalk region positioned between the extracellular domain and the transmembrane domain. The transmembrane domain includes CD28. In another aspect the CAR further includes one or more additional costimulatory molecules positioned between the transmembrane domain and the intracellular signaling domain. The costimulatory molecules is CD28, 4-1BB, ICOS, or OX40. The intracellular signaling domain is for example a CD3 zeta chain. The extracellular domain is an antibody such as a Fab or a scFV. Preferably the antibody is specific for BCMA, CA-9, CD138, CCR4, or the influenza virus.

[0008] Also included in the invention are nucleic acids encoding the CAR of the invention further including a nucleic acid encoding a polypeptide positioned after the intracellular signaling domain. The polypeptide is an antibody such as scFV. Preferably, the antibody is specific for CCR4, PD-1, PDL-1, PD-L2, CXCR4, or GITR. Also provided by the invention are vector including the nucleic acid according to the invention and cells including the vectors.

[0009] In yet a further aspect the invention provides a genetically engineered cell which express and bear on the cell surface membrane the chimeric antigen receptor of the invention. The cell is a T-cell or an NK cell. The T cell is $CD4^+$ or $CD8^+$. The cell is a mixed population of $CD4^+$ and $CD8$ $cells^+$. The cell is further engineered to express and secrete a polypeptide such as for example an antibody.

2015364245 26 Feb 2020

[00010] Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention pertains. Although methods and materials similar or equivalent to those described herein can be used in the practice of the present invention, suitable methods and materials are described below. All publications, patent applications, patents, and other references mentioned herein are expressly incorporated by reference in their entirety. In cases of conflict, the present specification, including definitions, will control. In addition, the materials, methods, and examples described herein are illustrative only and are not intended to be limiting.

[00011] Other features and advantages of the invention will be apparent from and encompassed by the following detailed description and claims.

[00011a] Definitions of the specific embodiments of the invention as claimed herein follow.

[00011b] According to a first embodiment of the invention, there is provided a nucleic acid encoding a chimeric antigen receptor (CAR) comprising an extracellular domain, a transmembrane domain and an intracellular signaling domain, further comprising a nucleic acid encoding a polypeptide positioned after the intracellular signaling domain, wherein the polypeptide is an IgG scFV antibody or a cytokine, and further comprising an internal ribosome entry site (IRES) positioned between the intracellular signaling domain and the nucleic acid encoding the polypeptide.

[00011c] According to a second embodiment of the invention, there is provided a vector comprising the nucleic acid of the first embodiment.

[00011d] According to a third embodiment of the invention, there is provided a genetically engineered cell which expresses and bears on the cell surface membrane a chimeric antigen receptor (CAR) comprising an extracellular domain, a transmembrane domain and an intracellular domain, wherein the cell is further engineered to express and secrete a polypeptide, wherein the polypeptide is an IgG scFv antibody or a cytokine.

BRIEF DESCRIPTION OF THE DRAWINGS

[00012] **Figure 1. ADCC of CAIX-specific Abs.** 1μg/ml CAIX-specific scFv-Fc minibodies were added to the target tumor cells in the presence of

2015364245 26 Feb 2020

human PBMC (E:T 25:1). Similar results were obtained in 2 experiments. Irrelevant anti-SARS scFv-Fc (11A) and anti-CCR4 scFv-Fc (48) minibodies were used as negative controls. A, CAIX+ sk-rc-09 cells; B, CAIX+ sk-rc-52 cells; C, CAIX- sk-rc-59 cells.

[00013] Fig. 2. Construction and expression of CAIX-specific CARs. A. Construction: The 1st generation CAR, scFv-CD8-TCR ζ; (CD8 CAR), is composed of a specific anti-CAIX scFv that is coupled to truncated human CD8α extracellular domain, hinge (H), transmembrane (TM) and intracellular regions, then to the signaling domain of human TCRζ. The 2nd generation CAR, scFv-CD28-TCRζ; (CD28 CAR), contains anti-CAIX scFv fused with human CD28 extracellular, TM and intracellular signaling domain to TCRζ. Both anti-CAIX CARs were cloned into a bicistronic self-inactivating (SIN) lentiviral vector with expression driven by an internal eFl-α promoter. The CAR control construct contains an irrelevant anti-HIV CCR5 specific A8 scFv substitution. **B.** FACS analysis: Reporter gene ZsGreen was used to quantitate primary T cell transduction efficiency by the lentiviral CAR constructs. In addition, anti-CAIX scFv CARs were stained with CAIX-Fc fusion protein and C9-tag (TETSQVAPA) was stained with 1D4 antibody. Untransduced activated T-cells, LAK only were served as unstained cell control (i) or stained with 2nd antibody (ii. PE-anti-human IgG and iii. APC-anti-mouse IgG) were

[Text continues on page 4.]

used as staining controls. **C.** Western blot: Molecular sizes of monomer/dimer structures of anti-CAIX (clone G36) CD28 and annti-CCR5 (clone A8) CD28 CARs, as well as endogenous TCRζ chain of untransduced T cells were indicated.

[00014] Fig. 3. Effector functions of CAIX-specific CARTs. A. Cytokine secretion. Anti-CAIX CART, irrelevant CART or activated control T cells (LAK) were cocultivated overnight with kidney cancer cell lines sk-rc-52 (CAIX+) and sk-rc-59 (CAIX−) for cytokine production. One representative out of 2-3 results is shown. **B.** ELISPOT. G36 CART or control A8 CART cells were added to tumor cells overnight. IFN-γ or granzyme B secreting T cells detected by ELISPOT. Similar results were obtained in 2-3 experiments. **C**. Specific anti-tumor cytotoxicity of CAIX-specific CART cells, control A8 CART cells or LAK cells were incubated in a 4-hour cytotoxicity assay at different amounts of target tumor cell at the ratios as indicated. One out of two experiments is shown. Clone 4-1 is a *in vivo* passaged subclone of sk-rc-52.

[00015] Fig. 4. Clonal expansion of CART cells after tumor contact. A. Proliferation. CAR-transduced T cells or untransduced T cells (LAK) were plated with irradiated tumor cells (CAIX+ sk-rc-52 & CAIX- sk-rc-59) weekly at three different ratios of tumor to T cells as indicated. Number of T cells was counted every 3-4 days in triplicate from two separate wells. Similar results were obtained in two experiments. **B**. Clonal enrichment. In tumor stimulation experiments, cultures from CART-and LAK cells were assayed on one week and two weeks by flow cytometry for expression of CART and T-cell subset. One representative of two results is shown.

[00016] Fig. 5. Regression of established human RCC xenografts by CART cells. Athymic null mice were inoculated subcutaneously with 7.5×10^6 sk-rc-52 and 5×10^6 sk-rc-59 RCC tumor cells at left and right flank respectively. After 6 days of tumor implantation, mice were injected i.v. with 50×10^6 G36 CD28 CART cells, A8 CD28 CART cells (≥ 20% CAR+), LAK, or PBS alone. High dose of IL-2 (1×10^5 U/ml) was injected every 2-3 days. Tumor size was measured by caliper every 2-3 days. Experiment 1, n = 7 & Experiment 2, n = 8. Tumor size of these two experiments was shown separately. +, $p<0.05$; *, $p< 0.01$; **, $p< 0.001$ in groups of G36 Tandem treated mice versus control no T cell treated mice in these two trials. Other statistic calculations are reported in the text.

[00017] Fig. 6. *In vivo* anti-tumor activity of CAR+ T-cells. **A**. Expression of ZsGreen by CART cells is shown in *upper panel*. CART cells were pre-stained with Far Red dye,

cytospun and examined by fluorescent microscopy (*lower panel*). **B**. *In situ* staining of G36 CD28 CART cells in regressing tumor. CART-cells were i.v. injected into RCC established mice and tumor tissue was collected on day 1-3. Confocal microscopy was used to measure apoptosis of tumor cells by TUNNEL assay with PE-Cy5 dye (shown as red). Transduced T cells were shown by ZsGreen. Nuclei were counterstained with DPAI. Two representative slides were shown to indicate the apoptosis of tumor cells at the edge of tumor (*upper panel*) and inside the tumor bed (*middle panel*), respectively. The magnified image (*lower panel*) demonstrates CART cells interacted with multiple tumors while a few surrounding tumor cells were dying. **C**. Granzyme B+ T cells and tumor necrosis. After the treatment with CART cells, the regressing CAIX+ sk-rc-52 tumors were stained by granzyme B antibody (brown) and H&E. The higher magnification view (*middle and lower panels of sections a and b in upper panel*) shows the locations of granzyme B+ T cells (shown by arrows) and the corresponding H&E slide shows the tumor necrosis (shown by n). Granzyme B+ T cells are distributed at the edge of tumor (*middle panel*) and inside the tumor (*lower panel*).

[00018] **Figure 7.** CAIX- sk-rc-52 tumors treated with control LAK cells showed negative granzyme B staining (left) (*upper panel*) and the corresponding histology was shown in H&E (right).

[00019] **Figure 8.** Low background staining of granzyme B in CAIX- sk-rc-59 tumors treated with G36 CD28z CART cells

[00020] **Figure 9.** Low background staining of granzyme B in CAIX- sk-rc-59 tumors treated with LAK cells.

[00021] **Figure 10**. Positive control of granzyme B staining was performed on sk-rc-52 tumors which was local injected with G36 CD28z CART cells (left) and tumor morphology was shown in H&E (right).

[00022] **Figure 11** Expression of αCAIX CAR and αPD-L1 scFv-Fc transiently transfected 293T cells. 10^6 of 293T cells were transfected with or without lentiviral pHAGE-EF1αG36-C9tag-CD28-CD3zeta-IRES-anti-PDL1 scFv-Fc (IgG4)-WPRE or the control pHAGE-EF1α-A716-C9tag-CD28-CD3zeta-IRES-ZsGreen-WPRE plasmids. Cells and supernatant were harvested at 24 and 48 hours post transfection. **Left**, purified CAIX(ECD)-Fc-Biotin and Streptavidin-APC were used for cell staining and flow

cytometry analysis. **Right**, total human IgG in supernatant was quantitated with human IgG quantification kit.

[00023] **Figure 12 (A)** Total PBMCs from 4 donors were stimulated with 50 ng/ml SEB and treated with 10 ug/ml anti-PDL1 (#42) sIgG4 or anti-influenza sIgG4. Restoration of IFNγ production (**upper**) or TNFa production (**lower**) was measured. **(B)** Parental anti-CCR4 antibody, c1567IgG, inhibited chemotaxis of Tregs to CCL22. **(C)** $CD4^+CD25^-$ T cells were CFSE-labeled, incubated with Tregs at 10:1 ratio, and then stimulated with anti-CCR4 mAb and control mAb in the presence of anti-CD3/28 co-stimulation. After 3 and 7 days cells were harvested and analyzed by flow cytometry. The percentage of cells was calculated among the fluorescence positive $CD4^+CD25^-$ T and counting beads. The percent proliferation was normalized to $CD4^+CD25^-$ T effector cells at Day 0. The data shown were calculated from two independent experiments. Bars represent mean ± S.D.. **(D)** IFNγ ELISpot analysis of mAb2-3 and control antibody treated $CD4^+CD25^-$ Teff cells. Data represents the quantification from three separate experiments using three individual donor bloods. **(E) Left**, CFSE-labeled Teffs ($5x10^4$) and unlabeled Tregs ($5x10^3$) were co-incubated with 20 μg/ml PHA in 96-well plates for 5 days. The CFSE-labeled Teffs were harvested and CFSE intensity was analyzed by flow cytometry. The proliferation of Teffs were only observed when the coculture incubated with anti-GITR mAb. **Right**, IFNγ production in the same cultures was further measured by MSD. CFSE-labeled Teffs ($5x10^4$) and unlabeled Tregs ($5x10^3$) were co-incubated with 20 μg/ml PHA in 96-well plates for 5 days. The CFSE-labeled Teffs were harvested and CFSE intensity was analyzed by flow cytometry. Teffs were proliferated after 5-day incubation with PHA, but not in the Teff/Treg coculture. **Left**, IFNγ production in the same cultures was measured by MSD.

[00024] **Figure 13** is an illustration showing different CART configurations according to the invention.

[00025] **Figure 14** is an illustration showing different armed CART configurations according to the invention.

[00026] **Figure 15** is a further illustration showing different armed CART configurations according to the invention.

[00027] **Figure 16** is a series of illustrations and graphs indicating chimeric antigen receptors (CAR) constructs for CD8+ T cell transduction. (A) Schematic representation of second generation pHAGE lentiviral vectors containing CD28 as a co-stimulatory domain.

The anti-carbonic anhydrase IX (CAIX) or the Anti-B-cell maturation antigen (BCMA) scFv (as a negative control) were inserted after the eIFα promoter, in order to express the CAR binding domain. The second cassette, after the Internal Ribosome Entry Site (IRES) sequence, is responsible by coding the soluble Anti-PD-L1 IgG1 or IgG4 isotypes or the Anti-Severe Acute respiratory syndrome (SARS) coronavirus IgG1. To produce the lentiviruses, the pHAGE vectors were transfected together with the packaging plasmids (Gag, Rev, Tat and VSVG) into 293T LentiX cells using Polyethyleneimine. The viruses were harvested two days after transfection, purified and concentrated using LentiX Concentrator (Clontech™), according to the manufacturer instructions. LTR: long terminal repeat, eIFα: eukaryotic initiation factor alpha, scFv: single-chain variable fragment, C9 TAG: C9 peptide TETSQVAPA, IRES: Internal Ribosome Entry Site, WPRE: Woodchuck Hepatitis Virus Posttranscriptional Regulatory Element. (B) T cells were transduced with the lentiviruses to generate Anti-CAIX CART Cells, which are able to recognize CAIX positive RCC, and also release Anti-PD-L1 IgG1 or IgG4 in the tumor microenvironment to block PD-1/PD-L1-induced T cell exhaustion. (C) Percentage of CART cells 14 days after transduction, representing the stable long-term expression of CAR by the integrated lentiviruses in CD8+T cells. The CD8+ T cells were selected using Dynabeads™ CD8 Positive isolation Kit (Life Technologies) and activated with Dynabeads™ Human T Cell Activator CD3/CD28 (Life Technologies) in the presence of IL-21 50U/mL. IL-21 was added to the medium every 2 days. After 14 days, the CART cells were incubated with human CAIX-Fc or BCMA-Fc, followed by incubation with an APC conjugated anti-human Fc IgG and analyzed by FACS. (D) Concentration of IgG secreted to the medium of transduced T cells evaluated by Human IgG ELISA Quantitation Set (Bethyl Laboratories). (E) Concentration of Anti-PD-L1 antibodies in the supernatant of 293T Cells transduced with lentiviruses containing Anti-CAIX or Anti-BCMA CAR and Anti-PD-L1 IgG1, Anti-PD-L1 IgG4 or unspecific Anti-SARS IgG1 sequences. The antibodies in the supernatant were purified with Protein A sepharose beads (GE Healthcare) and biotinylated using the EZ-Link Sulfo-NHS-LC-Biotin (Thermo Scientific™). These antibodies were incubated with 5 µg/mL of human PD-L1 pre-immobilized in the 96 wells MaxiSorp plate (Nunc™). The biotinylated antibodies were detected by incubation with streptavidin-HRP for 1h and developed with TMB. The absorbance was read at λ=450 nm. *$P<0.001$ compared to Anti BCMA/Anti SARS IgG1 and Anti-CAIX/Anti-SARS IgG1. **$P<0.05$ compared to Anti-

CAIX/Anti-PD-L1 IgG1. (F and G) Clonal Expansion of CD8+ CART cells. (F) Concentration of CART cells versus days in the presence of skrc-52 CAIX+/PD-L1- cells. *P<0.05 comparing all CARS to Anti-BCMA/ Anti-SARS IgG1. (G) Percentage of transduced T cells versus days in the presence of skrc-52 CAIX positive cells.*P<0.05 comparing all CARS to Anti-BCMA/ Anti-SARS IgG1. The CD8+ CART cells were previously cultivated for five days after transduction with Anti CAIX CAR able to express anti-PD-L1 IgG1 (AntiCAIX/Anti-PD-L1 IgG1), IgG4 (Anti-CAIX/ Anti-PD-L1 IgG4) or a unspecific Anti-SARS Ab (Anti-CAIX/Anti SARS IgG1) or Anti-BCMA CAR (negative control) able to express an unspecific anti-SARS Ab (Anti-BCMA/Anti SARS IgG1) and activated with Dynabeads™ Human T Activator CD3/CD28 (Life Technologies) in the presence of IL-21 50U/mL. The beads were removed and the CART cells were cultured with skrc52 CAIX+ PD-L1- and IL-21 (50 U/mL), which was added to the medium every 2 days for 21 days. The results represent the average ± SD of three donors in duplicate.

[00028] **Figure 17** is a series of graphs that illustrate CART cell effector function. (A) Viability of Skrc59 CAIX+/ PD-L1+ cells or (B) Skrc52 CAIX-/ PD-L1- cells incubated overnight (O.N.) with CART cells Anti-CAIX/Anti-PD-L1 IgG1, Anti-CAIX/Anti-PD-L1 IgG4, Anti-CAIX/Anti SARS IgG1 or Anti-BCMA/Anti SARS IgG1. These CART cells were used 4 days after lentiviral transduction. The cell viability was evaluated by MTT (Molecular Probes™). *P<0.05 for all CART cells compared to Anti BCMA/Anti SARS IgG1 (C) IL2 released by CART cells after overnight contact with Skrc59 CAIX+/ PD-L1+ cells or (D) Skrc52 CAIX-/PD-L1- cells. The IL-2 secretion was evaluated using the Human IL-2 ELISA Ready-SET-Go Kit (eBioscience™). *P<0.001 for all CART cells compared to Anti BCMA/Anti SARS IgG1. (E) IFNγ released by CART cells after overnight contact with Skrc59 CAIX+/ PD-L1 + or (F) Skrc52 CAIX-/ PD-L1- cells. The IFNγ secretion was evaluated using the Human IFNγ ELISA Ready-SET-Go Kit (eBiosciences™). *P<0.05 for all CART cells compared to Anti-BCMA/Anti-SARS IgG1. (G) Ab-dependent cell-mediated cytotoxicity of skrc59 CAIX+/PD-L1+ or (H) skrc52 CAIX-/PD-L1- after incubation with the supernatant (SN) of CART cells containing 500 ng/mL of the Anti-PD-L1 IgG1, Anti-PD-L1 IgG4 or the Anti-SARS IgG1. To obtain the antibodies, CART cells were incubated for six days with Dynabeads™ Human T Activator CD3/CD28 (Life Technologies) in the presence of IL-21 50U/mL. After 7 days, the medium containing the mAbs was harvested NK cells were purified using an EasySep™ Human NK Cell

Enrichment Kit (StemCell™ Technologies). RCC cell lines Skrc59 CAIX+ PD-L1+ and Skrc52 CAIX- PD-L1- were used as target cells and plated at 1.5×10^3/well in a 96-well plate. RCC cells were incubated for 1 hour, 37°C, with 50 µL of the CART cells supernatant adjusted for 500 ng/mL of the respective Ab Anti-PD-L1 IgG1, Anti-PD-L1 IgG4 or Anti-SARS IgG1. After the incubation, the cells were washed with medium and incubated with 12.5:1, 25:1 or 50:1 NK cells for 4h, 37°C. Culture supernatants were harvested by centrifugation and LDH measured in the supernatant by CytoTox 96® Non-Radioactive Cytotoxicity Assay (Promega™) at 490 nm. These results represent the average ± SD of three donors in duplicate.

[00029] **Figure 18** is a series of graphs that depict CART cells expression of exhaustion markers. (A) Lag3, (B) Tim3 and (C) PD-1 expression. *P<0.05 compared to Anti-CAIX/Anti-SARS IgG1 and Anti-BCMA/Anti-SARS IgG1. The CD8+ CART cells were selected using Dynabeads™ CD8 Positive isolation Kit (Life Technologies), activated with Dynabeads™ Human T Activator CD3/CD28 (Life Technologies) and transduced with the following CARs: Anti-CAIX/Anti-PD-L1 IgG1, Anti-CAIX/Anti-PD-L1 IgG4, Anti-CAIX/Anti SARS IgG1 or Anti-BCMA/Anti SARS IgG1. These cells were cultured in the presence of IL-21 50U/mL and Dynabeads™ Human T Activator CD3/CD28 for five days. After this period the CART cells were co-cultured with Skrc-59 CAIX+ PD-L1+ for 2 days in order to stimulate exhaustion. CART cells were stained with FITC-conjugated anti-human PD-1, PE-conjugated anti-human Tim3 and PerCP/Cy5.5 anti-human Lag3 and analyzed by FACS. (D) Viability of Skrc59 CAIX positive/ PD-L1 positive cells after incubation with exhausted CART cells. The cell viability was evaluated by MTT (Molecular Probes). *P<0.05 compared to both Anti-CAIX/Anti-SARS IgG1 and Anti-BCMA/Anti-SARS IgG1. **P<0.05 compared to Anti-CAIX/Anti-PD-L1 IgG1. These results represent the average ± SD of three donors.

[00030] **Figure 19** is a series of images and graphs that depict the effect that CART cells have in an orthotopic model of human RCC. (A) NSG Mice (N=35) were injected with 5.0x104 skrc-59 CAIX positive, PD-L1 positive and luciferase positive RCC cells. After a week, the mice were injected with 1.0x107 CART or untransduced T cells IV (Day 0). The CART cells were previously transduced with the following lentiviral sequences: Anti-BCMA CAR/Anti-SARS IgG1, Anti-CAIX CAR/Anti SARS IgG1, Anti-CAIX CAR/Anti-PD-L1 IgG1 and Anti-CAIX CAR/Anti-PD-L1 IgG4 (N=6 mice per group). The tumor

bioluminescence was quantified after 5 minutes of luciferin IP injection using IVIS. A. Imaging of the tumors before CART injection (Day 0), and after 7, 14, 23 and 30 days after first CART cells injection. A second injection of 2.5x106 cells was made on day 17. (B) Imaging of the tumors after excision at day 30. Scale bar= 1 cm. (C) Tumor growth curve. *P<0.05 when Anti-PD-L1 IgG1 and IgG4 groups were compared to Anti-BCMA/Anti-SARS IgG1 and **P<0.05 when Anti-PD-L1 IgG1 and IgG4 groups were compared to Anti-CAIX/Anti-SARS IgG1. (D) Tumor weight after 30 days of treatment. *P<0.05 compared with Anti-BCMA/Anti SARS IgG1 CAR, **P<0.05 compared with Anti-CAIX/Anti-SARS IgG1.

[00031] **Figure 20** is a series of graphs and histological images that depict antitumor activity from CART cells. (A) Expression of exhaustion markers in tumor infiltrating lymphocytes (TIL). The kidney tumors from all mice were divided in two parts and one of them was fragmented in small pieces and digested with collagenase and DNAse to extraction of TIL. The CART cells were analyzed for the exhaustion markers PD-1, Tim-3 and Lag3. *P<0.05 compared with untransduced, Anti-BCMA/Anti SARS IgG1 CAR and Anti-CAIX/Anti-SARS IgG1. (B) Detection of Ki67 as a tumor cell proliferation marker and granzyme B to analyze CART cells activity in the tissue. Four-micrometer sections of formalin-fixed, paraffin-embedded tissues were dewaxed and rehydrated in a decreasing ethanol series. Endogenous peroxidase activity was quenched using 3% hydrogen peroxide. The antigen retrieval was performed using pressure cooker in citrate buffer (pH=6.0) for 45 seconds at 123oC , 15 PSI. The tissue sections were incubated for 45 minutes with the rabbit anti human Ki67 polyclonal Ab 1:2000 (Vector, VP-K451), mouse anti-human PD-L1 mAb 10.4 µg/mL (Clone 405.9A11) developed by Dr. Gordon Freeman (Boston, MA), biotinylated CAIX-Fc protein 17 µg/mL (produced in our lab), rabbit anti human granzyme B polyclonal Ab (Abcam, ab4059) 1:100 or rabbit anti-human NCAM (CD56) mAb 1:100 (Abcam, ab133345), followed by secondary HRP conjugated anti-rabbit Ab or HRP-Avidin. The slides were developed using 3,3'-diaminobenzidine (DAB) and counterstained with hematoxylin. The images were obtained in an Olympus BX51 microscopy using a DP71 digital camera (Olympus) and analyzed in the DP Controller Software (Olympus™). The scale bars represent the magnification of the images of each column [500µm (40X), 100 µm (200X) or 50 µm (400X)].(C) A series of graphs present percentage quantification of TIL

staining positive for Granzyme B, PD-L1-IHC, and Ki67. Also presented in (C) is a Ki67-DAB Pixel count of TILs.

[00032] **Figure 21** is a series of graphs that depict the evaluation of IL-2 versus IL-21 to CD8+ CART cells proliferation. A and B. Proliferation of CART transduced cells in the presence of IL-2 or IL-21 evaluated 48h, 72h and 120h after transduction with lentiviruses. (A) Anti-CAIX CART cells or (B) Unspecific Anti-BCMA CART cells (both with ZsGreen in the second cassette). The CD8+ T cells were selected using Dynabeads™ CD8 Positive isolation Kit (Life Technologies) and activated with Dynabeads™ Human T Activator CD3/CD28 (Life Technologies) in the presence of IL2 or IL-21 50U/mL (Peprotech™). The CART cells transduction was evaluated by ZsGreen expression using FACS. The data represents the average ± SD of two donors. *$p<0.05$ comparing IL-21 with non treated control (Ctr); **$p<0.05$ comparing IL21 with IL-2. C and D. Viability of RCC cells treated with CD8+ CART cells cultivated in the presence of IL-2 or IL-21. The viability was evaluated by MTT after an overnight incubation of CART cells Anti-BCMA, Anti-CAIX or Untransduced T cells with (C) Skrc-59 CAIX+/PD-L1+ and (F) Skrc-52 CAIX-/PD-L1- RCC cells. The CART cells were previously cultivated in the presence of IL2 or IL-21 50U/mL for 120 hours. These results represent the average ± SD of two donors in triplicate. *$P<0.05$ comparing Anti-CAIX CAR with Anti-BCMA CAR or untransduced T cells.

[00033] **Figure 22** is a series of flow cytometry graphs that depict the expression of PD-1 and CAIX in the renal cell carcinoma (RCC) lines. (A) Negative control, (B) Skrc52 CAIX-PD-L1-, (C) Skrc52 CAIX+ PD-L1-, (D) Skrc59 CAIX+ PD-L1+. The cells were stained with Anti-human CAIX antibody developed with APC-Anti-human Fc IgG and Biotinylated Anti human PD-L1 antibody developed with PE-Avidin. The analysis was performed by FACS.

[00034] **Figure 23** is a series of graphs that depict the characterization of CART cells. (A) Proliferation of total CD8+ T cells two or four days after transduction Anti CAIX CAR/Anti-PD-L1 IgG1), (Anti-CAIX CAR/Anti-PD-L1 IgG4), Anti-CAIX CAR/Anti SARS IgG1) or Anti-BCMA CAR/Anti SARS IgG1). The CD8+ T cells were selected using Dynabeads™ CD8 Positive isolation Kit (Life Technologies) and activated with Dynabeads™ Human T Activator CD3/CD28 (Life Technologies) in the presence of IL-21 50U/mL. IL-21 was added to the medium every 2 days. The proliferation was evaluated by FACS using Counting Beads (Molecular Probes). (B) Concentration of CAR-transduced T

cells two and four days after transduction. The CART cells were incubated with human CAIX-Fc or BCMA-Fc, followed by incubation with an APC conjugated anti-human Fc IgG and analyzed by FACS. (C) Percentage of CART cells 2 and 4 days after transduction. The results represent the average ± SD of three donors in duplicate.

[00035] **Figure 24** is a series of graphs that depict the effect that CART cells have in an orthotopic model of human RCC. (A) Comparison of tumor size detected by bioluminescence versus days among the CART cells groups. NSG Mice (N=35) were injected in the renal capsule with 5.0x104 skrc-59 CAIX+, PD-L1+ and luciferase + RCC cells. After a week, the mice were injected with 1.0x107 CART or untransduced T cells IV. The CART cells were previously transduced with the following lentiviral sequences: Anti-BCMA CAR/Anti-SARS IgG1, Anti-CAIX CAR/Anti SARS IgG1, Anti-CAIX CAR/Anti-PD-L1 IgG1 and Anti-CAIX CAR/ Anti-PD-L1 IgG4 (N=6 mice per group). The tumor bioluminescence was quantified after 5 minutes of luciferin IP injection using IVIS. In the Day 17, more 2.5x106 CART cells were injected. *P<0.05 compared to anti-BCMA CART cells. **P<0.05 compared to untransduced T cells, ***P<0.05 compared to Anti-CAIX/Anti-SARS IgG1. (B) Percentage of T cells in the mice blood after 8 days of treatment. *P<0.05 compared to untransduced T cells. **P<0.05 compared to all Anti-CAIX CARs. The red blood cells were lysed with ACK Lysing Buffer (Lonza™) and the remaining cells were stained with Pacific Blue conjugated Anti-human CD45 and analyzed by FACS. (C) Total tumor infiltrating lymphocytes (TIL) after 30 days of treatment with CART cells. The tumors and kidney from all mice were divided in two parts and one of them was fragmented in small pieces and digested with collagenase and DNAse to extraction of TIL. The cells were stained with Pacific Blue conjugated Anti-human CD45 and analyzed by FACS.

[00036] Figures 25A and 25B are a series of graphs and histological images that depict Human natural killer (NK) cells in the tumors treated with Anti-CAIX CART cells releasing anti-PD-L1 IgG1 Ab. (A) Percentage of CD56+ cells (NK marker) in the tumors. Two mice of each group were injected with 4.5x106 NK cells one day before the euthanasia. The kidney tumors from all mice were divided in two parts and one of them was fragmented in small pieces and digested with collagenase and DNAse to extraction of NK. NK cells present in the tumor were stained with APC-Anti-CD56 Ab and analyzed by FACS. *P<0.05. (B) CD56+ cells into the excised tumors detected by IHC and quantified using

IHC Profiler Plugin of ImageJ Software. Four-micrometer sections of formalin-fixed, paraffin-embedded tissues were dewaxed and rehydrated in a decreasing ethanol series. Endogenous peroxidase activity was quenched using 3% hydrogen peroxide. The antigen retrieval was performed using pressure cooker in citrate buffer (pH=6.0) for 45 seconds at 123oC , 15 PSI. The tissue sections were incubated for 45 minutes with the rabbit anti-human CD56 mAb 1:100 (Abcam, ab133345), followed by secondary HRP conjugated anti-rabbit or anti-mouse Ab. The slides were developed using 3,3'-diaminobenzidine (DAB) and counterstained with hematoxylin. The images were obtained in an Olympus BX51 microscopy using a DP71 digital camera (Olympus) and analyzed in the DP Controller Software (Olympus). The quantification was performed using the IHC Profiler Plugin of ImageJ Software (23). The scale bars represent the magnification of the images (400X). *P<0.05 compared with untransduced, **P<0.05 compared with untransduced and Anti-BCMA/Anti-SARS IgG1.

DETAILED DESCRIPTION OF THE INVENTION

[00037] The present invention relates to a chimeric antigen receptor (CAR) particularly adapted to immune cells used in immunotherapy.

[00038] In one embodiment, a double immunotherapeutic strategy is described based on the blocking of T cell exhaustion using anti-PD-L1 antibodies secreted by targeted anti-CAIX CAR T cells combined in a single lentivirus construct for improving cancer treatment.

[00039] An emerging mechanism associated with the progression of RCC and other tumors is the immune checkpoint pathway, which consists in cellular interactions that prevent excessive activation of T cells under normal conditions, allowing T cell function in a self-limited manner. As an evasion mechanism, many tumors are able to stimulate the expression of immune checkpoint molecules, resulting in an anergic phenotype of T cells that cannot restrain tumor progression. Emerging clinical data highlight the importance of one inhibitory ligand and receptor pair as an immune checkpoint: the programmed death-ligand 1 (PD-L1; B7-H1 and CD274) and programmed death receptor-1 (PD-1; CD279), in preventing killing of cancer cells by cytotoxic T-lymphocytes. PD1 receptor is expressed by many cell types like T cells, B cells, Natural Killer cells (NK) and host tissues. Tumors and Antigen-presenting cells (APC) expressing PD-L1 can block T cell receptor (TCR) signaling of cytotoxic T-lymphocytes through binding to receptor PD-1, decreasing the

production of cytokines and T cell proliferation. PD-L1 overexpression can be found in many tumor types and may also mediate an immunosuppressive function through its interaction with other proteins, including CD80 (B7.1), blocking its ability to activate T cells through binding to CD28.

[00040] Genetic engineering of human lymphocytes to express tumor-directed chimeric antigen receptors (CAR) can produce antitumor effector cells that bypass tumor immune escape mechanisms that are due to abnormalities in protein-antigen processing and presentation. Moreover, these transgenic receptors can be directed to tumor-associated antigens that are not protein-derived. In certain embodiments of the invention there are lymphocytes (CARTS) that are modified to comprise at least a CAR, and in particular embodiments of the invention a single CAR targets two or more antigens. In preferred embodiments, the CARTS are further modified to express and secrete one or more polypeptides, such as for example an antibody or a cytokine. Such CARTS are referred to herein as armed CARTS. Armed CARTS allow for simultaneous secretion of the polypeptide locally at the targeted site (i.e., tumor site).

[00041] A modified TCR called chimeric antigen receptor (CAR) containing single chain variable antibody fragment (scFv) previously selected by high affinity against a specific tumor associated antigen is a powerful new approach against cancer. The scFv presented in the CAR is linked to an intracellular signaling block that includes CD3ζ to induce T cell activation followed by antigen binding. This structure is characteristic for first-generation CARs, which were improved to second- and generation CARs that link the signaling co-stimulatory endodomains of CD28, 4-1BB, or OX40 to CD3 or 3rd-generation CARs that links two elements to CD3ζ in tandem. These endodomains are required for complete T cell activation during TCR recognition by antigen-presenting cells (APCs), improving cytokine production and proliferation of CAR-T cells. The effect of CART cells has heretofore been modest for the treatment of solid tumors, due to difficulty in finding unique tumor associated antigens, inefficient homing of T cells to tumor locations, low persistence of T cells in the body and the immunosuppressive microenvironment of solid tumors.

[00042] In particular cases, the lymphocytes include a receptor that is chimeric, non-natural and engineered at least in part by the hand of man. In particular cases, the engineered chimeric antigen receptor (CAR) has one, two, three, four, or more components,

and in some embodiments the one or more components facilitate targeting or binding of the lymphocyte to one or more tumor antigen-comprising cancer cells.

[00043] The CAR according to the invention generally comprises at least one transmembrane polypeptide comprising at least one extracellular ligand-biding domain and; one transmembrane polypeptide comprising at least one intracellular signaling domain; such that the polypeptides assemble together to form a Chimeric Antigen Receptor.

[00044] The term "extracellular ligand-binding domain" as used herein is defined as an oligo- or polypeptide that is capable of binding a ligand. Preferably, the domain will be capable of interacting with a cell surface molecule. For example, the extracellular ligand-binding domain may be chosen to recognize a ligand that acts as a cell surface marker on target cells associated with a particular disease state.

[00045] In particular, the extracellular ligand-binding domain can comprise an antigen binding domain derived from an antibody against an antigen of the target.

[00046] As non limiting examples, the antigen of the target can be a tumor-associated surface antigen, such as ErbB2 (HER2/neu), carcinoembryonic antigen (CEA), epithelial cell adhesion molecule (EpCAM), epidermal growth factor receptor (EGFR), EGFR variant III (EGFRvIII), CD19, CD20, CD30, CD40, disialoganglioside GD2, ductal-epithelial mucine, gp36, TAG-72, glycosphingolipids, glioma-associated antigen, .beta.-human chorionic gonadotropin, alphafetoprotein (AFP), lectin-reactive AFP, thyroglobulin, RAGE-1, MN-CA IX, human telomerase reverse transcriptase, RU1, RU2 (AS), intestinal carboxyl esterase, mut hsp70-2, M-CSF, prostase, prostase specific antigen (PSA), PAP, NY-ESO-1, LAGA-1a, p53, prostein, PSMA, surviving and telomerase, prostate-carcinoma tumor antigen-1 (PCTA-1), MAGE, ELF2M, neutrophil elastase, ephrin B2, CD22, insulin growth factor (IGF1)-I, IGF-II, IGFI receptor, mesothelia, a major histocompatibility complex (MHC) molecule presenting a tumor-specific peptide epitope, 5T4, ROR1, Nkp30, NKG2D, tumor stromal antigens, the extra domain A (EDA) and extra domain B (EDB) of fibronectin and the A1 domain of tenascin-C (TnC A1) and fibroblast associated protein (fap); a lineage-specific or tissue specific antigen such as CD3, CD4, CD8, CD24, CD25, CD33, CD34, CD133, CD138, CTLA-4, B7-1 (CD80), B7-2 (CD86), endoglin, a major histocompatibility complex (MHC) molecule, BCMA (CD269, TNFRSF 17), or a virus-specific surface antigen such as an HIV-specific antigen (such as HIV gp120); an EBV-specific antigen, a CMV-specific antigen, a HPV-specific antigen, a Lasse Virus-specific

antigen, an Influenza Virus-specific antigen as well as any derivate or variant of these surface markers.

[00047] Preferably, the CAR is specific for BMCA, CAIX, CCR4, PD-L1, PD-L2, PD1, Glucocorticoid-Induced Tumor Necrosis Factor Receptors (GITR), Severe acute respiratory syndrome (SARS), influenza, flavivirus or Middle East Respiratory Syndrome (MERS).

[00048] In a preferred embodiment, said extracellular ligand-binding domain is a single chain antibody fragment (scFv) comprising the light (V_L) and the heavy (V_H) variable fragment of a target antigen specific monoclonal antibody joined by a flexible linker.

[00049] In a more preferred embodiment, said scFv antibody is specific for BMCA, CAIX, CCR4, PD-L1, PD-L2, PD1, GITR, SARS, influenza, flavivirus or MERS.

[00050] Exemplary antibodies useful in constructing the CAR according to the invention includes antibodies disclosed in for example: WO/2005/060520 , WO/2006/089141, WO/2007/065027, WO/2009/086514, WO/2009/079259, WO/2011/153380, WO/2014/055897, WO 2015/143194, WO 2015/164865, WO 2013/166500, and WO 2014/144061; PCT/US2015/054202, PCT/US2015/054010 and 62/144,729 the contents of which are hereby incorporated by reference in their entireties.

[00051] **PDL1 (68)**

[00052] Exemplary anti-PDL1 antibodies include antibodies having containing a $_{VH}$ nucleotide sequence having SEQ ID NO: 1485 and a $_{VL}$ nucleotide sequence having SEQ ID NO: 1487; a VH nucleotide sequence having SEQ ID NO: 1485 and a VL nucleotide sequence having SEQ ID NO: 1487; a VH nucleotide sequence having SEQ ID NO: 1489 and a VL nucleotide sequence having SEQ ID NO: 1491; a VH nucleotide sequence having SEQ ID NO: 1493 and a VL nucleotide sequence having SEQ ID NO: 1495; a VH nucleotide sequence having SEQ ID NO: 1497 and a VL nucleotide sequence having SEQ ID NO: 1499; a VH nucleotide sequence having SEQ ID NO: 1501 and a VL nucleotide sequence having SEQ ID NO: 1503; a VH nucleotide sequence having SEQ ID NO: 1505 and a VL nucleotide sequence having SEQ ID NO: 1507; a VH nucleotide sequence having SEQ ID NO: 1509 and a VL nucleotide sequence having SEQ ID NO: 1511; a VH nucleotide sequence having SEQ ID NO: 1513 and a VL nucleotide sequence having SEQ ID NO: 1515; a VH nucleotide sequence having SEQ ID NO: 1517 and a VL nucleotide sequence having SEQ ID NO: 1519; a VH nucleotide sequence having SEQ ID NO: 1521 and a VL nucleotide sequence having SEQ ID NO: 1523; a VH nucleotide sequence having

SEQ ID NO: 1525 and a VL nucleotide sequence having SEQ ID NO: 1527; a VH nucleotide sequence having SEQ ID NO: 1529 and a VL nucleotide sequence having SEQ ID NO: 1531; a VH nucleotide sequence having SEQ ID NO: 1533 and a VL nucleotide sequence having SEQ ID NO: 1535; a VH nucleotide sequence having SEQ ID NO: 1537 and a VL nucleotide sequence having SEQ ID NO: 1539.

[00053] Exemplary anti-PDL1 antibodies include antibodies having containing a $_{VH}$ amino acid sequence having SEQ ID NO: 970 and a $_{VL}$ amino acid sequence having SEQ ID NO: 971; a VH amino acid having SEQ ID NO: 1486 and a VL polypeptide sequence having SEQ ID NO: 1488 a VH amino acid having SEQ ID NO: 1490 and a VL polypeptide sequence having SEQ ID NO: 1492 a VH amino acid having SEQ ID NO: 1494 and a VL polypeptide sequence having SEQ ID NO: 1496 a VH amino acid having SEQ ID NO: 1498 and a VL polypeptide sequence having SEQ ID NO: 1500 a VH amino acid having SEQ ID NO: 1502 and a VL polypeptide sequence having SEQ ID NO: 1504 a VH amino acid having SEQ ID NO: 1506 and a VL polypeptide sequence having SEQ ID NO: 1508 a VH amino acid having SEQ ID NO: 1510 and a VL polypeptide sequence having SEQ ID NO: 1512 a VH amino acid having SEQ ID NO: 1514 and a VL polypeptide sequence having SEQ ID NO: 1516 a VH amino acid having SEQ ID NO: 1518 and a VL polypeptide sequence having SEQ ID NO: 1520 a VH amino acid having SEQ ID NO: 1522 and a VL polypeptide sequence having SEQ ID NO: 1524 a VH amino acid having SEQ ID NO: 1526 and a VL polypeptide sequence having SEQ ID NO: 1528 a VH amino acid having SEQ ID NO: 1530 and a VL polypeptide sequence having SEQ ID NO: 1532 a VH amino acid having SEQ ID NO: 1534 and a VL polypeptide sequence having SEQ ID NO: 1536 a VH amino acid having SEQ ID NO: 1538 and a VL polypeptide sequence having SEQ ID NO: 1540.

[00054] In other embodiments the anti-PDL1 antibodies have a heavy chain with three CDRs including the amino acid sequences SEQ ID NO: 1541, 1554, 1569 respectively and a light chain with three CDRs including the amino acid sequences 1584, 1599, 1610 respectively; or a heavy chain with three CDRs comprising the amino acid sequences 1543, 1556, 1571 and a light chain with three CDRs comprising the amino acid sequences 1586, 1600, 1612; or a heavy chain with three CDRs comprising the amino acid sequences 1544, 1557, 1572 and a light chain with three CDRs comprising the amino acid sequences 1587, 1601, 1613; or a heavy chain with three CDRs comprising the amino acid sequences 1545,

1558, 1573 and a light chain with three CDRs comprising the amino acid sequences 1588, 1602, 1614; or a heavy chain with three CDRs comprising the amino acid sequences 1546, 1559, 1574 and a light chain with three CDRs comprising the amino acid sequences 1589, 1603, 1615; or a heavy chain with three CDRs comprising the amino acid sequences 1547, 1560, 1575 and a light chain with three CDRs comprising the amino acid sequences 1590, 1604, 1616; or a heavy chain with three CDRs comprising the amino acid sequences 1548, 1561, 1576 and a light chain with three CDRs comprising the amino acid sequences 1591, 1605, 1617; or a heavy chain with three CDRs comprising the amino acid sequences 1541, 1562, 1577 and a light chain with three CDRs comprising the amino acid sequences 1592, 1599, 1618; or a heavy chain with three CDRs comprising the amino acid sequences 1549, 1563, 1578 and a light chain with three CDRs comprising the amino acid sequences 1593, 1606, 1619; or a heavy chain with three CDRs comprising the amino acid sequences 1550, 1564, 1579 and a light chain with three CDRs comprising the amino acid sequences 1594, 1607, 1620; or a heavy chain with three CDRs comprising the amino acid sequences 1551, 1565, 1580 and a light chain with three CDRs comprising the amino acid sequences 1595, 1599, 1621; or a heavy chain with three CDRs comprising the amino acid sequences 1542, 1566, 1581 and a light chain with three CDRs comprising the amino acid sequences 1596, 1599, 1622; or a heavy chain with three CDRs comprising the amino acid sequences 1552, 1567, 1582 and a light chain with three CDRs comprising the amino acid sequences 1597, 1608, 1623; or a heavy chain with three CDRs comprising the amino acid sequences 1553, 1568, 1583 and a light chain with three CDRs comprising the amino acid sequences 1598, 1609 1624.

[00055] SARS (26)

[00056] Exemplary SARS neutralizing antibodies include antibodies having containing a $_{VH}$ nucleotide sequence having SEQ ID NO: 1626 and a $_{VL}$ nucleotide sequence having SEQ ID NO: 1628; a VH nucleotide sequence having SEQ ID NO: 1630 and a VL nucleotide sequence having SEQ ID NO: 1639; a VH nucleotide sequence having SEQ ID NO: 1634 and a VL nucleotide sequence having SEQ ID NO: 1640; a VH nucleotide sequence having SEQ ID NO: 1632 and a VL nucleotide sequence having SEQ ID NO: 1641; a VH nucleotide sequence having SEQ ID NO: 1633 and a VL nucleotide sequence having SEQ ID NO: 1642; a VH nucleotide sequence having SEQ ID NO: 1634 and a VL nucleotide sequence having SEQ ID NO: 1643; a VH nucleotide sequence having SEQ ID NO: 1635

and a VL nucleotide sequence having SEQ ID NO: 1644; a VH nucleotide sequence having SEQ ID NO: 1636 and a VL nucleotide sequence having SEQ ID NO: 1645; a VH nucleotide sequence having SEQ ID NO: 1637 and a VL nucleotide sequence having SEQ ID NO: 1646

[00057] CXCR4 (33)

[00058] Exemplary anti-CXCR4 antibody include antibodies having a VH amino acid sequence having SEQ ID NO: 771 and a VL amino acid sequence having SEQ ID NO: 779; a VH amino acid sequence having SEQ ID NO: 772 and a VL amino acid sequence having SEQ ID NO: 780; a VH amino acid sequence having SEQ ID NO: 773 and a VL amino acid sequence having SEQ ID NO: 781; a VH amino acid sequence having SEQ ID NO: 774 and a VL amino acid sequence having SEQ ID NO: 782; a VH amino acid sequence having SEQ ID NO: 775 and a VL amino acid sequence having SEQ ID NO: 783; a VH amino acid sequence having SEQ ID NO: 776 and a VL amino acid sequence having SEQ ID NO: 784; a VH amino acid sequence having SEQ ID NO: 777 and a VL amino acid sequence having SEQ ID NO: 785; or a VH amino acid sequence having SEQ ID NO: 778 and a VL amino acid sequence having SEQ ID NO: 786.

[00059] In other embodiments the anti-CXCR4 antibodies have a heavy chain with three CDRs including the amino acid sequences SEQ ID NO: 803, 804, 805 respectively and a light chain with three CDRs including the amino acid sequences 806, 807, 808 respectively; or a heavy chain with three CDRs comprising the amino acid sequences 809, 810, 811, respectively and a light chain with three CDRs comprising the amino acid sequences 812, 813, 814, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 815, 816, 817 respectively and a light chain with three CDRs comprising the amino acid sequences 818, 819, 820 respectively; or a heavy chain with three CDRs comprising the amino acid sequences 827, 828, 829 respectively and a light chain with three CDRs comprising the amino acid sequences 830, 831, 832 respectively; or a heavy chain with three CDRs comprising the amino acid sequences 833, 834, 835, respectively and a light chain with three CDRs comprising the amino acid sequences 836, 837, 838, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 839, 840, 841 respectively and a light chain with three CDRs comprising the amino acid sequences 842, 843, 844 respectively.

[00060] CARBONIC ANHYDRASE IX (40)

[00061] Exemplary anti-CA IX antibodies include antibodies having containing a $_{VH}$ amino acid sequence having SEQ ID NO: 845 and a $_{VL}$ amino acid sequence having SEQ ID NO: 846; a VH amino acid sequence having SEQ ID NO: 847 and a VL amino acid sequence having SEQ ID NO: 868; a VH amino acid sequence having SEQ ID NO: 848 and a VL amino acid sequence having SEQ ID NO: 869; a VH amino acid sequence having SEQ ID NO: 849 and a VL amino acid sequence having SEQ ID NO: 870; a VH amino acid sequence having SEQ ID NO: 850 and a VL amino acid sequence having SEQ ID NO: 871; a VH amino acid sequence having SEQ ID NO: 851 and a VL amino acid sequence having SEQ ID NO: 872; a VH amino acid sequence having SEQ ID NO: 852 and a VL amino acid sequence having SEQ ID NO: 873; a VH amino acid sequence having SEQ ID NO: 853 and a VL amino acid sequence having SEQ ID NO: 874; a VH amino acid sequence having SEQ ID NO: 854 and a VL amino acid sequence having SEQ ID NO: 875; a VH amino acid sequence having SEQ ID NO: 855 and a VL amino acid sequence having SEQ ID NO: 876; a VH amino acid sequence having SEQ ID NO: 856 and a VL amino acid sequence having SEQ ID NO: 877; a VH amino acid sequence having SEQ ID NO: 857 and a VL amino acid sequence having SEQ ID NO: 878; a VH amino acid sequence having SEQ ID NO: 858 and a VL amino acid sequence having SEQ ID NO: 879; a VH amino acid sequence having SEQ ID NO: 859 and a VL amino acid sequence having SEQ ID NO: 880; a VH amino acid sequence having SEQ ID NO: 860 and a VL amino acid sequence having SEQ ID NO: 881; a VH amino acid sequence having SEQ ID NO: 861 and a VL amino acid sequence having SEQ ID NO: 882 a VH amino acid sequence having SEQ ID NO: 862 and a VL amino acid sequence having SEQ ID NO: 883; a VH amino acid sequence having SEQ ID NO: 863 and a VL amino acid sequence having SEQ ID NO: 884; a VH amino acid sequence having SEQ ID NO: 864 and a VL amino acid sequence having SEQ ID NO: 885; a VH amino acid sequence having SEQ ID NO: 865 and a VL amino acid sequence having SEQ ID NO: 886; a VH amino acid sequence having SEQ ID NO: 866 and a VL amino acid sequence having SEQ ID NO: 887; a VH amino acid sequence having SEQ ID NO: 867 and a VL amino acid sequence having SEQ ID NO: 888.

[00062] In other embodiments the anti-CA IX antibodies have a heavy chain with three CDRs including the amino acid sequences SEQ ID NO: 803, 804, 805 respectively and a light chain with three CDRs including the amino acid sequences 806, 807, 808 respectively; or a heavy chain with three CDRs comprising the amino acid sequences 899, 915, 909 and

a light chain with three CDRs comprising the amino acid sequences 905, 906, 952 or a heavy chain with three CDRs comprising the amino acid sequences 899, 915, 909 and a light chain with three CDRs comprising the amino acid sequences 935, 943, 953 or a heavy chain with three CDRs comprising the amino acid sequences 899, 915, 909 and a light chain with three CDRs comprising the amino acid sequences 935, 906, 954 or a heavy chain with three CDRs comprising the amino acid sequences 910, 916, 923 and a light chain with three CDRs comprising the amino acid sequences 936, 944, 955 or a heavy chain with three CDRs comprising the amino acid sequences 899, 915, 909 and a light chain with three CDRs comprising the amino acid sequences 936, 944, 956 or a heavy chain with three CDRs comprising the amino acid sequences 911, 917, 924 and a light chain with three CDRs comprising the amino acid sequences 937, 945, 957 or a heavy chain with three CDRs comprising the amino acid sequences 899, 915, 909 and a light chain with three CDRs comprising the amino acid sequences 935, 946, 958 or a heavy chain with three CDRs comprising the amino acid sequences 899, 915, 909 and a light chain with three CDRs comprising the amino acid sequences 938, 946, 959 or a heavy chain with three CDRs comprising the amino acid sequences 899, 915, 909 and a light chain with three CDRs comprising the amino acid sequences 905, 946, 960 or a heavy chain with three CDRs comprising the amino acid sequences 899, 918, 925 and a light chain with three CDRs comprising the amino acid sequences 937, 947, 955 or a heavy chain with three CDRs comprising the amino acid sequences 899, 918, 926 and a light chain with three CDRs comprising the amino acid sequences 937, 945, 957 or a heavy chain with three CDRs comprising the amino acid sequences 912, 919, 927 and a light chain with three CDRs comprising the amino acid sequences 937, 943, 961 or a heavy chain with three CDRs comprising the amino acid sequences 899, 918, 928 and a light chain with three CDRs comprising the amino acid sequences 937, 906, 960 or a heavy chain with three CDRs comprising the amino acid sequences 899, 918, 928 and a light chain with three CDRs comprising the amino acid sequences 937, 906, 960 or a heavy chain with three CDRs comprising the amino acid sequences 913, 920, 929 and a light chain with three CDRs comprising the amino acid sequences 939, 948, 962 or a heavy chain with three CDRs comprising the amino acid sequences 899, 918, 930 and a light chain with three CDRs comprising the amino acid sequences 935, 944, 955 or a heavy chain with three CDRs comprising the amino acid sequences 899, 921, 931 and a light

chain with three CDRs comprising the amino acid sequences 935, 944, 955 or a heavy chain with three CDRs comprising the amino acid sequences 912, 919 ,932 and a light chain with three CDRs comprising the amino acid sequences 940, 949, 963 or a heavy chain with three CDRs comprising the amino acid sequences 899, 915, 909 and a light chain with three CDRs comprising the amino acid sequences 935, 943, 960 or a heavy chain with three CDRs comprising the amino acid sequences 914, 922, 933 and a light chain with three CDRs comprising the amino acid sequences 941, 950, 964 or a heavy chain with three CDRs comprising the amino acid sequences 912, 918, 934 and a light chain with three CDRs comprising the amino acid sequences 942, 951, 965.

[00063] CC-CHEMOKINE RECEPTOR 4 (CCR4) (048)

[00064] Exemplary CC-chemokine receptor 4 (CCR4) antibodies include antibodies having containing a $_{VH}$ nucleotide sequence having SEQ ID NO: 969 and a $_{VL}$ nucleotide sequence having SEQ ID NO: 971; a $_{VH}$ nucleotide sequence having SEQ ID NO: 969 and a V_L nucleotide sequence having SEQ ID NO: 972.

[00065] Exemplary CCR4 antibodies include antibodies having containing a $_{VH}$ amino acid sequence having SEQ ID NO: 970 and a $_{VL}$ amino acid sequence having SEQ ID NO: 971.

[00066] In other embodiments the CCR4 antibodies have a heavy chain with three CDRs including the amino acid sequences SEQ ID NO: 973, 974, 975 respectively and a light chain with three CDRs including the amino acid sequences 976, 977, 978 respectively.

[00067] MIDDLE EAST RESPIRATORY SYNDROME CORONAVIRUS (MERS-COV). (85)

[00068] Exemplary anti-Middle East Respiratory Syndrome coronavirus (MERS-CoV) antibody include antibodies having a VH nucleotide sequence having SEQ ID NO: 677and a VL nucleotide sequence having SEQ ID NO:679; a VH nucleotide sequence having SEQ ID NO: 681and a VL nucleotide sequence having SEQ ID NO:683; a VH nucleotide sequence having SEQ ID NO: 685and a VL nucleotide sequence having SEQ ID NO:687; a VH nucleotide sequence having SEQ ID NO: 689and a VL nucleotide sequence having SEQ ID NO:692; a VH nucleotide sequence having SEQ ID NO: 693and a VL nucleotide sequence having SEQ ID NO:695; a VH nucleotide sequence having SEQ ID NO: 697and a VL nucleotide sequence having SEQ ID NO:699; and a VH nucleotide sequence having SEQ ID NO: 701and a VL nucleotide sequence having SEQ ID NO:703.

[00069] Exemplary anti-Middle East Respiratory Syndrome coronavirus (MERS-CoV) antibody include antibodies having a VH amino acid sequence SEQ ID NO: 678 and a VL amino acid sequence having SEQ ID NO: 680; a VH amino acid sequence SEQ ID NO: 682 and a VL amino acid sequence having SEQ ID NO: 684; a VH amino acid sequence SEQ ID NO: 686 and a VL amino acid sequence having SEQ ID NO: 688; a VH amino acid sequence SEQ ID NO: 690 and a VL amino acid sequence having SEQ ID NO: 692; a VH amino acid sequence SEQ ID NO: 694 and a VL amino acid sequence having SEQ ID NO: 696; a VH amino acid sequence SEQ ID NO: 698 and a VL amino acid sequence having SEQ ID NO: 700; and a VH amino acid sequence SEQ ID NO: 702 and a VL amino acid sequence having SEQ ID NO: 704.

[00070] In other embodiments the anti-Middle East Respiratory Syndrome coronavirus (MERS-CoV) antibody has a heavy chain with three CDRs including the amino acid sequences of 705, 706, and 707 and a light chain with three CDRs including the amino acid sequences 722, 723, and 724; a heavy chain with three CDRs including the amino acid sequences of 708, 709, and 710 and a light chain with three CDRs including the amino acid sequences 725, 726, and 727; a heavy chain with three CDRs including the amino acid sequences of 711, 712, and 713 and a light chain with three CDRs including the amino acid sequences 728, 729, and 730; a heavy chain with three CDRs including the amino acid sequences of 711, 735, and 715 and a light chain with three CDRs including the amino acid sequences 731, 732, and 733; a heavy chain with three CDRs including the amino acid sequences of 711, 735, and 716 and a light chain with three CDRs including the amino acid sequences 737, 738, and 739; a heavy chain with three CDRs including the amino acid sequences of 717, 718, and 719 and a light chain with three CDRs including the amino acid sequences 736, 742, and 743; and a heavy chain with three CDRs including the amino acid sequences of 714, 720, and 721 and a light chain with three CDRs including the amino acid sequences 740, 729, and 741.

[00071] **GITR (93)**

[00072] Exemplary anti-human GITR antibody include antibodies having a VH nucleotide sequence having SEQ ID NO: 1361 and a VL nucleotide sequence having SEQ ID NO: 1363; a VH nucleotide sequence having SEQ ID NO: 1365 and a VL nucleotide sequence having SEQ ID NO:1367; a VH nucleotide sequence having SEQ ID NO: 1369 and a VL nucleotide sequence having SEQ ID NO: 1371; a VH nucleotide sequence having

SEQ ID NO: 1381 and a VL nucleotide sequence having SEQ ID NO: 1375; a VH nucleotide sequence having SEQ ID NO: 1377 and a VL nucleotide sequence having SEQ ID NO: 1379; a VH nucleotide sequence having SEQ ID NO: 1381 and a VL nucleotide sequence having SEQ ID NO: 1383; a VH nucleotide sequence having SEQ ID NO: 1385 and a VL nucleotide sequence having SEQ ID NO: 1387; a VH nucleotide sequence having SEQ ID NO: 1389 and a VL nucleotide sequence having SEQ ID NO:1391; a VH nucleotide sequence having SEQ ID NO: 1393 and a VL nucleotide sequence having SEQ ID NO: 1395; a VH nucleotide sequence having SEQ ID NO: 1397 and a VL nucleotide sequence having SEQ ID NO: 1398; or a VH nucleotide sequence having SEQ ID NO: 1401and a VL nucleotide sequence having SEQ ID NO: 1403.

[00073] Exemplary anti-human GITR antibody include antibodies having a VH amino acid sequence having SEQ ID NO: 1362 and a VL amino acid sequence having SEQ ID NO: 1364; a VH amino acid having SEQ ID NO: 1366 and a VL polypeptide sequence having SEQ ID NO:1368; a VH amino acid sequence having SEQ ID NO: 1371 and a VL amino acid sequence having SEQ ID NO: 1372; a VH amino acid sequence having SEQ ID NO: 1382 and a VL amino acid sequence having SEQ ID NO: 1376; a VH nucleotide sequence having SEQ ID NO: 1378 and a VL nucleotide sequence having SEQ ID NO: 1380; a VH amino acid having SEQ ID NO: 1382 and a VL polypeptide sequence having SEQ ID NO: 1384; a VH amino acid sequence having SEQ ID NO: 1386 and a VL amino acid sequence having SEQ ID NO: 1388; a VH amino acid sequence having SEQ ID NO: 1390 and a VL amino acid sequence having SEQ ID NO: 1392; a VH amino acid having SEQ ID NO: 1394 and a VL polypeptide sequence having SEQ ID NO: 1396; a VH amino acid sequence having SEQ ID NO: 1399 and a VL amino acid sequence having SEQ ID NO: 1400; or a VH amino acid sequence having SEQ ID NO: 1402 and a VL amino acid sequence having SEQ ID NO: 1404.

[00074] In other embodiments the anti-human GITR antibody has a heavy chain with three CDRs including the amino acid sequences 1405, 1406, and 1407 and a light chain with three CDRs including the amino acid sequences1408, 1409, and 1410 respectively; a heavy chain with three CDRs including the amino acid sequences 1411, 1412, and 1413 and a light chain with three CDRs including the amino acid sequences1414, 1415, and 1416 respectively; a heavy chain with three CDRs including the amino acid sequences 1417, 1418, and 1419 and a light chain with three CDRs including the amino acid sequences1420,

1421, and 1422 respectively; a heavy chain with three CDRs including the amino acid sequences 1423, 1424, and 1425 and a light chain with three CDRs including the amino acid sequences1426, 1427, and 1428 respectively; a heavy chain with three CDRs including the amino acid sequences 1429, 1430, and 1431 and a light chain with three CDRs including the amino acid sequences1432, 1433, and 1434 respectively; a heavy chain with three CDRs including the amino acid sequences 1435, 1436, and 1437 and a light chain with three CDRs including the amino acid sequences1438, 1439, and 1440 respectively; a heavy chain with three CDRs including the amino acid sequences 1441, 1442, and 1443 and a light chain with three CDRs including the amino acid sequences1444, 1445, and 1446 respectively; a heavy chain with three CDRs including the amino acid sequences 1447, 1448, and 1449 and a light chain with three CDRs including the amino acid sequences1450, 1451, and 1452 respectively; a heavy chain with three CDRs including the amino acid sequences 1453, 1454, and 1455 and a light chain with three CDRs including the amino acid sequences1456, 1457, and 1458 respectively; a heavy chain with three CDRs including the amino acid sequences 1459, 1460, and 1461 and a light chain with three CDRs including the amino acid sequences1462, 1463, and 1464 respectively; or a heavy chain with three CDRs including the amino acid sequences 1465, 1466, and 1467 and a light chain with three CDRs including the amino acid sequences1468, 1469, and 1470 respectively.

[00075] **FLAVIVIRUS (73)**

[00076] Exemplary anti-West Nile virus envelope protein E (WNE) antibody include antibodies having a VH nucleotide sequence having a VH amino acid sequence having SEQ ID NO: 1224 and a VL amino acid sequence having SEQ ID NO: 1226.

[00077] Exemplary anti-West Nile virus envelope protein E (WNE) antibody include antibodies having a VH nucleotide sequence having SEQ ID NO: 1225 and a VL nucleotide sequence having SEQ ID NO: 1227.

[00078] In other embodiments the anti-West Nile virus envelope protein E (WNE) antibody has a heavy chain with three CDRs including the amino acid sequences 1244, 1245, and 1246 and a light chain with three CDRs including the amino acid sequences 1247, 1248, and 1249 respectively.

[00079] **CCR4 (65)**

[00080] Exemplary anti-CC-chemokine receptor 4 (CCR4) antibody include antibodies

having a $_{VH}$ nucleotide sequence having SEQ ID NO: 1329 and a $_{VL}$ nucleotide sequence having SEQ ID NO: 1331; a $_{VH}$ nucleotide sequence having SEQ ID NO: 1333 and a V_L nucleotide sequence having SEQ ID NO:1335; a $_{VH}$ nucleotide sequence having SEQ ID NO: 1337 and a V_L nucleotide sequence having SEQ ID NO: 1192; a $_{VH}$ nucleotide sequence having SEQ ID NO: 1341 and a $_{VL}$ nucleotide sequence having SEQ ID NO: 1343; or a $_{VH}$ nucleotide sequence having SEQ ID NO: 1357 and a $_{VL}$ nucleotide sequence having SEQ ID NO:1359.

[00081] Exemplary anti-CC-chemokine receptor 4 (CCR4) antibody include antibodies having a V_H amino acid sequence having SEQ ID NO: 1330 and a V_L amino acid sequence having SEQ ID NO: 1332; a V_H amino acid sequence having SEQ ID NO: 1334 and a V_L amino acid sequence having SEQ ID NO: 1336; a V_H amino acid sequence having SEQ ID NO: 1338 and a V_L amino acid sequence having SEQ ID NO: 1340; a V_H amino acid sequence having SEQ ID NO: 1342 and a V_L amino acid sequence having SEQ ID NO: 1344; or a V_H amino acid sequence having SEQ ID NO: 1358 and a V_L amino acid sequence having SEQ ID NO: 1360.

[00082] In other embodiments the anti-CC-chemokine receptor 4 (CCR4) antibody has a heavy chain with three CDRs including the amino acid sequences 1203, 1208, and 1211 and a light chain with three CDRs including the amino acid sequences 1207, 1209, and 1216 respectively; or a heavy chain with three CDRs including the amino acid sequences 1204, 1208, and 1212 and a light chain with three CDRs including the amino acid sequences 1207, 1209, and 1217 respectively; or a heavy chain with three CDRs including the amino acid sequences 1204, 1208, and 1213 and a light chain with three CDRs including the amino acid sequences 1207, 1209, and 1217 respectively; or a heavy chain with three CDRs including the amino acid sequences 1205, 1208, and 1214 and a light chain with three CDRs including the amino acid sequences 1207, 1209, and 1218 respectively; or a heavy chain with three CDRs including the amino acid sequences 1206, 1208, and 1210 and a light chain with three CDRs including the amino acid sequences 1207, 1209, and 1220 respectively; or a heavy chain with three CDRs including the amino acid sequences 1202, 1208, and 1210 and a light chain with three CDRs including the amino acid sequences 1207, 1209, and 1219 respectively.

[00083] HUMAN IMMUNOGLOBULIN HEAVY CHAIN VARIABLE REGION GERMLINE GENE VH1-69 (57)

[00084] Exemplary anti-human immunoglobulin heavy chain variable region germline gene VH1-69 antibody include antibodies having a VH nucleotide sequence having SEQ ID NO: 1153 and a VL nucleotide sequence having SEQ ID NO: 1155; or a VH nucleotide sequence having SEQ ID NO: 1163 and a VL nucleotide sequence having SEQ ID NO:1155.

[00085] Exemplary anti-human immunoglobulin heavy chain variable region germline gene VH1-69 antibody include antibodies having a V_H amino acid sequence having SEQ ID NO: 1154 and a V_L amino acid sequence having SEQ ID NO: 1156; or a V_H amino acid sequence having SEQ ID NO: 1164 and a V_L amino acid sequence having SEQ ID NO: 1156.

[00086] In other embodiments the anti-human immunoglobulin heavy chain variable region germline gene VH1-69 antibody has a heavy chain with three CDRs including the amino acid sequences 1157, 1158, and 1159 and a light chain with three CDRs including the amino acid sequences 1160, 1161, and 1162 respectively.

[00087] INFLUENZA (49)

[00088] Exemplary anti-influenza antibody include antibodies having a VH nucleotide sequence having SEQ ID NO: 981 and a VL nucleotide sequence having SEQ ID NO: 983; a VH nucleotide sequence having SEQ ID NO: 985 and a VL nucleotide sequence having SEQ ID NO: 989; a VH nucleotide sequence having SEQ ID NO: 987 and a VL nucleotide sequence having SEQ ID NO: 991; a VH nucleotide sequence having SEQ ID NO: 993 and a VL nucleotide sequence having SEQ ID NO: 997; a VH nucleotide sequence having SEQ ID NO: 995 and a VK nucleotide sequence having SEQ ID NO: 999; a VH nucleotide sequence having SEQ ID NO: 1001 and a VL nucleotide sequence having SEQ ID NO: 1005; a VH nucleotide sequence having SEQ ID NO: 1003 and a VL nucleotide sequence having SEQ ID NO: 1007; a VH nucleotide sequence having SEQ ID NO: 1009 and a VL nucleotide sequence having SEQ ID NO: 1011; a VH nucleotide sequence having SEQ ID NO: 1013 and a VL nucleotide sequence having SEQ ID NO: 1015; and a VH nucleotide sequence having SEQ ID NO: 1017 and a VK nucleotide sequence having SEQ ID NO: 1019; a VH nucleotide sequence having SEQ ID NO: 1020 and a VL nucleotide sequence having SEQ ID NO: 1022.

[00089] Exemplary anti-influenza antibody include antibodies having a VH amino acid sequence having SEQ ID NO: 982 and a VL amino acid sequence having SEQ ID NO: 984; a VH amino acid sequence having SEQ ID NO: 986 and a VL amino acid sequence having SEQ ID NO: 988; a VH amino acid sequence having SEQ ID NO: 986 and a VL amino acid sequence having SEQ ID NO: 990; a VH amino acid sequence having SEQ ID NO: 992 and a VL amino acid sequence having SEQ ID NO: 994; a VH amino acid sequence having SEQ ID NO: 992 and a VK amino acid sequence having SEQ ID NO: 996; a VH amino acid sequence having SEQ ID NO: 998 and a VL amino acid sequence having SEQ ID NO: 1000; a VH amino acid sequence having SEQ ID NO: 998 and a VL amino acid sequence having SEQ ID NO: 1002; a VH amino acid sequence having SEQ ID NO: 1004 and a VL amino acid sequence having SEQ ID NO: 1006; a VH amino acid sequence having SEQ ID NO: 1008 and a VL amino acid sequence having SEQ ID NO: 1010; a VH amino acid sequence having SEQ ID NO: 1012 and a VK amino acid sequence having SEQ ID NO: 1014; and a VH amino acid sequence having SEQ ID NO: 1016 and a VL amino acid sequence having SEQ ID NO: 1018.

[00090] In other embodiments the anti-influenza antibody has a heavy chain with three CDRs including the amino acid sequences of 1023, 1031, and 1039 and a light chain with three CDRs including the amino acid sequences 1047, 1059, and 1071; a heavy chain with three CDRs including the amino acid sequences of 1023, 1032, and 1040 and a light chain with three CDRs including the amino acid sequences 1048, 1060, and 1072; a heavy chain with three CDRs including the amino acid sequences of 1025, 1032, and 1040 and a light chain with three CDRs including the amino acid sequences 1057, 1069, and 1081; a heavy chain with three CDRs including the amino acid sequences of 1026, 1033, and 1041 and a light chain with three CDRs including the amino acid sequences 1049, 1061, and 1073; a heavy chain with three CDRs including the amino acid sequences of 1026, 1033, and 1041 and a light chain with three CDRs including the amino acid sequences 1054, 1066, and 1078; a heavy chain with three CDRs including the amino acid sequences of 1027, 1034, and 1042 and a light chain with three CDRs including the amino acid sequences 1050, 1062, and 1074; a heavy chain with three CDRs including the amino acid sequences of 1027, 1034, and 1042 and a light chain with three CDRs including the amino acid sequences 1056, 1068, and 1080; a heavy chain with three CDRs including the amino acid sequences of 1028, 1035, and 1043 and a light chain with three CDRs including the amino

acid sequences 1051, 1063, and 1065; a heavy chain with three CDRs including the amino acid sequences of 1028, 1036, and 1044 and a light chain with three CDRs including the amino acid sequences 1052, 1064, and 1076; a heavy chain with three CDRs including the amino acid sequences of 1029, 1037, and 1045 and a light chain with three CDRs including the amino acid sequences 1053, 1065, and 1077; or a heavy chain with three CDRs including the amino acid sequences of 1030, 1038, and 1046 and a light chain with three CDRs including the amino acid sequences 1058, 1070, and 1082.

[00091]

[00092] **Influenza (78)**

[00093] Exemplary anti-influenza antibodies include antibodies having containing a $_{VH}$ nucleotide sequence having SEQ ID NO: 397 and a $_{VL}$ nucleotide sequence having SEQ ID NO: 398; a $_{VH}$ nucleotide sequence having SEQ ID NO: 399 and a V_L nucleotide sequence having SEQ ID NO:400; a $_{VH}$ nucleotide sequence having SEQ ID NO: 401 and a V_L nucleotide sequence having SEQ ID NO: 402; a $_{VH}$ nucleotide sequence having SEQ ID NO: 403 and a $_{VL}$ nucleotide sequence having SEQ ID NO: 404; or a $_{VH}$ nucleotide sequence having SEQ ID NO: 405 and a $_{VL}$ nucleotide sequence having SEQ ID NO:406; or a $_{VH}$ nucleotide sequence having SEQ ID NO: 407 and a $_{VL}$ nucleotide sequence having SEQ ID NO:408; or a $_{VH}$ nucleotide sequence having SEQ ID NO: 409 and a $_{VL}$ nucleotide sequence having SEQ ID NO:410; or a $_{VH}$ nucleotide sequence having SEQ ID NO: 411 and a $_{VL}$ nucleotide sequence having SEQ ID NO:412; or a $_{VH}$ nucleotide sequence having SEQ ID NO: 413 and a $_{VL}$ nucleotide sequence having SEQ ID NO:414; or a $_{VH}$ nucleotide sequence having SEQ ID NO: 415 and a $_{VL}$ nucleotide sequence having SEQ ID NO:416; or a $_{VH}$ nucleotide sequence having SEQ ID NO: 417 and a $_{VL}$ nucleotide sequence having SEQ ID NO:418; or a $_{VH}$ nucleotide sequence having SEQ ID NO: 419 and a $_{VL}$ nucleotide sequence having SEQ ID NO:420;or a $_{VH}$ nucleotide sequence having SEQ ID NO: 421 and a $_{VL}$ nucleotide sequence having SEQ ID NO:422; or a $_{VH}$ nucleotide sequence having SEQ ID NO: 423 and a $_{VL}$ nucleotide sequence having SEQ ID NO:424; or a $_{VH}$ nucleotide sequence having SEQ ID NO: 425 and a $_{VL}$ nucleotide sequence having SEQ ID NO:426; or a $_{VH}$ nucleotide sequence having SEQ ID NO: 427 and a $_{VL}$ nucleotide sequence having SEQ ID NO:428; or a $_{VH}$ nucleotide sequence having SEQ ID NO: 429 and a $_{VL}$ nucleotide sequence having SEQ ID NO:430; or a $_{VH}$ nucleotide sequence having SEQ ID NO: 431 and a $_{VL}$ nucleotide sequence having SEQ ID NO:432; or a $_{VH}$ nucleotide sequence having SEQ

ID NO: 433 and a $_{VL}$ nucleotide sequence having SEQ ID NO:434; or a $_{VH}$ nucleotide sequence having SEQ ID NO: 435 and a $_{VL}$ nucleotide sequence having SEQ ID NO:436; or a $_{VH}$ nucleotide sequence having SEQ ID NO: 437 and a $_{VL}$ nucleotide sequence having SEQ ID NO:438; or a $_{VH}$ nucleotide sequence having SEQ ID NO: 439 and a $_{VL}$ nucleotide sequence having SEQ ID NO:440; or a $_{VH}$ nucleotide sequence having SEQ ID NO: 441 and a $_{VL}$ nucleotide sequence having SEQ ID NO:442; ; or a VH nucleotide sequence having SEQ ID NO: 541 and a VL nucleotide sequence having SEQ ID NO: 542 ; or a VH nucleotide sequence having SEQ ID NO: 543 and a VL nucleotide sequence having SEQ ID NO: 544 ; or a VH nucleotide sequence having SEQ ID NO: 545 and a VL nucleotide sequence having SEQ ID NO: 546 ; or a VH nucleotide sequence having SEQ ID NO: 547 and a VL nucleotide sequence having SEQ ID NO: 548 ; or a VH nucleotide sequence having SEQ ID NO: 549 and a VL nucleotide sequence having SEQ ID NO: 550 ; or a VH nucleotide sequence having SEQ ID NO: 551 and a VL nucleotide sequence having SEQ ID NO: 552 ; or a VH nucleotide sequence having SEQ ID NO: 553 and a VL nucleotide sequence having SEQ ID NO: 554 ; or a VH nucleotide sequence having SEQ ID NO: 555 and a VL nucleotide sequence having SEQ ID NO: 556 ; or a VH nucleotide sequence having SEQ ID NO: 557 and a VL nucleotide sequence having SEQ ID NO: 558 ; or a VH nucleotide sequence having SEQ ID NO: 559 and a VL nucleotide sequence having SEQ ID NO: 560 ; or a VH nucleotide sequence having SEQ ID NO: 561 and a VL nucleotide sequence having SEQ ID NO: 562 ; or a VH nucleotide sequence having SEQ ID NO: 563 and a VL nucleotide sequence having SEQ ID NO: 564 ; or a VH nucleotide sequence having SEQ ID NO: 565 and a VL nucleotide sequence having SEQ ID NO: 566 ; or a VH nucleotide sequence having SEQ ID NO: 567 and a VL nucleotide sequence having SEQ ID NO: 568 ; or a VH nucleotide sequence having SEQ ID NO: 569 and a VL nucleotide sequence having SEQ ID NO: 570 ; or a VH nucleotide sequence having SEQ ID NO: 571 and a VL nucleotide sequence having SEQ ID NO: 572 ; or a VH nucleotide sequence having SEQ ID NO: 573 and a VL nucleotide sequence having SEQ ID NO: 574 ; or a VH nucleotide sequence having SEQ ID NO: 575 and a VL nucleotide sequence having SEQ ID NO: 576 ; or a VH nucleotide sequence having SEQ ID NO: 577 and a VL nucleotide sequence having SEQ ID NO: 578 ; or a VH nucleotide sequence having SEQ ID NO: 579 and a VL nucleotide sequence having SEQ ID NO: 580 ; or a VH nucleotide sequence having SEQ ID NO: 581 and a VL nucleotide sequence having SEQ ID NO: 582 ; or a VH

nucleotide sequence having SEQ ID NO: 583 and a VL nucleotide sequence having SEQ ID NO: 584 ; or a VH nucleotide sequence having SEQ ID NO: 585 and a VL nucleotide sequence having SEQ ID NO: 586 ; or a VH nucleotide sequence having SEQ ID NO: 587 and a VL nucleotide sequence having SEQ ID NO: 588 ; or a VH nucleotide sequence having SEQ ID NO: 589 and a VL nucleotide sequence having SEQ ID NO: 590 ; or a VH nucleotide sequence having SEQ ID NO: 591 and a VL nucleotide sequence having SEQ ID NO: 592 ; or a VH nucleotide sequence having SEQ ID NO: 593 and a VL nucleotide sequence having SEQ ID NO: 594 ; or a VH nucleotide sequence having SEQ ID NO: 595 and a VL nucleotide sequence having SEQ ID NO: 596 ; or a VH nucleotide sequence having SEQ ID NO: 597 and a VL nucleotide sequence having SEQ ID NO: 598 ; or a VH nucleotide sequence having SEQ ID NO: 599 and a VL nucleotide sequence having SEQ ID NO: 600.

[00094] Exemplary anti-influenza antibodies antibody include antibodies having containing a $_{VH}$ amino acid sequence having SEQ ID NO: 469 and a $_{VL}$ amino acid sequence having SEQ ID NO: 470; a $_{VH}$ amino acid having SEQ ID NO: 471 and a V_L polypeptide sequence having SEQ ID NO:472; a $_{VH}$ amino acid sequence having SEQ ID NO: 473 and a V_L amino acid sequence having SEQ ID NO: 474; a $_{VH}$ amino acid sequence having SEQ ID NO: 475 and a $_{VL}$ amino acid sequence having SEQ ID NO: 476; or a $_{VH}$ nucleotide sequence having SEQ ID NO: 477 and a $_{VL}$ nucleotide sequence having SEQ ID NO:478; a $_{VH}$ amino acid sequence having SEQ ID NO: 479 and a $_{VL}$ amino acid sequence having SEQ ID NO: 480; a $_{VH}$ amino acid sequence having SEQ ID NO: 481 and a $_{VL}$ amino acid sequence having SEQ ID NO: 482; a $_{VH}$ amino acid sequence having SEQ ID NO: 483 and a $_{VL}$ amino acid sequence having SEQ ID NO: 484; a $_{VH}$ amino acid sequence having SEQ ID NO: 485 and a $_{VL}$ amino acid sequence having SEQ ID NO: 486; a $_{VH}$ amino acid sequence having SEQ ID NO: 487 and a $_{VL}$ amino acid sequence having SEQ ID NO: 488; a $_{VH}$ amino acid sequence having SEQ ID NO: 489 and a $_{VL}$ amino acid sequence having SEQ ID NO: 490; a $_{VH}$ amino acid sequence having SEQ ID NO: 491 and a $_{VL}$ amino acid sequence having SEQ ID NO: 492; a $_{VH}$ amino acid sequence having SEQ ID NO: 493 and a $_{VL}$ amino acid sequence having SEQ ID NO: 494; a $_{VH}$ amino acid sequence having SEQ ID NO: 495 and a $_{VL}$ amino acid sequence having SEQ ID NO: 496; a $_{VH}$ amino acid sequence having SEQ ID NO: 497 and a $_{VL}$ amino acid sequence having SEQ ID NO: 498; a $_{VH}$ amino acid sequence having SEQ ID NO: 499 and a $_{VL}$ amino acid sequence having

SEQ ID NO: 500; a $_{VH}$ amino acid sequence having SEQ ID NO: 501 and a $_{VL}$ amino acid sequence having SEQ ID NO: 502; a $_{VH}$ amino acid sequence having SEQ ID NO: 503 and a $_{VL}$ amino acid sequence having SEQ ID NO: 504; a $_{VH}$ amino acid sequence having SEQ ID NO: 505 and a $_{VL}$ amino acid sequence having SEQ ID NO: 506; a $_{VH}$ amino acid sequence having SEQ ID NO: 507 and a $_{VL}$ amino acid sequence having SEQ ID NO: 508; a $_{VH}$ amino acid sequence having SEQ ID NO: 509 and a $_{VL}$ amino acid sequence having SEQ ID NO: 510; a $_{VH}$ amino acid sequence having SEQ ID NO: 511 and a $_{VL}$ amino acid sequence having SEQ ID NO: 512; a $_{VH}$ amino acid sequence having SEQ ID NO: 513 and a $_{VL}$ amino acid sequence having SEQ ID NO: 514; a $_{VH}$ amino acid sequence having SEQ ID NO: 515 and a $_{VL}$ amino acid sequence having SEQ ID NO: 516; a $_{VH}$ amino acid sequence having SEQ ID NO: 517 and a $_{VL}$ amino acid sequence having SEQ ID NO: 518; a $_{VH}$ amino acid sequence having SEQ ID NO: 519 and a $_{VL}$ amino acid sequence having SEQ ID NO: 520; a $_{VH}$ amino acid sequence having SEQ ID NO: 521 and a $_{VL}$ amino acid sequence having SEQ ID NO: 522; a $_{VH}$ amino acid sequence having SEQ ID NO: 523 and a $_{VL}$ amino acid sequence having SEQ ID NO: 524; a $_{VH}$ amino acid sequence having SEQ ID NO: 525 and a $_{VL}$ amino acid sequence having SEQ ID NO: 526; a $_{VH}$ amino acid sequence having SEQ ID NO: 527 and a $_{VL}$ amino acid sequence having SEQ ID NO: 528; a $_{VH}$ amino acid sequence having SEQ ID NO: 529 and a $_{VL}$ amino acid sequence having SEQ ID NO: 530; a $_{VH}$ amino acid sequence having SEQ ID NO: 531 and a $_{VL}$ amino acid sequence having SEQ ID NO: 532; a $_{VH}$ amino acid sequence having SEQ ID NO: 533 and a $_{VL}$ amino acid sequence having SEQ ID NO: 534; a $_{VH}$ amino acid sequence having SEQ ID NO: 535 and a $_{VL}$ amino acid sequence having SEQ ID NO: 536; a $_{VH}$ amino acid sequence having SEQ ID NO: 537 and a $_{VL}$ amino acid sequence having SEQ ID NO: 538; a $_{VH}$ amino acid sequence having SEQ ID NO: 539 and a $_{VL}$ amino acid sequence having SEQ ID NO: 540 a VH amino acid sequence having SEQ ID NO: 601 and a VL amino acid sequence having SEQ ID NO: 602 a VH amino acid sequence having SEQ ID NO: 603 and a VL amino acid sequence having SEQ ID NO: 604 a VH amino acid sequence having SEQ ID NO: 605 and a VL amino acid sequence having SEQ ID NO: 606 a VH amino acid sequence having SEQ ID NO: 607 and a VL amino acid sequence having SEQ ID NO: 608 a VH amino acid sequence having SEQ ID NO: 609 and a VL amino acid sequence having SEQ ID NO: 610 a VH amino acid sequence having SEQ ID NO: 611 and a VL amino acid sequence having SEQ ID NO: 612 a VH amino acid sequence having

SEQ ID NO: 613 and a VL amino acid sequence having SEQ ID NO: 614 a VH amino acid sequence having SEQ ID NO: 615 and a VL amino acid sequence having SEQ ID NO: 616 a VH amino acid sequence having SEQ ID NO: 617 and a VL amino acid sequence having SEQ ID NO: 618 a VH amino acid sequence having SEQ ID NO: 619 and a VL amino acid sequence having SEQ ID NO: 620 a VH amino acid sequence having SEQ ID NO: 621 and a VL amino acid sequence having SEQ ID NO: 622 a VH amino acid sequence having SEQ ID NO: 623 and a VL amino acid sequence having SEQ ID NO: 624 a VH amino acid sequence having SEQ ID NO: 625 and a VL amino acid sequence having SEQ ID NO: 626 a VH amino acid sequence having SEQ ID NO: 627 and a VL amino acid sequence having SEQ ID NO: 628 a VH amino acid sequence having SEQ ID NO: 629 and a VL amino acid sequence having SEQ ID NO: 630 a VH amino acid sequence having SEQ ID NO: 631 and a VL amino acid sequence having SEQ ID NO: 632 a VH amino acid sequence having SEQ ID NO: 633 and a VL amino acid sequence having SEQ ID NO: 634 a VH amino acid sequence having SEQ ID NO: 635 and a VL amino acid sequence having SEQ ID NO: 636 a VH amino acid sequence having SEQ ID NO: 637 and a VL amino acid sequence having SEQ ID NO: 638 a VH amino acid sequence having SEQ ID NO: 639 and a VL amino acid sequence having SEQ ID NO: 640 a VH amino acid sequence having SEQ ID NO: 641 and a VL amino acid sequence having SEQ ID NO: 642 a VH amino acid sequence having SEQ ID NO: 643 and a VL amino acid sequence having SEQ ID NO: 644 a VH amino acid sequence having SEQ ID NO: 645 and a VL amino acid sequence having SEQ ID NO: 646 a VH amino acid sequence having SEQ ID NO: 647 and a VL amino acid sequence having SEQ ID NO: 648 a VH amino acid sequence having SEQ ID NO: 649 and a VL amino acid sequence having SEQ ID NO: 650 a VH amino acid sequence having SEQ ID NO: 651 and a VL amino acid sequence having SEQ ID NO: 652 a VH amino acid sequence having SEQ ID NO: 653 and a VL amino acid sequence having SEQ ID NO: 654 a VH amino acid sequence having SEQ ID NO: 655 and a VL amino acid sequence having SEQ ID NO: 656 a VH amino acid sequence having SEQ ID NO: 657 and a VL amino acid sequence having SEQ ID NO: 658 a VH amino acid sequence having SEQ ID NO: 659 and a VL amino acid sequence having SEQ ID NO: 660.

[00095] In other embodiments the anti-influenza antibodies antibody has a heavy chain with three CDRs including the amino acid sequences SEQ ID NO: 1, 37, 73

respectively and a light chain with three CDRs including the amino acid sequences 109, 145, 181 respectively; or a heavy chain with three CDRs comprising the amino acid sequences 2, 38, 74 respectively and a light chain with three CDRs comprising the amino acid sequences 110, 146, 182, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 3, 39, 75 respectively and a light chain with three CDRs comprising the amino acid sequences 111, 147, 183, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 4, 40, 76 respectively and a light chain with three CDRs comprising the amino acid sequences 112, 148, 184, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 5, 41, 77 respectively and a light chain with three CDRs comprising the amino acid sequences 113, 149, 185, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 6, 42, 78 respectively and a light chain with three CDRs comprising the amino acid sequences 114, 150, 186, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 7, 43, 79 respectively and a light chain with three CDRs comprising the amino acid sequences 115, 151, 187, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 8, 44, 80 respectively and a light chain with three CDRs comprising the amino acid sequences 116, 152, 188, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 9, 45, 81 respectively and a light chain with three CDRs comprising the amino acid sequences 117, 153, 189, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 10, 46, 82 respectively and a light chain with three CDRs comprising the amino acid sequences 118, 154, 190, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 11, 47, 83 respectively and a light chain with three CDRs comprising the amino acid sequences 119, 155, 191, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 12, 48, 84 respectively and a light chain with three CDRs comprising the amino acid sequences 120, 156, 192, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 13, 49, 85 respectively and a light chain with three CDRs comprising the amino acid sequences 121, 157, 193, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 14, 50, 86 respectively and a light chain with three CDRs comprising the amino acid sequences 122, 158, 194, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 15, 51, 87 respectively and a light chain with three CDRs comprising the amino acid sequences 123, 159, 195,

respectively; or a heavy chain with three CDRs comprising the amino acid sequences 16, 52, 88 respectively and a light chain with three CDRs comprising the amino acid sequences 124, 160, 196, respectively; ; or a heavy chain with three CDRs comprising the amino acid sequences 17, 53, 89 respectively and a light chain with three CDRs comprising the amino acid sequences 125, 161, 197, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 18, 54, 90 respectively and a light chain with three CDRs comprising the amino acid sequences 126, 162, 198, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 19, 55, 91 respectively and a light chain with three CDRs comprising the amino acid sequences 127, 163, 199, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 20, 56, 92 respectively and a light chain with three CDRs comprising the amino acid sequences 128, 164, 200, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 21, 57, 93 respectively and a light chain with three CDRs comprising the amino acid sequences 129, 165, 201, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 22, 58, 94 respectively and a light chain with three CDRs comprising the amino acid sequences 130, 166, 202, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 23, 59, 95 respectively and a light chain with three CDRs comprising the amino acid sequences 131, 167, 203, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 24, 60, 96 respectively and a light chain with three CDRs comprising the amino acid sequences 132, 168, 204, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 25, 61, 95 respectively and a light chain with three CDRs comprising the amino acid sequences 133, 169, 205, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 26, 62, 96 respectively and a light chain with three CDRs comprising the amino acid sequences 134, 170, 206, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 27, 63, 97 respectively and a light chain with three CDRs comprising the amino acid sequences 135, 171, 207, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 28, 64, 98 respectively and a light chain with three CDRs comprising the amino acid sequences 136, 172, 208, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 29, 65, 99 respectively and a light chain with three CDRs comprising the amino acid sequences 137, 173, 209, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 30, 66, 100 respectively

and a light chain with three CDRs comprising the amino acid sequences 138, 174, 210, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 31, 67, 101 respectively and a light chain with three CDRs comprising the amino acid sequences 139, 175, 211, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 32, 68, 102 respectively and a light chain with three CDRs comprising the amino acid sequences 140, 176, 212, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 33, 69, 103 respectively and a light chain with three CDRs comprising the amino acid sequences 141, 177, 213, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 34, 70, 104 respectively and a light chain with three CDRs comprising the amino acid sequences 142, 178, 214, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 35, 71, 105 respectively and a light chain with three CDRs comprising the amino acid sequences 143, 179, 215, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 36, 72, 106 respectively and a light chain with three CDRs comprising the amino acid sequences 144, 180, 216, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 217, 247, 277 respectively and a light chain with three CDRs comprising the amino acid sequences 307, 337, 367, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 218, 248, 278 respectively and a light chain with three CDRs comprising the amino acid sequences 308, 338, 368, respectively; ; or a heavy chain with three CDRs comprising the amino acid sequences 219, 249, 279 respectively and a light chain with three CDRs comprising the amino acid sequences 309, 339, 369, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 220, 250, 280 respectively and a light chain with three CDRs comprising the amino acid sequences 310, 340, 370, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 221, 251, 281 respectively and a light chain with three CDRs comprising the amino acid sequences 311, 341, 371, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 222, 252, 282 respectively and a light chain with three CDRs comprising the amino acid sequences 312, 342, 372, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 223, 253, 283 respectively and a light chain with three CDRs comprising the amino acid sequences 313, 343, 373, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 224, 254, 284 respectively and a light

chain with three CDRs comprising the amino acid sequences 314, 344, 374, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 225, 255, 285 respectively and a light chain with three CDRs comprising the amino acid sequences 315, 345, 375, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 226, 256, 286 respectively and a light chain with three CDRs comprising the amino acid sequences 316, 346, 376, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 227, 257, 287 respectively and a light chain with three CDRs comprising the amino acid sequences 317, 347, 377, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 228, 258, 288 respectively and a light chain with three CDRs comprising the amino acid sequences 318, 348, 378, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 229, 259, 289 respectively and a light chain with three CDRs comprising the amino acid sequences 319, 349, 379, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 230, 260, 290 respectively and a light chain with three CDRs comprising the amino acid sequences 320, 350, 380, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 231, 261, 291 respectively and a light chain with three CDRs comprising the amino acid sequences 321, 351, 381, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 232, 262, 292 respectively and a light chain with three CDRs comprising the amino acid sequences 322, 352, 382, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 233, 263, 293 respectively and a light chain with three CDRs comprising the amino acid sequences 323, 353, 383, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 234, 273, 294 respectively and a light chain with three CDRs comprising the amino acid sequences 324, 354, 384, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 235, 274, 295 respectively and a light chain with three CDRs comprising the amino acid sequences 325, 355, 385, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 236, 275, 296 respectively and a light chain with three CDRs comprising the amino acid sequences 326, 356, 386, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 237, 276, 297 respectively and a light chain with three CDRs comprising the amino acid sequences 327, 357, 387, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 237, 277, 298 respectively and a light

chain with three CDRs comprising the amino acid sequences 328, 358, 388, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 238, 278, 299 respectively and a light chain with three CDRs comprising the amino acid sequences 329, 359, 389, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 239, 279, 300 respectively and a light chain with three CDRs comprising the amino acid sequences 330, 360, 390, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 240, 280, 301 respectively and a light chain with three CDRs comprising the amino acid sequences 331, 361, 391, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 241, 281, 302 respectively and a light chain with three CDRs comprising the amino acid sequences 332, 362, 392, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 242, 282, 303 respectively and a light chain with three CDRs comprising the amino acid sequences 333, 363, 393, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 243, 283, 304 respectively and a light chain with three CDRs comprising the amino acid sequences 334, 364, 394, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 244, 284, 305 respectively and a light chain with three CDRs comprising the amino acid sequences 335, 365, 395, respectively; or a heavy chain with three CDRs comprising the amino acid sequences 245, 285, 306 respectively and a light chain with three CDRs comprising the amino acid sequences 336, 366, 396, respectively.

[00096] Other anti-influenza antibodies include those having the amino acid or nucleic acid sequences shown in the below Table 1.

Table 1A. Antibody 3I14Variable Region nucleic acid sequences
V_H chain of 3I14 (SEQ ID NO:1665)
CAGGTGCAGCTGTTGGAGTCTGGGGGAGGCGTGGTCCAGCCTGGGAGGTCCCTGAGACTCTCCTGT GCAGCCTCTGGATTCACCTTCAGTAACTATGGCATGCACTGGGTCCGCCAGGCTCCAGGCAAGGGG CTGGAGTGGGTGGCAATTATATCATTTGATGGAAGTAAAAAATATTATGCAAACTCCGTGAAGGGC CGATCCACCATCTCCAGAGACAATTCCAAGAACACGCTGTCTCTGCAAATGAACAGCCTGGGACCT GAGGACACGGCTCTATATTACTGTGCGAAACTGCCCTCCCCGTATTACTTTGATAGTCGGTTCGTG TGGGTCGCCGCCAGCGCATTTCACTTCTGGGGCCAGGGAATCCTGGTCACCGTCTCTTCA
V_L chain of 3I14 (SEQ ID NO:1667)

AATTTTATGCTGACTCAGCCACCCTCAGCGTCTGGGACCCCCGGGCAGAGGGTCACCATCTCTTGC TCTGGAAGCAGCTCCAACATCGGAGGTAATACTGTACACTGGTTCCAGCAGCTCCCAGGAACGGCC CCCAAACTCCTCATCTATACTAATAGTCTGCGGCCCTCAGGGGTCCCTGACCGATTCTCTGGCTCC AAGTCTGGCACCTCAGCCTCCCTGGCCATCAGTGGGCTCCAGTCTGAGGATGAGGCTGATTATTAC TGTGCAGCATGGGATGACAGCCTAAATGGTCAGGTGTTCGGCGGAGGGACCAAGCTGACCGTCCTA

Table 1B. Antibody3I14Variable Region amino acid sequences
V_H chain of 3I14 (SEQ ID NO: 1666)
QVQLLESGGGVVQPGRSLRLSCAAS**GFTFSNYG**MHWVRQAPGKGLEWVAI**ISFDGSKK**YY ANSVKGRSTISRDNSKNTLSLQMNSLGPEDTALYY**CAKLPSPYYFDSRFVWVAASAFHFW** GQGILVTVSS
V_L chain of 3I14 (SEQ ID NO:1668)
NFMLTQPPSASGTPGQRVTISCSGS**SSNIGGNT**VHWFQQLPGTAPKLLIY**TNS**LRPSGVPD RFSGSKSGTSASLAISGLQSEDEADYY**CAAWDDSLNGQVF**GGGTKLTVL

Table 1C. Antibody 3I14V_LD94N Variable Region nucleic acid sequence
V_L chain of 3I14V_LD94N (SEQ ID NO:1669)
AATTTTATGCTGACTCAGCCACCCTCAGCGTCTGGGACCCCCGGGCAGAGGGTCACCATCTCTTGC TCTGGAAGCAGCTCCAACATCGGAGGTAATACTGTACACTGGTTCCAGCAGCTCCCAGGAACGGCC CCCAAACTCCTCATCTATACTAATAGTCTGCGGCCCTCAGGGGTCCCTGACCGATTCTCTGGCTCC AAGTCTGGCACCTCAGCCTCCCTGGCCATCAGTGGGCTCCAGTCTGAGGATGAGGCTGATTATTAC TGTGCAGCATGGGAT**N**ACAGCCTAAATGGTCAGGTGTTCGGCGGAGGGACCAAGCTGACCGTCCTA

Table 1C. Antibody 3I14V_LD94N Variable Region amino acid sequence
V_L chain of 3I14V_LD94N (SEQ ID NO:1670)
NFMLTQPPSASGTPGQRVTISCSGS**SSNIGGNT**VHWFQQLPGTAPKLLIY**TNS**LRPSGVPD RFSGSKSGTSASLAISGLQSEDEADYY**CAAWD**N**SLNGQVF**GGGTKLTVL

[00097] The amino acid sequences of the heavy and light chain complementary determining regions of the 3I14 and3I14V_LD94N neutralizing influenza antibodies are shown in the below Table 2

[00098] Table 2

HCDR1	GFTFSNYG	(SEQ ID NO:1671)
HCDR2	ISFDGSKK	(SEQ ID NO:1672)
HCDR3	CAKLPSPYYFDSRFVWVA ASAFHFW	(SEQ ID NO:1673)
LCDR1	SSNIGGNT	(SEQ ID NO:1674)
LCDR2	TNS	(SEQ ID NO:1675)
LCDR3	CAAWDDSLNGQVF	(SEQ ID NO:1676)
3I14V_LD94N LCDR3	CAAWDNSLNGQVF	(SEQ ID NO:1677)

[00099] Other binding domain than scFv can also be used for predefined targeting of lymphocytes, such as camelid single-domain antibody fragments or receptor ligands, antibody binding domains, antibody hypervariable loops or CDRs as non limiting examples.

[000100] In a preferred embodiment said transmembrane domain further comprises a stalk region between said extracellular ligand-binding domain and said transmembrane domain. The term "stalk region" used herein generally means any oligo- or polypeptide that functions to link the transmembrane domain to the extracellular ligand-binding domain. In particular, stalk region are used to provide more flexibility and accessibility for the extracellular ligand-binding domain. A stalk region may comprise up to 300 amino acids, preferably 10 to 100 amino acids and most preferably 25 to 50 amino acids. Stalk region may be derived from all or part of naturally occurring molecules, such as from all or part of the extracellular region of CD8, CD4 or CD28, or from all or part of an antibody constant region. Alternatively the stalk region may be a synthetic sequence that corresponds to a naturally occurring stalk sequence, or may be an entirely synthetic stalk sequence. In a preferred embodiment said stalk region is a part of human CD8 alpha chain

[000101] The signal transducing domain or intracellular signaling domain of the CAR of the invention is responsible for intracellular signaling following the binding of extracellular ligand binding domain to the target resulting in the activation of the immune cell and immune response. In other words, the signal transducing domain is responsible for the activation of at least one of the normal effector functions of the immune cell in which the CAR is expressed. For example, the effector function of a T cell can be a cytolytic activity or helper activity including the secretion of cytokines. Thus, the term "signal transducing domain" refers to the portion of a protein which transduces the effector signal function signal and directs the cell to perform a specialized function.

[000102] Signal transduction domain comprises two distinct classes of cytoplasmic signaling sequence, those that initiate antigen-dependent primary activation, and those that act in an antigen-independent manner to provide a secondary or co-stimulatory signal. Primary cytoplasmic signaling sequence can comprise signaling motifs which are known as immunoreceptor tyrosine-based activation motifs of ITAMs. ITAMs are well defined signaling motifs found in the intracytoplasmic tail of a variety of receptors that serve as binding sites for syk/zap70 class tyrosine kinases. Examples of ITAM used in the invention can include as non limiting examples those derived from TCR zeta, FcR gamma, FcR beta,

FcR epsilon, CD3 gamma, CD3 delta, CD3 epsilon, CD5, CD22, CD79a, CD79b and CD66d. In a preferred embodiment, the signaling transducing domain of the CAR can comprise the CD3 zeta signaling domain, or the intracytoplasmic domain of the Fc epsilon RI beta or gamma chains. In another preferred embodiment, the signaling is provided by CD3 zeta together with co-stimulation provided by CD28 and a tumor necrosis factor receptor (TNFr), such as 4-1BB or OX40), for example.

[000103] In particular embodiment the intracellular signaling domain of the CAR of the present invention comprises a co-stimulatory signal molecule. In some embodiments the intracellular signaling domain contains 2, 3, 4 or more co-stimulatory molecules in tandem. A co-stimulatory molecule is a cell surface molecule other than an antigen receptor or their ligands that is required for an efficient immune response.

[000104] "Co-stimulatory ligand" refers to a molecule on an antigen presenting cell that specifically binds a cognate co-stimulatory molecule on a T-cell, thereby providing a signal which, in addition to the primary signal provided by, for instance, binding of a TCR/CD3 complex with an MHC molecule loaded with peptide, mediates a T cell response, including, but not limited to, proliferation activation, differentiation and the like. A co-stimulatory ligand can include but is not limited to CD7, B7-1 (CD80), B7-2 (CD86), PD-L1, PD-L2, 4-1BBL, OX40L, inducible costimulatory ligand (ICOS-L), intercellular adhesion molecule (ICAM, CD30L, CD40, CD70, CD83, HLA-G, MICA, M1CB, HVEM, lymphotoxin beta receptor, 3/TR6, ILT3, ILT4, an agonist or antibody that binds Toll ligand receptor and a ligand that specifically binds with B7-H3. A co-stimulatory ligand also encompasses, inter alia, an antibody that specifically binds with a co-stimulatory molecule present on a T cell, such as but not limited to, CD27, CD28, 4-IBB, OX40, CD30, CD40, PD-1, ICOS, lymphocyte function-associated antigen-1 (LFA-1), CD2, CD7, LTGHT, NKG2C, B7-H3, a ligand that specifically binds with CD83.

[000105] A "co-stimulatory molecule" refers to the cognate binding partner on a T-cell that specifically binds with a co-stimulatory ligand, thereby mediating a co-stimulatory response by the cell, such as, but not limited to proliferation. Co-stimulatory molecules include, but are not limited to an MHC class 1 molecule, BTLA and Toll ligand receptor. Examples of costimulatory molecules include CD27, CD28, CD8, 4-1BB (CD137), OX40, CD30, CD40, PD-1, ICOS, lymphocyte function-associated antigen-1 (LFA-1), CD2, CD7, LIGHT, NKG2C, B7-H3 and a ligand that specifically binds with CD83 and the like. The

In another particular embodiment, said signal transducing domain is a TNFR-associated Factor 2 (TRAF2) binding motifs, intracytoplasmic tail of costimulatory TNFR member family. Cytoplasmic tail of costimulatory TNFR family member contains TRAF2 binding motifs consisting of the major conserved motif (P/S/A)X(Q/E)E) or the minor motif (PXQXXD), wherein X is any amino acid. TRAF proteins are recruited to the intracellular tails of many TNFRs in response to receptor trimerization.

[000106] The distinguishing features of appropriate transmembrane polypeptides comprise the ability to be expressed at the surface of an immune cell, in particular lymphocyte cells or Natural killer (NK) cells, and to interact together for directing cellular response of immune cell against a predefined target cell. The different transmembrane polypeptides of the CAR of the present invention comprising an extracellular ligand-biding domain and/or a signal transducing domain interact together to take part in signal transduction following the binding with a target ligand and induce an immune response. The transmembrane domain can be derived either from a natural or from a synthetic source. The transmembrane domain can be derived from any membrane-bound or transmembrane protein.

[000107] The term "a part of" used herein refers to any subset of the molecule, that is a shorter peptide. Alternatively, amino acid sequence functional variants of the polypeptide can be prepared by mutations in the DNA which encodes the polypeptide. Such variants or functional variants include, for example, deletions from, or insertions or substitutions of, residues within the amino acid sequence. Any combination of deletion, insertion, and substitution may also be made to arrive at the final construct, provided that the final construct possesses the desired activity, especially to exhibit a specific anti-target cellular immune activity. The functionality of the CAR of the invention within a host cell is detectable in an assay suitable for demonstrating the signaling potential of said CAR upon binding of a particular target. Such assays are available to the skilled person in the art. For example, this assay allows the detection of a signaling pathway, triggered upon binding of the target, such as an assay involving measurement of the increase of calcium ion release, intracellular tyrosine phosphorylation, inositol phosphate turnover, or interleukin (IL) 2, interferon .gamma., GM-CSF, IL-3, IL-4 production thus effected.

[000108] ***Cells***

[000109] Embodiments of the invention include cells that express a CAR (i.e, CARTS). The cell may be of any kind, including an immune cell capable of expressing the CAR for

cancer therapy or a cell, such as a bacterial cell, that harbors an expression vector that encodes the CAR. As used herein, the terms "cell," "cell line," and "cell culture" may be used interchangeably. All of these terms also include their progeny, which is any and all subsequent generations. It is understood that all progeny may not be identical due to deliberate or inadvertent mutations. In the context of expressing a heterologous nucleic acid sequence, "host cell" refers to a eukaryotic cell that is capable of replicating a vector and/or expressing a heterologous gene encoded by a vector. A host cell can, and has been, used as a recipient for vectors. A host cell may be "transfected" or "transformed," which refers to a process by which exogenous nucleic acid is transferred or introduced into the host cell. A transformed cell includes the primary subject cell and its progeny. As used herein, the terms "engineered" and "recombinant" cells or host cells are intended to refer to a cell into which an exogenous nucleic acid sequence, such as, for example, a vector, has been introduced. Therefore, recombinant cells are distinguishable from naturally occurring cells which do not contain a recombinantly introduced nucleic acid. In embodiments of the invention, a host cell is a T cell, including a cytotoxic T cell (also known as TC, Cytotoxic T Lymphocyte, CTL, T-Killer cell, cytolytic T cell, CD8+ T-cells or killer T cell); NK cells and NKT cells are also encompassed in the invention.

[000110] Some vectors may employ control sequences that allow it to be replicated and/or expressed in both prokaryotic and eukaryotic cells. One of skill in the art would further understand the conditions under which to incubate all of the above described host cells to maintain them and to permit replication of a vector. Also understood and known are techniques and conditions that would allow large-scale production of vectors, as well as production of the nucleic acids encoded by vectors and their cognate polypeptides, proteins, or peptides.

[000111] The cells can be autologous cells, syngeneic cells, allogenic cells and even in some cases, xenogeneic cells.

[000112] In many situations one may wish to be able to kill the modified CTLs, where one wishes to terminate the treatment, the cells become neoplastic, in research where the absence of the cells after their presence is of interest, or other event. For this purpose one can provide for the expression of certain gene products in which one can kill the modified cells under controlled conditions, such as inducible suicide genes.

[000113] ***Armed CARTS***

[000114] The invention further includes CARTS that are modified to secrete one or more polypeptides. The polypeptide can be for example an antibody or cytokine. Preferably, the antibody is specific for CAIX, GITR, PD-L1, PD-L2. PD-1, or CCR4

[000115] Armed CARTS have the advantage of simultaneously secreting a polypeptide at the targeted site, e.g. tumor site.

[000116] Armed CART can be constructed by including a nucleic acid encoding the polypeptide of interest after the intracellular signaling domain. Preferably, there is an internal ribosome entry site, (IRES), positioned between the intracellular signaling domain and the polypeptide of interest. One skilled in the art can appreciate that more than one polypeptide can be expressed by employing multiple IRES sequences in tandem.

[000117] In one embodiment, the methods and compositions presented herein provide a target-specific Anti-CAIX CAR T cell of second generation armed with the power to secrete anti-PD-L1 IgGs in the RCC milieu to combat T cell exhaustion. The human Anti-CAIX CAR containing the CD28 co-stimulatory domain was chosen based in its killing activity and low immunogenicity in human cRCC xenografts in mice. The Anti-CAIX CART cells-secreting Anti-PD-L1 IgG1 or IgG4 was extensively compared with an unrelated Anti-BCMA CAR or with an Anti-CAIX CAR, both secreting an irrelevant Anti-SARS IgG1. We have demonstrated stable expression of the CARs and high proliferation of all CART cells. Anti-CAIX CART cells have capacity to undergo clonal expansion when in contact with CAIX+ RCC cells, and were also activated, releasing high levels of IFN and IL-2, which could improve tumor suppression. These Anti-CAIX CART cells are also able to secrete high levels of Anti-PD-L1 IgG1 or IgG4 and these antibodies can interact specifically with PD-L1, inducing downregulation of the exhaustion markers PD-1, Tim-3 and Lag-3 in vitro and in vivo. These results have shown that the Anti-PD-L1 antibodies secreted in the tumor microenvironment are able to revert T cell exhaustion, facilitating the Anti-CAIX CART cells antitumor activity. These Anti-CAIX CART cells, mainly the ones secreting anti-PD-L1, are also able to diminish the proliferation of CAIX+ RCC cells, resulting in a slow tumor growth and small tumor size and weight in an orthotopic NSG mice model of RCC. In addition, Anti-CAIX CART cell secreting the IgG1 isotype of Anti-PD-L1 was also able to induce ADCC in vitro and increased the number of human NK cells infiltrating the tumor site in vivo. The human NK cells were injected only in 2 mice of each group, two days before their euthanasia to determine the NK cells capacity to recognize the

IgG1 isotype of the Anti-PD-L1 in vivo, which was attested. The injection of human NK cells was not made in the beginning of the treatment once our previous experience with this mice model showed that these cells last only for a few days in their blood

[000118] In one embodiment, the injection of CART cells into mice was performed without the addition of interleukins to avoid their influence in the therapeutic effect of CART cells alone.

[000119] In another embodiment, CART cells can be maintained with the use of cytokines such as, for example, IL-2, IL-4, IL-7, IL-9, IL-15 and IL-21.

[000120] Cytokines sharing the γc receptor, like IL-2, IL-4, IL-7, IL-9, IL-15 and IL-21 are important for the development and maintenance of memory T cells. Among them, IL-21 promote a less differentiated phenotype, associated with an enrichment of tumor-specific CD8 T cells, with increased anti-tumor effect in a mouse melanoma model when compared to IL-2 or IL-15.

[000121] In certain embodiments, CART cells are maintained with IL-21.

[000122] CAIX is a consistent marker for development of cancer targeted systemic therapies due to it overexpression in many tumors, remarkably in cRCC, but it is also expressed physiologically in a few tissues.

[000123] In one embodiment, the anti-CAIX scFv in the CAR recognizes the catalytic domain of CAIX, located in the central portion of the protein, which could increase its specificity to sites of higher expression of CAIX.

[000124] The choice of CD28 as a co-stimulatory domain for the CARs presented herein was based in the fact that CD28 CARs direct an active proliferative response and enhance effector functions, whereas 4-1BB-based CARs induce a more progressive T cell accumulation that may counterweigh for less immediate effectiveness. In one embodiment, the CD28 is replaced by 41BB in the CAR constructs.

[000125] T cell exhaustion is common in cancer and these T cells present low capacities of proliferation and cytokine production associated with high apoptosis rate and expression of inhibitory receptors like PD-1, Tim-3 and Lag3. New strategies for preventing T cell exhaustion include of PD-1/PD-L1 axis.

[000126] The methods and compositions presented herein provide Anti-CAIX CART cells-secreting Anti-PD-L1 IgG1 or IgG4 that can diminish T cell exhaustion, improving CART cell efficiency in the cRCC treatment *in vitro* and *in vivo*.

[000127] ***Introduction of Constructs into CTLs***

[000128] Expression vectors that encode the CARs can be introduced as one or more DNA molecules or constructs, where there may be at least one marker that will allow for selection of host cells that contain the construct(s).

[000129] The constructs can be prepared in conventional ways, where the genes and regulatory regions may be isolated, as appropriate, ligated, cloned in an appropriate cloning host, analyzed by restriction or sequencing, or other convenient means. Particularly, using PCR, individual fragments including all or portions of a functional unit may be isolated, where one or more mutations may be introduced using "primer repair", ligation, in vitro mutagenesis, etc., as appropriate. The construct(s) once completed and demonstrated to have the appropriate sequences may then be introduced into the CTL by any convenient means. The constructs may be integrated and packaged into non-replicating, defective viral genomes like Adenovirus, Adeno-associated virus (AAV), or Herpes simplex virus (HSV) or others, including retroviral vectors or lentiviral vectors, for infection or transduction into cells. The constructs may include viral sequences for transfection, if desired. Alternatively, the construct may be introduced by fusion, electroporation, biolistics, transfection, lipofection, or the like. The host cells may be grown and expanded in culture before introduction of the construct(s), followed by the appropriate treatment for introduction of the construct(s) and integration of the construct(s). The cells are then expanded and screened by virtue of a marker present in the construct. Various markers that may be used successfully include hprt, neomycin resistance, thymidine kinase, hygromycin resistance, etc.

[000130] In some instances, one may have a target site for homologous recombination, where it is desired that a construct be integrated at a particular locus. For example,) can knock-out an endogenous gene and replace it (at the same locus or elsewhere) with the gene encoded for by the construct using materials and methods as are known in the art for homologous recombination. For homologous recombination, one may use either .OMEGA. or O-vectors. See, for example, Thomas and Capecchi, Cell (1987) 51, 503-512; Mansour, et al., Nature (1988) 336, 348-352; and Joyner, et al., Nature (1989) 338, 153-156.

[000131] The constructs may be introduced as a single DNA molecule encoding at least the CAR and optionally another gene, or different DNA molecules having one or more genes. Other genes include genes that encode therapeutic molecules or suicide genes, for

example. The constructs may be introduced simultaneously or consecutively, each with the same or different markers.

[000132] Vectors containing useful elements such as bacterial or yeast origins of replication, selectable and/or amplifiable markers, promoter/enhancer elements for expression in prokaryotes or eukaryotes, etc. that may be used to prepare stocks of construct DNAs and for carrying out transfections are well known in the art, and many are commercially available.

[000133] ***Methods of Use***

[000134] The cells according to the invention can be used for treating cancer, viral infections or autoimmune disorders in a patient in need thereof. In another embodiment, said isolated cell according to the invention can be used in the manufacture of a medicament for treatment of a cancer, viral infections of autoimmune disorders, in a patient in need thereof.

[000135] The present invention relies on methods for treating patients in need thereof, said method comprising at least one of the following steps: (a) providing a chimeric antigen receptor cells according to the invention and (b) administrating the cells to said patient.

[000136] Said treatment can be ameliorating, curative or prophylactic. It may be either part of an autologous immunotherapy or part of an allogenic immunotherapy treatment. By autologous, it is meant that cells, cell line or population of cells used for treating patients are originating from said patient or from a Human Leucocyte Antigen (HLA) compatible donor. By allogeneic is meant that the cells or population of cells used for treating patients are not originating from said patient but from a donor.

[000137] The invention is particularly suited for allogenic immunotherapy, insofar as it enables the transformation of T-cells, typically obtained from donors, into non-alloreactive cells. This may be done under standard protocols and reproduced as many times as needed. The resulted modified T cells may be pooled and administrated to one or several patients, being made available as an "off the shelf" therapeutic product.

[000138] Cells that can be used with the disclosed methods are described in the previous section. Said treatment can be used to treat patients diagnosed with cancer, viral infection, autoimmune disorders or Graft versus Host Disease (GvHD). Cancers that may be treated include tumors that are not vascularized, or not yet substantially vascularized, as well as vascularized tumors. The cancers may comprise nonsolid tumors (such as hematological

tumors, for example, leukemias and lymphomas) or may comprise solid tumors. Types of cancers to be treated with the CARs of the invention include, but are not limited to, carcinoma, blastoma, and sarcoma, and certain leukemia or lymphoid malignancies, benign and malignant tumors, and malignancies e.g., sarcomas, carcinomas, and melanomas. Adult tumors/cancers and pediatric tumors/cancers are also included.

[000139] It can be a treatment in combination with one or more therapies against cancer selected from the group of antibodies therapy, chemotherapy, cytokines therapy, dendritic cell therapy, gene therapy, hormone therapy, laser light therapy and radiation therapy.

[000140] According to a preferred embodiment of the invention, said treatment can be administrated into patients undergoing an immunosuppressive treatment. Indeed, the present invention preferably relies on cells or population of cells, which have been made resistant to at least one immunosuppressive agent due to the inactivation of a gene encoding a receptor for such immunosuppressive agent. In this aspect, the immunosuppressive treatment should help the selection and expansion of the T-cells according to the invention within the patient.

[000141] In a further embodiment, the cell compositions of the present invention are administered to a patient in conjunction with (e.g., before, simultaneously or following) bone marrow transplantation, T cell ablative therapy using either chemotherapy agents such as, fludarabine, external-beam radiation therapy (XRT), cyclophosphamide, or antibodies such as OKT3 or CAM PATH. In another embodiment, the cell compositions of the present invention are administered following B-cell ablative therapy such as agents that react with CD20, e.g., Rituxan. For example, in one embodiment, subjects may undergo standard treatment with high dose chemotherapy followed by peripheral blood stem cell transplantation. In certain embodiments, following the transplant, subjects receive an infusion of the expanded immune cells of the present invention. In an additional embodiment, expanded cells are administered before or following surgery. Said modified cells obtained by any one of the methods described here can be used in a particular aspect of the invention for treating patients in need thereof against Host versus Graft (HvG) rejection and Graft versus Host Disease (GvHD); therefore in the scope of the present invention is a method of treating patients in need thereof against Host versus Graft (HvG) rejection and Graft versus Host Disease (GvHD) comprising treating said patient by administering to said patient an effective amount of modified cells comprising inactivated TCR alpha and/or TCR beta genes.

[000142] ***Administration of Cells***

[000143] The invention is particularly suited for allogenic immunotherapy, insofar as it enables the transformation of T-cells, typically obtained from donors, into non-alloreactive cells. This may be done under standard protocols and reproduced as many times as needed. The resulted modified T cells may be pooled and administrated to one or several patients, being made available as an "off the shelf" therapeutic product.

[000144] Depending upon the nature of the cells, the cells may be introduced into a host organism, e.g. a mammal, in a wide variety of ways. The cells may be introduced at the site of the tumor, in specific embodiments, although in alternative embodiments the cells hone to the cancer or are modified to hone to the cancer. The number of cells that are employed will depend upon a number of circumstances, the purpose for the introduction, the lifetime of the cells, the protocol to be used, for example, the number of administrations, the ability of the cells to multiply, the stability of the recombinant construct, and the like. The cells may be applied as a dispersion, generally being injected at or near the site of interest. The cells may be in a physiologically-acceptable medium.

[000145] In some embodiments, the cells are encapsulated to inhibit immune recognition and placed at the site of the tumor.

[000146] The cells may be administered as desired. Depending upon the response desired, the manner of administration, the life of the cells, the number of cells present, various protocols may be employed. The number of administrations will depend upon the factors described above at least in part.

[000147] The administration of the cells or population of cells according to the present invention may be carried out in any convenient manner, including by aerosol inhalation, injection, ingestion, transfusion, implantation or transplantation. The compositions described herein may be administered to a patient subcutaneously, intradermaly, intratumorally, intranodally, intramedullary, intramuscularly, by intravenous or intralymphatic injection, or intraperitoneally. In one embodiment, the cell compositions of the present invention are preferably administered by intravenous injection.

[000148] The administration of the cells or population of cells can consist of the administration of 10^4 -10^9 cells per kg body weight, preferably 10^5 to 10^6 cells/kg body weight including all integer values of cell numbers within those ranges. The cells or population of cells can be administrated in one or more doses. In another embodiment, said

effective amount of cells are administrated as a single dose. In another embodiment, said effective amount of cells are administrated as more than one dose over a period time. Timing of administration is within the judgment of managing physician and depends on the clinical condition of the patient. The cells or population of cells may be obtained from any source, such as a blood bank or a donor. While individual needs vary, determination of optimal ranges of effective amounts of a given cell type for a particular disease or conditions within the skill of the art. An effective amount means an amount which provides a therapeutic or prophylactic benefit. The dosage administrated will be dependent upon the age, health and weight of the recipient, kind of concurrent treatment, if any, frequency of treatment and the nature of the effect desired.

[000149] It should be appreciated that the system is subject to many variables, such as the cellular response to the ligand, the efficiency of expression and, as appropriate, the level of secretion, the activity of the expression product, the particular need of the patient, which may vary with time and circumstances, the rate of loss of the cellular activity as a result of loss of cells or expression activity of individual cells, and the like. Therefore, it is expected that for each individual patient, even if there were universal cells which could be administered to the population at large, each patient would be monitored for the proper dosage for the individual, and such practices of monitoring a patient are routine in the art.

[000150] ***Nucleic Acid-Based Expression Systems***

[000151] The CARs of the present invention may be expressed from an expression vector. Recombinant techniques to generate such expression vectors are well known in the art.

[000152] Vectors

[000153] The term "vector" is used to refer to a carrier nucleic acid molecule into which a nucleic acid sequence can be inserted for introduction into a cell where it can be replicated. A nucleic acid sequence can be "exogenous," which means that it is foreign to the cell into which the vector is being introduced or that the sequence is homologous to a sequence in the cell but in a position within the host cell nucleic acid in which the sequence is ordinarily not found. Vectors include plasmids, cosmids, viruses (bacteriophage, animal viruses, and plant viruses), and artificial chromosomes (e.g., YACs). One of skill in the art would be well equipped to construct a vector through standard recombinant techniques (see, for example, Maniatis et al., 1988 and Ausubel et al., 1994, both incorporated herein by reference).

[000154] The term "expression vector" refers to any type of genetic construct comprising a nucleic acid coding for a RNA capable of being transcribed. In some cases, RNA molecules are then translated into a protein, polypeptide, or peptide. In other cases, these sequences are not translated, for example, in the production of antisense molecules or ribozymes. Expression vectors can contain a variety of "control sequences," which refer to nucleic acid sequences necessary for the transcription and possibly translation of an operably linked coding sequence in a particular host cell. In addition to control sequences that govern transcription and translation, vectors and expression vectors may contain nucleic acid sequences that serve other functions as well and are described infra.

[000155] . Promoters and Enhancers

[000156] A "promoter" is a control sequence that is a region of a nucleic acid sequence at which initiation and rate of transcription are controlled. It may contain genetic elements at which regulatory proteins and molecules may bind, such as RNA polymerase and other transcription factors, to initiate the specific transcription a nucleic acid sequence. The phrases "operatively positioned," "operatively linked," "under control," and "under transcriptional control" mean that a promoter is in a correct functional location and/or orientation in relation to a nucleic acid sequence to control transcriptional initiation and/or expression of that sequence.

[000157] A promoter generally comprises a sequence that functions to position the start site for RNA synthesis. The best known example of this is the TATA box, but in some promoters lacking a TATA box, such as, for example, the promoter for the mammalian terminal deoxynucleotidyl transferase gene and the promoter for the SV40 late genes, a discrete element overlying the start site itself helps to fix the place of initiation. Additional promoter elements regulate the frequency of transcriptional initiation. Typically, these are located in the region 30 110 bp upstream of the start site, although a number of promoters have been shown to contain functional elements downstream of the start site as well. To bring a coding sequence "under the control of" a promoter, one positions the 5' end of the transcription initiation site of the transcriptional reading frame "downstream" of (i.e., 3' of) the chosen promoter. The "upstream" promoter stimulates transcription of the DNA and promotes expression of the encoded RNA.

[000158] The spacing between promoter elements frequently is flexible, so that promoter function is preserved when elements are inverted or moved relative to one another. In the tk

promoter, the spacing between promoter elements can be increased to 50 bp apart before activity begins to decline. Depending on the promoter, it appears that individual elements can function either cooperatively or independently to activate transcription. A promoter may or may not be used in conjunction with an "enhancer," which refers to a cis-acting regulatory sequence involved in the transcriptional activation of a nucleic acid sequence.

[000159] A promoter may be one naturally associated with a nucleic acid sequence, as may be obtained by isolating the 5 prime' non-coding sequences located upstream of the coding segment and/or exon. Such a promoter can be referred to as "endogenous." Similarly, an enhancer may be one naturally associated with a nucleic acid sequence, located either downstream or upstream of that sequence. Alternatively, certain advantages will be gained by positioning the coding nucleic acid segment under the control of a recombinant or heterologous promoter, which refers to a promoter that is not normally associated with a nucleic acid sequence in its natural environment. A recombinant or heterologous enhancer refers also to an enhancer not normally associated with a nucleic acid sequence in its natural environment. Such promoters or enhancers may include promoters or enhancers of other genes, and promoters or enhancers isolated from any other virus, or prokaryotic or eukaryotic cell, and promoters or enhancers not "naturally occurring," i.e., containing different elements of different transcriptional regulatory regions, and/or mutations that alter expression. For example, promoters that are most commonly used in recombinant DNA construction include the lactamase (penicillinase), lactose and tryptophan (trp) promoter systems. In addition to producing nucleic acid sequences of promoters and enhancers synthetically, sequences may be produced using recombinant cloning and/or nucleic acid amplification technology, including PCR.TM., in connection with the compositions disclosed herein (see U.S. Pat. Nos. 4,683,202 and 5,928,906, each incorporated herein by reference). Furthermore, it is contemplated the control sequences that direct transcription and/or expression of sequences within non-nuclear organelles such as mitochondria, chloroplasts, and the like, can be employed as well.

[000160] Naturally, it will be important to employ a promoter and/or enhancer that effectively directs the expression of the DNA segment in the organelle, cell type, tissue, organ, or organism chosen for expression. Those of skill in the art of molecular biology generally know the use of promoters, enhancers, and cell type combinations for protein expression, (see, for example Sambrook et al. 1989, incorporated herein by reference). The

promoters employed may be constitutive, tissue-specific, inducible, and/or useful under the appropriate conditions to direct high level expression of the introduced DNA segment, such as is advantageous in the large-scale production of recombinant proteins and/or peptides. The promoter may be heterologous or endogenous.

[000161] Additionally any promoter/enhancer combination could also be used to drive expression. Use of a T3, T7 or SP6 cytoplasmic expression system is another possible embodiment. Eukaryotic cells can support cytoplasmic transcription from certain bacterial promoters if the appropriate bacterial polymerase is provided, either as part of the delivery complex or as an additional genetic expression construct.

[000162] The identity of tissue-specific promoters or elements, as well as assays to characterize their activity, is well known to those of skill in the art.

[000163] A specific initiation signal also may be required for efficient translation of coding sequences. These signals include the ATG initiation codon or adjacent sequences. Exogenous translational control signals, including the ATG initiation codon, may need to be provided. One of ordinary skill in the art would readily be capable of determining this and providing the necessary signals

[000164] In certain embodiments of the invention, the use of internal ribosome entry sites (IRES) elements are used to create multigene, or polycistronic, messages, and these may be used in the invention.

[000165] Vectors can include a multiple cloning site (MCS), which is a nucleic acid region that contains multiple restriction enzyme sites, any of which can be used in conjunction with standard recombinant technology to digest the vector. "Restriction enzyme digestion" refers to catalytic cleavage of a nucleic acid molecule with an enzyme that functions only at specific locations in a nucleic acid molecule. Many of these restriction enzymes are commercially available. Use of such enzymes is widely understood by those of skill in the art. Frequently, a vector is linearized or fragmented using a restriction enzyme that cuts within the MCS to enable exogenous sequences to be ligated to the vector. "Ligation" refers to the process of forming phosphodiester bonds between two nucleic acid fragments, which may or may not be contiguous with each other. Techniques involving restriction enzymes and ligation reactions are well known to those of skill in the art of recombinant technology.

[000166] Splicing sites, termination signals, origins of replication, and selectable markers may also be employed.

[000167] Plasmid Vectors

[000168] In certain embodiments, a plasmid vector is contemplated for use to transform a host cell. In general, plasmid vectors containing replicon and control sequences which are derived from species compatible with the host cell are used in connection with these hosts. The vector ordinarily carries a replication site, as well as marking sequences which are capable of providing phenotypic selection in transformed cells. In a non-limiting example, E. coli is often transformed using derivatives of pBR322, a plasmid derived from an E. coli species. pBR322 contains genes for ampicillin and tetracycline resistance and thus provides easy means for identifying transformed cells. The pBR plasmid, or other microbial plasmid or phage must also contain, or be modified to contain, for example, promoters which can be used by the microbial organism for expression of its own proteins.

[000169] In addition, phage vectors containing replicon and control sequences that are compatible with the host microorganism can be used as transforming vectors in connection with these hosts. For example, the phage lambda GEM.TM. 11 may be utilized in making a recombinant phage vector which can be used to transform host cells, such as, for example, E. coli LE392.

[000170] Further useful plasmid vectors include pIN vectors (Inouye et al., 1985); and pGEX vectors, for use in generating glutathione S transferase (GST) soluble fusion proteins for later purification and separation or cleavage. Other suitable fusion proteins are those with galactosidase, ubiquitin, and the like.

[000171] Bacterial host cells, for example, E. coli, comprising the expression vector, are grown in any of a number of suitable media, for example, LB. The expression of the recombinant protein in certain vectors may be induced, as would be understood by those of skill in the art, by contacting a host cell with an agent specific for certain promoters, e.g., by adding IPTG to the media or by switching incubation to a higher temperature. After culturing the bacteria for a further period, generally of between 2 and 24 h, the cells are collected by centrifugation and washed to remove residual media.

[000172] Viral Vectors

[000173] The ability of certain viruses to infect cells or enter cells via receptor mediated endocytosis, and to integrate into host cell genome and express viral genes stably and

efficiently have made them attractive candidates for the transfer of foreign nucleic acids into cells (e.g., mammalian cells). Components of the present invention may be a viral vector that encodes one or more CARs of the invention. Non-limiting examples of virus vectors that may be used to deliver a nucleic acid of the present invention are described below.

[000174] *Adenoviral Vectors*

[000175] A particular method for delivery of the nucleic acid involves the use of an adenovirus expression vector. Although adenovirus vectors are known to have a low capacity for integration into genomic DNA, this feature is counterbalanced by the high efficiency of gene transfer afforded by these vectors. "Adenovirus expression vector" is meant to include those constructs containing adenovirus sequences sufficient to (a) support packaging of the construct and (b) to ultimately express a tissue or cell specific construct that has been cloned therein. Knowledge of the genetic organization or adenovirus, a 36 kb, linear, double stranded DNA virus, allows substitution of large pieces of adenoviral DNA with foreign sequences up to 7 kb (Grunhaus and Horwitz, 1992).

[000176] *AAV Vectors*

[000177] The nucleic acid may be introduced into the cell using adenovirus assisted transfection. Increased transfection efficiencies have been reported in cell systems using adenovirus coupled systems (Kelleher and Vos, 1994; Cotten et al., 1992; Curiel, 1994). Adeno associated virus (AAV) is an attractive vector system for use in the cells of the present invention as it has a high frequency of integration and it can infect nondividing cells, thus making it useful for delivery of genes into mammalian cells, for example, in tissue culture (Muzyczka, 1992) or in vivo. AAV has a broad host range for infectivity (Tratschin et al., 1984; Laughlin et al., 1986; Lebkowski et al., 1988; McLaughlin et al., 1988). Details concerning the generation and use of rAAV vectors are described in U.S. Pat. Nos. 5,139,941 and 4,797,368, each incorporated herein by reference.

[000178] *Retroviral Vectors*

[000179] Retroviruses are useful as delivery vectors because of their ability to integrate their genes into the host genome, transferring a large amount of foreign genetic material, infecting a broad spectrum of species and cell types and of being packaged in special cell lines (Miller, 1992).

[000180] In order to construct a retroviral vector, a nucleic acid (e.g., one encoding the desired sequence) is inserted into the viral genome in the place of certain viral sequences to

produce a virus that is replication defective. In order to produce virions, a packaging cell line containing the gag, pol, and env genes but without the LTR and packaging components is constructed (Mann et al., 1983). When a recombinant plasmid containing a cDNA, together with the retroviral LTR and packaging sequences is introduced into a special cell line (e.g., by calcium phosphate precipitation for example), the packaging sequence allows the RNA transcript of the recombinant plasmid to be packaged into viral particles, which are then secreted into the culture media (Nicolas and Rubenstein, 1988; Temin, 1986; Mann et al., 1983). The media containing the recombinant retroviruses is then collected, optionally concentrated, and used for gene transfer. Retroviral vectors are able to infect a broad variety of cell types. However, integration and stable expression require the division of host cells (Paskind et al., 1975).

[000181] Lentiviruses are complex retroviruses, which, in addition to the common retroviral genes gag, pol, and env, contain other genes with regulatory or structural function. Lentiviral vectors are well known in the art (see, for example, Naldini et al., 1996; Zufferey et al., 1997; Blomer et al., 1997; U.S. Pat. Nos. 6,013,516 and 5,994,136). Some examples of lentivirus include the Human Immunodeficiency Viruses: HIV-1, HIV-2 and the Simian Immunodeficiency Virus: SIV. Lentiviral vectors have been generated by multiply attenuating the HIV virulence genes, for example, the genes env, vif, vpr, vpu and nef are deleted making the vector biologically safe.

[000182] Recombinant lentiviral vectors are capable of infecting non-dividing cells and can be used for both in vivo and ex vivo gene transfer and expression of nucleic acid sequences. For example, recombinant lentivirus capable of infecting a non-dividing cell wherein a suitable host cell is transfected with two or more vectors carrying the packaging functions, namely gag, pol and env, as well as rev and tat is described in U.S. Pat. No. 5,994,136, incorporated herein by reference. One may target the recombinant virus by linkage of the envelope protein with an antibody or a particular ligand for targeting to a receptor of a particular cell-type. By inserting a sequence (including a regulatory region) of interest into the viral vector, along with another gene which encodes the ligand for a receptor on a specific target cell, for example, the vector is now target-specific.

[000183] ***Other Viral Vectors***

[000184] Other viral vectors may be employed as vaccine constructs in the present invention. Vectors derived from viruses such as vaccinia virus (Ridgeway, 1988; Baichwal

and Sugden, 1986; Coupar et al., 1988), sindbis virus, cytomegalovirus and herpes simplex virus may be employed. They offer several attractive features for various mammalian cells (Friedmann, 1989; Ridgeway, 1988; Baichwal and Sugden, 1986; Coupar et al., 1988; Horwich et al., 1990).

[000185] ***Delivery Using Modified Viruses***

[000186] A nucleic acid to be delivered may be housed within an infective virus that has been engineered to express a specific binding ligand. The virus particle will thus bind specifically to the cognate receptors of the target cell and deliver the contents to the cell. A novel approach designed to allow specific targeting of retrovirus vectors was developed based on the chemical modification of a retrovirus by the chemical addition of lactose residues to the viral envelope. This modification can permit the specific infection of hepatocytes via sialoglycoprotein receptors.

[000187] Another approach to targeting of recombinant retroviruses was designed in which biotinylated antibodies against a retroviral envelope protein and against a specific cell receptor were used. The antibodies were coupled via the biotin components by using streptavidin (Roux et al., 1989). Using antibodies against major histocompatibility complex class I and class II antigens, they demonstrated the infection of a variety of human cells that bore those surface antigens with an ecotropic virus in vitro (Roux et al., 1989).

[000188] ***Vector Delivery and Cell Transformation***

[000189] Suitable methods for nucleic acid delivery for transfection or transformation of cells are known to one of ordinary skill in the art. Such methods include, but are not limited to, direct delivery of DNA such as by ex vivo transfection, by injection, and so forth. Through the application of techniques known in the art, cells may be stably or transiently transformed.

[000190] ***Ex Vivo Transformation***

[000191] Methods for transfecting eukaryotic cells and tissues removed from an organism in an ex vivo setting are known to those of skill in the art. Thus, it is contemplated that cells or tissues may be removed and transfected ex vivo using nucleic acids of the present invention. In particular aspects, the transplanted cells or tissues may be placed into an organism. In preferred facets, a nucleic acid is expressed in the transplanted cells.

Kits of the Invention

[000192] Any of the compositions described herein may be comprised in a kit. In a non-limiting example, one or more cells for use in cell therapy and/or the reagents to generate one or more cells for use in cell therapy that harbors recombinant expression vectors may be comprised in a kit. The kit components are provided in suitable container means.

[000193] Some components of the kits may be packaged either in aqueous media or in lyophilized form. The container means of the kits will generally include at least one vial, test tube, flask, bottle, syringe or other container means, into which a component may be placed, and preferably, suitably aliquoted. Where there are more than one component in the kit, the kit also will generally contain a second, third or other additional container into which the additional components may be separately placed. However, various combinations of components may be comprised in a vial. The kits of the present invention also will typically include a means for containing the components in close confinement for commercial sale. Such containers may include injection or blow molded plastic containers into which the desired vials are retained.

[000194] When the components of the kit are provided in one and/or more liquid solutions, the liquid solution is an aqueous solution, with a sterile aqueous solution being particularly ueful. In some cases, the container means may itself be a syringe, pipette, and/or other such like apparatus, from which the formulation may be applied to an infected area of the body, injected into an animal, and/or even applied to and/or mixed with the other components of the kit.

[000195] However, the components of the kit may be provided as dried powder(s). When reagents and/or components are provided as a dry powder, the powder can be reconstituted by the addition of a suitable solvent. It is envisioned that the solvent may also be provided in another container means. The kits may also comprise a second container means for containing a sterile, pharmaceutically acceptable buffer and/or other diluent.

[000196] In particular embodiments of the invention, cells that are to be used for cell therapy are provided in a kit, and in some cases the cells are essentially the sole component of the kit. The kit may comprise reagents and materials to make the desired cell. In specific embodiments, the reagents and materials include primers for amplifying desired sequences, nucleotides, suitable buffers or buffer reagents, salt, and so forth, and in some cases the reagents include vectors and/or DNA that encodes a CAR as described herein and/or regulatory elements therefor.

[000197] In particular embodiments, there are one or more apparatuses in the kit suitable for extracting one or more samples from an individual. The apparatus may be a syringe, scalpel, and so forth.

[000198] In some cases of the invention, the kit, in addition to cell therapy embodiments, also includes a second cancer therapy, such as chemotherapy, hormone therapy, and/or immunotherapy, for example. The kit(s) may be tailored to a particular cancer for an individual and comprise respective second cancer therapies for the individual.

[000199] ***Combination Therapy***

[000200] In certain embodiments of the invention, methods of the present invention for clinical aspects are combined with other agents effective in the treatment of hyperproliferative disease, such as anti-cancer agents. An "anti-cancer" agent is capable of negatively affecting cancer in a subject, for example, by killing cancer cells, inducing apoptosis in cancer cells, reducing the growth rate of cancer cells, reducing the incidence or number of metastases, reducing tumor size, inhibiting tumor growth, reducing the blood supply to a tumor or cancer cells, promoting an immune response against cancer cells or a tumor, preventing or inhibiting the progression of cancer, or increasing the lifespan of a subject with cancer. More generally, these other compositions would be provided in a combined amount effective to kill or inhibit proliferation of the cell. This process may involve contacting the cancer cells with the expression construct and the agent(s) or multiple factor(s) at the same time. This may be achieved by contacting the cell with a single composition or pharmacological formulation that includes both agents, or by contacting the cell with two distinct compositions or formulations, at the same time, wherein one composition includes the expression construct and the other includes the second agent(s).

[000201] Tumor cell resistance to chemotherapy and radiotherapy agents represents a major problem in clinical oncology. One goal of current cancer research is to find ways to improve the efficacy of chemo- and radiotherapy by combining it with other therapies. In the context of the present invention, it is contemplated that cell therapy could be used similarly in conjunction with chemotherapeutic, radiotherapeutic, or immunotherapeutic intervention, as well as pro-apoptotic or cell cycle regulating agents.

[000202] Alternatively, the present inventive therapy may precede or follow the other agent treatment by intervals ranging from minutes to weeks. In embodiments where the

other agent and present invention are applied separately to the individual, one would generally ensure that a significant period of time did not expire between the time of each delivery, such that the agent and inventive therapy would still be able to exert an advantageously combined effect on the cell. In such instances, it is contemplated that one may contact the cell with both modalities within about 12-24 h of each other and, more preferably, within about 6-12 h of each other. In some situations, it may be desirable to extend the time period for treatment significantly, however, where several d (2, 3, 4, 5, 6 or 7) to several wk (1, 2, 3, 4, 5, 6, 7 or 8) lapse between the respective administrations.

[000203] It is expected that the treatment cycles would be repeated as necessary. It also is contemplated that various standard therapies, as well as surgical intervention, may be applied in combination with the inventive cell therapy.

[000204] Chemotherapy

[000205] Cancer therapies also include a variety of combination therapies with both chemical and radiation based treatments. Combination chemotherapies include, for example, abraxane, altretamine, docetaxel, herceptin, methotrexate, novantrone, zoladex, cisplatin (CDDP), carboplatin, procarbazine, mechlorethamine, cyclophosphamide, camptothecin, ifosfamide, melphalan, chlorambucil, busulfan, nitrosurea, dactinomycin, daunorubicin, doxorubicin, bleomycin, plicomycin, mitomycin, etoposide (VP16), tamoxifen, raloxifene, estrogen receptor binding agents, taxol, gemcitabien, navelbine, farnesyl-protein tansferase inhibitors, transplatinum, 5-fluorouracil, vincristin, vinblastin and methotrexate, or any analog or derivative variant of the foregoing and also combinations thereof.

[000206] In specific embodiments, chemotherapy for the individual is employed in conjunction with the invention, for example before, during and/or after administration of the invention

[000207] Radiotherapy

[000208] Other factors that cause DNA damage and have been used extensively include what are commonly known as .gamma.-rays, X-rays, and/or the directed delivery of radioisotopes to tumor cells. Other forms of DNA damaging factors are also contemplated such as microwaves and UV-irradiation. It is most likely that all of these factors effect a broad range of damage on DNA, on the precursors of DNA, on the replication and repair of DNA, and on the assembly and maintenance of chromosomes. Dosage ranges for X-rays

range from daily doses of 50 to 200 roentgens for prolonged periods of time (3 to 4 wk), to single doses of 2000 to 6000 roentgens. Dosage ranges for radioisotopes vary widely, and depend on the half-life of the isotope, the strength and type of radiation emitted, and the uptake by the neoplastic cells.

[000209] The terms "contacted" and "exposed," when applied to a cell, are used herein to describe the process by which a therapeutic construct and a chemotherapeutic or radiotherapeutic agent are delivered to a target cell or are placed in direct juxtaposition with the target cell. To achieve cell killing or stasis, both agents are delivered to a cell in a combined amount effective to kill the cell or prevent it from dividing.

[000210] Immunotherapy

[000211] Immunotherapeutics generally rely on the use of immune effector cells and molecules to target and destroy cancer cells. The immune effector may be, for example, an antibody specific for some marker on the surface of a tumor cell. The antibody alone may serve as an effector of therapy or it may recruit other cells to actually effect cell killing. The antibody also may be conjugated to a drug or toxin (chemotherapeutic, radionuclide, ricin A chain, cholera toxin, pertussis toxin, etc.) and serve merely as a targeting agent. Alternatively, the effector may be a lymphocyte carrying a surface molecule that interacts, either directly or indirectly, with a tumor cell target. Various effector cells include cytotoxic T cells and NK cells.

[000212] Immunotherapy other than the inventive therapy described herein could thus be used as part of a combined therapy, in conjunction with the present cell therapy. The general approach for combined therapy is discussed below. Generally, the tumor cell must bear some marker that is amenable to targeting, i.e., is not present on the majority of other cells. Many tumor markers exist and any of these may be suitable for targeting in the context of the present invention. Common tumor markers include PD-1, PD-L1, CTLA4, carcinoembryonic antigen, prostate specific antigen, urinary tumor associated antigen, fetal antigen, tyrosinase (p97), gp68, TAG-72, HMFG, Sialyl Lewis Antigen, MucA, MucB, PLAP, estrogen receptor, laminin receptor, erb B and p155.

[000213] Genes

[000214] In yet another embodiment, the secondary treatment is a gene therapy in which a therapeutic polynucleotide is administered before, after, or at the same time as the present invention clinical embodiments. A variety of expression products are encompassed within

the invention, including inducers of cellular proliferation, inhibitors of cellular proliferation, or regulators of programmed cell death.

[000215] Surgery

[000216] Approximately 60% of persons with cancer will undergo surgery of some type, which includes preventative, diagnostic or staging, curative and palliative surgery. Curative surgery is a cancer treatment that may be used in conjunction with other therapies, such as the treatment of the present invention, chemotherapy, radiotherapy, hormonal therapy, gene therapy, immunotherapy and/or alternative therapies.

[000217] Curative surgery includes resection in which all or part of cancerous tissue is physically removed, excised, and/or destroyed. Tumor resection refers to physical removal of at least part of a tumor. In addition to tumor resection, treatment by surgery includes laser surgery, cryosurgery, electrosurgery, and miscopically controlled surgery (Mohs' surgery). It is further contemplated that the present invention may be used in conjunction with removal of superficial cancers, precancers, or incidental amounts of normal tissue.

[000218] Upon excision of part of all of cancerous cells, tissue, or tumor, a cavity may be formed in the body. Treatment may be accomplished by perfusion, direct injection or local application of the area with an additional anti-cancer therapy. Such treatment may be repeated, for example, every 1, 2, 3, 4, 5, 6, or 7 days, or every 1, 2, 3, 4, and 5 weeks or every 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, or 12 months. These treatments may be of varying dosages as well.

[000219] Other Agents

[000220] It is contemplated that other agents may be used in combination with the present invention to improve the therapeutic efficacy of treatment. These additional agents include immunomodulatory agents, agents that affect the upregulation of cell surface receptors and GAP junctions, cytostatic and differentiation agents, inhibitors of cell adhesion, or agents that increase the sensitivity of the hyperproliferative cells to apoptotic inducers. Immunomodulatory agents include tumor necrosis factor; interferon alpha, beta, and gamma; IL-2 and other cytokines; F42K and other cytokine analogs; or MIP-1, MIP-1beta, MCP-1, RANTES, and other chemokines. It is further contemplated that the upregulation of cell surface receptors or their ligands such as Fas/Fas ligand, DR4 or DR5/TRAIL would potentiate the apoptotic inducing abililties of the present invention by establishment of an autocrine or paracrine effect on hyperproliferative cells. Increases intercellular signaling by

elevating the number of GAP junctions would increase the anti-hyperproliferative effects on the neighboring hyperproliferative cell population. In other embodiments, cytostatic or differentiation agents can be used in combination with the present invention to improve the anti-hyerproliferative efficacy of the treatments. Inhibitors of cell adhesion are contemplated to improve the efficacy of the present invention. Examples of cell adhesion inhibitors are focal adhesion kinase (FAKs) inhibitors and Lovastatin. It is further contemplated that other agents that increase the sensitivity of a hyperproliferative cell to apoptosis, such as the antibody c225, could be used in combination with the present invention to improve the treatment efficacy.

EXAMPLES

[000221] **EXAMPLE 1: MATERIALS AND METHODS**

[000222] ***Cells, culture media and reagents.*** Human CAIX+ renal cell carcinoma cell lines sk-rc-52, sk-rc-09 and CAIX- sk-rc-59 were obtained from Dr. Gerd Ritter, Memorial Sloan-Kettering Cancer Center, New York. They were cultured at 37°C with 5% CO_2 in R-10 complete medium containing RPMI 1640 medium (Life Technologies) supplemented with 10% FCS, 2 mmol/L L-glutamine, 100 U/ml penicillin, and 100 μg/ml streptomycin (Sigma). Primary human T cells were maintained in R-10 with 10% human serum and 100 IU/ml recombinant human interleukin 2 (IL-2) (Chiron). Human embryonic kidney cell line 293T (ATCC) and mouse fibroblast NIH3T3 cells (ATCC) were grown in D-10 complete medium (Life Technologies) containing DMEM medium with 10% FCS, 100 U/ml penicillin, and 100 μg/ml streptomycin (Sigma). Leukopacks obtained from the blood bank of the Children's Hospital Boston were collected from healthy volunteers with written informed consent.

[000223] In one embodiment, Human ccRCC cell lines, Skrc52, originally CAIX+/ PD-L1-, and Skrc59, originally CAIX-/PD-L1+, were obtained from Dr. Gerd Ritter (Memorial Sloan-Kettering Cancer Center, New York). These cells were cultivated in RPMI 1640 Medium (Life Technologies) supplemented with 10 % (v/v) heat-inactivated fetal bovine serum (FBS, Gibco), 100 IU/ml penicillin and 100 μg/ml streptomycin. 293T (CRL-11268, ATCC) and Lenti-X 293T (Clontech) cells were grown in DMEM Medium (Life Technologies) supplemented with 10% FBS, 100 IU/ml penicillin and 100 μg/ml streptomycin. All cell lines used in this project were transduced with luciferase through

lentiviral transduction and maintained at 37°C with 5% CO2. The Skrc52 cells were selected for CAIX-/PD-L1- and CAIX+/PD-L1- cell populations by Fluorescence activated cell sorting (FACS) sorting. Skrc59 cells were engineered to express high levels of human CAIX and CAIX+/PD-L1+ were selected by FACS sorting.

[000224] ***Cloning of anti-PD-L1 scFv-Fc IgG1 and IgG4 into a bicistronic lentiviral vector encoding an anti-CAIX 2nd generation CAR***

[000225] The anti-PD-L1 antibody (Ab) used to construct the CART cells was previously selected using a 27-billion-member human scFv phage display library against a full length PD-L1 in the form of paramagnetic proteoliposomes (manuscript in preparation). The DNA sequences that encoded the anti-PD-L1 scFv (Clone 42)-Fc IgG1 or IgG4 were codon optimized and synthesized (Genewiz) containing the restriction sites for 5' *NdeI* and 3' *ClaI* to allow further scFv-Fc cloning to replace ZsGreen in the lentiviral vector pHAGE-eIFα signal-scFvG36 (anti-CAIX)-C9TAG-linker-CD28-CD3ζ-IRES-ZsGreen (e.g. CD28z). This anti-CAIX original vector was previously constructed and published (21). For the cloning of the negative controls, firstly we replaced anti-PD-L1 scFv with an anti-Severe Acute Respiratory Syndrome (SARS) scFv (Clone 11A) in the IgG1-Fc lentiviral vector containing the anti-CAIX G36 scFv CAR. The DNA sequence that coded for the anti-SARS scFv was amplified by PCR from the plasmid pHAGE CMV-Anti-SARS (11A) scFv-Fc-CD28-gp41-IRES-ZsGreen to insert the restriction sites for 5' *MluI* and 3' *XbaI* for further cloning using the *MluI* forward primer 5' TCG *ACG CGT* GAG GTG CAG CTG GTG CAG T 3' and *XbaI* reverse primer 5' TCC *TCT AGA* CAG GAC GGT GAC CTT GGT CC 3'. The final pHAGE-eIFα-scFv G36 (anti-CAIX)-C9TAG-linker-CD28-CD3ζ-IRES-anti-SARS (11A) IgG1 was used as one of the negative controls. We also replaced the anti-CAIX scFv in the CAR structure containing the anti-SARS IgG1 for the anti-B cell maturation antigen (BCMA) scFv by double digestion of the pHAGE-eIFα-A716scFv (anti-BCMA)-C9TAG-linker-CD28-CD3ζ-IRES-ZsGreen and the pHAGE-eIFα-G36scFv(anti-CAIX)-C9TAG-linker-CD28-CD3ζ-IRES-anti-SARS(11A) IgG1 with *NcoI* and *NotI*. After the cloning processes we obtained four main plasmids to start the Lentiviruses production: Anti-CAIX CAR able to express anti-PD-L1 IgG1 (anti-CAIX/anti-PD-L1 IgG1), anti-CAIX CAR able to express anti-PD-L1 IgG4 (anti-CAIX/ anti-PD-L1 IgG4), anti-CAIX CAR able to express an irrelevant anti-SARS Ab (anti-CAIX/anti-SARS IgG1) and anti-

BCMA CAR able to express an irrelevant anti-SARS Ab (anti-BCMA/anti-SARS IgG1).

[000226] ***scFv isolation and conversion of scFv to scFv-Fc.*** CAIX-specific scFv antibodies were isolated from a non-immune human scFv phage library as previously reported and submitted to GenBank with accession numbers of GQ903548-GQ903561[23]. scFv-coding DNA fragments from the pFarber phagemid were digested with *Sfi*I/*Not*I sites and subcloned into the mammalian expression vector pcDNA3.1-F105L-hinge-stuffer which has a human IgG1 F105 leader sequence and the human IgG1 hinge-CH2-CH3 Fc portion to express scFv-Fc antibodies. Plasmids of scFv-Fc were transiently transfected into 293T cells by lipofectamine 2000 (Invitrogen), and expressed antibodies were purified using Sepharose protein A beads (Amersham Bioscience). Specific binding to CAIX was tested by staining with phage scFv antibodies or scFv converted into scFv-Fc format antibodies by incubation with CAIX-expressing 293T and sk-rc-52 cell lines, and with CAIX negative 293T and sk-rc-59 cell lines. In these experiments, irrelevant anti-HIV CCR5 antibody (clone A8)[25] or anti-SARS antibody (11A)[24] and fluorescently conjugated secondary antibodies alone were used as negative controls.

[000227] ***Construction of scFv-CD8-TCRζ and scFv-CD28-TCRζ constructs.*** Pz1, scFv-CD8-TCRζ, and P28z, scFv-CD28-TCRζ, DNA constructs in phagemid vector pSL1180 were obtained from Dr. Michel Sadelain, Memorial Sloan-Kettering Cancer Center, New York. In Pz1, the scFv and TCRζ intracellular domain are appended to N- and C-terminus of human CD8α chain, respectively. Similarly, in P28z, the scFv and TCRζ sequences are appended to the N- and C-terminus of human CD28, respectively. The amino acid sequence of human CD8α is 71 residues in length, consisting of 47 (aa 137 – 183), 23 (aa 184 – 206), and 2 (aa 207 – 208) residues of the CD8α extracellular and hinge, transmembrane, and cytoplasmic domains, respectively. The CD28 sequence in P28z is 107 residues in length, consisting of 40 (aa 114 – 153), 23 (aa 154 – 176), and 44 (aa 177 – 220) residues of the CD28 extracellular, transmembrane, and cytoplasmic domains respectively. The human CD3ζ intracellular domain common to both CARs consists of 112 amino acids (aa 52-163).

[000228] The nucleic acid sequence encoding an internal C9-tag (a nine-amino acid peptide of human rhodopsin, TETSQVAPA) with a GGGGS linker was amplified by PCR and was fused upstream with CD8-TCRζ and CD28-TCRζ sequences with 5' *Not*I site and 3' *Pac*I sites. The primers used for cloning chimeric TCRζ constructs are 5' TAG GGC

*GCG GCC GC*a acc gag acc agc cag gtg gcg ccc gcc GGG GGA GGA GGC AGC CCC ACC ACG ACG CCA GCG CCG CGA 3' (forward primer for CD8 construct where italic is the *Not*I site, upper case is the C9 tag sequence, and underlining indicates the GGGGS linker), 5' TAG GGC *GCG GCC GC*a acc gag acc agc cag gtg gcg ccc gcc GGC GGA GGA GGC AGC ATT GAA GTT ATG TAT CCT CCT CCT 3' (forward primer for CD28 construct) and reverse primer for both constructs CTA GCC T*T AAT TAA* ,TTA GCG AGG AGG GGG CAG GGC CTG CAT, italic is *Pac I* site. These DNA fragments encoded functional features which are arranged in accordance with the following sequence: *Not*I – C9tag (TETSQVQPQ) – GGGGS – CD8 or CD28 – TCRζ – *Pac*I. The chimeric TCR constructs tagged with internal C9 peptide were cloned into the pcDNA3.1-F105L-hinge stuffer vector containing anti-CXCR4 scFv-Fc, clone 48, using *Not*I and *Pac*I restriction sites. This design allowed us to insert chimeric TCR receptor constructs to replace Fc portion fragment. Later, anti-CAIX scFv (clone G36) and anti-CCR5 scFv (clone A8, as irrelevant scFv control) antibody fragments were cloned to replace anti-CXCR4 scFv at *Sfi*I/*Not*I sites to create CAIX-specific chimeric TCR constructs.

[000229] The lentivirus vector pHAGE-CMV-DsRed-IRES-ZsGreen, and four HIV helper plasmids pHDM-Hgpm2 (HIV gag-pol), pMD-tat, pRC/CMV-rev, and an Env VSV-G pseudotype were obtained from Dr. Richard Mulligan, of the Virus Production Core at The Harvard Gene Therapy Initiative in Boston. The CMV promoter in pHAGE-CMV-IRES-ZsGreen was replaced by an EF1α promoter derived from the pSIN lentivirus vector at *Spe*I/*Not*I sites. One of the 5 scFv-Fc antibodies, G36, which possess high affinity to CAIX+ cells and high ADCC only against CAIX+ tumor cells, was cloned into pHAGE-EF1α lentivirus vector at *Asc*I/*Bam*HI to replace the first cassette of the DsRed protein.

[000230] ***Production of lentivirus and transduction of human primary T cells.*** Lentivirus was produced by five plasmid transient transfection into 293T cells using lipofectamine 2000 as per the manufacturer's instructions (Invitrogen). Cells were prepared for 80% confluence in 15 cm Petri dishes (Nalge Nunc) and transfected with 30 μg of total plasmid DNA. The ratio of vector plasmids (pHDM-Hgpm2 (HIV gag-pol): pMD-tat: pRC/CMV-rev: Env VSV-G pseudotype) was 20:1:1:1:2. After changing to D-10 medium, virus supernatant was harvested on day 3, filtrated through a 0.45 μm filter, and concentrated by ultracentrifugation (Beckman Coulter, Fullerton, CA) for 90 minutes at 16,500 rpm (48,960

x g, Beckman SW28 rotor) and 4°C. The virus pellets were resuspended in R-10 medium and kept frozen at -80°C.

[000231] In one embodiment, Lentiviruses were produced by transient transfection of five plasmids into 293T cells using Polyethyleneimine (PEI). Briefly, each 80% confluent 293T cells in 15 cm plate (Nalge Nunc) was transfected with 30 µg of total five plasmids, being 5 µg of each structural plasmid pHDH-Hgpm2 (HIV gag-pol), pMD-tat; pRC/CMV-rev and Env VSV-G, and 10 µg of the main plasmid codifying the CAR (anti-CAIX/anti-PD-L1 IgG1, anti-CAIX/anti-PD-L1 IgG4, anti-CAIX/anti SARS IgG1 or anti-BCMA/anti SARS IgG1). The virus supernatant was concentrated using Lenti-X Concentrator (Clontech), following the manufacturer instructions, and kept frozen at -80°C.

[000232] Human PBMCs were isolated by ficoll density gradient separation and were activated with 2 µg/ml PHA (Sigma) plus 100 IU/ml human IL-2 for 4 days. The cells were infected with two or three rounds of lentivirus transduction at multiplicity of infection (MOI) of 10-20 in the presence of 10 µg/ml DEAE. Three days after transduction, transduced T cells were collected for phenotypic and functional analyses *in vitro*, or were expanded for *in vivo* experiments.

[000233] ***Selection, activation and lentivector trasduction of CD8+ T cells.*** Blood collars collected from healthy volunteers with written informed consent were obtained from the blood bank of the Brigham and Woman's Hospital (Boston, MA). The isolation of human peripheral blood mononuclear cells (PBMCs) was performed using Ficoll-Paque PLUS (GE Healthcare, NJ). The Dynabeads for CD8 Positive Isolation (Life Technologies) were used to isolate CD8 positive cells from PBMCs, which were cultured in RPMI 1640 medium (Life Technologies) with 10% heat inactivated fetal bovine serum, 20mM HEPES, 100 IU/ml penicillin and 100 µg/ml streptomycin and 50 IU/mL of IL-21 (Peprotech) was added in the medium every 2 days. The assays performed to determine if IL-2 or IL-21 were the best cytokine to induce anti-CAIX CART cells proliferation were performed with 50 IU/mL of each cytokine. The CD8+ T cells were activated with Dynabeads Human T-Activator CD3/CD28 (Life Technologies) using a ratio of 1:1. The cells were transduced with the Lentiviruses at a multiplicity of infection of 20 and 10µg/mL of Diethylaminoethyl. All the assays were performed in triplicate and using T cells from three different healthy donors.

[000234] ***Flow cytometric analysis.*** Transduction efficiency of human primary T cells was assessed by expression of a reporter gene (ZsGreen). The CAIX-Fc protein was expressed

from a pcDNA3.1 plasmid that encoded amino acids 38-397 of CAIX followed by human IgG1 hinge, CH2 and CH3 domains, the CAIX signal peptide (aa 1-37) was replaced with Ig leader sequence. Expression of scFv(G250) on transduced T cells was tested by staining the cells with 1 μg CAIX-Fc protein, and then APC-conjugated mouse anti-human IgG antibody (Jackson ImmunoResearch). Additionally, expression of the internal rhodopsin nonapeptide (TETSQVAPA) C9 tag of the scFv domain of TCR constructs on transduced T cells was detected by staining with 5 μg mouse 1D4 antibody followed by APC-conjugated goat anti-mouse IgG antibody (Jackson ImmunoResearch). For analysis, the subsets of human cells in culture during clonal expansion experiment were stained with fluorescence conjugated mouse anti-human antibodies (Invitrogen) against CD3 (clone S4.1), CD4 (clone S3.5) or CD8 (clone 3B5). In all cell staining, five hundred thousand cells were stained with antibodies at recommended concentration according to company's instruction. The matched isotype control antibodies for each sample were used and the cells were analyzed using a FACSCalibur cytometer (Becton-Dickinson).

[000235] In one embodiment, transduction of 293T cells or CD8+T cells was confirmed by FACS analysis of the anti-CAIX or anti-BCMA expression. The cells were stained with 10 μg/mL of human CAIX-Fc produced in our lab or human BCMA-mouse-Fc (AB Bioscience) and then developed with 1:250 APC-conjugated mouse anti-human IgG Ab (Southern Biotech) or goat-anti mouse IgG Ab (Biolegend), respectively. CountBrightTM Absolute Counting Beads (Molecular Probes) was used for the proliferation and clonal expansion assays. All samples were analyzed with an LSR Fortessa or with a FACSCalibur (BD Bioscience) and data were analyzed using FlowJo software. To analyze the status of T cell exhaustion of the CART cells they were cultured in the presence of IL-21 50U/mL (Peprotech) and Dynabeads Human T Activator CD3/CD28 for five days. After this period the CART cells were co-cultured with Skrc-59 CAIX+ PD-L1+ cells for 2 days in order to stimulate exhaustion. 1x106 CART cells from this assay and Tumor-infiltrating Lymphocytes (TIL) collected from the in vivo assay were stained with FITC-conjugated anti-human PD-1, PE-conjugated anti-human Tim3, PerCP/Cy5.5-conjugated anti-human Lag3 antibodies (Biolegend) and Pacific Blue-conjugated anti-human CD45 and and analyzed by FACS. To verify the expression levels of CAIX and PD-L1 in the different RCC cell lineages used in this project, we used 10 μg/mL of the anti-human CAIX mAb (Clone G36), produced in our laboratory, and 10 μg/mL of the biotinylated mouse anti-

human PD-L1 (Biolegend). The primary antibodies were detected using 1:250 APC-conjugated anti-human Ab and PE-conjugated avidin, respectively, and analyzed by FACS.

[000236] ***ADCC and cytotoxicity assay of lentivirus transduced T cells.*** Cytotoxicity assays were performed using the DELFIA EuTDA Cytotoxicity kit (Perkin Elmer, Boston, MA) in accordance with the manufacturer's instructions. Briefly, target tumor cells were labeled with a fluorescent ligand (BATDA) for 30 minutes at 37 °C and 1 x 10^4 labeled cells were loaded per well in 96-well U-bottom plate. For antibody-dependent cellular cytotoxicity (ADCC) assay, a panel of anti-CAIX scFv-Fc antibodies or irrevelant scFv-Fc antibody at a concentration of 1 μg/ml or 5 μg/ml was added separately. The assay was set up with ratios of effector cells (human PBMC) to target cells (E:T) at 50:1, 25:1 and 12.5:1. For the T cell cytoxicity assay, different ratios of effector cells (nontransduced or transduced T cells) to target cells (E:T) were prepared (100:1, 50:1 and 25:1). The culture was incubated for 4 hours in humidified 5% CO_2 at 37°C. After the plate was spun for 5 minutes at 500x g, 20 μl of supernatant was transferred to a flat-bottom plate. 200 μl of Europium solution was added and the fluorescence released from the cells was read by fluorometer (Victor™, PerkinElmer). The control for spontaneous release was prepared by culturing the labeling cells only and the control for maximum release was made by adding lysis buffer (kit provided) to the labeling cells.

[000237] ***ELISA, ELISPOT assays and Western blot.*** For cytokine secretion, RCC cell lines sk-rc-52 (CAIX+) or sk-rc-59 (CAIX-) were seeded overnight at 1 x 10^6 per well in a 24-well plate, followed by 1 x 10^6 untransduced or transduced T cells. Before co-culture with tumor cells, T cells were washed with PBS twice to remove human IL-2. After overnight incubation, the supernatant was harvested and analyzed for IL-2 and IFN-γ by ELISA (e-Bioscience). In detecting T cells for the IFN-γ ELISPOT assay (e-Bioscience), a membrane was developed using AEC substrate solution and the number of spots was counted by ELISPOT plate reader (C.T.L. Cellular Technology).

[000238] For Western blot, preparation of untransduced and transduced T cells was described[50]. One million cells were prepared in non-reducing and reducing buffer (0.1 M dithiothreitol) and run on a 10-20% polyacrylamide gradient gel (Invitrogen). Proteins were transferred to polyvinylidence fluoride transfer membrane (NEN Life Science Products, Boston, MA) at 100 V, 4°C overnight. The membrane was incubated with 1:2000 primary antibody, anti-human ζ-chain monoclonal antibody 8D3 (BD Pharmingen, San Diego, CA)

and then with 1:3000 secondary antibody horseradish peroxidase (Caltag). Immunodetection was performed using the ECL Plus Western blotting detection system (GE Healthcare, Piscataway, NJ) and x-ray film exposure.

[000239] ***Detection of IgG secreted by CART cells using ELISA.*** The total level of IgG secreted to the medium of transduced cells was detected using Human IgG ELISA Quantitation Set (Bethyl Laboratories). The Anti-PD-L1 Abs secreted by transduced CD8+ CART Cells were purified with Protein A sepharose beads (GE Healthcare) and biotinylated using the EZ-Link Sulfo-NHS-LC-Biotin (Thermo Scientific). These antibodies were incubated with 5 µg/mL of human PD-L1 produced in the lab, which was pre-immobilized in MaxiSorp plates (Nunc) by 2 hours, RT. The biotinylated antibodies were detected by incubation with streptavidin-HRP for 1h and developed with SureBlueTM TMB Peroxidase Substrate and TMB Stop Solution (KPL). The absorbance was read at λ=450 nm.

[000240] ***Proliferation, clonal expansion and cytokine secretion after tumor cell contact.*** Tumor cells were irradiated (3,000 rads) and seeded at 2.5 x 10^5 per well. T cells were added at 1 x 10^6 in culture medium containing R-10 plus 100 IU/ml human IL-2 for a week culture. T cells were split to maintain suitable density and re-stimulated with tumor cells weekly. The number of T cells was counted every 3 or 4 days for 2 weeks. The percentage expression of ZsGreen by transduced T cells and T cell subsets were determined weekly by fluorescence-activated cell sorting (FACS). For cytokine secretion studies after tumor cell contact, T cells that were in contact with irradiated tumor cells for one or two weeks were washed, incubated with fresh tumor cells overnight and culture supernatants were collected after 24 hrs for analysis.

[000241] ***Clonal expansion of CAIX+ CART cells.***

[000242] In one embodiment, Skrc52 CAIX+/PD-L1- and Skrc52 CAIX-/PD-L1- cells were irradiated with 3,000 rads and seeded at 2.5x10^5 per well. 1x10^6 T cells were added at the culture medium containing 50 IU/ml human IL-21 every two days. T cells were split to maintain suitable density and re-stimulated with tumor cells weekly. T cell number was counted once a week for 3 weeks by FACS.

[000243] ***Effect of anti-CAIX CART Cells Secreting anti-PD-L1 antibodies on RCC cells viability and antibody-dependent cellular cytotoxicity (ADCC).*** 2.5x103 Skrc59 CAIX+/PD-L1+ and Skrc52 CAIX-/PD-L1- were plated in 96 wells plate ON. Four days after the CART cells transduction they were added to the RCC cells in the 25:1, 50:1 and

100:1 ratio Effector cells: Tumor cells (E:T) and incubated ON. CART cells were removed and the viability of the tumor cells was assayed for MTT (Life Technologies). For the ADCC assay RCC cells were incubated for 1 hour, 37oC with 50 µL of the CART cells supernatant adjusted for 500 ng/mL of the respective Ab Anti-PD-L1 IgG1, Anti-PD-L1 IgG4 or Anti-SARS IgG1. The cells were then incubated with 12.5:1, 25:1 or 50:1 NK cells for 4h, 37 oC, Lactate dehydrogenase (LDH) was measured in the supernatant by CytoTox 96® Non-Radioactive Cytotoxicity Assay (Promega).

[000244] ***ELISA assays to detect IL-2 and IFNγ released by functional CART cells.*** For analysis of cytokine secretion, 2.5x103 RCC cells Skrc59 CAIX+/PD-L1+ or Skrc52 CAIX-/PD-L1-were seeded in 96 wells plates ON, followed by 5:1, 25:1 and 50:1 CAR transduced T cells addition and incubation ON. The supernatant was removed and analyzed for IL-2 and IFNγ secretion using the Human IFNγ or Human IL-2 ELISA Ready-SET-Go Kit (eBioscience).

[000245] ***Orthotopic Renal Cell Carcinoma Model Establishment and CART-Cells Therapy.*** $5x10^4$ passaged Skrc59 CAIX+/PD-L1+ cells were suspended in 10 µL of culture medium and diluted 1:1 in Matrigel™ (Life Technologies) and injected into the left subrenal capsule of 6-8 week-old male NSG mice (N=35). After a week, tumor implantation was confirmed by bioluminescence (BLI) image using a Xenogen IVIS imaging system (Life Technologies) and 1.0x107 of each CAR T cell (anti-BCMA CAR/ anti-SARS IgG1, anti-CAIX CAR/anti SARS IgG1, anti-CAIX CAR/ anti-PD-L1 IgG1 and anti-CAIX CAR/ anti-PD-L1 IgG4) or untransduced T cells were injected intravenously in the tail vein (Day 0); N=6 mice per group. The tumor BLI was quantified after 7, 14, 23 and 30 days of CART cells injection. A second injection of $2.5x10^6$ CAR or untransduced T cells was made on day 17. Mice were sacrificed at 30 days post tumor engraftment by standard CO2 inhalation, and tumors were harvested and weighted. The kidney tumors from all mice were divided in two equal parts and one of them was fragmented in small pieces and digested with collagenase 0.5U/mL and DNAse 1.0 mg/mLto TIL extraction, which were analyzed for the expression of the exhaustion markers and the percentage of CART cells by FACS. The other part was fixed in 10% buffered formaldehyde, and submitted to immunohistochemistry for different markers. Two mice of each group were injected with 4.5x106 NK cells 2 days before the euthanasia. NK cells present in the tumor were stained

with APC-Anti-CD56 Ab and analyzed by FACS. Animal experiments were performed in accordance with the guidelines of the DFCI Animal Care Committee.

[000246] ***Tumor establishment and T cell therapy.*** In one embodiment, due to immune-rejection of sk-rc-52 in 6-8 week-old female BALB/c nude mice and to accelerate *in vivo* growth properties, five million cells were subcutaneously inoculated into the mice, harvested, and expanded *in vitro*. The cell line was then passaged two more times in nude mice and the passaged cells were expanded for further experiments (subclone 4-1). For the therapeutic experiments, 5 million sk-rc-59 and 7.5 million passaged sk-rc-52 cells were subcutaneously inoculated on opposing flanks into nude mice to yield comparable tumor growth rates. After 7 days, tumors grew to the size of ~6 mm, and 50 million nontransduced or transduced T cells were injected intravenously. The mice were also treated with 20,000 IU human IL-2 by peritoneal injection every two days. Tumor size was measured by caliper in two dimensions and the mean of two tumor diameter was reported here. Animal experiments were performed in accordance with the guidelines of the Dana Farber Cancer Institute Animal Care Committee. Mice were sacrificed when tumors reached 15-mm diameter or 2,000 mm^3 and tumors were harvested.

[000247] ***Immunohistochemistry and immunofluorescence staining.*** For *in vitro* examination of transduced T cells, the cultured T cells were washed twice using PBS and resupended in 2μM Far Red DDAO-SE CellTrace dye (Molecular Probe) in PBS for 15 minutes at 37°C. Then the cells were washed with culture medium twice and cytospun on the glass slide. Far red pre-stained CART cells with ZsGreen coexpression were visualized using confocal microscopy (Zeiss) at the Optical Imaging Core facility, Harvard NeuroDiscovery Center.

[000248] To examine the killing effect of transduced T cells in tumor bed *in situ*, tumors were prepared for frozen sections for ApopTag Peroxidase In Situ Apoptosis Detection kit (Millipore). Cryosections were incubated with TdT enzyme (Millipore) for 1 hour. Rabbit anti-DIG (Dako) was added and incubated for 30 minutes and then Cy3-conjugated anti-rabbit antibody (Invitrogen) was added and incubated for 30 minutes. Sections were mounted with DAPI antifade mounting medium and fluorescent images were examined using confocal microscopy.

[000249] Xenograft tumors and mouse spleens were harvested, fixed in 10% formalin/PBS solution, and submitted to the Harvard Medical School, Rodent

Histopathology Core Facility. Paraffin-embedded sections were dewaxed with xylene and rehydrated through graded alcohols before staining. Immunohistochemistry staining was performed by incubating with anti-human granzyme B antibody (Dako, clone GrB-7 (1:200)) as a primary antibody for 1 hour followed by secondary anti-rabbit antibody (Pierce) or anti-mouse antibody (Dako) for 30 minutes. Sections were developed using DAB substrate and counterstained with hematoxylin.

[000250] In one embodiment, the fixed tumors were paraffin-embedded, sectioned at four-micrometer, placed on slides and prepared for IHQ. The tissues were stained with the anti human: Ki67 (Vector, VP-K451), PD-L1 (Clone 405.9A11, produced in Dr. Gordon Freeman's lab), granzyme B (Abcam, ab4059) or NCAM (CD56) (Abcam, ab133345) antibodies, followed by secondary HRP conjugated anti-rabbit Ab or HRP-Avidin. The slides were developed using DAB and counterstained with hematoxylin. The images were obtained in an Olympus BX51 microscopy using a DP71 digital camera (Olympus) and analyzed in the DP Controller Software (Olympus). The image quantification was performed using the IHC Profiler Plugin of ImageJ Software as described in Varghese F, Bukhari AB, Malhotra R, De A. IHC Profiler: an open source plugin for the quantitative evaluation and automated scoring of immunohistochemistry images of human tissue samples. PloS one. 2014;9:e96801.

[000251] ***Statistical analyses.***

[000252] Statistical significance was determined using the two-tailed Student's *t*-test.

[000253] The statistical analysis associated with Figures 16-23 are reprentative of at least three experiments unless otherwise noted. The statistical significance of the data was evaluated using ANOVA and Tukey posttest. $P<0.05$ was considered significant. The statistical analysis was performed using the IBM SPSS Statistics software version 20.

[000254] **EXAMPLE 2: ADCC MEDIATED KILLING OF ANTI-CAIX ANTIBODIES AND CHOICE OF CAR TARGETING MOIETY.**

[000255] We have previously reported on a panel of high affinity human anti-CAIX antibodies that differed in their epitope mapping, expression levels and ability to internalize CAIX[23]. Our first aim was to investigate the anti-tumor activity of five of these anti-CAIX single-chain antibodies as candidates for CAR construction. To test for anti-CAIX mAb mediated ADCC, the scFvs were converted to scFv-Fc (hIgG1) minibodies[23]. We found that all scFv-Fcs exhibited antigen-specific tumor lysis. For tumor cell line sk-rc-09 with high

CAIX+ expression, specific lysis ranged from 40-57% and for sk-rc-52 with moderate CAIX+ expression, specific lysis ranged from 46-60%, with background of lysis of < 5% for the CAIX- tumor cell line sk-rc-59. For negative control scFv-Fcs such as anti-CXCR4 48-Fc[23] and anti-SARS 11A-Fc[24], only background levels of cell lysis were seen (**Fig. 1**). Based on ADCC killing and other published analyses, scFvG36 was chosen for further evaluation as the CAR targeting moiety.

[000256] Construction and expression of CAIX-specific chimeric receptors. Two generations of anti-CAIX CARs were constructed: 1st generation G36 CD8 CAR, with scFvG36 linked to CD8, truncated extracellular, hinge, and transmembrane domains plus signaling domain of TCRζ (G36-CD8z). To deliver costimulatory signals, 2nd generation CD28 CAR was generated, consisting of scFvG36 fused to truncated extracellular, transmembrane and intracellular domains of CD28 plus signaling domain of TCRζ (G36-CD28z) (**Fig. 2A**). Irrelevant 2nd generation CD28 CAR was made by using anti-HIV CCR5 (clone A8) scFv instead [25]. In order to detect the expression of these constructs, human rhodopsin C9 tag were inserted between the scFv and CD8 or CD28 domains, respectively and ZsGreen was expressed after the IRES sequence. High concentrations of viral stocks were obtained at comparable levels among the different constructs that were tested by cotransfection of vector plasmids into 293T cells (data not shown).

[000257] For transduction, PHA mitogen was used to stimulate peripheral blood lymphocytes for 3 days. Concentrated lentivirus supernatants were used to infect human primary T cells in the presence of cationic reagent DEAE as it increased the transduction rate of 1.5-2x fold as compared with polybrene (data not shown). The transduction rate of primary T cells ranged from 17% to 45% by ZsGreen expression in FACS analysis. A representative experiment showing ZsGreen expression in circa 25% by primary CART cells following lentivirus transduction is shown in **Fig. 2B, left column**. CAIX-Fc fusion protein can bind to the G36-CD8z and -CD28z CART cells but not to control A8-CD28z CART cells (**Fig 2B, middle column**). C9-tag expression was only detected at circa one-third the level of the CAIX-Fc protein (**Fig 2B, right column**) which is likely related to the finding that mAb 1D4 preferentially recognizes the rhodopsin nonapeptide C9 when presented as a carboxy-terminal verses internal polypeptide sequence (data not shown). Transduced cells that were cultured *in vitro* for 6 weeks maintained their expression of ZsGreen.

[000258] On Western blot under reducing conditions, G36 and A8 CD28z CARs migrated with a mol wt of circa 53kD whereas endogenous TCRζ was 16 kDa. G36-CD8z CAR migrated with a mol wt of circa 48 kD. Under nonreducing conditions, these two CD28z CARs formed homodimers (**Fig. 2C**, data of CD8z CAR not shown).

[000259] **EXAMPLE 3: ENHANCED CYTOKINE SECRETION BY TRANSDUCED T CELLS ON CONTACT WITH CAIX+ TUMOR.**

[000260] A study was performed to compare the reported superior effects of using 2nd generation G36-CD28z CART cells that incorporate signaling components of the costimulatory molecule CD28 to bypass MHC presentation and enhance T cell effector functions verses 1st generation G36-CD8z CART cells. As seen in **Fig 3A**, after incubation with CAIX+ sk-rc-52 cells overnight, only low levels of type I cytokines IL-2, IFNγ and IL-17 secretion were seen with control A8 CD28z CART cells or LAK cells alone. In contrast, both 1st and 2nd generation G36 expressing CART cells showed elevated levels of cytokine secretion with 2nd generation G36-CD28z CART cells secreting higher amounts of type I cytokines which reflects their higher activation status compared to 1st generation G36-CD8z CART cells. Specifically, G36-CD28z CART cells secreted 6.5X, 2.3X and 4X more IL-2, IFNγ and IL-17, respectively than G36-CD8z CART cells. Specificity of cytokine secretion induction by the two G36 CART cells is seen by their minimal stimulation with CAIX- sk-rc-59 cells.

[000261] In an Elispot study, after interaction with CAIX+ sk-rc-52 tumors, G36-CD28z CART cells became high capacity IFN- γ producing cells (**Fig 3B**). G36-CD28z CART cells produced 6 times more spots than seen for G36-CD8z CART cells upon interaction with CAIX+ sk-rc 52 tumor cells and 12 times more spots than seen after interaction with CAIX- sk-rc-59 tumor cells. Similarly, G36-CD28z CART cells had a higher amount of granzyme B-secreting spots after contact with CAIX+ tumors as compared with G36-CD8z CART cells and control T cells. PMA and ionomycin stimulated T cells yielded the highest amount of IFN- γ and granzyme B secreting T cells. These studies demonstrate both specificity and high capacity of G36-CD28z CART cells to be activated by contact with CAIX+ tumor cells.

[000262] **EXAMPLE 4: SPECIFIC CYTOTOXICITY VIA CAR SIGNALING IN TRANSDUCED T CELLS.** An *in vitro* cytotoxicity assay was established to further evaluate the killing activity of the different G36 CART cells. Using different ratios of effector-to-target, G36-CD28z

CART cells and its' twice *in vivo* passaged subclone 4-1 exhibited the highest amount of cytolysis of CAIX+ tumor sk-rc-52 (**Fig 3C**). With high ratio of more than 25:1, G36-CD28z CART cells showed 2-3 fold higher cytotoxicity than G36-CD8z CART cells and with low ratio of 5:1, G36-CD28z CART cells showed 8-9 fold higher lysis than G36-CD8z CART cells. However, G36-CD8z CART cells still exhibited good cytotoxicity with up to more than 60% tumor lysis using 100:1 of E:T ratio. Irrelevant A8-CD28z CART cells and control T cell LAK showed the background non-specific tumor lysis with around 20% lysis when using the highest 100:1 of E:T ratio. In all cases of using CAIX- tumor sk-rc-59, transduced and untransduced T cells showed background lysis.

[000263] EXAMPLE 5: IMPROVED *IN VITRO* PROLIFERATION IN CART CELLS WITH PROLONGED CAIX+ TUMOR.

[000264] Besides enhanced cytokine secretion and cytotoxicity on short term CAIX+ tumor cell contact, incorporation of the CD28 costimulatory molecule into the CAR construct demonstrated improved proliferation upon prolonged contact with antigen-specific tumor cells. Untransduced and transduced (around 20%) T cells were mixed with freshly irradiated tumor cells weekly in the presence of 100 units/ml human IL-2. To test the different levels of antigen stimulation to a fixed amount of T cells, we used tumor cell to T cell ratios of 1:8, 1:4 and 1:2. T cell numbers were counted by trypan exclusion and CART cell fractions were examined by flow cytometry. Under culture with CAIX- sk-rc-59 tumor cells, the number of transduced and untransduced T cells was maintained (**Fig 4A bottom**). The lack of basal level of proliferation of control T cells might be due to the high amount of suppressive cytokines secreted by the tumor cell line. In contrast, after two weeks of culture with CAIX+ sk-rc-52 tumor cells, at ratio 1:8, the population of G36-CD28z CART cells increased to 30-fold and G36-CD8z CART cells proliferated up to 17-fold whereas at a ratio of 1:4, the number of G36-CD28z CART cells increased 19-fold and G36-CD8z CART cells proliferated 4-fold. With higher amounts of tumor cells, neither G36-CD28z or G36-CD8z CART cells could proliferate. Irrelevant A8-CD28z CART cells and control T cell LAK showed no proliferation with tumor cells (**Fig. 4A top**).

[000265] Proliferating T cells were also harvested to examine their enrichment on CAIX+ tumor cell contact. On CAIX- tumor contact, there was no change in the percentage of any CART cells within the population. However on contact with CAIX+ sk-rc-52 tumor cells, there was enrichment in both populations of G36 CART cells. For G36-CD28z CART cells,

the positive population was enriched from 18% on day 0 to 52% on day 8 to 88% on day 16. Expression of G36-CD8z CART cells was enriched from 19% on day 0 (same levels at T cells only) to 32% on day 8, and to 72% on day 16. No expansion of A8-CD28z CART cells was seen over the two week study (**Fig. 4B**). The percentage of CD8 cells remained constant throughout the 16 day study under all conditions (**Fig 4C**).

[000266] EXAMPLE 6: PERSISTENT EFFECTOR FUNCTION OF CART CELLS AFTER RE-CONTACT WITH TUMOR.

[000267] Transduced T cells that were in contact with irradiated tumor cells for one or two weeks were also tested for cytokine secretion after 24 hours of contact with fresh non-irradiated tumor cells. Upon contact with CAIX+ tumor (sk-rc-52) for one or two weeks, G36-CD28z and G36-CD8z CART cells showed similar IFN- γ secretion levels although costimulatory signaling through G36-CD28z CAR yielding 2x to 2.5x more IFN- γ secretion than seen for G36-CD8z CAR (**Table 1**). For IL-2 secretion, two weeks of tumor contact for G36-CD28z and G36-CD8z CART cells exhibited more IL-2 secretion than one week of contact. G36-CD28z CART cells yielding 5x more IL2 than G36-CD8z CART cell on one week of contact and 2.5x more on contact for two weeks. In addition, G36-CD28z CART cells in contact with tumor cells for two weeks secreted 3.3x more IL-2 than one time tumor contact whereas G36-CD8z CART gave 6.8x more IL-2 secretion after two weeks compared to after one week of tumor contact. These results indicate that the transduced CART cells did not become exhausted and maintained functional activity after a second tumor stimulation. Only background levels of INF-γ and IL-2 secretion were seen with A8-CD28z, LAK and G36 CART cell treatments on contact with CAIX- sk-rc59 cells.

[000268] EXAMPLE 7: SUPPRESSION OF ESTABLISHED TUMOR BY CART CELLS.

[000269] We next tested CART cells to inhibit established tumor cell growth in nude mice that were inoculated with sk-rc-52 tumor cells on left flank and sk-rc-59 tumor cells on right flank that had been established to yield similar tumor curves. On day 7 after tumor implantation, with typical tumor size of ~6x6 mm, 50 million G36-CD28z CART cells, A8-CD28z CART cell or untransduced T cells (LAK) were injected intravenously. Adoptive T-cell therapy was performed in two separate experiments with group sizes of n=7 in the first trial and n=8 in the second trial, in the presence of high dose IL-2 (2×10^5 IU) via intraperitoneal injection. No T-cell treatment was included in order to compare the growth of tumor and the effect of cell-therapy.

[000270] In trial one, treated and untreated CAIX- sk-rc-59 tumors had average size of 6.09 ± 0.02 mm on day 4 and 9.29 ± 0.12 mm on day 25 (within four tested groups). They exhibited the same tumor growth rate in control groups and T-cell treated groups. Untreated CAIX+ tumors that received no T cells showed similar tumor size as CAIX- tumors, with an average size of 6.09 ± 0.13 mm on day 4 and 9.15 ± 0.11 mm on day 25. However, the tumor size of G36-CD28z CART cell treated mice showed statistically significant reduction in size compared to no T-cell treated mice at every time point that was examined over the 25 day study (**Fig. 5**). G36-CD28z CART treatment also led to a greater reduction in tumor size than seen with A8-CD28z CART cell and LAK treated mice on day 7 ($p<0.05$) and on day 25 ($p<0.001$), as calculated by two-tailed *t* test. In trial two, tumor size of G36-CD28z CART cell treated mice was significant smaller than that of no T-cell treated mice through the 29 day experiment. G36-CD28z CART cell treated mice also had smaller tumors than were seen with A8 CD28z CART cell and LAK treated mice on day 8 to day 26 with $p<0.01$ and on day 29 with $p<0.001$ (**Fig. 5**).

[000271] Partial regression of CAIX+ tumor was considered when the tumor size was smaller than 30% volume of control CAIX- tumor in a same mouse receiving the same T-cell. Partial tumor regression was observed in a high percentage of cases using G36-CD28z CART cells (10 out of 15, (67%)), but only infrequently in irrelevant target A8-CD28z CART cells (1 out of 15, (7%)) and in activated T cell LAKs (2 out of 15, (13%)) (**Table 2**). Frequency of partial regression response was found to be statistically significant for mice treated with G36-CD28z CART cells versus control A8-CD28z CART cells and LAKs at $p<0.001$ and $p<0.005$, respectively by Fisher test.

[000272] **EXAMPLE 8: *IN SITU* CYTOTOXICITY BY CART CELLS.**

[000273] A sample of the whole population of transduced T cells used for the *in vivo* study were pre-stained with Far red dye and the CART cells expressing ZsGreen protein within the population were analyzed by confocal microscopy. These results demonstrated circa 30% transduction efficiency which is in agreement with our FACS analysis (**Fig 6A**).

[000274] To provide evidence that G36-CD28z CART cell treatment of CAIX+ sk-rc-52 tumor cells *in vivo* resulted in killing by apoptosis, tumor sections were stained by Tunnel assay. On day 3 after adoptive T cell treatment, Tunnel staining identified apoptotic tumor cells (red) at the edge of tumor (**Fig. 6B upper row**) and inside the tumor bed (**Fig. 6B middle row**). The apoptoic tumor cells lost the DAPI nuclear staining. Shown in the

enlarged graph (**Fig. 6B bottom row**) is a ZsGreen expressing CART cell interacting with two tumor cells that were going apoptosis.

[000275] Due to the limitation of fluorescent signal, ZsGreen expressing CART cells could not be observed from the whole tissue section. Therefore on day 3 after G36-CD28z CART cell or LAK treatment, the tumors were harvested and sections were also stained with granzyme B antibody to locate the activated T cells. In **Fig 6C**, the dark brown areas of staining show granzyme B+ T cells that are seen infiltrating into the CAIX+ sk-rc-52 tumor sections (**Fig. 6C upper left**). These granzyme B+ T cells were seen surrounding the tumor (**Fig. 6C upper left (a) and middle**) and inside the tumor (**Fig. 6C upper left (b) and lower**). Tumors with necrotic areas were shown in H&E stained slides (labeled as n inside **Fig. 6C right middle and lower**) and lie at locations near to the granzyme B+ T cells. In contrast, the CAIX+ sk-rc-52 tumors treated with control activated T cells (LAK) (**Fig. 7**) did not show any granzyme B+ T cells. Similarly, CAIX- sk-rc-59 treated with G36-CD28z CART cells (**Fig. 8**) or treated with LAK (**Fig. 9**) showed a low background staining while tumor was proliferating. For positive control of granzyme B staining, CART cells was locally injected into the established sk-rc-52 tumor in mice. After one day, the mice was sacrificed and tumor tissue was sectioned for this staining (**Fig. 10**).

Table 1
Cytokine Secretion After One or Two Weeks of Contact with Tumor Cells*

	RC-SK-52 (CAIX+) Cells			
CART cells	IFN-γ (pg/ml)		IL-2 (pg/ml)	
	One week	Two weeks	One week	Two weeks
G36-CD28z	25,788	28,192	7,524	24,937
G36-CD8z	13,096	10,961	1,470	10,029
A8-CD28z	55	55	9	13
LAK	68	58	9	13
	RC-SK-59 (CAIX-) Cells			
G36-CD28z	31	29	5	4
G36-CD8z	27	38	8	10
A8-CD28z	56	55	7	8
LAK	49	56	10	8

*- Transduced T cells were incubated with irradiated tumor cells for one or two weeks then harvested, washed and incubated with fresh non-irradiated tumor cells overnight and supernatants collected after 24 hrs for cytokine analysis. For T cell cultures that did not interact with tumor cells, only background level of cytokines were detected at levels <50 pg/ml IFN-γ and <10 pg/ml IL-2.

Table 2
Frequency of Partial Regression of CAIX+ Tumors by G36-CD28z CART cells

Gene construct	LAK	A8-CD28z	G36-CD28z	Statistics
Target antigen	none	irrelevant	specific	
Co-stimulatory	none	2 signals	2 signals	
Partial response	2	1	10	$p<0.005$*; $p<0.001$**
Non-partial response	13	14	5	N.S.
Mice from experiments reported in Fig. 5 (experiment 1, n = 7 & experiment 2, n = 8) were scored for response at day 10. Partial response is defined as the regression of tumor to smaller than 30% volume of control tumor (same T-cell treatment in the same mouse bearing left flank of sk-rc-52 and right flank of control tumor sk-rc-59).				
Fisher test results - * G36-CD28z verses LAK, ** G36-CD28z verses A8-CD28z, N.S. - no statistically significant relationship between number of tumors and partial response between T cells transduced with LAK and with A8-CD28z				

[000276] EXAMPLE 9: ANTI-CARBONIC ANHYDRASE IX CHIMERIC ANTIGEN RECEPTOR T CELLS RELEASING ANTI-PD-L1 ANTIBODIES REVERT T CELL EXHAUSTION AND REGRESS RENAL CELL CARCINOMA IN A HUMANIZED MOUSE MODEL

[000277] ***Characterization of anti-CAIX CAR T cells secreting anti-PDL1 IgG1 or IgG4***

[000278] In order to develop a new CAR therapy for CAIX+ RCC, we engineered a bicistronic lentiviral vector to express the anti-CAIX (G36) scFv linked to CD28 and CD3-ζ signaling domains (G36-CD28z CAR in the first cassette and anti-PD-L1 IgG1 or IgG4 in a second expression cassette after an IRES site (Figure 16A). The anti-PD-L1 IgG sequence was inserted into the lentiviral vector with the aim to block T-cell exhaustion, which we propose may imporve the efficacy of G36-CD28z CART cells (Figure 16B). As controls, we used an anti-CAIX CAR or anti-BCMA CAR containing an irrelevant anti-SARS IgG1 mAb in the second cassette. The lentiviruses generated from these constructs were transduced into CD8 T cells and cultivated in the presence of IL-21, which yielded CART cells with modestly improved proliferation than was seen with IL-2 (Figures 21A and 21B), while maintaining the same specific killing activity for CAIX+ RCC (Figures 21C and 21D). The percentage of CAIX and PD-L1 expression in all RCC lineages used in our experiments is shown in the Figure 22.

[000279] The CART cell functionality is demonstrated in Figure 23, where CD8 T cells transduced with all CARS were able to proliferate in the presence of IL-21 and anti-CD8/CD28 beads (Figures 23A and 23B), achieving transduction levels of 65-90% after four days (Figure 23C). Fourteen days after transduction, we evaluated the stable long-term expression of CAR by the integrated lentiviruses (Figure 16C), which was maintained around 25-50% for all CARs. Total IgG levels secreted by CD8 T cells was also determined, ranging around 300-650 ng/mL after 4 days (Figure 16D). The binding specificity of the anti-PD-L1 IgG1 and IgG4 antibodies for human PD-L1 was also confirmed (Figure 16E). The levels of biotinylated anti-PDL1 IgG1 and 4 were significantly lower than total IgG, which could be explained by the fact that a portion of the IgG was wasted during the purification process. The ability of anti-CAIX CART cells to undergo clonal expansion in the presence of CAIX+ RCC cells was established (Figures 16F and 16G). Anti-CAIX CART cells cannot expand significantly in the presence of CAIX- RCC cells.

[000280] ***Effector Activity of Anti-CAIX CART Cells.*** All anti-CAIX CART cells were able to induce around 50-70% decrease in the viability of Skrc59 CAIX+/PD-L1+, indicating that the Anti-PD-L1 IgG1 and IgG4, secreted by some CART cells, did not augment cell death under these assay conditions (Figure 17A). Anti-CAIX CART cells induced IL-2 and IFNγ release in the presence of CAIX+/PD-L1+ cells, indicating the specific activation of anti-CAIX CART cells (Figures 17C and 17E, respectively). Regarding the anti-CAIX CART cells secreting anti-PD-L1 IgGs, the unique differential effect was seen for the IgG1 isoform, which was able to induce around 60% of ADCC in CAIX+/PD-L1+ RCC cells when incubated with natural killer cells (NK) (Figure 17G). No effect in cell viability, cytokines secretion or ADCC was detected for any of the CART cells in the presence of CAIX-/PD-L1- cells (Figures 17B, 17D, 17F and 17H).

[000281] ***Anti-CAIX CART cells-secreting anti-PD-L1 antibodies can diminish T cell exhaustion in vitro.*** A circa 50% decrease in the exhaustion markers Lag-3, Tim3 and PD-1 was found in the anti-PD-L1 IgG1 and IgG4 anti-CAIX CART groups (Figures 18A, 18B and 18C, respectively) after induction of exhaustion compared to the parental anti-CAIX or irrelevant anti-BCMA CART cells. At this point, the killing activity of anti-CAIX CART cells without anti-PD-L1 was retested over Skrc59 CAIX+/PD-L1+ cells. As can be seen in Figure 18D, the anti-CAIX CART cells had lost their killing activity against CAIX+/PD-

L1+ RCC *in vitro* to a level that was similar to the irrelavent CAR group, establishing that the anti-CAIX CART cells became anergic. In contract, the RCC viability diminished 25-50% for the anti-CAIX CAR anti-PD-L1 IgG1 and IgG4 CART groups, thereby providing evidence that the checkpoint blockade elicited by the presence of sectreted anti-PD-L1 IgGs can lead to diminished T cell exhaustion.

[000282] ***Anti-CAIX CART cells secreting anti-PD-L1 antibodies can further decrease tumor growth in an orthotopic mouse model of human RCC.*** NSG mice were used to establish an orthotopic RCC model by injecting Skrc-59 CAIX+PD-L1+luciferase+ positive RCC cells under the kidney capsule followed by i.v. injection of 1.0x107 CART or untransduced T cells (Day 0) and repeat treatment on Day 17 with a lower dose ($2.5x10^6$) of the same cells. We did not treat the mice with systemic IL-2 to maintain the proliferation of CART cells to avoid the bias that this molecule could exert over the tumor growth. The data in Figures 19A-19C demonstrate that all three anti-CAIX CART cell groups showed decreased RCC growth compared to irrelevant anti-BCMA CART cells or untransduced cells over the course of the experiment with the marked anti-tumor effects of the anti-CAEX CART cells secreting anti-PD-L1 IgG1 or IgG4 becoming evidenct at day 23 and 30 (Figure 19A and 19B). However, even one week after i.v. treatment with CART cells, we observed that the tumors were 2-3 times smaller in the anti-PD-L1-secreting CART cells when compared with parental anti-CAIX CART cells and the two control groups (Figure 24A). We also analyzed CD45+ T cell survival in the mouse blood to gauge their survival in this passive transfer model. At Day 8 we observed that the amount of human T cells within the PBMCs was only 10-15% (Figure 24B) and for this reason we decided to expand the CART cells *in vitro* to perform a second injection into the mail blood at Day 17. One week after the second injection (Day 23) the anti-PD-L1 IgG1 and IgG4 groups had tumors 15 times smaller than the control groups and 5 times smaller than the anti-CAIX CAR T cells without anti-PD-L1 secretion (Figure 19C and Figure 24A). At day 30, the group of mice treated with CART cells-secreting anti-PD-L1 antibody had tumors 5 times smaller than the control groups (Figure 19C and Figure 24A). The excised tumors weights were also lower from the mice treated CART cells-secreting anti-PD-L1 antibody and that was particularly evident for the anti-PDL1 IgG4 antibody group (Figures19B and 19D).

[000283] ***Analysis of CART cell tumor infiltrates and evidence that anti-CAIX CART cells secreting anti-PD-L1 antibodies can lead to reversal of T cell exhaustion.*** Analysis in the excised tumors showed around 10% of TIL in all groups (Figure 24C)

[000284] One of the most important effects observed with the anti-CAIX CART cells secreting anti-PD-L1 IgG1 or IgG4 antibodies in vivo was their ability to decrease the expression of the exhaustion markers PD-1, Tim-3 and Lag-3. As shown in Figure 20A, we observed a circa 40-50% decrease in the expression of these markers in the TIL's when compared with the treatment using untransduced control cells at the Day 30 There was also a circa 30-70% decrease compared to anti-CAIX CAR cells That were not secreting anti-PDL-1 antibodies thereby providing evidence that the locally secreted antibodies had an effect on decreasing T cell exhaustion.

[000285] The effector activity of CART cells and their influence over RCC proliferation in vivo was evaluated by the immunohistochemical detection of granzyme B in the TIL, the tumor proliferation marker Ki67 and the tumor immunosuppressive proteinPD-L1 (Figures 20B and 20C). The granzyme B staining showed the effector activity of CD8+ cells, especially in the RCC tumorstreatedwith the anti-CAIX CART cells secreting anti-PD-L1 IgG4, which presented an augmented percentage of high positive stained cells (Figure 20B and 20C). PD-L1 expression decreased dramatically in the tumors treated with Antianti-CAIX CART cells, being more expressive in the Anti-CAIX/Anti-PD-L1 IgG-secreting groups (Figures 20B and 20C). Ki67 expression decreased significantly in the Anti-CAIX/Anti-PD-L1 IgG-secreting groups, as we can visualize in the total DAB pixel count graph, however when the intensity among the positive nuclei staining (Ki67 IHC quantification graph) was evaluated, we can note that the Anti-CAIX/Anti-PD-L1 IgG4 presented the lowest intensity of Ki67 expression (Figures 20B and 20C). For the quantification of nuclear proteins, like Ki67, DAB staining pattern is confined to the nuclei, and the threshold feature of ImageJ should be used to select the positive stained areas for quantification. For this reason, there are no negative cells in the Ki67 IHC quantification graph (Figure 20C) and DAB pixel count were also shown for evaluation of total Ki67 staining, including negative cells (Figure 20C).

[000286] ***Anti-CAIX CART cells secreting anti-PD-L1 IgG1 antibodies can recruit NK cells to the tumor.*** The tumors of the mice treated with Anti-CAIX/Anti-PD-L1 IgG1 that received an injection of NK cells 2 days before the euthanasia showed the presence of 40%

more NK cells inside the tumor, when compared with Anti-BCMA/Anti-SARS IgG1, as detected by Anti-CD56 staining by FACS (Figure 25A). The increase in NK cells in the Anti-CAIX/Anti-PD-L1 IgG1 group was also detected and quantified by IHC (Figure 25B). Very few NK cells were also detected in the groups treated with CART cells secreting an unspecific IgG1 Ab.

[000287] OTHER EMBODIMENTS

[000288] While the invention has been described in conjunction with the detailed description thereof, the foregoing description is intended to illustrate and not limit the scope of the invention, which is defined by the scope of the appended claims. Other aspects, advantages, and modifications are within the scope of the following claims.

REFERENCES

1. Ivanov S, Liao SY, Ivanova A, Danilkovitch-Miagkova A, Tarasova N, Weirich G *et al.* Expression of hypoxia-inducible cell-surface transmembrane carbonic anhydrases in human cancer. *Am J Pathol* 2001; 158(3): 905-19.

2. Loncaster JA, Harris AL, Davidson SE, Logue JP, Hunter RD, Wycoff CC *et al.* Carbonic anhydrase (CA IX) expression, a potential new intrinsic marker of hypoxia: correlations with tumor oxygen measurements and prognosis in locally advanced carcinoma of the cervix. *Cancer research* 2001; 61(17): 6394-9.

3. Hilvo M, Baranauskiene L, Salzano AM, Scaloni A, Matulis D, Innocenti A *et al.* Biochemical characterization of CA IX, one of the most active carbonic anhydrase isozymes. *J Biol Chem* 2008; 283(41): 27799-809.

4. Oosterwijk E, Ruiter DJ, Hoedemaeker PJ, Pauwels EK, Jonas U, Zwartendijk J *et al.* Monoclonal antibody G 250 recognizes a determinant present in renal-cell carcinoma and absent from normal kidney. *International journal of cancer. Journal international du cancer* 1986; 38(4): 489-94.

5. Liao SY, Brewer C, Zavada J, Pastorek J, Pastorekova S, Manetta A *et al.* Identification of the MN antigen as a diagnostic biomarker of cervical intraepithelial squamous and glandular neoplasia and cervical carcinomas. *Am J Pathol* 1994; 145(3): 598-609.

6. Liao SY, Aurelio ON, Jan K, Zavada J, Stanbridge EJ. Identification of the MN/CA9 protein as a reliable diagnostic biomarker of clear cell carcinoma of the kidney. *Cancer research* 1997; 57(14): 2827-31.

7. Atkins M, Regan M, McDermott D, Mier J, Stanbridge E, Youmans A *et al.* Carbonic anhydrase IX expression predicts outcome of interleukin 2 therapy for renal cancer. *Clin Cancer Res* 2005; 11(10): 3714-21.

8. Lokich J. Spontaneous regression of metastatic renal cancer. Case report and literature review. *Am J Clin Oncol* 1997; 20(4): 416-8.

9. Chang AE, Li Q, Jiang G, Sayre DM, Braun TM, Redman BG. Phase II trial of autologous tumor vaccination, anti-CD3-activated vaccine-primed lymphocytes, and interleukin-2 in stage IV renal cell cancer. *J Clin Oncol* 2003; 21(5): 884-90.

10. Dudley ME, Wunderlich JR, Robbins PF, Yang JC, Hwu P, Schwartzentruber DJ *et al.* Cancer regression and autoimmunity in patients after clonal repopulation with antitumor lymphocytes. *Science* 2002; 298(5594): 850-4.

11. Schaft N, Willemsen RA, de Vries J, Lankiewicz B, Essers BW, Gratama JW *et al.* Peptide fine specificity of anti-glycoprotein 100 CTL is preserved following transfer of engineered TCR alpha beta genes into primary human T lymphocytes. *J Immunol* 2003; 170(4): 2186-94.

12. Bubenik J. MHC class I down-regulation: tumour escape from immune surveillance? (review). *International journal of oncology* 2004; 25(2): 487-91.

13. Gajewski TF, Meng Y, Blank C, Brown I, Kacha A, Kline J *et al.* Immune resistance orchestrated by the tumor microenvironment. *Immunological reviews* 2006; 213: 131-45.

14. Frigola X, Inman BA, Lohse CM, Krco CJ, Cheville JC, Thompson RH *et al.* Identification of a soluble form of B7-H1 that retains immunosuppressive activity and is associated with aggressive renal cell carcinoma. *Clin Cancer Res* 2011; 17(7): 1915-23.

15. Grepin R, Guyot M, Giuliano S, Boncompagni M, Ambrosetti D, Chamorey E *et al.* The CXCL7/CXCR1/2 axis is a key driver in the growth of clear cell renal cell carcinoma. *Cancer research* 2014; 74(3): 873-83.

16. Sadelain M, Brentjens R, Riviere I. The promise and potential pitfalls of chimeric antigen receptors. *Curr Opin Immunol* 2009; 21(2): 215-23.

17. Lamers CH, Sleijfer S, van Steenbergen S, van Elzakker P, van Krimpen B, Groot C *et al.* Treatment of metastatic renal cell carcinoma with CAIX CAR-engineered T cells: clinical evaluation and management of on-target toxicity. *Molecular therapy : the journal of the American Society of Gene Therapy* 2013; 21(4): 904-12.

18. Milone MC, Fish JD, Carpenito C, Carroll RG, Binder GK, Teachey D *et al.* Chimeric receptors containing CD137 signal transduction domains mediate enhanced survival of T cells and increased antileukemic efficacy in vivo. *Molecular therapy : the journal of the American Society of Gene Therapy* 2009; 17(8): 1453-64.

19. Wilkie S, Picco G, Foster J, Davies DM, Julien S, Cooper L *et al.* Retargeting of human T cells to tumor-associated MUC1: the evolution of a chimeric antigen receptor. *J Immunol* 2008; 180(7): 4901-9.

20. Lo AS, Ma Q, Liu DL, Junghans RP. Anti-GD3 chimeric sFv-CD28/T-cell receptor zeta designer T cells for treatment of metastatic melanoma and other neuroectodermal tumors. *Clin Cancer Res* 2010; 16(10): 2769-80.

21. Kalos M, Levine BL, Porter DL, Katz S, Grupp SA, Bagg A *et al.* T cells with chimeric antigen receptors have potent antitumor effects and can establish memory in patients with advanced leukemia. *Science translational medicine* 2011; 3(95): 95ra73.

22. Pegram HJ, Park JH, Brentjens RJ. CD28z CARs and armored CARs. *Cancer J* 2014; 20(2): 127-33.

23. Xu C, Lo A, Yammanuru A, Tallarico AS, Brady K, Murakami A *et al.* Unique biological properties of catalytic domain directed human anti-CAIX antibodies discovered through phage-display technology. *PloS one* 2010; 5(3): e9625.

24. Sui J, Aird DR, Tamin A, Murakami A, Yan M, Yammanuru A *et al.* Broadening of neutralization activity to directly block a dominant antibody-driven SARS-coronavirus evolution pathway. *PLoS pathogens* 2008; 4(11): e1000197.

25. Mirzabekov T, Kontos H, Farzan M, Marasco W, Sodroski J. Paramagnetic proteoliposomes containing a pure, native, and oriented seven-transmembrane segment protein, CCR5. *Nat Biotechnol* 2000; 18(6): 649-54.

26. Wald O, Weiss ID, Wald H, Shoham H, Bar-Shavit Y, Beider K *et al.* IFN-gamma acts on T cells to induce NK cell mobilization and accumulation in target organs. *J Immunol* 2006; 176(8): 4716-29.

27. Zeytin H, Reali E, Zaharoff DA, Rogers CJ, Schlom J, Greiner JW. Targeted delivery of murine IFN-gamma using a recombinant fowlpox virus: NK cell recruitment to regional lymph nodes and priming of tumor-specific host immunity. *Journal of interferon & cytokine research : the official journal of the International Society for Interferon and Cytokine Research* 2008; 28(2): 73-87.

28. Murugaiyan G, Saha B. Protumor vs antitumor functions of IL-17. *J Immunol* 2009; 183(7): 4169-75.

29. Bar E, Whitney PG, Moor K, Reis e Sousa C, LeibundGut-Landmann S. IL-17 regulates systemic fungal immunity by controlling the functional competence of NK cells. *Immunity* 2014; 40(1): 117-27.

30. Hinrichs CS, Kaiser A, Paulos CM, Cassard L, Sanchez-Perez L, Heemskerk B *et al.* Type 17 CD8+ T cells display enhanced antitumor immunity. *Blood* 2009; 114(3): 596-9.

31. Hombach AA, Rappl G, Abken H. Arming cytokine-induced killer cells with chimeric antigen receptors: CD28 outperforms combined CD28-OX40 "super-stimulation". *Molecular therapy : the journal of the American Society of Gene Therapy* 2013; 21(12): 2268-77.

32. Mor F, Cohen IR. IL-2 rescues antigen-specific T cells from radiation or dexamethasone-induced apoptosis. Correlation with induction of Bcl-2. *J Immunol* 1996; 156(2): 515-22.

33. Isakov N, Altman A. PKC-theta-mediated signal delivery from the TCR/CD28 surface receptors. *Frontiers in immunology* 2012; 3: 273.

34. Loskog A, Giandomenico V, Rossig C, Pule M, Dotti G, Brenner MK. Addition of the CD28 signaling domain to chimeric T-cell receptors enhances chimeric T-cell resistance to T regulatory cells. *Leukemia* 2006; 20(10): 1819-28.

35. Schwarzer A, Wolf B, Fisher JL, Schwaab T, Olek S, Baron U *et al.* Regulatory T-cells and associated pathways in metastatic renal cell carcinoma (mRCC) patients undergoing DC-vaccination and cytokine-therapy. *PloS one* 2012; 7(10): e46600.

36. Lamers CH, Willemsen R, van Elzakker P, van Steenbergen-Langeveld S, Broertjes M, Oosterwijk-Wakka J *et al.* Immune responses to transgene and retroviral vector in patients treated with ex vivo-engineered T cells. *Blood* 2011; 117(1): 72-82.

37. Miotti S, Negri DR, Valota O, Calabrese M, Bolhuis RL, Gratama JW *et al.* Level of anti-mouse-antibody response induced by bi-specific monoclonal antibody OC/TR in ovarian-carcinoma patients is associated with longer survival. *International journal of cancer. Journal international du cancer* 1999; 84(1): 62-8.

38. Kershaw MH, Westwood JA, Parker LL, Wang G, Eshhar Z, Mavroukakis SA *et al.* A phase I study on adoptive immunotherapy using gene-modified T cells for ovarian cancer. *Clin Cancer Res* 2006; 12(20 Pt 1): 6106-15.

39. Pastorekova S. Carbonic anhydrase IX (CA IX) as a potential target for cancer therapy. *Cancer Therapy* 2004; 2: 245-262.

40. Pastorekova S, Parkkila S, Parkkila AK, Opavsky R, Zelnik V, Saarnio J *et al.* Carbonic anhydrase IX, MN/CA IX: analysis of stomach complementary DNA sequence and expression in human and rat alimentary tracts. *Gastroenterology* 1997; 112(2): 398-408.

41. Saarnio J, Parkkila S, Parkkila AK, Waheed A, Casey MC, Zhou XY *et al.* Immunohistochemistry of carbonic anhydrase isozyme IX (MN/CA IX) in human gut reveals polarized expression in the epithelial cells with the highest proliferative capacity. *The journal of histochemistry and cytochemistry : official journal of the Histochemistry Society* 1998; 46(4): 497-504.

42. Zavada J, Zavadova Z, Zat'ovicova M, Hyrsl L, Kawaciuk I. Soluble form of carbonic anhydrase IX (CA IX) in the serum and urine of renal carcinoma patients. *Br J Cancer* 2003; 89(6): 1067-71.

43. Hombach A, Koch D, Sircar R, Heuser C, Diehl V, Kruis W *et al.* A chimeric receptor that selectively targets membrane-bound carcinoembryonic antigen (mCEA) in the presence of soluble CEA. *Gene Ther* 1999; 6(2): 300-4.

44. Carpenito C, Milone MC, Hassan R, Simonet JC, Lakhal M, Suhoski MM *et al.* Control of large, established tumor xenografts with genetically retargeted human T cells containing CD28 and CD137 domains. *Proceedings of the National Academy of Sciences of the United States of America* 2009; 106(9): 3360-5.

45. Gill S, Tasian SK, Ruella M, Shestova O, Li Y, Porter DL *et al.* Efficacy against human acute myeloid leukemia and myeloablation of normal hematopoiesis in a mouse model using chimeric antigen receptor-modified T cells. *Blood* 2014.

46. Hombach AA, Heiders J, Foppe M, Chmielewski M, Abken H. OX40 costimulation by a chimeric antigen receptor abrogates CD28 and IL-2 induced IL-10 secretion by redirected CD4(+) T cells. *Oncoimmunology* 2012; 1(4): 458-466.

47. Song DG, Ye Q, Carpenito C, Poussin M, Wang LP, Ji C *et al.* In vivo persistence, tumor localization, and antitumor activity of CAR-engineered T cells is enhanced by costimulatory signaling through CD137 (4-1BB). *Cancer research* 2011; 71(13): 4617-27.

48. Bedke J, Stenzl A. Immunotherapeutic strategies for the treatment of renal cell carcinoma: where are we now? *Expert review of anticancer therapy* 2013; 13(12): 1399-408.

49. Bailey A, McDermott DF. Immune checkpoint inhibitors as novel targets for renal cell carcinoma therapeutics. *Cancer J* 2013; 19(4): 348-52.

50. Maher J, Brentjens RJ, Gunset G, Riviere I, Sadelain M. Human T-lymphocyte cytotoxicity and proliferation directed by a single chimeric TCRzeta /CD28 receptor. *Nat Biotechnol* 2002; 20(1): 70-5.

51. Ferlay J, Soerjomataram I, Dikshit R, Eser S, Mathers C, Rebelo M, et al. Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012. International journal of cancer. 2015;136:E359-86.

52. Dutcher JP. Recent developments in the treatment of renal cell carcinoma. Therapeutic advances in urology. 2013;5:338-53.

53. Cohen HT, McGovern FJ. Renal-cell carcinoma. The New England journal of medicine. 2005;353:2477-90.

54. Sedlakova O, Svastova E, Takacova M, Kopacek J, Pastorek J, Pastorekova S. Carbonic anhydrase IX, a hypoxia-induced catalytic component of the pH regulating machinery in tumors. Frontiers in physiology. 2014;4:400.

55. Benej M, Pastorekova S, Pastorek J. Carbonic anhydrase IX: regulation and role in cancer. Sub-cellular biochemistry. 2014;75:199-219.

56. Tostain J, Li G, Gentil-Perret A, Gigante M. Carbonic anhydrase 9 in clear cell renal cell carcinoma: a marker for diagnosis, prognosis and treatment. European journal of cancer. 2010;46:3141-8.

57. Genega EM, Ghebremichael M, Najarian R, Fu Y, Wang Y, Argani P, et al. Carbonic anhydrase IX expression in renal neoplasms: correlation with tumor type and grade. American journal of clinical pathology. 2010;134:873-9.

58. Alegre ML, Frauwirth KA, Thompson CB. T-cell regulation by CD28 and CTLA-4. Nature reviews Immunology. 2001;1:220-8.

59. Pardoll DM. The blockade of immune checkpoints in cancer immunotherapy. Nature reviews Cancer. 2012;12:252-64.

60. Harshman LC, Drake CG, Choueiri TK. PD-1 blockade in renal cell carcinoma: to equilibrium and beyond. Cancer immunology research. 2014;2:1132-41.

61. Srivastava S, Riddell SR. Engineering CAR-T cells: Design concepts. Trends in immunology. 2015;36:494-502.

62. Maude SL, Frey N, Shaw PA, Aplenc R, Barrett DM, Bunin NJ, et al. Chimeric antigen receptor T cells for sustained remissions in leukemia. The New England journal of medicine. 2014;371:1507-17.

63. Zhu Y, Tan Y, Ou R, Zhong Q, Zheng L, Du Y, et al. Anti-CD19 chimeric antigen receptor-modified T cells for B-cell malignancies: a systematic review of efficacy and safety in clinical trials. European journal of haematology. 2015.

64. Kakarla S, Gottschalk S. CAR T cells for solid tumors: armed and ready to go? Cancer journal. 2014;20:151-5.

65. Lo AS, Xu C, Murakami A, Marasco WA. Regression of established renal cell carcinoma in nude mice using lentivirus-transduced human T-cells expressing a human anti-CAIX chimeric antigen receptor. Molecular Therapy - Oncolytics. 2014;1:1-12.

66. Hsu CY, Uludag H. A simple and rapid nonviral approach to efficiently transfect primary tissue-derived cells using polyethylenimine. Nature protocols. 2012;7:935-45.

67. Singh H, Figliola MJ, Dawson MJ, Huls H, Olivares S, Switzer K, et al. Reprogramming CD19-specific T cells with IL-21 signaling can improve adoptive immunotherapy of B-lineage malignancies. Cancer research. 2011;71:3516-27.

68. June C, Rosenberg SA, Sadelain M, Weber JS. T-cell therapy at the threshold. Nature biotechnology. 2012;30:611-4.

69. Chang DK, Moniz RJ, Xu Z, Sun J, Signoretti S, Zhu Q, et al. Human anti-CAIX antibodies mediate immune cell inhibition of renal cell carcinoma in vitro and in a humanized mouse model in vivo. Molecular cancer. 2015;14:119.

70. Kaka AS, Shaffer DR, Hartmaier R, Leen AM, Lu A, Bear A, et al. Genetic modification of T cells with IL-21 enhances antigen presentation and generation of central

memory tumor-specific cytotoxic T-lymphocytes. Journal of immunotherapy. 2009;32:726-36.

71. Li Y, Bleakley M, Yee C. IL-21 influences the frequency, phenotype, and affinity of the antigen-specific CD8 T cell response. Journal of immunology. 2005;175:2261-9.

72. van der Stegen SJ, Hamieh M, Sadelain M. The pharmacology of second-generation chimeric antigen receptors. Nature reviews Drug discovery. 2015;14:499-509.

73. Long AH, Haso WM, Shern JF, Wanhainen KM, Murgai M, Ingaramo M, et al. 4-1BB costimulation ameliorates T cell exhaustion induced by tonic signaling of chimeric antigen receptors. Nature medicine. 2015;21:581-90.

74. Lee DW, Kochenderfer JN, Stetler-Stevenson M, Cui YK, Delbrook C, Feldman SA, et al. T cells expressing CD19 chimeric antigen receptors for acute lymphoblastic leukaemia in children and young adults: a phase 1 dose-escalation trial. Lancet. 2015;385:517-28.

75. Virgin HW, Wherry EJ, Ahmed R. Redefining chronic viral infection. Cell. 2009;138:30-50.

76. Wherry EJ. T cell exhaustion. Nature immunology. 2011;12:492-9.

77. Topalian SL, Hodi FS, Brahmer JR, Gettinger SN, Smith DC, McDermott DF, et al. Safety, activity, and immune correlates of anti-PD-1 antibody in cancer. The New England journal of medicine. 2012;366:2443-54.

78. Brahmer JR, Tykodi SS, Chow LQ, Hwu WJ, Topalian SL, Hwu P, et al. Safety and activity of anti-PD-L1 antibody in patients with advanced cancer. The New England journal of medicine. 2012;366:2455-65.

79. John LB, Devaud C, Duong CP, Yong CS, Beavis PA, Haynes NM, et al. Anti-PD-1 antibody therapy potently enhances the eradication of established tumors by gene-modified

2015364245 26 Feb 2020

T cells. Clinical cancer research : an official journal of the American Association for Cancer Research. 2013;19:5636-46.

The term "comprise" and variants of the term such as "comprises" or "comprising" are used herein to denote the inclusion of a stated integer or stated integers but not to exclude any other integer or any other integers, unless in the context or usage an exclusive interpretation of the term is required.

Any reference to publications cited in this specification is not an admission that the disclosures constitute common general knowledge in Australia.

2015364245 26 Feb 2020

CLAIMS:

1. A nucleic acid encoding a chimeric antigen receptor (CAR) comprising an extracellular domain, a transmembrane domain and an intracellular signaling domain, further comprising a nucleic acid encoding a polypeptide positioned after the intracellular signaling domain, wherein the polypeptide is an IgG scFV antibody or a cytokine, and further comprising an internal ribosome entry site (IRES) positioned between the intracellular signaling domain and the nucleic acid encoding the polypeptide.

2. The nucleic acid of claim 1, wherein the transmembrane domain further comprises a stalk region positioned between the extracellular domain and the transmembrane domain or wherein the transmembrane domain comprises CD28.

3. The nucleic acid of claim 1 or claim 2, further comprising one or more additional costimulatory molecules positioned between the transmembrane domain and the intracellular signaling domain, optionally wherein the costimulatory molecules is CD28, 4-1BB, ICOS, or OX40.

4. The nucleic acid of any one of claims 1 to 3, wherein the intracellular signaling domain comprises a CD3 zeta chain.

5. The nucleic acid of any one of claims 1 to 4, wherein the extracellular domain comprises an antigen binding domain derived from an antibody against a tumor-associated antigen.

6. The nucleic acid of claim 5, wherein the extracellular domain is a Fab antibody or a scFV antibody.

7. The nucleic acid of claim 6, wherein the Fab antibody or the scFv antibody is specific for CAIX, BCMA, CD138, CCR4, PD-1, PDL-1, PD-L2, CXCR4, GITR, SARS virus, flavivirus, MERS virus, or influenza virus.

8. The nucleic acid of any one of claims 1 to 7, wherein the IgG scFv antibody encoded by the nucleic acid positioned after the intracellular signaling domain is specific for PD-L1, BCMA, CD138, CCR4, PD-1, PD-L2, CXCR4, GITR, SARS virus, flavivirus, MERS virus, influenza virus, or CAIX; or wherein the cytokine encoded by the nucleic acid positioned after the intracellular signaling domain is IL-2, IL-4, IL-7, IL-9, IL-15 or IL-21.

2015364245 26 Feb 2020

9. A vector comprising the nucleic acid of any one of claims 1 to 8.

10. A genetically engineered cell which expresses and bears on the cell surface membrane a chimeric antigen receptor (CAR) comprising an extracellular domain, a transmembrane domain and an intracellular domain, wherein the cell is further engineered to express and secrete a polypeptide, wherein the polypeptide is an IgG scFv antibody or a cytokine.

11. The genetically engineered cell of claim 10, wherein the transmembrane domain further comprises a stalk region positioned between the extracellular domain and the transmembrane domain or wherein the transmembrane domain comprises CD28.

12. The genetically engineered cell of claim 10 or claim 11, further comprising one or more additional costimulatory molecules positioned between the transmembrane domain and the intracellular signaling domain, optionally wherein the costimulatory molecules is CD28, 4-1BB, ICOS, or OX40.

13. The genetically engineered cell of any one of claims 10 to 12, wherein the intracellular signaling domain comprises a CD3 zeta chain.

14. The genetically engineered cell of any one of claims 10 to 13, wherein the extracellular domain comprises an antigen binding domain derived from an antibody against a tumor-associated antigen.

15. The genetically engineered cell of claim 14, wherein the extracellular domain is a Fab antibody or a scFv antibody.

16. The genetically engineered cell of claim 15, wherein the Fab antibody or the scFv antibody is specific for CAIX, BCMA, CD138, CCR4, PD-1, PDL-1, PD-L2, CXCR4, GITR, SARS virus, flavivirus, MERS virus or influenza virus.

17. The genetically engineered cell of any one of claims 10 to 16, wherein the expressed and secreted IgG scFv antibody is specific for PD-L1, CCR4, PD-1, PD-L2, CXCR4, GITR, or CAIX; or wherein the expressed and secreted cytokine is IL-2, IL-4, IL-7, IL-9, IL-15 or IL-21.

18. The genetically engineered cell of claim 10 comprising the nucleic acid of any one of claims 1 to 8, or the vector of claim 9.

2015364245 26 Feb 2020

19. The genetically engineered cell of any one of claims 10 to 18, wherein the cell is a T-cell or an NK cell, optionally wherein the T cell is $CD4^+$ or $CD8^+$ and optionally which comprises a mixed population of $CD4^+$ and $CD8$ cells$^+$.

20. The genetically engineered cell of claim 17, wherein the expressed and secreted IgG scFv antibody is anti-PD-L1.

21. The genetically engineered cell of claim 15, wherein the extracellular domain is a scFv antibody specific for CAIX.

Date: 26 February 2020

Fig. 1a

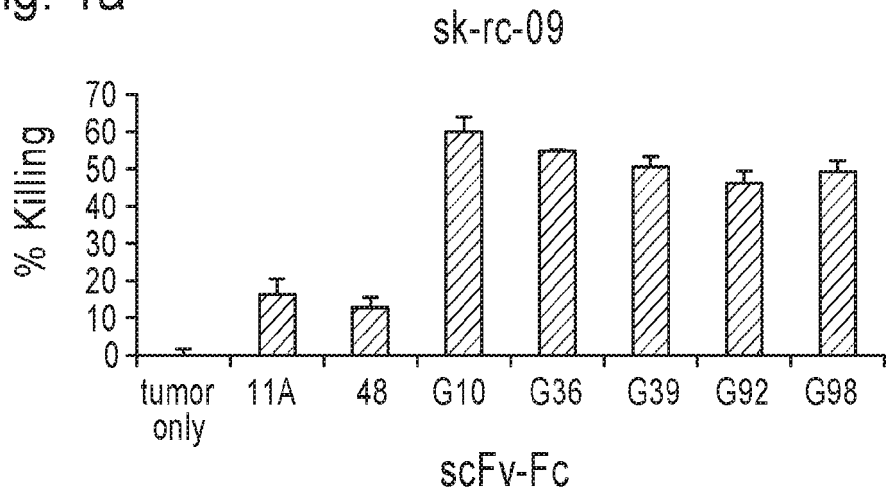


Fig. 1b

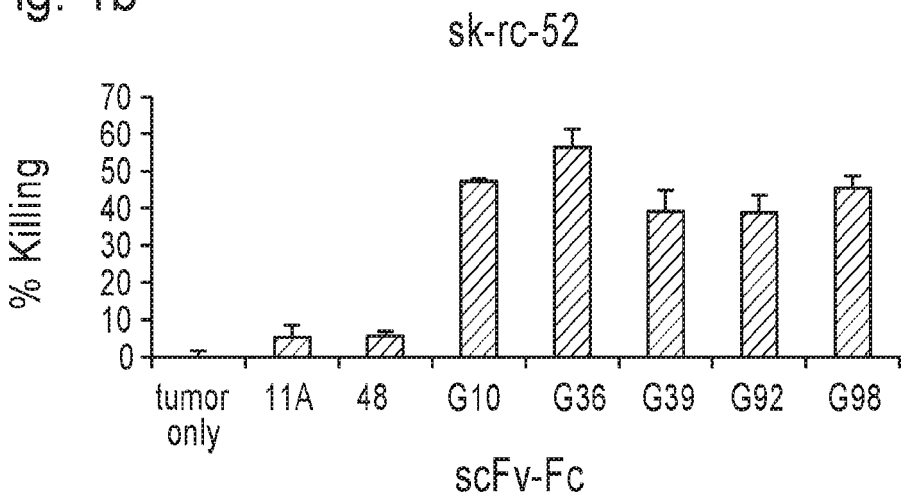
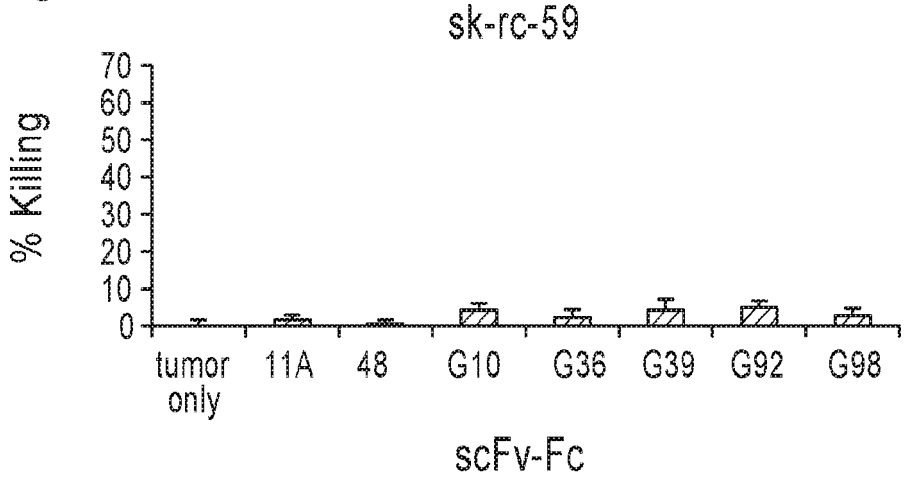


Fig. 1c



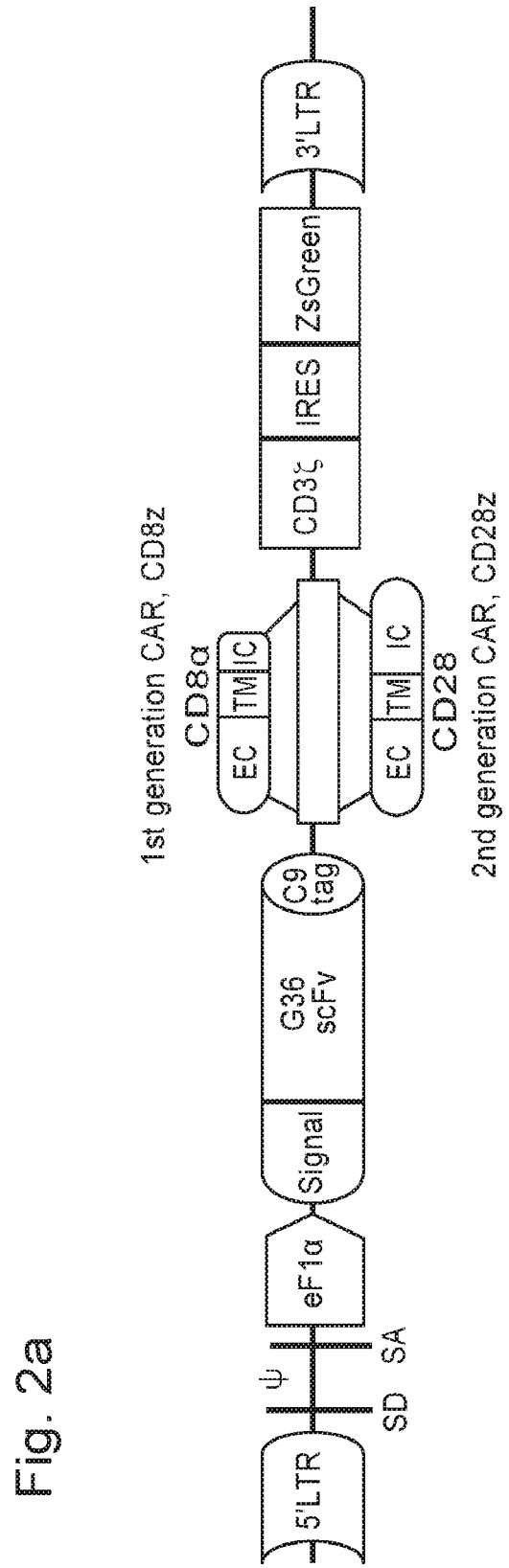
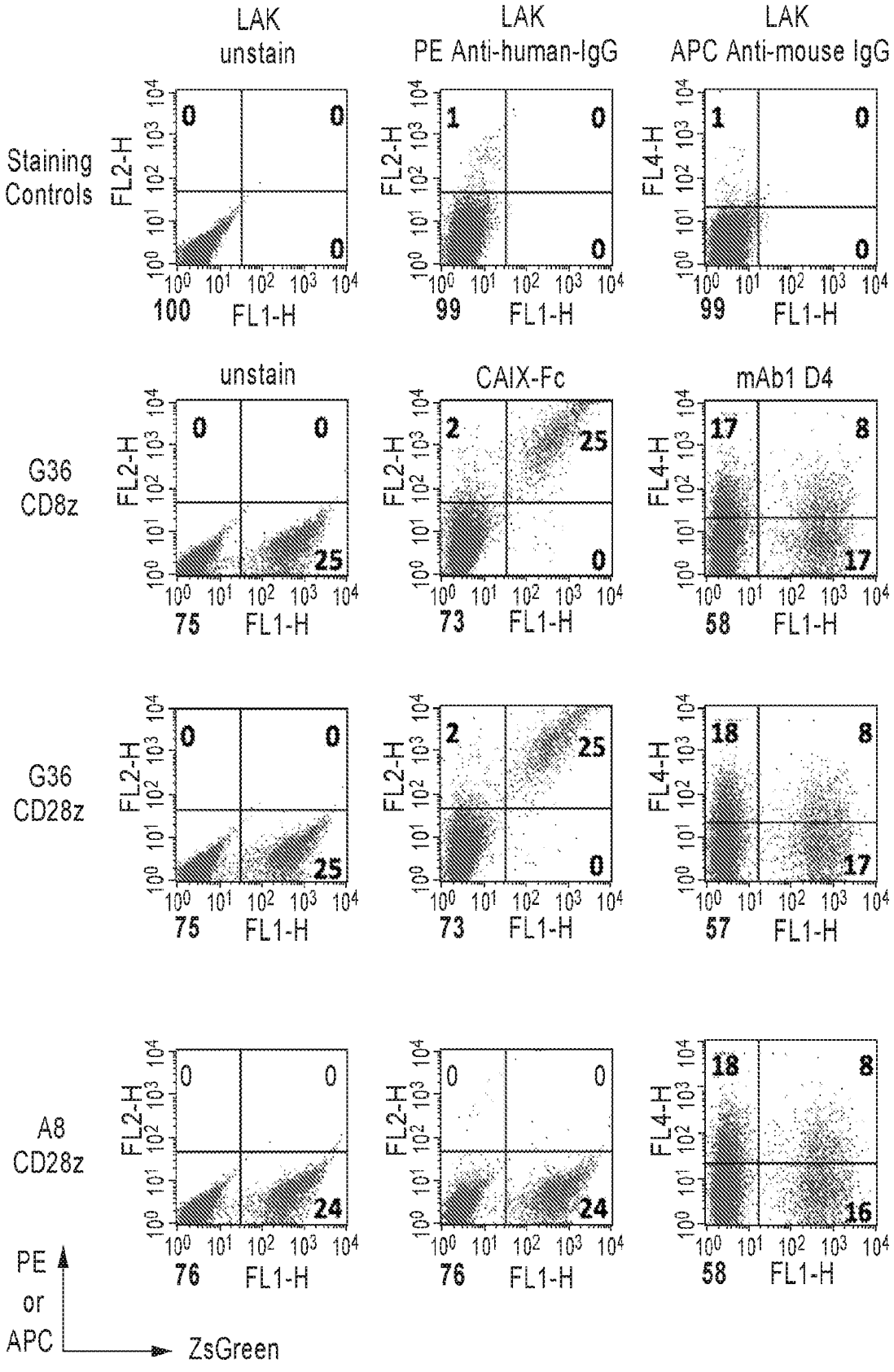

5'LTR
Ψ
SD
SA
eF1α
Signal
G36 scFv
C9 tag
EC
TM
IC
CD8α
1st generation CAR, CD8z
CD3ζ
IRES
ZsGreen
3'LTR
EC
TM
IC
CD28
2nd generation CAR, CD28z

Fig. 2a

Fig. 2b


LAK
unstain
LAK
PE Anti-human-IgG
LAK
APC Anti-mouse IgG
Staining Controls
G36 CD8z
G36 CD28z
A8 CD28z
unstain
CAIX-Fc
mAb1 D4
FL2-H
FL4-H
FL1-H
PE or APC
ZsGreen

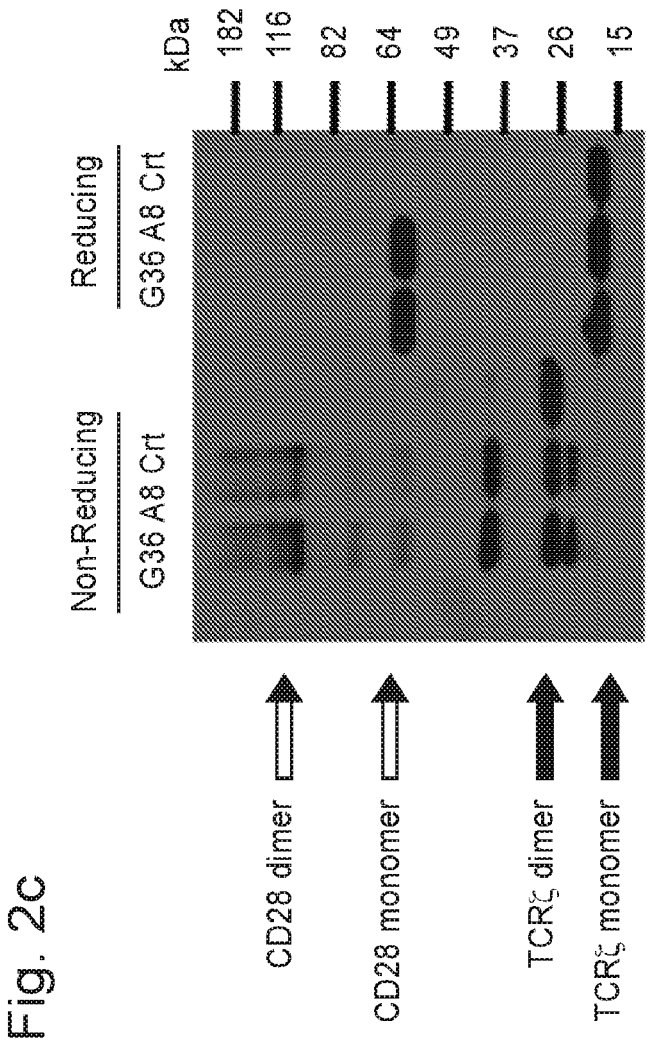

kDa
182
116
82
64
49
37
26
15
Non-Reducing
G36 A8 Crt
Reducing
G36 A8 Crt
CD28 dimer
CD28 monomer
TCRζ dimer
TCRζ monomer

Fig. 2c

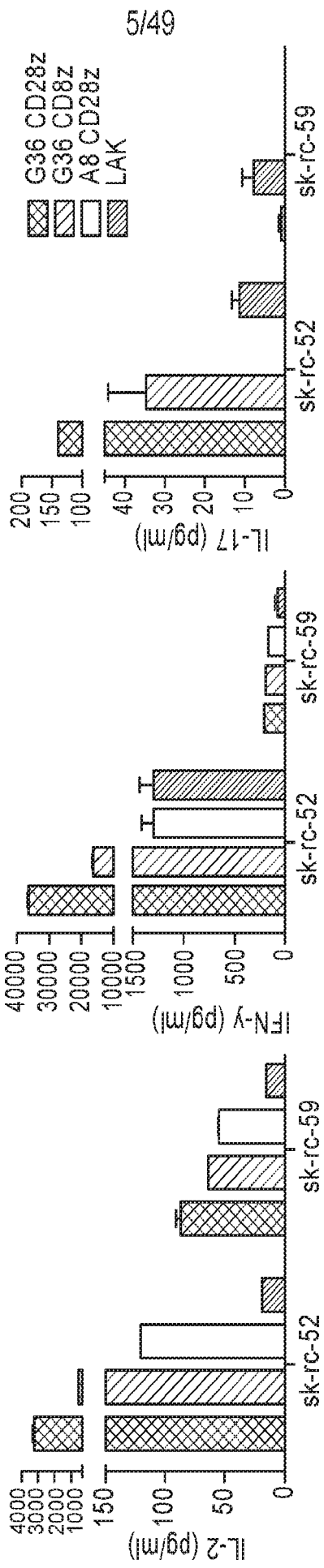
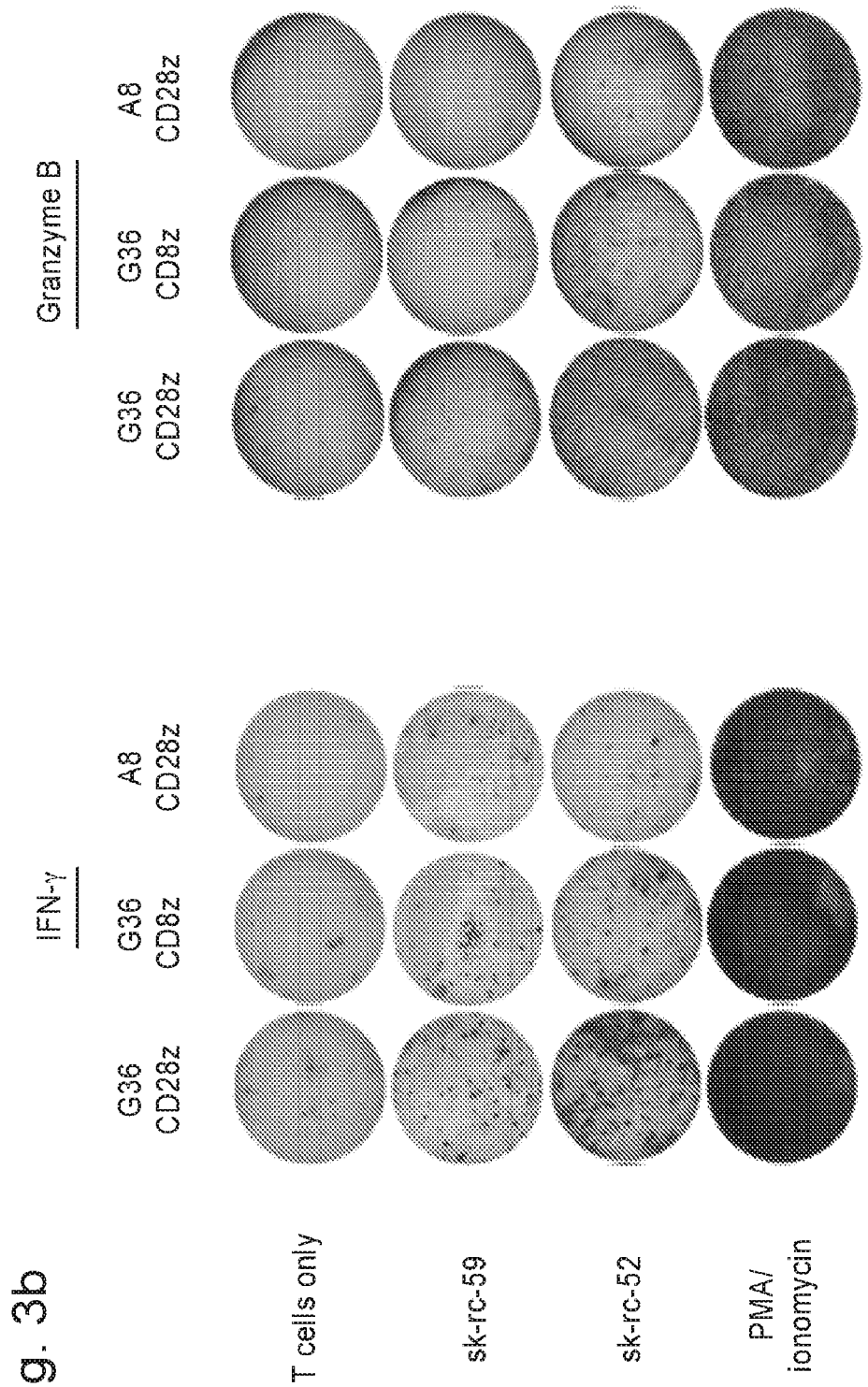

G36 CD28z
G36 CD8z
A8 CD28z
LAK
IL-2 (pg/ml)
4000
3000
2000
1000
150
100
50
0
sk-rc-52
sk-rc-59
IFN-γ (pg/ml)
40000
30000
20000
10000
1500
1000
500
0
sk-rc-52
sk-rc-59
IL-17 (pg/ml)
200
150
100
40
30
20
10
0
sk-rc-52
sk-rc-59

Fig. 3a

Fig. 3b


IFN-γ
G36 CD28z
G36 CD8z
A8 CD28z
Granzyme B
G36 CD28z
G36 CD8z
A8 CD28z
T cells only
sk-rc-59
sk-rc-52
PMA/ ionomycin

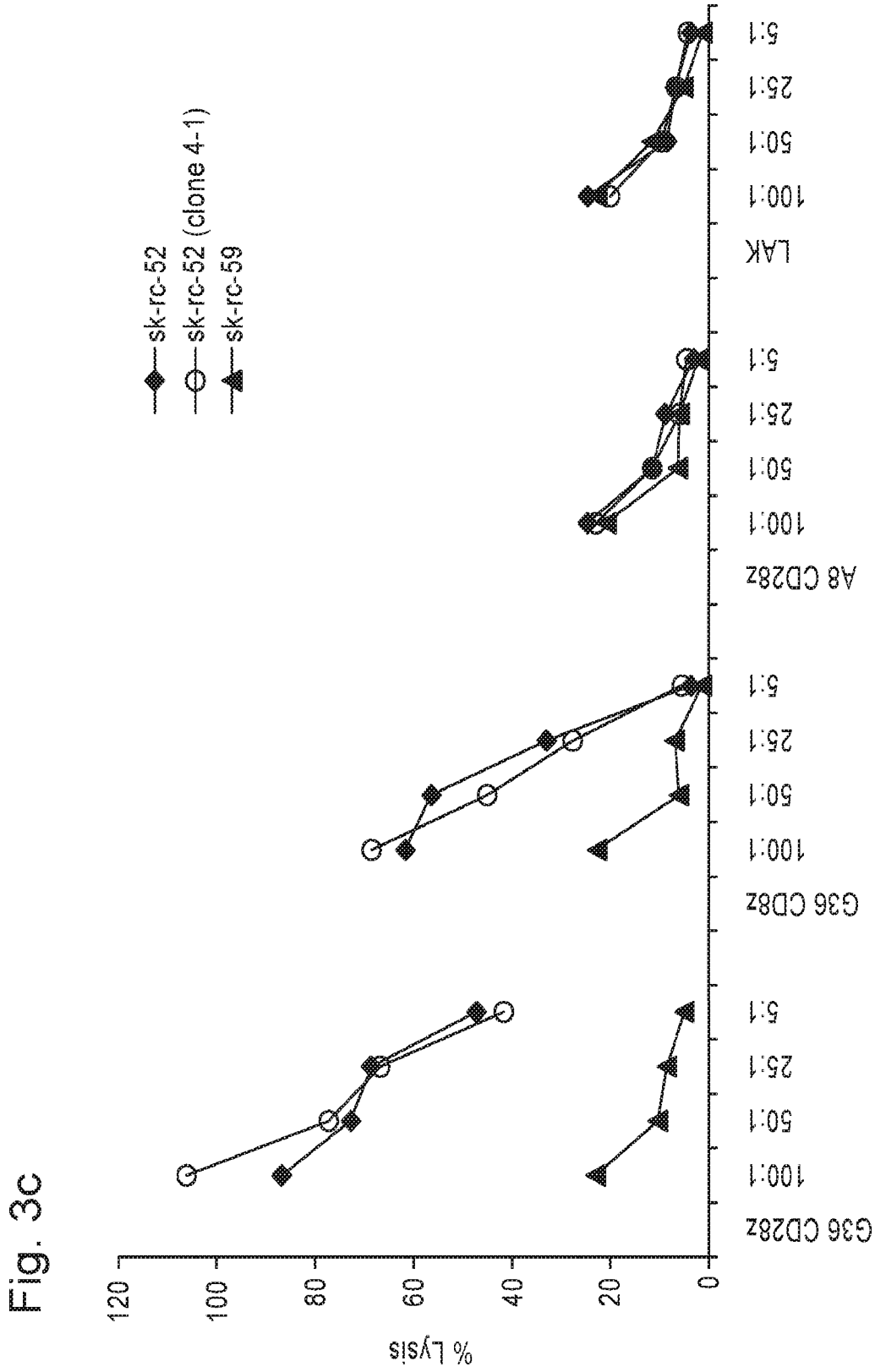
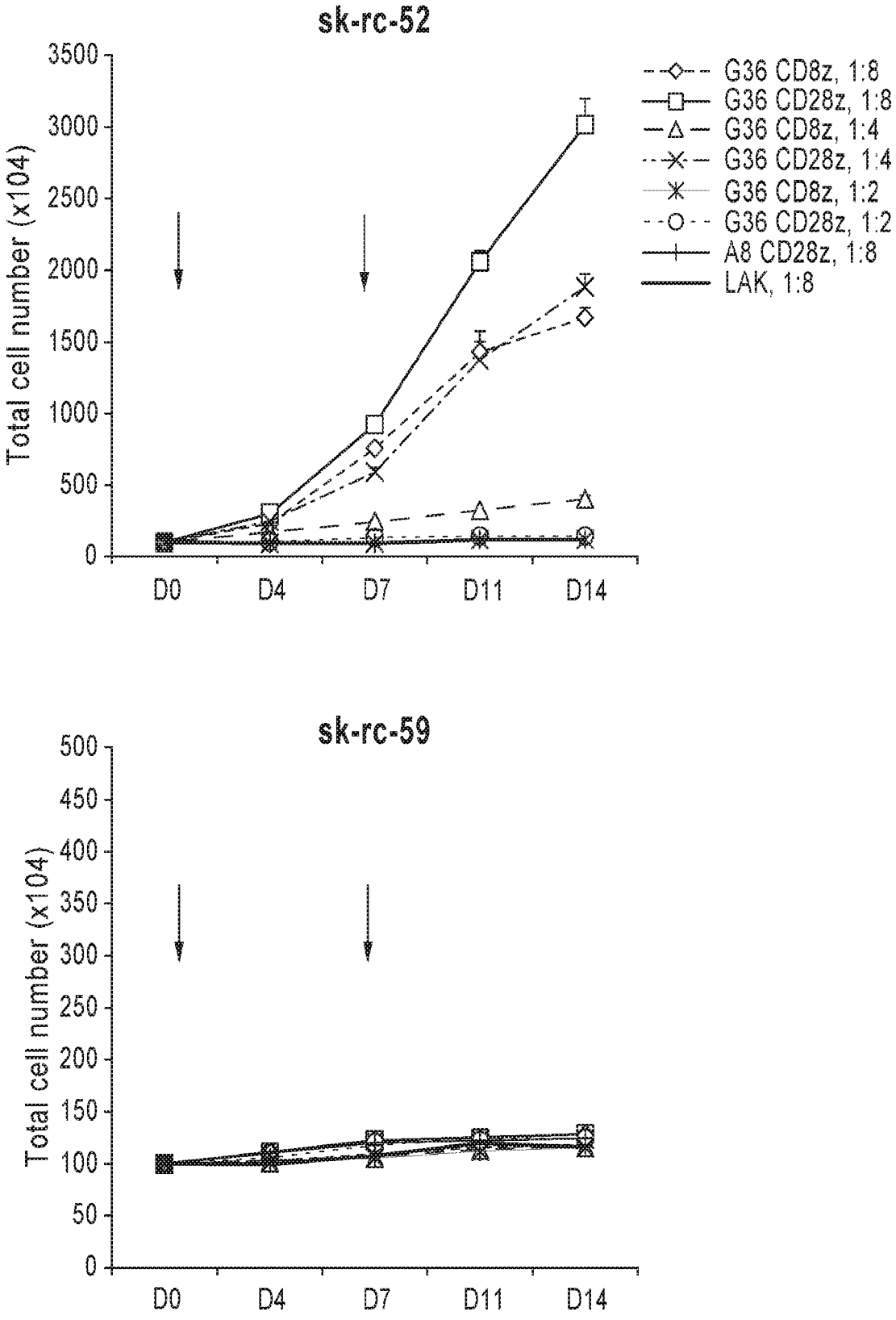

% Lysis
120
100
80
60
40
20
0
G36 CD28z
100:1
50:1
25:1
5:1
G36 CD8z
100:1
50:1
25:1
5:1
A8 CD28z
100:1
50:1
25:1
5:1
LAK
100:1
50:1
25:1
5:1
sk-rc-52
sk-rc-52 (clone 4-1)
sk-rc-59

Fig. 3c

Fig 4a


sk-rc-52
Total cell number (x104)
3500
3000
2500
2000
1500
1000
500
0
D0
D4
D7
D11
D14
G36 CD8z, 1:8
G36 CD28z, 1:8
G36 CD8z, 1:4
G36 CD28z, 1:4
G36 CD8z, 1:2
G36 CD28z, 1:2
A8 CD28z, 1:8
LAK, 1:8
sk-rc-59
Total cell number (x104)
500
450
400
350
300
250
200
150
100
50
0
D0
D4
D7
D11
D14

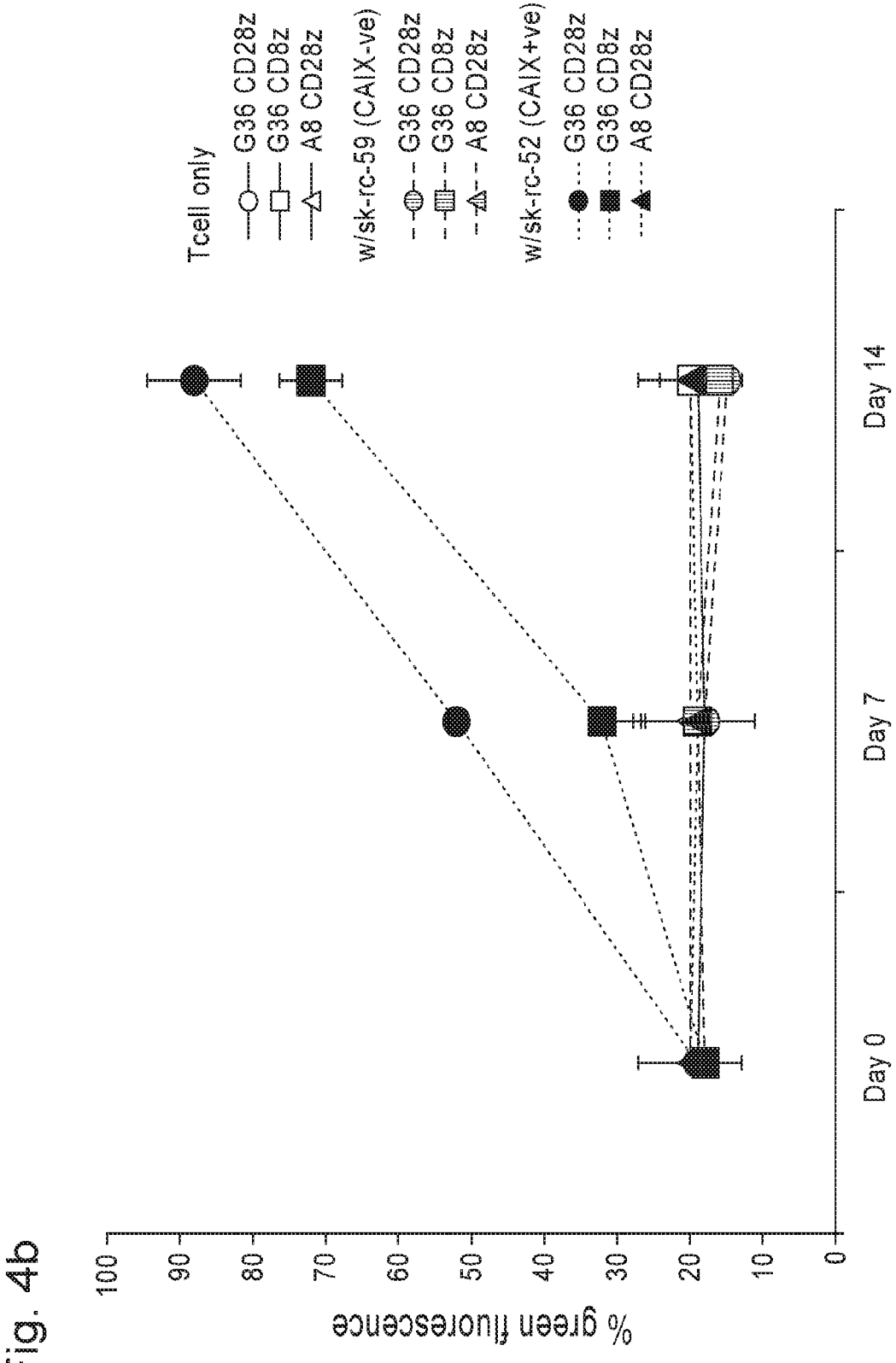

Tcell only
G36 CD28z
G36 CD8z
A8 CD28z
w/sk-rc-59 (CAIX-ve)
G36 CD28z
G36 CD8z
A8 CD28z
w/sk-rc-52 (CAIX+ve)
G36 CD28z
G36 CD8z
A8 CD28z
% green fluorescence
100
90
80
70
60
50
40
30
20
10
0
Day 0
Day 7
Day 14

Fig. 4b

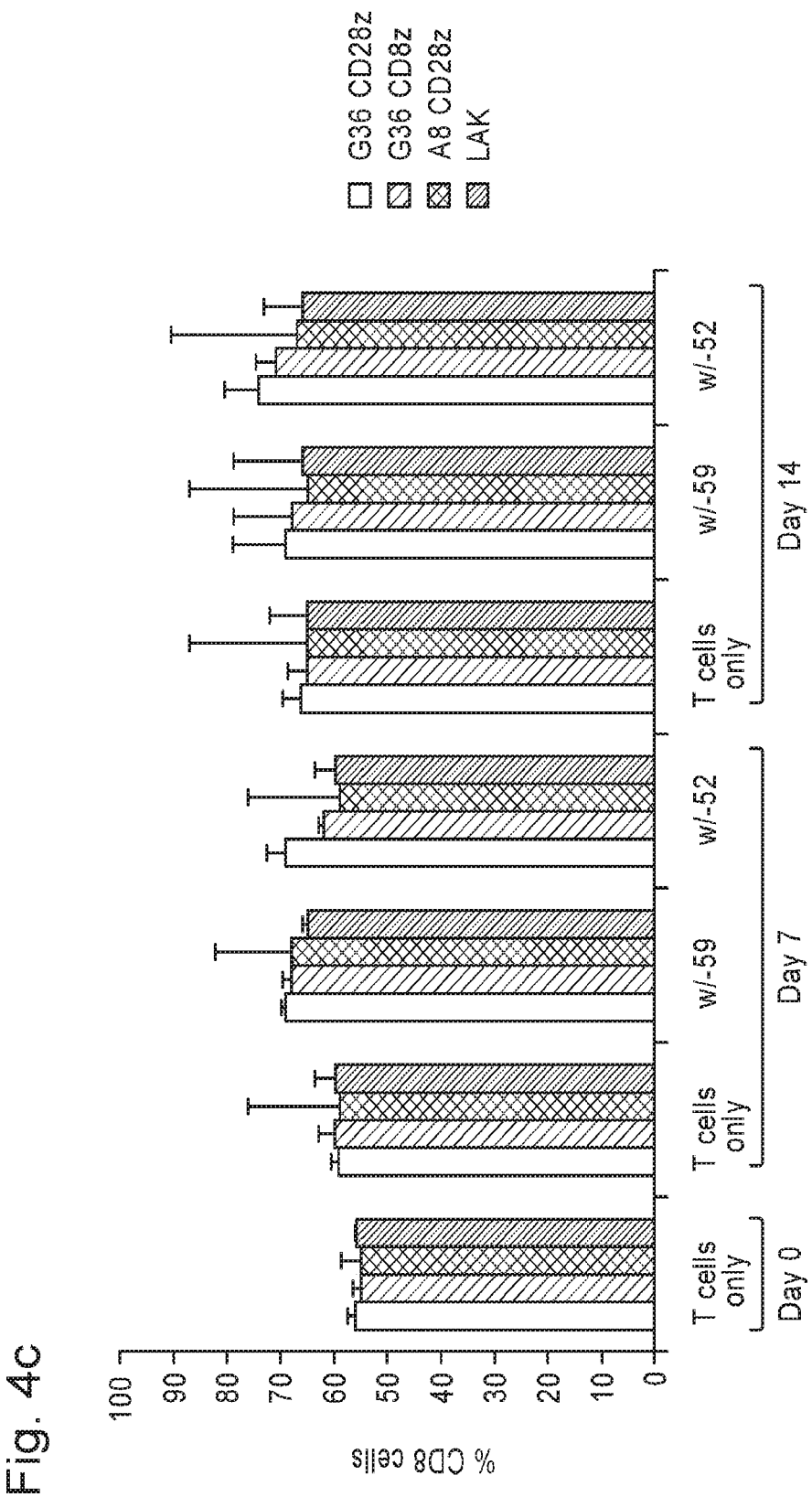
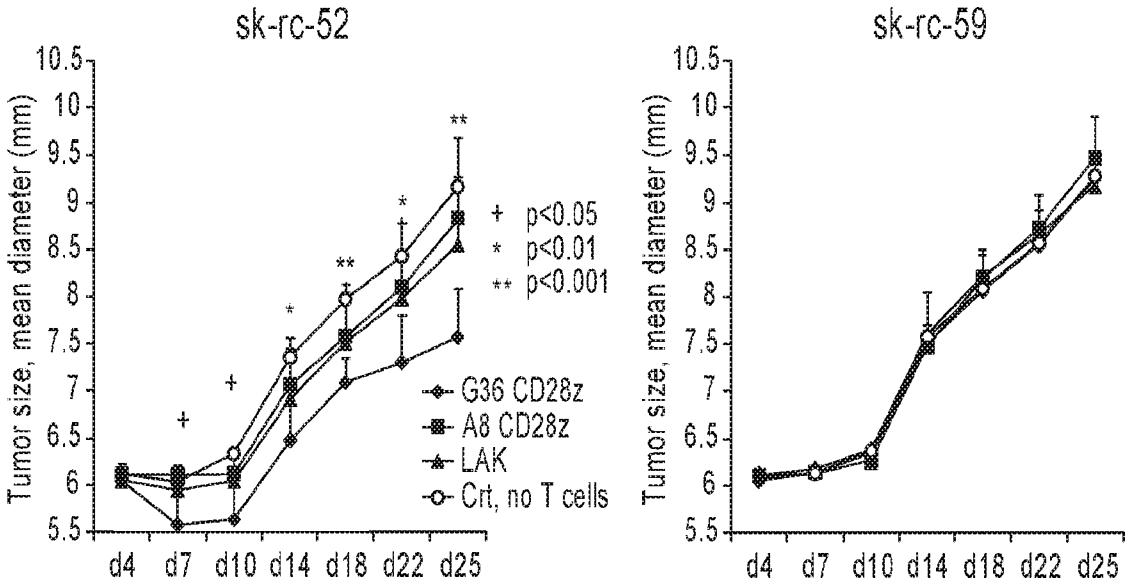

G36 CD28z
G36 CD8z
A8 CD28z
LAK
% CD8 cells
100
90
80
70
60
50
40
30
20
10
0
T cells only
w/-59
w/-52
Day 0
Day 7
Day 14

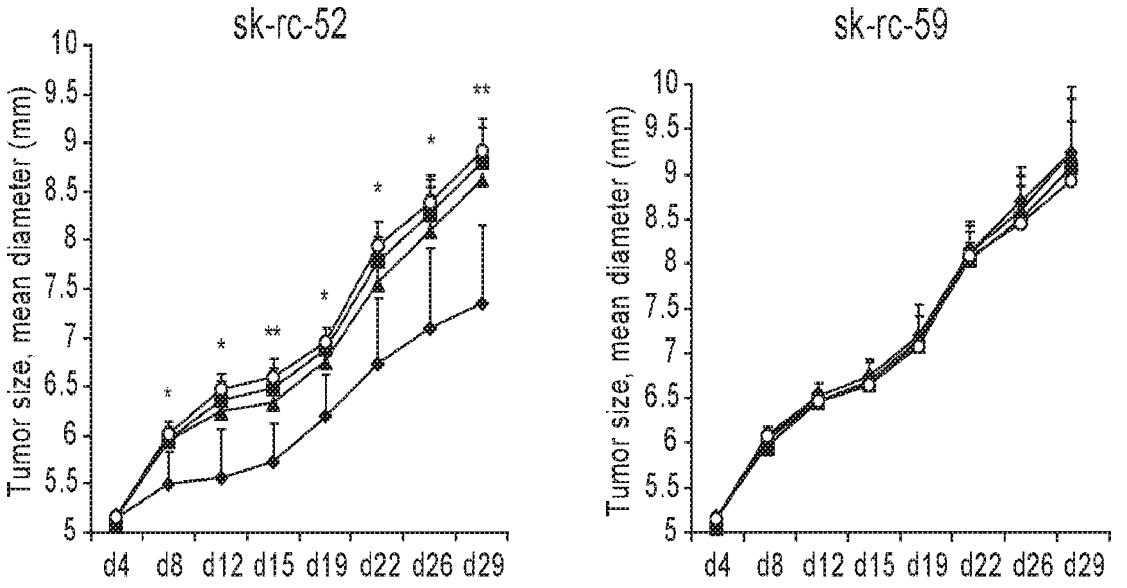
Fig. 4c

Fig. 5

Experiment 1



Experiment 2



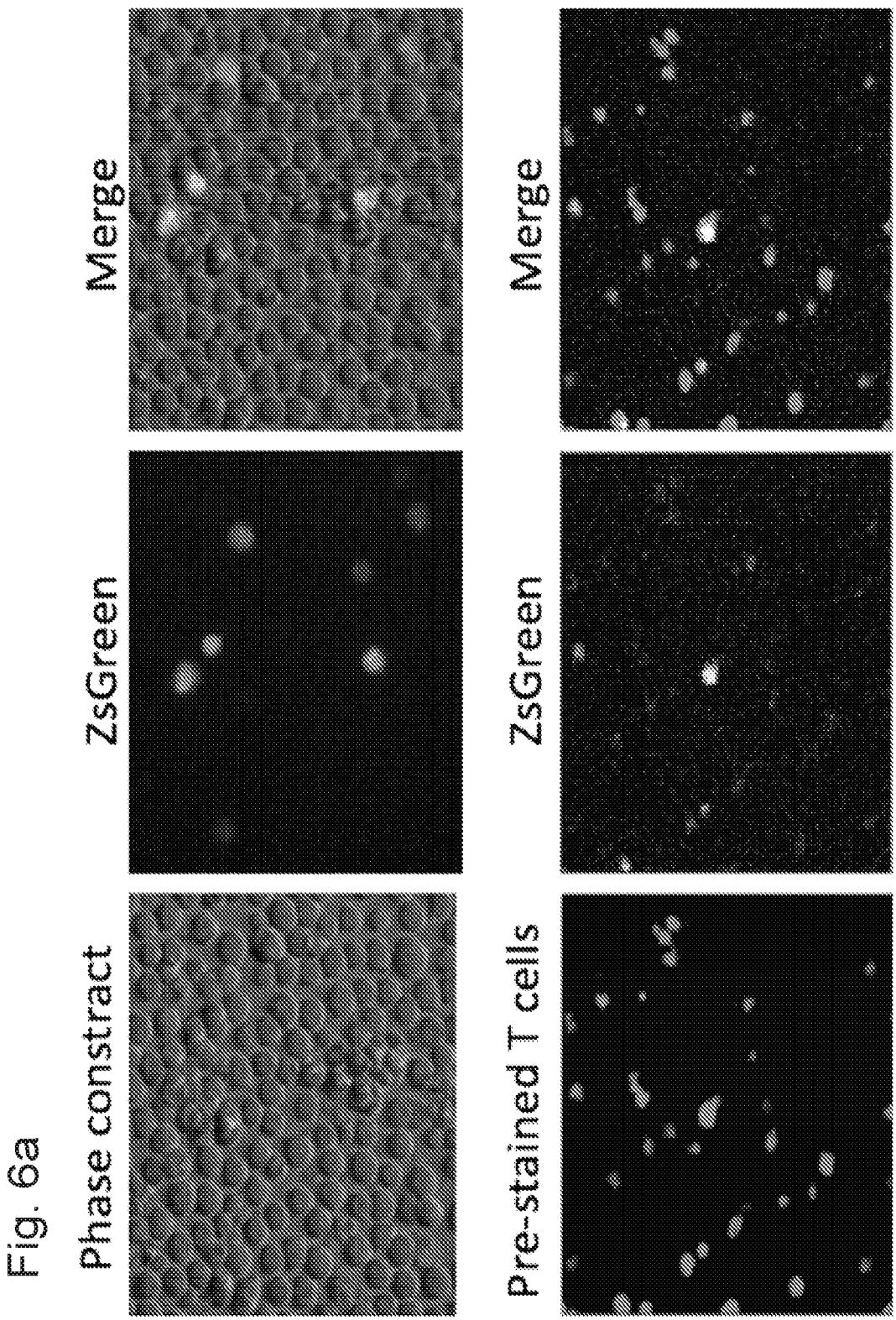

Phase constract
ZsGreen
Merge
Pre-stained T cells
ZsGreen
Merge

Fig. 6a

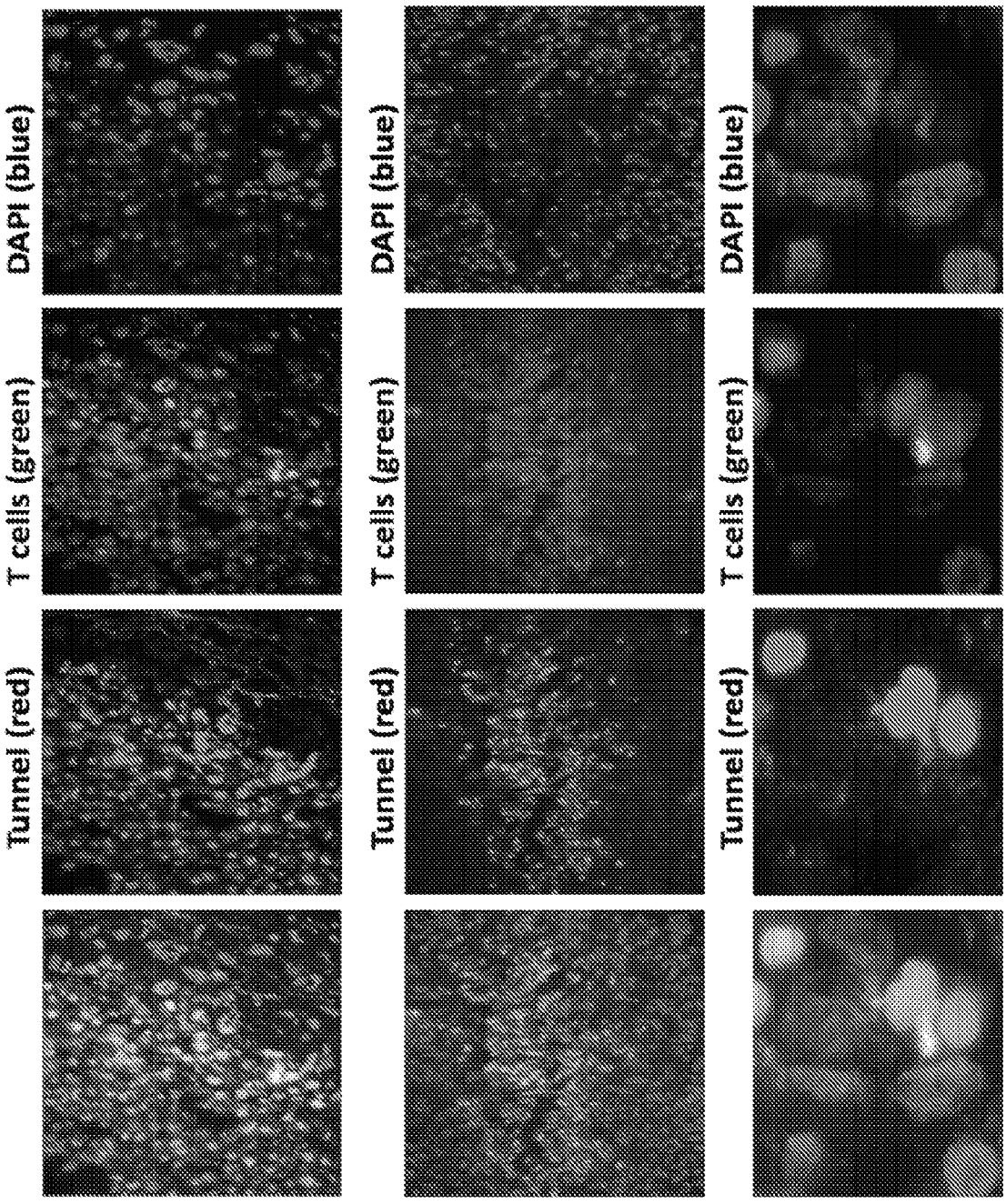

DAPI (blue)
T cells (green)
Tunnel (red)
DAPI (blue)
T cells (green)
Tunnel (red)
DAPI (blue)
T cells (green)
Tunnel (red)

Fig. 6b

Fig. 6c

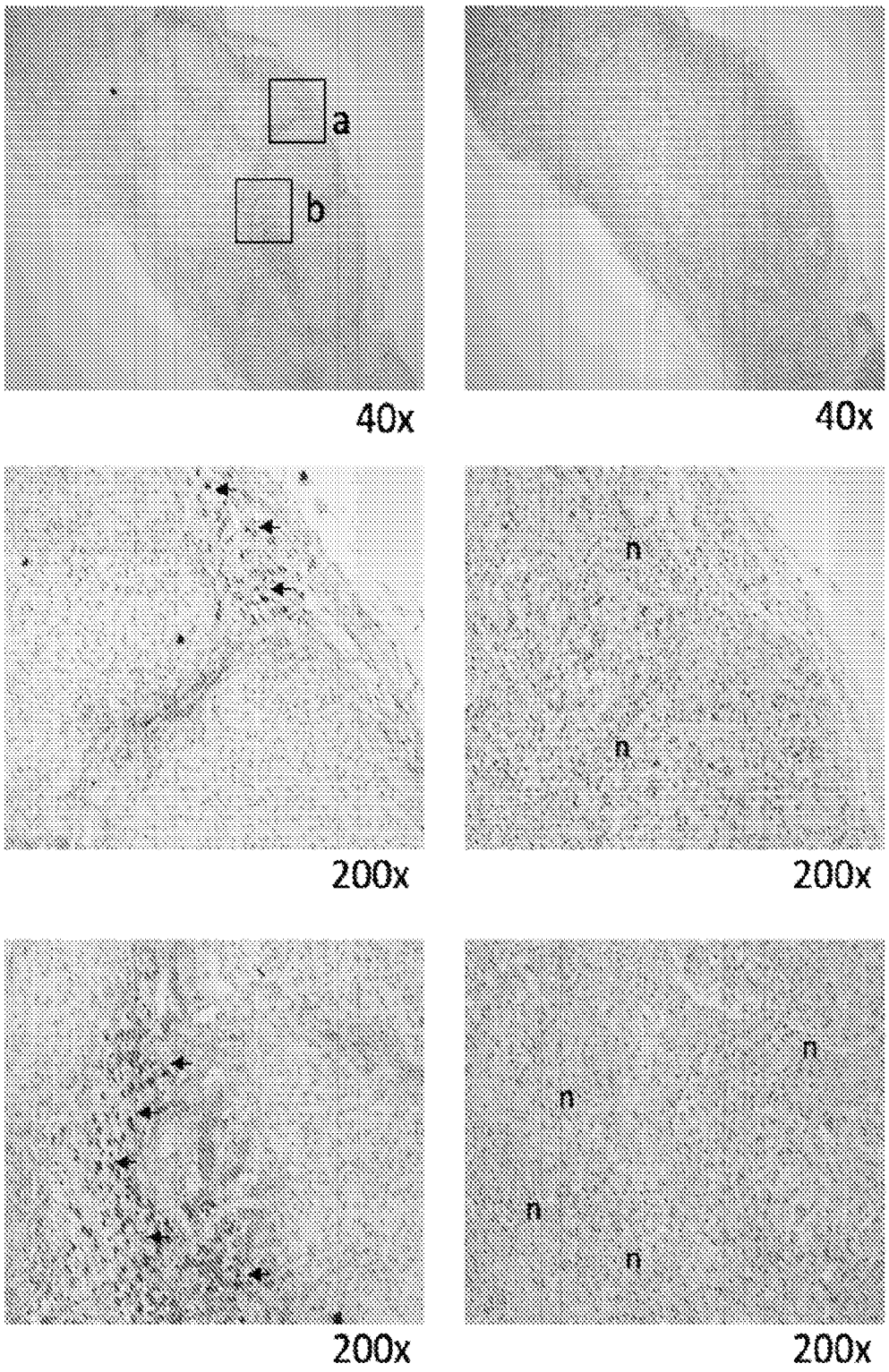


Fig. 7

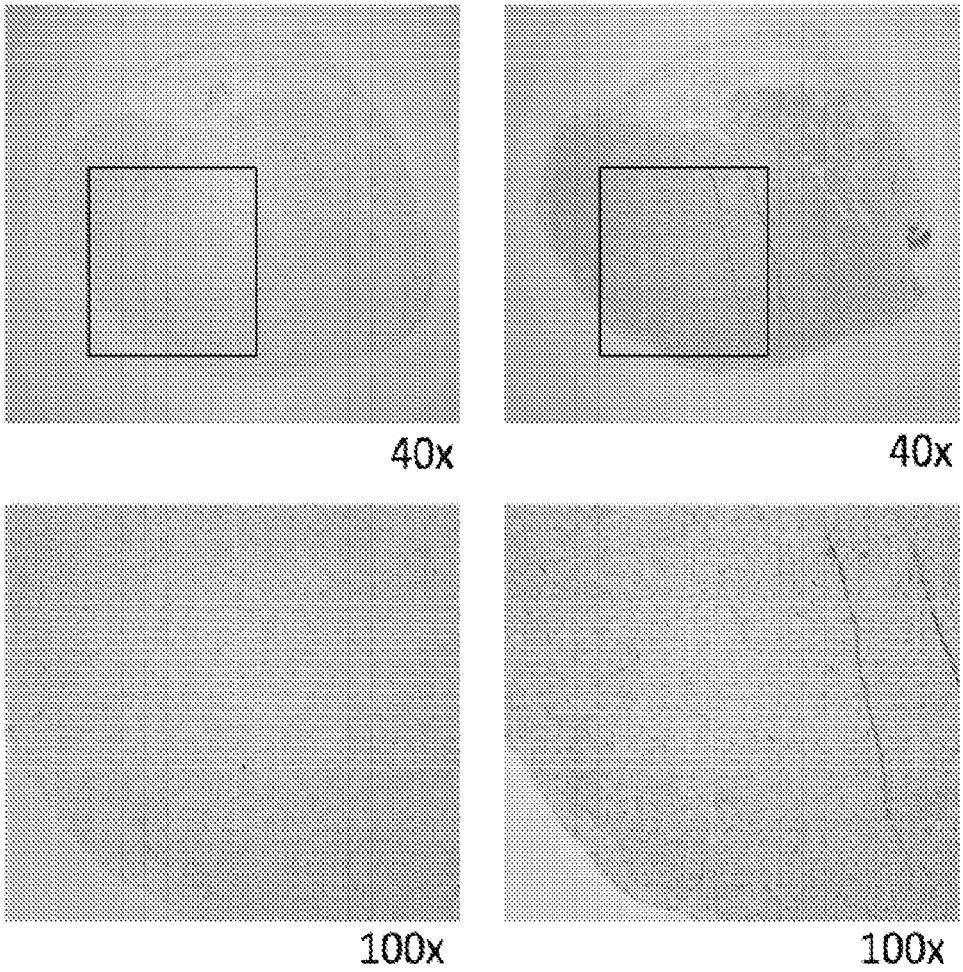


Fig. 8

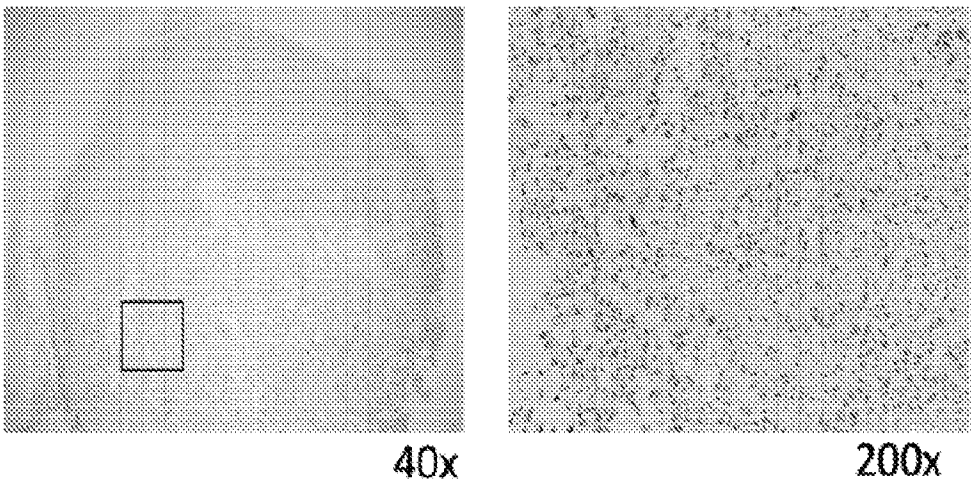


Fig. 9

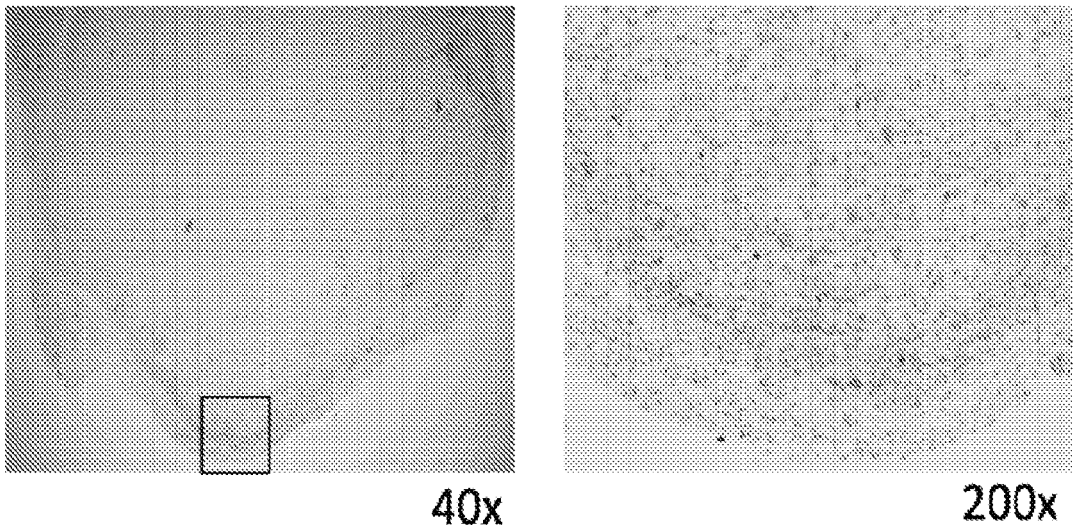


Fig. 10

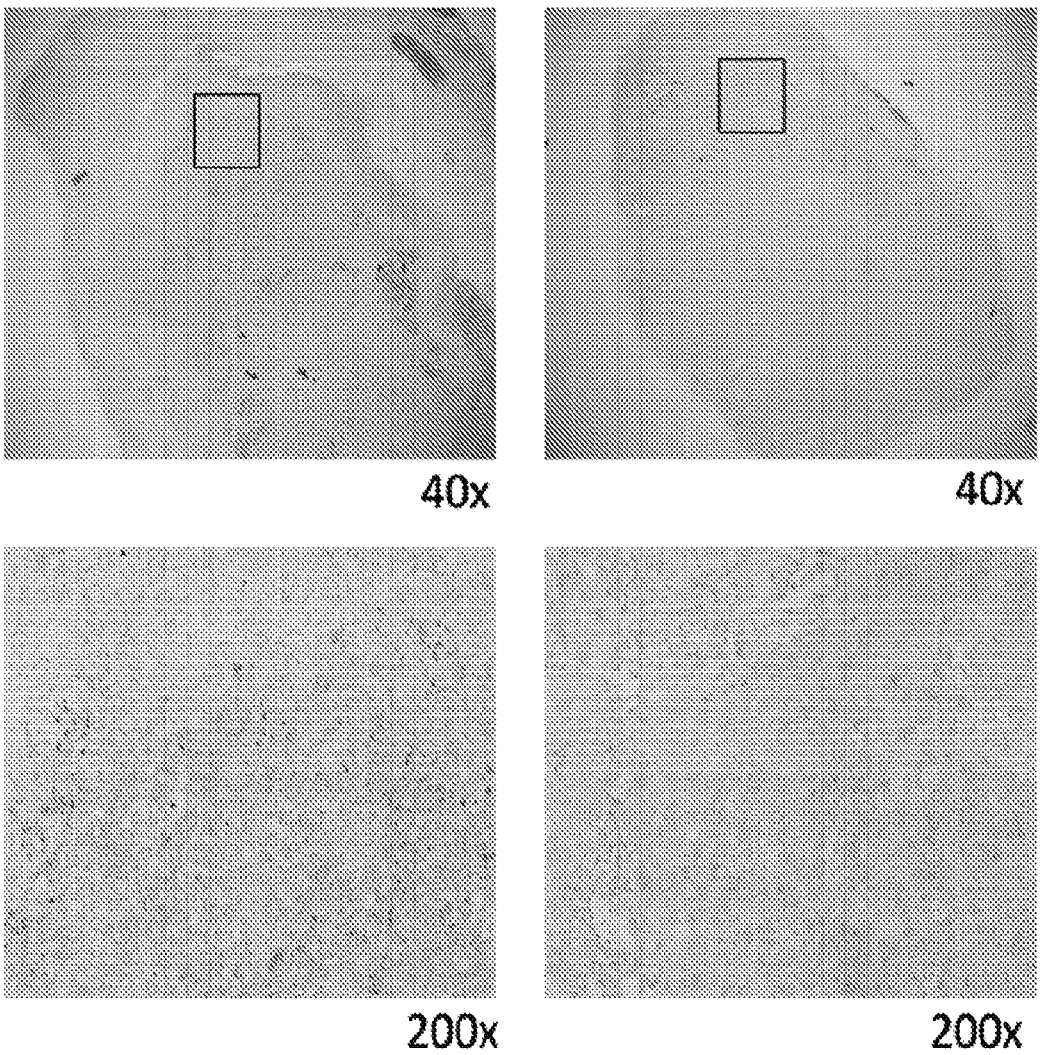


Figure 11

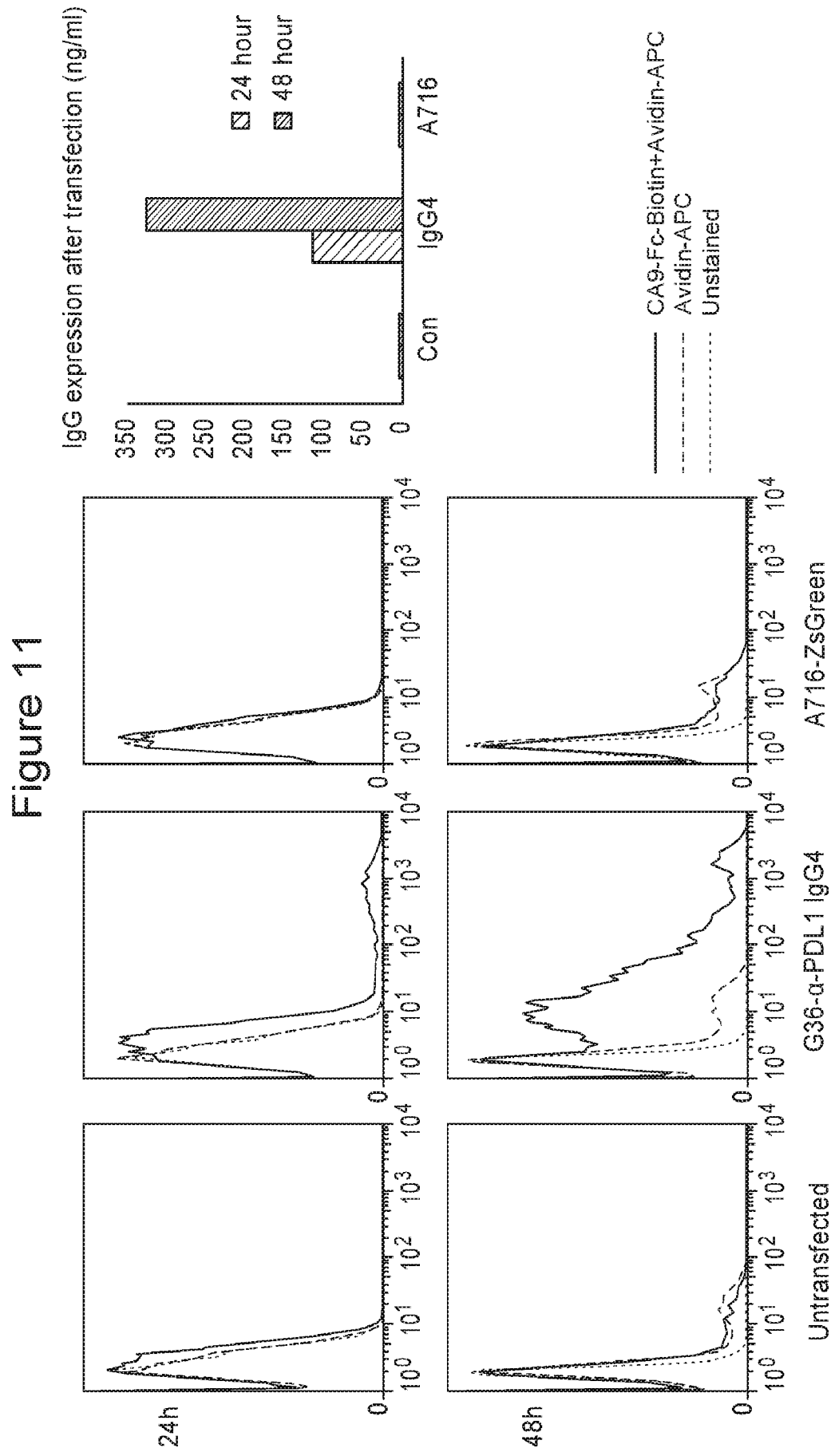
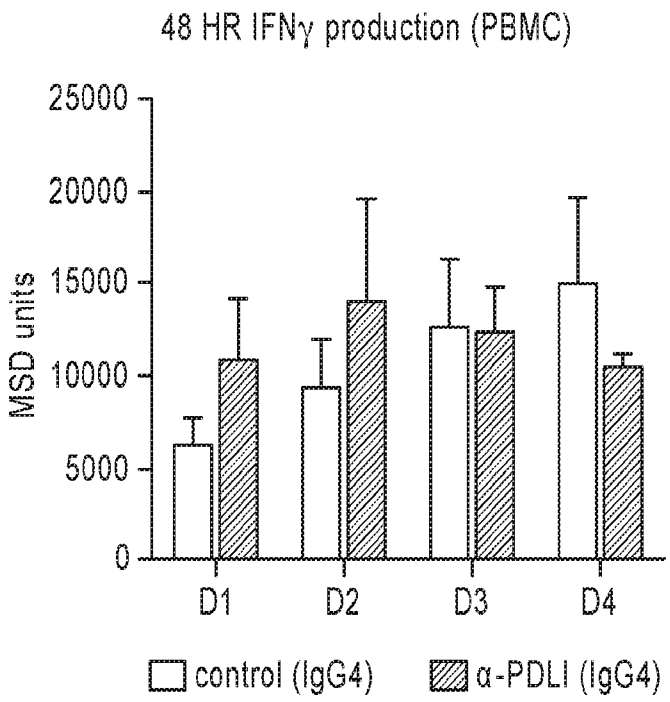
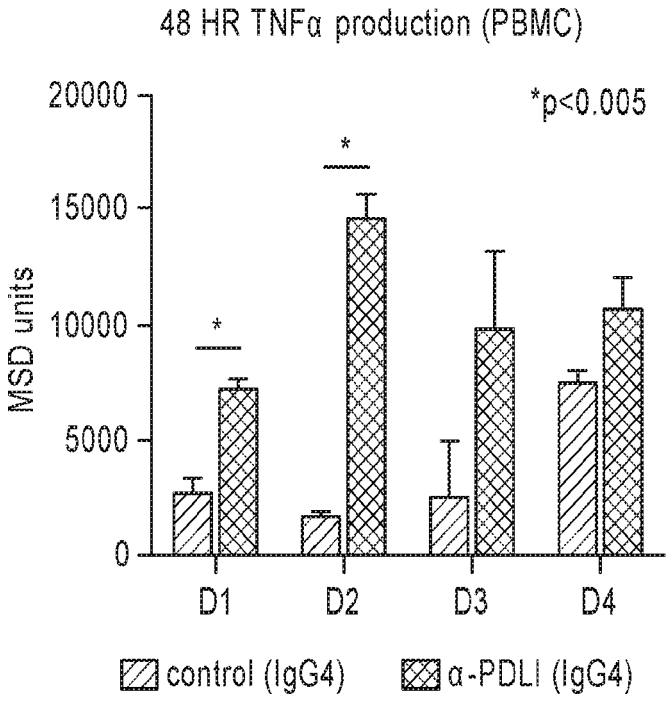

IgG expression after transfection (ng/ml)
350
300
250
200
150
100
50
0
24 hour
48 hour
Con
IgG4
A716
CA9-Fc-Biotin+Avidin-APC
Avidin-APC
Unstained
24h
48h
Untransfected
G36-a-PDL1 IgG4
A716-ZsGreen
0
10^0
10^1
10^2
10^3
10^4

Figure 12

A


48 HR IFNγ production (PBMC)
25000
20000
15000
10000
5000
0
MSD units
D1
D2
D3
D4
control (IgG4)
α-PDLI (IgG4)


48 HR TNFα production (PBMC)
*p<0.005
20000
15000
10000
5000
0
MSD units
*
*
D1
D2
D3
D4
control (IgG4)
α-PDLI (IgG4)

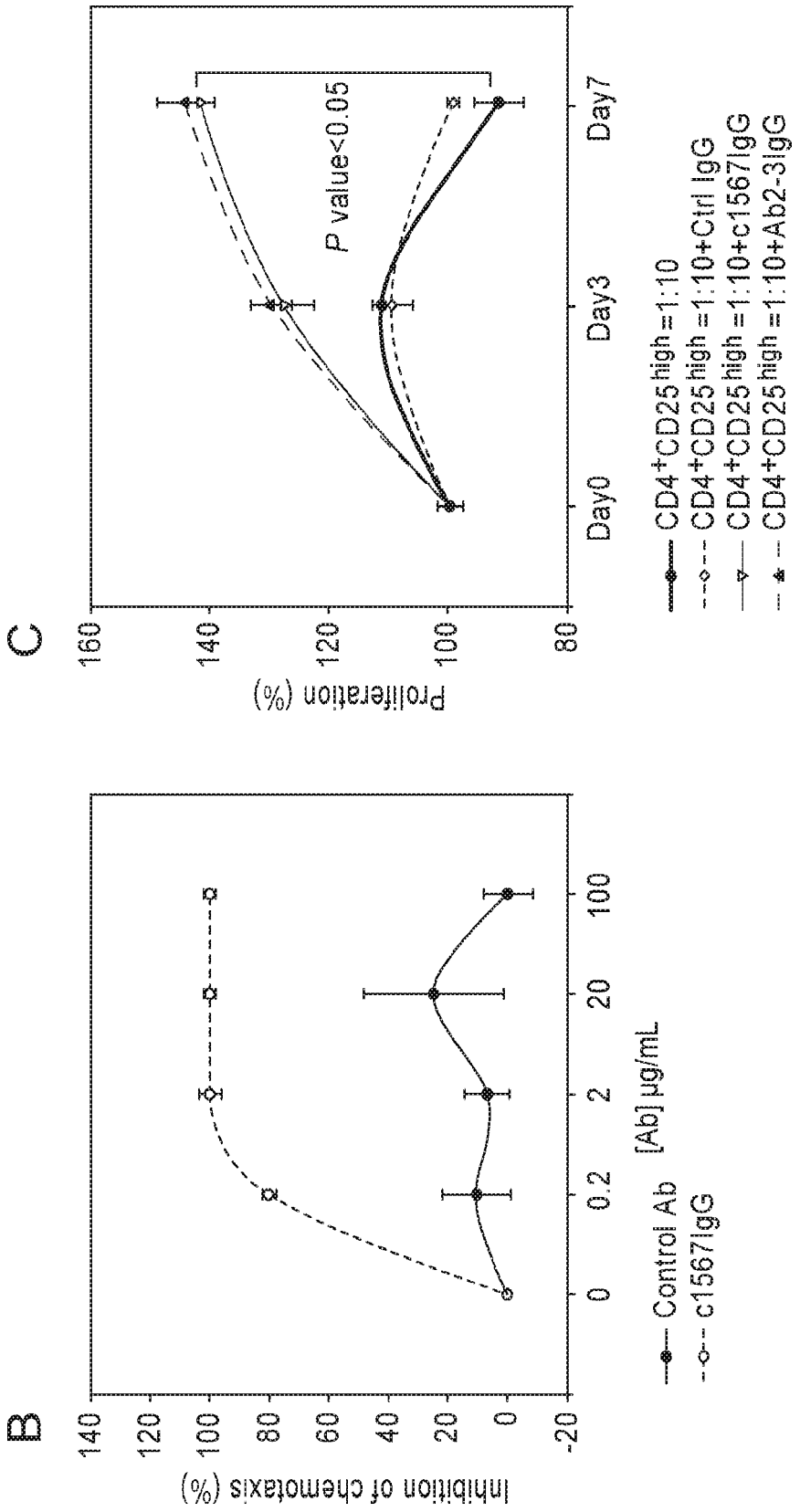


Figure 12 (Cont.)

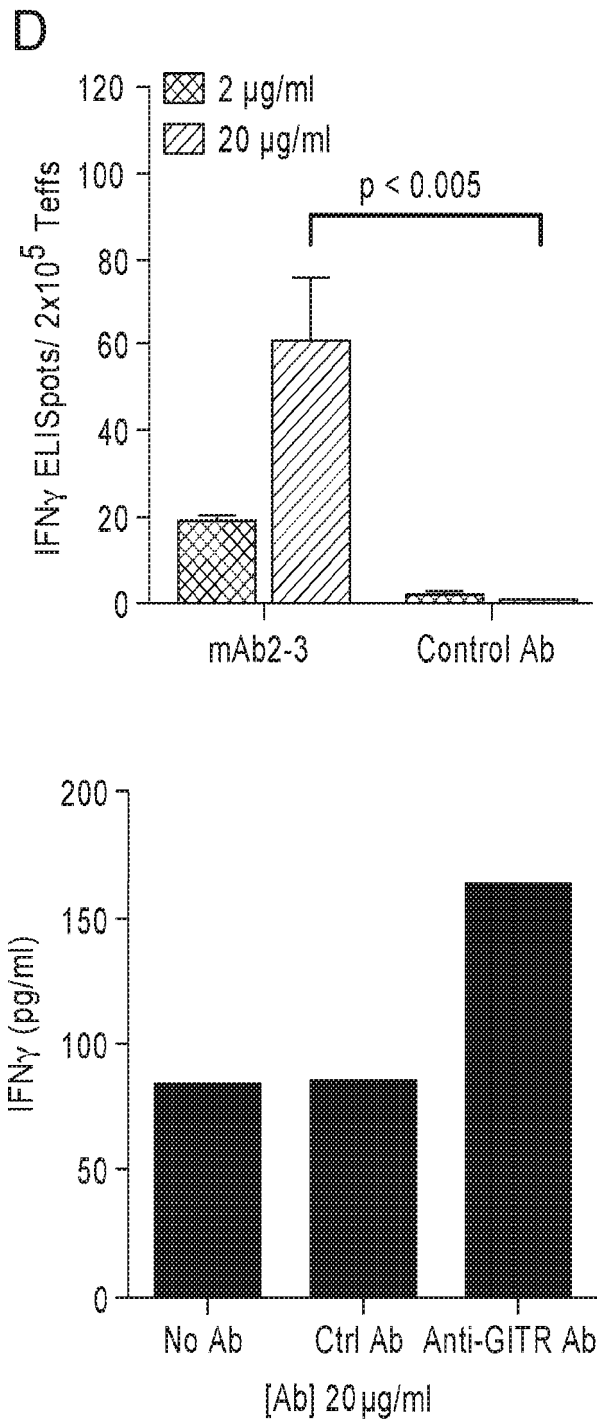


Figure 12 (Cont.)

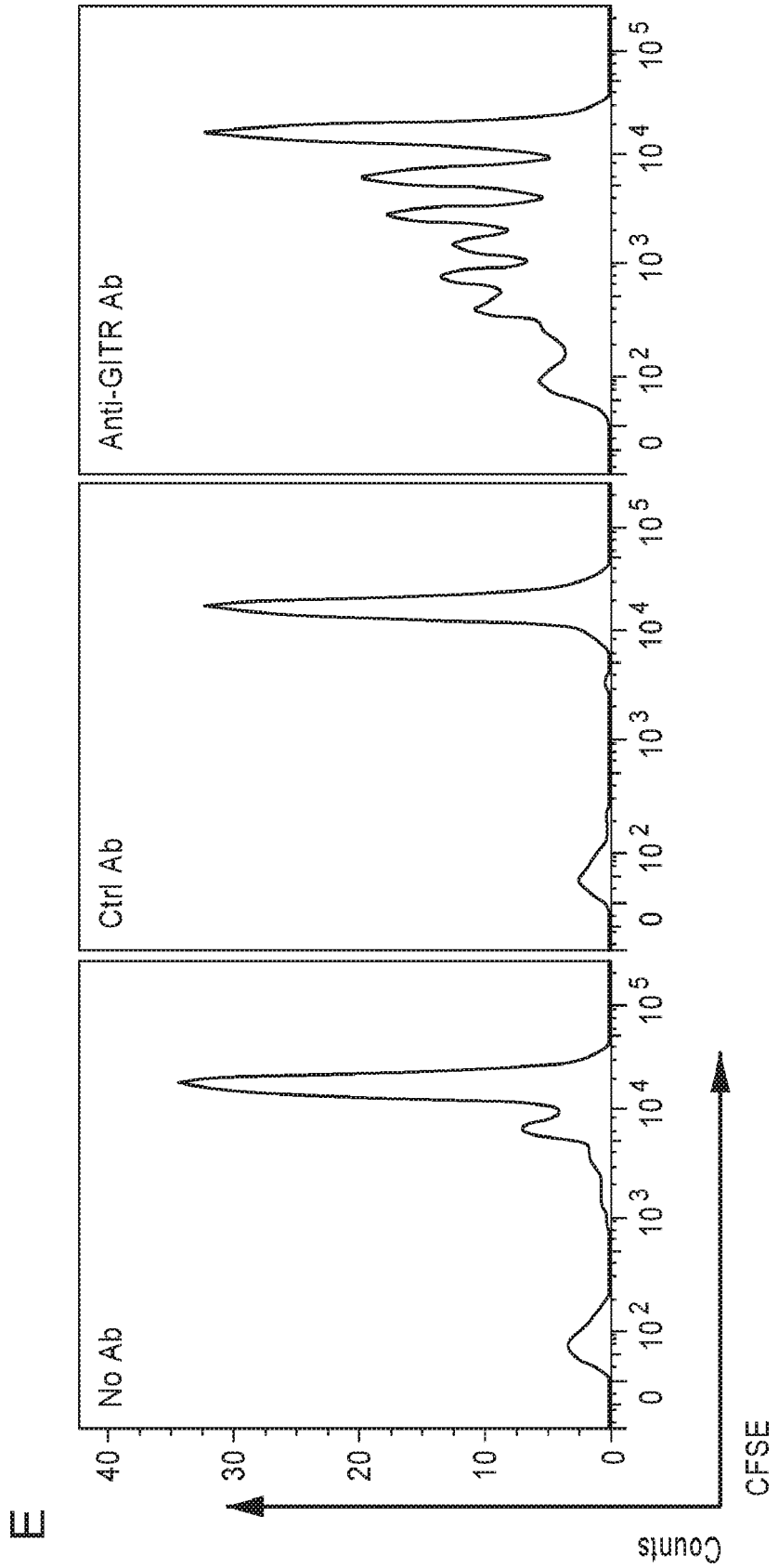


Figure 12 (Cont.)

Figure 13

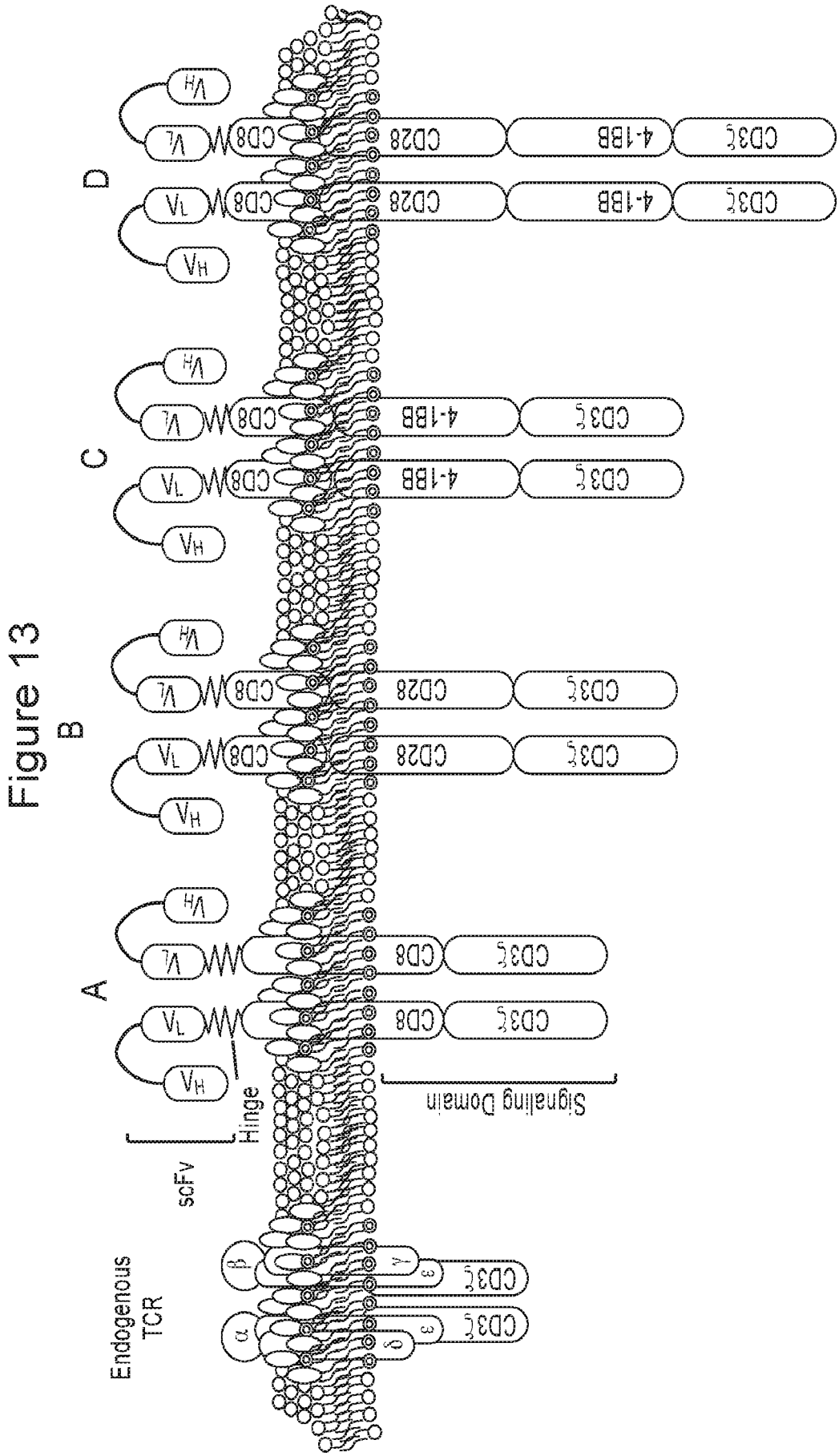
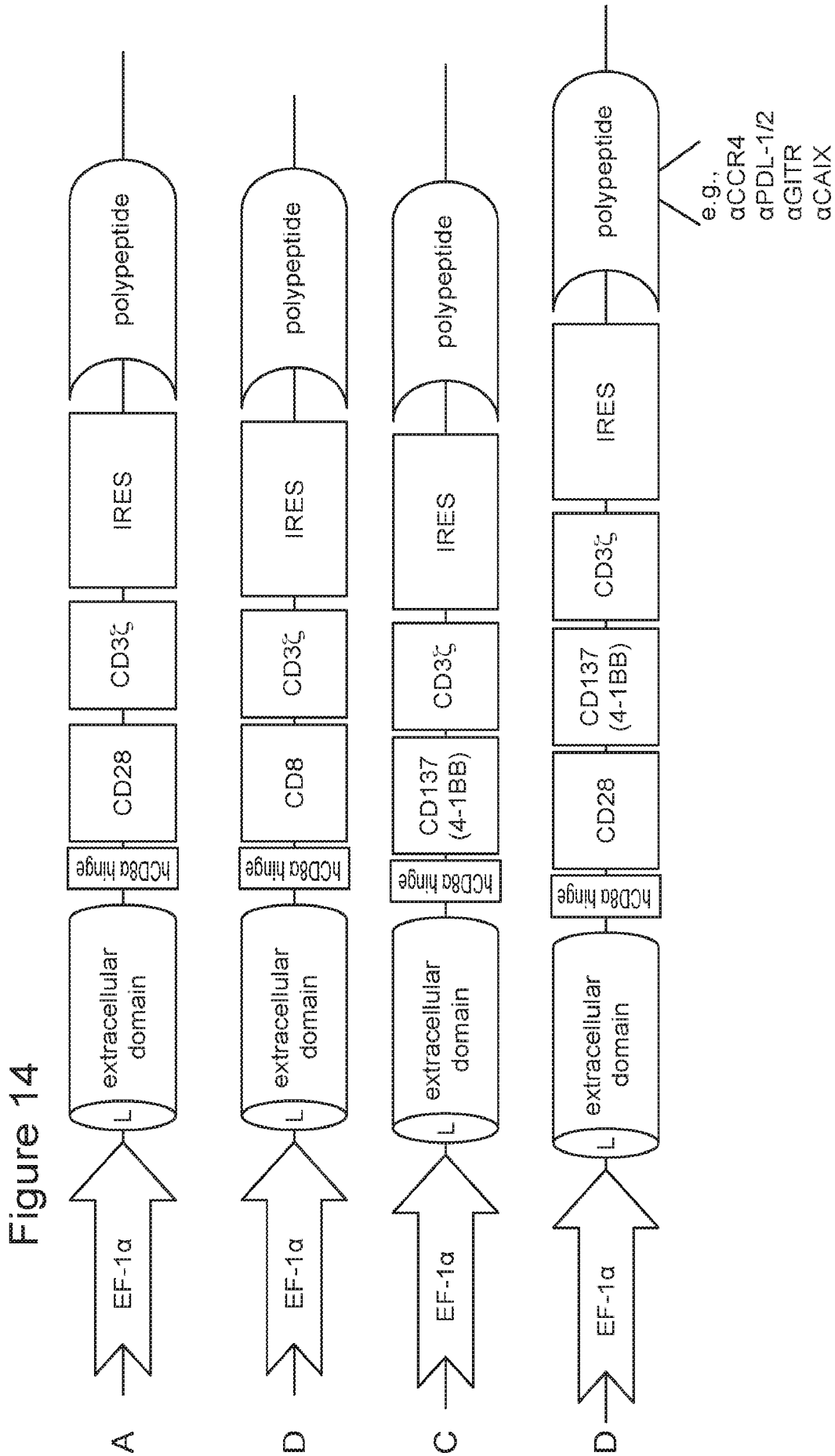

A
B
C
D
Endogenous TCR
scFv
Hinge
Signaling Domain
CD3ζ
CD8
CD28
4-1BB
VH
VL

Figure 14


A
EF-1α
L
extracellular domain
hCD8α hinge
CD28
CD3ζ
IRES
polypeptide
D
EF-1α
L
extracellular domain
hCD8α hinge
CD8
CD3ζ
IRES
polypeptide
C
EF-1α
L
extracellular domain
hCD8α hinge
CD137 (4-1BB)
CD3ζ
IRES
polypeptide
D
EF-1α
L
extracellular domain
hCD8α hinge
CD28
CD137 (4-1BB)
CD3ζ
IRES
polypeptide
e.g.,
αCCR4
αPDL-1/2
αGITR
αCAIX

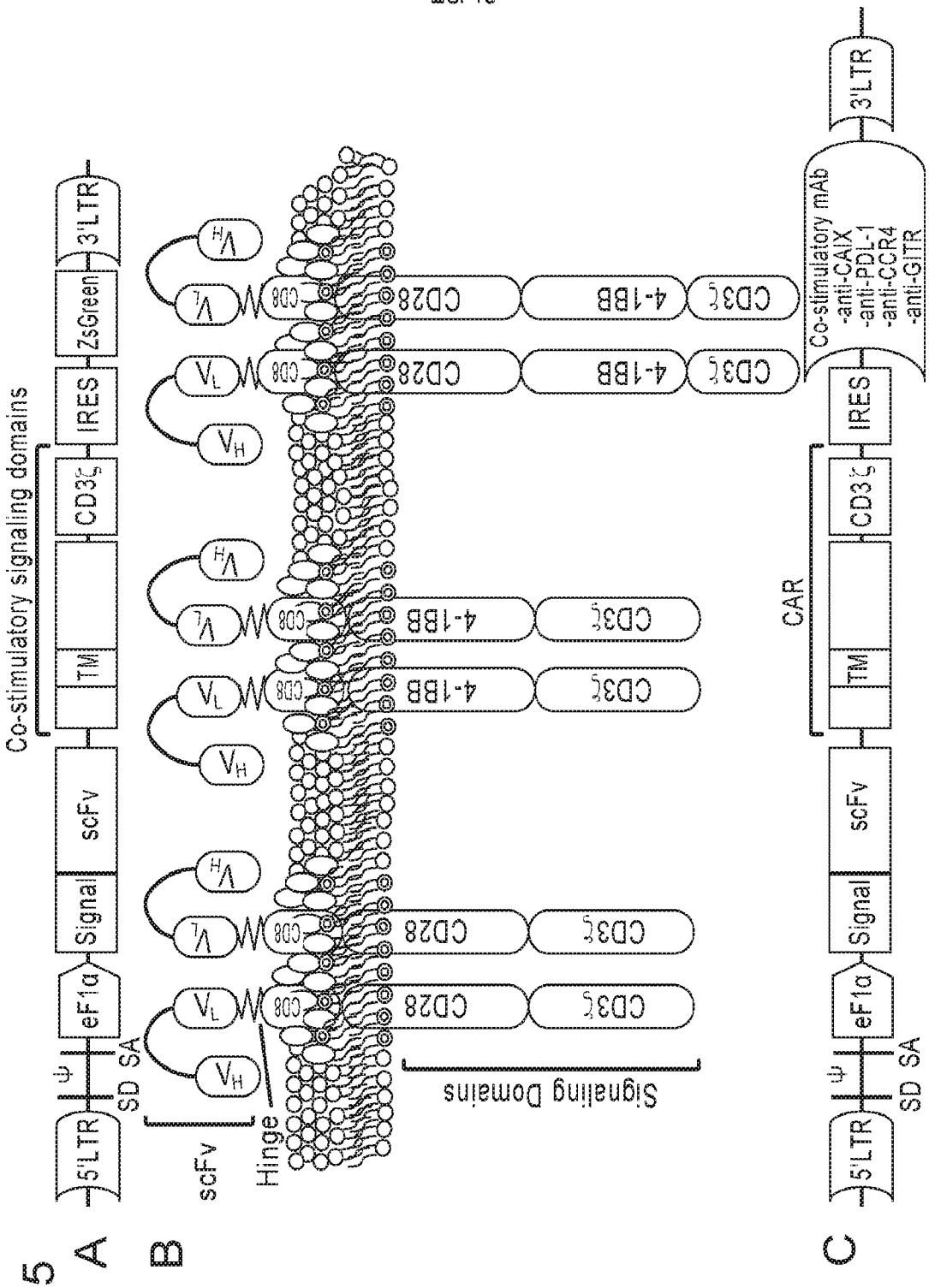
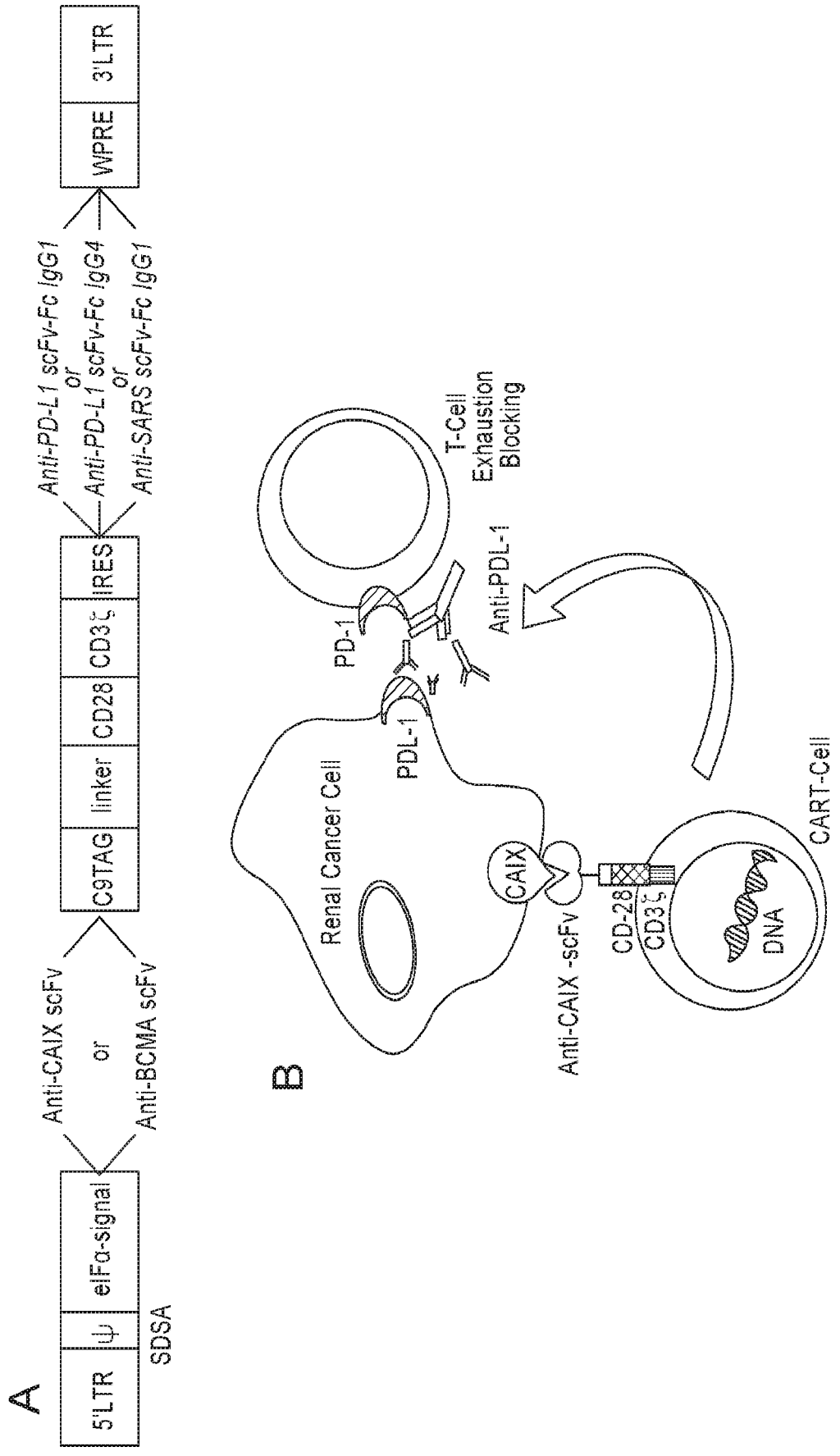

A
5'LTR
Ψ
SD SA
eF1α
Signal
scFv
TM
CD3ζ
IRES
ZsGreen
3'LTR
Co-stimulatory signaling domains
B
scFv
Hinge
Signaling Domains
CD28
4-1BB
CD3ζ
C
5'LTR
Ψ
SD SA
eF1α
Signal
scFv
TM
CD3ζ
IRES
3'LTR
CAR
Co-stimulatory mAb
-anti-CAIX
-anti-PDL-1
-anti-CCR4
-anti-GITR

Figure 15

Figure 16


A
5'LTR
ψ
elFα-signal
SDSA
Anti-CAIX scFv
or
Anti-BCMA scFv
C9TAG
linker
CD28
CD3ζ
IRES
Anti-PD-L1 scFv-Fc IgG1
or
Anti-PD-L1 scFv-Fc IgG4
or
Anti-SARS scFv-Fc IgG1
WPRE
3'LTR
B
Renal Cancer Cell
PDL-1
PD-1
T-Cell
Exhaustion
Blocking
Anti-PDL-1
CAIX
Anti-CAIX -scFv
CD-28
CD3ζ
DNA
CART-Cell

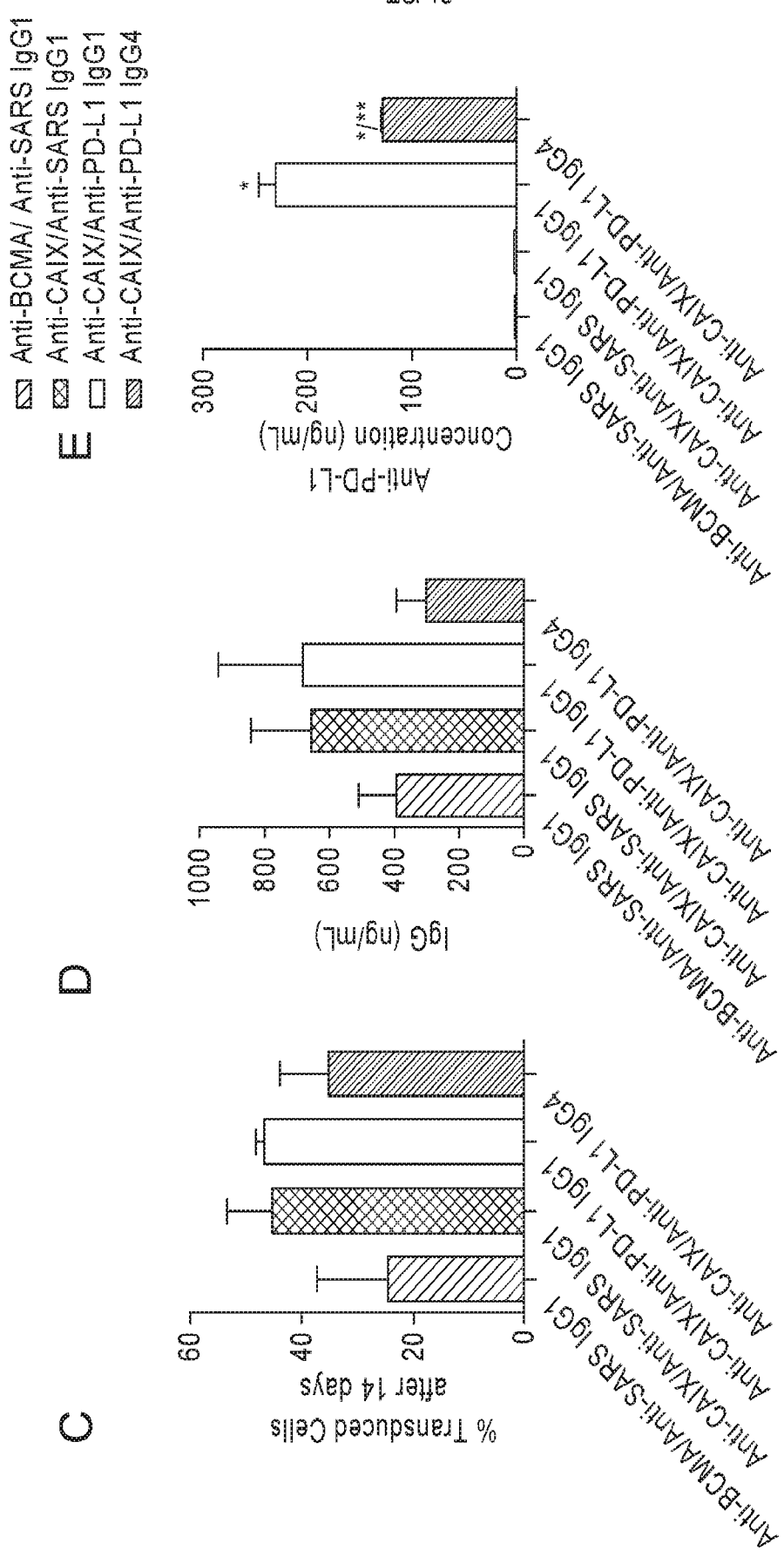


Figure 16 (Cont.)

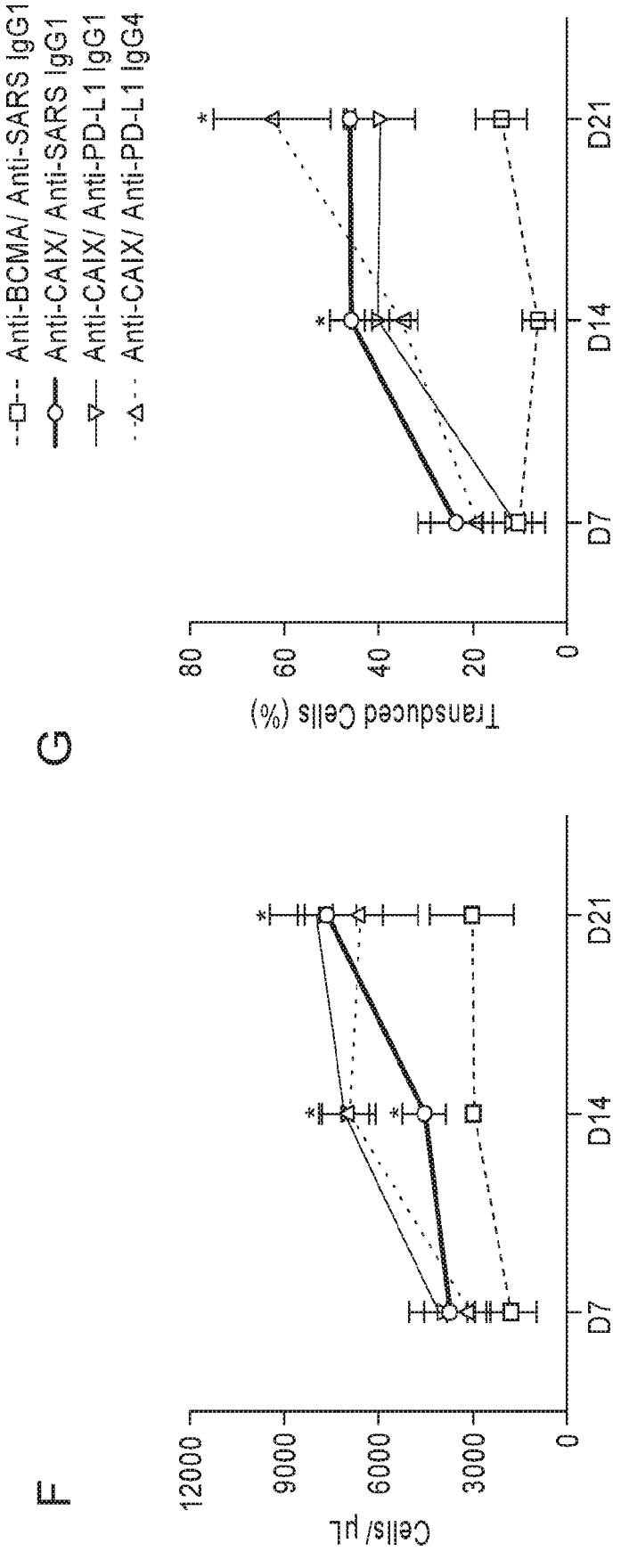
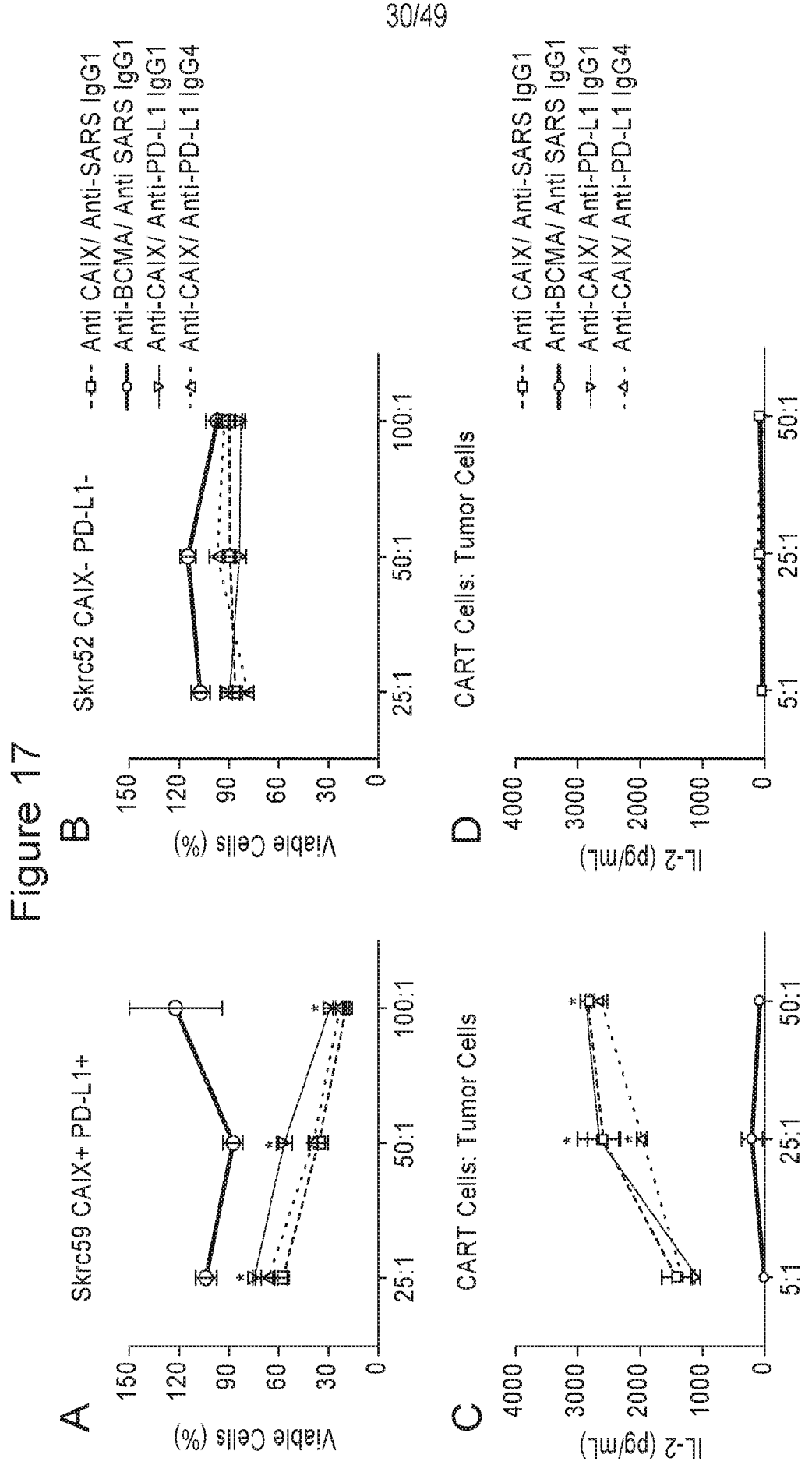


Figure 16 (Cont.)

Figure 17


A
Skrc59 CAIX+ PD-L1+
Viable Cells (%)
150
120
90
60
30
0
25:1
50:1
100:1
B
Skrc52 CAIX- PD-L1-
Anti CAIX/ Anti-SARS IgG1
Anti-BCMA/ Anti SARS IgG1
Anti-CAIX/ Anti-PD-L1 IgG1
Anti-CAIX/ Anti-PD-L1 IgG4
C
CART Cells: Tumor Cells
IL-2 (pg/mL)
4000
3000
2000
1000
0
5:1
25:1
50:1
D

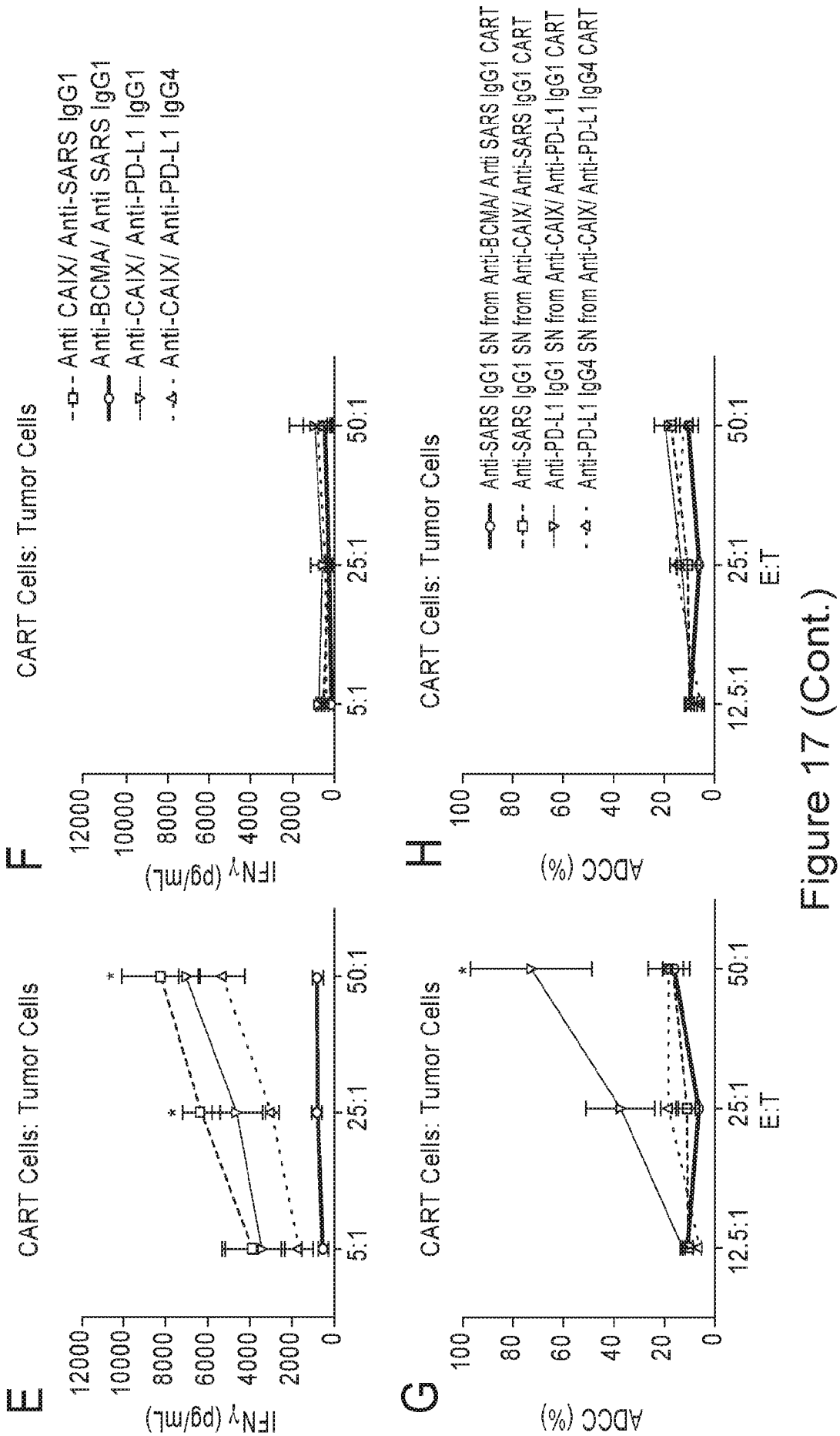
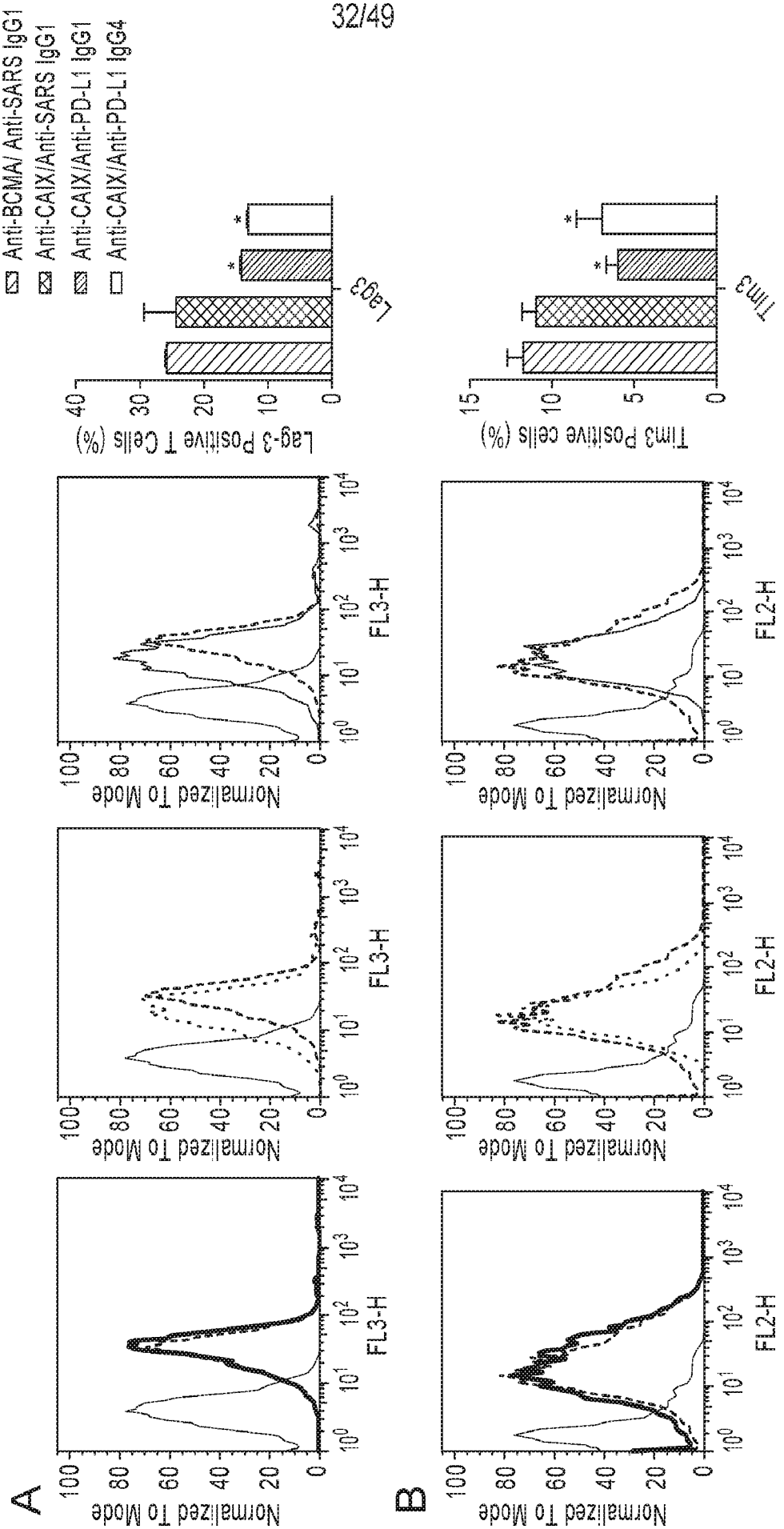


Figure 17 (Cont.)

Figure 18


A
B
Normalized To Mode
FL3-H
FL2-H
Anti-BCMA/ Anti-SARS IgG1
Anti-CAIX/Anti-SARS IgG1
Anti-CAIX/Anti-PD-L1 IgG1
Anti-CAIX/Anti-PD-L1 IgG4
Lag-3 Positive T Cells (%)
Lag3
Tim3 Positive cells (%)
Tim3

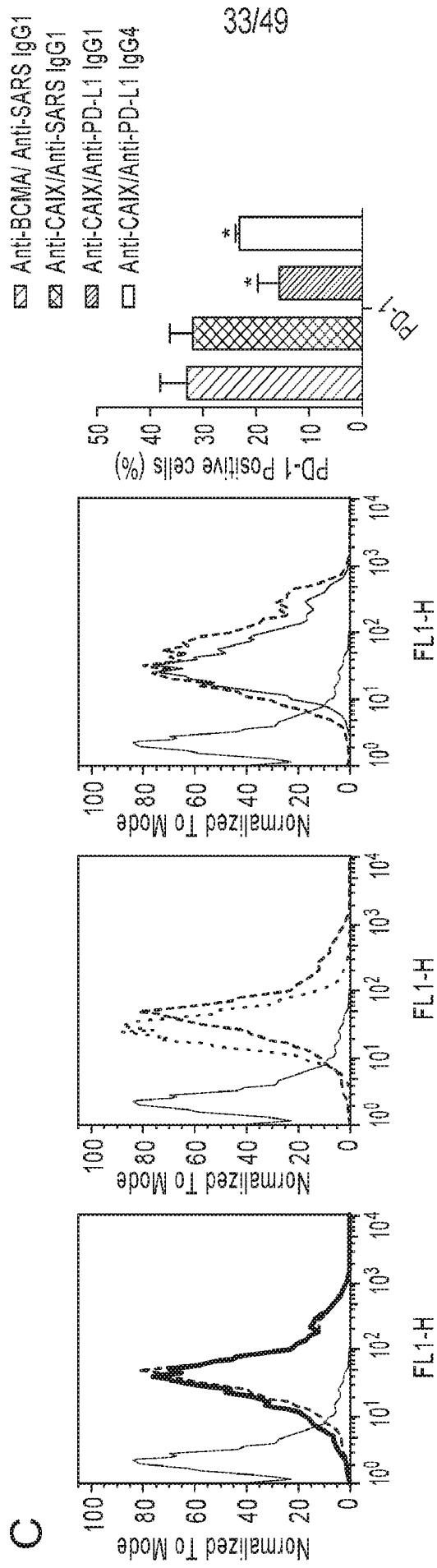


Figure 18 (Cont.)

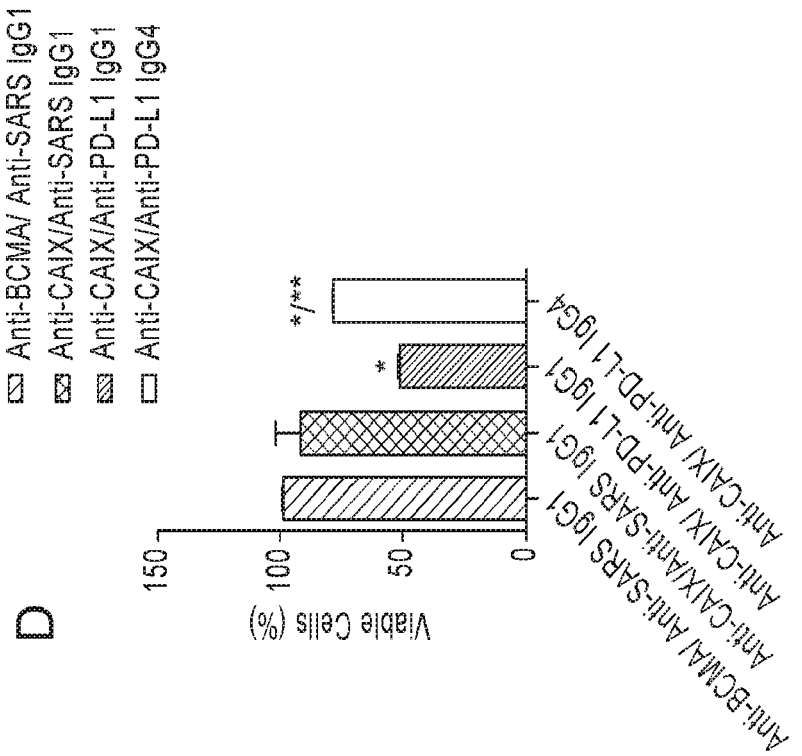
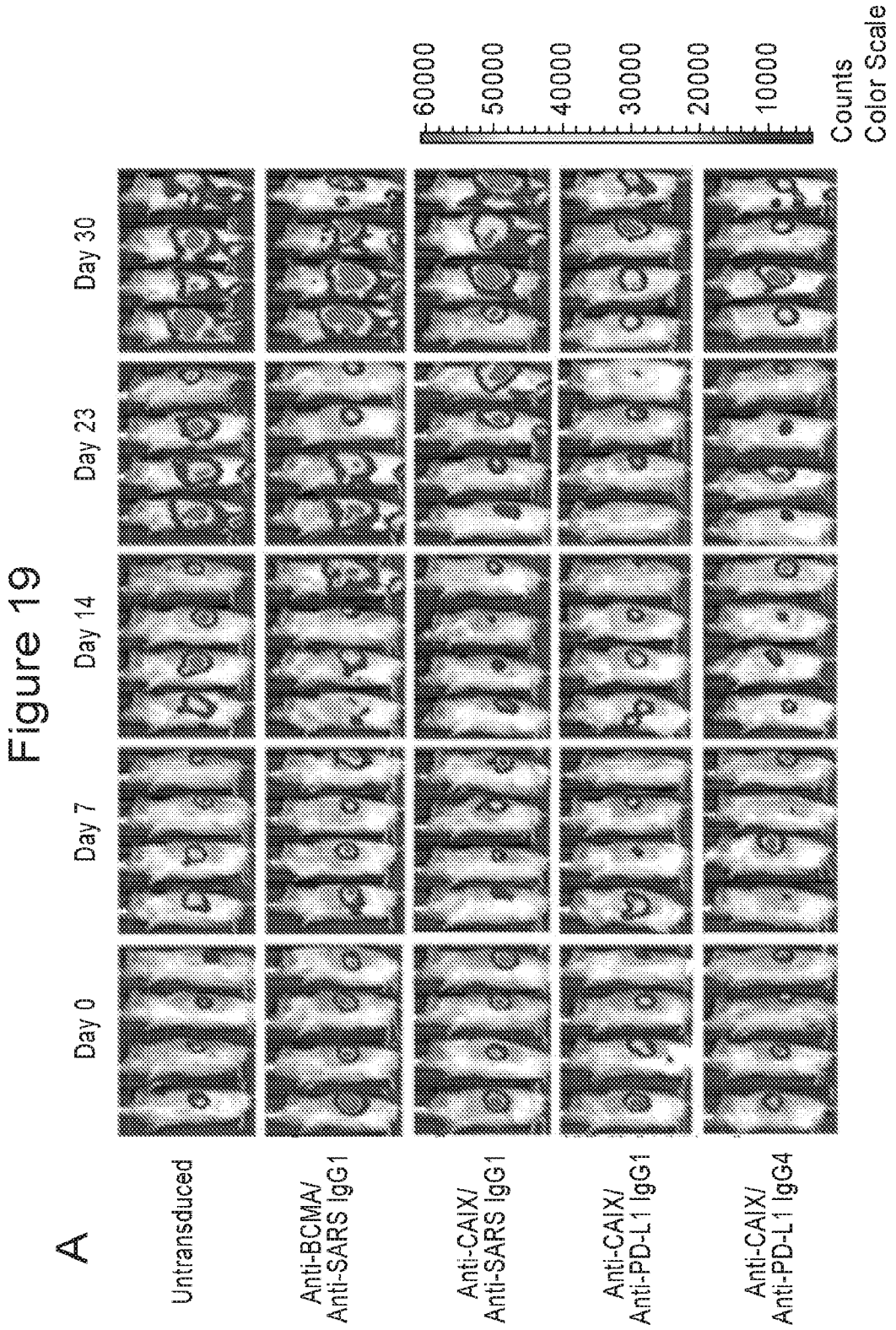


Figure 18 (Cont.)

Figure 19


A
Day 0
Day 7
Day 14
Day 23
Day 30
Untransduced
Anti-BCMA/
Anti-SARS IgG1
Anti-CAIX/
Anti-SARS IgG1
Anti-CAIX/
Anti-PD-L1 IgG1
Anti-CAIX/
Anti-PD-L1 IgG4
60000
50000
40000
30000
20000
10000
Counts
Color Scale

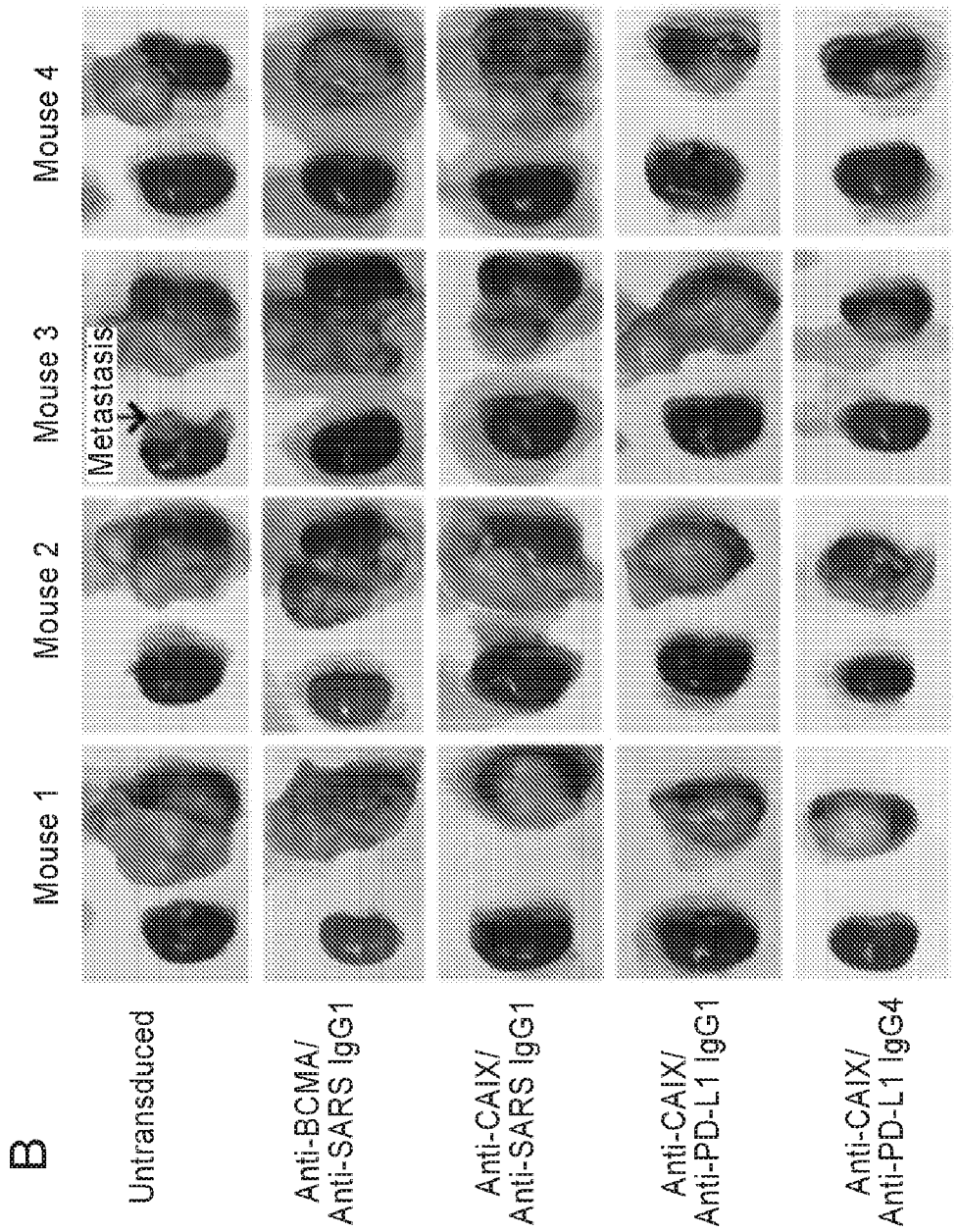
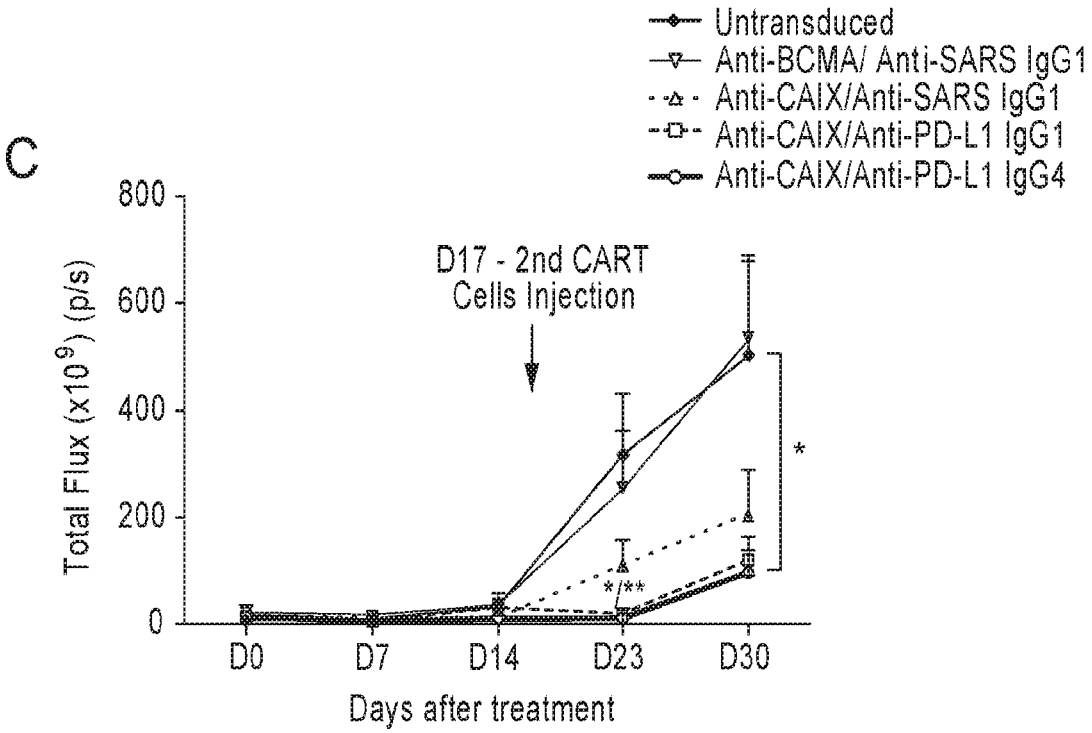


Figure 19 (Cont.)



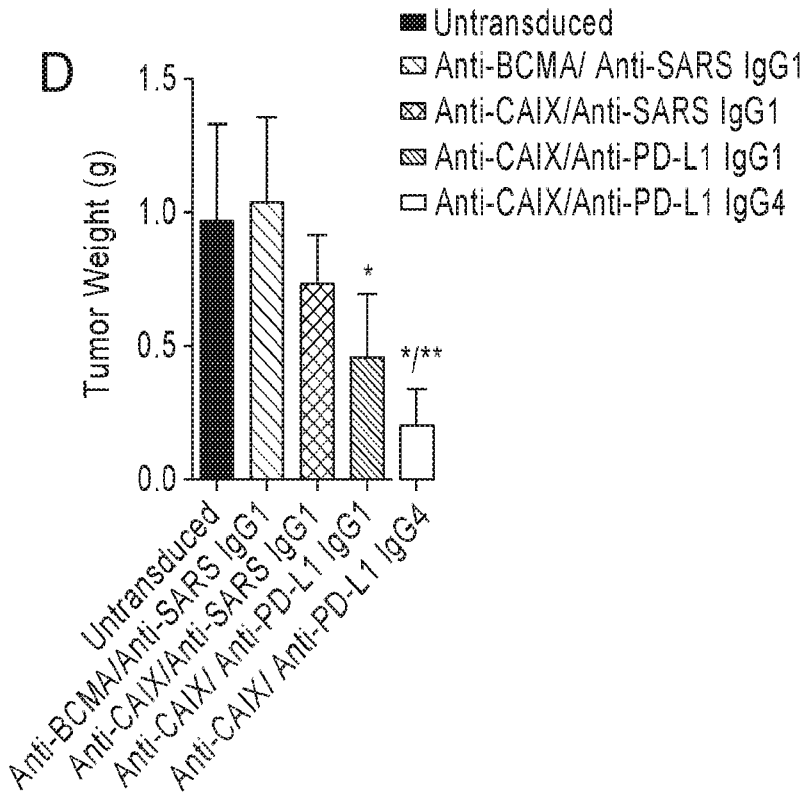
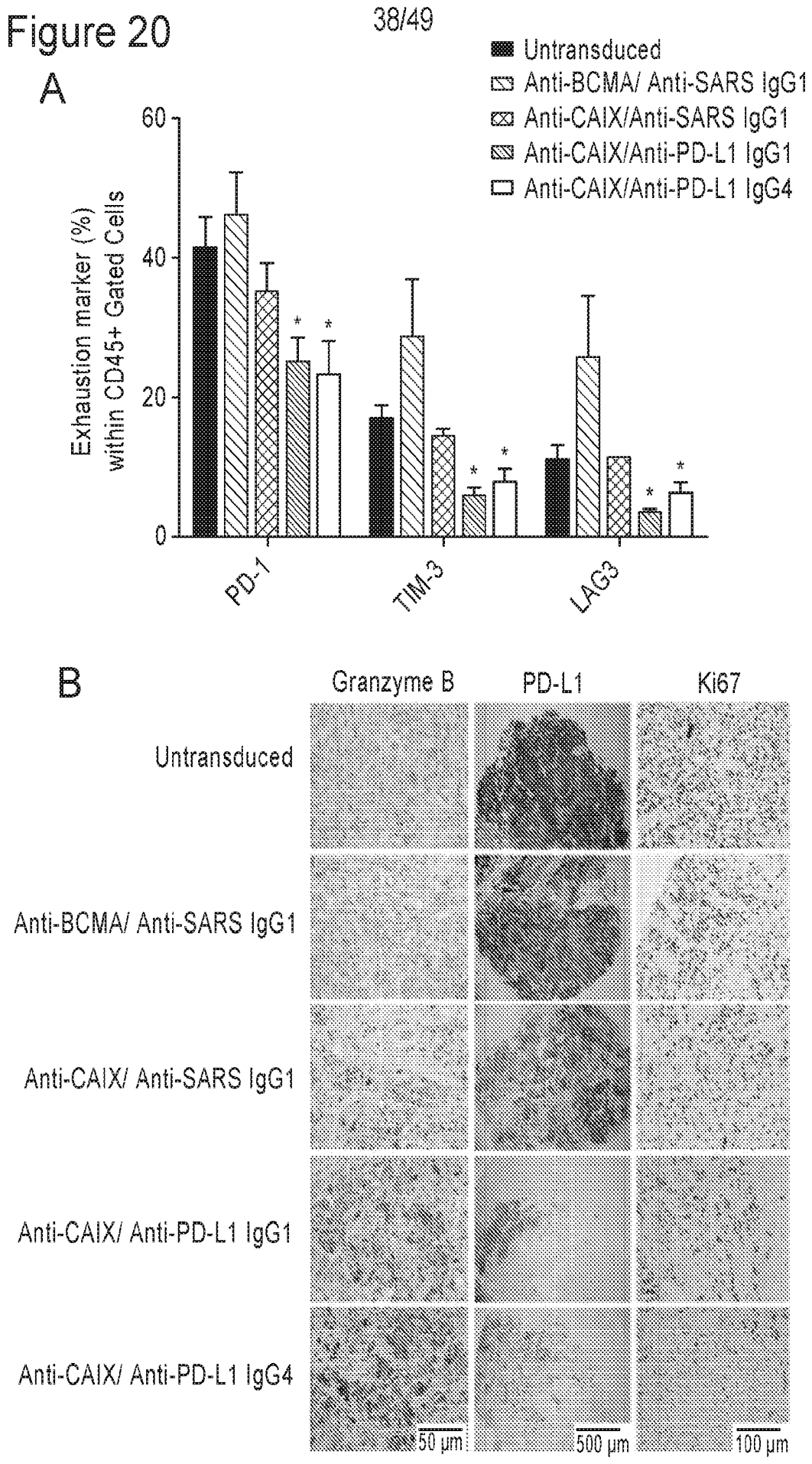


Figure 19 (Cont.)

Figure 20


A
Untransduced
Anti-BCMA/ Anti-SARS IgG1
Anti-CAIX/Anti-SARS IgG1
Anti-CAIX/Anti-PD-L1 IgG1
Anti-CAIX/Anti-PD-L1 IgG4
Exhaustion marker (%) within CD45+ Gated Cells
60
40
20
0
PD-1
TIM-3
LAG3
B
Granzyme B
PD-L1
Ki67
Untransduced
Anti-BCMA/ Anti-SARS IgG1
Anti-CAIX/ Anti-SARS IgG1
Anti-CAIX/ Anti-PD-L1 IgG1
Anti-CAIX/ Anti-PD-L1 IgG4
50 µm
500 µm
100 µm

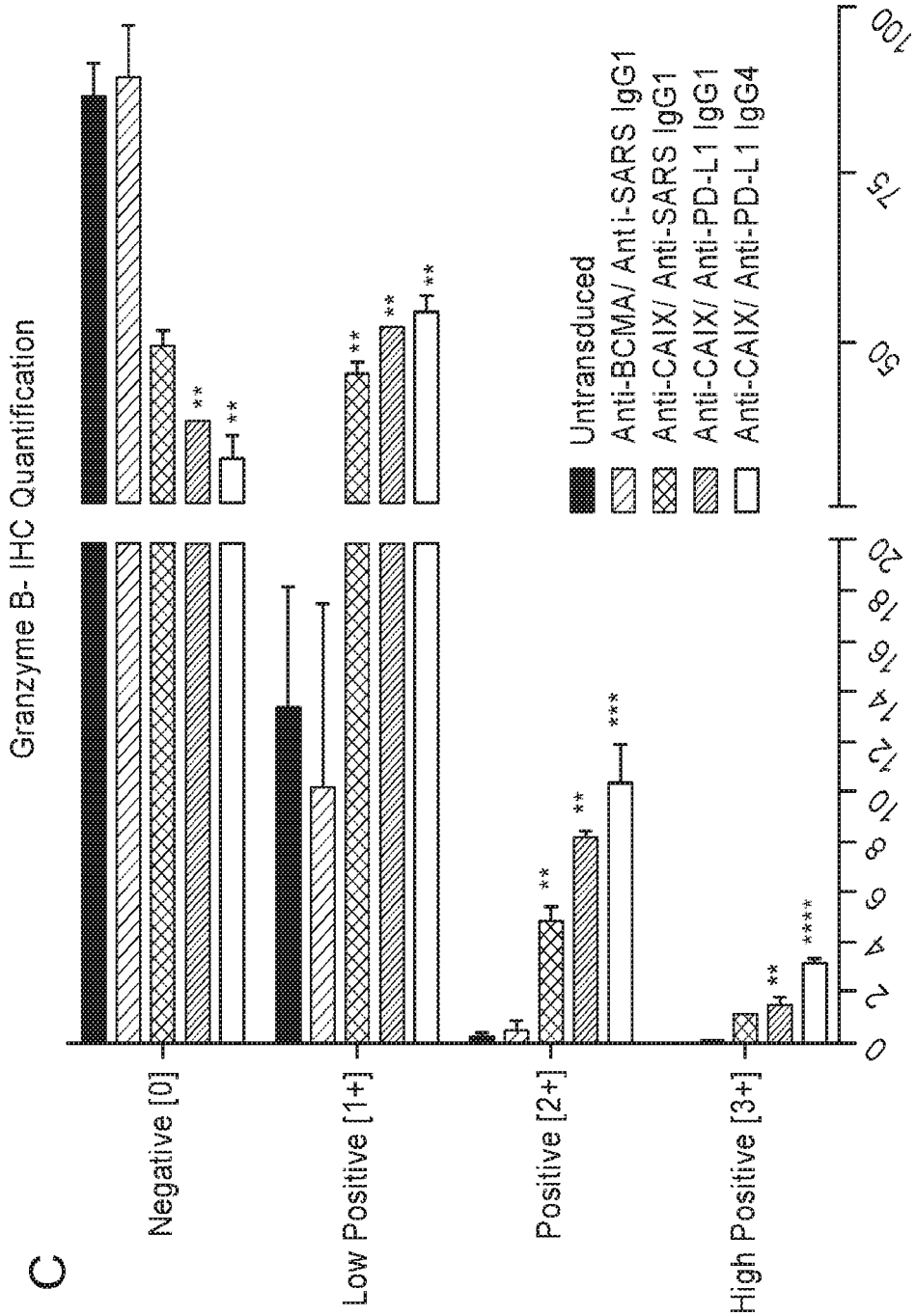


Figure 20 (Cont.)

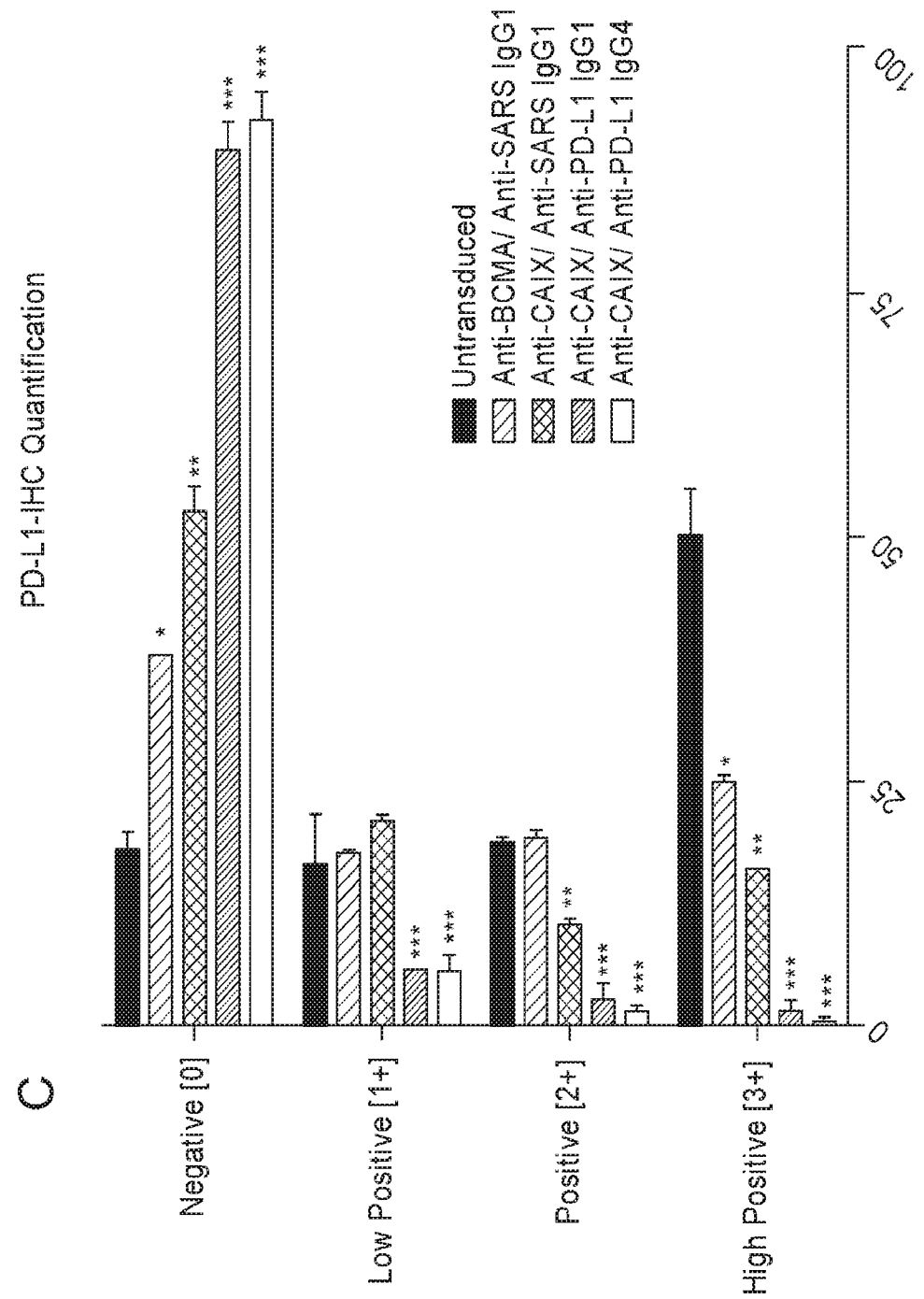


Figure 20 (Cont.)

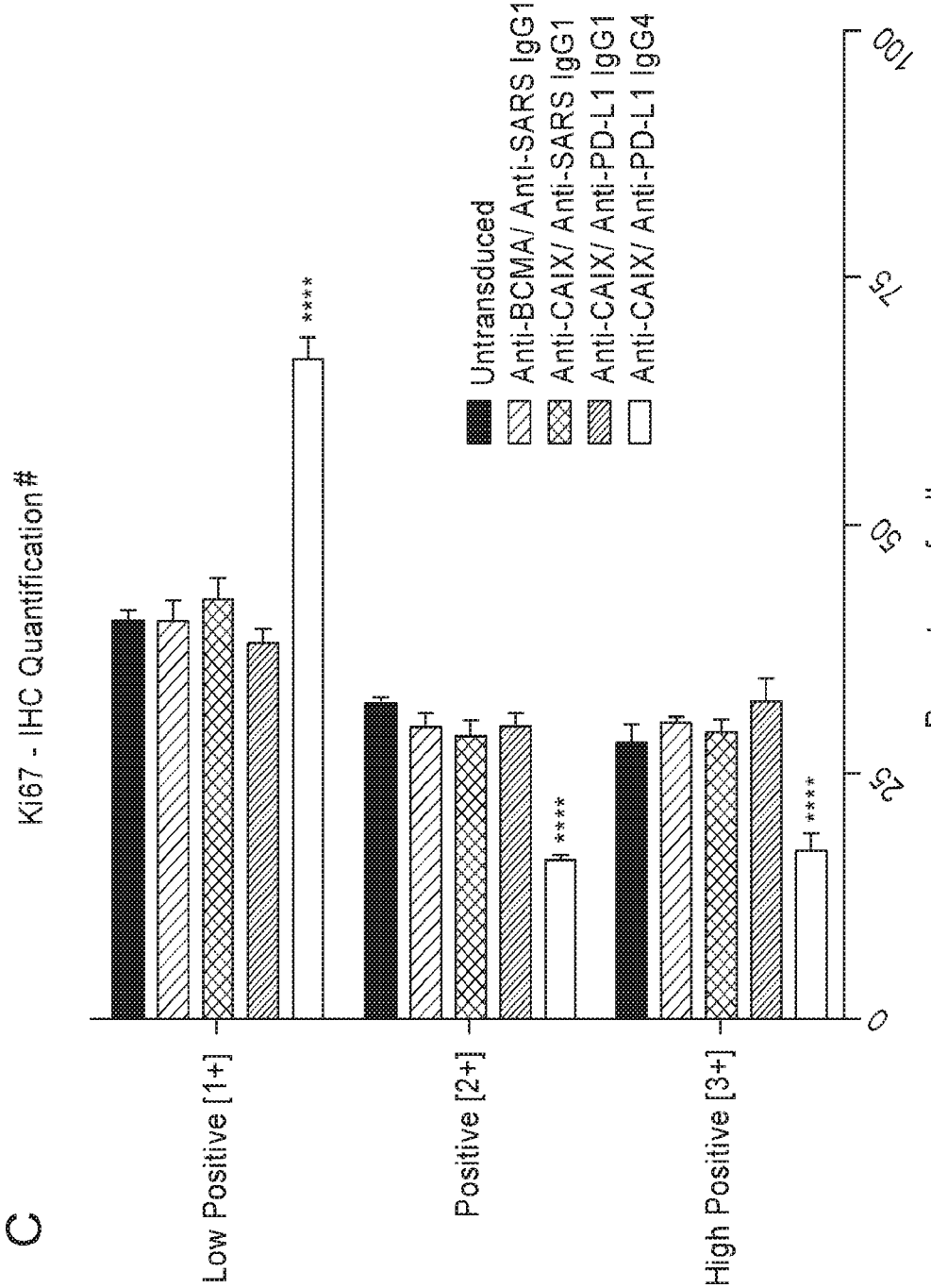


Figure 20 (Cont.)

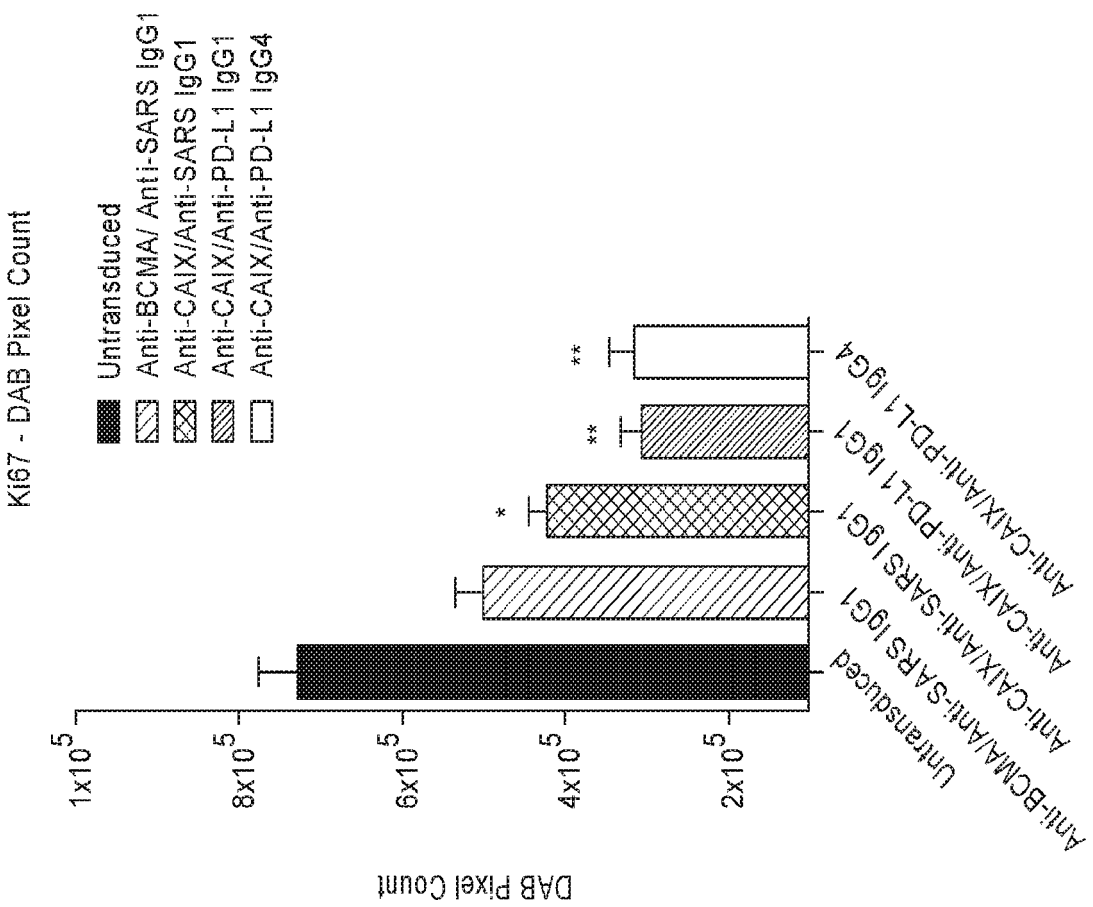


Figure 20 (Cont.)

Figure 21

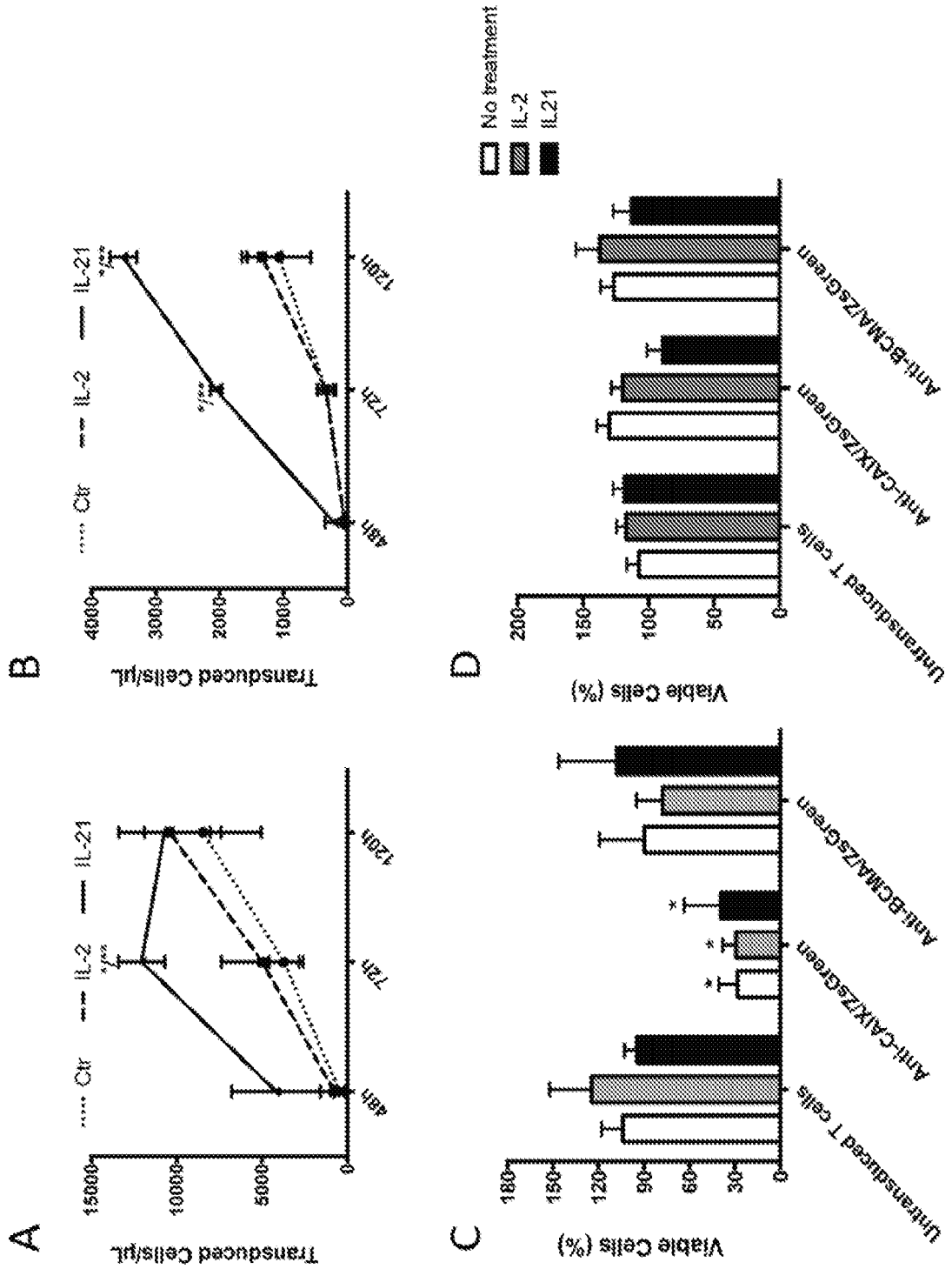

A
B
C
D
Ctr
IL-2
IL-21
No treatment
Transduced Cells/µL
Viable Cells (%)
48h
72h
120h
Untransduced T cells
Anti-CAIX/ZsGreen
Anti-BCMA/ZsGreen

Figure 22

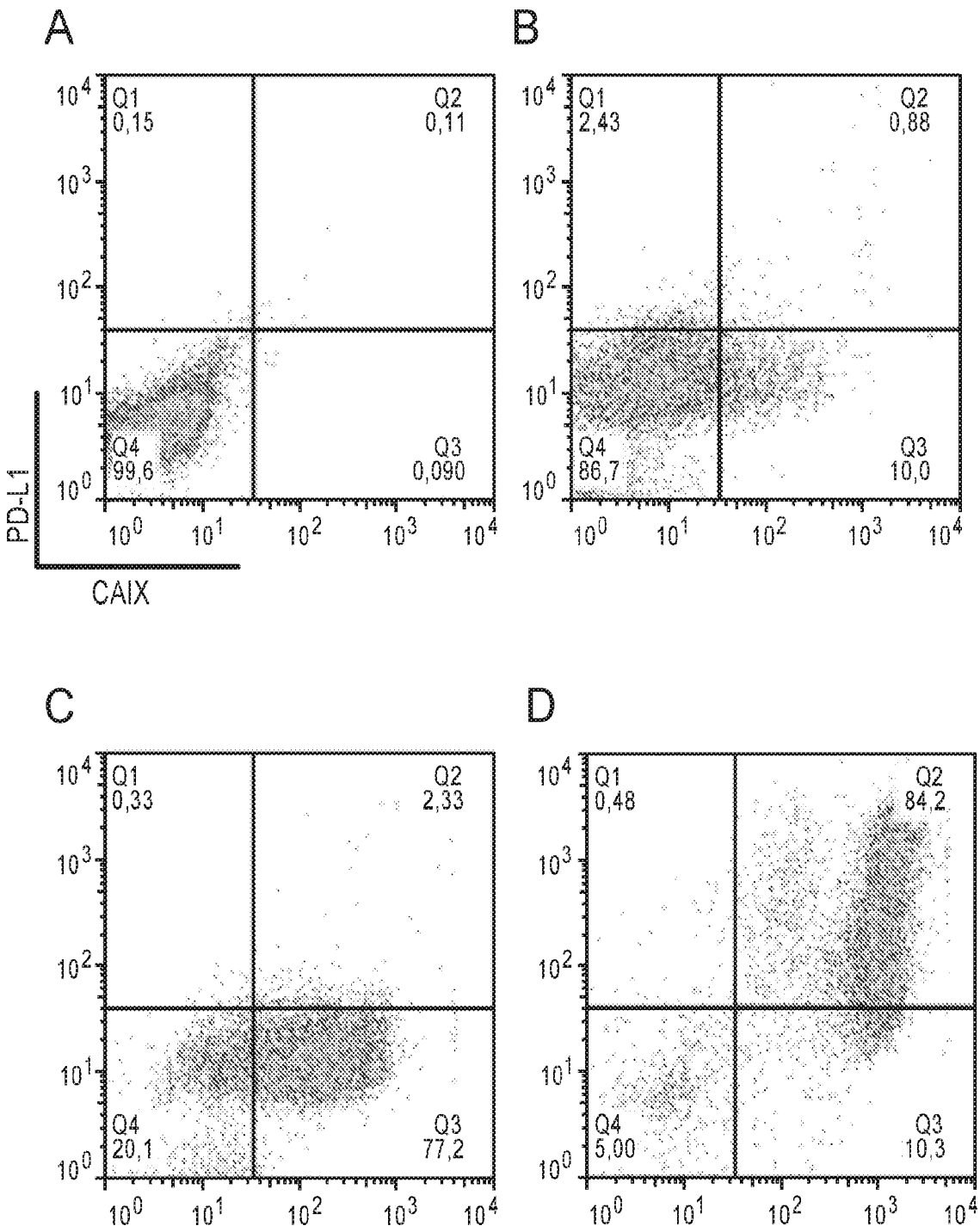

A
B
C
D
Q1
0,15
Q2
0,11
Q4
99,6
Q3
0,090
Q1
2,43
Q2
0,88
Q4
86,7
Q3
10,0
Q1
0,33
Q2
2,33
Q4
20,1
Q3
77,2
Q1
0,48
Q2
84,2
Q4
5,00
Q3
10,3
PD-L1
CAIX

Figure 23

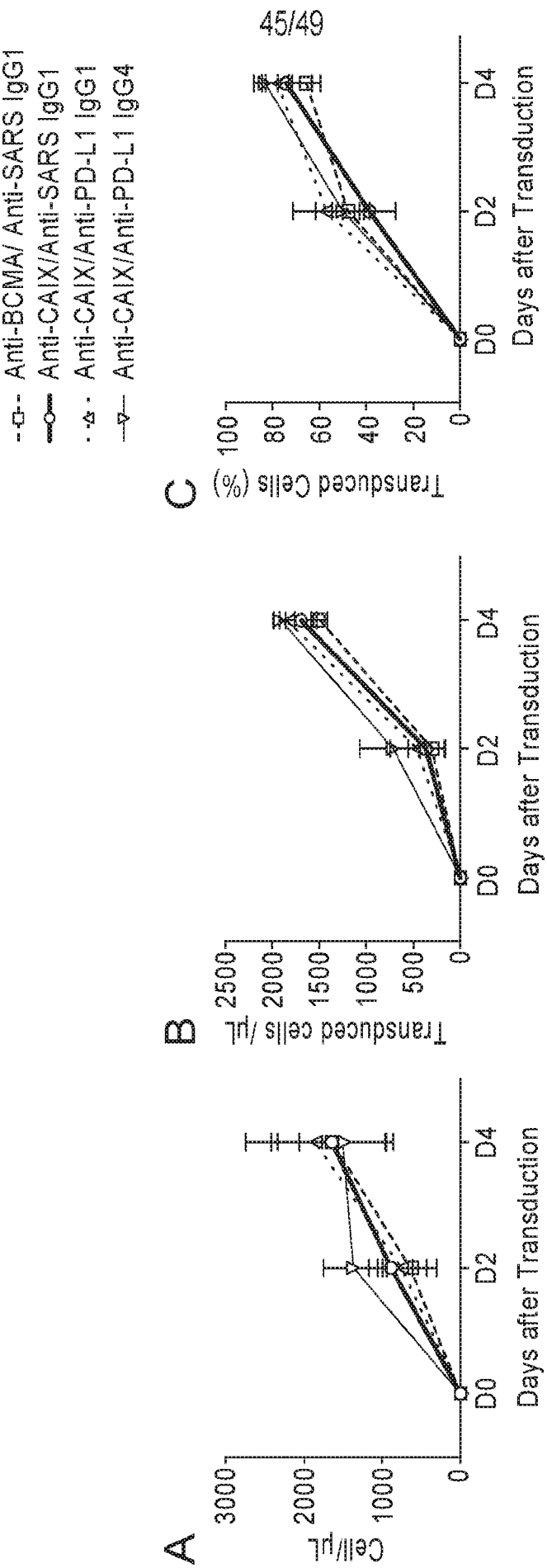
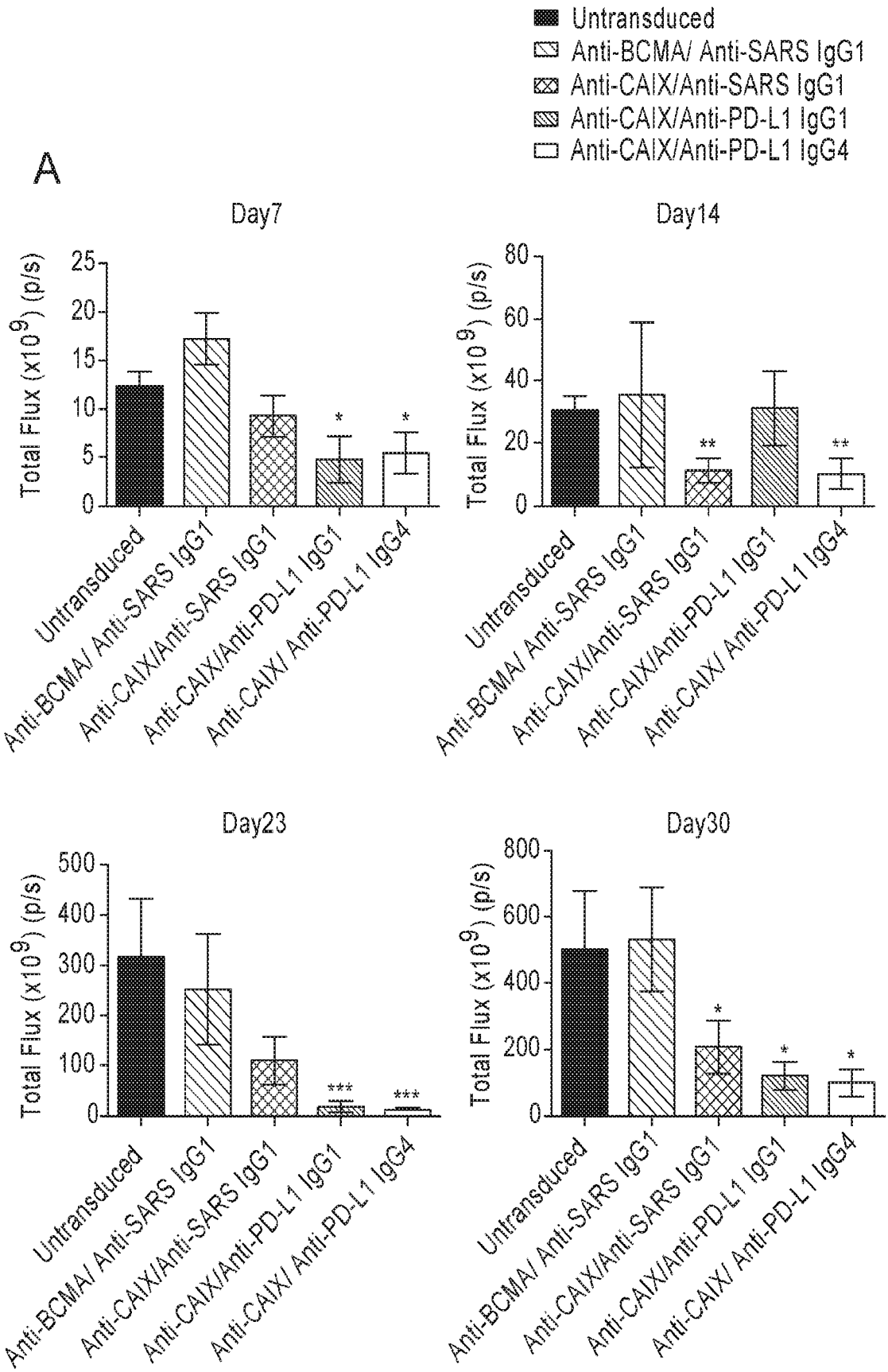

A
Cell/µL
3000
2000
1000
0
D0
D2
D4
Days after Transduction
B
Transduced cells /µL
2500
2000
1500
1000
500
0
D0
D2
D4
Days after Transduction
C
Transduced Cells (%)
100
80
60
40
20
0
D0
D2
D4
Days after Transduction
Anti-BCMA/ Anti-SARS IgG1
Anti-CAIX/Anti-SARS IgG1
Anti-CAIX/Anti-PD-L1 IgG1
Anti-CAIX/Anti-PD-L1 IgG4

Figure 24


Untransduced
Anti-BCMA/ Anti-SARS IgG1
Anti-CAIX/Anti-SARS IgG1
Anti-CAIX/Anti-PD-L1 IgG1
Anti-CAIX/ Anti-PD-L1 IgG4
A
Day7
Day14
Day23
Day30
Total Flux (x10^9) (p/s)
0
5
10
15
20
25
40
60
80
100
200
300
400
500
600
800
*
**
***

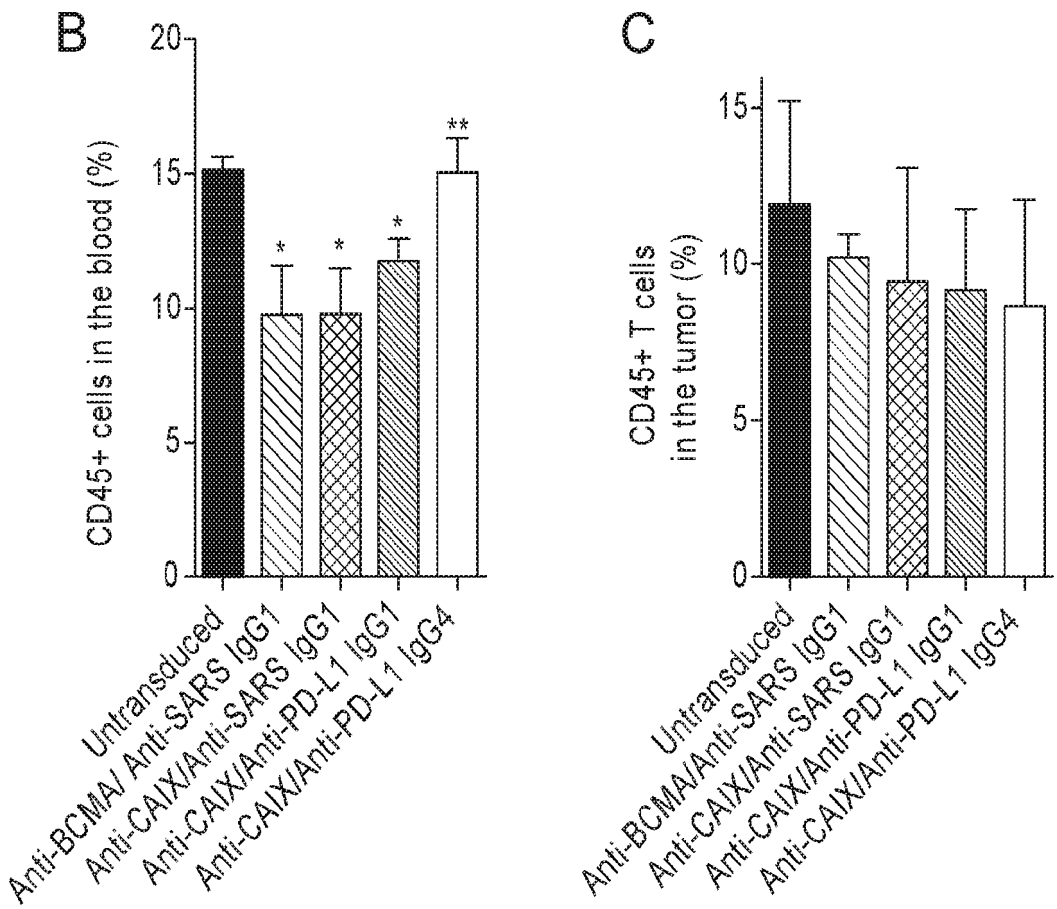
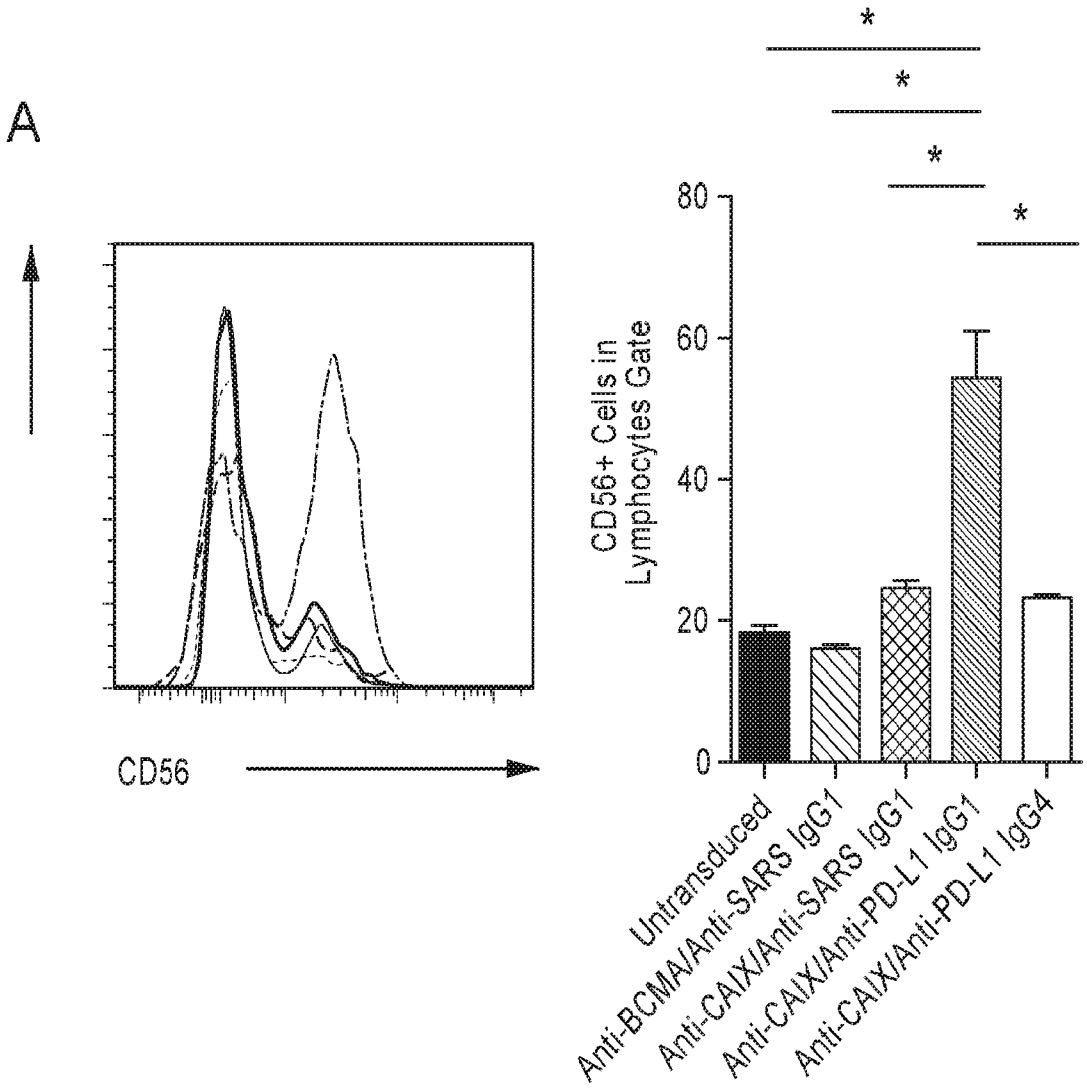


Figure 24 (Cont.)

Figure 25


A
CD56
CD56+ Cells in Lymphocytes Gate
0
20
40
60
80
*
*
*
*
Untransduced
Anti-BCMA/Anti-SARS IgG1
Anti-CAIX/Anti-SARS IgG1
Anti-CAIX/Anti-PD-L1 IgG1
Anti-CAIX/Anti-PD-L1 IgG4

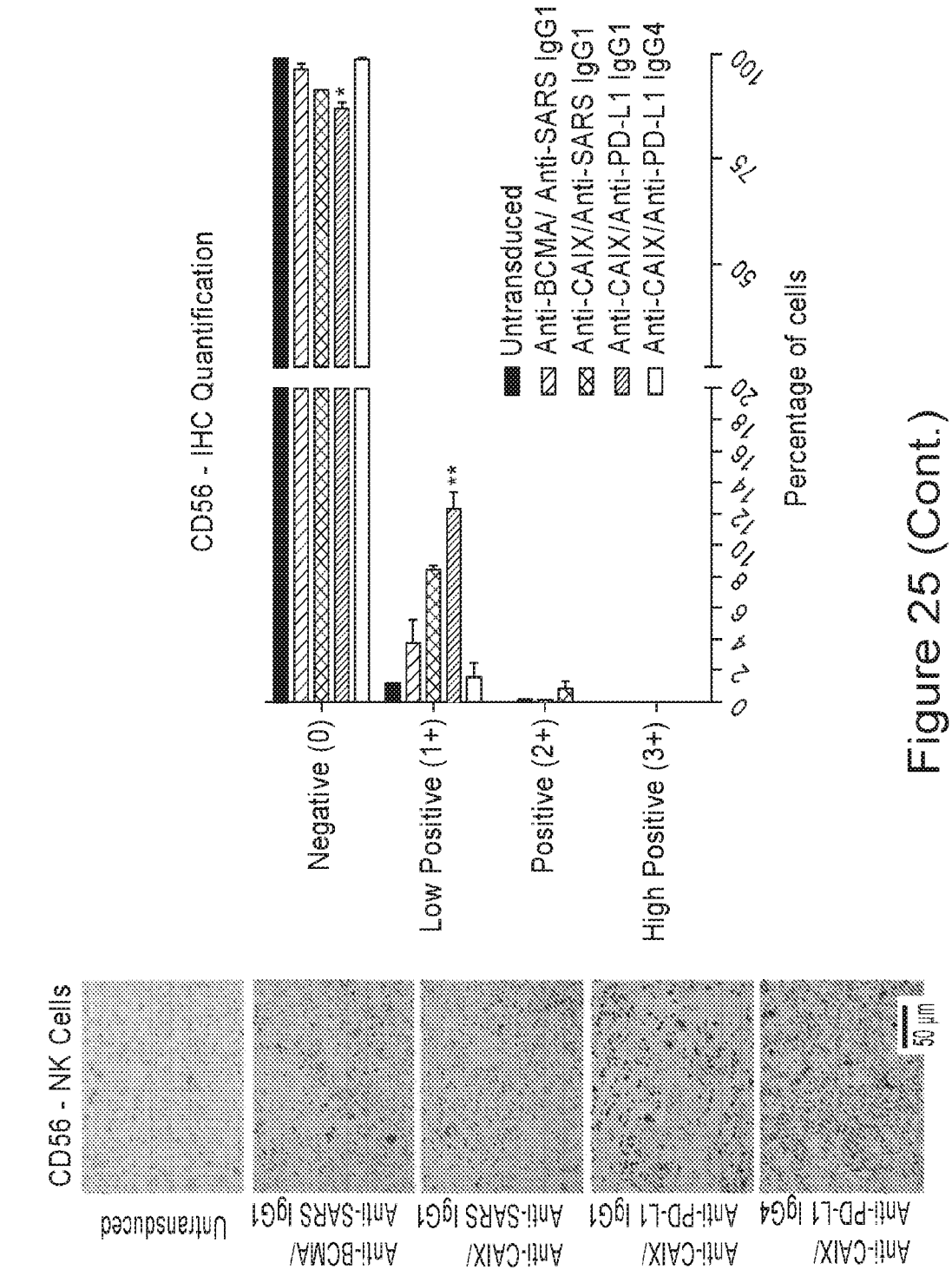


Figure 25 (Cont.)

SEQUENCE LISTING

<110> Dana-Farber Cancer Institute

<120> CHIMERIC ANTIGEN RECEPTORS AND METHODS OF USE THEREOF

<130> DFCI-102_001WO

<150> 62/094,625
<151> 2014-12-19

<150> 62/252,083
<151> 2015-11-06

<160> 1664

<170> PatentIn version 3.5

<210> 1
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1

Gly Gly Pro Phe Ser Ser Tyr Ala
1 5

<210> 2
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 2

Gly Gly Ile Phe Ser Ser Tyr Ala
1 5

<210> 3
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 3

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 4
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 4

Gly Val Thr Phe Ser Ser Tyr Ala
1 5

<210> 5
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 5

Gly Val Thr Phe Ser Ser Tyr Ala
1 5

<210> 6
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 6

Gly Val Thr Phe Ser Ser Tyr Ala
1 5

<210> 7
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 7

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 8
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 8

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 9
<211> 8
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Polypeptide

<400> 9

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 10
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 10

Gly Val Thr Phe Ser Ser Tyr Ala
1 5

<210> 11
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 11

Gly Val Thr Phe Arg Ser Tyr Ala
1 5

<210> 12
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 12

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 13
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 13

Gly Gly Pro Phe Ser Ser Tyr Ala
1 5

<210> 14
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 14

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 15
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 15

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 16
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 16

Gly Val Thr Phe Ser Ser Tyr Ala
1 5

<210> 17
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 17

Gly Val Thr Phe Ser Ser Tyr Ala
1 5

<210> 18
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 18

Gly Val Thr Phe Ser Ser Tyr Ala
1 5

<210> 19
<211> 8

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 19

Gly Gly Pro Phe Ser Ser Tyr Ala
1 5

<210> 20
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 20

Gly Gly Pro Phe Ser Ser Tyr Ala
1 5

<210> 21
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 21

Gly Val Thr Phe Ser Ser Tyr Ala
1 5

<210> 22
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 22

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 23
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 23

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 24
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 24

Gly Val Thr Phe Ser Ser Tyr Ala
1 5

<210> 25
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 25

Gly Val Thr Phe Ser Ser Tyr Ala
1 5

<210> 26
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 26

Gly Val Thr Phe Ser Ser Tyr Ala
1 5

<210> 27
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 27

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 28
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 28

Gly Gly Ile Phe Ser Ser Tyr Ala
1 5

<210> 29
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 29

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 30
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 30

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 31
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 31

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 32
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 32

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 33
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 33

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 34
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 34

Gly Val Thr Phe Arg Ser Tyr Ala
1 5

<210> 35
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 35

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 36
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 36

Gly Val Thr Phe Ser Ser Tyr Ala
1 5

<210> 37
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 37

Ile Ser Pro Met Phe Gly Thr Ala
1 5

<210> 38
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 38

Ile Ser Pro Ile Phe Gly Thr Ala
1 5

<210> 39
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 39

Ile Ser Pro Ile Phe Gly Thr Ala
1 5

<210> 40
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 40

Ile Ser Pro Ile Phe Gly Thr Ala
1 5

<210> 41
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 41

Ile Met Pro Met Phe Gly Thr Ala
1 5

<210> 42
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 42

Ile Ser Pro Leu Phe Gly Thr Ala
1 5

<210> 43
<211> 8
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Polypeptide

<400> 43

Ile Ser Pro Ile Phe Gly Thr Ala
1 5

<210> 44
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 44

Ile Ser Pro Ile Phe Gly Thr Ala
1 5

<210> 45
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 45

Ile Ser Pro Met Phe Gly Thr Ala
1 5

<210> 46
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 46

Ile Ser Pro Ile Phe Gly Thr Ala
1 5

<210> 47
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 47

Ile Ser Gly Ile Phe Gly Thr Ala
1 5

<210> 48
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 48

Ile Ser Pro Met Phe Gly Thr Ala
1 5

<210> 49
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 49

Ile Ser Gly Ile Phe Gly Thr Ala
1 5

<210> 50
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 50

Ile Ser Pro Ile Phe Gly Thr Ala
1 5

<210> 51
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 51

Ile Ser Pro Ile Phe Gly Thr Ala
1 5

<210> 52
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 52

Ile Ser Pro Met Phe Gly Thr Ala
1 5

<210> 53
<211> 8

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 53

Ile Thr Pro Met Phe Gly Thr Ala
1 5

<210> 54
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 54

Ile Ser Pro Leu Phe Gly Thr Ala
1 5

<210> 55
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 55

Ile Ser Pro Met Phe Gly Thr Ala
1 5

<210> 56
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 56

Ile Ser Pro Leu Phe Gly Thr Ala
1 5

<210> 57
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 57

Ile Ser Pro Met Phe Gly Thr Ala
1 5

<210> 58
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 58

Ile Ser Pro Leu Phe Gly Thr Ala
1 5

<210> 59
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 59

Ile Ser Pro Ile Phe Gly Thr Ala
1 5

<210> 60
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 60

Ile Ser Pro Ile Phe Gly Thr Ala
1 5

<210> 61
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 61

Ile Ser Pro Leu Phe Gly Thr Ala
1 5

<210> 62
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 62

Ile Ser Pro Ile Phe Gly Thr Ala
1 5

<210> 63
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 63

Ile Ser Pro Met Phe Gly Thr Ala
1 5

<210> 64
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 64

Ile Ser Pro Ile Phe Gly Thr Ala
1 5

<210> 65
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 65

Ile Thr Pro Ile Phe Gly Thr Ala
1 5

<210> 66
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 66

Ile Ser Pro Ile Phe Gly Thr Ala
1 5

<210> 67
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 67

Ile Ile Pro Ile Phe Gly Thr Ala
1 5

<210> 68
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 68

Ile Thr Pro Met Phe Gly Thr Ala
1 5

<210> 69
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 69

Ile Ser Ala Met Phe Gly Thr Ala
1 5

<210> 70
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 70

Ile Ile Pro Ile Phe Gly Thr Ala
1 5

<210> 71
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 71

Ile Thr Pro Met Phe Gly Thr Ala
1 5

<210> 72
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 72

Ile Ser Pro Met Phe Gly Thr Ala
1 5

<210> 73
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 73

Ala Arg Asp Asp Gly Tyr Ala Pro Ser Gly Gly Leu Arg Glu Phe Asp
1 5 10 15

Val

<210> 74
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 74

Ala Arg Gly Arg Gly Ala Tyr Met Gly Pro Ser Met Asp Val
1 5 10

<210> 75
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 75

Ala Arg Gly Ala Arg Tyr Tyr Ala Gly Gly Tyr Phe Asp Val
1 5 10

<210> 76
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 76

Ala Arg Asp Ser Gly Asn Tyr Asp Gly Tyr Gly Pro Gly Ser Arg Phe
1 5 10 15

Asp Val

<210> 77
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 77

Ala Arg Glu Arg Gly Ser Trp Ser Phe Gly Tyr Phe Asp Val
1 5 10

<210> 78
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 78

Ala Arg Ser Arg Thr Tyr Ala Asp Gly Arg Thr Phe Asp Val
1 5 10

<210> 79
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 79

Ala Arg Glu Leu Gly Tyr Leu Ala Gly Ser Pro Ser Pro Gly Phe Asp
1 5 10 15

Tyr

<210> 80
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 80

Ala Arg Ser Arg Arg Tyr Trp Ala Asp Gly Gly Phe Asp Tyr
1 5 10

<210> 81
<211> 15
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Polypeptide

<400> 81

Ala Arg Glu Gly Gly Tyr Ser Pro Gly Gly Val Asp Phe Asp Tyr
1 5 10 15

<210> 82
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 82

Ala Arg Gly Thr Thr Tyr Ser Thr Ala Arg Tyr Phe Asp Val
1 5 10

<210> 83
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 83

Ala Arg Ser Pro Ala Tyr Tyr Phe Gly Pro Asn Met Asp Val
1 5 10

<210> 84
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 84

Ala Arg Ser Ser Arg Tyr Ala Pro Ser Asp Ser Thr Asn Phe Asp Gln
1 5 10 15

<210> 85
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 85

Ala Arg Gly Asp Arg Phe Tyr Val Gly Glu Arg Phe Asp Val
1 5 10

<210> 86
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 86

Ala Arg Gly Gly Gly Val Gly Arg Ile Trp Ile Ala Gly Tyr Gly Phe
1 5 10 15

Asp Gln

<210> 87
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 87

Ala Arg Gly Pro Gly Tyr His Pro Ala Gly Ala Ser Gly Gln Phe Phe
1 5 10 15

Asp Leu

<210> 88
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 88

Ala Arg Gly Arg Gly Tyr Ala Pro Asp Ala Leu Thr Asn Phe Asp Val
1 5 10 15

<210> 89
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 89

Ala Arg Gly Arg Gly Tyr Ile Ala Val Ala Gly Asp Met Asp Val
1 5 10 15

<210> 90
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 90

Ala Arg Gly Asp Ala Tyr Tyr Val Gly Gly Gly Ala Arg Pro Phe Asp
1 5 10 15

Leu

<210> 91
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 91

Ala Arg Gly Tyr Ser Tyr Tyr Pro Gly Gly Gly Gly Gly Arg Asn Phe
1 5 10 15

Asp Tyr

<210> 92
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 92

Ala Arg Ala Pro Thr Tyr Tyr Ala Ser Arg Asp Ser Tyr Asn Phe Asp
1 5 10 15

Tyr

<210> 93
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 93

Ala Arg Asp Thr Thr Tyr Ile Ala Gly Gly His Phe Asp Val
1 5 10

<210> 94
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 94

Ala Arg Ala Ser Gly Tyr Phe Thr Gly Trp Gly Thr Phe Asp Tyr
1 5 10 15

<210> 95
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 95

Ala Arg Gly Arg Tyr Tyr Tyr Thr Val Gly Val Tyr Asp Val
1 5 10

<210> 96
<211> 20
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 96

Ala Arg Gly Gly Gly Tyr Ser Ala Asp Gly Gly Ala Gly Asn Asn Thr
1 5 10 15

Ile Phe Asp Val
20

<210> 97
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 97

Ala Arg Glu Arg Gly Tyr Thr Val Gly Gly Gly Gly Met Asp Val
1 5 10 15

<210> 98
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 98

Ala Arg Glu Tyr Leu Gly Asp Asp Tyr Ser Ser Gly Ser Tyr Phe Asp
1 5 10 15

Val

<210> 99
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 99

Ala Arg Glu Ser Gly Tyr Ser Gly Thr Gly Gln Phe Asp Val
1 5 10

<210> 100
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 100

Ala Arg Ser Gly Gly Tyr Tyr Asp Tyr Gly Val Gly Tyr Asp Gln
1 5 10 15

<210> 101
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 101

Ala Arg Ser Gly Gly Tyr Ser Pro Ser Ile Gly Gly Phe Asp Val
1 5 10 15

<210> 102
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 102

Ala Arg Gly Pro Gly Tyr Asp Pro Ser Ser Leu Arg Gly Phe Asp Val
1 5 10 15

<210> 103
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 103

Ala Arg Gly Glu Glu Ala Tyr Tyr Asp Leu
1 5 10

<210> 104
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 104

Ala Arg Gly Thr Ser Tyr Leu Pro Gly Arg Ser Gly Phe Asp Val
1 5 10 15

<210> 105
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 105

Ala Arg Gly Arg Gly Tyr Asp Pro Ser Val Gly Gly Phe Asp Val
1 5 10 15

<210> 106
<211> 20
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 106

Ala Arg Asp Ser Thr Pro Ser Val Thr Ser Ser Leu Tyr Arg Ile Pro
1 5 10 15

Ala Phe Asp Val
20

<210> 107
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 107

Ala Arg Gly Pro Gly Tyr Tyr Pro Asp Ser Asn Asn Tyr Asp Leu
1 5 10 15

<210> 108
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 108

Ala Arg Gly Gly Thr Tyr Ser Pro Gly Gly Thr Tyr Phe Asp Val
1 5 10 15

<210> 109
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 109

Arg Ser Val Leu Tyr Ser Ser Asn Asn Lys Asn Tyr
1 5 10

<210> 110
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 110

Asn Ile Gly Ser Lys Ser
1 5

<210> 111
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 111

Gln Thr Val Ser Asn Tyr
1 5

<210> 112
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 112

Ser Ser Asn Ile Gly Ser Asn Thr
1 5

<210> 113
<211> 6

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 113

His Ile Gly Ser Lys Ser
1 5

<210> 114
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 114

Ser Ser Asp Val Gly Gly Tyr Asn His
1 5

<210> 115
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 115

Ser Ser Asp Val Gly Gly Tyr Asn Tyr
1 5

<210> 116
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 116

Ser Ser Asn Met Gly Arg Asn Thr
1 5

<210> 117
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 117

Ser Gly Ser Ile Ala Ser Thr Tyr
1 5

<210> 118
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 118

Ser Gly Ser Ile Ala Ser Asn Tyr
1 5

<210> 119
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 119

Ser Ser Asn Ile Gly Ala Gly Tyr Asp
1 5

<210> 120
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 120

Ser Gly Ser Ile Ala Ser Asn Tyr
1 5

<210> 121
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 121

Asp Ile Gly Ser Lys Ser
1 5

<210> 122
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 122

Ser Gly Ser Val Ser Thr Ser Asn Tyr
1 5

<210> 123
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 123

Ser Asn Asn Val Gly Asn Gln Gly
1 5

<210> 124
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 124

Arg Ser Leu Phe Asp Ser Ser Asp Asn Lys Asn Tyr
1 5 10

<210> 125
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 125

Arg Ser Val Leu Tyr Ser Ser Asn Asn Lys Asn Tyr
1 5 10

<210> 126
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 126

Ser Ser Asn Ile Gly Val Asn Tyr
1 5

<210> 127
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 127

Ser Ser Asn Ile Gly Ser Asn Thr
1 5

<210> 128
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 128

Gln Ser Val Asp Arg Gly Tyr
1 5

<210> 129
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 129

Ser Ser Asp Ile Gly Ala Tyr Asn Tyr
1 5

<210> 130
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 130

Ala Leu Pro Lys Gln Tyr
1 5

<210> 131
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 131

Ser Asp Asn Val Gly Asn Gln Gly
1 5

<210> 132
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 132

Asn Asn Asn Val Gly Asn Gln Gly
1 5

<210> 133
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 133

Ser Ser Asp Val Gly Ala His Asn Phe
1 5

<210> 134
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 134

Gln Ser Val Asp Ser His
1 5

<210> 135
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 135

Thr Ser Asn Val Gly Arg Asn Thr
1 5

<210> 136
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 136

Arg Ser Asn Ile Gly Ser Asn Thr
1 5

<210> 137
<211> 8
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Polypeptide

<400> 137

Arg Ser Asn Ile Gly Arg Asn Thr
1 5

<210> 138
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 138

Ser Asn Asn Val Gly Asn Gln Gly
1 5

<210> 139
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 139

Gln Ser Val Ser Ser Phe
1 5

<210> 140
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 140

Ala Leu Pro Lys Gln Tyr
1 5

<210> 141
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 141

Ser Gly Ser Ile Ala Ser Asn Tyr
1 5

<210> 142
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 142

Asn Gly Pro Ser Asn Tyr Ile
1 5

<210> 143
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 143

Gln Ser Val Ser Ser Ser Tyr
1 5

<210> 144
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 144

Ser Ser Asn Ile Gly Val Ser Phe
1 5

<210> 145
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 145

Trp Ala Ser
1

<210> 146
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 146

Asp Asp Ser
1

<210> 147
<211> 3

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 147

Ala Ala Ser
1

<210> 148
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 148

Ser Asn Asn
1

<210> 149
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 149

Ser Asn Asn
1

<210> 150
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 150

Asp Val Ser
1

<210> 151
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 151

Glu Val Thr
1

<210> 152
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 152

Asp Asn Asp
1

<210> 153
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 153

Glu Asp His
1

<210> 154
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 154

Glu Asp Asn
1

<210> 155
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 155

Asp Asn Ser
1

<210> 156
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 156

Glu Asp Asn
1

<210> 157
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 157

Asp Asp Ile
1

<210> 158
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 158

Ser Thr Asn
1

<210> 159
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 159

Arg Asn Asn
1

<210> 160
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 160

Trp Ala Ser
1

<210> 161
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 161

Trp Ala Ser
1

<210> 162
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 162

Arg Asn Asn
1

<210> 163
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 163

Ser Asn Asn
1

<210> 164
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 164

Gly Ala Ser
1

<210> 165
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 165

Glu Val Ser
1

<210> 166
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 166

Lys Asp Ser
1

<210> 167
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 167

Arg Asp Asn
1

<210> 168
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 168

Arg Asn Asn
1

<210> 169
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 169

Glu Val Asn
1

<210> 170
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 170

Gly Ala Ser
1

<210> 171
<211> 3
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Polypeptide

<400> 171

Asn Asp Asn
1

<210> 172
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 172

Ser Asn Asn
1

<210> 173
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 173

Ser Asn Asn
1

<210> 174
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 174

Lys Asn Asn
1

<210> 175
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 175

Asp Ala Ser
1

<210> 176
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 176

Lys Asp Thr
1

<210> 177
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 177

Glu Asp Asn
1

<210> 178
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 178

Leu Asn Ser Asp Gly Ser His
1 5

<210> 179
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 179

Gly Ala Ser
1

<210> 180
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 180

Arg Asp Asp
1

<210> 181
<211> 9

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 181

Gln Gln Tyr Tyr Ser Gly Ser Trp Thr
1 5

<210> 182
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 182

Gln Val Trp Asp Arg Ser Ser Asp His Val Val
1 5 10

<210> 183
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 183

Gln Gln Tyr Asp Asn Leu Pro Pro Val Thr
1 5 10

<210> 184
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 184

Ser Ala Trp Asp Asp Ser Leu Gly Gly Glu Val
1 5 10

<210> 185
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 185

Gln Val Trp Asp Ser Ser Asn Asp His Pro Val
1 5 10

<210> 186
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 186

Thr Ser Tyr Ala Gly Ser Asn Ser Leu Val
1 5 10

<210> 187
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 187

Ser Ser Tyr Ala Gly Gly Lys Trp Val
1 5

<210> 188
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 188

Ala Ala Trp Asp Asp Ser Leu Asn Gly Pro Val
1 5 10

<210> 189
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 189

Gln Ser Phe Asp Ala Ser Thr Leu Val
1 5

<210> 190
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 190

Gln Ser Tyr Asp Ser Asp Asn His Glu Val Ile
1 5 10

<210> 191
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 191

Gln Ser Tyr Asp Ser Ser Leu Ser Val Val Val
1 5 10

<210> 192
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 192

Gln Ser Tyr Asp Thr Ser Asn Arg Lys Val
1 5 10

<210> 193
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 193

Gln Val Trp Asp Thr Asn Ser Asp Pro Val Phe Val
1 5 10

<210> 194
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 194

Val Leu Tyr Met Gly Ser Gly Ile Ser Met
1 5 10

<210> 195
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 195

Ser Ala Trp Asp Ser Ser Leu Ser Ala Trp Val
1 5 10

<210> 196
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 196

Gln Gln Tyr Phe Ser Ser Pro Pro Ile Phe Thr
1 5 10

<210> 197
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 197

Gln Gln Tyr Tyr Ser Thr Pro Pro Thr
1 5

<210> 198
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 198

Gly Val Trp Asp Asp Ser Leu Asn Gly His Trp Val
1 5 10

<210> 199
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 199

Ala Ala Trp Asp Asp Ser Leu Lys Gly Arg Val
1 5 10

<210> 200
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 200

Gln Gln Tyr Gly Ser Ser Arg Leu Ser
1 5

<210> 201
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 201

Ser Ser Tyr Ala Gly Ser Asn Asn Val Val
1 5 10

<210> 202
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 202

Gln Ala Trp Asp Ser Ser Thr Ala Val
1 5

<210> 203
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 203

Ser Ala Trp Asp Ser Ser Leu Thr Ala Val Val
1 5 10

<210> 204
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 204

Ser Ala Trp Asp Ser Ser Leu Ser Ala Trp Val
1 5 10

<210> 205
<211> 11
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Polypeptide

<400> 205

Ala Ala Trp Asp Asp Ser Leu Asp Gly Pro Val
1 5 10

<210> 206
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 206

Gln Gln Arg Ser Met Trp Pro Leu Thr
1 5

<210> 207
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 207

Ser Ser Trp Asp Asp Asp Leu Asn Gly Pro Val
1 5 10

<210> 208
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 208

Gln Ser Tyr Asp Ser Ser Val Val
1 5

<210> 209
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 209

Ala Ala Trp Asp Val Ser Leu Asn Gly Gln Val
1 5 10

<210> 210
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 210

Ser Ala Trp Asp Ser Ser Leu Ser Asp Trp Val
1 5 10

<210> 211
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 211

Gln Gln Arg Phe Asn Trp Pro Pro Thr
1 5

<210> 212
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 212

Gln Ser Ala Asp Ala Ser Glu Asn Ser Val
1 5 10

<210> 213
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 213

Gln Ser Tyr Asp Thr Ser Asn Leu Val
1 5

<210> 214
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 214

Glu Thr Trp Asp Ser Asn Thr His Val Val
1 5 10

<210> 215
<211> 9

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 215

Gln Gln Val Asn Ser Phe Pro Arg Thr
1 5

<210> 216
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 216

Ser Ala Trp Asp Glu Ser Leu Ser Ser Val Leu
1 5 10

<210> 217
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 217

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 218
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 218

Gly Val Thr Phe Ser Ser Tyr Ala
1 5

<210> 219
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 219

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 220
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 220

Gly Gly Ile Phe Ser Ser Tyr Ala
1 5

<210> 221
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 221

Gly Val Ile Phe Ser Ser Tyr Ala
1 5

<210> 222
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 222

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 223
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 223

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 224
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 224

Gly Gly Pro Phe Arg Ser Tyr Ala
1 5

<210> 225
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 225

Gly Val Pro Phe Ser Ser Tyr Ala
1 5

<210> 226
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 226

Gly Val Thr Phe Ser Ser Tyr Ala
1 5

<210> 227
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 227

Gly Val Ile Phe Ser Ser Tyr Ala
1 5

<210> 228
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 228

Gly Val Thr Phe Ser Ser Tyr Ala
1 5

<210> 229
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 229

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 230
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 230

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 231
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 231

Gly Gly Pro Phe Ser Ser Tyr Ala
1 5

<210> 232
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 232

Gly Gly Ile Phe Ser Ser Tyr Ala
1 5

<210> 233
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 233

Gly Gly Ile Phe Arg Ser Tyr Ala
1 5

<210> 234
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 234

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 235
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 235

Gly Val Thr Phe Ser Ser Tyr Ala
1 5

<210> 236
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 236

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 237
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 237

Gly Gly Thr Phe Arg Ser Tyr Ala
1 5

<210> 238
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 238

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 239
<211> 8
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Polypeptide

<400> 239

Gly Gly Pro Phe Ser Ser Tyr Ala
1 5

<210> 240
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 240

Gly Val Thr Phe Ser Ser Tyr Ala
1 5

<210> 241
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 241

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 242
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 242

Gly Val Thr Phe Arg Ser Tyr Ala
1 5

<210> 243
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 243

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 244
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 244

Gly Val Thr Phe Ser Ser Tyr Ala
1 5

<210> 245
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 245

Gly Gly Pro Phe Ser Ser Tyr Ala
1 5

<210> 246
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 246

Gly Gly Ile Phe Ser Ser Tyr Ala
1 5

<210> 247
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 247

Ile Ile Thr Ile Phe Gly Thr Ala
1 5

<210> 248
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 248

Ile Ser Pro Ile Phe Gly Thr Ala
1 5

<210> 249
<211> 8

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 249

Ile Ser Ala Ile Phe Gly Thr Ala
1 5

<210> 250
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 250

Ile Thr Pro Ile Phe Gly Thr Ala
1 5

<210> 251
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 251

Ile Ser Pro Ile Phe Gly Thr Ala
1 5

<210> 252
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 252

Ile Ser Pro Ile Phe Gly Thr Ala
1 5

<210> 253
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 253

Ile Ile Thr Ile Phe Gly Thr Ala
1 5

<210> 254
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 254

Ile Ile Pro Ile Phe Gly Thr Ala
1 5

<210> 255
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 255

Ile Ser Pro Leu Phe Gly Thr Ala
1 5

<210> 256
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 256

Ile Ser Pro Met Phe Gly Thr Ala
1 5

<210> 257
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 257

Ile Ile Pro Ile Phe Gly Thr Ala
1 5

<210> 258
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 258

Ile Ser Pro Val Phe Gly Thr Ala
1 5

<210> 259
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 259

Ile Val Pro Leu Phe Gly Thr Ala
1 5

<210> 260
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 260

Ile Ile Pro Ile Phe Gly Thr Ala
1 5

<210> 261
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 261

Ile Ser Pro Ile Phe Gly Thr Ala
1 5

<210> 262
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 262

Ile Ser Ala Ile Phe Gly Thr Ala
1 5

<210> 263
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 263

Ile Ile Pro Met Phe Gly Thr Ala
1 5

<210> 264
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 264

Ile Asn Pro Ile Phe Gly Thr Ala
1 5

<210> 265
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 265

Ile Ser Pro Met Phe Gly Thr Ala
1 5

<210> 266
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 266

Ile Thr Pro Leu Phe Gly Thr Ala
1 5

<210> 267
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 267

Ile Met Pro Ile Phe Gly Thr Ala
1 5

<210> 268
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 268

Ile Ser Pro Met Phe Gly Thr Ala
1 5

<210> 269
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 269

Ile Ile Pro Ile Phe Gly Thr Ala
1 5

<210> 270
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 270

Ile Thr Pro Ile Phe Gly Thr Ala
1 5

<210> 271
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 271

Ile Ser Pro Met Phe Gly Thr Ala
1 5

<210> 272
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 272

Ile Ser Gly Ile Phe Gly Thr Ala
1 5

<210> 273
<211> 8
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Polypeptide

<400> 273

Ile Ser Pro Ile Phe Gly Thr Ala
1 5

<210> 274
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 274

Ile Ser Pro Met Phe Gly Thr Ala
1 5

<210> 275
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 275

Ile Ser Pro Met Phe Gly Thr Ala
1 5

<210> 276
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 276

Ile Ser Pro Ile Phe Gly Thr Ala
1 5

<210> 277
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 277

Ala Arg Gly Ala Thr Gly Phe Tyr Asp Val
1 5 10

<210> 278
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 278

Ala Arg Gly Arg Glu Tyr Tyr Ala Ser Asn Gly Asp Ser Phe Asp Val
1 5 10 15

<210> 279
<211> 20
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 279

Ala Arg Asp Leu Ser Arg Asp Ser Leu Asn Leu Pro Gly Ser Ser Pro
1 5 10 15

Gly Tyr Asp Leu
20

<210> 280
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 280

Ala Arg Gly Ser Gly Tyr Tyr Val Ala Ala Ser Gly Ala Phe Asp Val
1 5 10 15

<210> 281
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 281

Ala Arg Ser Arg Gly Tyr Ala Pro Gly Thr Ser Phe His Tyr Asp Val
1 5 10 15

<210> 282
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 282

Ala Arg Asp Gln Gly Gly Thr Arg Gly Asn Tyr Phe Asp Val
1 5 10

<210> 283
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 283

Ala Arg Gly Gly Gly Gly Arg Phe Asp Val
1 5 10

<210> 284
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 284

Ala Arg Gly Gly Val Tyr Ser Phe Asp Val
1 5 10

<210> 285
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 285

Ala Arg Gly Leu Gly Thr Tyr Ser Pro Ser Leu Tyr Pro Arg Gly Met
1 5 10 15

Asp Val

<210> 286
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 286

Ala Arg Gly Arg Ala Tyr Leu Ser Val Arg Gly Ser Phe Asp Val
1 5 10 15

<210> 287
<211> 10
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Polypeptide

<400> 287

Ala Arg Gly Gly Ser Gly Ser Phe Asp Val
1 5 10

<210> 288
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 288

Ala Arg Ser Arg Gly Tyr Thr Val Ser Ser Leu Ala Gly Arg Tyr Phe
1 5 10 15

Asp Gln

<210> 289
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 289

Ala Arg Gly Leu Gly Leu Tyr Phe Asp Val
1 5 10

<210> 290
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 290

Ala Arg Val Arg Gly Gly Tyr Gly Pro Tyr Gly Asp Phe Asp Val
1 5 10 15

<210> 291
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 291

Ala Arg Gly Arg Ser Tyr Ile Val Ser Val Ser Pro Gly Phe Asp Val
1 5 10 15

<210> 292
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 292

Ala Arg Asp Ser Gly Ile Ala Ser Gly Tyr Thr Ala Tyr Met Asp Tyr
1 5 10 15

<210> 293
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 293

Ala Arg Gly Ala Gly Ser Thr Phe Asp Val
1 5 10

<210> 294
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 294

Ala Arg Gly Glu Ser Ala Tyr Tyr Ser Arg Asn Tyr Asp Val
1 5 10

<210> 295
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 295

Ala Arg Gly Gly Gly Tyr Tyr Pro Ala Gly Val Gly Arg Tyr Asp Val
1 5 10 15

<210> 296
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 296

Ala Arg Gly Pro Thr Leu Tyr Ser Pro Pro Val Phe Asp Val
1 5 10

<210> 297
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 297

Ala Arg Gly Ala Gly Val Ser Ala Gly Pro Ser Trp Pro Phe Asp Val
1 5 10 15

<210> 298
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 298

Ala Arg Ser Arg Gly Tyr Asn Val Ala Ala Ser Phe Gly Phe Asp Val
1 5 10 15

<210> 299
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 299

Ala Arg Gly Thr Asp Tyr Ser Gly Tyr Arg Gly Phe Asp Val
1 5 10

<210> 300
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 300

Ala Arg Gly Gly Gly Val Phe Asp Val
1 5

<210> 301
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 301

Ala Arg Glu Gly Gly Tyr Ser Pro Gly Gly Val Asp Phe Asp Tyr
1 5 10 15

<210> 302
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 302

Ala Arg Ser Pro Ala Tyr Tyr Phe Gly Pro Asn Met Asp Val
1 5 10

<210> 303
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 303

Ala Arg Gly Pro Gly Tyr His Pro Ala Gly Ala Ser Gly Gln Phe Phe
1 5 10 15

Asp Leu

<210> 304
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 304

Ala Arg Gly Arg Gly Tyr Ala Pro Asp Ala Leu Thr Asn Phe Asp Val
1 5 10 15

<210> 305
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 305

Ala Arg Gly Tyr Ser Tyr Tyr Pro Gly Gly Gly Gly Gly Arg Asn Phe
1 5 10 15

Asp Tyr

<210> 306
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 306

Ala Arg Ser Gly Gly Tyr Tyr Asp Tyr Gly Val Gly Tyr Asp Gln
1 5 10 15

<210> 307
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 307

Ser Ser Asn Ile Gly Ser Asn Thr
1 5

<210> 308
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 308

Asn Ile Ala Thr Lys Ser
1 5

<210> 309
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 309

Asn Ile Ala Thr Lys Ser
1 5

<210> 310
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 310

Ile Asn Asn Val Gly Asp Gln Gly
1 5

<210> 311
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 311

Asn Ile Gly Ser Lys Ser
1 5

<210> 312
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 312

Ser Asn Asn Val Gly Asn Gln Gly
1 5

<210> 313
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 313

Thr Ser Asn Ile Gly Asn Asn Ala
1 5

<210> 314
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 314

Gly Ser Asn Val Gly Ser Asn Val
1 5

<210> 315
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 315

Ser Ser Asn Ile Gly Arg Asn Asp
1 5

<210> 316
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 316

Ser Ser Asn Ile Gly Ser Asn Thr
1 5

<210> 317
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 317

Ser Ser Asn Leu Gly Ser Asn Tyr
1 5

<210> 318
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 318

Glu Ser Leu Cys Ser Thr Cys
1 5

<210> 319
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 319

Thr Gly Ala Val Thr Ser Gly Tyr Tyr
1 5

<210> 320
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 320

Ser Ser Asn Ile Gly Ser His Ser
1 5

<210> 321
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 321

Ser Ser Asp Val Gly Gly Tyr Asn Tyr
1 5

<210> 322
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 322

Ser Leu Arg Thr Ser Tyr
1 5

<210> 323
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 323

Ser Ser Asn Ile Gly Ser Asn Thr
1 5

<210> 324
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 324

Ser Ser Asn Val Gly Asn Gln Gly
1 5

<210> 325
<211> 12
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Polypeptide

<400> 325

Gln Asn Val Leu Tyr Ser Ser Asn Asn Lys Asn Asn
1 5 10

<210> 326
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 326

Ser Gly Ser Val Ser Thr Thr Asn Tyr
1 5

<210> 327
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 327

Ser Asn Asn Val Gly Lys Gln Gly
1 5

<210> 328
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 328

Gln Tyr Ile Asp Arg Ser
1 5

<210> 329
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 329

Ser Gly Ser Val Ser Ser Phe Asn Tyr
1 5

<210> 330
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 330

Ser Ser Asn Ile Gly Asn Asn Ala
1 5

<210> 331
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 331

Ser Gly Ser Ile Ala Ser Thr Tyr
1 5

<210> 332
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 332

Ser Ser Asn Ile Gly Ala Gly Tyr Asp
1 5

<210> 333
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 333

Ser Asn Asn Val Gly Asn Gln Gly
1 5

<210> 334
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 334

Arg Ser Leu Phe Asp Ser Ser Asp Asn Lys Asn Tyr
1 5 10

<210> 335
<211> 8

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 335

Ser Ser Asn Ile Gly Ser Asn Thr
1 5

<210> 336
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 336

Arg Ser Asn Ile Gly Ser Asn Thr
1 5

<210> 337
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 337

Ser Asn Asn
1

<210> 338
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 338

His Asp Ser
1

<210> 339
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 339

Arg Asn Ser
1

<210> 340
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 340

Gly Ala Ser
1

<210> 341
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 341

Tyr Asp Ser
1

<210> 342
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 342

Arg Asn Asn
1

<210> 343
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 343

Ser Leu Asn
1

<210> 344
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 344

Arg Asn Asn
1

<210> 345
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 345

Gly Arg Asp
1

<210> 346
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 346

Ser Asn Asn
1

<210> 347
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 347

Arg Asn Ser
1

<210> 348
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 348

Gly Ala Thr
1

<210> 349
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 349

Ser Thr Ser
1

<210> 350
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 350

Gly Asn Ser
1

<210> 351
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 351

Glu Val Ser
1

<210> 352
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 352

Gln Ser Thr
1

<210> 353
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 353

Ser Asn Asn
1

<210> 354
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 354

Arg Asn Asp
1

<210> 355
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 355

Trp Ala Ser
1

<210> 356
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 356

Asn Thr Asn
1

<210> 357
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 357

Arg Asn Asn
1

<210> 358
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 358

Tyr Ala Ser
1

<210> 359
<211> 3
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Polypeptide

<400> 359

Asn Thr Asn
1

<210> 360
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 360

Tyr Asp Asp
1

<210> 361
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 361

Glu Asp His
1

<210> 362
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 362

Asp Asn Ser
1

<210> 363
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 363

Arg Asn Asn
1

<210> 364
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 364

Trp Ala Ser
1

<210> 365
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 365

Ser Asn Asn
1

<210> 366
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 366

Ser Asn Asn
1

<210> 367
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 367

Ala Ala Trp Asp Asp Ser Leu Asn Gly Pro Val
1 5 10

<210> 368
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 368

Ala Ala Trp Asp Asp Ser Leu Ser Gly Pro Trp Val
1 5 10

<210> 369
<211> 11

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 369

Ser Ala Trp Asp Ser Ser Leu Ser Asp Trp Val
1 5 10

<210> 370
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 370

Gln Gln Tyr Ser Ser Ser Pro Tyr Thr
1 5

<210> 371
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 371

Gln Leu Trp Asp His Thr Asn Ser His Val Val
1 5 10

<210> 372
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 372

Ser Ala Trp Asp Asn Thr Val Ser Gly Trp Val
1 5 10

<210> 373
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 373

Glu Ala Trp Asp Asp Ser Leu Ser Gly Pro Val
1 5 10

<210> 374
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 374

Ala Ala Trp Asp Asp Arg Leu Asn Gly Phe Val
1 5 10

<210> 375
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 375

Ala Ala Trp Asp Ala Ser Leu Met Ile Tyr Val
1 5 10

<210> 376
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 376

Ala Ala Trp Asp Asp Ser Leu Asn Gly Tyr Val
1 5 10

<210> 377
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 377

Ala Ala Trp Asp Asp Ser Leu Asn Gly Val Val
1 5 10

<210> 378
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 378

Gln Gln Tyr Gly Ser Ser Pro Gln Thr
1 5

<210> 379
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 379

Leu Leu Tyr Tyr Gly Gly Pro Trp Val
1 5

<210> 380
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 380

Ala Ala Trp Asp Asp Gly Leu Ser Gly Trp Val
1 5 10

<210> 381
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 381

Ala Ser Trp Asp Asp Ser Leu Asn Ala Tyr Val
1 5 10

<210> 382
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 382

Asn Ser Arg Gly Ser Gly Gly Asn Pro Tyr Val
1 5 10

<210> 383
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 383

Ala Ala Trp Asp Asp Ser Leu Asn Gly Arg Val
1 5 10

<210> 384
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 384

Ser Ala Trp Asp Asn Ser Leu Ser Ala Trp Val
1 5 10

<210> 385
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 385

Gln Gln Tyr Tyr Gly Lys Pro Phe Thr
1 5

<210> 386
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 386

Val Leu Tyr Met Gly Arg Gly Ile Tyr Val
1 5 10

<210> 387
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 387

Ser Ala Trp Asp Ser Ser Leu Ser Val Trp Val
1 5 10

<210> 388
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 388

His Gln Thr Ser Ser Leu Pro Trp Thr
1 5

<210> 389
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 389

Ala Leu Tyr Val Gly Gly Gly Ile Ser Val
1 5 10

<210> 390
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 390

Ala Ala Trp Asp Asp Ser Leu Ser Gly Pro Val
1 5 10

<210> 391
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 391

Gln Ser Phe Asp Ala Ser Thr Leu Val
1 5

<210> 392
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 392

Gln Ser Tyr Asp Ser Ser Leu Ser Val Val Val
1 5 10

<210> 393
<211> 11
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Polypeptide

<400> 393

Ser Ala Trp Asp Ser Ser Leu Ser Ala Trp Val
1 5 10

<210> 394
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 394

Gln Gln Tyr Phe Ser Ser Pro Pro Ile Phe Thr
1 5 10

<210> 395
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 395

Ala Ala Trp Asp Asp Ser Leu Lys Gly Arg Val
1 5 10

<210> 396
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 396

Gln Ser Tyr Asp Ser Ser Val Val
1 5

<210> 397
<211> 372
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 397
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgg cccattcagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcccaa tgtttggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagaca agagcacctc aaccgcctac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcgacgac 300

ggttacgctc ctagtggtgg tctgcgtgag tttgacgttt ggggccaggg gaccttagtc 360

actgtgtcta gc 372

<210> 398
<211> 340
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 398
gacatccaga tgacccagtc tccagactcc ctggctgtgt ctctgggcga gagggccacc 60

atcaactgca agtccagccg gagtgtttta tacagctcca acaacaagaa ctacttagct 120

tggtaccaac aaaaaccggg acagcctcct aagttgctca tttattgggc ttctacccgg 180

gaatccgggg tccctgaccg attcagtggc agcgggtctg ggacagattt cactctcacc 240

atcagcagcc tgcaggctga agatgtggcg gtttattact gtcagcaata ttatagtggt 300

tcctggacat tcggccaagg gaccaaggtg gaaatcaaac 340

<210> 399
<211> 363
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 399
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagg catctttagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcccta tctttggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagata aaagcacgaa taccgcctac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtcgt 300

ggtgcttaca tgggtcctag tatggatgtg tggggccagg ggaccttagt cactgtgtct 360

agc 363

<210> 400
<211> 325
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 400
cagcctgtgc tgactcagcc accctcggtg tcagtggccc caggacagac ggccaggatt 60

acctgtgggg gaaacaacat tggaagtaaa agtgtgcact ggtaccagca gaagccaggc 120

caggcccctg tgctggtcgt ctatgatgat agcgaccggc cctcagggat ccctgagcga 180

ttctctggct ccaactctgg gaacacggcc accctgacca tcagcagggt cgaggccggg 240

gatgaggccg actactactg tcaggtgtgg gataggagta gtgatcatgt ggtgttcggc 300

ggagggacca agctgaccgt cctag 325

<210> 401
<211> 363
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 401
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagg taccttcagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcagcccaa tctttggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagata aaagcacgtc aactgtgtat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtgct 300

cgttactacg ctggtggtta cttcgatgtg tggggccagg ggaccttagt cactgtgtct 360

agc 363

<210> 402
<211> 325
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 402

Gly Ala Ala Ala Thr Thr Gly Thr Gly Cys Thr Gly Ala Cys Thr Cys
1 5 10 15

Ala Gly Thr Cys Thr Cys Cys Ala Gly Gly Cys Ala Cys Cys Cys Thr
20 25 30

Gly Thr Cys Thr Thr Thr Gly Thr Cys Thr Cys Cys Ala Gly Gly Gly
35 40 45

Gly Ala Ala Ala Gly Ala Gly Cys Cys Ala Cys Cys Cys Thr Cys Thr
50 55 60

Cys Cys Thr Gly Cys Ala Gly Gly Gly Cys Cys Ala Gly Thr Cys Ala
65 70 75 80

Gly Ala Cys Thr Gly Thr Thr Ala Gly Cys Ala Ala Cys Thr Ala Cys
85 90 95

Thr Thr Ala Gly Cys Cys Thr Gly Gly Thr Ala Thr Cys Ala Gly Cys
100 105 110

```
Ala Gly Ala Gly Ala Cys Cys Thr Gly Gly Cys Cys Ala Gly Gly Cys
        115                 120                 125

Thr Cys Cys Cys Ala Gly Gly Cys Thr Cys Cys Thr Cys Ala Thr Cys
    130                 135                 140

Thr Ala Cys Gly Cys Thr Gly Cys Ala Thr Cys Cys Ala Cys Gly Cys
145                 150                 155                 160

Gly Gly Gly Cys Cys Ala Cys Thr Gly Gly Thr Gly Thr Cys Cys Cys
                165                 170                 175

Ala Gly Cys Cys Ala Gly Gly Thr Thr Cys Ala Gly Thr Gly Gly Cys
            180                 185                 190

Ala Gly Cys Gly Gly Gly Thr Cys Thr Gly Gly Gly Ala Cys Ala Gly
        195                 200                 205

Ala Gly Thr Thr Cys Ala Cys Thr Cys Thr Cys Ala Cys Cys Ala Thr
    210                 215                 220

Cys Ala Gly Cys Ala Gly Cys Cys Thr Gly Cys Ala Ala Thr Cys Thr
225                 230                 235                 240

Gly Ala Ala Gly Ala Thr Thr Thr Thr Gly Cys Ala Ala Thr Thr Thr
                245                 250                 255

Ala Thr Thr Ala Cys Thr Gly Thr Cys Ala Ala Cys Ala Gly Thr Ala
            260                 265                 270

Thr Gly Ala Thr Ala Ala Cys Thr Thr Gly Cys Cys Thr Cys Cys Gly
        275                 280                 285

Gly Thr Cys Ala Cys Thr Thr Thr Cys Gly Gly Cys Cys Cys Thr Gly
    290                 295                 300

Gly Gly Ala Cys Cys Ala Cys Ala Gly Thr Gly Gly Ala Thr Ala Thr
305                 310                 315                 320

Cys Ala Ala Ala Cys
                325
```

<210> 403
<211> 375
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 403
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgt tacctttagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcagcccaa tcttcggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatc agagtaccaa cactgtctac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcgacagt 300

ggtaattacg acggttacgg tcctggtagt cgtttcgacg tgtggggcca ggggacctta 360

gtcactgtgt ctagc 375

<210> 404
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 404
cagcctgggc tgactcagcc accctcagcg tctgggaccc ccgggcagag ggtcaccatc 60

tcttgttctg gaagcagctc caacatcgga agtaatactg taaactggta ccagcagctc 120

ccaggaacgg cccccaaact cctcatctat agtaataatc agcggccctc aggggtccct 180

gaccgattct ctggctccaa gtctggcacc tcagcctccc tggccatcag tgggctccag 240

tctgaggatg aggctgatta tttctgttca gcttgggatg acagcctggg tggcgaggtc 300

ttcggaactg ggaccaaggt caacgtccta g 331

<210> 405
<211> 363
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 405
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagt gacctttagt tcttacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attatgccta tgttcggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagata agagtacgag cactgcctat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcgagcgt 300

ggtagttgga gtttcggtta ctttgatgtg tggggccagg ggaccttagt cactgtgtct 360

agc 363

<210> 406
<211> 325
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 406
ctgcctgtgc tgactcagcc accctcgatg tcagcggccc caggacagac ggccaggatt 60

acctgtgggg gagaccacat tggaagtaaa agtgtgcact ggtaccagcg gaagccgggc 120

caggcccctg tgctggtcat ctattctgac accgaccggc cctcagggat ccctgagcgg 180

ttctctggct ccaactctgg gaacacggcc accctgacca tcagcagggt cgaagccggg 240

gatgaggccg actatttctg tcaggtgtgg gatagtagta atgatcatcc ggtgttcggc 300

ggaggcacca agctgaccgt cctag 325

<210> 407
<211> 363
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 407
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagt gacctttagc tcttacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcagccctc tgtttggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagaca aaagtacgag caccgtgtat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcagtcgt 300

acatacgctg acggtcgtac attcgacgtg tggggccagg ggaccttagt cactgtgtct 360

agc 363

<210> 408
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 408
cagtctgtgc tgactcagcc accctccgcg tccgggtctc ctggacagtc ggtcaccatc 60

tcctgcactg gaaccagtag tgacgttggt ggttataacc atgtctcctg gtaccaacag 120

cacccaggca aagcccccaa agtcctgatt tatgacgtca gtaagcggcc ctcaggggtc 180

ccagatcgct tctctggctc caagtctggc aacacggcct ccctgaccgt ctctgggctc 240

caggctgagg atgaggctga ttattactgc acctcatatg caggcagcaa cagtttggtc 300

ttcggaactg ggaccgaggt caccgtccta g 331

<210> 409
<211> 372
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 409

```
Cys Ala Gly Gly Thr Thr Cys Ala Ala Thr Thr Ala Gly Thr Gly Cys
1               5                   10                  15

Ala Gly Thr Cys Thr Gly Gly Thr Gly Cys Thr Gly Ala Ala Gly Thr
            20                  25                  30

Gly Ala Ala Ala Ala Ala Gly Cys Cys Cys Gly Gly Cys Thr Cys Ala
        35                  40                  45

Ala Gly Thr Gly Thr Thr Ala Ala Ala Gly Thr Ala Ala Gly Cys Thr
    50                  55                  60

Gly Thr Ala Ala Gly Gly Cys Gly Ala Gly Cys Gly Gly Thr Gly Gly
65                  70                  75                  80

Cys Ala Cys Thr Thr Thr Cys Ala Gly Thr Thr Cys Ala Thr Ala Cys
                85                  90                  95

Gly Cys Cys Ala Thr Thr Ala Gly Cys Thr Gly Gly Gly Thr Gly Cys
            100                 105                 110

Gly Ala Cys Ala Gly Gly Cys Thr Cys Cys Thr Gly Gly Thr Cys Ala
        115                 120                 125

Gly Gly Gly Cys Cys Thr Cys Gly Ala Ala Thr Gly Gly Ala Thr Gly
    130                 135                 140

Gly Gly Cys Gly Gly Cys Ala Thr Cys Ala Gly Cys Cys Cys Ala Ala
145                 150                 155                 160

Thr Cys Thr Thr Thr Gly Gly Thr Ala Cys Thr Gly Cys Ala Ala Ala
                165                 170                 175

Thr Thr Ala Thr Gly Cys Cys Cys Ala Gly Ala Ala Ala Thr Thr Thr
            180                 185                 190

Cys Ala Gly Gly Gly Thr Ala Gly Ala Gly Thr Cys Ala Cys Ala Ala
        195                 200                 205

Thr Thr Ala Cys Cys Gly Cys Ala Gly Ala Cys Ala Ala Gly Ala Gly
    210                 215                 220

Cys Ala Cys Gly Ala Gly Cys Ala Cys Thr Gly Cys Cys Thr Ala Cys
225                 230                 235                 240

Ala Thr Gly Gly Ala Ala Cys Thr Gly Ala Gly Thr Ala Gly Cys Cys
                245                 250                 255

Thr Gly Cys Gly Thr Thr Cys Cys Gly Ala Ala Gly Ala Thr Ala Cys
            260                 265                 270
```

Ala Gly Cys Thr Gly Thr Gly Thr Ala Thr Thr Ala Cys Thr Gly Thr
275 280 285

Gly Cys Gly Cys Gly Cys Gly Ala Gly Cys Thr Gly Gly Gly Thr Thr
290 295 300

Ala Cys Cys Thr Gly Gly Cys Thr Gly Gly Thr Ala Gly Thr Cys Cys
305 310 315 320

Thr Ala Gly Thr Cys Cys Thr Gly Gly Thr Thr Thr Cys Gly Ala Thr
325 330 335

Thr Ala Cys Thr Gly Gly Gly Gly Cys Cys Ala Gly Gly Gly Gly Ala
340 345 350

Cys Cys Thr Thr Ala Gly Thr Cys Ala Cys Thr Gly Thr Gly Thr Cys
355 360 365

Thr Ala Gly Cys
370

<210> 410
<211> 328
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 410
cagtctgtgc tgactcagcc accctccgcg tccgggtctc ctggacagtc agtcaccatc 60

tcctgcactg gaaccagcag tgacgttggt ggttataact atgtctcctg gtaccaacag 120

cacccaggca aagcccccaa actcatcatt tatgaggtca ctaagcggcc ctcaggggtc 180

cctgatcgct tctctggctc caagtctggc aacacggcct ccctgaccgt cgctgggctc 240

caggctgagg atgaggctga ttattactgc agctcgtatg caggcggcaa gtgggtcttc 300

ggaactggga ccaaggtcac cgtcctag 328

<210> 411
<211> 363
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 411

Cys Ala Gly Gly Thr Thr Cys Ala Ala Thr Thr Ala Gly Thr Gly Cys
1 5 10 15

Ala Gly Thr Cys Thr Gly Gly Thr Gly Cys Thr Gly Ala Ala Gly Thr
20 25 30

```
Gly Ala Ala Ala Ala Ala Gly Cys Cys Cys Gly Gly Cys Thr Cys Ala
        35                  40                  45

Ala Gly Thr Gly Thr Thr Ala Ala Ala Gly Thr Ala Ala Gly Cys Thr
    50                  55                  60

Gly Thr Ala Ala Gly Gly Cys Gly Ala Gly Cys Gly Gly Ala Gly Gly
65                  70                  75                  80

Cys Ala Cys Thr Thr Thr Thr Ala Gly Cys Thr Cys Thr Thr Ala Cys
                85                  90                  95

Gly Cys Cys Ala Thr Thr Ala Gly Cys Thr Gly Gly Gly Thr Gly Cys
            100                 105                 110

Gly Ala Cys Ala Gly Gly Cys Thr Cys Cys Thr Gly Gly Thr Cys Ala
        115                 120                 125

Gly Gly Gly Cys Cys Thr Cys Gly Ala Ala Thr Gly Gly Ala Thr Gly
    130                 135                 140

Gly Gly Cys Gly Gly Cys Ala Thr Thr Ala Gly Cys Cys Cys Ala Ala
145                 150                 155                 160

Thr Cys Thr Thr Cys Gly Gly Cys Ala Cys Thr Gly Cys Ala Ala Ala
                165                 170                 175

Thr Thr Ala Thr Gly Cys Cys Cys Ala Gly Ala Ala Ala Thr Thr Thr
            180                 185                 190

Cys Ala Gly Gly Gly Thr Ala Gly Ala Gly Thr Cys Ala Cys Ala Ala
        195                 200                 205

Thr Thr Ala Cys Cys Gly Cys Ala Gly Ala Cys Ala Cys Cys Ala Gly
    210                 215                 220

Cys Ala Cys Cys Thr Cys Ala Ala Cys Cys Gly Cys Cys Thr Ala Cys
225                 230                 235                 240

Ala Thr Gly Gly Ala Ala Cys Thr Gly Ala Gly Thr Ala Gly Cys Cys
                245                 250                 255

Thr Gly Cys Gly Thr Thr Cys Cys Gly Ala Ala Gly Ala Thr Ala Cys
            260                 265                 270

Ala Gly Cys Thr Gly Thr Gly Thr Ala Thr Thr Ala Cys Thr Gly Thr
        275                 280                 285

Gly Cys Gly Cys Gly Cys Ala Gly Thr Cys Gly Thr Cys Gly Thr Thr
    290                 295                 300
```

Ala Cys Thr Gly Gly Gly Cys Thr Gly Ala Cys Gly Gly Thr Gly Gly
305 310 315 320

Thr Thr Thr Cys Gly Ala Thr Thr Ala Thr Thr Gly Gly Gly Gly Cys
325 330 335

Cys Ala Gly Gly Gly Gly Ala Cys Cys Thr Thr Ala Gly Thr Cys Ala
340 345 350

Cys Thr Gly Thr Gly Thr Cys Thr Ala Gly Cys
355 360

<210> 412
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 412
ctgcctgtgc tgactcagcc accctcagcg tctgggaccc ccgggcagag ggtcaccatc 60

tcttgttctg gaagcagctc caacatggga agaaataccg tcaactggta ccggcacctc 120

ccagggacgg cccccgaact cctcatctat gataatgatg agcgtccctc aggggtccct 180

gaccgattct ctggctccaa gtctggcacc tcagcctccc tggccatcag tgggctccag 240

tctgaagatg agggtcatta ttactgtgct gcgtgggatg acagcctgaa tggtccggtg 300

ttcggcggag ggaccaagct gaccgtcctg g 331

<210> 413
<211> 366
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 413

Cys Ala Gly Gly Thr Thr Cys Ala Ala Thr Thr Ala Gly Thr Gly Cys
1 5 10 15

Ala Gly Thr Cys Thr Gly Gly Thr Gly Cys Thr Gly Ala Ala Gly Thr
20 25 30

Gly Ala Ala Ala Ala Ala Gly Cys Cys Cys Gly Gly Cys Thr Cys Ala
35 40 45

Ala Gly Thr Gly Thr Thr Ala Ala Ala Gly Thr Ala Ala Gly Cys Thr
50 55 60

Gly Thr Ala Ala Gly Gly Cys Gly Ala Gly Cys Gly Gly Ala Gly Gly
65 70 75 80

```
Thr Ala Cys Thr Thr Thr Thr Ala Gly Thr Thr Cys Thr Thr Ala Cys
                85                  90                  95

Gly Cys Cys Ala Thr Thr Ala Gly Cys Thr Gly Gly Gly Thr Gly Cys
            100                 105                 110

Gly Ala Cys Ala Gly Gly Cys Thr Cys Cys Thr Gly Gly Thr Cys Ala
        115                 120                 125

Gly Gly Gly Cys Cys Thr Cys Gly Ala Ala Thr Gly Gly Ala Thr Gly
    130                 135                 140

Gly Gly Cys Gly Gly Cys Ala Thr Thr Ala Gly Cys Cys Cys Thr Ala
145                 150                 155                 160

Thr Gly Thr Thr Cys Gly Gly Thr Ala Cys Thr Gly Cys Ala Ala Ala
                165                 170                 175

Thr Thr Ala Thr Gly Cys Cys Cys Ala Gly Ala Ala Ala Thr Thr Thr
            180                 185                 190

Cys Ala Gly Gly Gly Thr Ala Gly Ala Gly Thr Cys Ala Cys Ala Ala
        195                 200                 205

Thr Thr Ala Cys Cys Gly Cys Ala Gly Ala Cys Ala Ala Ala Ala Gly
    210                 215                 220

Thr Ala Cys Cys Ala Gly Cys Ala Cys Thr Gly Cys Cys Thr Ala Cys
225                 230                 235                 240

Ala Thr Gly Gly Ala Ala Cys Thr Gly Ala Gly Thr Ala Gly Cys Cys
                245                 250                 255

Thr Gly Cys Gly Thr Thr Cys Cys Gly Ala Ala Gly Ala Thr Ala Cys
            260                 265                 270

Ala Gly Cys Thr Gly Thr Gly Thr Ala Thr Thr Ala Cys Thr Gly Thr
        275                 280                 285

Gly Cys Gly Cys Gly Cys Gly Ala Gly Gly Gly Thr Gly Gly Thr Thr
    290                 295                 300

Ala Cys Ala Gly Thr Cys Cys Thr Gly Gly Thr Gly Gly Thr Gly Thr
305                 310                 315                 320

Thr Gly Ala Cys Thr Thr Cys Gly Ala Cys Thr Ala Cys Thr Gly Gly
                325                 330                 335

Gly Gly Cys Cys Ala Gly Gly Gly Gly Ala Cys Cys Thr Thr Ala Gly
            340                 345                 350
```

Thr Cys Ala Cys Thr Gly Thr Gly Thr Cys Thr Ala Gly Cys
355 360 365

<210> 414
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 414
aattttatgc tgactcagcc ccactctgtg tcggagtctc cggggaagac ggtaaccatc 60

tcctgcaccc gcagcagtgg cagcattgcc agcacctatg tgcagtggta ccggcagcgc 120

ccgggcagtg cccccaccac tgtgatctat gaggatcatc agagaccctc tggggtccct 180

gatcggttct ccggctccct cgacagctcc tccaactctg cctccctcac catctctgga 240

ctgaggactg aggacgcggc aacctactac tgtcagtctt ttgatgccag cactctggtg 300

ttcggcggcg ggaccaagct gaccgtcctc g 331

<210> 415
<211> 363
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 415

Cys Ala Gly Gly Thr Thr Cys Ala Ala Thr Thr Ala Gly Thr Gly Cys
1 5 10 15

Ala Gly Thr Cys Thr Gly Gly Thr Gly Cys Thr Gly Ala Ala Gly Thr
20 25 30

Gly Ala Ala Ala Ala Ala Gly Cys Cys Cys Gly Gly Cys Thr Cys Ala
35 40 45

Ala Gly Thr Gly Thr Thr Ala Ala Ala Gly Thr Ala Ala Gly Cys Thr
50 55 60

Gly Thr Ala Ala Gly Gly Cys Gly Ala Gly Cys Gly Gly Thr Gly Thr
65 70 75 80

Thr Ala Cys Thr Thr Thr Thr Ala Gly Thr Thr Cys Thr Thr Ala Cys
85 90 95

Gly Cys Cys Ala Thr Thr Ala Gly Cys Thr Gly Gly Gly Thr Gly Cys
100 105 110

Gly Ala Cys Ala Gly Gly Cys Thr Cys Cys Thr Gly Gly Thr Cys Ala
115 120 125

```
Gly Gly Gly Cys Cys Thr Cys Gly Ala Ala Thr Gly Gly Ala Thr Gly
    130                 135                 140

Gly Gly Cys Gly Gly Cys Ala Thr Cys Ala Gly Cys Cys Cys Ala Ala
145                 150                 155                 160

Thr Cys Thr Thr Thr Gly Gly Thr Ala Cys Thr Gly Cys Ala Ala Ala
                165                 170                 175

Thr Thr Ala Thr Gly Cys Cys Cys Ala Gly Ala Ala Ala Thr Thr Thr
            180                 185                 190

Cys Ala Gly Gly Gly Thr Ala Gly Ala Gly Thr Cys Ala Cys Ala Ala
        195                 200                 205

Thr Thr Ala Cys Cys Gly Cys Ala Gly Ala Cys Gly Ala Ala Ala Gly
    210                 215                 220

Thr Ala Cys Gly Ala Ala Thr Ala Cys Thr Gly Thr Gly Thr Ala Thr
225                 230                 235                 240

Ala Thr Gly Gly Ala Ala Cys Thr Gly Ala Gly Thr Ala Gly Cys Cys
                245                 250                 255

Thr Gly Cys Gly Thr Thr Cys Cys Gly Ala Ala Gly Ala Thr Ala Cys
            260                 265                 270

Ala Gly Cys Thr Gly Thr Gly Thr Ala Thr Thr Ala Cys Thr Gly Thr
        275                 280                 285

Gly Cys Gly Cys Gly Cys Gly Gly Thr Ala Cys Ala Ala Cys Ala Thr
    290                 295                 300

Ala Cys Ala Gly Thr Ala Cys Ala Gly Cys Thr Cys Gly Thr Thr Ala
305                 310                 315                 320

Cys Thr Thr Cys Gly Ala Cys Gly Thr Thr Thr Gly Gly Gly Gly Cys
                325                 330                 335

Cys Ala Gly Gly Gly Gly Ala Cys Cys Thr Thr Ala Gly Thr Cys Ala
            340                 345                 350

Cys Thr Gly Thr Gly Thr Cys Thr Ala Gly Cys
        355                 360
```

<210> 416
<211> 337
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 416
aattttatgc tgactcagcc ccactctgtg tcggagtctc cggggaagac ggtaaccatc 60

tcctgcaccc gcagaagtgg cagcattgcc agcaactatg tgcagtggta ccagcagcgc 120

ccgggcagtg cccccaccac tgtgatctat gaggataacc aaagaccctc tggggtccct 180

gatcgcttct ctggctccat cgacaggtcc tccaactctg cctccctcac catctctgga 240

ctgaagactg aggacgaggc tgactactac tgtcagtctt atgacagcga caatcatgaa 300

gtgatattcg gcggagggac caagctgacc gtcctag 337

<210> 417
<211> 363
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 417
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagt gacttttcgt tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcagcggta tctttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg agagcacgtc aaccgcatat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcagtcct 300

gcttactact tcggtcctaa tatggacgtg tggggccagg ggaccttagt cactgtgtct 360

agc 363

<210> 418
<211> 334
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 418
cagtctgtgc tgactcagcc accctcagtg tctggggccc agggcagag ggtcaccatc 60

tcctgcactg ggagcagctc caacatcggg gcaggttatg atgtacactg gtaccagcaa 120

cttccaggaa cagtccccaa actcatcatc tatgataata gcaatcggcc ctcaggggtc 180

cctgcccgat tctctggctc caagtctggc acctcagcct ccctggccat cagtgggctc 240

cagtctgagg atgaggccgc atattattgc cagtcgtatg acagcagcct gagtgttgtg 300

gtattcggcg gtgggaccaa gctgtccgtc ctag 334

<210> 419
<211> 369
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 419
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagg cacttttagt tcttacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcagcccta tgtttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagaca aaagtacgag cactgcctac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcagtagt 300

cgttacgctc ctagtgacag tacaaatttt gatcaatggg gccaggggac cttagtcact 360

gtgtctagc 369

<210> 420
<211> 334
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 420
aattttatgc tgactcagcc ccactctgtg tcggagtctc cggggaagac ggtaaccatc 60

tcctgcaccg gcagcagtgg cagcattgcc agcaactatg tgcagtggta ccagcagcgc 120

ccgggcagtg cccccaccac tgtgatctat gaggataacc aaagaccctc tggggtccct 180

gatcggttct ctggctccat cgacagctcc tccaactctg cctccctcac catctctgga 240

ctgaagactg aggacgaggc tgactactac tgtcagtctt atgataccag caatcggaag 300

gttttcggcg gagggaccaa gctgaccgtc ctag 334

<210> 421
<211> 363
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 421
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgg cccatttagt tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcggta tctttggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg agagcacgtc aaccgcatat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtgac 300

cgtttctacg ttggtgagcg tttcgatgtg tggggccagg ggaccttagt cactgtgtct 360

agc 363

<210> 422
<211> 328
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic Polynucleotide

<400> 422
cagtctgtgc tgactcagcc accctcggtg tcagtggccc caggacagac ggccagaatt 60

acctgtgggg gaaatgacat tggaagtaaa agtgtccact ggtaccagca gaagccaggc 120

caggcccctg tgctggtcgt ctatgatgat atcgaccggc cctcagggat ccctgagcga 180

ttctctggct ccaactatgg ggacacggcc accctgacca tcagctgggt cgaggccggg 240

gatgaggccg actattactg tcaggtgtgg gatactaata gtgatcccgt ctttgtcttc 300

ggaagtggga ccaaggtcac cgtccttg 328

<210> 423
<211> 375
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 423

Cys Ala Gly Gly Thr Thr Cys Ala Ala Thr Thr Ala Gly Thr Gly Cys
1 5 10 15

Ala Gly Thr Cys Thr Gly Gly Thr Gly Cys Thr Gly Ala Ala Gly Thr
20 25 30

Gly Ala Ala Ala Ala Ala Gly Cys Cys Cys Gly Gly Cys Thr Cys Ala
35 40 45

Ala Gly Thr Gly Thr Thr Ala Ala Ala Gly Thr Ala Ala Gly Cys Thr
50 55 60

Gly Thr Ala Ala Gly Gly Cys Gly Ala Gly Cys Gly Gly Thr Gly Gly
65 70 75 80

Cys Ala Cys Cys Thr Thr Cys Ala Gly Cys Thr Cys Thr Thr Ala Cys
85 90 95

Gly Cys Cys Ala Thr Thr Ala Gly Cys Thr Gly Gly Gly Thr Gly Cys
100 105 110

Gly Ala Cys Ala Gly Gly Cys Thr Cys Cys Thr Gly Gly Thr Cys Ala
115 120 125

Gly Gly Gly Cys Cys Thr Cys Gly Ala Ala Thr Gly Gly Ala Thr Gly
130 135 140

Gly Gly Cys Gly Gly Cys Ala Thr Thr Ala Gly Cys Cys Cys Ala Ala
145 150 155 160

Thr Cys Thr Thr Cys Gly Gly Thr Ala Cys Thr Gly Cys Ala Ala Ala
165 170 175

```
Thr Thr Ala Thr Gly Cys Cys Cys Ala Gly Ala Ala Ala Thr Thr Thr
            180                 185                 190

Cys Ala Gly Gly Gly Thr Ala Gly Ala Gly Thr Cys Ala Cys Ala Ala
        195                 200                 205

Thr Thr Ala Cys Cys Gly Cys Ala Gly Ala Cys Cys Ala Gly Ala Gly
    210                 215                 220

Cys Ala Cys Gly Ala Gly Cys Ala Cys Thr Gly Cys Cys Thr Ala Cys
225                 230                 235                 240

Ala Thr Gly Gly Ala Ala Cys Thr Gly Ala Gly Thr Ala Gly Cys Cys
                245                 250                 255

Thr Gly Cys Gly Thr Thr Cys Cys Gly Ala Ala Gly Ala Thr Ala Cys
            260                 265                 270

Ala Gly Cys Thr Gly Thr Gly Thr Ala Thr Thr Ala Cys Thr Gly Thr
        275                 280                 285

Gly Cys Gly Cys Gly Cys Gly Gly Thr Gly Gly Thr Gly Gly Thr Gly
    290                 295                 300

Thr Thr Gly Gly Thr Cys Gly Thr Ala Thr Cys Thr Gly Gly Ala Thr
305                 310                 315                 320

Cys Gly Cys Thr Gly Gly Thr Thr Ala Cys Gly Gly Thr Thr Thr Cys
                325                 330                 335

Gly Ala Thr Cys Ala Gly Thr Gly Gly Gly Gly Cys Cys Ala Gly Gly
            340                 345                 350

Gly Gly Ala Cys Cys Thr Thr Ala Gly Thr Cys Ala Cys Thr Gly Thr
        355                 360                 365

Gly Thr Cys Thr Ala Gly Cys
    370                 375


<210>  424
<211>  331
<212>  DNA
<213>  Artificial Sequence

<220>
<223>  Synthetic Polynucleotide

<400>  424
cagactgtgg tgactcagga gccatcgttc tcagtgtccc ctggagggac agttaccctc       60

acttgtggct tgagctctgg ctcagtctcc actagtaact accccagctg gtaccagcag      120

accccaggcc agcctccacg cacgctcatc tacagcacaa acactcgctc ttctggggtc      180
```

cctgatcgct tctctggctc catccttggg aacaaagctg ccctcaccat cacgggggcc 240

caggcagatg atgaatctga ttattactgt gtcctatata tgggtagtgg catttcgatg 300

ttcggcggag ggaccaagtt gaccgtccta g 331

<210> 425
<211> 375
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 425
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgg tacttttagt tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcccaa tctttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagacg aaagcaccag cactgtgtac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtcct 300

ggttaccacc ctgctggtgc tagtggtcaa ttctttgatc tttggggcca ggggacctta 360

gtcactgtgt ctagc 375

<210> 426
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 426
tcctatgagc tgactcagcc accctcggtg tccaaggact tgagacagac cgccacactc 60

acctgcactg ggaacagcaa caatgttggc aaccaaggag cagcttggct gcagcagcac 120

cagggccacc ctcccaaact cctatcctac aggaataacc accggccctc agggatctca 180

gacagatcat ctgcatccag gtcaggagac acagcctccc tgaccattac tggactccag 240

cctgaggacg aggctgacta ttactgctca gcatgggaca gcagcctcag tgcttgggtg 300

ttcggcggag ggaccaagct gaccgtccta g 331

<210> 427
<211> 369
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 427
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgt gaccttcagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcccta tgtttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg aaagcaccaa caccgcctat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtcgt 300

ggttacgctc ctgacgctct gacaaatttt gacgtttggg gccaggggac cttagtcact 360

gtgtctagc 369

<210> 428
<211> 346
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 428
gaaattgtgc tgactcagtc tccagactcc ctggctatgt ctctgggcga gagggccacc 60

gtcaactgca agtccagccg gagtcttttc gacagctccg acaataagaa ctacttagct 120

tggtaccaga agaaaccagg acagcctcct caattgctca tttactgggc atctacccga 180

caatccgggg tccctgaccg attcagtggc agcgggtctg ggacagattt cactctcacc 240

atcagcagcc tgcaggctga agatgtggca gtttattact gtcagcaata ttttagtagt 300

cctcccatat tcaccttcgg ccctgggacc aaagtggaga tcaaac 346

<210> 429
<211> 366
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 429
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagt gacttttagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attacccta tgtttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagata aaagtacgag caccgtctat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtcgt 300

ggttacatcg ctgttgctgg tgacatggac gtgtggggcc aggggacctt agtcactgtg 360

tctagc 366

<210> 430
<211> 340
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 430
gacatccaga tgacccagtc tccagactcc ctggctgtgt ctctgggcga gagggccacc 60

atcaactgca agtccagtcg gagtgtttta tacagctcca acaataagaa ctacttagct 120

tggtaccagc agaaagcagg acagcctcct aagctgctca tttactgggc atctacccgg 180

gaatccgggg tccctgaccg attcagtggc agcgggtctg ggacagattt cactctcacc 240

atcagcagcc tgcaggctga agatgtggca gtttattact gtcagcaata ttatagtact 300

cctccgacgt tcggccaagg gaccaaggtg gaaatcaaac 340

<210> 431
<211> 372
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 431
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgt taccttcagt tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcccac tgttcggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagata agagcacgag cactgcctac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtgac 300

gcttactacg ttggtggtgg tgctcgtcct tttgacctct ggggccaggg gaccttagtc 360

actgtgtcta gc 372

<210> 432
<211> 334
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 432
tcctatgagc tgactcagcc accctcagtg tctgagaccc ccgggcagaa cgtcattatc 60

tcttgttctg gaggcagctc caacatcgga gttaattatg tatactggta tcaggtggtc 120

ccaggagcgg cccccaaact cctcatctat aggaataatc agcggccctc aggggtccct 180

gaccgattct ctggctccaa gtctggcacc tcagcctccc tggccatcag tggactccag 240

tctgaggatg aggctgacta ttactgtgga gtatgggatg acagcctgaa tggtcattgg 300

gtgttcggcg gagggaccga cctgaccgtc ctgg 334

<210> 433
<211> 375
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 433
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgg tccatttagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcccta tgtttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg aaagcacgtc aaccgtgtac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggttac 300

agttactacc ctggtggtgg tggtggtcgt aatttcgact actggggcca ggggacctta 360

gtcactgtgt ctagc 375

<210> 434
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 434
ctgcctgtgc tgactcagcc accctcagcg tctgggaccc ccgggcagag ggtcaccatc 60

tcttgttctg gaagcagctc caacatcgga agtaatactg taaactggta ccagcagctc 120

ccaggaacgg cccccaaact cctcatctat agtaataatc agcggccctc aggggtccct 180

gaccgattct ctggctccaa gtctggcacc tcagcctccc tggccatcag tgggctccag 240

tctgagggtg aggctgatta ttactgtgca gcatgggatg acagcctgaa aggtcgggtg 300

ttcggcggag ggaccaaggt gaccgtccta g 331

<210> 435
<211> 372
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 435
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagg tccattcagt tcttacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcagccctc tgtttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg aaagcacgtc aaccgcctac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcgctcct 300

acatactacg ctagtcgtga cagttacaat ttcgattatt ggggccaggg gaccttagtc 360

actgtgtcta gc 372

<210> 436
<211> 325
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 436
gaaacgacac tcacgcagtc tccagccacc ctgtctgtgt ctccagggga aagagccacc 60

ctctcctgca gggccagtca gagtgttgac agaggctact tagcctggta tcagcagaag 120

cctggccagg ctcccaggct cctcatctat ggtgcatccc acagggccgc tggcatccca 180

gacaggttca gtggcagtgg gtctgggaca gacttcactc tcaccatcag cagactggag 240

cctgaggatt ttgcagtata tttctgtcag cagtatggta gttcacgcct ctctttcggc 300

ggagggacca aggtggagat ccaac 325

<210> 437
<211> 363
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 437
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgt gactttcagt tcttacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcccta tgttcggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagaca agagcacgaa tactgcatat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcgacaca 300

acatacatcg ctggtggtca cttcgacgtt tggggccagg ggaccttagt cactgtgtct 360

agc 363

<210> 438
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 438
cagtctgtgc tgactcagcc accctccgcg tccgggtctc ctggacagtc agtcaccatc 60

tcctgcactg gaaccagcag tgacattggt gcttataact atgtctcctg gtaccaacaa 120

cacccagaca aagcccccaa gctcatcatt tatgaggtca gtaagcggcc ctcaggggtc 180

cctgatcgct tctctggctc caagtctggc aacacggcct ccctgaccgt ctctgggctc 240

caggctgagg atgaggctga ttattactgc agctcctatg caggcagcaa caatgtggta 300

ttcggcggag ggaccaagct gaccgtccta g 331

<210> 439
<211> 366
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 439
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgg taccttcagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcagccctc tgtttggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg agagtaccaa tactgcctat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcgctagt 300

ggttacttca caggttgggg tacattcgac tactggggcc aggggacctt agtcactgtg 360

tctagc 366

<210> 440
<211> 319
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 440
tcctatgagc tgactcagcc accctcggtg tcagtgtccc caggacagac ggccaggatc 60

acctgctctg gagatgcatt gccaaagcaa tatgcttatt ggtaccagca gaagccaggc 120

caggcccctg tgctggtgat atataaagac agtgagaggc cctcagggat ccctgagcga 180

ttctctggct ccaactctgg gaacacagcc actctgacca tcagcgggac ccaggctttg 240

gatgaggctg actattactg tcaggcgtgg gacagcagca ctgctgtctt cggaactggg 300

accaaggtca ccgtcctag 319

<210> 441
<211> 363
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 441
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagg tacttttagt tcttacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcagcccta tctttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagaca agagcacgag caccgcctac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtcgt 300

tactactaca cagttggtgt ttatgacgtt tggggccagg ggaccttagt cactgtgtct 360

agc 363

<210> 442
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 442
tcctatgagc tgactcagcc accctcggtg tccaagggct tgagacagac cgccaccctc 60

acctgcattg gggacagcga caatgttggc aaccaaggag taggttggct gcagcagcac 120

cagggccacc ctcccaaact cctgtcctac agggataaca cccggccctc aggcatctca 180

gagagattct ctgcatccag gtcaggaaac acagcctccc tgaccattac tggactccag 240

cctgaggacg aggctgacta ttactgctca gcatgggaca gcagcctcac tgccgtggtg 300

ttcggcggag ggaccaagct ggccgtccta g 331

<210> 443
<211> 381
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 443
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgt taccttcagt tcttacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcccta tctttggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagata aaagtacctc aaccgtctac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtggt 300

ggttacagtg ctgacggtgg tgctggtaat aatacaatct tcgacgtttg gggccagggg 360

accttagtca ctgtgtctag c 381

<210> 444
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 444
cagcctgtgc tgactcagcc accctcggtg tccaagggct tgagacagac cgccacactc 60

acctgtactg ggaacaacaa caatgttggc aaccaaggag cagcctggct gcagcagcac 120

cagggccacc ctcccaaact cctatccgac aggaataaca accggccctc agggatctca 180

gagagattat ctgcatccag gtcaggaaat acagcctccc tgaccattac tggactccag 240

gctgaggacg aggctgacta ttactgctca gcatgggaca gcagcctcag tgcttgggtg 300

ttcggcggag ggaccaagct gaccgtccta a 331

<210> 445
<211> 366
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 445
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagt tacttttagc tcttacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagccctc tgtttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg agagtacctc aactgcatat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcgagcgt 300

ggttacacag ttggtggtgg tggtatggac gtgtggggcc aggggacctt agtcactgtg 360

tctagc 366

<210> 446
<211> 334
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 446
cagtctgccc tgactcagcc tccctccgcg tccgggtctc ctggacagtc agtcaccatc 60

tcctgcactg gaaccagcag tgacgttggt gctcacaact ttgtctcctg gtaccaacaa 120

cacccagaca aagcccccaa actcatcatt tatgaggtca ataggcggcc ctcaggggtc 180

cctgatcgct tctctggctc caagtctggc acctcagcct ccctggccat cagtggtctc 240

cagtctgacg atgaggctga ctattactgt gcagcatggg acgacagtct cgatggtccg 300

gtgttcggcg gagggaccaa gctgaccgtc ctag 334

<210> 447
<211> 372
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 447
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagt tacttttagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcagcccaa tctttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagaca agagcacgaa cactgtgtac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcgagtac 300

ctgggtgacg actacagtag tggtagttac ttcgatgtgt ggggccaggg gaccttagtc 360

actgtgtcta gc 372

<210> 448
<211> 322
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic Polynucleotide

<400> 448
gaaacgacac tcacgcagtc tccaggcaca ctgtctttgt ctccagggga aacagccatc 60

ctctcctgta gggccagtca gagtgttgat agtcacttag cctggtacca acaaaaaggt 120

ggccaggctc ccaggctcct catctatggt gcatccacca gggccactgg tatcccagcc 180

aggttcagtg gcagtgggtc tgggacagac ttcactctca ccatcaatgg cctagagcct 240

gaggattttg caatttattt ctgtcagcag cgcagcatgt ggcccctcac tttcggcgga 300

gggaccaagg tggagatcaa ac 322

<210> 449
<211> 363
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 449
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagg tactttcagt tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcccta tgtttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagaca aaagtacctc aactgcatat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcgagagt 300

ggttacagtg gtacaggtca atttgacgtg tggggccagg ggaccttagt cactgtgtct 360

agc 363

<210> 450
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 450
cagtctgtgc tgactcagcc accctcagcg tctgggaccg ccgggcagag ggtcacaatc 60

tcctgttttg ggagaacctc caacgtcgga cgaaacactg ttaactggta ccaacaattg 120

cccggagcgg cccccaagat cctcatttttt aacgataatc aacggccctc gggggtccct 180

gaccgcttct ctggctccaa gtctggcacc gccgcctccc tgaccataag taggctccag 240

tccgcggatg aggctgatta ctattgttca tcatgggatg acgacctgaa cggtccggtc 300

ttcggcggag ggaccaagct gagcgtcgta g 331

<210> 451
<211> 366
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic Polynucleotide

<400> 451
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagg tatctttagt tcttacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcccaa tcttcggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg agagcacgaa caccgcctat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcagtggt 300

ggttactacg actacggtgt tggttacgac caatggggcc aggggacctt agtcactgtg 360

tctagc 366

<210> 452
<211> 322
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 452
cagcctgtgc tgactcagcc accctcagcg tctgggaccc ccgggcagag ggtcaccatc 60

tcttgttctg gaggcaggtc caacatcgga agtaatactg ttaactggta ccagcagctc 120

ccaggaacgg cccccaaact cctcatctat agtaataatc accggccctc aggggtccct 180

gatcgcttct ctggctccaa gtctggcaac acggcctccc tgaccatctc tgggctccag 240

gcggaggatg aggctgatta ttactgccag tcctatgaca gcagcgttgt attcggcgga 300

gggaccaagc tgaccgtcct ag 322

<210> 453
<211> 366
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 453
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgg taccttcagc tcttacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attacccctа tctttggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagacg agagtaccag cactgcctac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcagtggt 300

ggttacagtc ctagtatcgg tggtttcgac gtttggggcc aggggacctt agtcactgtg 360

tctagc 366

<210> 454
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 454
cagcctgggc tgactcagcc accctcagcg tctgggaccc ccgggcagag ggtcaccatc 60

tcttgttctg gaagcaggtc caatatcgga agaaatactg taaactggta ccagcaactc 120

ccaggaacgg cccccaaact cctcatctat agtaacaatc agcggccctc aggggtccct 180

gaccgagtct ctggctccaa gtctggcacc tcagcctccc tggccatcag tgggctccag 240

tctgaggatg aggctgatta ttactgtgca gcatgggatg tgagcctgaa tggtcaggtc 300

ttcggaactg ggaccaaggt caccgtccta g 331

<210> 455
<211> 369
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 455
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagg tacctttagt tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcagcccaa tctttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatc gcagtacgag caccgcctac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtcct 300

ggttacgacc ctagtagtct gcgtggtttt gacgtttggg gccaggggac cttagtcact 360

gtgtctagc 369

<210> 456
<211> 330
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 456
tcctatgagc tgactcagcc accctcggtg tccaaggact tgagacagac cgccacactc 60

acctgcactg ggaacagcaa caatgttggc aaccaaggag cagcttggct gcagcagcac 120

cagggccacc ctcccaaact cctattctac aagaataaca accggccctc agggatttca 180

gagagattat ctgcatccag gtcaggaaac acagcctccc tgaccattac tggactccag 240

cctgaggacg aggctgacta ttactgctca gcatgggaca gcagcctcag tgattgggtg 300

ttcggcggag ggaccaagct gaccgtccta 330

<210> 457
<211> 351
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 457
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgg cacttttagc tcttacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcattccaa tctttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg agagcacgaa tactgcctac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtgag 300

gaggcttact acgacctttg gggccagggg accttagtca ctgtgtctag c 351

<210> 458
<211> 322
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 458
gaaattgtgt tgacgcagtc tccaggcacc ctgtctttgt ctccagggga aagagccacc 60

ctctcctgct gggccagtca gagtgttagc agcttcttag cctggtacca acacaaacct 120

ggccaggttc ccaggctcct catctatgat gcatccaata gggccactgg catcccagcc 180

aggttctctg gcagtgggtc tgggacacac ttcactctca ctatcagcag cctagagcct 240

gaagattttg cagtttatta ctgtcagcag cgtttcaatt ggcctccgac gttcggccaa 300

gggaccaagg tggaaagcaa ac 322

<210> 459
<211> 366
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 459
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagg tacttttagt tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcacccctа tgttcggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagaca aaagtacgag caccgcctat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtaca 300

agttacctgc ctggtcgtag tggttttgat gtttggggcc aggggacctt agtcactgtg 360

tctagc 366

<210> 460
<211> 322
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 460
cagcctgggc tgactcagcc accctcggtg tcagtgtccc caggacagac ggccaggatc 60

acctgctctg cagatgcatt gccaaagcaa tatgcttatt ggtaccagca gaggccaggc 120

caggcccctg tgttgctgat atataaagac actgagaggc ccccagggat ccctgagcga 180

ttctctggct ccagctcagg gacaacagtc acgttgacca tcagtggagt ccaggcagaa 240

gacgaggctg actactattg tcaatcagca gacgctagtg aaaattctgt cttcggaggt 300

gggaccaagg tcaccgtcct ag 322

<210> 461
<211> 366
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 461
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgt tacttttcgt tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcagcgcaa tgtttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagaca agagtacgaa caccgcatat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtcgt 300

ggttacgacc ctagtgttgg tggttttgat gtgtggggcc aggggacctt agtcactgtg 360

tctagc 366

<210> 462
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 462
aattttatgc tgactcagcc ccactctgtg tcggagtctc cggggaagac ggtcagcatc 60

tcctgcaccg gcagcagtgg cagcattgcc agcaactatg tgcagtggta ccagcagcgc 120

ccgggcagtg cccccgccac tgtgatctat gaggataacc aaagaccctc tggggtccct 180

gatcggttct ctggctccat cgacagctcc tccaactctg cctccctcac catctctgga 240

ctgaagactg aggacgaggc tgactactac tgtcagtctt atgataccag caatctggta 300

ttcggcgtag ggaccaagct gaccgtccta g 331

<210> 463
<211> 381
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 463
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgg tacctttagt tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attattccta tcttcggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagacg atagcacgtc aaccgcatac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcgacagt 300

acacctagtg ttacaagtag tctgtaccgt atccctgctt ttgatgtgtg gggccagggg 360

accttagtca ctgtgtctag c 381

<210> 464
<211> 337
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 464
ctgcctgtgc tgactcaatc atcctctgcc tctgcttccc tgggatcctc ggtcaagctc 60

acctgcagtc tgaccaatgg gcccagtaac tacatcatcg catggcatca gcagcagcca 120

gagaagggcc ctcggtactt gatgaagctt aacagtgatg gcagccacag caagggggac 180

gggatccctg atcgcttctc aggctccagc tctggggctg agcgctacct caccatctcc 240

aaccttaagt ctgaggatga ggctgattat tactgtgaga cctgggacag taacactcat 300

gtggtattcg gcggagggac caagctgacc gtcctag 337

<210> 465
<211> 366
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 465
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagg tacctttagt tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attaccccaa tgtttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagaca agagcacgtc aactacatac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtcct 300

ggttactacc ctgacagtaa taattatgat ctctggggcc aggggacctt agtcactgtg 360

tctagc 366

<210> 466
<211> 325

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 466
gaaacgacac tcacgcagtc tccaggcacc ctgtctttgt ctccagggga aagagccacc 60

ctctcctgca gggccagtca gagtgttagt agcagctact tagcctggta ccagcagaaa 120

cctggccagg ctcccaggct cctcatctat ggtgcatcaa gtagggccac tggcatccca 180

gacaggttca gtggcagtgg gtctgggaca gacttcactc tcaccatcag cagactggag 240

cctgaagatt ttgcaaccta ctattgtcaa caggttaaca gcttccctcg aacttttggc 300

caggggacca agctggagat gaaac 325

<210> 467
<211> 366
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 467
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgt gacctttagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcccaa tgtttggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagacc agagcacgaa caccgcctat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtggt 300

acatacagtc ctggtggtac atactttgat gtttggggcc aggggacctt agtcactgtg 360

tctagc 366

<210> 468
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 468
cagcctgtgc tgactcagcc accctcagcg tctgcgaccc ccggacagac ggtgaccatc 60

tcttgttctg gcagcagttc caacatcggc gtgagctttg tctactggta tcaacaattt 120

ccaggaacgg cccccaagct cctcatttac agggatgata tgaggcagtc aggggtccct 180

gaccgatttt ctggcttcaa gtctggctcc tcagcctccc tgaccatctc tgggctccag 240

tccgaagatg aggccactta ttattgttcc gcgtgggatg agagcctgag tagtgtgttg 300

ttcggcggag ggaccaaggt caccgtccta g 331

<210> 469
<211> 124

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 469

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 Pro 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 Ser Pro Met Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys 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 Asp Gly Tyr Ala Pro Ser Gly Gly Leu Arg Glu Phe Asp
100 105 110

Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 470
<211> 113
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 470

Asp Ile Gln 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 Arg 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 Ser Gly Ser Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile
            100                 105                 110

Lys
```

<210> 471
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 471

```
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 Ile 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 Ser Pro Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Asn 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 Arg Gly Ala Tyr Met Gly Pro Ser Met Asp Val Trp Gly
            100                 105                 110

Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 472
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 472

```
Gln Pro 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 Arg Ser Ser Asp His
                85                  90                  95

Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105
```

<210> 473
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 473

```
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 Ser Pro Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys 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 Gly Ala Arg Tyr Tyr Ala Gly Gly Tyr Phe Asp Val Trp Gly
            100                 105                 110

Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 474
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 474

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 Thr Val Ser Asn Tyr
20 25 30

Leu Ala Trp Tyr Gln Gln Arg Pro Gly Gln Ala Pro Arg Leu Leu Ile
35 40 45

Tyr Ala Ala Ser Thr Arg Ala Thr Gly Val 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 Asp Asn Leu Pro Pro
85 90 95

Val Thr Phe Gly Pro Gly Thr Thr Val Asp Ile Lys
100 105

<210> 475
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 475

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 Val 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 Ser Pro Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Gln 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 Asp Ser Gly Asn Tyr Asp Gly Tyr Gly Pro Gly Ser Arg Phe
            100                 105                 110


Asp Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125


<210>  476
<211>  110
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic Polypeptide

<400>  476

Gln Pro Gly 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 Phe Cys Ser Ala Trp Asp Asp Ser Leu
                85                  90                  95


Gly Gly Glu Val Phe Gly Thr Gly Thr Lys Val Asn Val Leu
            100                 105                 110


<210>  477
<211>  121
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic Polypeptide

<400>  477

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 Val 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 Met Pro Met Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys 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 Arg Gly Ser Trp Ser Phe Gly Tyr Phe Asp Val Trp Gly
            100                 105                 110

Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 478
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 478

```
Leu Pro Val Leu Thr Gln Pro Pro Ser Met Ser Ala Ala Pro Gly Gln
1               5                   10                  15

Thr Ala Arg Ile Thr Cys Gly Gly Asp His Ile Gly Ser Lys Ser Val
            20                  25                  30

His Trp Tyr Gln Arg Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

Ser Asp Thr 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 Phe Cys Gln Val Trp Asp Ser Ser Asn Asp His
                85                  90                  95

Pro Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105
```

<210> 479
<211> 121
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Polypeptide

<400> 479

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 Val 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 Ser Pro Leu Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys 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 Ser Arg Thr Tyr Ala Asp Gly Arg Thr Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 480
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 480

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 Val 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 Ser Pro Leu Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys 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 Ser Arg Thr Tyr Ala Asp Gly Arg Thr Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 481
<211> 124
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 481

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 Ser Pro Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys 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 Leu Gly Tyr Leu Ala Gly Ser Pro Ser Pro Gly Phe Asp
100 105 110

Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 482
<211> 109
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 482

Gln Ser Val 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

Ile 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 Ala Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Tyr Ala Gly Gly
85 90 95

Lys Trp Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu
100 105

<210> 483
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 483

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 Ser Pro Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Thr 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 Ser Arg Arg Tyr Trp Ala Asp Gly Gly Phe Asp Tyr Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 484
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 484

Leu Pro 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 Met Gly Arg Asn
20 25 30

Thr Val Asn Trp Tyr Arg His Leu Pro Gly Thr Ala Pro Glu Leu Leu
35 40 45

Ile Tyr Asp Asn Asp Glu 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 Gly His Tyr Tyr Cys Ala Ala Trp Asp Asp Ser Leu
85 90 95

Asn Gly Pro Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 485
<211> 122
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 485

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 Ser Pro Met Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys 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 Gly Gly Tyr Ser Pro Gly Gly Val Asp Phe Asp Tyr Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 486
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 486

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 Ser Thr
20 25 30

Tyr Val Gln Trp Tyr Arg Gln Arg Pro Gly Ser Ala Pro Thr Thr Val
35 40 45

Ile Tyr Glu Asp His Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
50 55 60

Gly Ser Leu Asp Ser Ser Ser Asn Ser Ala Ser Leu Thr Ile Ser Gly
65 70 75 80

Leu Arg Thr Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Ser Phe Asp Ala
85 90 95

Ser Thr Leu Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 487
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 487

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 Val 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 Ser 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 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 Gly Thr Thr Tyr Ser Thr Ala Arg Tyr Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 488
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 488

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 Arg Ser Gly Ser Ile Ala Ser Asn
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 Asn Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
50 55 60

Gly Ser Ile Asp Arg 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

Asp Asn His Glu Val Ile Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 489
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 489

```
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 Val Thr Phe Arg 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 Ser Gly 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 Ser Pro Ala Tyr Tyr Phe Gly Pro Asn Met Asp Val Trp Gly
            100                 105                 110

Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120


<210>  490
<211>  111
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic Polypeptide

<400>  490

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 Gln Leu Pro Gly Thr Val Pro Lys Leu
        35                  40                  45

Ile Ile Tyr Asp Asn Ser Asn Arg Pro Ser Gly Val Pro Ala Arg Phe
    50                  55                  60

Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu
65                  70                  75                  80

Gln Ser Glu Asp Glu Ala Ala Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser
                85                  90                  95

Leu Ser Val Val Val Phe Gly Gly Gly Thr Lys Leu Ser Val Leu
            100                 105                 110
```

<210> 491
<211> 123
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 491

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 Ser Pro Met Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys 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 Ser Ser Arg Tyr Ala Pro Ser Asp Ser Thr Asn Phe Asp Gln
100 105 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 492
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 492

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 Gly Ser Ser Gly Ser Ile Ala Ser Asn
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 Asn Gln 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 Thr
                85                  90                  95


Ser Asn Arg Lys Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110


<210>  493
<211>  121
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic Polypeptide

<400>  493

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 Pro 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 Ser Gly 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 Gly Asp Arg Phe Tyr Val Gly Glu Arg Phe Asp Val Trp Gly
            100                 105                 110


Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120


<210>  494
<211>  109
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic Polypeptide

<400>  494

Gln Ser 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 Asp 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 Ile Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

Asn Tyr Gly Asp Thr Ala 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 Thr Asn Ser Asp Pro
                85                  90                  95

Val Phe Val Phe Gly Ser Gly Thr Lys Val Thr Val Leu
            100                 105
```

<210> 495
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 495

```
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 Ser Pro Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Ile Thr Ala Asp Gln 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 Gly Gly Val Gly Arg Ile Trp Ile Ala Gly Tyr Gly Phe
            100                 105                 110

Asp Gln Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125
```

<210> 496
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 496

Gln Thr Val Val Thr Gln Glu Pro Ser Phe Ser Val Ser Pro Gly Gly
1 5 10 15

Thr Val Thr Leu Thr Cys Gly Leu Ser Ser Gly Ser Val Ser Thr Ser
20 25 30

Asn Tyr Pro Ser Trp Tyr Gln Gln Thr Pro Gly Gln Pro Pro Arg Thr
35 40 45

Leu Ile Tyr Ser Thr Asn Thr 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 Glu Ser Asp Tyr Tyr Cys Val Leu Tyr Met Gly Ser
85 90 95

Gly Ile Ser Met Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 497
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 497

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 Ser 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 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 Gly Pro Gly Tyr His Pro Ala Gly Ala Ser Gly Gln Phe Phe
            100                 105                 110

Asp Leu Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125
```

<210> 498
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 498

```
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Lys Asp Leu Arg Gln
1               5                   10                  15

Thr Ala Thr Leu Thr Cys Thr Gly Asn Ser Asn Asn Val Gly Asn Gln
            20                  25                  30

Gly Ala Ala Trp Leu Gln Gln His Gln Gly His Pro Pro Lys Leu Leu
        35                  40                  45

Ser Tyr Arg Asn Asn His Arg Pro Ser Gly Ile Ser Asp Arg Ser Ser
    50                  55                  60

Ala Ser Arg Ser Gly Asp Thr Ala Ser Leu Thr Ile Thr Gly Leu Gln
65                  70                  75                  80

Pro Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ala Trp Asp Ser Ser Leu
                85                  90                  95

Ser Ala Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110
```

<210> 499
<211> 123
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 499

```
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 Val 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 Ser Pro Met 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 Asn 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 Arg Gly Tyr Ala Pro Asp Ala Leu Thr Asn Phe Asp Val
            100                 105                 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 500
<211> 115
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 500

```
Glu Ile Val Leu Thr Gln Ser Pro Asp Ser Leu Ala Met Ser Leu Gly
1               5                   10                  15

Glu Arg Ala Thr Val Asn Cys Lys Ser Ser Arg Ser Leu Phe Asp Ser
            20                  25                  30

Ser Asp Asn Lys Asn Tyr Leu Ala Trp Tyr Gln Lys Lys Pro Gly Gln
        35                  40                  45

Pro Pro Gln Leu Leu Ile Tyr Trp 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 Phe Ser Ser Pro Pro Ile Phe Thr Phe Gly Pro Gly Thr Lys Val
            100                 105                 110

Glu Ile Lys
        115
```

<210> 501
<211> 122

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 501

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 Val 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 Thr Pro Met Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys 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 Gly Arg Gly Tyr Ile Ala Val Ala Gly Asp Met Asp Val Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 502
<211> 113
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 502

Asp Ile Gln 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 Arg Ser Val Leu Tyr Ser
20 25 30

Ser Asn Asn Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Ala 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 Pro Thr Phe Gly Gln Gly Thr Lys Val Glu Ile
100 105 110

Lys

<210> 503
<211> 124
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 503

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 Val 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 Ser Pro Leu Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys 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 Asp Ala Tyr Tyr Val Gly Gly Gly Ala Arg Pro Phe Asp
100 105 110

Leu Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 504
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 504

Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Glu Thr Pro Gly Gln
1 5 10 15

```
Asn Val Ile Ile Ser Cys Ser Gly Gly Ser Ser Asn Ile Gly Val Asn
            20                  25                  30

Tyr Val Tyr Trp Tyr Gln Val Val Pro Gly Ala 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 Gln
65                  70                  75                  80

Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Gly Val Trp Asp Asp Ser Leu
                85                  90                  95

Asn Gly His Trp Val Phe Gly Gly Gly Thr Asp Leu Thr Val Leu
            100                 105                 110
```

<210> 505
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 505

```
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 Pro 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 Ser Pro Met 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 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 Gly Tyr Ser Tyr Tyr Pro Gly Gly Gly Gly Gly Arg Asn Phe
            100                 105                 110

Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125
```

<210> 506
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 506

Leu Pro 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 Gly Glu Ala Asp Tyr Tyr Cys Ala Ala Trp Asp Asp Ser Leu
85 90 95

Lys Gly Arg Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu
100 105 110

<210> 507
<211> 124
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 507

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 Pro 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 Ser Pro Leu 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 Ala Pro Thr Tyr Tyr Ala Ser Arg Asp Ser Tyr Asn Phe Asp
            100                 105                 110


Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120


<210>  508
<211>  108
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic Polypeptide

<400>  508

Glu Thr Thr Leu 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 Arg 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 His Arg Ala Ala 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 Phe Cys Gln Gln Tyr Gly Ser Ser Arg
                85                  90                  95


Leu Ser Phe Gly Gly Gly Thr Lys Val Glu Ile Gln
            100                 105


<210>  509
<211>  121
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic Polypeptide

<400>  509

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 Val 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 Ser Pro Met Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Asn 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 Thr Thr Tyr Ile Ala Gly Gly His Phe Asp Val Trp Gly
            100                 105                 110

Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120


<210>  510
<211>  110
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic Polypeptide

<400>  510

Gln Ser Val 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 Ile Gly Ala Tyr
            20                  25                  30

Asn Tyr Val Ser Trp Tyr Gln Gln His Pro Asp Lys Ala Pro Lys Leu
        35                  40                  45

Ile 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 Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110


<210>  511
<211>  122
<212>  PRT
<213>  Artificial Sequence

<220>
```

<223> Synthetic Polypeptide

<400> 511

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 Ser Pro Leu 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 Asn 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 Ala Ser Gly Tyr Phe Thr Gly Trp Gly Thr Phe Asp Tyr Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 512
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 512

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

Asn 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 Val
85 90 95

Phe Gly Thr Gly Thr Lys Val Thr Val Leu
100 105

<210> 513
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 513

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 Ser Pro Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys 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 Arg Tyr Tyr Tyr Thr Val Gly Val Tyr Asp Val Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 514
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 514

Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Lys Gly Leu Arg Gln
1 5 10 15

Thr Ala Thr Leu Thr Cys Ile Gly Asp Ser Asp Asn Val Gly Asn Gln
20 25 30

Gly Val Gly Trp Leu Gln Gln His Gln Gly His Pro Pro Lys Leu Leu
35 40 45

```
Ser Tyr Arg Asp Asn Thr Arg Pro Ser Gly Ile Ser Glu Arg Phe Ser
    50                  55                  60

Ala Ser Arg Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Leu Gln
65                  70                  75                  80

Pro Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ala Trp Asp Ser Ser Leu
                85                  90                  95

Thr Ala Val Val Phe Gly Gly Gly Thr Lys Leu Ala Val Leu
            100                 105                 110
```

<210> 515
<211> 127
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 515

```
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 Val 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 Ser Pro Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys 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 Gly Gly Gly Tyr Ser Ala Asp Gly Gly Ala Gly Asn Asn Thr
            100                 105                 110

Ile Phe Asp Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125
```

<210> 516
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 516

Gln Pro Val Leu Thr Gln Pro Pro Ser Val Ser Lys Gly Leu Arg Gln
1 5 10 15

Thr Ala Thr Leu Thr Cys Thr Gly Asn Asn Asn Asn Val Gly Asn Gln
20 25 30

Gly Ala Ala Trp Leu Gln Gln His Gln Gly His Pro Pro Lys Leu Leu
35 40 45

Ser Asp Arg Asn Asn Asn Arg Pro Ser Gly Ile Ser Glu Arg Leu Ser
50 55 60

Ala Ser Arg Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Leu Gln
65 70 75 80

Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ala Trp Asp Ser Ser Leu
85 90 95

Ser Ala Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 517
<211> 122
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 517

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 Val 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 Ser Pro Leu 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 Arg Gly Tyr Thr Val Gly Gly Gly Gly Met Asp Val Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115   120

<210> 518
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 518

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 Ala His
            20   25   30

Asn Phe Val Ser Trp Tyr Gln Gln His Pro Asp Lys Ala Pro Lys Leu
        35   40   45

Ile Ile Tyr Glu Val Asn Arg 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 Ser Gly Leu
65   70   75   80

Gln Ser Asp Asp Glu Ala Asp Tyr Tyr Cys Ala Ala Trp Asp Asp Ser
                85   90   95

Leu Asp Gly Pro Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100   105   110

<210> 519
<211> 124
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 519

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 Val 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 Ser Pro Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
    50   55   60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys 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 Glu Tyr Leu Gly Asp Asp Tyr Ser Ser Gly Ser Tyr Phe Asp
100 105 110

Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 520
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 520

Glu Thr Thr Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Thr Ala Ile Leu Ser Cys Arg Ala Ser Gln Ser Val Asp Ser His
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Gly 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 Asp Phe Thr Leu Thr Ile Asn Gly Leu Glu Pro
65 70 75 80

Glu Asp Phe Ala Ile Tyr Phe Cys Gln Gln Arg Ser Met Trp Pro Leu
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105

<210> 521
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 521

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 Ser Pro Met Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys 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 Ser Gly Tyr Ser Gly Thr Gly Gln Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 522
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 522

Gln Ser Val Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Ala Gly Gln
1 5 10 15

Arg Val Thr Ile Ser Cys Phe Gly Arg Thr Ser Asn Val Gly Arg Asn
20 25 30

Thr Val Asn Trp Tyr Gln Gln Leu Pro Gly Ala Ala Pro Lys Ile Leu
35 40 45

Ile Phe Asn Asp Asn Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
50 55 60

Gly Ser Lys Ser Gly Thr Ala Ala Ser Leu Thr Ile Ser Arg Leu Gln
65 70 75 80

Ser Ala Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Trp Asp Asp Asp Leu
85 90 95

Asn Gly Pro Val Phe Gly Gly Gly Thr Lys Leu Ser Val Val
100 105 110

<210> 523
<211> 122

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 523

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 Ile 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 Ser 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 Asn 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 Ser Gly Gly Tyr Tyr Asp Tyr Gly Val Gly Tyr Asp Gln Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 524
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 524

Gln Pro 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 Gly Arg 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 His Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
50 55 60

Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu Gln
65 70 75 80

```
Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser Val
                85                  90                  95


Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105


<210>  525
<211>  122
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic Polypeptide

<400>  525

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 Thr 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 Ser Gly Gly Tyr Ser Pro Ser Ile Gly Gly Phe Asp Val Trp
            100                 105                 110


Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120


<210>  526
<211>  110
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic Polypeptide

<400>  526

Gln Pro Gly 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 Arg Ser Asn Ile Gly Arg 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 Val 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 Val Ser Leu
                85   90   95

Asn Gly Gln Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu
            100   105   110

<210> 527
<211> 123
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 527

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 Ser Pro Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
    50   55   60

Gln Gly Arg Val Thr Ile Thr Ala Asp Arg 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 Pro Gly Tyr Asp Pro Ser Ser Leu Arg Gly Phe Asp Val
            100   105   110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115   120

<210> 528
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 528

Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Lys Asp Leu Arg Gln
1 5 10 15

Thr Ala Thr Leu Thr Cys Thr Gly Asn Ser Asn Asn Val Gly Asn Gln
20 25 30

Gly Ala Ala Trp Leu Gln Gln His Gln Gly His Pro Pro Lys Leu Leu
35 40 45

Phe Tyr Lys Asn Asn Asn Arg Pro Ser Gly Ile Ser Glu Arg Leu Ser
50 55 60

Ala Ser Arg Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Leu Gln
65 70 75 80

Pro Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ala Trp Asp Ser Ser Leu
85 90 95

Ser Asp Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 529
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 529

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 Asn 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 Glu Glu Ala Tyr Tyr Asp Leu Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser Ser
115

<210> 530
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 530

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 Trp Ala Ser Gln Ser Val Ser Ser Phe
20 25 30

Leu Ala Trp Tyr Gln His Lys Pro Gly Gln Val 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 His 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 Phe Asn Trp Pro Pro
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ser Lys
100 105

<210> 531
<211> 122
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 531

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 Thr Pro Met Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys 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 Thr Ser Tyr Leu Pro Gly Arg Ser Gly Phe Asp Val Trp
            100                 105                 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 532
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 532

```
Gln Pro Gly Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1               5                   10                  15

Thr Ala Arg Ile Thr Cys Ser Ala Asp Ala Leu Pro Lys Gln Tyr Ala
            20                  25                  30

Tyr Trp Tyr Gln Gln Arg Pro Gly Gln Ala Pro Val Leu Leu Ile Tyr
        35                  40                  45

Lys Asp Thr Glu Arg Pro Pro 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 Ala Ser Glu Asn Ser
                85                  90                  95

Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu
            100                 105
```

<210> 533
<211> 122
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 533

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 Val Thr Phe Arg 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 Ser Ala Met Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Asn 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 Arg Gly Tyr Asp Pro Ser Val Gly Gly Phe Asp Val Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 534
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 534

Asn Phe Met Leu Thr Gln Pro His Ser Val Ser Glu Ser Pro Gly Lys
1 5 10 15

Thr Val Ser Ile Ser Cys Thr Gly Ser Ser Gly Ser Ile Ala Ser Asn
20 25 30

Tyr Val Gln Trp Tyr Gln Gln Arg Pro Gly Ser Ala Pro Ala Thr Val
35 40 45

Ile Tyr Glu Asp Asn Gln 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 Thr
85 90 95

Ser Asn Leu Val Phe Gly Val Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 535
<211> 127
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 535

```
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 Asp 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 Ser Thr Pro Ser Val Thr Ser Ser Leu Tyr Arg Ile Pro
            100                 105                 110


Ala Phe Asp Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125
```

<210> 536
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 536

```
Leu Pro Val Leu Thr Gln Ser Ser Ser Ala Ser Ala Ser Leu Gly Ser
1               5                   10                  15


Ser Val Lys Leu Thr Cys Ser Leu Thr Asn Gly Pro Ser Asn Tyr Ile
            20                  25                  30


Ile Ala Trp His Gln Gln Gln Pro Glu Lys Gly Pro Arg Tyr Leu Met
        35                  40                  45


Lys Leu Asn Ser Asp Gly Ser His Ser Lys Gly Asp Gly Ile Pro Asp
    50                  55                  60
```

```
Arg Phe Ser Gly Ser Ser Ser Gly Ala Glu Arg Tyr Leu Thr Ile Ser
65                  70                  75                  80

Asn Leu Lys Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Glu Thr Trp Asp
                85                  90                  95

Ser Asn Thr His Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110
```

<210> 537
<211> 122
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 537

```
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 Thr Pro Met Phe Gly Thr Ala 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 Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Gly Pro Gly Tyr Tyr Pro Asp Ser Asn Asn Tyr Asp Leu Trp
            100                 105                 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 538
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 538

```
Glu Thr Thr 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 Thr Tyr Tyr Cys Gln Gln Val Asn Ser Phe Pro
                85                  90                  95

Arg Thr Phe Gly Gln Gly Thr Lys Leu Glu Met Lys
            100                 105
```

<210> 539
<211> 122
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 539

```
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 Val 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 Ser Pro Met Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Ile Thr Ala Asp Gln Ser Thr Asn 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 Gly Thr Tyr Ser Pro Gly Gly Thr Tyr Phe Asp Val Trp
            100                 105                 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 540
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 540

Gln Pro Val Leu Thr Gln Pro Pro Ser Ala Ser Ala Thr Pro Gly Gln
1 5 10 15

Thr Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Val Ser
20 25 30

Phe Val Tyr Trp Tyr Gln Gln Phe Pro Gly Thr Ala Pro Lys Leu Leu
35 40 45

Ile Tyr Arg Asp Asp Met Arg Gln Ser Gly Val Pro Asp Arg Phe Ser
50 55 60

Gly Phe Lys Ser Gly Ser Ser Ala Ser Leu Thr Ile Ser Gly Leu Gln
65 70 75 80

Ser Glu Asp Glu Ala Thr Tyr Tyr Cys Ser Ala Trp Asp Glu Ser Leu
85 90 95

Ser Ser Val Leu Phe Gly Gly Gly Thr Lys Val Thr Val Leu
100 105 110

<210> 541
<211> 351
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 541
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagg tacttttagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attatcacaa tctttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagaca aaagtacctc aaccgcatac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtgct 300

acaggtttct acgacgtttg gggccagggg accttagtca ctgtgtctag c 351

<210> 542
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 542
ctgcctgtgc tgactcagcc accctcagcg tctgggaccc ccgggcagag ggtcaccatc 60

tcttgttctg gaagcagctc caacatcgga agtaatactg taaactggta ccagcagctc 120

ccaggaacgg cccccaaact cctcatctat agtaataatc agcggccctc aggggtccct 180

gaccgattct ctggctccaa gtctggcacc tcagcctccc tggccatcag tgggctccag 240

tctgaggatg aggctgatta ttactgtgca gcatgggatg acagcctgaa tggtccggta 300

ttcggcggag ggaccaagct gaccgtccta g 331

<210> 543
<211> 369
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 543
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagt tactttcagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcccta tcttcggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg aaagcacgtc aactgcatac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtcgt 300

gagtactacg ctagtaatgg tgacagtttc gatgtttggg gccaggggac cttagtcact 360

gtgtctagc 369

<210> 544
<211> 328
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 544
cagcctgtgc tgactcagcc accctcggtg tcagtggccc caggaaagac ggccagcatt 60

tcctgtgagg gaaacaacat tgcgactaaa agtgtgcact ggtaccagca gaagtcaggc 120

cacgcccctg tggtggtcgt ctatcatgat agcgaccggc cctcaggggt ccctgaccga 180

ttctctggct ccaagtctgg cacctcagcc tccctggcca tcagtgggct ccggtccgag 240

gatgaggctg attattactg tgcagcatgg gatgacagcc tgagtggtcc ttgggtgttc 300

ggcggaggga ccaagctgac cgtcctag 328

<210> 545
<211> 369
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 545
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagg tacctttagt tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcgcaa tcttcggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg agagcacgcg caccgcatac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtagt 300

ggttactacg ttgctgctag tggtgctttc gacgtgtggg gccaggggac cttagtcact 360

gtgtctagc 369

<210> 546
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 546
cagcctgggc tgactcagcc accctcggtg tcaaagggct tgagacagac cgccacactc 60

acctgcactg ggaacatcaa caatgttggc gaccaaggag caggttggct gcagcagcac 120

cagggccgcc ctcccaaact cctgtcgtac aggaatagca accggccctc aggtgtctca 180

gagagattct ctgcatccag gtcaggaaat acagcctccc tgaccattac tggactccag 240

cctgaggacg aggctgacta ttactgctca gcatgggaca gcagcctcag tgattgggtg 300

ttcggcggag ggaccaagct gaccgtccta g 331

<210> 547
<211> 381
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 547
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgg catcttcagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcaccccaa tcttcggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagacg aaagcacgcg taccgcatat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcgacctg 300

agtcgtgaca gtctgaatct gcctggtagt agtcctggtt acgatctctg gggccagggg 360

accttagtca ctgtgtctag c 381

<210> 548
<211> 322
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic Polynucleotide

<400> 548
gaaacgacac tcacgcagtc tccaggcacc ctgtctttgt ctccaggaga aagagccacc 60

ctctcctgca gggccagtca gagtgttagc agcaacttag cctggtacca gcagaaacct 120

ggccaggctc ccaggctcct catctatggt gcatccacca gggccactgg tatcccagcc 180

aggttcagtg gcagtgggtc tgggacagag ttcactctca ccatcagcag cctgcagtct 240

gaagattttg cagtgtatta ctgtcagcag tatagtagtt ctccctacac ttttggccag 300

gggaccaaac tggagatcaa ac 322

<210> 549
<211> 369
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 549
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagt gattttcagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcccta tcttcggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg agagcacgtc aaccgcatat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcagtcgt 300

ggttacgctc ctggtacaag tttccactac gatgtgtggg gccaggggac cttagtcact 360

gtgtctagc 369

<210> 550
<211> 325
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 550
ctgcctgtgc tgactcaggc accctcaatg tcagtggccc caggaaagac ggccagtatt 60

acctgtgggg gagacaacat tggaagtaaa agtgtgcact ggtaccagca gaagccaggc 120

caggcccctg tgctggtcat gtattatgat agcgaccggc cctcagggat ccctgagcga 180

ttctctggct ccaactctgg gaacacggcc accctgacca tcagcagggt cgaggccggg 240

gatgaggccg actatttctg ccagctgtgg gatcatacta attctcatgt ggtcttcggc 300

ggaaggacca aactgaccgt cctag 325

<210> 551
<211> 363
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic Polynucleotide

<400> 551
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgg caccttttagt tcttacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcccaa tctttggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt acctcagatg agagtaccag cactgcatac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcgaccaa 300

ggtggtacac gtggtaatta cttcgacgtt tggggccagg ggaccttagt cactgtgtct 360

agc 363

<210> 552
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 552
cagcctgtgc tgactcagcc accctcggtg tccaagggct tgagacagac cgccacagtc 60

acctgcactg ggaacagcaa caatgttggc aaccaaggag cagcttggct gcagcagcac 120

cagggccacc ctcccaaact cctatcctac aggaataaca accggccctc agggatttca 180

gagagattat ctgcatccag gtcaggaaac acagcctccc tgaccattgc tggactccag 240

cctgaggacg aggctgacta ttactgctca gcatgggaca acaccgtcag tggttgggtg 300

ttcggcggag ggaccagggt gaccgtccta g 331

<210> 553
<211> 351
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 553
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgg tactttcagt tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attatcacaa tcttcggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg agagcacgaa caccgcctac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtggt 300

ggtggtcgtt ttgacgtttg gggccagggg accttagtca ctgtgtctag c 351

<210> 554
<211> 331
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic Polynucleotide

<400> 554
tcctatgagc tgactcagcc accctcagtg tctgggaccc ccgggcagag ggtcaccatc 60

tcttgttctg gaagcacctc caacatcgga aataatgctc taaactggta ccagaaactc 120

ccagggacgg cccccaaact cctcatctat agtcttaatc agcgtccctc aggggtccct 180

gaccgattct ctggctccaa gtctggcacc tcagcctccc tggccatcag tgggctccag 240

tctgaggatg aggctgatta ttactgtgaa gcatgggatg acagcctgag tggtccggtg 300

ttcggcggag ggaccaaggt gaccgtccta g 331

<210> 555
<211> 351
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 555
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagg tccatttcgc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attatcccaa tcttcggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg aaagtacgtc aactgcatac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtggt 300

gtttacagtt ttgatgtgtg gggccagggg accttagtca ctgtgtctag c 351

<210> 556
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 556
cagtctgggc tgactcagcc accctcagcg tctgggaccc ccgggcagag ggtcaccatt 60

tcttgttctg gaagcggctc caacgtcgga agtaatgttg taaattggta ccagcatctc 120

ccaggaacgg cccccaaact cctcatctat cgtaataatc agcggccctc aggggtccct 180

gaccgattct ctggctccaa gtctggcacc tcagcctccc tggccatcag tgggctccag 240

tctgaggatg aggctgatta ttattgtgca gcatgggatg acagactgaa tggctttgtc 300

tttggtactg ggacgaaggt caccgtcctg a 331

<210> 557
<211> 375
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 557
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgt tcctttcagt tcttacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcagcccac tgtttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagacc agagcacgtc aaccgtctac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtctg 300

ggtacataca gtcctagtct gtaccctcgt ggtatggacg tttggggcca ggggacctta 360

gtcactgtgt ctagc 375

<210> 558
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 558
ctgcctgtgc tgactcagcc accctcagcg tctgggaccc ccggacagag tgtcaccatc 60

tcttgttctg gaagcagctc caacatcggc agaaatgatg ttaactggta ccagcaattc 120

ccgggaaggg cccccaaact cctcatctat ggtcgtgatg agcggccctt cggggtccct 180

gcccgattct ctggctccaa gtctggcacc tcagcctccc tggccatcag tgggctccag 240

tctgaggatg aggctgatta ttactgtgct gcatgggatg ccagtctgat gatctatgtc 300

ttcggaactg ggaccacggt caccgtcctg g 331

<210> 559
<211> 366
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 559
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagt gacctttagt tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcagcccta tgttcggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagacg aaagtacgaa tactgtctat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtcgt 300

gcttacctga gtgttcgtgg tagtttcgac gtgtggggcc aggggacctt agtcactgtg 360

tctagc 366

<210> 560
<211> 331
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic Polynucleotide

<400> 560
tcctatgagc tgactcagcc accctcagtg tctgggaccc ccgggcagag ggtcaccatc 60

tcttgttctg gaagcagctc caacatcgga agtaacactg taaactggta ccagcagctc 120

ccaggaacgg cccccaaact cctcatctat agtaataatc agcggccctc aggggtccct 180

gaccgattct ctggctccaa gtctggcacc tcagcctccc tggccatcag tgggctccag 240

tctgaggatg aggctgatta ttactgtgca gcatgggatg acagcctgaa tggttatgtc 300

ttcggaactg ggaccaaggt caccgtccta g 331

<210> 561
<211> 351
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 561
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgt gattttcagt tcttacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcatcccaa tctttggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagata aaagtacgtc aactgcctat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtggt 300

agtggtagtt tcgacgtttg gggccagggg accttagtca ctgtgtctag c 351

<210> 562
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 562
cagcctgggc tgactcagcc accctcagcg tctgggaccc ccgggcagag ggtcaccatc 60

tcttgttctg gaagcagttc caacctcgga agtaattatg tcttctggta ccagcacctc 120

ccaggagcgg cccccaaact cctcatctat agaaatagtc agcggccctc tggggtccct 180

gaccgattct ctggctccaa gtctggcacc tcagcctccc tggccatcag tgggctccag 240

tctgaggatg aggctgatta ttactgtgca gcatgggatg acagcctgaa tggtgtggta 300

ttcggcggag ggaccaagct gaccgtccta g 331

<210> 563
<211> 375
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 563
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagt gactttcagc tcttacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcagccctg tgtttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg atagtacgaa taccgcctac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcagtcgt 300

ggttacacag ttagtagtct ggctggtcgt tacttcgacc agtggggcca ggggacctta 360

gtcactgtgt ctagc 375

<210> 564
<211> 325
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 564
gaaacgacac tcacgcagtc tccaggcacc ctgtccttgt ctccagggga aagagcctcc 60

ctctcctgca aggccagtga gagtctttgc agcacttgct tggcctggta ccagcagaaa 120

cctggccagg ctcccaggct catcgtctat ggtgcaacca gcagggccac tggcatccca 180

gacaggttca gtggcagtgg gtctgggaca gacttcactc tcaccatcag cagactggag 240

cctgaagatt ttgcagtgta ttactgtcag cagtatggta gctcacctca gacgttcggc 300

caagggacca aggtggaaat caaac 325

<210> 565
<211> 351
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 565
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagg cacttttagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcgtgccac tgtttggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagacg aaagtaccag cactgcatat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtctg 300

ggtctgtact ttgacgtgtg gggccagggg accttagtca ctgtgtctag c 351

<210> 566
<211> 328
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 566
cagactgtgg tgactcagga gccctcactg actgtgtccc caggagagac agtcactctc 60

acctgtgctt ccagcactgg agcagtcacc agtggttact atccaaactg gttccagcag 120

aaacctggac aagcacccag ggcactgatt tatagtacaa gcaacaaaca ctcctggacc 180

cctgcccggt tctcaggctc cctccttggg ggcaaagctg ccctgacact gtcaggtgtg 240

cagcctgagg acgaggctga gtattattgt ctgctctact atggtggtcc ttgggtgttc 300

ggcggaggga ccaagttgac cgtcctgg 328

<210> 567
<211> 366
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 567
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgg tactttcagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attatcccaa tcttcggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagacg aaagcacgaa caccgcctac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcgttcgt 300

ggtggttacg gtccttacgg tgactttgac gtttggggcc aggggacctt agtcactgtg 360

tctagc 366

<210> 568
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 568
cagcctgggc tgactcagcc accctcagcg tctgggaccc ccgggcagag ggtcaccatc 60

tcttgttctg gaagcagctc caacatcgga agtcattctg tgaactggta ccggcagctc 120

ccaggaacgg ccccccaact cctcatctat ggtaacagca atcggccctc aggggtccct 180

gaccgattct ctggctccaa gtctggcacc tcagcgtccc tggccatcag tgggctccag 240

tctgaggatg aggctgatta tttctgtgcg gcatgggatg acggcctgag tggttgggtg 300

ttcggcggag ggaccaaatt gaccgtccta g 331

<210> 569
<211> 369
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 569
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgg ccctttttagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcccaa tcttcggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagata agagtacgaa caccgcatac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtcgt 300

agttacatcg ttagtgttag tcctggtttt gacgtgtggg gccaggggac cttagtcact 360

gtgtctagc 369

<210> 570
<211> 334
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 570
cagtctgtgc tgactcagcc accctccgcg tccgggtctc ctggacagtc agtcaccatc 60

tcctgcactg gaaccagcag tgacgttggt ggttataact atgtctcctg gtaccaacag 120

tacccaggca aagcccccaa actcatgatt tatgaggtca gtaagcggcc ctcaggggtc 180

cctgatcgtt tctctggctc caagtctggc acctcagcct ccctggccat cagtgagctc 240

caatctgagg atgaggctga ttattactgt gcatcatggg atgacagcct gaatgcttat 300

gtcttcggaa gtgggaccaa ggtcaccgtc ctgg 334

<210> 571
<211> 369
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 571
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagg cattttcagt tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcagcgcaa tctttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg agagtaccag caccgcatat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcgacagt 300

ggtatcgcta gtggttacac agcttacatg gattattggg gccaggggac cttagtcact 360

gtgtctagc 369

<210> 572
<211> 325
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic Polynucleotide

<400> 572
tcttctgagc tgactcagga ccctgctgtg tctgtggcct tgggacagac agtcaggatc 60

acatgccaag gagacagcct cagaacctct tacgcaagct ggtaccagca gaagccaggc 120

cagtcccctg tactggtcat ctatcaaagt actaagcggc cctcagggat ccctgagcga 180

ttctctgcct ccagctcagg aaacacagct tccctgacca tcactggggc tcaggcggaa 240

gatgaggctg actattactg taactcccgg ggcagcgggg gtaaccccta tgtcttcgga 300

actgggacca aggtcaccgt ccttg 325

<210> 573
<211> 351
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 573
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgg cattttccgt tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attatcccaa tgttcggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg agagtacgac tactgtctat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtgct 300

ggtagtacat ttgatgtgtg gggccagggg accttagtca ctgtgtctag c 351

<210> 574
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 574
cagtctgtgc tgactcagcc accctcagcg tctgggaccc ccgggcagag ggtcaccatc 60

tcttgttctg gaagcagctc caacatcgga agtaatactg taaactggta ccagcagctc 120

ccaggaacgg cccccagact cctcatctat agtaataatc agcggccctc aggggtccct 180

gaccgattct ctggctccaa gtctggcacc tcagcctccc tggccatcag tgggctccag 240

tctgaggatg aggctgatta ttactgtgca gcatgggatg acagcctgaa tggtcgggtg 300

ttcggcggag ggaccaagct gaccgtccta g 331

<210> 575
<211> 363
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 575
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgg taccttcagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attaacccta tctttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg agagcacgaa tactgcctac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtgag 300

agtgcttact acagtcgtaa ttacgatgtg tggggccagg ggaccttagt cactgtgtct 360

agc 363

<210> 576
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 576
tcctatgagc tgactcagcc accctcggtg tccaagggct tgagacagac cgccacactc 60

acctgcactg ggaacagcag caatgttggc aaccaaggag catcttggct gcagcagcac 120

cagggccacc ctcccaaact cctatcctac aggaatgaca accggccctc agggatctca 180

gagagattct ctgcatccag gtcaggaaat acagcctccc tgaccattac tggactccag 240

cctgaggacg aggctgacta ttactgctca gcatgggaca acagcctcag tgcttgggtg 300

ttcggtggag ggaccaagct gaccgtccta g 331

<210> 577
<211> 369
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 577
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgt gacttttagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcagcccaa tgttcggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg agagcacgaa taccgcatat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtggt 300

ggttactacc ctgctggtgt tggtcgttat gatgtttggg gccaggggac cttagtcact 360

gtgtctagc 369

<210> 578
<211> 340
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic Polynucleotide

<400> 578
gacatcgtga tgacccagtc tccagactcc ctggctgtgt ctctgggcga gagggccacc 60

atcaactgca agtccagcca gaatgtttta tacagctcca acaataagaa taacttagct 120

tggtaccaac aaagaccagg acagcctcct aaagtgctcc tttattgggc atctacccgg 180

gcatccgggg tccctgaccg attcagtggc agcgggtctg ggacagattt cactctcacc 240

atcaacagcc ttcaggctga agatgtggca ctttattact gtcaacaata ttatggtaaa 300

cccttcactt tcggccctgg gaccaaagtg gagatcaaac 340

<210> 579
<211> 363
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 579
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagg tacctttagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attacccctc tgttcggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagacg atagtacgtc aactgcatat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtcct 300

acactgtaca gtcctcctgt ttttgatgtg tggggccagg ggaccttagt cactgtgtct 360

agc 363

<210> 580
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 580
cagactgtgg tgactcagga gccatcgttc tcagtgtccc ctggagggac aatcaccctc 60

acttgtggct tgagttctgg ctcagtctct actactaatt atcccagctg gtaccagcag 120

accccaggcc gaactccacg cacgctcatc tacaacacaa acactcgctc ttctggggtc 180

cctgatcgct tctctggctc catccttggg aacaaagctg ccctcaccat cacgggggcc 240

caggcaggtg atgaatctga ttattactgt gttttatata tgggtcgtgg catttatgtc 300

ttcggaagtg ggaccaaggt ctccgtcctg g 331

<210> 581
<211> 369
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic Polynucleotide

<400> 581
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagg cacttttcgc tcttacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcatgccaa tctttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagacg agagtacgac aaccgtgtac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtgct 300

ggtgttagtg ctggtcctag ttggcctttt gacgtttggg gccaggggac cttagtcact 360

gtgtctagc 369

<210> 582
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 582
cagcctgggc tgactcagcc accctcggtg tccaaggact tgaggcagac cgccacactc 60

acctgcactg ggaacagcaa caatgttggc aaacaaggag ctacttggct gcagcagcac 120

cagggccacc ctcccaaact cctatcctac aggaataaca accggccctc agggatctca 180

gagagattct ctgcatccag gtcaggagac acagcctccc tgaccattac tggcctccag 240

cctgaggacg aggctgacta ttactgctca gcatgggaca gcagcctcag tgtatgggtg 300

ttcggcggag ggaccaagct gaccgtccta g 331

<210> 583
<211> 369
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 583
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgg taccttcagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcccta tgtttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg agagcacgtc aaccgtgtac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcagtcgt 300

ggttacaatg ttgctgctag tttcggtttc gatgtgtggg gccaggggac cttagtcact 360

gtgtctagc 369

<210> 584
<211> 322
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 584
gaaattgtgt tgacgcagtc tccatccttc ctgtctgcat ctgtaggaga cagagtcacc 60

atcacttgcc gggccagtca gtacattgat cgtagcttac actggtacca gcagaaacca 120

gatcagtctc caaagctcct catcaagtat gcttctcagt ccatctcagg ggtcccctcg 180

aggttcagtg gcagtggatc tgggacagat ttcagcctca ccatcaatag cctggaaact 240

gaagatgctg caacctatta ctgccatcag accagtagtt tgccgtggac attcggccaa 300

gggaccacgg tggaaatcaa ac 322

<210> 585
<211> 363
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 585
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgg cccatttagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcatcccta tcttcggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg aaagtacgtc aaccgcctat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtaca 300

gactacagtg gttaccgtgg ttttgacgtt tggggccagg ggaccttagt cactgtgtct 360

agc 363

<210> 586
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 586
cagactgtgg tgactcagga gccatcgttc tcagtgtccc ctggagggac agtcacactc 60

acctgtgctt tgagttctgg ctcagtctcc agttttaact acgccagctg gtaccagcag 120

accccaggcc aggcgccacg cacactcatc tccaacacaa acactcgctc ttctggggtc 180

cctgatcgct tctctggctc catccttggg aacaaagcta ccctcaccat cacgggggcc 240

caggcagatg atgaatctca ttattactgt gcactgtatg tgggtggtgg catttccgtg 300

ttcggcggag ggaccaagtt gaccgtccta g 331

<210> 587
<211> 348
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 587
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgt tacttttagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcaccccaa tctttggcac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatc agagtacgag cactgcatac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtggt 300

ggtgttttcg acgtttgggg ccaggggacc ttagtcactg tgtctagc 348

<210> 588
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 588
tcctatgagc tgactcagcc accctcggtg tctggagccc cccgacagag ggtcaccatc 60

tcctgttctg gaagcagctc caacatcgga aataatgctg taaactggta ccagcagctc 120

ccaggaaagg ctcccaaact cctcatctat tatgatgata tgctgccctc aggggtctct 180

gaccgattct ctggctccaa gtctggctcc tcagcctccc tggccatcag tgggctccag 240

tctgaggatg aggctgacta ttattgtgca gcatgggatg acagcctgag cggtccggtt 300

ttcggcggag ggaccaacct gaccgtccta g 331

<210> 589
<211> 366
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 589
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagg tacttttagt tcttacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcccta tgttcggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagaca aaagtaccag cactgcctac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcgagggt 300

ggttacagtc ctggtggtgt tgacttcgac tactggggcc aggggacctt agtcactgtg 360

tctagc 366

<210> 590
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 590
aattttatgc tgactcagcc ccactctgtg tcggagtctc cggggaagac ggtaaccatc 60

tcctgcaccc gcagcagtgg cagcattgcc agcacctatg tgcagtggta ccggcagcgc 120

ccgggcagtg cccccaccac tgtgatctat gaggatcatc agagaccctc tggggtccct 180

gatcggttct ccggctccct cgacagctcc tccaactctg cctccctcac catctctgga 240

ctgaggactg aggacgcggc aacctactac tgtcagtctt ttgatgccag cactctggtg 300

ttcggcggcg ggaccaagct gaccgtcctc g 331

<210> 591
<211> 363
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 591
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagt gacttttcgt tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc atcagcggta tctttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg agagcacgtc aaccgcatat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcagtcct 300

gcttactact tcggtcctaa tatggacgtg tggggccagg ggaccttagt cactgtgtct 360

agc 363

<210> 592
<211> 334
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 592
cagtctgtgc tgactcagcc accctcagtg tctggggccc cagggcagag ggtcaccatc 60

tcctgcactg ggagcagctc caacatcggg gcaggttatg atgtacactg gtaccagcaa 120

cttccaggaa cagtccccaa actcatcatc tatgataata gcaatcggcc ctcaggggtc 180

cctgcccgat tctctggctc caagtctggc acctcagcct ccctggccat cagtgggctc 240

cagtctgagg atgaggccgc atattattgc cagtcgtatg acagcagcct gagtgttgtg 300

gtattcggcg gtgggaccaa gctgtccgtc ctag 334

<210> 593
<211> 375
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 593
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgg tacttttagt tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcccaa tctttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagacg aaagcaccag cactgtgtac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtcct 300

ggttaccacc ctgctggtgc tagtggtcaa ttctttgatc tttggggcca ggggacctta 360

gtcactgtgt ctagc 375

<210> 594
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 594
tcctatgagc tgactcagcc accctcggtg tccaaggact tgagacagac cgccacactc 60

acctgcactg ggaacagcaa caatgttggc aaccaaggag cagcttggct gcagcagcac 120

cagggccacc ctcccaaact cctatcctac aggaataacc accggccctc agggatctca 180

gacagatcat ctgcatccag gtcaggagac acagcctccc tgaccattac tggactccag 240

cctgaggacg aggctgacta ttactgctca gcatgggaca gcagcctcag tgcttgggtg 300

ttcggcggag ggaccaagct gaccgtccta g 331

<210> 595
<211> 369
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 595
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgt gaccttcagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcccta tgtttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg aaagcaccaa caccgcctat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggtcgt 300

ggttacgctc ctgacgctct gacaaatttt gacgtttggg gccaggggac cttagtcact 360

gtgtctagc 369

<210> 596
<211> 346

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 596
gaaattgtgc tgactcagtc tccagactcc ctggctatgt ctctgggcga gagggccacc 60

gtcaactgca agtccagccg gagtcttttc gacagctccg acaataagaa ctacttagct 120

tggtaccaga agaaaccagg acagcctcct caattgctca tttactgggc atctacccga 180

caatccgggg tccctgaccg attcagtggc agcgggtctg ggacagattt cactctcacc 240

atcagcagcc tgcaggctga agatgtggca gtttattact gtcagcaata ttttagtagt 300

cctcccatat tcaccttcgg ccctgggacc aaagtggaga tcaaac 346

<210> 597
<211> 375
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 597
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggtgg tccatttagc tcatacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcccta tgtttggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg aaagcacgtc aaccgtgtac 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcggttac 300

agttactacc ctggtggtgg tggtggtcgt aatttcgact actggggcca ggggacctta 360

gtcactgtgt ctagc 375

<210> 598
<211> 331
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 598
ctgcctgtgc tgactcagcc accctcagcg tctgggaccc ccgggcagag ggtcaccatc 60

tcttgttctg gaagcagctc caacatcgga agtaatactg taaactggta ccagcagctc 120

ccaggaacgg cccccaaact cctcatctat agtaataatc agcggccctc aggggtccct 180

gaccgattct ctggctccaa gtctggcacc tcagcctccc tggccatcag tgggctccag 240

tctgagggtg aggctgatta ttactgtgca gcatgggatg acagcctgaa aggtcgggtg 300

ttcggcggag ggaccaaggt gaccgtccta g 331

<210> 599
<211> 366

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 599
caggttcaat tagtgcagtc tggtgctgaa gtgaaaaagc ccggctcaag tgttaaagta 60

agctgtaagg cgagcggagg tatctttagt tcttacgcca ttagctgggt gcgacaggct 120

cctggtcagg gcctcgaatg gatgggcggc attagcccaa tcttcggtac tgcaaattat 180

gcccagaaat ttcagggtag agtcacaatt accgcagatg agagcacgaa caccgcctat 240

atggaactga gtagcctgcg ttccgaagat acagctgtgt attactgtgc gcgcagtggt 300

ggttactacg actacggtgt tggttacgac caatggggcc aggggacctt agtcactgtg 360

tctagc 366

<210> 600
<211> 322
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 600
cagcctgtgc tgactcagcc accctcagcg tctgggaccc ccgggcagag ggtcaccatc 60

tcttgttctg gaggcaggtc caacatcgga agtaatactg ttaactggta ccagcagctc 120

ccaggaacgg cccccaaact cctcatctat agtaataatc accggccctc aggggtccct 180

gatcgcttct ctggctccaa gtctggcaac acggcctccc tgaccatctc tgggctccag 240

gcggaggatg aggctgatta ttactgccag tcctatgaca gcagcgttgt attcggcgga 300

gggaccaagc tgaccgtcct ag 322

<210> 601
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 601

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 Thr Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

```
Gln Gly Arg Val Thr Ile Thr Ala Asp Lys 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 Ala Thr Gly Phe Tyr Asp Val Trp Gly Gln Gly Thr Leu
            100                 105                 110


Val Thr Val Ser Ser
        115


<210>  602
<211>  110
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic Polypeptide

<400>  602

Leu Pro 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 Pro Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110


<210>  603
<211>  123
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic Polypeptide

<400>  603

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 Val 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 Ser 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 Gly Arg Glu Tyr Tyr Ala Ser Asn Gly Asp Ser Phe Asp Val
            100                 105                 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120


<210>  604
<211>  109
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic Polypeptide

<400>  604

Gln Pro Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Lys
1               5                   10                  15

Thr Ala Ser Ile Ser Cys Glu Gly Asn Asn Ile Ala Thr Lys Ser Val
            20                  25                  30

His Trp Tyr Gln Gln Lys Ser Gly His Ala Pro Val Val Val Val Tyr
        35                  40                  45

His Asp Ser Asp Arg Pro Ser Gly Val Pro Asp Arg Phe Ser Gly Ser
    50                  55                  60

Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Arg Ser Glu
65                  70                  75                  80

Asp Glu Ala Asp Tyr Tyr Cys Ala Ala Trp Asp Asp Ser Leu Ser Gly
                85                  90                  95

Pro Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105
```

<210> 605
<211> 123
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 605

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 Ser Ala 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 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 Ser Gly Tyr Tyr Val Ala Ala Ser Gly Ala Phe Asp Val
100 105 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 606
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 606

Gln Pro Gly Leu Thr Gln Pro Pro Ser Val Ser Lys Gly Leu Arg Gln
1 5 10 15

Thr Ala Thr Leu Thr Cys Thr Gly Asn Ile Asn Asn Val Gly Asp Gln
20 25 30

Gly Ala Gly Trp Leu Gln Gln His Gln Gly Arg Pro Pro Lys Leu Leu
35 40 45

Ser Tyr Arg Asn Ser Asn Arg Pro Ser Gly Val Ser Glu Arg Phe Ser
50 55 60

Ala Ser Arg Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Leu Gln
65 70 75 80

Pro Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ala Trp Asp Ser Ser Leu
85 90 95

Ser Asp Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 607
<211> 127
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 607

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 Ile 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 Thr 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 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 Asp Leu Ser Arg Asp Ser Leu Asn Leu Pro Gly Ser Ser Pro
100 105 110

Gly Tyr Asp Leu Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120 125

<210> 608
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 608

Glu Thr Thr 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

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 Val Tyr Tyr Cys Gln Gln Tyr Ser Ser Ser Pro Tyr
85 90 95

Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105

<210> 609
<211> 123
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 609

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 Val Ile 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 Ser 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 Ser Arg Gly Tyr Ala Pro Gly Thr Ser Phe His Tyr Asp Val
100 105 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 610
<211> 108

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 610

Leu Pro Val Leu Thr Gln Ala Pro Ser Met Ser Val Ala Pro Gly Lys
1 5 10 15

Thr Ala Ser Ile Thr Cys Gly Gly Asp Asn Ile Gly Ser Lys Ser Val
20 25 30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Met 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 Phe Cys Gln Leu Trp Asp His Thr Asn Ser His
85 90 95

Val Val Phe Gly Gly Arg Thr Lys Leu Thr Val Leu
100 105

<210> 611
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 611

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 Ser Pro Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ser 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 Gln Gly Gly Thr Arg Gly Asn Tyr Phe Asp Val Trp Gly
            100                 105                 110


Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120


<210>  612
<211>  110
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic Polypeptide

<400>  612

Gln Pro Val Leu Thr Gln Pro Pro Ser Val Ser Lys Gly Leu Arg Gln
1               5                   10                  15


Thr Ala Thr Val Thr Cys Thr Gly Asn Ser Asn Asn Val Gly Asn Gln
            20                  25                  30


Gly Ala Ala Trp Leu Gln Gln His Gln Gly His Pro Pro Lys Leu Leu
        35                  40                  45


Ser Tyr Arg Asn Asn Asn Arg Pro Ser Gly Ile Ser Glu Arg Leu Ser
    50                  55                  60


Ala Ser Arg Ser Gly Asn Thr Ala Ser Leu Thr Ile Ala Gly Leu Gln
65                  70                  75                  80


Pro Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ala Trp Asp Asn Thr Val
                85                  90                  95


Ser Gly Trp Val Phe Gly Gly Gly Thr Arg Val Thr Val Leu
            100                 105                 110


<210>  613
<211>  117
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic Polypeptide

<400>  613

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 Thr 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 Asn 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 Gly Gly Gly Arg Phe Asp Val Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser Ser
115

<210> 614
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 614

Ser Tyr Glu 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 Ser Thr Ser Asn Ile Gly Asn Asn
20 25 30

Ala Leu Asn Trp Tyr Gln Lys Leu Pro Gly Thr Ala Pro Lys Leu Leu
35 40 45

Ile Tyr Ser Leu 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 Glu Ala Trp Asp Asp Ser Leu
85 90 95

Ser Gly Pro Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu
100 105 110

<210> 615
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 615

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 Pro Phe Arg 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 Gly Gly Val Tyr Ser Phe Asp Val Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser Ser
115

<210> 616
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 616

Gln Ser Gly 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 Gly Ser Asn Val Gly Ser Asn
20 25 30

Val Val Asn Trp Tyr Gln His 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 Gln
65 70 75 80

Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ala Trp Asp Asp Arg Leu
85 90 95

Asn Gly Phe Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu
100 105 110

<210> 617
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 617

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 Val Pro 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 Ser Pro Leu Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Gln 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 Gly Leu Gly Thr Tyr Ser Pro Ser Leu Tyr Pro Arg Gly Met
100 105 110

Asp Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120 125

<210> 618
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 618

Leu Pro Val Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Pro Gly Gln
1 5 10 15

Ser Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Arg Asn
20 25 30

Asp Val Asn Trp Tyr Gln Gln Phe Pro Gly Arg Ala Pro Lys Leu Leu
35 40 45

Ile Tyr Gly Arg Asp Glu Arg Pro Phe Gly Val Pro Ala 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 Ala Ser Leu
85 90 95

Met Ile Tyr Val Phe Gly Thr Gly Thr Thr Val Thr Val Leu
100 105 110

<210> 619
<211> 122
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 619

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 Val 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 Ser Pro Met 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 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 Gly Arg Ala Tyr Leu Ser Val Arg Gly Ser Phe Asp Val Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 620
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 620

Ser Tyr Glu 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 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 Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu
100 105 110

<210> 621
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 621

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 Val Ile 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 Lys 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 Gly Ser Gly Ser Phe Asp Val Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser Ser
115

<210> 622
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 622

Gln Pro Gly 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 Leu Gly Ser Asn
20 25 30

Tyr Val Phe Trp Tyr Gln His Leu Pro Gly Ala Ala Pro Lys Leu Leu
35 40 45

Ile Tyr Arg Asn 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 Ala Trp Asp Asp Ser Leu
85 90 95

Asn Gly Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 623
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 623

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 Val 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 Ser Pro Val Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Asp Ser Thr Asn 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 Ser Arg Gly Tyr Thr Val Ser Ser Leu Ala Gly Arg Tyr Phe
            100                 105                 110

Asp Gln Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125
```

<210> 624
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 624

```
Glu Thr Thr Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

Glu Arg Ala Ser Leu Ser Cys Lys Ala Ser Glu Ser Leu Cys Ser Thr
            20                  25                  30

Cys Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Ile
        35                  40                  45

Val Tyr Gly Ala Thr 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

Gln Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
            100                 105
```

<210> 625
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 625

```
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 Val Pro Leu 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 Gly Leu Gly Leu Tyr Phe Asp Val Trp Gly Gln Gly Thr Leu
            100                 105                 110

Val Thr Val Ser Ser
        115
```

<210> 626
<211> 109
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 626

```
Gln Thr Val Val Thr Gln Glu Pro Ser Leu Thr Val Ser Pro Gly Glu
1               5                   10                  15

Thr Val Thr Leu Thr Cys Ala Ser Ser Thr Gly Ala Val Thr Ser Gly
            20                  25                  30

Tyr Tyr Pro Asn Trp Phe Gln Gln Lys Pro Gly Gln Ala Pro Arg Ala
        35                  40                  45

Leu Ile Tyr Ser 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 Gly Val
65                  70                  75                  80

Gln Pro Glu Asp Glu Ala Glu Tyr Tyr Cys Leu Leu Tyr Tyr Gly Gly
                85                  90                  95

Pro Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105
```

<210> 627
<211> 122
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 627

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 Asn 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 Arg Gly Gly Tyr Gly Pro Tyr Gly Asp Phe Asp Val Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 628
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 628

Gln Pro Gly 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 His
20 25 30

Ser Val Asn Trp Tyr Arg Gln Leu Pro Gly Thr Ala Pro Gln Leu Leu
35 40 45

Ile Tyr Gly Asn Ser Asn 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 Phe Cys Ala Ala Trp Asp Asp Gly Leu
85 90 95

Ser Gly Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 629
<211> 123
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 629

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 Pro 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 Ser Pro Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Asn 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 Arg Ser Tyr Ile Val Ser Val Ser Pro Gly Phe Asp Val
100 105 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 630
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 630

Gln Ser Val 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 Tyr 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 Thr Ser Ala Ser Leu Ala Ile Ser Glu Leu
65 70 75 80

Gln Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ser Trp Asp Asp Ser
85 90 95

Leu Asn Ala Tyr Val Phe Gly Ser Gly Thr Lys Val Thr Val Leu
100 105 110

<210> 631
<211> 123
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 631

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 Ile 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 Ser Ala 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 Ser Gly Ile Ala Ser Gly Tyr Thr Ala Tyr Met Asp Tyr
100 105 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 632
<211> 108
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Polypeptide

<400> 632

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 Ser Tyr Ala
20 25 30

Ser Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
35 40 45

Gln Ser Thr Lys Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Ala 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 Gly Ser Gly Gly Asn Pro
85 90 95

Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu
100 105

<210> 633
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 633

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 Ile Phe Arg 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 Met 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 Thr 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 Gly Ala Gly Ser Thr Phe Asp Val Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser Ser
        115

<210> 634
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 634

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 Leu Pro Gly Thr Ala Pro Arg 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 Arg Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100   105   110

<210> 635
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 635

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 Asn 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 Asn 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 Glu Ser Ala Tyr Tyr Ser Arg Asn Tyr Asp Val Trp Gly
            100                 105                 110


Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120


<210>  636
<211>  110
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic Polypeptide

<400>  636

Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Lys Gly Leu Arg Gln
1               5                   10                  15


Thr Ala Thr Leu Thr Cys Thr Gly Asn Ser Ser Asn Val Gly Asn Gln
            20                  25                  30


Gly Ala Ser Trp Leu Gln Gln His Gln Gly His Pro Pro Lys Leu Leu
        35                  40                  45


Ser Tyr Arg Asn Asp Asn Arg Pro Ser Gly Ile Ser Glu Arg Phe Ser
    50                  55                  60


Ala Ser Arg Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Leu Gln
65                  70                  75                  80


Pro Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ala Trp Asp Asn Ser Leu
                85                  90                  95


Ser Ala Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110


<210>  637
<211>  123
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic Polypeptide

<400>  637

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 Val 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 Ser Pro Met 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 Asn 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 Gly Gly Tyr Tyr Pro Ala Gly Val Gly Arg Tyr Asp Val
            100                 105                 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 638
<211> 113
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 638

```
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 Asn Val Leu Tyr Ser
            20                  25                  30

Ser Asn Asn Lys Asn Asn Leu Ala Trp Tyr Gln Gln Arg Pro Gly Gln
        35                  40                  45

Pro Pro Lys Val Leu Leu Tyr Trp Ala Ser Thr Arg Ala 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 Leu Tyr Tyr Cys Gln Gln
                85                  90                  95

Tyr Tyr Gly Lys Pro Phe Thr Phe Gly Pro Gly Thr Lys Val Glu Ile
            100                 105                 110
```

Lys

<210> 639
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 639

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 Thr Pro Leu Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Asp 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 Pro Thr Leu Tyr Ser Pro Pro Val Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 640
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 640

Gln Thr Val Val Thr Gln Glu Pro Ser Phe Ser Val Ser Pro Gly Gly
1 5 10 15

Thr Ile Thr Leu Thr Cys Gly Leu Ser Ser Gly Ser Val Ser Thr Thr
20 25 30

Asn Tyr Pro Ser Trp Tyr Gln Gln Thr Pro Gly Arg Thr Pro Arg Thr
35 40 45

```
Leu Ile Tyr Asn Thr Asn Thr 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 Gly Asp Glu Ser Asp Tyr Tyr Cys Val Leu Tyr Met Gly Arg
                85                  90                  95

Gly Ile Tyr Val Phe Gly Ser Gly Thr Lys Val Ser Val Leu
            100                 105                 110
```

<210> 641
<211> 123
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 641

```
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 Arg 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 Met 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 Thr 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 Gly Ala Gly Val Ser Ala Gly Pro Ser Trp Pro Phe Asp Val
            100                 105                 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 642
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 642

Gln Pro Gly Leu Thr Gln Pro Pro Ser Val Ser Lys Asp Leu Arg Gln
1 5 10 15

Thr Ala Thr Leu Thr Cys Thr Gly Asn Ser Asn Asn Val Gly Lys Gln
20 25 30

Gly Ala Thr Trp Leu Gln Gln His Gln Gly His Pro Pro Lys Leu Leu
35 40 45

Ser Tyr Arg Asn Asn Asn Arg Pro Ser Gly Ile Ser Glu Arg Phe Ser
50 55 60

Ala Ser Arg Ser Gly Asp Thr Ala Ser Leu Thr Ile Thr Gly Leu Gln
65 70 75 80

Pro Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ala Trp Asp Ser Ser Leu
85 90 95

Ser Val Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 643
<211> 123
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 643

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 Ser Pro Met 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 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 Ser Arg Gly Tyr Asn Val Ala Ala Ser Phe Gly Phe Asp Val
100 105 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 644
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 644

Glu Ile Val 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 Tyr Ile Asp Arg Ser
20 25 30

Leu His Trp Tyr Gln Gln Lys Pro Asp Gln Ser Pro Lys Leu Leu Ile
35 40 45

Lys Tyr Ala Ser Gln Ser Ile Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Ser Leu Thr Ile Asn Ser Leu Glu Thr
65 70 75 80

Glu Asp Ala Ala Thr Tyr Tyr Cys His Gln Thr Ser Ser Leu Pro Trp
85 90 95

Thr Phe Gly Gln Gly Thr Thr Val Glu Ile Lys
100 105

<210> 645
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 645

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 Pro 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 Gly Thr Asp Tyr Ser Gly Tyr Arg Gly Phe Asp Val Trp Gly
            100                 105                 110

Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 646
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 646

```
Gln Thr Val Val Thr Gln Glu Pro Ser Phe Ser Val Ser Pro Gly Gly
1               5                   10                  15

Thr Val Thr Leu Thr Cys Ala Leu Ser Ser Gly Ser Val Ser Ser Phe
            20                  25                  30

Asn Tyr Ala Ser Trp Tyr Gln Gln Thr Pro Gly Gln Ala Pro Arg Thr
        35                  40                  45

Leu Ile Ser Asn Thr Asn Thr Arg Ser Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

Ser Gly Ser Ile Leu Gly Asn Lys Ala Thr Leu Thr Ile Thr Gly Ala
65                  70                  75                  80

Gln Ala Asp Asp Glu Ser His Tyr Tyr Cys Ala Leu Tyr Val Gly Gly
                85                  90                  95

Gly Ile Ser Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110
```

<210> 647
<211> 116
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 647

```
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 Val 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 Thr Pro Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Ile Thr Ala Asp Gln 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 Gly Gly Val Phe Asp Val Trp Gly Gln Gly Thr Leu Val
            100                 105                 110

Thr Val Ser Ser
        115
```

<210> 648
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 648

```
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Arg Gln
1               5                   10                  15

Arg Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Asn Asn
            20                  25                  30

Ala Val Asn Trp Tyr Gln Gln Leu Pro Gly Lys Ala Pro Lys Leu Leu
        35                  40                  45

Ile Tyr Tyr Asp Asp Met Leu Pro Ser Gly Val Ser Asp Arg Phe Ser
    50                  55                  60

Gly Ser Lys Ser Gly Ser 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

Ser Gly Pro Val Phe Gly Gly Gly Thr Asn Leu Thr Val Leu
            100                 105                 110
```

<210> 649
<211> 122
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 649

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 Ser Pro Met Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys 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 Gly Gly Tyr Ser Pro Gly Gly Val Asp Phe Asp Tyr Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 650
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 650

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 Ser Thr
20 25 30

Tyr Val Gln Trp Tyr Arg Gln Arg Pro Gly Ser Ala Pro Thr Thr Val
35 40 45

Ile Tyr Glu Asp His Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
50 55 60

Gly Ser Leu Asp Ser Ser Ser Asn Ser Ala Ser Leu Thr Ile Ser Gly
65 70 75 80

Leu Arg Thr Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Ser Phe Asp Ala
85 90 95

Ser Thr Leu Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 651
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 651

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 Val Thr Phe Arg 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 Ser Gly 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 Ser Pro Ala Tyr Tyr Phe Gly Pro Asn Met Asp Val Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 652
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 652

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 Gln Leu Pro Gly Thr Val Pro Lys Leu
35 40 45

Ile Ile Tyr Asp Asn Ser Asn Arg Pro Ser Gly Val Pro Ala Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu
65 70 75 80

Gln Ser Glu Asp Glu Ala Ala Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser
85 90 95

Leu Ser Val Val Val Phe Gly Gly Gly Thr Lys Leu Ser Val Leu
100 105 110

<210> 653
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 653

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 Ser 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 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 Gly Pro Gly Tyr His Pro Ala Gly Ala Ser Gly Gln Phe Phe
100 105 110

Asp Leu Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120 125

<210> 654
<211> 110
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Polypeptide

<400> 654

Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Lys Asp Leu Arg Gln
1 5 10 15

Thr Ala Thr Leu Thr Cys Thr Gly Asn Ser Asn Asn Val Gly Asn Gln
20 25 30

Gly Ala Ala Trp Leu Gln Gln His Gln Gly His Pro Pro Lys Leu Leu
35 40 45

Ser Tyr Arg Asn Asn His Arg Pro Ser Gly Ile Ser Asp Arg Ser Ser
50 55 60

Ala Ser Arg Ser Gly Asp Thr Ala Ser Leu Thr Ile Thr Gly Leu Gln
65 70 75 80

Pro Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ala Trp Asp Ser Ser Leu
85 90 95

Ser Ala Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 655
<211> 123
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 655

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 Val 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 Ser Pro Met 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 Asn 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 Arg Gly Tyr Ala Pro Asp Ala Leu Thr Asn Phe Asp Val
100 105 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 656
<211> 115
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 656

Glu Ile Val Leu Thr Gln Ser Pro Asp Ser Leu Ala Met Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Val Asn Cys Lys Ser Ser Arg Ser Leu Phe Asp Ser
20 25 30

Ser Asp Asn Lys Asn Tyr Leu Ala Trp Tyr Gln Lys Lys Pro Gly Gln
35 40 45

Pro Pro Gln Leu Leu Ile Tyr Trp 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 Phe Ser Ser Pro Pro Ile Phe Thr Phe Gly Pro Gly Thr Lys Val
100 105 110

Glu Ile Lys
115

<210> 657
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 657

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 Pro 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 Ser Pro Met 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 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 Gly Tyr Ser Tyr Tyr Pro Gly Gly Gly Gly Gly Arg Asn Phe
            100                 105                 110

Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125
```

<210> 658
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 658

```
Leu Pro 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 Gly Glu Ala Asp Tyr Tyr Cys Ala Ala Trp Asp Asp Ser Leu
                85                  90                  95

Lys Gly Arg Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu
            100                 105                 110
```

<210> 659
<211> 122
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 659

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 Ile 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 Ser 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 Asn 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 Ser Gly Gly Tyr Tyr Asp Tyr Gly Val Gly Tyr Asp Gln Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 660
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 660

Gln Pro 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 Gly Arg 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 His Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
50 55 60

Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu Gln
65 70 75 80

Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser Val
85 90 95

Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105

<210> 661
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> misc_feature
<222> (4)..(5)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (8)..(8)
<223> Xaa can be any naturally occurring amino acid

<400> 661

Cys Ala Arg Xaa Xaa Gly Tyr Xaa Pro
1 5

<210> 662
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<220>
<221> misc_feature
<222> (4)..(6)
<223> Xaa can be any naturally occurring amino acid

<400> 662

Cys Ala Arg Xaa Xaa Xaa Tyr Tyr
1 5

<210> 663
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<400> 663
tggacaaggg cttgagtgga t 21

<210> 664
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<400> 664
ccctggaact tctgtgcgta gt 22

<210> 665
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<400> 665

Cys Cys Thr Ala Thr Cys Cys Thr Thr Gly Gly Thr Ala Thr Ala Gly
1 5 10 15

Cys Ala

<210> 666
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<400> 666
tggacaaggg cttgagtgga t 21

<210> 667
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<400> 667
ccctggaact tctgtgcgta gt 22

<210> 668
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<400> 668
ccctatcttt ggtacagc 18

<210> 669
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 669

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
1 5 10

<210> 670
<211> 20
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 670

Tyr Tyr Tyr Tyr Tyr Gly Met Asp Val Trp Gly Gln Gly Thr Thr Val
1 5 10 15

Thr Val Ser Ser
20

<210> 671
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 671

Phe Asp Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
1 5 10

<210> 672
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 672

Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser
1 5 10 15

<210> 673
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 673

Ile Ile Pro Ile Phe Gly Thr Ala
1 5

<210> 674
<211> 8
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 674

Ile Ser Pro Ile Phe Gly Thr Ala
1 5

<210> 675
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 675

Ile Ile Pro Met Phe Gly Thr Ala
1 5

<210> 676
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 676

Ile Ile Pro Ile Phe Arg Thr Ala
1 5

<210> 677
<211> 354
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide

<400> 677
caggtgcagc tggtgcagtc tgggggaggc gtggtccaac ctgggaggtc cctgagactc 60

tcctgtgtag cctctgagtt caccttcaat acttatggca tgcactgggt ccgccaggct 120

ccaggcaagg gactggagtg ggtggcagct atttcatatg atggaactaa gaaattttat 180

gcagactccc tgaagggccg attcaccatc tccagagaca attccaagaa cacgttgtat 240

ctccaaatga acagcctgag atctgaggac acggccgtgt attactgtgc gagaagtggt 300

gactccgatg cttttgatat ctggggccaa gggacaatgg tcaccgtctc ctca 354

<210> 678
<211> 118
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide

<400> 678

Gln Val Gln Leu Val Gln Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 5 10 15

Ser Leu Arg Leu Ser Cys Val Ala Ser Glu Phe Thr Phe Asn 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 Ala Ile Ser Tyr Asp Gly Thr Lys Lys Phe Tyr Ala Asp Ser Leu
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 Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Ser Gly Asp Ser Asp Ala Phe Asp Ile Trp Gly Gln Gly Thr
100 105 110

Met Val Thr Val Ser Ser
115

<210> 679
<211> 321
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide

<400> 679
tcctatgagc tgactcagcc accctcagtg tccgtgtccc caggacagac agccaccatc 60

acctgctctg gagatgaatt gggggataaa tttgctttct ggtatcaaca aaagccaggc 120

cagtcccctg tgctggtcat ctatcaagat agtaagaggc cctcagggat ccctgagcga 180

ttctctggct ccaactctgg gaacacagcc actctgacca tcagcgggac ccaggctctg 240

gatgaggctg actattactg tcaggcgtgg gacagcaaca gttatgtctt cggaactggg 300

accaaggtca ccgtcctagg t 321

<210> 680
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide

<400> 680

Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln

1 5 10 15

Thr Ala Thr Ile Thr Cys Ser Gly Asp Glu Leu Gly Asp Lys Phe Ala
20 25 30

Phe 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 Leu
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Gln Ala Trp Asp Ser Asn Ser Tyr Val
85 90 95

Phe Gly Thr Gly Thr Lys Val Thr Val Leu
100 105

<210> 681
<211> 360
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide

<400> 681
gaggtgcagc tggtgcagtc tggggctgag gtgaaggagc ctgggtcctc ggtgaaggtc 60

tcctgcaagg cttctggggg caccttcggc agttatgcta tcaactgggt gcgacaggcc 120

cctggacaaa ggcttgagtg gatgggatgg atcgacgctg ccaatggtaa cacaaaatat 180

tcacagaagt tccagggcag agtcaccatt accggagaca catccgcgag cacagcctac 240

atggaactga gcagcctgag atctgaagac acggctgtgt attactgtgc gagagatagg 300

tggatgacta cgcgggcttt tgatatctgg ggccaaggga caatggtcac cgtctcttca 360

<210> 682
<211> 120
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide

<400> 682

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Glu Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Thr Phe Gly Ser Tyr
20 25 30

Ala Ile Asn Trp Val Arg Gln Ala Pro Gly Gln Arg Leu Glu Trp Met

35 40 45

Gly Trp Ile Asp Ala Ala Asn Gly Asn Thr Lys Tyr Ser Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Gly Asp Thr Ser Ala 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 Arg Trp Met Thr Thr Arg Ala Phe Asp Ile Trp Gly Gln
100 105 110

Gly Thr Met Val Thr Val Ser Ser
115 120

<210> 683
<211> 333
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide

<400> 683
cagcctgtgc tgactcagcc accctcagcg tctgggaccc ccgggcagag ggtcaccatc 60

tcttgttctg gaagcagctc caacatcgga agtaattatg ttttctggta ccagcagctc 120

ccagggatgg cccccaaact cctcatctct aggaataatc agcggccctc aggggtccct 180

gaccgattct ctggctccaa gtctggcacc tcagcctccc tggccatcag tgggccccag 240

tctgaggatg aggctgatta ttactgtgca gcatgggatg acagcctgcg tggtcccgtg 300

ttcggcggag ggaccagggt gaccgtccta ggt 333

<210> 684
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide

<400> 684

Gln Pro 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 Phe Trp Tyr Gln Gln Leu Pro Gly Met Ala Pro Lys Leu Leu
35 40 45

Ile Ser 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 Pro Gln
65 70 75 80

Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ala Trp Asp Asp Ser Leu
85 90 95

Arg Gly Pro Val Phe Gly Gly Gly Thr Arg Val Thr Val Leu
100 105 110

<210> 685
<211> 369
<212> DNA
<213> Artificial Sequence

<220>
<223> Artificial polynucleotide

<400> 685
caggtgcagc tggtgcagtc tggggctgag gtgaagaagc ctgggtcctc ggtgaaggtc 60

tcctgcaagg cgtctggagg cactttcagc agctatgcag tcagctgggt gcgacaggcc 120

cctggacaag gtcttgagtg ggtgggaagg ataatcccta tttttggtaa ggcaaactac 180

gcacagaagt tccagggcag agtcacgata accgcggaca aatccacgag cacagcctat 240

atggaactga gcagcctgag acctgaagac acggccgtat attactgtgc gagagatcag 300

gggatttcgg ccaatttcaa agatgctttt gatatctggg gccaagggac cacggtcacc 360

gtctcctca 369

<210> 686
<211> 123
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide

<400> 686

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 Val Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Val
35 40 45

Gly Arg Ile Ile Pro Ile Phe Gly Lys Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Pro Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Gln Gly Ile Ser Ala Asn Phe Lys Asp Ala Phe Asp Ile
100 105 110

Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 687
<211> 321
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide

<400> 687
gaaacgacac tcacgcagtc tccagccacc ctgtctgtgt ctccagggga aagagccacc 60

ctctcctgca gggccagtga gagtgttggc agcaacttag cctggtacca gcagaaacct 120

ggccaggctc ccagcctcct catctatggt gcatccacca gggccactgg tatcccagac 180

agattcagtg gcagtgggtc tgggacagac ttcactctca ccatcagcag cctgcagtct 240

gaagattttg cagcttatta ttgtcagcag tataataact ggccactcac cttcggccct 300

gggaccaaag tggaaatcaa a 321

<210> 688
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide

<400> 688

Glu Thr Thr Leu 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 Glu Ser Val Gly Ser Asn
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Ser Leu Leu Ile
35 40 45

Tyr Gly Ala Ser Thr Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Ser
65 70 75 80

Glu Asp Phe Ala Ala Tyr Tyr Cys Gln Gln Tyr Asn Asn Trp Pro Leu
85 90 95

Thr Phe Gly Pro Gly Thr Lys Val Glu Ile Lys
100 105

<210> 689
<211> 375
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide

<400> 689
caggtgcagc tggtgcagtc tggggctgag gtgaagaagc ctgggtcctc ggtgaaggtc 60

tcctgcaagg cttctggagg caccttcagc agctatgcta tcagctgggt gcgacaggcc 120

cctggacaag ggcttgagtg gatgggaggg atcatcccta tctttggtac agcaaactac 180

gcacagaagt tccagggcag agtcacgatt accgcggaca aatccacgag cacagcctac 240

atggagctga gcagcctgag atctgaggac acggccgtgt attactgtgc gagggtagga 300

tattgtagta gtaccagctg tcacatcggc gcttttgata tctggggcca agggaccacg 360

gtcaccgtct cctca 375

<210> 690
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide

<400> 690

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 Lys 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 Gly Tyr Cys Ser Ser Thr Ser Cys His Ile Gly Ala Phe
100 105 110

Asp Ile Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser

115 120 125

<210> 691
<211> 321
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide

<400> 691
gaaacgacac tcacgcagtc tccaggcacc ctgtctttgt ctccagggga aagagccacc 60

ctctcctgca gggccagtca gagtgttagc agcagcatag cctggtatca gcagaaacct 120

gggcaggctc ccaggctcct catgtttgat tcatccacca gggccactgg tatcccagac 180

aggttcagtg gcagtgggtc tgggacagac ttcactctca acatcagcag cctagagcct 240

gaagattttg cagtgtatta ctgtcagcag tatagtagct caccttacac ttttggccag 300

gggaccaaac tggagatcaa a 321

<210> 692
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide

<400> 692

Glu Thr Thr 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

Ile Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Met
35 40 45

Phe Asp Ser Ser Thr Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Asn Ile Ser Ser Leu Glu Pro
65 70 75 80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Ser Ser Ser Pro Tyr
85 90 95

Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105

<210> 693
<211> 375
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide

<400> 693
caggtgcagc tggtgcagtc tggggctgag gtgaagaagc ctgggtcctc ggtgaaggtc 60

tcctgcaagg cttctggagg caccttcagc agctatgcta tcagctgggt gcgacaggcc 120

cctggacaag ggcttgagtg gatgggaggg atcatcccta tctttggtac agcaaactac 180

gcacagaagt tccagggcag agtcacgatt accgcggaca aatccacgag cacagcctac 240

atggagctga gcagcctgag atctgaggac acggccgtgt attactgtgc gagagcctca 300

tattgtagta ctaccagctg cgctagtggt gcttttgata tctggggcca aggcaccctg 360

gtcaccgtct cctca 375

<210> 694
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide

<400> 694

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 Lys 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 Ala Ser Tyr Cys Ser Thr Thr Ser Cys Ala Ser Gly Ala Phe
100 105 110

Asp Ile Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120 125

<210> 695
<211> 339
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide

<400> 695
gacatccaga tgacccagtc tccagactcc ctggctgtgt ctctgggcga gagggccacc 60

atcaactgca agtccagcca gagtgtttta tacagctcca acaataagaa ctacttagct 120

tggtaccagc agaaaccagg acagcctcct aagctgctca tttactgggc atctgcccgg 180

gaatccgggg tccctgaccg attcagtggc agcgggtctg ggacagattt cactctcacc 240

atcagcagcc tgcagcctga agatgtggca atttattact gtcagcaata ttatagtgtt 300

ccattcactt tcggccctgg gaccaaagtg gagatcaaa 339

<210> 696
<211> 113
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide

<400> 696

Asp Ile Gln 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 Ala 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 Pro Glu Asp Val Ala Ile Tyr Tyr Cys Gln Gln
85 90 95

Tyr Tyr Ser Val Pro Phe Thr Phe Gly Pro Gly Thr Lys Val Glu Ile
100 105 110

Lys

<210> 697
<211> 363
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide

<400> 697
gaggtgcagc tggtgcagtc tggagctgag gtgaagaagc ctggggcctc agtgaaggtt 60

tcctgcaagg cttctggata caccttcaat gtatatgcta tcaactgggt gcgacaggcc 120

cctggacaag ggcttgagtg gatgggaagg atcatcccta tccttggtat agcaaactac 180

gcacagaagt tccagggcag agtcacgatt accgcggaca aatccacgag cacagcctac 240

atggagctga gcagcctgag atctgaggac acggccgtgt attactgtgc gagagattac 300

tatggttcgg gagctagggg ctttgactac tggggccagg gcaccctggt caccgtctcc 360

tca 363

<210> 698
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide

<400> 698

Glu 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 Asn Val Tyr
20 25 30

Ala Ile Asn Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Arg Ile Ile Pro Ile Leu Gly Ile Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys 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 Tyr Tyr Gly Ser Gly Ala Arg Gly Phe Asp Tyr Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 699
<211> 333
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide

<400> 699
cagcctgggc tgactcagcc accctcggtg tccaagggct tgagacagac cgccacactc 60

acctgcactg ggaacagcaa caatgttggc aaccaaggag cagcttggct gcagcagcac 120

cagggccacc ctcccaaact cctatcctac acgaataaca accggccctc agggatctca 180

gagagattat ctgcatccag gtcaggaaac acagcctccc tggccattac tggactccag 240

cctgaggacg aggcagacta ttactgtgca tcatgggaca gcagcctcag tgtttgggtg 300

atcggcggag ggaccaagtt gaccgtccta ggt 333

<210> 700
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide

<400> 700

Gln Pro Gly Leu Thr Gln Pro Pro Ser Val Ser Lys Gly Leu Arg Gln
1 5 10 15

Thr Ala Thr Leu Thr Cys Thr Gly Asn Ser Asn Asn Val Gly Asn Gln
20 25 30

Gly Ala Ala Trp Leu Gln Gln His Gln Gly His Pro Pro Lys Leu Leu
35 40 45

Ser Tyr Thr Asn Asn Asn Arg Pro Ser Gly Ile Ser Glu Arg Leu Ser
50 55 60

Ala Ser Arg Ser Gly Asn Thr Ala Ser Leu Ala Ile Thr Gly Leu Gln
65 70 75 80

Pro Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ser Trp Asp Ser Ser Leu
85 90 95

Ser Val Trp Val Ile Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 701
<211> 378
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide

<400> 701
gaggtgcagc tggtgcagtc tggggctgag gtgaagaagc ctgggtcctc ggtgaaggtc 60

tcctgcaagg cttctggagg caccttcagc agctatgcta tcagctgggt gcgacaggcc 120

cctggacaag ggcttgagtg gatgggaggg atcatcccta tctttggtat agcaaactac 180

gcacagaagt tccagggcag agtcacgatt accgcggaca aatccacgag cacagcctac 240

atggagctga gcagcctgag atctgaggac acggccgtgt attactgtgc gagctctaat 300

tactatggtt cagggagtta ttatccgcga agtgcttttg atatctgggg ccaagggacc 360

acggtcaccg tctcctca 378

<210> 702
<211> 126
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide

<400> 702

Glu 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 Ile Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys 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 Ser Ser Asn Tyr Tyr Gly Ser Gly Ser Tyr Tyr Pro Arg Ser Ala
100 105 110

Phe Asp Ile Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
115 120 125

<210> 703
<211> 321
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic polynucleotide

<400> 703
gaaacgacac tcacgcagtc tccagccacc ctgtctgtgt ctccagggga aagggccatc 60

ctctcctgca gggccagtca gagtataagc aatgacttag cctggtacca gcagaaacct 120

ggccaggctc ccaggctcct catctatggt gcatccagca gggccactgg catcccagac 180

aggttcagtg gcagtgggtc tgggacggac ttcaccttca ccatcagcag actggagtct 240

gaagattttg cagtgtatta ctgtcagcag tatggtgttt cacctctcac tttcggcggg 300

gggaccaagg tggagatcaa a 321

<210> 704

<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic polypeptide

<400> 704

Glu Thr Thr Leu Thr Gln Ser Pro Ala Thr Leu Ser Val Ser Pro Gly
1 5 10 15

Glu Arg Ala Ile Leu Ser Cys Arg Ala Ser Gln Ser Ile Ser Asn Asp
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 Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Phe Thr Ile Ser Arg Leu Glu Ser
65 70 75 80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Val Ser Pro Leu
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105

<210> 705
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 705

Glu Phe Thr Phe Asn Thr Tyr Gly
1 5

<210> 706
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 706

Ile Ser Tyr Asp Gly Thr Lys Lys
1 5

<210> 707
<211> 11
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 707

Ala Arg Ser Gly Asp Ser Asp Ala Phe Asp Ile
1 5 10

<210> 708
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 708

Gly Gly Thr Phe Gly Ser Tyr Ala
1 5

<210> 709
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 709

Ile Asp Ala Ala Asn Gly Asn Thr
1 5

<210> 710
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 710

Ala Arg Asp Arg Trp Met Thr Thr Arg Ala Phe Asp Ile
1 5 10

<210> 711
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 711

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 712

<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 712

Ile Ile Pro Ile Phe Gly Lys Ala
1 5

<210> 713
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 713

Ala Arg Asp Gln Gly Ile Ser Ala Asn Phe Lys Asp Ala Phe Asp Ile
1 5 10 15

<210> 714
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 714

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 715
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 715

Ala Arg Val Gly Tyr Cys Ser Ser Thr Ser Cys His Ile Gly Ala Phe
1 5 10 15

Asp Ile

<210> 716
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 716

Ala Arg Ala Ser Tyr Cys Ser Thr Thr Ser Cys Ala Ser Gly Ala Phe
1 5 10 15

Asp Ile

<210> 717
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 717

Gly Tyr Thr Phe Asn Val Tyr Ala
1 5

<210> 718
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 718

Ile Ile Pro Ile Leu Gly Ile Ala
1 5

<210> 719
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 719

Ala Arg Asp Tyr Tyr Gly Ser Gly Ala Arg Gly Phe Asp Tyr
1 5 10

<210> 720
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 720

Ile Ile Pro Ile Phe Gly Ile Ala
1 5

<210> 721
<211> 19
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 721

Ala Ser Ser Asn Tyr Tyr Gly Ser Gly Ser Tyr Tyr Pro Arg Ser Ala
1 5 10 15

Phe Asp Ile

<210> 722
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 722

Glu Leu Gly Asp Lys Phe
1 5

<210> 723
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 723

Gln Asp Ser
1

<210> 724
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 724

Gln Ala Trp Asp Ser Asn Ser Tyr Val
1 5

<210> 725
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 725

Ser Ser Asn Ile Gly Ser Asn Tyr

1 5

<210> 726
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 726

Arg Asn Asn
1

<210> 727
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 727

Ala Ala Trp Asp Asp Ser Leu Arg Gly Pro Val
1 5 10

<210> 728
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 728

Glu Ser Val Gly Ser Asn
1 5

<210> 729
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 729

Gly Ala Ser
1

<210> 730
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 730

Gln Gln Tyr Asn Asn Trp Pro Leu Thr
1   5

<210> 731
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 731

Gln Ser Val Ser Ser Ser
1   5

<210> 732
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 732

Asp Ser Ser
1

<210> 733
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 733

Gln Gln Tyr Ser Ser Ser Pro Tyr Thr
1   5

<210> 734
<211> 1255
<212> PRT
<213> Middle East Respiratory Syndrome coronavirus

<400> 734

Met Phe Ile Phe Leu Leu Phe Leu Thr Leu Thr Ser Gly Ser Asp Leu
1   5   10   15

Asp Arg Cys Thr Thr Phe Asp Asp Val Gln Ala Pro Asn Tyr Thr Gln
            20   25   30

His Thr Ser Ser Met Arg Gly Val Tyr Tyr Pro Asp Glu Ile Phe Arg
        35   40   45

Ser Asp Thr Leu Tyr Leu Thr Gln Asp Leu Phe Leu Pro Phe Tyr Ser
    50   55   60

```
Asn Val Thr Gly Phe His Thr Ile Asn His Thr Phe Gly Asn Pro Val
65                  70                  75                  80

Ile Pro Phe Lys Asp Gly Ile Tyr Phe Ala Ala Thr Glu Lys Ser Asn
                85                  90                  95

Val Val Arg Gly Trp Val Phe Gly Ser Thr Met Asn Asn Lys Ser Gln
            100                 105                 110

Ser Val Ile Ile Ile Asn Asn Ser Thr Asn Val Val Ile Arg Ala Cys
        115                 120                 125

Asn Phe Glu Leu Cys Asp Asn Pro Phe Phe Ala Val Ser Lys Pro Met
    130                 135                 140

Gly Thr Gln Thr His Thr Met Ile Phe Asp Asn Ala Phe Asn Cys Thr
145                 150                 155                 160

Phe Glu Tyr Ile Ser Asp Ala Phe Ser Leu Asp Val Ser Glu Lys Ser
                165                 170                 175

Gly Asn Phe Lys His Leu Arg Glu Phe Val Phe Lys Asn Lys Asp Gly
            180                 185                 190

Phe Leu Tyr Val Tyr Lys Gly Tyr Gln Pro Ile Asp Val Val Arg Asp
        195                 200                 205

Leu Pro Ser Gly Phe Asn Thr Leu Lys Pro Ile Phe Lys Leu Pro Leu
    210                 215                 220

Gly Ile Asn Ile Thr Asn Phe Arg Ala Ile Leu Thr Ala Phe Ser Pro
225                 230                 235                 240

Ala Gln Asp Ile Trp Gly Thr Ser Ala Ala Ala Tyr Phe Val Gly Tyr
                245                 250                 255

Leu Lys Pro Thr Thr Phe Met Leu Lys Tyr Asp Glu Asn Gly Thr Ile
            260                 265                 270

Thr Asp Ala Val Asp Cys Ser Gln Asn Pro Leu Ala Glu Leu Lys Cys
        275                 280                 285

Ser Val Lys Ser Phe Glu Ile Asp Lys Gly Ile Tyr Gln Thr Ser Asn
    290                 295                 300

Phe Arg Val Val Pro Ser Gly Asp Val Val Arg Phe Pro Asn Ile Thr
305                 310                 315                 320

Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Lys Phe Pro Ser
                325                 330                 335
```

```
Val Tyr Ala Trp Glu Arg Lys Lys Ile Ser Asn Cys Val Ala Asp Tyr
            340                 345                 350

Ser Val Leu Tyr Asn Ser Thr Phe Phe Ser Thr Phe Lys Cys Tyr Gly
        355                 360                 365

Val Ser Ala Thr Lys Leu Asn Asp Leu Cys Phe Ser Asn Val Tyr Ala
    370                 375                 380

Asp Ser Phe Val Val Lys Gly Asp Asp Val Arg Gln Ile Ala Pro Gly
385                 390                 395                 400

Gln Thr Gly Val Ile Ala Asp Tyr Asn Tyr Lys Leu Pro Asp Asp Phe
                405                 410                 415

Met Gly Cys Val Leu Ala Trp Asn Thr Arg Asn Ile Asp Ala Thr Ser
            420                 425                 430

Thr Gly Asn Tyr Asn Tyr Lys Tyr Arg Tyr Leu Arg His Gly Lys Leu
        435                 440                 445

Arg Pro Phe Glu Arg Asp Ile Ser Asn Val Pro Phe Ser Pro Asp Gly
    450                 455                 460

Lys Pro Cys Thr Pro Pro Ala Leu Asn Cys Tyr Trp Pro Leu Asn Asp
465                 470                 475                 480

Tyr Gly Phe Tyr Thr Thr Thr Gly Ile Gly Tyr Gln Pro Tyr Arg Val
                485                 490                 495

Val Val Leu Ser Phe Glu Leu Leu Asn Ala Pro Ala Thr Val Cys Gly
            500                 505                 510

Pro Lys Leu Ser Thr Asp Leu Ile Lys Asn Gln Cys Val Asn Phe Asn
        515                 520                 525

Phe Asn Gly Leu Thr Gly Thr Gly Val Leu Thr Pro Ser Ser Lys Arg
    530                 535                 540

Phe Gln Pro Phe Gln Gln Phe Gly Arg Asp Val Ser Asp Phe Thr Asp
545                 550                 555                 560

Ser Val Arg Asp Pro Lys Thr Ser Glu Ile Leu Asp Ile Ser Pro Cys
                565                 570                 575

Ser Phe Gly Gly Val Ser Val Ile Thr Pro Gly Thr Asn Ala Ser Ser
            580                 585                 590

Glu Val Ala Val Leu Tyr Gln Asp Val Asn Cys Thr Asp Val Ser Thr
        595                 600                 605
```

```
Ala Ile His Ala Asp Gln Leu Thr Pro Ala Trp Arg Ile Tyr Ser Thr
    610                 615                 620

Gly Asn Asn Val Phe Gln Thr Gln Ala Gly Cys Leu Ile Gly Ala Glu
625                 630                 635                 640

His Val Asp Thr Ser Tyr Glu Cys Asp Ile Pro Ile Gly Ala Gly Ile
                645                 650                 655

Cys Ala Ser Tyr His Thr Val Ser Leu Leu Arg Ser Thr Ser Gln Lys
            660                 665                 670

Ser Ile Val Ala Tyr Thr Met Ser Leu Gly Ala Asp Ser Ser Ile Ala
        675                 680                 685

Tyr Ser Asn Asn Thr Ile Ala Ile Pro Thr Asn Phe Ser Ile Ser Ile
    690                 695                 700

Thr Thr Glu Val Met Pro Val Ser Met Ala Lys Thr Ser Val Asp Cys
705                 710                 715                 720

Asn Met Tyr Ile Cys Gly Asp Ser Thr Glu Cys Ala Asn Leu Leu Leu
                725                 730                 735

Gln Tyr Gly Ser Phe Cys Thr Gln Leu Asn Arg Ala Leu Ser Gly Ile
            740                 745                 750

Ala Ala Glu Gln Asp Arg Asn Thr Arg Glu Val Phe Ala Gln Val Lys
        755                 760                 765

Gln Met Tyr Lys Thr Pro Thr Leu Lys Tyr Phe Gly Gly Phe Asn Phe
    770                 775                 780

Ser Gln Ile Leu Pro Asp Pro Leu Lys Pro Thr Lys Arg Ser Phe Ile
785                 790                 795                 800

Glu Asp Leu Leu Phe Asn Lys Val Thr Leu Ala Asp Ala Gly Phe Met
                805                 810                 815

Lys Gln Tyr Gly Glu Cys Leu Gly Asp Ile Asn Ala Arg Asp Leu Ile
            820                 825                 830

Cys Ala Gln Lys Phe Asn Gly Leu Thr Val Leu Pro Pro Leu Leu Thr
        835                 840                 845

Asp Asp Met Ile Ala Ala Tyr Thr Ala Ala Leu Val Ser Gly Thr Ala
    850                 855                 860

Thr Ala Gly Trp Thr Phe Gly Ala Gly Ala Ala Leu Gln Ile Pro Phe
865                 870                 875                 880
```

```
Ala Met Gln Met Ala Tyr Arg Phe Asn Gly Ile Gly Val Thr Gln Asn
                885                 890                 895

Val Leu Tyr Glu Asn Gln Lys Gln Ile Ala Asn Gln Phe Asn Lys Ala
            900                 905                 910

Ile Ser Gln Ile Gln Glu Ser Leu Thr Thr Thr Ser Thr Ala Leu Gly
        915                 920                 925

Lys Leu Gln Asp Val Val Asn Gln Asn Ala Gln Ala Leu Asn Thr Leu
    930                 935                 940

Val Lys Gln Leu Ser Ser Asn Phe Gly Ala Ile Ser Ser Val Leu Asn
945                 950                 955                 960

Asp Ile Leu Ser Arg Leu Asp Lys Val Glu Ala Glu Val Gln Ile Asp
                965                 970                 975

Arg Leu Ile Thr Gly Arg Leu Gln Ser Leu Gln Thr Tyr Val Thr Gln
            980                 985                 990

Gln Leu Ile Arg Ala Ala Glu Ile  Arg Ala Ser Ala Asn  Leu Ala Ala
        995                 1000                1005

Thr Lys  Met Ser Glu Cys Val  Leu Gly Gln Ser Lys  Arg Val Asp
    1010                1015                1020

Phe Cys  Gly Lys Gly Tyr His  Leu Met Ser Phe Pro  Gln Ala Ala
    1025                1030                1035

Pro His  Gly Val Val Phe Leu  His Val Thr Tyr Val  Pro Ser Gln
    1040                1045                1050

Glu Arg  Asn Phe Thr Thr Ala  Pro Ala Ile Cys His  Glu Gly Lys
    1055                1060                1065

Ala Tyr  Phe Pro Arg Glu Gly  Val Phe Val Phe Asn  Gly Thr Ser
    1070                1075                1080

Trp Phe  Ile Thr Gln Arg Asn  Phe Phe Ser Pro Gln  Ile Ile Thr
    1085                1090                1095

Thr Asp  Asn Thr Phe Val Ser  Gly Asn Cys Asp Val  Val Ile Gly
    1100                1105                1110

Ile Ile  Asn Asn Thr Val Tyr  Asp Pro Leu Gln Pro  Glu Leu Asp
    1115                1120                1125

Ser Phe  Lys Glu Glu Leu Asp  Lys Tyr Phe Lys Asn  His Thr Ser
    1130                1135                1140
```

```
Pro Asp  Val Asp Leu Gly Asp  Ile Ser Gly Ile Asn  Ala Ser Val
    1145                 1150                 1155


Val Asn  Ile Gln Lys Glu Ile  Asp Arg Leu Asn Glu  Val Ala Lys
    1160                 1165                 1170


Asn Leu  Asn Glu Ser Leu Ile  Asp Leu Gln Glu Leu  Gly Lys Tyr
    1175                 1180                 1185


Glu Gln  Tyr Ile Lys Trp Pro  Trp Tyr Val Trp Leu  Gly Phe Ile
    1190                 1195                 1200


Ala Gly  Leu Ile Ala Ile Val  Met Val Thr Ile Leu  Leu Cys Cys
    1205                 1210                 1215


Met Thr  Ser Cys Cys Ser Cys  Leu Lys Gly Ala Cys  Ser Cys Gly
    1220                 1225                 1230


Ser Cys  Cys Lys Phe Asp Glu  Asp Asp Ser Glu Pro  Val Leu Lys
    1235                 1240                 1245


Gly Val  Lys Leu His Tyr Thr
    1250                 1255
```

<210> 735
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 735

```
Ile Ile Pro Ile Phe Gly Thr Ala
1               5
```

<210> 736
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 736

```
Ser Asn Asn Val Gly Asn Gln Gly
1               5
```

<210> 737
<211> 12
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic oligopeptide

<400> 737

Gln Ser Val Leu Tyr Ser Ser Asn Asn Lys Asn Tyr
1 5 10

<210> 738
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 738

Trp Ala Ser
1

<210> 739
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 739

Gln Gln Tyr Tyr Ser Val Pro Phe Thr
1 5

<210> 740
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 740

Gln Ser Ile Ser Asn Asp
1 5

<210> 741
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 741

Gln Gln Tyr Gly Val Ser Pro Leu Thr
1 5

<210> 742
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 742

Thr Asn Asn
1

<210> 743
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 743

Ala Ser Trp Asp Ser Ser Leu Ser Val Trp Val
1 5 10

<210> 744
<211> 96
<212> PRT
<213> Homo sapiens

<400> 744

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 Lys 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

<210> 745
<211> 96
<212> PRT
<213> Homo sapiens

<400> 745

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 Arg Ile Ile Pro Ile Leu Gly Ile Ala Asn Tyr Ala Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys 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
```

<210> 746
<211> 96
<212> PRT
<213> Homo sapiens

<400> 746

```
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
```

<210> 747
<211> 96
<212> PRT
<213> Homo sapiens

<400> 747

```
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

Ala Met 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 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

<210> 748
<211> 87
<212> PRT
<213> Homo sapiens

<400> 748

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
85

<210> 749
<211> 89
<212> PRT
<213> Homo sapiens

<400> 749

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

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
                85


<210>  750
<211>  88
<212>  PRT
<213>  Homo sapiens

<400>  750

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 Val Tyr Tyr Cys
                85


<210>  751
<211>  94
<212>  PRT
<213>  Homo sapiens

<400>  751

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 Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
                85                  90
```

<210> 752
<211> 89
<212> PRT
<213> Homo sapiens

<400> 752

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 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
85

<210> 753
<211> 89
<212> PRT
<213> Homo sapiens

<400> 753

Gln Ala Gly Leu Thr Gln Pro Pro Ser Val Ser Lys Gly Leu Arg Gln
1 5 10 15

Thr Ala Thr Leu Thr Cys Thr Gly Asn Ser Asn Asn Val Gly Asn Gln
20 25 30

Gly Ala Ala Trp Leu Gln Gln His Gln Gly His Pro Pro Lys Leu Leu
35 40 45

Ser Tyr Arg Asn Asn Asn Arg Pro Ser Gly Ile Ser Glu Arg Leu Ser
50 55 60

Ala Ser Arg Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Leu Gln
65 70 75 80

Pro Glu Asp Glu Ala Asp Tyr Tyr Cys
85

<210> 754
<211> 12
<212> PRT
<213> Middle East Respiratory Syndrome coronavirus

<400> 754

Ala Ala Ala Leu Asp Thr Val Tyr Arg Pro Asn Ile
1 5 10

<210> 755
<211> 12
<212> PRT
<213> Middle East Respiratory Syndrome coronavirus

<400> 755

Pro Ala Val Leu Asp Thr Val Tyr Arg Pro Asn Ile
1 5 10

<210> 756
<211> 12
<212> PRT
<213> Middle East Respiratory Syndrome coronavirus

<400> 756

Ala Ser Ala Leu Asp Thr Val Tyr Arg Pro Asn Ile
1 5 10

<210> 757
<211> 12
<212> PRT
<213> Middle East Respiratory Syndrome coronavirus

<400> 757

Ala Val Ala Leu Asp Thr Val Tyr Arg Pro Asn Ile
1 5 10

<210> 758
<211> 12
<212> PRT
<213> Middle East Respiratory Syndrome coronavirus

<400> 758

Ala Ala Ala Phe Asp Thr Val Tyr Arg Pro Asn Ile
1 5 10

<210> 759
<211> 12
<212> PRT
<213> Middle East Respiratory Syndrome coronavirus

<400> 759

Ala Ala Ala Leu Gly Thr Val Tyr Arg Pro Asn Ile
1 5 10

<210> 760
<211> 12
<212> PRT
<213> Middle East Respiratory Syndrome coronavirus

<400> 760

Ala Ala Ala Leu Asp Thr Ala Tyr Arg Pro Asn Ile

1 5 10

<210> 761
<211> 12
<212> PRT
<213> Middle East Respiratory Syndrome coronavirus

<400> 761

Ala Ala Ala Leu Asp Thr Val Tyr Arg Pro Ile Ile
1 5 10

<210> 762
<211> 12
<212> PRT
<213> Middle East Respiratory Syndrome coronavirus

<400> 762

Ala Ala Ala Leu Asp Thr Val Tyr Arg Ser Asn Ile
1 5 10

<210> 763
<211> 12
<212> PRT
<213> Middle East Respiratory Syndrome coronavirus

<400> 763

Ala Ala Ala Leu Asp Thr Val Tyr Gly Pro Asn Ile
1 5 10

<210> 764
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 764

Ala Ala Ala Leu Asp Thr Val Tyr Ser Pro Asn Thr
1 5 10

<210> 765
<211> 12
<212> PRT
<213> Middle East Respiratory Syndrome coronavirus

<400> 765

Ala Ala Ala Leu Asp Thr Val Tyr Thr Pro Asn Ile
1 5 10

<210> 766
<211> 12
<212> PRT
<213> Middle East Respiratory Syndrome coronavirus

<400> 766

Ala Ala Ala Leu Asp Thr Val Tyr Lys Pro Asn Ile
1 5 10

<210> 767
<211> 12
<212> PRT
<213> Middle East Respiratory Syndrome coronavirus

<400> 767

Ala Ala Ala Phe Asp Ala Val Tyr Arg Pro Asn Ile
1 5 10

<210> 768
<211> 12
<212> PRT
<213> Middle East Respiratory Syndrome coronavirus

<400> 768

Ala Ala Ala Leu Asp Thr Val Tyr Lys Pro Asn Ile
1 5 10

<210> 769
<211> 12
<212> PRT
<213> Middle East Respiratory Syndrome coronavirus

<400> 769

Ala Ala Ala Phe Asp Thr Val Cys Arg Pro Asn Ile
1 5 10

<210> 770
<211> 12
<212> PRT
<213> Middle East Respiratory Syndrome coronavirus

<400> 770

Ala Ala Ala Leu Asp Thr Val His Arg Pro Asn Ile
1 5 10

<210> 771
<211> 112
<212> PRT
<213> Homo sapiens

<400> 771

Gln Val Gln Leu Val Gln 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 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

Arg Asp Gly Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
100 105 110

<210> 772
<211> 121
<212> PRT
<213> Homo sapiens

<400> 772

Glu 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 Val Ser Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Val Arg Asp Leu Val Ala Ala Ala Gly Thr Ala Phe Asp Ile Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 773
<211> 120
<212> PRT
<213> Homo sapiens

<400> 773

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 Val Ser Gly Asp Ser Val Ser Ser Asn
20 25 30

```
Phe Val 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 Arg Trp Tyr Asn Asp Tyr Ala
    50                  55                  60

Val Ser Val Gln Ser Arg Ile Arg Val Thr Pro Asp Thr Ser Lys Asn
65                  70                  75                  80

Gln Phe Ser Leu His Leu Asp Ser Val Thr Pro Glu Asp Thr Ala Val
                85                  90                  95

Tyr Tyr Cys Ala Arg Gly Gln His Ser Gly Phe Asp Phe Trp Gly Gln
            100                 105                 110

Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 774
<211> 126
<212> PRT
<213> Homo sapiens

<400> 774

```
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 Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Asp Thr Pro Gly Ile Ala Ala Arg Arg Tyr Tyr Tyr Tyr Gly
            100                 105                 110

Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
        115                 120                 125
```

<210> 775
<211> 121
<212> PRT
<213> Homo sapiens

<400> 775

```
Gln Val Gln Leu Val Gln 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

Pro Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Met
        35                  40                  45

Thr Val Ile Ser Ser Asp Gly Arg Asn Lys Tyr Tyr Pro 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 Pro Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Gly Gly Tyr His Asp Phe Trp Ser Gly Pro Asp Tyr Trp Gly
            100                 105                 110

Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 776
<211> 127
<212> PRT
<213> Homo sapiens

<400> 776

```
Glu Val Gln Leu Val 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 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 Asp Gln Val Ser Gly Ile Thr Ile Phe Gly Gly Lys Trp Arg
            100                 105                 110
```

```
Ser Pro Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
        115                 120                 125


<210>  777
<211>  126
<212>  PRT
<213>  Homo sapiens

<400>  777

Gln Val Thr Leu Lys 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


Gly Leu His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45


Ala Val Ile Ser His Asp Gly Thr Lys Lys Tyr Tyr Ala Asp Ser Val
    50                  55                  60


Lys Gly Arg Phe Thr Ile Ser Arg Asp Ser Ser Glu Asn Thr Leu Tyr
65                  70                  75                  80


Leu Gln Met Asn Ser Leu Arg Pro Glu Asp Ser Ala Leu Tyr Tyr Cys
                85                  90                  95


Ala Arg Asp Gly Gly Tyr Cys Ser Gly Gly Arg Cys Tyr Ser Tyr Gly
            100                 105                 110


Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
        115                 120                 125


<210>  778
<211>  122
<212>  PRT
<213>  Homo sapiens

<400>  778

Gln Val Gln Leu Val Gln Ser Gly Gly Gly Val Val Leu Pro Gly Arg
1               5                   10                  15


Ser Leu Arg Leu Ser Cys Val Ala Ser Gly Phe Thr Phe Arg Arg Tyr
            20                  25                  30


Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45


Ser Leu Ile Ser Tyr Asp Gly Ser Lys Thr Phe Tyr Gly Glu 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 Ala Thr Val Thr Thr Asp Gly Tyr Tyr Tyr Met Asp Val Trp
            100                 105                 110

Gly Lys Gly Thr Thr Val Thr Val Ser Ser
        115                 120
```

<210> 779
<211> 89
<212> PRT
<213> Homo sapiens

<400> 779

```
Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Pro Gly Gln Thr Val
1               5                   10                  15

Thr Ile Ser Cys Gly Ser Gly Val Ser Trp Tyr Gln Gln Pro Gly Ala
            20                  25                  30

Pro Lys Leu Leu Ile Tyr Asn Arg Pro Ser Gly Ile Pro Asp Arg Phe
        35                  40                  45

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Leu
    50                  55                  60

Gln Ala Glu Asp Ala Glu Glu Tyr Tyr Cys Ser Trp Asp Val Phe Gly
65                  70                  75                  80

Gly Gly Thr Lys Leu Thr Val Leu Gly
                85
```

<210> 780
<211> 111
<212> PRT
<213> Homo sapiens

<400> 780

```
Gln Pro Val 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 Ile Ser Asp Val Gly Gly His
            20                  25                  30

Asn Phe Val Ser Trp Tyr Gln Gln Asn Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

Ile Ile Phe Glu Val Thr Lys Arg Pro Ala 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 Gly Glu Tyr Tyr Cys Ser Ser Tyr Gly Gly Ser
                85                  90                  95


Asn Asp Val Ile Phe Gly Gly Gly Thr Lys Leu Ser Val Leu Gly
            100                 105                 110


<210>  781
<211>  111
<212>  PRT
<213>  Homo sapiens

<400>  781

Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Lys Gly Leu Arg Gln
1               5                   10                  15


Thr Ala Thr Leu Thr Cys Thr Gly Asn Ser Asn Asn Val Gly Asn Gln
            20                  25                  30


Gly Ala Ala Trp Leu Gln Gln His Gln Gly His Pro Pro Lys Leu Leu
        35                  40                  45


Ser Tyr Arg Asn Asn Asn Arg Pro Ser Gly Ile Ser Glu Arg Phe Ser
    50                  55                  60


Ala Ser Arg Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Leu Gln
65                  70                  75                  80


Pro Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ala Trp Asp Asn Arg Leu
                85                  90                  95


Lys Thr Tyr Val Phe Gly Thr Gly Gly Lys Val Thr Val Leu Gly
            100                 105                 110


<210>  782
<211>  109
<212>  PRT
<213>  Homo sapiens

<400>  782

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 Lys Phe Phe Ala
            20                  25                  30


Ser Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45
```

Gly Lys Asn Ser Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly Ser
50 55 60

Asn Ser Arg Asn Thr Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala Glu
65 70 75 80

Asp Glu Gly Asp Tyr Tyr Cys Asn Ser Arg Asp Ser Arg Asp Asn His
85 90 95

Gln Val Phe Gly Ala Gly Thr Lys Val Thr Val Leu Ser
100 105

<210> 783
<211> 108
<212> PRT
<213> Homo sapiens

<400> 783

Glu Ile Val Leu 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 Asn Thr 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 Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro
65 70 75 80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln His Tyr Gly Ser Ser Pro Leu
85 90 95

Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg
100 105

<210> 784
<211> 107
<212> PRT
<213> Homo sapiens

<400> 784

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 Tyr Tyr Ala
20 25 30

Ser Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
35 40 45

Gly Lys Asn Asn Arg Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly Ser
50 55 60

Lys Ser His Asn Thr Ala Tyr Leu Thr Ile Thr Gly Ala Gln Ala Glu
65 70 75 80

Asp Glu Ala Asp Tyr Phe Cys Asn Ser Arg Ser Gly Ser Gln Arg Val
85 90 95

Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105

<210> 785
<211> 111
<212> PRT
<213> Homo sapiens

<400> 785

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 Arg 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 Thr 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 Thr Gly Leu Gln
65 70 75 80

Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Leu Ser Phe Asp Ser Ser Leu
85 90 95

Thr Ser Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu Gly
100 105 110

<210> 786
<211> 112
<212> PRT
<213> Homo sapiens

<400> 786

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 Arg Ser Asn Ile Gly Gly 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 Ala 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 Asn Leu
                85                  90                  95


Ser Gly His Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Arg
            100                 105                 110


<210>  787
<211>  5
<212>  PRT
<213>  Homo sapiens

<400>  787

Ser Tyr Gly Met His
1               5


<210>  788
<211>  17
<212>  PRT
<213>  Homo sapiens

<400>  788

Val Ile Ser Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val Lys
1               5                   10                  15


Gly



<210>  789
<211>  12
<212>  PRT
<213>  Homo sapiens

<400>  789

Asp Leu Val Ala Ala Ala Gly Thr Ala Phe Asp Ile
1               5                   10


<210>  790
<211>  14
<212>  PRT
<213>  Homo sapiens

<400>  790

Thr Gly Thr Ile Ser Asp Val Gly Gly His Asn Phe Val Ser
1               5                   10
```

<210> 791
<211> 7
<212> PRT
<213> Homo sapiens

<400> 791

Glu Val Thr Lys Arg Pro Ala
1 5

<210> 792
<211> 10
<212> PRT
<213> Homo sapiens

<400> 792

Ser Ser Tyr Gly Gly Ser Asn Asp Val Ile
1 5 10

<210> 793
<211> 7
<212> PRT
<213> Homo sapiens

<400> 793

Ser Asn Phe Val Ala Trp Asn
1 5

<210> 794
<211> 18
<212> PRT
<213> Homo sapiens

<400> 794

Arg Thr Tyr Tyr Arg Ser Arg Trp Tyr Asn Asp Tyr Ala Val Ser Val
1 5 10 15

Gln Ser

<210> 795
<211> 8
<212> PRT
<213> Homo sapiens

<400> 795

Gly Gln His Ser Gly Phe Asp Phe
1 5

<210> 796
<211> 13
<212> PRT
<213> Homo sapiens

<400> 796

Thr Gly Asn Ser Asn Asn Val Gly Asn Gln Gly Ala Ala
1 5 10

<210> 797
<211> 7
<212> PRT
<213> Homo sapiens

<400> 797

Arg Asn Asn Asn Arg Pro Ser
1 5

<210> 798
<211> 11
<212> PRT
<213> Homo sapiens

<400> 798

Ser Ala Trp Asp Asn Arg Leu Lys Thr Tyr Val
1 5 10

<210> 799
<211> 5
<212> PRT
<213> Homo sapiens

<400> 799

Ser Tyr Gly Ile Ser
1 5

<210> 800
<211> 17
<212> PRT
<213> Homo sapiens

<400> 800

Trp Ile Ser Ala Tyr Asn Gly Asn Thr Asn Tyr Ala Gln Lys Leu Gln
1 5 10 15

Gly

<210> 801
<211> 17
<212> PRT
<213> Homo sapiens

<400> 801

Asp Thr Pro Gly Ile Ala Ala Arg Arg Tyr Tyr Tyr Tyr Gly Met Asp
1 5 10 15

Val

<210> 802
<211> 11
<212> PRT

<213> Homo sapiens

<400> 802

Gln Gly Asp Ser Leu Arg Lys Phe Phe Ala Ser
1 5 10

<210> 803
<211> 7
<212> PRT
<213> Homo sapiens

<400> 803

Gly Lys Asn Ser Arg Pro Ser
1 5

<210> 804
<211> 11
<212> PRT
<213> Homo sapiens

<400> 804

Asn Ser Arg Asp Ser Arg Asp Asn His Gln Val
1 5 10

<210> 805
<211> 5
<212> PRT
<213> Homo sapiens

<400> 805

Ser Tyr Pro Met His
1 5

<210> 806
<211> 17
<212> PRT
<213> Homo sapiens

<400> 806

Val Ile Ser Ser Asp Gly Arg Asn Lys Tyr Tyr Pro Asp Ser Val Lys
1 5 10 15

Gly

<210> 807
<211> 12
<212> PRT
<213> Homo sapiens

<400> 807

Gly Gly Tyr His Asp Phe Trp Ser Gly Pro Asp Tyr
1 5 10

<210> 808

<211> 11
<212> PRT
<213> Homo sapiens

<400> 808

Arg Ala Ser Gln Ser Val Asn Thr Asn Leu Ala
1 5 10

<210> 809
<211> 7
<212> PRT
<213> Homo sapiens

<400> 809

Gly Ala Ser Ser Arg Ala Thr
1 5

<210> 810
<211> 9
<212> PRT
<213> Homo sapiens

<400> 810

Gln His Tyr Gly Ser Ser Pro Leu Thr
1 5

<210> 811
<211> 5
<212> PRT
<213> Homo sapiens

<400> 811

Ser Tyr Ala Met Ser
1 5

<210> 812
<211> 17
<212> PRT
<213> Homo sapiens

<400> 812

Asn Ile Lys Gln Asp Gly Ser Glu Lys Tyr Tyr Val Asp Ser Val Lys
1 5 10 15

Gly

<210> 813
<211> 18
<212> PRT
<213> Homo sapiens

<400> 813

Asp Gln Val Ser Gly Ile Thr Ile Phe Gly Gly Lys Trp Arg Ser Pro
1 5 10 15

Asp Val

<210> 814
<211> 11
<212> PRT
<213> Homo sapiens

<400> 814

Gln Gly Asp Ser Leu Arg Ser Tyr Tyr Ala Ser
1 5 10

<210> 815
<211> 7
<212> PRT
<213> Homo sapiens

<400> 815

Gly Lys Asn Asn Arg Pro Ser
1 5

<210> 816
<211> 9
<212> PRT
<213> Homo sapiens

<400> 816

Asn Ser Arg Ser Gly Ser Gln Arg Val
1 5

<210> 817
<211> 5
<212> PRT
<213> Homo sapiens

<400> 817

Asn Tyr Gly Leu His
1 5

<210> 818
<211> 17
<212> PRT
<213> Homo sapiens

<400> 818

Val Ile Ser His Asp Gly Thr Lys Lys Tyr Tyr Ala Asp Ser Val Lys
1 5 10 15

Gly

<210> 819
<211> 17
<212> PRT
<213> Homo sapiens

<400> 819

Asp Gly Gly Tyr Cys Ser Gly Gly Arg Cys Tyr Ser Tyr Gly Met Asp
1 5 10 15

Val

<210> 820
<211> 13
<212> PRT
<213> Homo sapiens

<400> 820

Ser Gly Ser Arg Ser Asn Ile Gly Ser Asn Thr Val Asn
1 5 10

<210> 821
<211> 7
<212> PRT
<213> Homo sapiens

<400> 821

Thr Asn Asn Gln Arg Pro Ser
1 5

<210> 822
<211> 11
<212> PRT
<213> Homo sapiens

<400> 822

Leu Ser Phe Asp Ser Ser Leu Thr Ser Tyr Val
1 5 10

<210> 823
<211> 5
<212> PRT
<213> Homo sapiens

<400> 823

Arg Tyr Gly Met His
1 5

<210> 824
<211> 17
<212> PRT
<213> Homo sapiens

<400> 824

Leu Ile Ser Tyr Asp Gly Ser Lys Thr Phe Tyr Gly Glu Ser Val Lys
1 5 10 15

Gly

<210> 825
<211> 13
<212> PRT
<213> Homo sapiens

<400> 825

Ala Thr Val Thr Thr Asp Gly Tyr Tyr Tyr Met Asp Val
1 5 10

<210> 826
<211> 13
<212> PRT
<213> Homo sapiens

<400> 826

Ser Gly Ser Arg Ser Asn Ile Gly Gly Asn Thr Val Asn
1 5 10

<210> 827
<211> 7
<212> PRT
<213> Homo sapiens

<400> 827

Ala Asn Asn Gln Arg Pro Ser
1 5

<210> 828
<211> 12
<212> PRT
<213> Homo sapiens

<400> 828

Ala Ala Trp Asp Asp Asn Leu Ser Gly His Val Val
1 5 10

<210> 829
<211> 3
<212> PRT
<213> Homo sapiens

<400> 829

Glu Leu Arg
1

<210> 830
<211> 38
<212> PRT
<213> Homo sapiens

<400> 830

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
35

<210> 831
<211> 38
<212> PRT
<213> Macaca mulatta

<400> 831

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 Ile Lys Glu Pro Cys Phe Arg Glu Glu
20 25 30

Asn Ala Asn Phe Asn Arg
35

<210> 832
<211> 38
<212> PRT
<213> Mus musculus

<400> 832

Met Glu Pro Ile Ser Ile Tyr Thr Ser Asp Asn Tyr Ser Glu Glu Val
1 5 10 15

Gly Ser Gly Asp Tyr Asp Ser Asn Lys Glu Pro Cys Phe Asp Glu Glu
20 25 30

Asn Val His Phe Asn Arg
35

<210> 833
<211> 14
<212> PRT
<213> Homo sapiens

<400> 833

Asp Ala Val Ala Asn Trp Tyr Phe Gly Asn Phe Leu Cys Lys
1 5 10

<210> 834
<211> 14
<212> PRT
<213> Macaca mulatta

<400> 834

Asp Ala Val Ala Asn Trp Tyr Phe Gly Asn Phe Leu Cys Lys
1 5 10

<210> 835
<211> 14
<212> PRT
<213> Mus musculus

<400> 835

Asp Ala Met Ala Asp Trp Tyr Phe Lys Asn Phe Leu Cys Lys
1 5 10

<210> 836
<211> 27
<212> PRT
<213> Homo sapiens

<400> 836

Asn Val Ser Glu Ala Asp Asp Arg Tyr Ile Cys Asp Arg Phe Tyr Pro
1 5 10 15

Asn Asp Leu Trp Val Val Val Phe Gln Phe Gln
20 25

<210> 837
<211> 27
<212> PRT
<213> Macaca mulatta

<400> 837

Ser Val Ser Glu Ala Asp Asp Arg Tyr Ile Cys Asp Arg Phe Tyr Pro
1 5 10 15

Asn Asp Leu Trp Val Val Val Phe Gln Phe Gln
20 25

<210> 838
<211> 30
<212> PRT
<213> Mus musculus

<400> 838

Asp Val Ser Gln Gly Asp Ile Ala Gln Gly Arg Tyr Ile Cys Asp Arg
1 5 10 15

Leu Tyr Pro Asp Ser Leu Trp Met Val Val Phe Gln Phe Gln
20 25 30

<210> 839
<211> 21
<212> PRT
<213> Homo sapiens

<400> 839

Asp Ser Phe Ile Leu Leu Glu Ile Ile Lys Gln Gly Cys Glu Phe Glu
1 5 10 15

Asn Thr Val His Lys

20

<210> 840
<211> 21
<212> PRT
<213> Macaca mulatta

<400> 840

Asp Ser Phe Ile Leu Leu Glu Ile Ile Lys Gln Gly Cys Glu Phe Glu
1 5 10 15

Asn Thr Val His Lys
20

<210> 841
<211> 21
<212> PRT
<213> Mus musculus

<400> 841

Asp Ser Phe Ile Leu Leu Gly Val Ile Lys Gln Gly Cys Asp Phe Glu
1 5 10 15

Ser Ile Val His Lys
20

<210> 842
<211> 365
<212> PRT
<213> Homo sapiens

<400> 842

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

Gly Thr Glu Thr Ser Gln Val Ala Pro Ala Leu Glu Ser
        355                 360                 365
```

<210> 843
<211> 341
<212> PRT
<213> Homo sapiens

<400> 843

```
Met Glu Pro Cys Phe Arg Glu Glu Asn Ala Asn Phe Asn Lys Ile Phe
1               5                  10                  15

Leu Pro Thr Ile Tyr Ser Ile Ile Phe Leu Thr Gly Ile Val Gly Asn
            20                  25                  30

Gly Leu Val Ile Leu Val Met Gly Tyr Gln Lys Lys Leu Arg Ser Met
        35                  40                  45

Thr Asp Lys Tyr Arg Leu His Leu Ser Val Ala Asp Leu Leu Phe Val
    50                  55                  60

Ile Thr Leu Pro Phe Trp Ala Val Asp Ala Val Ala Asn Trp Tyr Phe
65                  70                  75                  80

Gly Asn Phe Leu Cys Lys Ala Val His Val Ile Tyr Thr Val Asn Leu
                85                  90                  95

Tyr Ser Ser Val Leu Ile Leu Ala Phe Ile Ser Leu Asp Arg Tyr Leu
            100                 105                 110

Ala Ile Val His Ala Thr Asn Ser Gln Arg Pro Arg Lys Leu Leu Ala
        115                 120                 125

Glu Lys Val Val Tyr Val Gly Val Trp Ile Pro Ala Leu Leu Leu Thr
    130                 135                 140

Ile Pro Asp Phe Ile Phe Ala Asn Val Ser Glu Ala Asp Asp Arg Tyr
145                 150                 155                 160

Ile Cys Asp Arg Phe Tyr Pro Asn Asp Leu Trp Val Val Val Phe Gln
                165                 170                 175

Phe Gln His Ile Met Val Gly Leu Ile Leu Pro Gly Ile Val Ile Leu
            180                 185                 190

Ser Cys Tyr Cys Ile Ile Ile Ser Lys Leu Ser His Ser Lys Gly His
        195                 200                 205

Gln Lys Arg Lys Ala Leu Lys Thr Thr Val Ile Leu Ile Leu Ala Phe
    210                 215                 220

Phe Ala Cys Trp Leu Pro Tyr Tyr Ile Gly Ile Ser Ile Asp Ser Phe
225                 230                 235                 240

Ile Leu Leu Glu Ile Ile Lys Gln Gly Cys Glu Phe Glu Asn Thr Val
                245                 250                 255

His Lys Trp Ile Ser Ile Thr Glu Ala Leu Ala Phe Phe His Cys Cys
```

260 265 270

Leu Asn Pro Ile Leu Tyr Ala Phe Leu Gly Ala Lys Phe Lys Thr Ser
275 280 285

Ala Gln His Ala Leu Thr Ser Val Ser Arg Gly Ser Ser Leu Lys Ile
290 295 300

Leu Ser Lys Gly Lys Arg Gly Gly His Ser Ser Val Ser Thr Glu Ser
305 310 315 320

Glu Ser Ser Ser Phe His Ser Ser Gly Thr Glu Thr Ser Gln Val Ala
325 330 335

Pro Ala Leu Glu Ser
340

<210> 844
<211> 334
<212> PRT
<213> Homo sapiens

<400> 844

Glu Asn Ala Asn Phe Asn Lys Ile Phe Leu Pro Thr Ile Tyr Ser Ile
1 5 10 15

Ile Phe Leu Thr Gly Ile Val Gly Asn Gly Leu Val Ile Leu Val Met
20 25 30

Gly Tyr Gln Lys Lys Leu Arg Ser Met Thr Asp Lys Tyr Arg Leu His
35 40 45

Leu Ser Val Ala Asp Leu Leu Phe Val Ile Thr Leu Pro Phe Trp Ala
50 55 60

Val Asp Ala Val Ala Asn Trp Tyr Phe Gly Asn Phe Leu Cys Lys Ala
65 70 75 80

Val His Val Ile Tyr Thr Val Asn Leu Tyr Ser Ser Val Leu Ile Leu
85 90 95

Ala Phe Ile Ser Leu Asp Arg Tyr Leu Ala Ile Val His Ala Thr Asn
100 105 110

Ser Gln Arg Pro Arg Lys Leu Leu Ala Glu Lys Val Val Tyr Val Gly
115 120 125

Val Trp Ile Pro Ala Leu Leu Leu Thr Ile Pro Asp Phe Ile Phe Ala
130 135 140

Asn Val Ser Glu Ala Asp Asp Arg Tyr Ile Cys Asp Arg Phe Tyr Pro
145 150 155 160

```
Asn Asp Leu Trp Val Val Val Phe Gln Phe Gln His Ile Met Val Gly
                165                 170                 175

Leu Ile Leu Pro Gly Ile Val Ile Leu Ser Cys Tyr Cys Ile Ile Ile
            180                 185                 190

Ser Lys Leu Ser His Ser Lys Gly His Gln Lys Arg Lys Ala Leu Lys
        195                 200                 205

Thr Thr Val Ile Leu Ile Leu Ala Phe Phe Ala Cys Trp Leu Pro Tyr
    210                 215                 220

Tyr Ile Gly Ile Ser Ile Asp Ser Phe Ile Leu Leu Glu Ile Ile Lys
225                 230                 235                 240

Gln Gly Cys Glu Phe Glu Asn Thr Val His Lys Trp Ile Ser Ile Thr
                245                 250                 255

Glu Ala Leu Ala Phe Phe His Cys Cys Leu Asn Pro Ile Leu Tyr Ala
            260                 265                 270

Phe Leu Gly Ala Lys Phe Lys Thr Ser Ala Gln His Ala Leu Thr Ser
        275                 280                 285

Val Ser Arg Gly Ser Ser Leu Lys Ile Leu Ser Lys Gly Lys Arg Gly
    290                 295                 300

Gly His Ser Ser Val Ser Thr Glu Ser Glu Ser Ser Ser Phe His Ser
305                 310                 315                 320

Ser Gly Thr Glu Thr Ser Gln Val Ala Pro Ala Leu Glu Ser
                325                 330
```

<210> 845
<211> 121
<212> PRT
<213> Homo sapiens

<400> 845

```
Gln Val Gln Leu Val 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 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 Asn Gly Asn Tyr Arg Gly Ser Leu Ala Phe Asp Ile Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 846
<211> 113
<212> PRT
<213> Homo sapiens

<400> 846

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 Gln Leu Pro Gly Thr Ala Pro Lys Leu
35 40 45

Leu Ile Tyr Gly 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 Ser Ser
85 90 95

Leu Ser Ala Trp Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

Gly

<210> 847
<211> 119
<212> PRT
<213> Homo sapiens

<400> 847

Glu Val Gln Leu Val Gln 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 Pro 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 Asn Gly Gly Thr 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 Asn Gly Asn Tyr Arg Gly Ala Phe Asp Ile Trp Gly Gln Gly
100 105 110

Thr Met Val Thr Val Ser Ser
115

<210> 848
<211> 119
<212> PRT
<213> Homo sapiens

<400> 848

Gln Val Gln Leu Val 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 Pro 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 Asn Gly Gly Thr 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 Asn Gly Asn Tyr Arg Gly Ala Phe Asp Ile Trp Gly Gln Gly
100 105 110

Thr Met Val Thr Val Ser Ser
115

<210> 849
<211> 119

<212> PRT
<213> Homo sapiens

<400> 849

```
Gln Val Gln Leu Val 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 Pro 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 Asn Gly Gly Thr 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 Asn Gly Asn Tyr Arg Gly Ala Phe Asp Ile Trp Gly Gln Gly
            100                 105                 110

Thr Met Val Thr Val Ser Ser
        115
```

<210> 850
<211> 119
<212> PRT
<213> Homo sapiens

<400> 850

```
Gln Val Gln Leu Val Gln Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Glu Phe Thr Phe Gly Thr 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 Val 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 Arg Asn Thr Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
```

```
Ala Arg Gly Pro Val Leu Arg Tyr Gly Phe Asp Ile Trp Gly Gln Gly
            100                 105                 110


Thr Met Val Thr Val Ser Ser
        115


<210>  851
<211>  119
<212>  PRT
<213>  Homo sapiens

<400>  851

Gln Val Gln Leu Val Gln 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 Pro 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 Asn Gly Gly Thr 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 Asn Gly Asn Tyr Arg Gly Ala Phe Asp Ile Trp Gly Gln Gly
            100                 105                 110


Thr Met Val Thr Val Ser Ser
        115


<210>  852
<211>  118
<212>  PRT
<213>  Homo sapiens

<400>  852

Gln Val Gln Leu Gln 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 Ile 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 Gly Thr Tyr His 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 Phe Ser Ala Tyr Ser Gly Tyr Asp Leu Trp Gly Gln Gly Thr
            100                 105                 110

Leu Val Thr Val Ser Ser
        115
```

<210> 853
<211> 119
<212> PRT
<213> Homo sapiens

<400> 853

```
Gln Val Gln Leu Val Gln Ser Gly Gly Gly Leu Val Arg Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Pro 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 Asn Gly Gly Thr 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 Asn Gly Asn Tyr Arg Gly Ala Phe Asp Ile Trp Gly Gln Gly
            100                 105                 110

Thr Thr Val Thr Val Ser Ser
        115
```

<210> 854
<211> 119
<212> PRT
<213> Homo sapiens

<400> 854

```
Gln Val Gln Leu Val 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 Pro 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 Asn Gly Gly Thr 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 Asn Gly Asn Tyr Arg Gly Ala Phe Asp Ile Trp Gly Gln Gly
100 105 110

Thr Met Val Thr Val Ser Ser
115

<210> 855
<211> 119
<212> PRT
<213> Homo sapiens

<400> 855

Glu Val Gln Leu Val 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 Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Ala Ile Ser Ala Asn Gly Gly Thr 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 Asn Gly Asn Tyr Arg Gly Ala Phe Asp Ile Trp Gly Gln Gly
100 105 110

Thr Thr Val Thr Val Ser Ser
115

<210> 856

<211> 116
<212> PRT
<213> Homo sapiens

<400> 856

Gln Val Gln Leu Val 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 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 Ala Ala Ala Gly Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
100 105 110

Thr Val Ser Ser
115

<210> 857
<211> 119
<212> PRT
<213> Homo sapiens

<400> 857

Gln Val Gln Leu Gln 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 Lys Ile Gly Arg Tyr Ser Ser Ser Leu Gly Tyr Trp Gly Gln Gly
            100                 105                 110


Thr Leu Val Thr Val Ser Ser
        115


<210>  858
<211>  122
<212>  PRT
<213>  Homo sapiens

<400>  858

Gln Val Gln Leu Val Gln 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 Arg Glu Ala Pro Tyr Ser Ser Ser Leu Asp Ala Phe Asp Ile Trp
            100                 105                 110


Gly Gln Gly Thr Met Val Thr Val Ser Ser
        115                 120


<210>  859
<211>  118
<212>  PRT
<213>  Homo sapiens

<400>  859

Gln Val Gln Leu Gln 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 Ser His Ser Ser Gly Gly Phe Asp Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 860
<211> 118
<212> PRT
<213> Homo sapiens

<400> 860

Gln Val Gln Leu Gln 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 Ser His Ser Ser Gly Gly Phe Asp Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 861
<211> 116
<212> PRT
<213> Homo sapiens

<400> 861

Gln Val Thr Leu Lys Glu Ser Gly Gly Gly Val Val Gln Pro Gly Thr
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 Thr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Gly Leu Ile Ser Tyr Asp Gly Ser Val Thr His Tyr Thr 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 Thr Leu Arg Ala Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Gly Ser Gly Tyr Gln Glu His Trp Gly Gln Gly Thr Leu Val
            100                 105                 110

Thr Val Ser Ser
        115


<210>  862
<211>  118
<212>  PRT
<213>  Homo sapiens

<400>  862

Gln Val Gln Leu Val 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 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 Thr Tyr Gly Asp Tyr Gly Ser Leu Asp Tyr Trp Gly Gln Gly Thr
            100                 105                 110

Leu Val Thr Val Ser Ser
        115
```

<210> 863
<211> 122
<212> PRT
<213> Homo sapiens

<400> 863

Gln Val Gln Leu Val 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 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 Val 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 Tyr Cys Ser Ser Thr Ser Cys Tyr Arg Gly Met Asp Val Trp
100 105 110

Gly Lys Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 864
<211> 119
<212> PRT
<213> Homo sapiens

<400> 864

Gln Val Gln Leu Val Gln 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 Arg Gly Arg Ala Ala Arg Pro Pro Phe Asp Tyr Trp Gly Gln Gly
            100                 105                 110


Thr Leu Val Thr Val Ser Ser
        115


<210>  865
<211>  119
<212>  PRT
<213>  Homo sapiens

<400>  865

Gln Val Gln Leu Val Gln 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 Pro 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 Asn Gly Gly Thr 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 Asn Gly Asn Tyr Arg Gly Ala Phe Asp Ile Trp Gly Gln Gly
            100                 105                 110


Thr Met Val Thr Val Ser Ser
        115


<210>  866
<211>  121
<212>  PRT
<213>  Homo sapiens

<400>  866

Gln Val Gln Leu Val Gln Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15


Ser Leu Arg Leu Ser Cys Ala Ala Pro Glu Phe Thr Phe Ser Lys Tyr
            20                  25                  30


Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45
```

Ser Gly 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 Lys Ser Ser Arg Ser Gly Tyr Phe Leu Pro Leu Asp Tyr Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 867
<211> 118
<212> PRT
<213> Homo sapiens

<400> 867

Glu 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

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 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 Ala Ala Val Thr Gly Gly Phe Asp Pro Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 868
<211> 112
<212> PRT
<213> Homo sapiens

<400> 868

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

Phe Asp Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

Leu Ile Tyr Gly 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 Thr Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Arg
                85                  90                  95

Leu Ser Ala Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110
```

<210> 869
<211> 111
<212> PRT
<213> Homo sapiens

<400> 869

```
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 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 Ser Ser Ala Ser Leu Ala Ile Thr Gly Leu
65                  70                  75                  80

Gln Ala Glu Asp Glu Ala His Tyr Tyr Cys Gln Ser Tyr Asp Arg Ser
                85                  90                  95

Leu Ser Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110
```

<210> 870
<211> 112
<212> PRT
<213> Homo sapiens

<400> 870

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 Gln Leu Pro Gly Thr Ala Pro Lys Leu
35 40 45

Leu Ile Tyr Gly 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 Ile Gly Leu
65 70 75 80

Gln Ala Asp Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Thr
85 90 95

Leu Arg Val Trp Met Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

<210> 871
<211> 112
<212> PRT
<213> Homo sapiens

<400> 871

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 Ser Arg Ser Asn Ile 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 Ala Asn Asn Asn Arg Pro Ser Gly Val Pro Gly 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

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser
85 90 95

Leu Arg Ala Trp Val Phe Gly Gly Gly Thr Lys Leu Ala Val Leu Gly
100 105 110

<210> 872
<211> 112
<212> PRT
<213> Homo sapiens

<400> 872

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 Ser Arg Ser Asn Ile 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 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 Thr Asp Tyr Phe Cys Gln Ser Tyr Asp Ser Ser
85 90 95

Leu Ser Ala Trp Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu Gly
100 105 110

<210> 873
<211> 111
<212> PRT
<213> Homo sapiens

<400> 873

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 Arg Gly
20 25 30

Tyr Asn Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
35 40 45

Leu Ile Tyr Asp Asn Thr Asn Arg Pro Ser Gly Val Pro Ala Arg Phe
50 55 60

Ser Gly Ser Lys Ser Ala Thr 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 Gly
85 90 95

Leu Arg Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Leu Leu Gly
100 105 110

<210> 874
<211> 111
<212> PRT

<213> Homo sapiens

<400> 874

```
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 Ser Ser Ser Asn Ile Gly Ala Gly
            20                  25                  30

Tyr Asp Val His Trp Tyr Gln Gln Val Pro Gly Lys Ala Pro Lys Val
        35                  40                  45

Val Ile Tyr Gly Asn Asn Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

Ser Gly Ser Lys Ser Gly Ala 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 Lys Ser
                85                  90                  95

Leu Thr Trp Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu Gly
            100                 105                 110
```

<210> 875
<211> 111
<212> PRT
<213> Homo sapiens

<400> 875

```
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 Thr Ser Ser Asn Ile Gly Ala Gly
            20                  25                  30

Tyr Asp Val His Trp Tyr Gln Gln Leu Pro Gly Ala Ala Pro Arg Val
        35                  40                  45

Leu Ile Tyr Gly 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 Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Lys Ser
                85                  90                  95

Leu Ser Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Arg
            100                 105                 110
```

<210> 876

<211> 112
<212> PRT
<213> Homo sapiens

<400> 876

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

Phe Asp Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Arg Leu
35 40 45

Leu Ile Tyr Gly 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 Thr Asp Tyr Phe Cys Gln Ser Tyr Asp Ser Ser
85 90 95

Leu Ser Ala Trp Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu Arg
100 105 110

<210> 877
<211> 112
<212> PRT
<213> Homo sapiens

<400> 877

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 Arg Gly
20 25 30

Tyr Asn Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
35 40 45

Leu Ile Tyr Asp Asp Thr Asn Arg Pro Ser Gly Val Pro His 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 Arg Ala Trp Val Phe Gly Gly Gly Thr Lys Leu Ala Val Leu Gly
100 105 110

<210> 878
<211> 111
<212> PRT
<213> Homo sapiens

<400> 878

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 Arg Gly
20 25 30

Tyr Asn Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
35 40 45

Leu Ile Tyr Asp Asn Thr Asn Arg Pro Ser Gly Val Pro Ala Arg Phe
50 55 60

Ser Gly Ser Lys Ser Ala 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 Gly
85 90 95

Leu Arg Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Leu Leu Arg
100 105 110

<210> 879
<211> 111
<212> PRT
<213> Homo sapiens

<400> 879

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 Arg Gly
20 25 30

Tyr Asn 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 Ser Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Ala
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys His Ser Arg Asp Asn Asn
85 90 95

Gly His His Ile Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Ser

100 105 110

<210> 880
<211> 112
<212> PRT
<213> Homo sapiens

<400> 880

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 Arg Gly
20 25 30

Tyr Asn Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
35 40 45

Leu Ile Tyr Gly 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 Gly Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser
85 90 95

Leu Ser Ala Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

<210> 881
<211> 112
<212> PRT
<213> Homo sapiens

<220>
<221> misc_feature
<222> (83)..(83)
<223> Xaa can be any naturally occurring amino acid

<400> 881

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 Arg Gly
20 25 30

Tyr Asn Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
35 40 45

Leu Ile Tyr Gly 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 Xaa Asp Glu Gly Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser
85 90 95

Leu Ser Ala Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

<210> 882
<211> 110
<212> PRT
<213> Homo sapiens

<400> 882

Leu Pro 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 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

His Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

<210> 883
<211> 112
<212> PRT
<213> Homo sapiens

<400> 883

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 Gln Leu Pro Gly 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 Ser Ser
85 90 95

Leu Arg Ala Trp Val Phe Gly Gly Gly Thr Lys Leu Ala Val Leu Gly
100 105 110

<210> 884
<211> 112
<212> PRT
<213> Homo sapiens

<400> 884

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 Gln Leu Pro Gly 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 Ser Ser
85 90 95

Leu Arg Ala Trp Val Phe Gly Gly Gly Thr Lys Leu Ala Val Leu Gly
100 105 110

<210> 885
<211> 111
<212> PRT
<213> Homo sapiens

<400> 885

Gln Pro 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 Pro
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

Asn Gly Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Arg
100 105 110

<210> 886
<211> 112
<212> PRT
<213> Homo sapiens

<400> 886

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 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 Thr Asp Tyr Phe Cys Gln Ser Tyr Asp Ser Ser
85 90 95

Leu Ser Ala Trp Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu Gly
100 105 110

<210> 887
<211> 109
<212> PRT
<213> Homo sapiens

<400> 887

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 Asn Ser Leu Arg Tyr Tyr Tyr Pro
20 25 30

Ser Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
35 40 45

```
Gly Lys 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 Thr Gln Ala Glu
65                  70                  75                  80

Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Arg Asp Asn Thr Asp Asn Arg
                85                  90                  95

Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105
```

<210> 888
<211> 109
<212> PRT
<213> Homo sapiens

<400> 888

```
Gln Pro Gly 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 Asp Asn Ile Gly Arg Lys Ser Val
            20                  25                  30

His Trp Tyr Gln Gln Arg Pro Gly Gln Ala Pro Ile Leu Val Ile Arg
        35                  40                  45

Asp Asp Arg Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

Ser Ser Val Asn Thr Ala Thr Leu Ile 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 Lys His
                85                  90                  95

Tyr Val Phe Gly Pro Gly Thr Lys Val Thr Ala Leu Gly
            100                 105
```

<210> 889
<211> 458
<212> PRT
<213> Homo sapiens

<400> 889

```
Met Ala Pro Leu Cys Pro Ser Pro Trp Leu Pro Leu Leu Ile Pro Ala
1               5                   10                  15

Pro Ala Pro Gly Leu Thr Val Gln Leu Leu Leu Ser Leu Leu Leu Leu
            20                  25                  30

Met Pro Val His Pro Gln Arg Leu Pro Arg Met Gln Glu Asp Ser Pro
```

```
        35                  40                  45

Leu Gly Gly Gly Ser Ser Gly Glu Asp Asp Pro Leu Gly Glu Glu Asp
    50                  55                  60

Leu Pro Ser Glu Glu Asp Ser Pro Arg Glu Glu Asp Pro Pro Gly Glu
65                  70                  75                  80

Glu Asp Leu Pro Gly Glu Glu Asp Leu Pro Gly Glu Glu Asp Leu Pro
                85                  90                  95

Glu Val Lys Pro Lys Ser Glu Glu Glu Gly Ser Leu Lys Leu Glu Asp
            100                 105                 110

Leu Pro Thr Val Glu Ala Pro Gly Asp Pro Gln Glu Pro Gln Asn Asn
        115                 120                 125

Ala His Arg Asp Lys Glu Gly Asp Asp Gln Ser His Trp Arg Tyr Gly
    130                 135                 140

Gly Asp Pro Pro Trp Pro Arg Val Ser Pro Ala Cys Ala Gly Arg Phe
145                 150                 155                 160

Gln Ser Pro Val Asp Ile Arg Pro Gln Leu Ala Ala Phe Cys Pro Ala
                165                 170                 175

Leu Arg Pro Leu Glu Leu Leu Gly Phe Gln Leu Pro Pro Leu Pro Glu
            180                 185                 190

Leu Arg Leu Arg Asn Asn Gly His Ser Val Gln Leu Thr Leu Pro Pro
        195                 200                 205

Gly Leu Glu Met Ala Leu Gly Pro Gly Arg Glu Tyr Ala Leu Gln Leu
    210                 215                 220

His Leu His Trp Gly Ala Ala Gly Arg Pro Gly Ser Glu His Thr Val
225                 230                 235                 240

Glu Gly His Arg Phe Pro Ala Glu Ile His Val Val His Leu Ser Thr
                245                 250                 255

Ala Phe Ala Arg Val Asp Glu Ala Leu Gly Arg Pro Gly Gly Leu Ala
            260                 265                 270

Val Leu Ala Ala Phe Leu Glu Glu Gly Pro Glu Glu Asn Ser Ala Tyr
        275                 280                 285

Glu Gln Leu Leu Ser Arg Leu Glu Glu Ile Ala Glu Glu Gly Ser Glu
    290                 295                 300

Thr Gln Val Pro Gly Leu Asp Ile Ser Ala Leu Leu Pro Ser Asp Phe
```

305 310 315 320

Ser Arg Tyr Phe Gln Tyr Glu Gly Ser Leu Thr Thr Pro Pro Cys Ala
325 330 335

Gln Gly Val Ile Trp Thr Val Phe Asn Gln Thr Val Met Leu Ser Ala
340 345 350

Lys Gln Leu His Thr Leu Ser Asp Thr Leu Trp Gly Pro Gly Asp Ser
355 360 365

Arg Leu Gln Leu Asn Phe Arg Ala Thr Gln Pro Leu Asn Gly Arg Val
370 375 380

Ile Glu Ala Ser Phe Pro Ala Gly Val Asp Ser Ser Pro Arg Ala Ala
385 390 395 400

Glu Pro Val Gln Leu Asn Ser Cys Leu Ala Ala Gly Asp Ile Leu Ala
405 410 415

Leu Val Phe Gly Leu Leu Phe Ala Val Thr Ser Val Ala Phe Leu Val
420 425 430

Gln Met Arg Arg Gln His Arg Arg Gly Thr Lys Gly Gly Val Ser Tyr
435 440 445

Arg Pro Ala Glu Val Ala Glu Thr Gly Ala
450 455

<210> 890
<211> 437
<212> PRT
<213> Mus musculus

<400> 890

Met Ala Ser Leu Gly Pro Ser Pro Trp Ala Pro Leu Ser Thr Pro Ala
1 5 10 15

Pro Thr Ala Gln Leu Leu Leu Phe Leu Leu Leu Gln Val Ser Ala Gln
20 25 30

Pro Gln Gly Leu Ser Gly Met Gln Gly Glu Pro Ser Leu Gly Asp Ser
35 40 45

Ser Ser Gly Glu Asp Glu Leu Gly Val Asp Val Leu Pro Ser Glu Glu
50 55 60

Asp Ala Pro Glu Glu Ala Asp Pro Pro Asp Gly Glu Asp Pro Pro Glu
65 70 75 80

Val Asn Ser Glu Asp Arg Met Glu Glu Ser Leu Gly Leu Glu Asp Leu
85 90 95

```
Ser Thr Pro Glu Ala Pro Glu His Ser Gln Gly Ser His Gly Asp Glu
            100                 105                 110

Lys Gly Gly Gly His Ser His Trp Ser Tyr Gly Gly Thr Leu Leu Trp
        115                 120                 125

Pro Gln Val Ser Pro Ala Cys Ala Gly Arg Phe Gln Ser Pro Val Asp
    130                 135                 140

Ile Arg Leu Glu Arg Thr Ala Phe Cys Arg Thr Leu Gln Pro Leu Glu
145                 150                 155                 160

Leu Leu Gly Tyr Glu Leu Gln Pro Leu Pro Glu Leu Ser Leu Ser Asn
                165                 170                 175

Asn Gly His Thr Val Gln Leu Thr Leu Pro Pro Gly Leu Lys Met Ala
            180                 185                 190

Leu Gly Pro Gly Gln Glu Tyr Arg Ala Leu Gln Leu His Leu His Trp
        195                 200                 205

Gly Thr Ser Asp His Pro Gly Ser Glu His Thr Val Asn Gly His Arg
    210                 215                 220

Phe Pro Ala Glu Ile His Val Val His Leu Ser Thr Ala Phe Ser Glu
225                 230                 235                 240

Leu His Glu Ala Leu Gly Arg Pro Gly Gly Leu Ala Val Leu Ala Ala
                245                 250                 255

Phe Leu Gln Glu Ser Pro Glu Glu Asn Ser Ala Tyr Glu Gln Leu Leu
            260                 265                 270

Ser His Leu Glu Glu Ile Ser Glu Glu Gly Ser Lys Ile Glu Ile Pro
        275                 280                 285

Gly Leu Asp Val Ser Ala Leu Leu Pro Ser Asp Phe Ser Arg Tyr Tyr
    290                 295                 300

Arg Tyr Glu Gly Ser Leu Thr Thr Pro Pro Cys Ser Gln Gly Val Ile
305                 310                 315                 320

Trp Thr Val Phe Asn Glu Thr Val Lys Leu Ser Ala Lys Gln Leu His
                325                 330                 335

Thr Leu Ser Val Ser Leu Trp Gly Pro Arg Asp Ser Arg Leu Gln Leu
            340                 345                 350

Asn Phe Arg Ala Thr Gln Pro Leu Asn Gly Arg Thr Ile Glu Ala Ser
        355                 360                 365
```

Phe Pro Ala Ala Glu Asp Ser Ser Pro Glu Pro Val His Val Asn Ser
370 375 380

Cys Phe Thr Ala Gly Asp Ile Leu Ala Leu Val Phe Gly Leu Leu Phe
385 390 395 400

Ala Val Thr Ser Ile Ala Phe Leu Leu Gln Leu Arg Arg Gln His Arg
405 410 415

His Arg Ser Gly Thr Lys Asp Arg Val Ser Tyr Ser Pro Ala Glu Met
420 425 430

Thr Glu Thr Gly Ala
435

<210> 891
<211> 38
<212> DNA
<213> Artificial sequence

<220>
<223> Chemically synthesized primer

<400> 891
atcgacgcgt gcctgagcga ggtgcagctg gtgcagtc 38

<210> 892
<211> 32
<212> DNA
<213> Artificial sequence

<220>
<223> Chemically synthesized primer

<400> 892
caatggtcac cgtctcttca gctagcacca gg 32

<210> 893
<211> 35
<212> DNA
<213> Artificial sequence

<220>
<223> Chemically synthesized primer

<400> 893
atcccaagct taagccagtc tgtgctgact cagcc 35

<210> 894
<211> 31
<212> DNA
<213> Artificial sequence

<220>
<223> Chemically synthesized primer

<400> 894
ggagggacca aattgaccgt cctaggtcag c 31

<210> 895
<211> 41
<212> DNA
<213> Artificial sequence

<220>
<223> Chemically synthesized primer

<400> 895
tagggcacgc gtgtgctgag cgaggtgcag ctggtgcagt c 41

<210> 896
<211> 32
<212> DNA
<213> Artificial sequence

<220>
<223> Chemically synthesized primer

<400> 896
tctagtgcta gctgaagaga cggtgaccat tg 32

<210> 897
<211> 35
<212> DNA
<213> Artificial sequence

<220>
<223> Chemically synthesized primer

<400> 897
ctagcaagct tatcccagtc tgtgctgact cagcc 35

<210> 898
<211> 26
<212> DNA
<213> Artificial sequence

<220>
<223> Chemically synthesized primer

<400> 898
atagcaccta ggacggtcag cttggt 26

<210> 899
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> Portion of CDR1 heavy chain sequence

<400> 899

Ser Tyr Ala Met Ser
1 5

<210> 900
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> Portion of CDR1 heavy chain sequence

<220>
<221> misc_feature
<222> (1)..(1)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (5)..(5)
<223> Xaa can be any naturally occurring amino acid

<400> 900

Xaa Tyr Ala Met Xaa
1 5

<210> 901
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> Portion of CDR1 heavy chain sequence

<220>
<221> misc_feature
<222> (3)..(3)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (5)..(5)
<223> Xaa can be any naturally occurring amino acid

<400> 901

Ser Tyr Xaa Met Xaa
1 5

<210> 902
<211> 17
<212> PRT
<213> Artificial sequence

<220>
<223> Portion of CDR2 heavy chain sequence

<220>
<221> misc_feature
<222> (4)..(5)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (8)..(8)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (10)..(11)

<223> Xaa can be any naturally occurring amino acid

<400> 902

Ala Ile Ser Xaa Xaa Gly Gly Xaa Thr Xaa Xaa Ala Asp Ser Val Lys
1   5   10   15

Gly

<210> 903
<211> 17
<212> PRT
<213> Artificial sequence

<220>
<223> Portion of CDR2 heavy chain sequence

<400> 903

Ala Ile Ser Gly Ser Gly Gly Ser Thr Thr Thr Ala Asp Ser Val Lys
1   5   10   15

Gly

<210> 904
<211> 13
<212> PRT
<213> Artificial sequence

<220>
<223> Portion of CDR3 heavy chain sequence

<220>
<221> misc_feature
<222> (9)..(9)
<223> Xaa can be any naturally occurring amino acid

<400> 904

Asn Gly Asn Tyr Arg Gly Ser Leu Xaa Ala Phe Asp Ile
1   5   10

<210> 905
<211> 14
<212> PRT
<213> Artificial sequence

<220>
<223> Portion of CDR1 light chain sequence

<400> 905

Thr Gly Ser Ser Ser Asn Ile Gly Ala Gly Tyr Asp Val His
1   5   10

<210> 906
<211> 7
<212> PRT
<213> Artificial sequence

<220>
<223> Portion of CDR2 light chain sequence

<400> 906

Gly Asn Asn Asn Arg Pro Ser
1 5

<210> 907
<211> 12
<212> PRT
<213> Artificial sequence

<220>
<223> Portion of CDR3 light chain sequence

<400> 907

Gln Ser Tyr Asp Ser Ser Leu Ser Ala Trp Val Val
1 5 10

<210> 908
<211> 6
<212> PRT
<213> Artificial sequence

<220>
<223> Consensus sequence

<400> 908

Glu Glu Asp Leu Pro Glu
1 5

<210> 909
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Portion of the CDR3 heavy chain sequence

<400> 909

Asn Gly Asn Tyr Arg Gly Ala Phe Asp Ile
1 5 10

<210> 910
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR1

<400> 910

Thr Tyr Ala Met Thr
1 5

<210> 911
<211> 5

<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR1

<400> 911

Ile Tyr Ala Met Ser
1 5

<210> 912
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR1

<400> 912

Ser Tyr Gly Met His
1 5

<210> 913
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR1

<400> 913

Asn Tyr Ala Met Thr
1 5

<210> 914
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR1

<400> 914

Lys Tyr Ala Met Ser
1 5

<210> 915
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR2

<400> 915

Ala Ile Ser Ala Asn Gly Gly Thr Thr Tyr Tyr Ala Asp Ser Val Lys
1 5 10 15

Gly

<210> 916
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR2

<400> 916

Ala Val Ser Gly Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val Lys
1 5 10 15

Gly

<210> 917
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR2

<400> 917

Ala Ile Ser Gly Ser Gly Gly Gly Thr Tyr His Ala Asp Ser Val Lys
1 5 10 15

Gly

<210> 918
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR2

<400> 918

Ala Ile Ser Gly Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val Lys
1 5 10 15

Gly

<210> 919
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR2

<400> 919

Val Ile Ser Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val Lys
1 5 10 15

Gly

<210> 920
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR2

<400> 920

Leu Ile Ser Tyr Asp Gly Ser Val Thr His Tyr Thr Asp Ser Val Lys
1 5 10 15

Gly

<210> 921
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR2

<400> 921

Ala Ile Ser Gly Ser Gly Val Ser Thr Tyr Tyr Ala Asp Ser Val Lys
1 5 10 15

Gly

<210> 922
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR2

<400> 922

Gly Ile Ser Gly Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val Lys
1 5 10 15

Gly

<210> 923
<211> 10
<212> PRT
<213> Artificial Sequence

<220>

<223> variable heavy chain, CDR3

<400> 923

Gly Pro Val Leu Arg Tyr Gly Phe Asp Ile
1 5 10

<210> 924
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR3

<400> 924

Phe Ser Ala Tyr Ser Gly Tyr Asp Leu
1 5

<210> 925
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR3

<400> 925

Ala Ala Ala Gly Phe Asp Tyr
1 5

<210> 926
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR3

<400> 926

Ile Gly Arg Tyr Ser Ser Ser Leu Gly Tyr
1 5 10

<210> 927
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR3

<400> 927

Glu Ala Pro Tyr Ser Ser Ser Leu Asp Ala Phe Asp Ile
1 5 10

<210> 928
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR3

<400> 928

Ser His Ser Ser Gly Gly Phe Asp Tyr
1 5

<210> 929
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR3

<400> 929

Gly Ser Gly Tyr Gln Glu His
1 5

<210> 930
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR3

<400> 930

Tyr Gly Asp Tyr Gly Ser Leu Asp Tyr
1 5

<210> 931
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR3

<400> 931

Tyr Cys Ser Ser Thr Ser Cys Tyr Arg Gly Met Asp Val
1 5 10

<210> 932
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR3

<400> 932

Gly Arg Ala Ala Arg Pro Pro Phe Asp Tyr
1 5 10

<210> 933
<211> 12

<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR3

<400> 933

Ser Ser Arg Ser Gly Tyr Phe Leu Pro Leu Asp Tyr
1 5 10

<210> 934
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> variable heavy chain, CDR3

<400> 934

Ala Ala Val Thr Gly Gly Phe Asp Pro
1 5

<210> 935
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR3

<400> 935

Thr Gly Ser Ser Ser Asn Ile Gly Ala Gly Tyr Asp Val His
1 5 10

<210> 936
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR1

<400> 936

Thr Gly Ser Arg Ser Asn Ile Gly Ala Asp Tyr Asp Val His
1 5 10

<210> 937
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR1

<400> 937

Thr Gly Ser Ser Ser Asn Ile Gly Arg Gly Tyr Asn Val His
1 5 10

<210> 938
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR1

<400> 938

Thr Gly Thr Ser Ser Asn Ile Gly Ala Gly Tyr Asp Val His
1 5 10

<210> 939
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR1

<400> 939

Gly Gly Asn Asn Ile Gly Ser Lys Ser Val His
1 5 10

<210> 940
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR1

<400> 940

Ser Gly Ser Ser Ser Asn Ile Gly Ser Asn Tyr Val Tyr
1 5 10

<210> 941
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR1

<400> 941

Gln Gly Asn Ser Leu Arg Tyr Tyr Tyr Pro Ser
1 5 10

<210> 942
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR1

<400> 942

Gly Gly Asp Asn Ile Gly Arg Lys Ser Val His
1 5 10

<210> 943
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR2

<400> 943

Gly Asn Ser Asn Arg Pro Ser
1 5

<210> 944
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR2

<400> 944

Ala Asn Asn Asn Arg Pro Ser
1 5

<210> 945
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR2

<400> 945

Asp Asn Thr Asn Arg Pro Ser
1 5

<210> 946
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR2

<400> 946

Gly Asn Asn Asn Arg Pro Ser
1 5

<210> 947
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR2

<400> 947

Asp Asp Thr Asn Arg Pro Ser
1 5

<210> 948
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR2

<400> 948

Tyr Asp Ser Asp Arg Pro Ser
1 5

<210> 949
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR2

<400> 949

Arg Asn Asn Gln Arg Pro Ser
1 5

<210> 950
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR2

<400> 950

Gly Lys Asn Asn Arg Pro Ser
1 5

<210> 951
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR2

<400> 951

Asp Asp Arg Asp Arg Pro Ser
1 5

<210> 952
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR3

<400> 952

Gln Ser Tyr Asp Ser Arg Leu Ser Ala Trp Val
1 5 10

<210> 953
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR3

<400> 953

Gln Ser Tyr Asp Arg Ser Leu Ser Trp Val
1 5 10

<210> 954
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR3

<400> 954

Gln Ser Tyr Asp Ser Thr Leu Arg Val Trp Met
1 5 10

<210> 955
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR3

<400> 955

Gln Ser Tyr Asp Ser Ser Leu Arg Ala Trp Val
1 5 10

<210> 956
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR3

<400> 956

Gln Ser Tyr Asp Ser Ser Leu Ser Ala Trp Val
1 5 10

<210> 957
<211> 10
<212> PRT
<213> Artificial Sequence

<220>

<223> variable light chain, CDR3

<400> 957

Gln Ser Tyr Asp Ser Gly Leu Arg Trp Val
1 5 10

<210> 958
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR3

<400> 958

Gln Ser Tyr Asp Lys Ser Leu Thr Trp Val
1 5 10

<210> 959
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR3

<400> 959

Gln Ser Tyr Asp Lys Ser Leu Ser Trp Val
1 5 10

<210> 960
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR3

<400> 960

Gln Ser Tyr Asp Ser Ser Leu Ser Ala Trp Val
1 5 10

<210> 961
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR3

<400> 961

His Ser Arg Asp Asn Asn Gly His His Ile
1 5 10

<210> 962
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR3

<400> 962

Gln Val Trp Asp Ser Ser Ser Asp His His Val Val
1 5 10

<210> 963
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR3

<400> 963

Ala Ala Trp Asp Asp Ser Leu Asn Gly Val Val
1 5 10

<210> 964
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR3

<400> 964

Ser Ser Arg Asp Asn Thr Asp Asn Arg Val Val
1 5 10

<210> 965
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> variable light chain, CDR3

<400> 965

Gln Val Trp Asp Ser Ser Ser Lys His Tyr Val
1 5 10

<210> 966
<211> 354
<212> DNA
<213> Homo sapiens

<400> 966
caggtgcagc tggtgcagag cggagccgag gtgaagaagc ctggagcttc cgtcaaggtg 60

tcctgcaagg ccagcggcta caccttcgcc agctactaca tgcactggat gcggcaggca 120

cctggacagg gcctcgaatg gatcggctgg atcaaccccg gcaacgtgaa caccaagtac 180

aacgagaagt tcaagggcag ggccaccctg accgtggaca ccagcaccaa caccgcctac 240

atggaactga gcagcctgcg gagcgaggac accgccgtgt actactgcgc cagaagcacc 300

tactaccggc ccctggacta ctggggccag ggcaccctgg tgaccgtgag cagc 354

<210> 967
<211> 118
<212> PRT
<213> Homo sapiens

<400> 967

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 Ala Ser Tyr
20 25 30

Tyr Met His Trp Met Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Trp Ile Asn Pro Gly Asn Val Asn Thr Lys Tyr Asn Glu Lys Phe
50 55 60

Lys Gly Arg Ala Thr Leu Thr Val Asp Thr Ser Thr Asn 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 Ser Thr Tyr Tyr Arg Pro Leu Asp Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 968
<211> 336
<212> DNA
<213> Homo sapiens

<400> 968
gacatcgtga tgacccagag ccccgacagc ctggccgtga gcctgggcga gcgggccacc 60

atcaactgca agagcagcca gagcatcctg tacagcagca accagaagaa ctacctggcc 120

tggtatcagc agaagcccgg ccagagcccc aagctgctga tctactgggc cagcacccgg 180

gagagcggcg tgcccgaccg gtttagcggc agcggctccg gcaccgactt caccctgacc 240

atcagcagcc tgcaggccga ggacgtggcc gtgtactact gccaccagta cctgagcagc 300

tacaccttcg gccagggcac aaagctggaa atcaag 336

<210> 969
<211> 112
<212> PRT
<213> Homo sapiens

<400> 969

```
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 Ile Leu Tyr Ser
            20                  25                  30

Ser Asn Gln Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
        35                  40                  45

Ser 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 Leu Ser Ser Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
            100                 105                 110


<210>  970
<211>  8
<212>  PRT
<213>  Homo sapiens

<400>  970

Gly Tyr Thr Phe Ala Ser Tyr Tyr
1               5


<210>  971
<211>  17
<212>  PRT
<213>  Homo sapiens

<400>  971

Trp Ile Asn Pro Gly Asn Val Asn Thr Lys Tyr Asn Glu Lys Phe Lys
1               5                   10                  15

Gly


<210>  972
<211>  9
<212>  PRT
<213>  Homo sapiens

<400>  972

Ser Thr Tyr Tyr Arg Pro Leu Asp Tyr
1               5


<210>  973
<211>  17
<212>  PRT
```

<213> Homo sapiens

<400> 973

Lys Ser Ser Gln Ser Ile Leu Tyr Ser Ser Asn Gln Lys Asn Tyr Leu
1 5 10 15

Ala

<210> 974
<211> 7
<212> PRT
<213> Homo sapiens

<400> 974

Trp Ala Ser Thr Arg Glu Ser
1 5

<210> 975
<211> 8
<212> PRT
<213> Homo sapiens

<400> 975

His Gln Tyr Leu Ser Ser Tyr Thr
1 5

<210> 976
<211> 17
<212> PRT
<213> Homo sapiens

<220>
<221> misc_feature
<222> (4)..(5)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (7)..(7)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (9)..(9)
<223> Xaa can be any naturally occurring amino acid

<400> 976

Trp Ile Asn Xaa Xaa Asn Xaa Asn Xaa Lys Tyr Asn Glu Lys Phe Lys
1 5 10 15

Gly

<210> 977
<211> 9
<212> PRT

<213> Homo sapiens

<220>
<221> misc_feature
<222> (2)..(2)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (4)..(5)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (9)..(9)
<223> Xaa can be any naturally occurring amino acid

<400> 977

Ser Xaa Tyr Xaa Xaa Pro Leu Asp Xaa
1 5

<210> 978
<211> 17
<212> PRT
<213> Homo sapiens

<220>
<221> misc_feature
<222> (6)..(6)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (10)..(13)
<223> Xaa can be any naturally occurring amino acid

<400> 978

Lys Ser Ser Gln Ser Xaa Leu Tyr Ser Xaa Xaa Xaa Xaa Asn Tyr Leu
1 5 10 15

Ala

<210> 979
<211> 7
<212> PRT
<213> Homo sapiens

<220>
<221> misc_feature
<222> (4)..(5)
<223> Xaa can be any naturally occurring amino acid

<400> 979

Trp Ala Ser Xaa Xaa Glu Ser
1 5

<210> 980

<211> 8
<212> PRT
<213> Homo sapiens

<220>
<221> misc_feature
<222> (5)..(6)
<223> Xaa can be any naturally occurring amino acid

<400> 980

His Gln Tyr Leu Xaa Xaa Tyr Thr
1 5

<210> 981
<211> 369
<212> DNA
<213> Homo sapiens

<400> 981
caggtgcagc tggtgcagtc tggggctgag gtgaagaagc ctgggtcctc ggtgaaggtc 60

tcctgcaagg cttctggagg caccttcagt gacaatgcta tcagctgggt gcgacaggcc 120

ccaggacaag ggcttgagtg gatgggggggc atcattccta tctttggaaa accaaactac 180

gcacagaagt tccagggcag agtcacgatt actgcggacg aatccacgag cacagcctac 240

atggacctga ggagcctgag atctgaggac acggccgttt attactgtgc gagagattca 300

gacgcgtatt actatggttc ggggggtatg gacgtctggg gccaaggcac cctggtcacc 360

gtctcctca 369

<210> 982
<211> 123
<212> PRT
<213> Homo sapiens

<400> 982

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 Asp Asn
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 Lys Pro 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 Asp Leu Arg Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Ser Asp Ala Tyr Tyr Tyr Gly Ser Gly Gly Met Asp Val
100 105 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 983
<211> 335
<212> DNA
<213> Homo sapiens

<400> 983
ctgcctgtgc tgactcaatc atcctctgcc tctgcttccc tgggatcctc ggtcaagctc 60

acctgcactc tgagcagtgg gcatagtaac tacatcatcg catggcatca acagcagcca 120

gggaaggccc ctcggtactt gatgaaggtt aatagtgatg gcagccacac caaggggac 180

gggatccctg atcgcttctc aggctccagc tctggggctg accgctacct caccatctcc 240

aacctccagt ctgaggatga ggctagttat ttctgtgaga cctgggacac taagattcat 300

gtcttcggaa ctgggaccaa ggtctccgtc ctcag 335

<210> 984
<211> 111
<212> PRT
<213> Homo sapiens

<400> 984

Leu Pro Val Leu Thr Gln Ser Ser Ser Ala Ser Ala Ser Leu Gly Ser
1 5 10 15

Ser Val Lys Leu Thr Cys Thr Leu Ser Ser Gly His Ser Asn Tyr Ile
20 25 30

Ile Ala Trp His Gln Gln Gln Pro Gly Lys Ala Pro Arg Tyr Leu Met
35 40 45

Lys Val Asn Ser Asp Gly Ser His Thr Lys Gly Asp Gly Ile Pro Asp
50 55 60

Arg Phe Ser Gly Ser Ser Ser Gly Ala Asp Arg Tyr Leu Thr Ile Ser
65 70 75 80

Asn Leu Gln Ser Glu Asp Glu Ala Ser Tyr Phe Cys Glu Thr Trp Asp
85 90 95

Thr Lys Ile His Val Phe Gly Thr Gly Thr Lys Val Ser Val Leu
100 105 110

<210> 985
<211> 363
<212> DNA
<213> Homo sapiens

<400> 985

caggtgcagc tggtgcagtc tggggctgag gtgaagaagc ctgggtcctc ggtgaaggtc 60

tcctgcaagg ctcctggagg tatcttcaac accaatgctt tcagctgggt ccgacaggcc 120

cctggacaag gtcttgagtg ggtgggaggg gtcatccctt tgtttcgaac agcaagctac 180

gcacagaacg tccagggcag agtcaccatt accgcggacg aatccacgaa cacagcctac 240

atggagctta ccagcctgag atctgcggac acggccgtgt attactgtgc gagaagtagt 300

ggttaccatt ttaggagtca ctttgactcc tggggcctgg gaaccctggt caccgtctcc 360

tca 363

<210> 986
<211> 121
<212> PRT
<213> Homo sapiens

<400> 986

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 Ile Phe Asn Thr Asn
20 25 30

Ala Phe Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Val
35 40 45

Gly Gly Val Ile Pro Leu Phe Arg Thr Ala Ser Tyr Ala Gln Asn Val
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Asn Thr Ala Tyr
65 70 75 80

Met Glu Leu Thr Ser Leu Arg Ser Ala Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Ser Ser Gly Tyr His Phe Arg Ser His Phe Asp Ser Trp Gly
100 105 110

Leu Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 987
<211> 363
<212> DNA
<213> Homo sapiens

<400> 987
caggtgcagc tggtgcaatc tggggctgag gtgaagaagc ctgggtcctc ggtgaaggtc 60

tcctgcaagg ctcctggagg tatcttcaac accaatgctt tcagctgggt ccgacaggcc 120

cctggacaag gtcttgagtg ggtgggaggg gtcatccctt tgtttcgaac agcaagctac 180

gcacagaacg tccagggcag agtcaccatt accgcggacg aatccacgaa cacagcctac 240

atggagctta ccagcctgag atctgcggac acggccgtgt attactgtgc gagaagtagt 300

ggttaccatt ttaggagtca ctttgactcc tggggcctgg gaaccctggt caccgtctcc 360

tca 363

<210> 988
<211> 111
<212> PRT
<213> Homo sapiens

<400> 988

Asn Phe Met Leu Thr Gln Pro His Ser Val Ser Ala Ser Pro Gly Lys
1 5 10 15

Thr Val Thr Ile Ser Cys Thr Gly Ser Ser Gly Asn Ile Ala Ala Asn
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 Arg Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
50 55 60

Gly Ser Ile Asp Arg 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 Thr Tyr Asp Thr
85 90 95

Asn Asn His Ala Val Phe Gly Gly Gly Thr His Leu Thr Val Leu
100 105 110

<210> 989
<211> 333
<212> DNA
<213> Homo sapiens

<400> 989
aattttatgc tgactcagcc ccactctgtg tcggcgtctc cggggaagac ggtgaccatc 60

tcctgcaccg gcagcagtgg caacattgcc gccaactatg tgcagtggta ccaacaacgt 120

ccgggcagtg cccccactac tgtgatctat gaggatgacc gaagaccctc tggggtccct 180

gatcggttct ctggctccat cgacaggtcc tccaactctg cctccctcac catctcagga 240

ctgaagactg aggacgaggc tgactactac tgtcagactt atgataccaa caatcatgct 300

gtgttcggag gaggcaccca cctgaccgtc ctc 333

<210> 990
<211> 110
<212> PRT
<213> Homo sapiens

<400> 990

Ser Tyr Glu Leu Thr Gln Pro Pro Ser Ala Ser Gly Lys His Gly Gln
1 5 10 15

Arg Val Thr Ile Ser Cys Ser Gly Gly Thr Ser Asn Ile Gly Arg Asn
20 25 30

His Val Asn Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
35 40 45

Ile Tyr Ser Asn Glu 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 Val Ser Gly Leu Gln
65 70 75 80

Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ser Trp Asp Asp Asn Leu
85 90 95

Ser Gly Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 991
<211> 330
<212> DNA
<213> Homo sapiens

<400> 991
tcctatgagc tgactcagcc accctcagcg tctgggaaac acgggcagag ggtcaccatc 60

tcttgttctg gaggcacctc caacatcgga cgtaatcatg ttaactggta ccagcaactc 120

ccaggaacgg cccccaaact cctcatctat agtaatgaac agcggccctc aggggtccct 180

gaccgattct ctggctccaa atctggcacc tccgcctccc tggccgtgag tgggctccag 240

tctgaggatg aggctgatta ttactgtgca tcatgggatg acaacttgag tggttgggtg 300

ttcggcggag ggaccaagct gaccgtccta 330

<210> 992
<211> 120
<212> PRT
<213> Homo sapiens

<400> 992

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 Ala Tyr
20 25 30

Ala Phe Thr Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Gly Ile Thr Gly Met Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe
50 55 60

```
Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Leu Thr Ser Thr Ala Tyr
65                  70                  75                  80

Met Glu Leu Ser Ser Leu Thr Ser Glu Asp Thr Ala Leu Tyr Tyr Cys
                85                  90                  95

Ala Arg Gly Leu Tyr Tyr Tyr Glu Ser Ser Leu Asp Tyr Trp Gly Gln
            100                 105                 110

Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 993
<211> 361
<212> DNA
<213> Homo sapiens

<400> 993

```
caggtgcagc tggtgcagtc tggggctgag gtgaagaagc ctgggtcctc ggtgaaggtc        60

tcctgcaagg cttctggagg caccttcagc gcttatgctt tcacctgggt gcggcaggcc       120

cctggacaag ggcttgagtg gatgggaggc atcaccggaa tgtttggcac agcaaactac       180

gcacagaagt tccagggcag agtcacgatt accgcggacg aactcacgag cacagcctac       240

atggagttga gctccctgac atctgaagac acggcccttt attattgtgc gagaggattg       300

tattactatg agagtagtct tgactattgg ggccagggaa ccctggtcac cgtctcctca       360

g                                                                       361
```

<210> 994
<211> 110
<212> PRT
<213> Homo sapiens

<400> 994

```
Gln Ser Val 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 Ser Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
        35                  40                  45

Met Ile Tyr Glu Val Thr Lys Arg Pro Ser Gly Val Pro Asp Arg Phe
    50                  55                  60

Ser Ala 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 Phe Cys Cys Ser Tyr Ala Gly His
                85                  90                  95
```

Ser Ala Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu
100 105 110

<210> 995
<211> 361
<212> DNA
<213> Homo sapiens

<400> 995
caggtgcagc tggtgcagtc tggggctgag gtgaagaagc ctgggtcctc ggtgaaggtc 60

tcctgcaggg cttctggagg caccttcagc gcttatgctt tcacctgggt gcggcaggcc 120

cctggacaag ggcttgagtg gatgggaggc atcaccggaa tgtttggcac agcaaactac 180

gcacagaagt tccagggcag agtcacgatt accgcggacg aactcacgag cacagcctac 240

atggagttga gctccctgac atctgaagac acggcccttt attattgtgc gagaggattg 300

tattactatg agagtagtct tgactattgg ggccagggaa ccctggtcac cgtctcctca 360

g 361

<210> 996
<211> 108
<212> PRT
<213> Homo sapiens

<400> 996

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 Lys
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 Ser Cys Gln Gln Tyr Asp Gly Val Pro
85 90 95

Arg Thr Phe Gly Gln Gly Thr Thr Val Glu Ile Lys
100 105

<210> 997
<211> 330
<212> DNA
<213> Homo sapiens

<400> 997

cagtctgtgc tgactcagcc accctccgcg tccgggtctc ctggacagtc agtcaccatc 60

tcctgcactg gaaccagcag tgacgttggt ggttataact ctgtctcctg gtaccaacag 120

cacccaggca aagcccccaa actcatgatt tatgaggtca ctaagcggcc ctcaggggtc 180

cctgatcgct tctctgcctc caagtctggc aacacggcct ccctgaccgt ctctgggctc 240

caggctgagg atgaggctga ttatttctgc tgctcatatg caggccacag tgcttatgtc 300

ttcggaactg ggaccaaggt caccgtcctg 330

<210> 998
<211> 124
<212> PRT
<213> Homo sapiens

<400> 998

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 Thr Ser Ser Glu Val Thr Phe Ser Ser Phe
20 25 30

Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Leu
35 40 45

Gly Gly Ile Ser Pro Met Phe Gly Thr Pro Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Gln Ser Thr Arg Thr Ala Tyr
65 70 75 80

Met Asp Leu Arg Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Ser Pro Ser Tyr Ile Cys Ser Gly Gly Thr Cys Val Phe Asp
100 105 110

His Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 999
<211> 324
<212> DNA
<213> Homo sapiens

<400> 999
gaaattgtgc tgactcagtc tccaggcacc ctgtctttgt ctccagggga aagagccacc 60

ctctcctgca gggccagtca gagtcttagc agcaagtact tagcctggta tcagcagaaa 120

cctggccagg ctcccaggct cctcatctat ggtgcatcca gcagggccac tggcatccca 180

gacaggttca gtggcagtgg gtctgggaca gacttcaccc tcaccatcag tagactggag 240

cctgaagatt ttgcagtgta ttcctgtcag cagtatgatg gcgtacctcg gacgttcggc 300

caagggacca cggtggaaat caaa 324

<210> 1000
<211> 110
<212> PRT
<213> Homo sapiens

<400> 1000

Gln Pro Gly Leu Thr Gln Pro Pro Ser Val Ser Lys Gly Leu Arg Gln
1 5 10 15

Thr Ala Thr Leu Thr Cys Thr Gly Asn Ser Asn Asn Val Gly Asn Gln
20 25 30

Gly Ala Ala Trp Leu Gln Gln His Gln Gly His Pro Pro Lys Leu Leu
35 40 45

Ser Tyr Arg Asn Asn Asp Arg Pro Ser Gly Ile Ser Glu Arg Phe Ser
50 55 60

Ala Ser Arg Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Leu Gln
65 70 75 80

Pro Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Thr Trp Asp Ser Ser Leu
85 90 95

Ser Ala Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 1001
<211> 372
<212> DNA
<213> Homo sapiens

<400> 1001
caggtgcagc tggtgcagtc aggggctgag gtgaagaagc ctgggtcctc ggtgaaggtc 60

tcctgcacgt cctctgaagt caccttcagt agttttgcta tcagctgggt gcgacaggcc 120

cctggacaag ggcttgagtg gctgggaggg atcagcccta tgtttggaac acctaattac 180

gcgcagaagt tccaaggcag agtcaccatt accgcggacc agtccacgag gacagcctac 240

atggacctga ggagcctgag atctgaggac acggccgtgt attattgtgc gagatctcct 300

tcttacattt gttctggtgg aacctgcgtc tttgaccatt ggggccaggg aaccctggtc 360

accgtctcct ca 372

<210> 1002
<211> 107
<212> PRT
<213> Homo sapiens

<400> 1002

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 Arg 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 Val Tyr Tyr Cys Gln Gln Tyr Asp Ser Ser Pro Tyr
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
100 105

<210> 1003
<211> 372
<212> DNA
<213> Homo sapiens

<400> 1003
caggtacagc tgcagcagtc aggggctgag gtgaagaagc ctgggtcctc ggtgaaggtc 60

tcctgcacgt cctctgaagt caccttcagt agttttgcta tcagctgggt gcgacaggcc 120

cctggacaag ggcttgagtg gctgggaggg atcagcccta tgtttggaac acctaattac 180

gcgcagaagt tccaaggcag agtcaccatt accgcggacc agtccacgag gacagcctac 240

atggacctga ggagcctgag atctgaggac acggccgtgt attattgtgc gagatctcct 300

tcttacattt gttctggtgg aacctgcgtc tttgaccatt ggggccaggg aaccctggtc 360

accgtctcct ca 372

<210> 1004
<211> 122
<212> PRT
<213> Homo sapiens

<400> 1004

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 Thr Ser Gly Val 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 Gly Val Phe Gly Val Pro Lys Tyr Ala Gln Asn Phe
50 55 60

```
Gln Gly Arg Val Thr Ile Thr Ala Asp Lys Pro Thr Ser Thr Val Tyr
65                  70                  75                  80

Met Glu Leu Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Glu Pro Gly Tyr Tyr Val Gly Lys Asn Gly Phe Asp Val Trp
            100                 105                 110

Gly Gln Gly Thr Met Val Thr Val Ser Ser
        115                 120
```

<210> 1005
<211> 330
<212> DNA
<213> Homo sapiens

<400> 1005

```
cagcctgggc tgactcagcc accctcggtg tccaagggct tgagacagac cgccacactc        60

acctgcactg ggaacagcaa caatgttggc aaccaaggag cagcttggct gcagcagcac       120

cagggccacc ctcccaaact cctatcctac aggaataatg accggccctc agggatctca       180

gagagattct ctgcatccag gtcaggaaac acagcctccc tgaccattac tggactccag       240

cctgaggacg aggctgacta ttactgctca acatgggaca gcagcctcag tgctgtggta       300

ttcggcggag ggaccaagct gaccgtccta                                        330
```

<210> 1006
<211> 110
<212> PRT
<213> Homo sapiens

<400> 1006

```
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Lys Gly Leu Arg Gln
1               5                   10                  15

Thr Ala Ile Leu Thr Cys Thr Gly Asp Ser Asn Asn Val Gly His Gln
            20                  25                  30

Gly Thr Ala Trp Leu Gln Gln His Gln Gly His Pro Pro Lys Leu Leu
        35                  40                  45

Ser Tyr Arg Asn Gly Asn Arg Pro Ser Gly Ile Ser Glu Arg Phe Ser
    50                  55                  60

Ala Ser Arg Ser Gly Asn Thr Ala Ser Leu Thr Ile Ile Gly Leu Gln
65                  70                  75                  80

Pro Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Val Trp Asp Ser Ser Leu
                85                  90                  95
```

Ser Ala Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 1007
<211> 321
<212> DNA
<213> Homo sapiens

<400> 1007
gacatccaga tgacccagtc tccatcctcc ctgtctgcat ctgtaggaga cagagtcacc 60

atcacttgcc gggcaagtca gagcattagc agctatttaa attggtatca gcagaaacca 120

gggaaagccc ctaagctcct gatctatgct gcatccagtt tgcaaagagg ggtcccatca 180

aggttcagtg gcagtggatc tgggacagac ttcactctca ccattagcag cctgcagcct 240

gaagattttg cagtgtatta ctgtcagcag tatgatagtt caccgtacac ttttggccag 300

gggaccaagg tagagatcaa a 321

<210> 1008
<211> 126
<212> PRT
<213> Homo sapiens

<400> 1008

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 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 Met Thr Gly Gly Thr Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Val Trp Val Thr Met Thr Arg Asp Thr Ser Ile Asn Thr Ala Tyr
65 70 75 80

Met Glu Val Ser Arg Leu Thr Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Gly Ala Ser Val Leu Arg Tyr Phe Asp Trp Gln Pro Glu Ala
100 105 110

Leu Asp Ile Trp Gly Leu Gly Thr Thr Val Thr Val Ser Ser
115 120 125

<210> 1009
<211> 366
<212> DNA
<213> Homo sapiens

<400> 1009

caggtgcagc tggtgcaatc tggggctgaa gtgaagaagc ctggggcctc agtgaaggtc 60

tcctgcaaga cttctggagt caccttcagc agctatgcta tcagttgggt gcgacaggcc 120

cctggacaag ggcttgagtg gatgggaggg atcatcggtg tctttggtgt accaaagtac 180

gcgcagaact tccagggcag agtcacaatt accgcggaca aaccgacgag tacagtctac 240

atggagctga acagcctgag agctgaggac acggccgtgt attactgtgc gagagagccc 300

gggtactacg taggaaagaa tggttttgat gtctggggcc aagggacaat ggtcaccgtc 360

tcttca 366

<210> 1010
<211> 108
<212> PRT
<213> Homo sapiens

<400> 1010

Gln Pro Val Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Gln
1 5 10 15

Thr Ala Ser Ile Pro Cys Gly Gly Asn Asn Ile Gly Gly Tyr Ser Val
20 25 30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Leu Leu Val Ile Tyr
35 40 45

Asp Asp Lys Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ala
50 55 60

Asn Ser Gly Ser Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65 70 75 80

Asp Glu Gly Asp Tyr Tyr Cys Gln Val Trp Asp Ser Gly Asn Asp Arg
85 90 95

Pro Leu Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105

<210> 1011
<211> 330
<212> DNA
<213> Homo sapiens

<400> 1011
tcctatgagc tgactcagcc accctcggtg tccaagggct tgagacagac cgccatactc 60

acctgcactg gagacagcaa caatgttggc caccaaggta cagcttggct gcaacaacac 120

cagggccacc ctcccaaact cctatcctac aggaatggca accggccctc agggatctca 180

gagagattct ctgcatccag gtcaggaaat acagcctccc tgaccattat tggactccag 240

cctgaggacg aggctgacta ctactgctca gtatgggaca gcagcctcag tgcctgggtg 300

ttcggcggag ggaccaagct gaccgtccta 330

<210> 1012
<211> 123
<212> PRT
<213> Homo sapiens

<400> 1012

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 Pro Phe Ser Met Thr
20 25 30

Ala Phe Thr Trp Leu Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Gly Ile Ser Pro Ile Phe Arg Thr Pro Lys Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Asn Thr Ala Asn
65 70 75 80

Met Glu Leu Thr Ser Leu Lys Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Thr Leu Ser Ser Tyr Gln Pro Asn Asn Asp Ala Phe Ala Ile
100 105 110

Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser
115 120

<210> 1013
<211> 378
<212> DNA
<213> Homo sapiens

<400> 1013
caggtgcagc tggtgcagtc tggggctgag gtgaggaagc ctggggcctc agtgaaggtc 60

tcatgtaagg cttctggata caccttcacc ggttattata ttcactgggt gcgacaggcc 120

cctggacaag gacttgagtg gatgggttgg atcaacccta tgactggtgg cacaaactat 180

gcacagaagt ttcaggtctg ggtcaccatg acccgggaca cgtccatcaa cacagcctac 240

atggaggtga gcaggctgac atctgacgac acggccgtgt attactgtgc gaggggggct 300

tccgtattac gatattttga ctggcagccc gaggctcttg atatctgggg cctcgggacc 360

acggtcaccg tctcctca 378

<210> 1014
<211> 106
<212> PRT
<213> Homo sapiens

<400> 1014

```
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 Arg Leu Glu Pro
65                  70                  75                  80

Glu Asp Phe Ala Val Tyr Phe Cys Gln Gln Tyr Gly Ser Ser Pro Gln
                85                  90                  95

Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys
            100                 105
```

<210> 1015
<211> 324
<212> DNA
<213> Homo sapiens

<400> 1015

```
cagcctgtgc tgactcagcc accctcggtg tcagtggccc caggacagac ggccagcatt       60

ccctgtgggg ggaacaacat tggaggctac agtgtacact ggtaccaaca aaagccgggc      120

caggcccccc tcttggtcat ttatgacgat aaagaccggc cctcagggat ccctgagcga      180

ttctctggcg ccaactctgg gagcacggcc accctgacaa tcagcagggt cgaagccggg      240

gatgagggcg actactactg tcaggtgtgg gatagtggta atgatcgtcc gctgttcggc      300

ggagggacca agctgaccgt ccta                                             324
```

<210> 1016
<211> 123
<212> PRT
<213> Homo sapiens

<400> 1016

```
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 Pro Phe Ser Met Thr
            20                  25                  30

Ala Phe Thr Trp Leu Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

Gly Gly Ile Ser Pro Ile Phe Arg Thr Pro Lys Tyr Ala Gln Lys Phe
    50                  55                  60
```

Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Asn Thr Ala Asn
65 70 75 80

Met Glu Leu Thr Ser Leu Lys Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Thr Leu Ser Ser Tyr Gln Pro Asn Asn Asp Ala Phe Ala Ile
100 105 110

Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser
115 120

<210> 1017
<211> 369
<212> DNA
<213> Homo sapiens

<400> 1017
caggtgcagc tggtgcagtc tggggctgaa gtgaagaagc ctggctcctc ggtgaaggtt 60

tcctgcaagg cttctggagg ccccttcagc atgactgctt tcacctggct gcgacaggcc 120

cctggacaag ggcttgagtg gatgggtggg atcagcccta tctttcgtac accgaagtac 180

gcacagaagt tccagggcag agtcacgatt accgcggacg aatccacgaa cacagccaac 240

atggagctga ccagcctgaa atctgaggac acggccgtgt attactgtgc gagaaccctt 300

tcctcctacc aaccgaataa tgatgctttt gctatctggg gccaagggac aatggtcacc 360

gtctcttca 369

<210> 1018
<211> 110
<212> PRT
<213> Homo sapiens

<400> 1018

Leu Pro 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 Arg Ser Gly Thr Ser Ala Ser Leu Ala Ile Ile Gly Leu Arg
65 70 75 80

Pro Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Arg Leu
85 90 95

Ser Ala Ser Leu Phe Gly Thr Gly Thr Thr Val Thr Val Leu
100 105 110

<210> 1019
<211> 318
<212> DNA
<213> Homo sapiens

<400> 1019
gaaattgtgt tgacgcagtc tccagccacc ctgtctttgt ctccagggga aagagccacc 60

ctctcctgca gggccagtca gagtgttagc agctacttag cctggtacca acagaaacct 120

ggccaggctc ccaggctcct catctatgat gcatccaaca gggccactgg catcccagcc 180

aggttcagtg gcagtgggtc tgggacagac ttcactctca ccatcagcag actggagcct 240

gaagattttg cagtctattt ctgtcagcag tatggtagct cacctcaatt cggccaaggg 300

acacgactgg agattaaa 318

<210> 1020
<211> 369
<212> DNA
<213> Homo sapiens

<400> 1020
caggtgcagc tggtgcagtc tggggctgaa gtgaagaagc ctggctcctc ggtgaaggtt 60

tcctgcaagg cttctggagg ccccttcagc atgactgctt tcacctggct gcgacaggcc 120

cctggacaag ggcttgagtg gatgggtggg atcagcccta tctttcgtac accgaagtac 180

gcacagaagt tccagggcag agtcacgatt accgcggacg aatccacgaa cacagccaac 240

atggagctga ccagcctgaa atctgaggac acggccgtgt attactgtgc gagaaccctt 300

tcctcctacc aaccgaataa tgatgctttt gctatctggg gccaagggac aatggtcacc 360

gtctcttca 369

<210> 1021

<400> 1021
000

<210> 1022
<211> 330
<212> DNA
<213> Homo sapiens

<400> 1022
ctgcctgtgc tgactcagcc accctcagcg tctgggaccc ccgggcagag ggtcaccatc 60

tcttgttctg gaagcagctc caacatcgga agtaatactg taaactggta ccagcagctc 120

ccaggaacgg cccccaaact cctcatctat agtaataatc agcggccctc aggggtccct 180

gaccgattct ctggctccag gtcaggcacc tcagcctccc tggccatcat tggactccgg 240

cctgaggatg aagctgatta ttactgtcag tcgtatgaca gcaggctcag tgcttctctc 300

ttcggaactg ggaccacggt caccgtcctc 330

<210> 1023
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Consensus Sequence

<400> 1023

Ser Tyr Ala Phe Ser
1 5

<210> 1024
<211> 5
<212> PRT
<213> Homo sapiens

<400> 1024

Thr Asn Ala Phe Ser
1 5

<210> 1025
<211> 5
<212> PRT
<213> Homo sapiens

<400> 1025

Ala Tyr Ala Phe Thr
1 5

<210> 1026
<211> 5
<212> PRT
<213> Homo sapiens

<400> 1026

Ser Phe Ala Ile Ser
1 5

<210> 1027
<211> 5
<212> PRT
<213> Homo sapiens

<400> 1027

Ser Tyr Ala Ile Ser
1 5

<210> 1028
<211> 5
<212> PRT
<213> Homo sapiens

<400> 1028

Gly Tyr Tyr Ile His

1 5

<210> 1029
<211> 5
<212> PRT
<213> Homo sapiens

<400> 1029

Met Thr Ala Phe Thr
1 5

<210> 1030
<211> 5
<212> PRT
<213> Homo sapiens

<400> 1030

Asp Asn Ala Ile Ser
1 5

<210> 1031
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Consensus Sequence

<400> 1031

Gly Ile Ile Pro Met Phe Gly Thr Pro Asn Tyr Ala Gln Lys Phe Gln
1 5 10 15

Gly

<210> 1032
<211> 17
<212> PRT
<213> Homo sapiens

<400> 1032

Gly Val Ile Pro Leu Phe Arg Thr Ala Ser Tyr Ala Gln Asn Val Gln
1 5 10 15

Gly

<210> 1033
<211> 17
<212> PRT
<213> Homo sapiens

<400> 1033

Gly Ile Ile Gly Met Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe Gln
1 5 10 15

Gly

<210> 1034
<211> 17
<212> PRT
<213> Homo sapiens

<400> 1034

Gly Ile Ser Pro Met Phe Gly Thr Pro Asn Tyr Ala Gln Lys Phe Gln
1 5 10 15

Gly

<210> 1035
<211> 17
<212> PRT
<213> Homo sapiens

<400> 1035

Gly Ile Ile Gly Val Phe Gly Val Pro Lys Tyr Ala Gln Lys Phe Gln
1 5 10 15

Gly

<210> 1036
<211> 17
<212> PRT
<213> Homo sapiens

<400> 1036

Trp Ile Asn Pro Met Thr Gly Gly Thr Asn Tyr Ala Gln Lys Phe Gln
1 5 10 15

Val

<210> 1037
<211> 17
<212> PRT
<213> Homo sapiens

<400> 1037

Gly Ile Ser Pro Ile Phe Arg Thr Pro Lys Tyr Ala Gln Lys Phe Gln
1 5 10 15

Gly

<210> 1038
<211> 17
<212> PRT

<213> Homo sapiens

<400> 1038

Gly Ile Ile Pro Ile Phe Gly Lys Pro Asn Tyr Ala Gln Lys Phe Gln
1 5 10 15

Gly

<210> 1039
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Consensus Sequence

<400> 1039

Ser Ser Gly Tyr Tyr Tyr Gly Gly Gly Phe Asp Val
1 5 10

<210> 1040
<211> 13
<212> PRT
<213> Homo sapiens

<400> 1040

Ser Ser Gly Tyr His Phe Gly Arg Ser His Phe Asp Ser
1 5 10

<210> 1041
<211> 11
<212> PRT
<213> Homo sapiens

<400> 1041

Gly Leu Tyr Tyr Tyr Glu Ser Ser Leu Asp Tyr
1 5 10

<210> 1042
<211> 15
<212> PRT
<213> Homo sapiens

<400> 1042

Ser Pro Ser Tyr Ile Cys Ser Gly Gly Thr Cys Val Phe Asp His
1 5 10 15

<210> 1043
<211> 13
<212> PRT
<213> Homo sapiens

<400> 1043

Glu Pro Gly Tyr Tyr Val Gly Lys Asn Gly Phe Asp Val
1 5 10

<210> 1044
<211> 17
<212> PRT
<213> Homo sapiens

<400> 1044

Gly Ala Ser Val Leu Arg Tyr Phe Asp Trp Gln Pro Glu Ala Leu Asp
1 5 10 15

Ile

<210> 1045
<211> 14
<212> PRT
<213> Homo sapiens

<400> 1045

Thr Leu Ser Ser Tyr Gln Pro Asn Asn Asp Ala Phe Ala Ile
1 5 10

<210> 1046
<211> 14
<212> PRT
<213> Homo sapiens

<400> 1046

Asp Ser Asp Ala Tyr Tyr Tyr Gly Ser Gly Gly Met Asp Val
1 5 10

<210> 1047
<211> 12
<212> PRT
<213> Homo sapiens

<400> 1047

Thr Gly Ser Ser Ser Asn Ile Gly Asn Tyr Val Ala
1 5 10

<210> 1048
<211> 13
<212> PRT
<213> Homo sapiens

<400> 1048

Thr Gly Ser Ser Ser Asn Ile Ala Ala Asn Tyr Val Gln
1 5 10

<210> 1049
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Consensus Sequence

<400> 1049

Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr Asn Ser Val Ser
1 5 10

<210> 1050
<211> 13
<212> PRT
<213> Homo sapiens

<400> 1050

Thr Gly Asn Ser Asn Asn Val Gly Asn Gln Gly Ala Ala
1 5 10

<210> 1051
<211> 13
<212> PRT
<213> Homo sapiens

<400> 1051

Thr Gly Asp Ser Asn Asn Val Gly His Gln Gly Thr Ala
1 5 10

<210> 1052
<211> 11
<212> PRT
<213> Homo sapiens

<400> 1052

Gly Gly Asn Asn Ile Gly Gly Tyr Ser Val His
1 5 10

<210> 1053
<211> 11
<212> PRT
<213> Homo sapiens

<400> 1053

Arg Ala Ser Gln Ser Val Ser Ser Tyr Leu Ala
1 5 10

<210> 1054
<211> 12
<212> PRT
<213> Homo sapiens

<400> 1054

Arg Ala Ser Gln Ser Leu Ser Ser Lys Tyr Leu Ala
1 5 10

<210> 1055
<211> 12
<212> PRT
<213> Homo sapiens

<400> 1055

Thr Gly Ser Ser Ser Asn Ile Gly Asn Tyr Val Ala
1 5 10

<210> 1056
<211> 13
<212> PRT
<213> Homo sapiens

<400> 1056

Ser Gly Ser Ser Ser Asn Ile Gly Ser Asn Thr Val Asn
1 5 10

<210> 1057
<211> 11
<212> PRT
<213> Homo sapiens

<400> 1057

Arg Ala Ser Gln Ser Ile Ser Ser Tyr Leu Asn
1 5 10

<210> 1058
<211> 12
<212> PRT
<213> Homo sapiens

<400> 1058

Thr Leu Ser Ser Gly His Ser Asn Tyr Ile Ile Ala
1 5 10

<210> 1059
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Consensus Sequence

<400> 1059

Ser Asn Ser Asp Arg Pro Ser
1 5

<210> 1060
<211> 7
<212> PRT
<213> Homo sapiens

<400> 1060

Glu Asp Asp Arg Arg Pro Ser
1 5

<210> 1061
<211> 7
<212> PRT
<213> Homo sapiens

<400> 1061

Glu Val Thr Lys Arg Pro Ser
1 5

<210> 1062
<211> 7
<212> PRT
<213> Homo sapiens

<400> 1062

Arg Asn Asn Asp Arg Pro Ser
1 5

<210> 1063
<211> 7
<212> PRT
<213> Homo sapiens

<400> 1063

Arg Asn Gly Asn Arg Pro Ser
1 5

<210> 1064
<211> 7
<212> PRT
<213> Homo sapiens

<400> 1064

Asp Asp Lys Asp Arg Pro Ser
1 5

<210> 1065
<211> 7
<212> PRT
<213> Homo sapiens

<400> 1065

Asp Ala Ser Asn Arg Ala Thr
1 5

<210> 1066
<211> 7
<212> PRT
<213> Homo sapiens

<400> 1066

Gly Ala Ser Ser Arg Ala Thr
1 5

<210> 1067
<211> 7
<212> PRT
<213> Homo sapiens

<400> 1067

Ser Asn Asn Gln Arg Pro Ser
1 5

<210> 1068
<211> 7
<212> PRT
<213> Homo sapiens

<400> 1068

Ala Ala Ser Ser Leu Gln Arg
1 5

<210> 1069
<211> 7
<212> PRT
<213> Homo sapiens

<400> 1069

Ser Asn Glu Gln Arg Pro Ser
1 5

<210> 1070
<211> 11
<212> PRT
<213> Homo sapiens

<400> 1070

Val Asn Ser Asp Gly Ser His Thr Lys Gly Asp
1 5 10

<210> 1071
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Consensus Sequence

<400> 1071

Gln Ser Tyr Asp Ser Leu Ser Ala Tyr Val
1 5 10

<210> 1072
<211> 10
<212> PRT
<213> Homo sapiens

<400> 1072

Gln Ser Tyr Asp Thr Asn Asn His Ala Val
1 5 10

<210> 1073
<211> 10
<212> PRT
<213> Homo sapiens

<400> 1073

Cys Ser Tyr Ala Gly His Ser Ala Tyr Val
1 5 10

<210> 1074
<211> 11
<212> PRT
<213> Homo sapiens

<400> 1074

Ser Thr Trp Asp Ser Ser Leu Ser Ala Val Val
1 5 10

<210> 1075
<211> 11
<212> PRT
<213> Homo sapiens

<400> 1075

Ser Val Trp Asp Ser Ser Leu Ser Ala Trp Val
1 5 10

<210> 1076
<211> 11
<212> PRT
<213> Homo sapiens

<400> 1076

Gln Val Trp Asp Ser Gly Asn Asp Arg Pro Leu
1 5 10

<210> 1077
<211> 9
<212> PRT
<213> Homo sapiens

<400> 1077

Gln Gln Tyr Gly Ser Ser Pro Gln Val
1 5

<210> 1078
<211> 9
<212> PRT
<213> Homo sapiens

<400> 1078

Gln Gln Tyr Asp Gly Val Pro Arg Thr
1 5

<210> 1079
<211> 11
<212> PRT
<213> Homo sapiens

<400> 1079

Gln Ser Tyr Asp Ser Arg Leu Ser Ala Ser Leu

1 5 10

<210> 1080
<211> 9
<212> PRT
<213> Homo sapiens

<400> 1080

Gln Gln Tyr Asp Ser Ser Pro Tyr Thr
1 5

<210> 1081
<211> 11
<212> PRT
<213> Homo sapiens

<400> 1081

Ala Ser Trp Asp Asp Asn Leu Ser Gly Trp Val
1 5 10

<210> 1082
<211> 9
<212> PRT
<213> Homo sapiens

<400> 1082

Glu Thr Trp Asp Thr Lys Ile His Val
1 5

<210> 1083
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic peptide

<400> 1083

Gly Thr Glu Thr Ser Gln Val Ala Pro Ala
1 5 10

<210> 1084
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic 6xHis tag

<400> 1084

His His His His His His
1 5

<210> 1085
<211> 4
<212> PRT
<213> Influenza A virus

<400> 1085

Ile Asn Gly Trp
1

<210> 1086
<211> 4
<212> PRT
<213> Influenza A virus

<400> 1086

Ile Asp Gly Trp
1

<210> 1087
<211> 4
<212> PRT
<213> Influenza A virus

<400> 1087

Val Ala Gly Trp
1

<210> 1088
<211> 4
<212> PRT
<213> Influenza A virus

<400> 1088

Val Asp Gly Trp
1

<210> 1089
<211> 4
<212> PRT
<213> Influenza A virus

<400> 1089

Ile Ala Gly Trp
1

<210> 1090
<211> 87
<212> PRT
<213> Homo sapiens

<400> 1090

Lys Lys Pro Gly Ser Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly
1 5 10 15

Thr Phe Ser Ser Tyr Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Gln
20 25 30

Gly Leu Glu Trp Met Gly Gly Ile Ile Pro Met Phe Gly Thr Pro Asn
35 40 45

Tyr Ala Gln Lys Phe Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser
50 55 60

Thr Ser Thr Ala Tyr Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr
65 70 75 80

Ala Val Tyr Tyr Cys Ala Arg
85

<210> 1091
<211> 87
<212> PRT
<213> Homo sapiens

<400> 1091

Lys Lys Pro Gly Ser Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly
1 5 10 15

Thr Phe Ser Ser Tyr Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Gln
20 25 30

Gly Leu Glu Trp Met Gly Gly Ile Ile Pro Ile Phe Gly Thr Pro Asn
35 40 45

Tyr Ala Gln Lys Phe Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser
50 55 60

Thr Ser Thr Ala Tyr Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr
65 70 75 80

Ala Val Tyr Tyr Cys Ala Arg
85

<210> 1092
<211> 108
<212> PRT
<213> Homo sapiens

<400> 1092

Lys Lys Pro Gly Ser Ser Val Lys Val Ser Cys Thr Ser Ser Glu Val
1 5 10 15

Thr Phe Ser Ser Phe Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Gln
20 25 30

Gly Leu Glu Trp Leu Gly Gly Ile Ser Pro Met Phe Gly Thr Pro Asn
35 40 45

Tyr Ala Gln Lys Phe Gln Gly Arg Val Thr Ile Thr Ala Asp Gln Ser
50 55 60

```
Thr Arg Thr Ala Tyr Met Asp Leu Arg Ser Leu Arg Ser Glu Asp Thr
65                  70                  75                  80


Ala Val Tyr Tyr Cys Ala Arg Ser Pro Ser Tyr Ile Cys Ser Gly Gly
                85                  90                  95


Thr Cys Val Phe Asp His Trp Gly Gln Gly Thr Leu
            100                 105


<210>  1093
<211>  104
<212>  PRT
<213>  Homo sapiens

<400>  1093

Lys Lys Pro Gly Ser Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly
1               5                   10                  15


Thr Phe Ser Ala Tyr Ala Phe Thr Trp Val Arg Gln Ala Pro Gly Gln
            20                  25                  30


Gly Leu Glu Trp Met Gly Gly Ile Ile Gly Met Phe Gly Thr Ala Asn
        35                  40                  45


Tyr Ala Gln Lys Phe Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Leu
    50                  55                  60


Thr Ser Thr Ala Tyr Met Glu Leu Ser Ser Leu Thr Ser Glu Asp Thr
65                  70                  75                  80


Ala Leu Tyr Tyr Cys Ala Arg Gly Leu Tyr Tyr Tyr Glu Ser Ser Phe
                85                  90                  95


Asp Tyr Trp Gly Gln Gly Thr Leu
            100


<210>  1094
<211>  107
<212>  PRT
<213>  Homo sapiens

<400>  1094

Lys Lys Pro Gly Ser Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly
1               5                   10                  15


Pro Phe Ser Met Thr Ala Phe Thr Trp Leu Arg Gln Ala Pro Gly Gln
            20                  25                  30


Gly Leu Glu Trp Met Gly Gly Ile Ser Pro Ile Phe Arg Thr Pro Lys
        35                  40                  45


Tyr Ala Gln Lys Phe Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser
    50                  55                  60
```

```
Thr Asn Thr Ala Asn Met Glu Leu Thr Ser Leu Lys Ser Glu Asp Thr
65                  70                  75                  80


Ala Val Tyr Tyr Cys Ala Arg Thr Leu Ser Ser Tyr Gln Pro Asn Asn
                85                  90                  95


Asp Ala Phe Ala Ile Trp Gly Gln Gly Thr Met
            100                 105


<210>  1095
<211>  106
<212>  PRT
<213>  Homo sapiens

<400>  1095

Lys Lys Pro Gly Ala Ser Val Lys Val Ser Cys Lys Thr Ser Gly Val
1               5                   10                  15


Thr Phe Ser Ser Tyr Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Gln
            20                  25                  30


Gly Leu Glu Trp Met Gly Gly Ile Ile Gly Val Phe Gly Val Pro Lys
        35                  40                  45


Tyr Ala Gln Lys Phe Gln Gly Arg Val Thr Ile Thr Ala Asp Lys Pro
    50                  55                  60


Thr Ser Thr Val Tyr Met Glu Leu Asn Ser Leu Arg Ala Glu Asp Thr
65                  70                  75                  80


Ala Val Tyr Tyr Cys Ala Arg Glu Pro Gly Tyr Tyr Val Gly Lys Asn
                85                  90                  95


Gly Phe Asp Val Trp Gly Gln Gly Thr Met
            100                 105


<210>  1096
<211>  105
<212>  PRT
<213>  Homo sapiens

<400>  1096

Lys Lys Pro Gly Ser Ser Val Lys Val Ser Cys Lys Ala Pro Gly Gly
1               5                   10                  15


Ile Phe Asn Thr Asn Ala Phe Ser Trp Val Arg Gln Ala Pro Gly Gln
            20                  25                  30


Gly Leu Glu Trp Val Gly Gly Val Ile Pro Leu Phe Arg Thr Ala Ser
        35                  40                  45
```

```
Tyr Ala Gln Asn Val Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser
    50                  55                  60

Thr Asn Thr Ala Tyr Met Glu Leu Thr Ser Leu Arg Ser Ala Asp Thr
65                  70                  75                  80

Ala Val Tyr Tyr Cys Ala Arg Ser Ser Gly Tyr His Phe Arg Ser His
                85                  90                  95

Phe Asp Ser Trp Gly Leu Gly Thr Leu
            100                 105
```

<210> 1097
<211> 110
<212> PRT
<213> Homo sapiens

<400> 1097

```
Arg Lys Pro Gly Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr
1               5                   10                  15

Thr Phe Thr Gly Tyr Tyr Ile His Trp Val Arg Gln Ala Pro Gly Gln
            20                  25                  30

Gly Leu Glu Trp Met Gly Trp Ile Asn Pro Met Thr Gly Gly Thr Asn
        35                  40                  45

Tyr Ala Gln Lys Phe Gln Val Trp Val Thr Met Thr Arg Asp Thr Ser
    50                  55                  60

Ile Asn Thr Ala Tyr Met Glu Val Thr Arg Leu Thr Ser Asp Asp Thr
65                  70                  75                  80

Ala Val Tyr Tyr Cys Ala Arg Gly Ala Ser Val Leu Arg Tyr Phe Asp
                85                  90                  95

Trp Gln Pro Glu Ala Leu Asp Ile Trp Gly Leu Gly Thr Thr
            100                 105                 110
```

<210> 1098
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1098

```
Gly Gly Thr Phe Ser Ser Tyr Ala
1               5
```

<210> 1099
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1099

Gly Gly Thr Phe Ser Ser Tyr Ala
1 5

<210> 1100
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1100

Glu Val Thr Phe Ser Ser Phe Ala
1 5

<210> 1101
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1101

Gly Gly Thr Phe Ser Ala Tyr Ala
1 5

<210> 1102
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1102

Gly Gly Pro Phe Ser Met Thr Ala
1 5

<210> 1103
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1103

Gly Val Thr Phe Ser Ser Tyr Ala
1 5

<210> 1104
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1104

Gly Gly Ile Phe Asn Thr Asn Ala
1 5

<210> 1105
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1105

Gly Tyr Thr Phe Thr Gly Tyr Tyr

1 5

<210> 1106
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1106

Ile Ile Pro Met Phe Gly Thr Pro
1 5

<210> 1107
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1107

Ile Ile Pro Ile Phe Gly Thr Pro
1 5

<210> 1108
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1108

Ile Ser Pro Met Phe Gly Thr Pro
1 5

<210> 1109
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1109

Ile Ile Gly Met Phe Gly Thr Ala
1 5

<210> 1110
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1110

Ile Ser Pro Ile Phe Arg Thr Pro
1 5

<210> 1111
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1111

Ile Ile Gly Val Phe Gly Val Pro
1 5

<210> 1112
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1112

Val Ile Pro Leu Phe Arg Thr Ala
1 5

<210> 1113
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1113

Ile Asn Pro Met Thr Gly Gly Thr
1 5

<210> 1114
<211> 17
<212> PRT
<213> Homo sapiens

<400> 1114

Ala Arg Ser Pro Ser Tyr Ile Cys Ser Gly Gly Thr Cys Val Phe Asp
1 5 10 15

His

<210> 1115
<211> 13
<212> PRT
<213> Homo sapiens

<400> 1115

Ala Arg Gly Leu Tyr Tyr Tyr Glu Ser Ser Phe Asp Tyr
1 5 10

<210> 1116
<211> 16
<212> PRT
<213> Homo sapiens

<400> 1116

Ala Arg Thr Leu Ser Ser Tyr Gln Pro Asn Asn Asp Ala Phe Ala Ile
1 5 10 15

<210> 1117
<211> 15
<212> PRT
<213> Homo sapiens

<400> 1117

Ala Arg Glu Pro Gly Tyr Tyr Val Gly Lys Asn Gly Phe Asp Val

1 5 10 15

<210> 1118
<211> 14
<212> PRT
<213> Homo sapiens

<400> 1118

Ala Arg Ser Ser Gly Tyr His Phe Arg Ser His Phe Asp Ser
1 5 10

<210> 1119
<211> 19
<212> PRT
<213> Homo sapiens

<400> 1119

Ala Arg Gly Ala Ser Val Leu Arg Tyr Phe Asp Trp Gln Pro Glu Ala
1 5 10 15

Leu Asp Ile

<210> 1120
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1120

Ser Gly Asn Ile Ala Ala Asn Tyr
1 5

<210> 1121
<211> 9
<212> PRT
<213> Homo sapiens

<400> 1121

Ser Ser Asp Val Gly Gly Tyr Asn Ser
1 5

<210> 1122
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1122

Ser Asn Asn Val Gly Asn Gln Gly
1 5

<210> 1123
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1123

Ser Asn Asn Val Gly His Gln Gly
1   5

<210> 1124
<211> 6
<212> PRT
<213> Homo sapiens

<400> 1124

Asn Ile Gly Gly Tyr Ser
1   5

<210> 1125
<211> 7
<212> PRT
<213> Homo sapiens

<400> 1125

Gln Ser Ser Val Ser Ser Tyr
1   5

<210> 1126
<211> 7
<212> PRT
<213> Homo sapiens

<400> 1126

Gln Ser Leu Ser Ser Lys Tyr
1   5

<210> 1127
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1127

Ser Ser Asn Ile Gly Ser Asn Thr
1   5

<210> 1128
<211> 6
<212> PRT
<213> Homo sapiens

<400> 1128

Gln Ser Ile Ser Ser Tyr
1   5

<210> 1129
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1129

Thr Ser Asn Ile Gly Arg Asn His

1 5

<210> 1130
<211> 3
<212> PRT
<213> Homo sapiens

<400> 1130

Glu Asp Asp
1

<210> 1131
<211> 3
<212> PRT
<213> Homo sapiens

<400> 1131

Glu Val Thr
1

<210> 1132
<211> 3
<212> PRT
<213> Homo sapiens

<400> 1132

Arg Asn Asn
1

<210> 1133
<211> 3
<212> PRT
<213> Homo sapiens

<400> 1133

Arg Asn Gly
1

<210> 1134
<211> 3
<212> PRT
<213> Homo sapiens

<400> 1134

Asp Asp Lys
1

<210> 1135
<211> 3
<212> PRT
<213> Homo sapiens

<400> 1135

Asp Ala Ser
1

<210> 1136
<211> 3
<212> PRT
<213> Homo sapiens

<400> 1136

Gly Ala Ser
1

<210> 1137
<211> 3
<212> PRT
<213> Homo sapiens

<400> 1137

Ser Asn Asn
1

<210> 1138
<211> 3
<212> PRT
<213> Homo sapiens

<400> 1138

Ala Ala Ser
1

<210> 1139
<211> 3
<212> PRT
<213> Homo sapiens

<400> 1139

Ser Asn Glu
1

<210> 1140
<211> 10
<212> PRT
<213> Homo sapiens

<400> 1140

Gln Thr Tyr Asp Thr Asn Asn His Ala Val
1 5 10

<210> 1141
<211> 10
<212> PRT
<213> Homo sapiens

<400> 1141

Cys Ser Tyr Ala Gly His Ser Ala Tyr Val
1 5 10

<210> 1142

<211> 11
<212> PRT
<213> Homo sapiens

<400> 1142

Ser Thr Trp Asp Ser Ser Leu Ser Ala Val Val
1 5 10

<210> 1143
<211> 11
<212> PRT
<213> Homo sapiens

<400> 1143

Ser Val Trp Asp Ser Ser Leu Ser Ala Trp Val
1 5 10

<210> 1144
<211> 11
<212> PRT
<213> Homo sapiens

<400> 1144

Gln Val Trp Asp Ser Gly Asn Asp Arg Pro Leu
1 5 10

<210> 1145
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1145

Gln Gln Tyr Gly Ser Ser Pro Gln
1 5

<210> 1146
<211> 9
<212> PRT
<213> Homo sapiens

<400> 1146

Gln Gln Tyr Asp Gly Val Pro Arg Thr
1 5

<210> 1147
<211> 11
<212> PRT
<213> Homo sapiens

<400> 1147

Gln Ser Tyr Asp Ser Arg Leu Ser Ala Ser Leu
1 5 10

<210> 1148
<211> 9
<212> PRT

<213> Homo sapiens

<400> 1148

Gln Gln Tyr Asp Ser Ser Pro Tyr Thr
1 5

<210> 1149
<211> 11
<212> PRT
<213> Homo sapiens

<400> 1149

Ala Ser Trp Asp Asp Asn Leu Ser Gly Trp Val
1 5 10

<210> 1150
<211> 2
<212> PRT
<213> Homo sapiens

<400> 1150

Ala Arg
1

<210> 1151
<211> 10
<212> PRT
<213> Homo sapiens

<400> 1151

Gln Val Gln Leu Val Gln Gly Ala Glu Val
1 5 10

<210> 1152
<211> 5
<212> PRT
<213> Homo sapiens

<400> 1152

Val Thr Val Ser Ser
1 5

<210> 1153
<211> 354
<212> DNA
<213> Homo sapiens

<400> 1153
caggtccagc tcgtccagtc cggcgctgaa gtggtgaaac ccggggcatc cgtcaaagtc 60

tcttgtaagg ctagtggcta caccttcaca tcctactgga tgcattgggt gaaacaggca 120

cctggccagg gactcgaatg gatcggagcc gtgtctcctg gaaattccga cacctcctac 180

aacgaaaaat tcaagggcaa ggcaaccctc actgtggata ctagtgcttc taccgcctac 240

atggaactct catctctccg ctctgaggac actgccgtct actactgtac tcggtcacga 300

tacgggaaca acgctctcga ttactgggga cagggcacac tggtcactgt ctct 354

<210> 1154
<211> 118
<212> PRT
<213> Homo sapiens

<400> 1154

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Val 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

Trp Met His Trp Val Lys Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Ala Val Ser Pro Gly Asn Ser Asp Thr Ser Tyr Asn Glu Lys Phe
50 55 60

Lys Gly Lys Ala Thr Leu Thr Val Asp Thr Ser Ala 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

Thr Arg Ser Arg Tyr Gly Asn Asn Ala Leu Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser
115

<210> 1155
<211> 321
<212> DNA
<213> Homo sapiens

<400> 1155
gatattcagc tcacacagag cccatcttct ctgtctgctt ctgtgggcga tcgagtgaca 60

atcacttgtc gggctagtca gggcatttct agcaacattg tgtggctcca gcagaaacct 120

ggcaaagccc caaaaggcct catctaccac ggaaccaacc tggaatctgg cgtgccatct 180

cggtttagtg gatctggatc cgggaccgat tacacactca ccatctcttc actggaacct 240

gaggatttcg ccacctacta ctgtgtccag tactcccagt ttccacccac ttttggacag 300

ggaaccaaac tcgagatcaa a 321

<210> 1156
<211> 107
<212> PRT
<213> Homo sapiens

<400> 1156

```
Asp Ile Gln Leu 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 Ser Ser Asn
            20                  25                  30

Ile Val Trp Leu Gln Gln Lys Pro Gly Lys Ala Pro Lys Gly Leu Ile
        35                  40                  45

Tyr His Gly Thr Asn Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Asp Tyr Thr Leu Thr Ile Ser Ser Leu Glu Pro
65                  70                  75                  80

Glu Asp Phe Ala Thr Tyr Tyr Cys Val Gln Tyr Ser Gln Phe Pro Pro
                85                  90                  95

Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
            100                 105
```

<210> 1157
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1157

```
Gly Tyr Thr Phe Thr Ser Tyr Trp
1               5
```

<210> 1158
<211> 8
<212> PRT
<213> Homo sapiens

<400> 1158

```
Val Ser Pro Gly Asn Ser Asp Thr
1               5
```

<210> 1159
<211> 12
<212> PRT
<213> Homo sapiens

<400> 1159

```
Thr Arg Ser Arg Tyr Gly Asn Asn Ala Leu Asp Tyr
1               5                   10
```

<210> 1160
<211> 9
<212> PRT
<213> Homo sapiens

<400> 1160

Gln Gly Ile Ser Ser Asn Ile Val Trp
1 5

<210> 1161
<211> 3
<212> PRT
<213> Homo sapiens

<400> 1161

His Gly Thr
1

<210> 1162
<211> 9
<212> PRT
<213> Homo sapiens

<400> 1162

Val Gln Tyr Ser Gln Phe Pro Pro Thr
1 5

<210> 1163
<211> 354
<212> DNA
<213> Homo sapiens

<400> 1163
caggtccagc tcgtccagtc cggcgctgaa gtggtgaaac ccggggcatc cgtcaaagtc 60

tcttgtaagg ctagtggcta caccttcaca tcctactgga tgcattgggt gaaacaggca 120

cctggccagg gactcgaatg gatcggagcc gtgtctcctg gaaattccga cacctcctac 180

aacgaaaaat tcaagggcaa ggcaaccctc actgtggaca aatctgcctc taccgcctac 240

atggaactct catctctccg ctctgaggat actgctgtgt actactgtac ccggtcacga 300

tacggcaata acgccctcga ttactggggg cagggaactc tggtcactgt gtct 354

<210> 1164
<211> 118
<212> PRT
<213> Homo sapiens

<400> 1164

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Val 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

Trp Met His Trp Val Lys Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Ala Val Ser Pro Gly Asn Ser Asp Thr Ser Tyr Asn Glu Lys Phe
50 55 60

Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ala 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

Thr Arg Ser Arg Tyr Gly Asn Asn Ala Leu Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser
115

<210> 1165
<211> 357
<212> DNA
<213> Mus musculus

<400> 1165
caggtccagc tgcagcagtc tgggactgtg ctcgcaaggc ctggggcttc agtgaagatg 60

tcctgcaagg cttctggcta cacctttacc agttactgga tgcactgggt aaaacagagg 120

cctggacagg gtctggaatg gattggcgct gtttctcctg gaaatagtga tactagctac 180

aaccagaagt tcaagggcaa ggccacactg actgcagtca catccaccag cactgcctac 240

atggagttca gcagcctgac aaatgaggac tctgcggtct attactgtac aagaagtcga 300

tatggtaaca atgctttgga ctactggggc caagggacca cggtcaccgt ctcctca 357

<210> 1166
<211> 119
<212> PRT
<213> Mus musculus

<400> 1166

Gln Val Gln Leu Gln Gln Ser Gly Thr Val Leu Ala Arg Pro Gly Ala
1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser Tyr
20 25 30

Trp Met His Trp Val Lys Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Ala Val Ser Pro Gly Asn Ser Asp Thr Ser Tyr Asn Gln Lys Phe
50 55 60

Lys Gly Lys Ala Thr Leu Thr Ala Val Thr Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Glu Phe Ser Ser Leu Thr Asn Glu Asp Ser Ala Val Tyr Tyr Cys
85 90 95

Thr Arg Ser Arg Tyr Gly Asn Asn Ala Leu Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Thr Val Thr Val Ser Ser
115

<210> 1167
<211> 330
<212> DNA
<213> Mus musculus

<400> 1167
gacatcgagc tcacccagtc tcctgcttcc ttagctgtat ctctggggca gagggccacc 60

atctcataca gggccagcaa aagtgtcagt acatctggct atagttatat gcactggaac 120

caacagaaac caggacagcc acccagactc ctcatctatc ttgtatccaa cctagaatct 180

ggggtccctg ccaggttcag tggcagtggg tctgggacag acttcaccct caacatccat 240

cctgtggagg aggaggatgc tgcaacctat tactgtcagc acattaaggg agcttacacg 300

ttcggagggg ggaccaagct ggaaataaaa 330

<210> 1168
<211> 330
<212> DNA
<213> Mus musculus

<400> 1168
gacatcgagc tcactcagtc tccagcttct ttggctgtgt ctctagggca gagggccacc 60

atctcctgca gagccagcgc aagtgttgat aattatggca ttagttttat gaactggttc 120

caacagaaac caggacagcc acccaaactc ctcatctatg ctgcatccaa ccaaggatcc 180

ggggtccctg ccaggtttag tggcagtggg tctgggacag acttcagcct caacatccat 240

cctatggagg aggatgatac tgcaacctat tactgtcagc acattaaggg agcttacacg 300

ttcggagggg ggaccaagct ggagctgaaa 330

<210> 1169
<211> 321
<212> DNA
<213> Mus musculus

<400> 1169
gacatcgagc tcactcagtc tccatcctcc atgtctgtat ctctgggaga cacagtcaac 60

atcacttgcc gtgcaagtca gggcattagc agtaatatag tgtggttgca gcagaaacca 120

gggaagtcat ttaagggcct gatctatcat gggaccaatt tggaagatgg agttccatca 180

aggttcagtg gcagtggatc tggagccgat tattctctca ccatcagcag cctggaatct 240

gaggattttg cagactatta ctgtgtacag tattctcagt ttcctcccac gttcggctcg 300

gggaccaagc tggagctgaa a 321

<210> 1170
<211> 107
<212> PRT
<213> Mus musculus

<400> 1170

Asp Ile Glu Leu Thr Gln Ser Pro Ser Ser Met Ser Val Ser Leu Gly
1 5 10 15

Asp Thr Val Asn Ile Thr Cys Arg Ala Ser Gln Gly Ile Ser Ser Asn
20 25 30

Ile Val Trp Leu Gln Gln Lys Pro Gly Lys Ser Phe Lys Gly Leu Ile
35 40 45

Tyr His Gly Thr Asn Leu Glu Asp Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Ala Asp Tyr Ser Leu Thr Ile Ser Ser Leu Glu Ser
65 70 75 80

Glu Asp Phe Ala Asp Tyr Tyr Cys Val Gln Tyr Ser Gln Phe Pro Pro
85 90 95

Thr Phe Gly Ser Gly Thr Lys Leu Glu Leu Lys
100 105

<210> 1171
<211> 118
<212> PRT
<213> Homo sapiens

<400> 1171

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Val 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

Trp Met His Trp Val Lys Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Ala Val Ser Pro Gly Asn Ser Asp Thr Ser Tyr Asn Glu Lys Phe
50 55 60

Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ala 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

Thr Arg Ser Arg Tyr Gly Asn Asn Ala Leu Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser
115

<210> 1172
<211> 118
<212> PRT
<213> Mus musculus

<400> 1172

```
Gln Val Gln Leu Gln Gln Ser Gly Thr Val Leu Ala Arg Pro Gly Ala
1               5                   10                  15


Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser Tyr
            20                  25                  30


Trp Met His Trp Val Lys Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile
        35                  40                  45


Gly Ala Val Ser Pro Gly Asn Ser Asp Thr Ser Tyr Asn Gln Lys Phe
    50                  55                  60


Lys Gly Lys Ala Thr Leu Thr Ala Val Thr Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80


Met Glu Phe Ser Ser Leu Thr Asn Glu Asp Ser Ala Val Tyr Tyr Cys
                85                  90                  95


Thr Arg Ser Arg Tyr Gly Asn Asn Ala Leu Asp Tyr Trp Gly Gln Gly
            100                 105                 110


Thr Thr Val Thr Val Ser
        115
```

<210> 1173
<211> 107
<212> PRT
<213> Homo sapiens

<400> 1173

```
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 Ser Ser Asn
            20                  25                  30


Ile Val Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Gly Leu Ile
        35                  40                  45


Tyr His Gly Thr Asn Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60


Ser Gly Ser Gly Thr Asp Tyr Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80


Glu Asp Phe Ala Thr Tyr Tyr Cys Val Gln Tyr Ser Gln Phe Pro Pro
```

85 90 95

Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105

<210> 1174
<211> 98
<212> PRT
<213> Homo sapiens

<400> 1174

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

<210> 1175
<211> 294
<212> DNA
<213> Homo sapiens

<400> 1175
caggtgcagc tggtgcagtc tggggctgag gtgaagaagc ctgggtcctc ggtgaaggtc 60

tcctgcaagg cttctggagg caccttcagc agctatgcta tcagctgggt gcgacaggcc 120

cctggacaag ggcttgagtg gatgggaggg atcatcccta tctttggtac agcaaactac 180

gcacagaagt tccagggcag agtcacgatt accgcggacg aatccacgag cacagcctac 240

atggagctga gcagcctgag atctgaggac acggccgtgt attactgtgc gaga 294

<210> 1176
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Chemically synthesized peptide

<400> 1176

Ile Ser Pro Met Phe Gly Thr Pro
1   5

<210> 1177
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Chemically synthesized peptide

<400> 1177

Ile Ile Pro Ile Phe Gly Thr Ala
1   5

<210> 1178
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Chemically synthesized peptide

<400> 1178

Ile Ser Pro Ile Phe Gly Thr Ala
1   5

<210> 1179
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Chemically synthesized peptide

<220>
<221> MISC_FEATURE
<222> (2)..(2)
<223> wherein said Xaa is an Isoleucine or a Serine

<220>
<221> MISC_FEATURE
<222> (4)..(4)
<223> wherein said Xaa is an Isoleucine or a Methionine

<400> 1179

Ile Xaa Pro Xaa Phe Gly Thr Ala
1   5

<210> 1180
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Chemically synthesized peptide

<220>

<221> MISC_FEATURE
<222> (1)..(1)
<223> wherein said Xaa is a Glycine or a Glutamic acid

<220>
<221> MISC_FEATURE
<222> (2)..(2)
<223> wherein said Xaa is a Glycine or a Valine

<400> 1180

Xaa Xaa Thr Phe Ser Ser Tyr Ala
1 5

<210> 1181
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Chemically synthesized peptide

<220>
<221> MISC_FEATURE
<222> (2)..(2)
<223> wherein said Xaa is an Isoleucine or a Serine

<220>
<221> MISC_FEATURE
<222> (4)..(4)
<223> wherein said Xaa is an Isoleucine or a Methionine

<400> 1181

Ile Xaa Pro Xaa Phe Gly Thr Ala
1 5

<210> 1182
<211> 354
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable heavy chain

<400> 1182
caggtgcagc tggtgcagag cggagccgag gtgaagaagc ctggagcttc cgtcaaggtg 60

tcctgcaagg ccagcggcta caccttcgcc agccaatgga tgcactggat gcggcaggca 120

cctggacagg gcctcgaatg gatcggctgg atcaaccccg gcaacgtgaa caccaagtac 180

aacgagaagt tcaagggcag ggccaccctg accgtggaca ccagcaccaa caccgcctac 240

atggaactga gcagcctgcg gagcgaggac accgccgtgt actactgcgc cagaagcacc 300

tggtaccggc cgctggacta ctggggccag ggcaccctgg tgaccgtgag cagc 354

<210> 1183
<211> 118
<212> PRT
<213> Artificial Sequence

<220>

<223> Variable heavy chain

<400> 1183

```
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 Ala Ser Gln
            20                  25                  30

Trp Met His Trp Met Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
        35                  40                  45

Gly Trp Ile Asn Pro Gly Asn Val Asn Thr Lys Tyr Asn Glu Lys Phe
    50                  55                  60

Lys Gly Arg Ala Thr Leu Thr Val Asp Thr Ser Thr Asn 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 Ser Thr Trp Tyr Arg Pro Leu Asp Tyr Trp Gly Gln Gly Thr
            100                 105                 110

Leu Val Thr Val Ser Ser
        115
```

<210> 1184
<211> 336
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable light chain

<400> 1184

```
gacatcgtga tgacccagag ccccgacagc ctggccgtga gcctgggcga gcgggccacc       60

atcaactgca agagcagcca gagcatcctg tacagcagca accagaagaa ctacctggcc      120

tggtatcagc agaagcccgg ccagagcccc aagctgctga tctactgggc cagcacccgg      180

gagagcggcg tgcccgaccg gtttagcggc agcggctccg gcaccgactt caccctgacc      240

atcagcagcc tgcaggccga ggacgtggcc gtgtactact gccaccagta catcagcagc      300

tacaccttcg gccagggcac aaagctggaa atcaag                                336
```

<210> 1185
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain

<400> 1185

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 Ile Leu Tyr Ser
20 25 30

Ser Asn Gln Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
35 40 45

Ser 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 Ile Ser Ser Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105 110

<210> 1186
<211> 354
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable heavy chain

<400> 1186
caggtgcagc tggtgcagag cggagccgag gtgaagaagc ctggagcttc cgtcaaggtg 60

tcctgcaagg ccagcggcta caccttcgcc agcagctgga tgcactggat gcggcaggca 120

cctggacagg gcctcgaatg gatcggctgg atcaaccccg gcaacgtgaa caccaagtac 180

aacgagaagt tcaagggcag ggccaccctg accgtggaca ccagcaccaa caccgcctac 240

atggaactga gcagcctgcg gagcgaggac accgccgtgt actactgcgc cagaagcacg 300

tggtatcggc cgaatgacta ctggggccag ggcaccctgg tgaccgtgag cagc 354

<210> 1187
<211> 118
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain

<400> 1187

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 Ala Ser Ser
20 25 30

Trp Met His Trp Met Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Trp Ile Asn Pro Gly Asn Val Asn Thr Lys Tyr Asn Glu Lys Phe
50 55 60

Lys Gly Arg Ala Thr Leu Thr Val Asp Thr Ser Thr Asn 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 Ser Thr Trp Tyr Arg Pro Asn Asp Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 1188
<211> 336
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable light chain

<400> 1188
gacatcgtga tgacccagag ccccgacagc ctggccgtga gcctgggcga gcgggccacc 60

atcaactgca agagcagcca gagcatcctg tacagcagca accagaagaa ctacctggcc 120

tggtatcagc agaagcccgg ccagagcccc aagctgctga tctactgggc cagcacccgg 180

gagagcggcg tgcccgaccg gtttagcggc agcggctccg gcaccgactt caccctgacc 240

atcagcagcc tgcaggccga ggacgtggcc gtgtactact gccaccagta caaaagcagc 300

tacaccttcg gccagggcac aaagctggaa atcaag 336

<210> 1189
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain

<400> 1189

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 Ile Leu Tyr Ser
20 25 30

Ser Asn Gln Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
35 40 45

Ser 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 Lys Ser Ser Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105 110

<210> 1190
<211> 354
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable heavy chain

<400> 1190
caggtgcagc tggtgcagag cggagccgag gtgaagaagc ctggagcttc cgtcaaggtg 60

tcctgcaagg ccagcggcta caccttcgcc agcagctgga tgcactggat gcggcaggca 120

cctggacagg gcctcgaatg gatcggctgg atcaaccccg gcaacgtgaa caccaagtac 180

aacgagaagt tcaagggcag ggccaccctg accgtggaca ccagcaccaa caccgcctac 240

atggaactga gcagcctgcg gagcgaggac accgccgtgt actactgcgc cagaaccacc 300

cgttatcggc ccctggacta ctggggccag ggcaccctgg tgaccgtgag cagc 354

<210> 1191
<211> 118
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain

<400> 1191

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 Ala Ser Ser
20 25 30

Trp Met His Trp Met Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Trp Ile Asn Pro Gly Asn Val Asn Thr Lys Tyr Asn Glu Lys Phe
50 55 60

Lys Gly Arg Ala Thr Leu Thr Val Asp Thr Ser Thr Asn 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 Thr Thr Arg Tyr Arg Pro Leu Asp Tyr Trp Gly Gln Gly Thr
            100                 105                 110

Leu Val Thr Val Ser Ser
        115
```

<210> 1192
<211> 336
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain

<400> 1192

```
Gly Ala Cys Ala Thr Cys Gly Thr Gly Ala Thr Gly Ala Cys Cys Cys
1               5                   10                  15

Ala Gly Ala Gly Cys Cys Cys Cys Gly Ala Cys Ala Gly Cys Cys Thr
            20                  25                  30

Gly Gly Cys Cys Gly Thr Gly Ala Gly Cys Cys Thr Gly Gly Gly Cys
        35                  40                  45

Gly Ala Gly Cys Gly Gly Gly Cys Cys Ala Cys Cys Ala Thr Cys Ala
    50                  55                  60

Ala Cys Thr Gly Cys Ala Ala Gly Ala Gly Cys Ala Gly Cys Cys Ala
65                  70                  75                  80

Gly Ala Gly Cys Ala Thr Cys Cys Thr Gly Thr Ala Cys Ala Gly Cys
                85                  90                  95

Ala Gly Cys Ala Ala Cys Cys Ala Gly Ala Ala Gly Ala Ala Cys Thr
            100                 105                 110

Ala Cys Cys Thr Gly Gly Cys Cys Thr Gly Gly Thr Ala Thr Cys Ala
        115                 120                 125

Gly Cys Ala Gly Ala Ala Gly Cys Cys Cys Gly Gly Cys Cys Ala Gly
    130                 135                 140

Ala Gly Cys Cys Cys Cys Ala Ala Gly Cys Thr Gly Cys Thr Gly Ala
145                 150                 155                 160

Thr Cys Thr Ala Cys Thr Gly Gly Gly Cys Cys Ala Gly Cys Ala Cys
                165                 170                 175

Cys Cys Gly Gly Gly Ala Gly Ala Gly Cys Gly Gly Cys Gly Thr Gly
            180                 185                 190
```

```
Cys Cys Cys Gly Ala Cys Cys Gly Gly Thr Thr Thr Ala Gly Cys Gly
        195                 200                 205

Gly Cys Ala Gly Cys Gly Gly Cys Thr Cys Cys Gly Gly Cys Ala Cys
    210                 215                 220

Cys Gly Ala Cys Thr Thr Cys Ala Cys Cys Cys Thr Gly Ala Cys Cys
225                 230                 235                 240

Ala Thr Cys Ala Gly Cys Ala Gly Cys Cys Thr Gly Cys Ala Gly Gly
                245                 250                 255

Cys Cys Gly Ala Gly Gly Ala Cys Gly Thr Gly Gly Cys Cys Gly Thr
            260                 265                 270

Gly Thr Ala Cys Thr Ala Cys Thr Gly Cys Cys Ala Cys Cys Ala Gly
        275                 280                 285

Thr Ala Cys Cys Gly Thr Ala Gly Cys Ala Gly Cys Thr Ala Cys Ala
    290                 295                 300

Cys Cys Thr Thr Cys Gly Gly Cys Cys Ala Gly Gly Gly Cys Ala Cys
305                 310                 315                 320

Ala Ala Ala Gly Cys Thr Gly Gly Ala Ala Ala Thr Cys Ala Ala Gly
                325                 330                 335
```

<210> 1193
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain

<400> 1193

```
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 Ile Leu Tyr Ser
            20                  25                  30

Ser Asn Gln Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
        35                  40                  45

Ser 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 Arg Ser Ser Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105 110

<210> 1194
<211> 354
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable heavy chain

<400> 1194
caggtgcagc tggtgcagag cggagccgag gtgaagaagc ctggagcttc cgtcaaggtg 60

tcctgcaagg ccagcggcta caccttcgcc agccaatata tgcactggat gcggcaggca 120

cctggacagg gcctcgaatg gatcggctgg atcaaccccg gcaacgtgaa caccaagtac 180

aacgagaagt tcaagggcag ggccaccctg accgtggaca ccagcaccaa caccgcctac 240

atggaactga gcagcctgcg gagcgaggac accgccgtgt actactgcgc cagactgacc 300

tattatcggc cgccggacta ctggggccag ggcaccctgg tgaccgtgag cagc 354

<210> 1195
<211> 118
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain

<400> 1195

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 Ala Ser Gln
20 25 30

Tyr Met His Trp Met Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Trp Ile Asn Pro Gly Asn Val Asn Thr Lys Tyr Asn Glu Lys Phe
50 55 60

Lys Gly Arg Ala Thr Leu Thr Val Asp Thr Ser Thr Asn 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 Leu Thr Tyr Tyr Arg Pro Pro Asp Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser
        115

<210> 1196
<211> 336
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable light chain

<400> 1196
gacatcgtga tgacccagag ccccgacagc ctggccgtga gcctgggcga gcgggccacc 60

atcaactgca agagcagcca gagcatcctg tacagcagca accagaagaa ctacctggcc 120

tggtatcagc agaagcccgg ccagagcccc aagctgctga tctactgggc cagcacccgg 180

gagagcggcg tgcccgaccg gtttagcggc agcggctccg gcaccgactt caccctgacc 240

atcagcagcc tgcaggccga ggacgtggcc gtgtactact gccaccagta ctatagcagc 300

tacaccttcg gccagggcac aaagctggaa atcaag   336

<210> 1197
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain

<400> 1197

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 Ile Leu Tyr Ser
            20   25   30

Ser Asn Gln Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
        35   40   45

Ser 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 Ser Ser Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
            100   105   110

<210> 1198
<211> 354
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable heavy chain

<400> 1198
caggtgcagc tggtgcagag cggagccgag gtgaagaagc ctggagcttc cgtcaaggtg 60

tcctgcaagg ccagcggcta caccttcgcc agcgcgtgga tgcactggat gcggcaggca 120

cctggacagg gcctcgaatg gatcggctgg atcaaccccg gcaacgtgaa caccaagtac 180

aacgagaagt tcaagggcag ggccaccctg accgtggaca ccagcaccaa caccgcctac 240

atggaactga gcagcctgcg gagcgaggac accgccgtgt actactgcgc cagaagcacg 300

tattaccggc cgctggacta ctggggccag ggcaccctgg tgaccgtgag cagc 354

<210> 1199
<211> 118
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain

<400> 1199

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 Ala Ser Ala
20 25 30

Trp Met His Trp Met Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Trp Ile Asn Pro Gly Asn Val Asn Thr Lys Tyr Asn Glu Lys Phe
50 55 60

Lys Gly Arg Ala Thr Leu Thr Val Asp Thr Ser Thr Asn 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 Ser Thr Tyr Tyr Arg Pro Leu Asp Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 1200
<211> 336
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable light chain

<400> 1200
gacatcgtga tgacccagag ccccgacagc ctggccgtga gcctgggcga gcgggccacc 60

atcaactgca agagcagcca gagcatcctg tacagcagca accagaagaa ctacctggcc 120

tggtatcagc agaagcccgg ccagagcccc aagctgctga tctactgggc cagcacccgg 180

gagagcggcg tgcccgaccg gtttagcggc agcggctccg gcaccgactt caccctgacc 240

atcagcagcc tgcaggccga ggacgtggcc gtgtactact gccaccagta catgagcagc 300

tacaccttcg gccagggcac aaagctggaa atcaag 336

<210> 1201
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain

<400> 1201

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 Ile Leu Tyr Ser
20 25 30

Ser Asn Gln Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
35 40 45

Ser 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 Met Ser Ser Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105 110

<210> 1202
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain, CDR1

<400> 1202

Gly Tyr Thr Phe Ala Ser Tyr Tyr
1 5

<210> 1203
<211> 8

<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain, CDR1

<400> 1203

Gly Tyr Thr Phe Ala Ser Gln Trp
1 5

<210> 1204
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain, CDR1

<400> 1204

Gly Tyr Thr Phe Ala Ser Ser Trp
1 5

<210> 1205
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain, CDR1

<400> 1205

Gly Tyr Thr Phe Ala Ser Gln Tyr
1 5

<210> 1206
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain, CDR1

<400> 1206

Gly Tyr Thr Phe Ala Ser Ala Trp
1 5

<210> 1207
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain, CDR1

<400> 1207

Gln Ser Ile Leu Tyr Ser Ser Asn Gln Lys Asn Tyr
1 5 10

<210> 1208
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain, CDR2

<400> 1208

Ile Asn Pro Gly Asn Val Asn Thr
1 5

<210> 1209
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain, CDR2

<400> 1209

Trp Ala Ser Thr Arg Glu
1 5

<210> 1210
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain, CDR3

<400> 1210

Ser Thr Tyr Tyr Arg Pro Leu Asp Tyr
1 5

<210> 1211
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain, CDR3

<400> 1211

Ser Thr Trp Tyr Arg Pro Leu Asp Tyr
1 5

<210> 1212
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain, CDR3

<400> 1212

Ser Thr Trp Tyr Arg Pro Asn Asp Tyr
1 5

<210> 1213
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain, CDR3

<400> 1213

Thr Thr Arg Tyr Arg Pro Leu Asp Tyr
1 5

<210> 1214
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain, CDR3

<400> 1214

Leu Thr Tyr Tyr Arg Pro Pro Asp Tyr
1 5

<210> 1215
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain, CDR3

<400> 1215

His Gln Tyr Leu Ser Ser Tyr Thr
1 5

<210> 1216
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain, CDR3

<400> 1216

His Gln Tyr Ile Ser Ser Tyr Thr
1 5

<210> 1217
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain, CDR3

<400> 1217

His Gln Tyr Lys Ser Ser Tyr Thr
1 5

<210> 1218
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain, CDR3

<400> 1218

His Gln Tyr Arg Ser Ser Tyr Thr
1 5

<210> 1219
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain, CDR3

<400> 1219

His Gln Tyr Tyr Ser Ser Tyr Thr
1 5

<210> 1220
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain, CDR3

<400> 1220

His Gln Tyr Met Ser Ser Tyr Thr
1 5

<210> 1221
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Chemically synthesized primer

<400> 1221
tctgagtagg tgtcattcta ttctggg 27

<210> 1222
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Chemically synthesized primer

<400> 1222
cactaggggt tcctagatct ctccc 25

<210> 1223
<211> 26
<212> PRT
<213> Artificial Sequence

<220>
<223> Chemically synthesized probe

<400> 1223

Thr Cys Thr Thr Cys Cys Cys Ala Ala Thr Cys Cys Thr Cys Cys Cys
1 5 10 15

Cys Cys Thr Thr Gly Cys Thr Gly Thr Cys
20 25

<210> 1224
<211> 123
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1224

Thr Arg Val Leu Ser Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val
1 5 10 15

Lys Lys Pro Gly Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr
20 25 30

Thr Phe Ser Gly Tyr Ser Thr His Trp Leu Arg Gln Val Pro Gly Gln
35 40 45

Gly Leu Glu Trp Ile Gly Trp Asp Asn Pro Ser Ser Gly Asp Thr Thr
50 55 60

Tyr Ala Glu Asn Phe Arg Gly Arg Val Thr Leu Thr Arg Asp Thr Ser
65 70 75 80

Ile Thr Thr Asp Tyr Leu Glu Val Arg Gly Leu Arg Ser Asp Asp Thr
85 90 95

Ala Val Tyr Tyr Cys Ala Arg Gly Gly Asp Asp Tyr Ser Phe Asp His
100 105 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 1225
<211> 354
<212> DNA
<213> Artificial Sequence

<220>

<223> Synthetic Oligonucleotide

<220>
<221> misc_feature
<222> (62)..(62)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (90)..(90)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (120)..(120)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (182)..(182)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (190)..(192)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (208)..(208)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (256)..(256)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (279)..(279)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (288)..(288)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (297)..(297)
<223> n is a, c, g, or t

<400> 1225
caggtgcagc tggtgcagtc tggggctgag gtgaagaagc ctggggcctc agtgaaagtc 60

tnctgcaagg cttctggata caccttcagn ggctactcta cacactggct gcgacaggtn 120

cctggacagg gacttgagtg gattggatgg gacaacccta gtagtggtga cacgacctat 180

gnagagaatn nncggggcag ggtcaccntg accagggaca cgtccatcac cacagattac 240

ttggaagtga ggggtntaag atctgacgac acggccgtnt attattgngc cagaggngga 300

gatgactaca gctttgacca ttggggtcag ggcaccctgg tcaccgtctc ctca 354

<210> 1226

<211> 105
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1226

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 Arg Gly Asp Ser Leu Arg Ser Tyr Tyr Ala
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 Asp 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 Asp His Leu
85 90 95

Leu Leu Phe Gly Gln Gly Thr Lys Leu
100 105

<210> 1227
<211> 327
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<400> 1227
tcttctgagc tgactcagga cccagctgtg tctgtggcct tgggacagac agtcaggatc 60

acatgccgag gagacagcct cagaagttat tatgcaagct ggtaccaaca gaagccagga 120

caggcccctg tacttgtcat ctatggtgaa aacaaccgac cctcagggat cccagaccga 180

ttctctggct ccagctcagg agacacagct tccttgacca tcactggggc tcaggcggaa 240

gatgaggctg actattactg taactcccgg gacagcagtg atcaccttct cctattcggt 300

ggagggacca agttgaccgt cctaggt 327

<210> 1228
<211> 330
<212> PRT
<213> Homo sapiens

<400> 1228

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
1 5 10 15

```
Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
            20                  25                  30

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
        35                  40                  45

Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
    50                  55                  60

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65                  70                  75                  80

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
                85                  90                  95

Lys Ala Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
            100                 105                 110

Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
        115                 120                 125

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
    130                 135                 140

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
145                 150                 155                 160

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
                165                 170                 175

Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
            180                 185                 190

His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
        195                 200                 205

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
    210                 215                 220

Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu
225                 230                 235                 240

Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
                245                 250                 255

Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
            260                 265                 270

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
        275                 280                 285
```

Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
290 295 300

Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
305 310 315 320

Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
325 330

<210> 1229
<211> 992
<212> DNA
<213> Homo sapiens

<400> 1229
ctagcaccaa gggcccatcg gtcttccccc tggcaccctc ctccaagagc acctctgggg 60

gcacagcggc cctgggctgc ctggtcaagg actacttccc cgaaccggtg acggtgtcgt 120

ggaactcagg cgccctgacc agcggcgtgc acaccttccc ggctgtccta cagtcctcag 180

gactctactc cctcagcagc gtggtgaccg tgccctccag cagcttgggc acccagacct 240

acatctgcaa cgtgaatcac aagcccagca acaccaaggt ggacaagaaa gcagagccca 300

aatcttgtga caaaactcac acatgcccac cgtgcccagc acctgaactc ctgggggggac 360

cgtcagtctt cctcttcccc ccaaaaccca aggacaccct catgatctcc cggacccctg 420

aggtcacatg cgtggtggtg gacgtgagcc acgaagaccc tgaggtcaag ttcaactggt 480

acgtggacgg cgtggaggtg cataatgcca agacaaagcc gcgggaggag cagtacaaca 540

gcacgtaccg tgtggtcagc gtcctcaccg tcctgcacca ggactggctg aatggcaagg 600

agtacaagtg caaggtctcc aacaaagccc tcccagcccc catcgagaaa accatctcca 660

aagccaaagg gcagccccga gaaccacagg tgtacaccct gcccccatcc cgggatgagc 720

tgaccaagaa ccaggtcagc ctgacctgcc tggtcaaagg cttctatccc agcgacatcg 780

ccgtggagtg ggagagcaat gggcagccgg agaacaacta caagaccacg cctcccgtgc 840

tggactccga cggctccttc ttcctctaca gcaagctcac cgtggacaag agcaggtggc 900

agcaggggaa cgtcttctca tgctccgtga tgcatgaggc tctgcacaac cactacacgc 960

agaagagcct ctccctgtct ccgggtaaat ga 992

<210> 1230
<211> 330
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1230

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
1 5 10 15

```
Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
            20                  25                  30

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
        35                  40                  45

Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
    50                  55                  60

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65                  70                  75                  80

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
                85                  90                  95

Lys Ala Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
            100                 105                 110

Pro Ala Pro Glu Ala Ala Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
        115                 120                 125

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
    130                 135                 140

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
145                 150                 155                 160

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
                165                 170                 175

Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
            180                 185                 190

His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
        195                 200                 205

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
    210                 215                 220

Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu
225                 230                 235                 240

Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
                245                 250                 255

Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
            260                 265                 270

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
        275                 280                 285
```

Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
290 295 300

Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
305 310 315 320

Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
325 330

<210> 1231
<211> 992
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<400> 1231
ctagcaccaa gggcccatcg gtcttccccc tggcaccctc ctccaagagc acctctgggg 60

gcacagcggc cctgggctgc ctggtcaagg actacttccc cgaaccggtg acggtgtcgt 120

ggaactcagg cgccctgacc agcggcgtgc acaccttccc ggctgtccta cagtcctcag 180

gactctactc cctcagcagc gtggtgaccg tgccctccag cagcttgggc acccagacct 240

acatctgcaa cgtgaatcac aagcccagca acaccaaggt ggacaagaaa gcagagccca 300

aatcttgtga caaaactcac acatgcccac cgtgcccagc acctgaagcc gccgggggac 360

cgtcagtctt cctcttcccc ccaaaaccca aggacaccct catgatctcc cggacccctg 420

aggtcacatg cgtggtggtg gacgtgagcc acgaagaccc tgaggtcaag ttcaactggt 480

acgtggacgg cgtggaggtg cataatgcca agacaaagcc gcgggaggag cagtacaaca 540

gcacgtaccg tgtggtcagc gtcctcaccg tcctgcacca ggactggctg aatggcaagg 600

agtacaagtg caaggtctcc aacaaagccc tcccagcccc catcgagaaa accatctcca 660

aagccaaagg gcagccccga gaaccacagg tgtacaccct gcccccatcc cgggatgagc 720

tgaccaagaa ccaggtcagc ctgacctgcc tggtcaaagg cttctatccc agcgacatcg 780

ccgtggagtg ggagagcaat gggcagccgg agaacaacta caagaccacg cctcccgtgc 840

tggactccga cggctccttc ttcctctaca gcaagctcac cgtggacaag agcaggtggc 900

agcaggggaa cgtcttctca tgctccgtga tgcatgaggc tctgcacaac cactacacgc 960

agaagagcct ctccctgtct ccgggtaaat ga 992

<210> 1232
<211> 97
<212> PRT
<213> Homo sapiens

<400> 1232

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
1 5 10 15

Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
20 25 30

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
35 40 45

Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
50 55 60

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65 70 75 80

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
85 90 95

Lys

<210> 1233
<211> 290
<212> DNA
<213> Homo sapiens

<400> 1233
ctagcaccaa gggcccatcg gtcttccccc tggcaccctc ctccaagagc acctctgggg 60

gcacagcggc cctgggctgc ctggtcaagg actacttccc cgaaccggtg acggtgtcgt 120

ggaactcagg cgccctgacc agcggcgtgc acaccttccc ggctgtccta cagtcctcag 180

gactctactc cctcagcagc gtggtgaccg tgccctccag cagcttgggc acccagacct 240

acatctgcaa cgtgaatcac aagcccagca acaccaaggt ggacaagaaa 290

<210> 1234
<211> 110
<212> PRT
<213> Homo sapiens

<400> 1234

Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys
1 5 10 15

Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val
20 25 30

Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr
35 40 45

Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu
50 55 60

Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
65 70 75 80

Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys
85 90 95

Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys
100 105 110

<210> 1235
<211> 330
<212> DNA
<213> Homo sapiens

<400> 1235
gcacctgaac tcctgggggg accgtcagtc ttcctcttcc ccccaaaacc caaggacacc 60

ctcatgatct cccggacccc tgaggtcaca tgcgtggtgg tggacgtgag ccacgaagac 120

cctgaggtca agttcaactg gtacgtggac ggcgtggagg tgcataatgc caagacaaag 180

ccgcgggagg agcagtacaa cagcacgtac cgtgtggtca gcgtcctcac cgtcctgcac 240

caggactggc tgaatggcaa ggagtacaag tgcaaggtct ccaacaaagc cctcccagcc 300

cccatcgaga aaaccatctc caaagccaaa 330

<210> 1236
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1236

Ala Pro Glu Ala Ala Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys
1 5 10 15

Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val
20 25 30

Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr
35 40 45

Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu
50 55 60

Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
65 70 75 80

Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys
85 90 95

Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys
100 105 110

<210> 1237
<211> 330
<212> DNA

<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<400> 1237
gcacctgaag ccgccggggg accgtcagtc ttcctcttcc ccccaaaacc caaggacacc 60

ctcatgatct cccggacccc tgaggtcaca tgcgtggtgg tggacgtgag ccacgaagac 120

cctgaggtca agttcaactg gtacgtggac ggcgtggagg tgcataatgc caagacaaag 180

ccgcgggagg agcagtacaa cagcacgtac cgtgtggtca gcgtcctcac cgtcctgcac 240

caggactggc tgaatggcaa ggagtacaag tgcaaggtct ccaacaaagc cctcccagcc 300

cccatcgaga aaaccatctc caaagccaaa 330

<210> 1238
<211> 107
<212> PRT
<213> Homo sapiens

<400> 1238

Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Asp
1 5 10 15

Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe
20 25 30

Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu
35 40 45

Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe
50 55 60

Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly
65 70 75 80

Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr
85 90 95

Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
100 105

<210> 1239
<211> 324
<212> DNA
<213> Homo sapiens

<400> 1239
gggcagcccc gagaaccaca ggtgtacacc ctgcccccat cccgggatga gctgaccaag 60

aaccaggtca gcctgacctg cctggtcaaa ggcttctatc ccagcgacat cgccgtggag 120

tgggagagca atgggcagcc ggagaacaac tacaagacca cgcctcccgt gctggactcc 180

gacggctcct tcttcctcta cagcaagctc accgtggaca agagcaggtg gcagcagggg 240

aacgtcttct catgctccgt gatgcatgag gctctgcaca accactacac gcagaagagc 300

ctctccctgt ctccgggtaa atga 324

<210> 1240
<211> 16
<212> PRT
<213> Homo sapiens

<400> 1240

Ala Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro
1 5 10 15

<210> 1241
<211> 48
<212> DNA
<213> Homo sapiens

<400> 1241
gcagagccca aatcttgtga caaaactcac acatgcccac cgtgccca 48

<210> 1242
<211> 453
<212> PRT
<213> Homo sapiens

<400> 1242

Thr Arg Val Leu Ser Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val
1 5 10 15

Lys Lys Pro Gly Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr
20 25 30

Thr Phe Ser Gly Tyr Ser Thr His Trp Leu Arg Gln Val Pro Gly Gln
35 40 45

Gly Leu Glu Trp Ile Gly Trp Asp Asn Pro Ser Ser Gly Asp Thr Thr
50 55 60

Tyr Ala Glu Asn Phe Arg Gly Arg Val Thr Leu Thr Arg Asp Thr Ser
65 70 75 80

Ile Thr Thr Asp Tyr Leu Glu Val Arg Gly Leu Arg Ser Asp Asp Thr
85 90 95

Ala Val Tyr Tyr Cys Ala Arg Gly Gly Asp Asp Tyr Ser Phe 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 Lys Ala Glu Pro Lys
    210                 215                 220

Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu
225                 230                 235                 240

Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
                245                 250                 255

Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val
            260                 265                 270

Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val
        275                 280                 285

Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser
    290                 295                 300

Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu
305                 310                 315                 320

Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala
                325                 330                 335

Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro
            340                 345                 350

Gln Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln
        355                 360                 365

Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala
    370                 375                 380

Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr
385                 390                 395                 400

Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu
                405                 410                 415
```

Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser
420 425 430

Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser
435 440 445

Leu Ser Pro Gly Lys
450

<210> 1243
<211> 453
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1243

Thr Arg Val Leu Ser Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val
1 5 10 15

Lys Lys Pro Gly Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr
20 25 30

Thr Phe Ser Gly Tyr Ser Thr His Trp Leu Arg Gln Val Pro Gly Gln
35 40 45

Gly Leu Glu Trp Ile Gly Trp Asp Asn Pro Ser Ser Gly Asp Thr Thr
50 55 60

Tyr Ala Glu Asn Phe Arg Gly Arg Val Thr Leu Thr Arg Asp Thr Ser
65 70 75 80

Ile Thr Thr Asp Tyr Leu Glu Val Arg Gly Leu Arg Ser Asp Asp Thr
85 90 95

Ala Val Tyr Tyr Cys Ala Arg Gly Gly Asp Asp Tyr Ser Phe 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 Lys Ala Glu Pro Lys
    210                 215                 220

Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Ala
225                 230                 235                 240

Ala Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
                245                 250                 255

Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val
            260                 265                 270

Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val
        275                 280                 285

Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser
    290                 295                 300

Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu
305                 310                 315                 320

Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala
                325                 330                 335

Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro
            340                 345                 350

Gln Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln
        355                 360                 365

Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala
    370                 375                 380

Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr
385                 390                 395                 400

Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu
                405                 410                 415

Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser
            420                 425                 430

Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser
        435                 440                 445

Leu Ser Pro Gly Lys
    450
```

<210> 1244
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1244

Gly Tyr Ser Thr His
1 5

<210> 1245
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Artificial Polypeptide

<400> 1245

Trp Asp Asn Pro Ser Ser Gly Asp Thr Thr Tyr Ala Glu Asn Phe Arg
1 5 10 15

Gly

<210> 1246
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1246

Gly Gly Asp Asp Tyr Ser Phe Asp His
1 5

<210> 1247
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1247

Arg Gly Asp Ser Leu Arg Ser Tyr Tyr Ala Ser
1 5 10

<210> 1248
<211> 7
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Polypeptide

<400> 1248

Gly Glu Asn Asn Arg Pro Ser
1 5

<210> 1249
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1249

Asn Ser Arg Asp Ser Ser Asp His Leu Leu Leu
1 5 10

<210> 1250
<211> 121
<212> PRT
<213> Homo sapiens

<400> 1250

Gln Val Gln Leu Val 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 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 Asn Gly Asn Tyr Arg Gly Ser Leu Ala Phe Asp Ile Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 1251
<211> 113
<212> PRT
<213> Homo sapiens

<400> 1251

```
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 Gln Leu Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

Leu Ile Tyr Gly 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 Ser Ser
                85                  90                  95

Leu Ser Ala Trp Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110

Gly
```

<210> 1252
<211> 119
<212> PRT
<213> Homo sapiens

<400> 1252

```
Glu Val Gln Leu Val Gln 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 Pro 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 Asn Gly Gly Thr 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 Asn Gly Asn Tyr Arg Gly Ala Phe Asp Ile Trp Gly Gln Gly
            100                 105                 110

Thr Met Val Thr Val Ser Ser
```

115

<210> 1253
<211> 119
<212> PRT
<213> Homo sapiens

<400> 1253

Gln Val Gln Leu Val 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 Pro 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 Asn Gly Gly Thr 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 Asn Gly Asn Tyr Arg Gly Ala Phe Asp Ile Trp Gly Gln Gly
100 105 110

Thr Met Val Thr Val Ser Ser
115

<210> 1254
<211> 119
<212> PRT
<213> Homo sapiens

<400> 1254

Gln Val Gln Leu Val 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 Pro 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 Asn Gly Gly Thr 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 Asn Gly Asn Tyr Arg Gly Ala Phe Asp Ile Trp Gly Gln Gly
            100                 105                 110

Thr Met Val Thr Val Ser Ser
        115
```

<210> 1255
<211> 119
<212> PRT
<213> Homo sapiens

<400> 1255

```
Gln Val Gln Leu Val Gln Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Glu Phe Thr Phe Gly Thr 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 Val 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 Arg Asn Thr Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Gly Pro Val Leu Arg Tyr Gly Phe Asp Ile Trp Gly Gln Gly
            100                 105                 110

Thr Met Val Thr Val Ser Ser
        115
```

<210> 1256
<211> 119
<212> PRT
<213> Homo sapiens

<400> 1256

```
Gln Val Gln Leu Val Gln 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 Pro 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 Asn Gly Gly Thr 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 Asn Gly Asn Tyr Arg Gly Ala Phe Asp Ile Trp Gly Gln Gly
100 105 110

Thr Met Val Thr Val Ser Ser
115

<210> 1257
<211> 118
<212> PRT
<213> Homo sapiens

<400> 1257

Gln Val Gln Leu Gln 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 Ile 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 Gly Thr Tyr His 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 Phe Ser Ala Tyr Ser Gly Tyr Asp Leu Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 1258
<211> 119
<212> PRT
<213> Homo sapiens

<400> 1258

```
Gln Val Gln Leu Val Gln Ser Gly Gly Gly Leu Val Arg Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Pro 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 Asn Gly Gly Thr 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 Asn Gly Asn Tyr Arg Gly Ala Phe Asp Ile Trp Gly Gln Gly
            100                 105                 110

Thr Thr Val Thr Val Ser Ser
        115


<210>  1259
<211>  119
<212>  PRT
<213>  Homo sapiens

<400>  1259

Gln Val Gln Leu Val 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 Pro 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 Asn Gly Gly Thr 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 Asn Gly Asn Tyr Arg Gly Ala Phe Asp Ile Trp Gly Gln Gly
            100                 105                 110
```

Thr Met Val Thr Val Ser Ser
        115

<210> 1260
<211> 119
<212> PRT
<213> Homo sapiens

<400> 1260

Glu Val Gln Leu Val 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 Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35   40   45

Ser Ala Ile Ser Ala Asn Gly Gly Thr 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 Asn Gly Asn Tyr Arg Gly Ala Phe Asp Ile Trp Gly Gln Gly
            100   105   110

Thr Thr Val Thr Val Ser Ser
        115

<210> 1261
<211> 116
<212> PRT
<213> Homo sapiens

<400> 1261

Gln Val Gln Leu Val 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 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 Ala Ala Ala Gly Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
            100                 105                 110

Thr Val Ser Ser
        115
```

<210> 1262
<211> 119
<212> PRT
<213> Homo sapiens

<400> 1262

```
Gln Val Gln Leu Gln 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 Lys Ile Gly Arg Tyr Ser Ser Ser Leu Gly Tyr Trp Gly Gln Gly
            100                 105                 110

Thr Leu Val Thr Val Ser Ser
        115
```

<210> 1263
<211> 122
<212> PRT
<213> Homo sapiens

<400> 1263

```
Gln Val Gln Leu Val Gln 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 Arg Glu Ala Pro Tyr Ser Ser Ser Leu Asp Ala Phe Asp Ile Trp
            100                 105                 110

Gly Gln Gly Thr Met Val Thr Val Ser Ser
        115                 120
```

<210> 1264
<211> 118
<212> PRT
<213> Homo sapiens

<400> 1264

```
Gln Val Gln Leu Gln 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 Ser His Ser Ser Gly Gly Phe Asp Tyr Trp Gly Gln Gly Thr
            100                 105                 110

Leu Val Thr Val Ser Ser
        115
```

<210> 1265
<211> 118
<212> PRT
<213> Homo sapiens

<400> 1265

Gln Val Gln Leu Gln 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 Ser His Ser Ser Gly Gly Phe Asp Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 1266
<211> 116
<212> PRT
<213> Homo sapiens

<400> 1266

Gln Val Thr Leu Lys Glu Ser Gly Gly Gly Val Val Gln Pro Gly Thr
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 Thr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Gly Leu Ile Ser Tyr Asp Gly Ser Val Thr His Tyr Thr 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 Thr Leu Arg Ala Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Gly Ser Gly Tyr Gln Glu His Trp Gly Gln Gly Thr Leu Val
100 105 110

Thr Val Ser Ser
        115

<210> 1267
<211> 118
<212> PRT
<213> Homo sapiens

<400> 1267

Gln Val Gln Leu Val 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 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 Thr Tyr Gly Asp Tyr Gly Ser Leu Asp Tyr Trp Gly Gln Gly Thr
            100   105   110

Leu Val Thr Val Ser Ser
        115

<210> 1268
<211> 122
<212> PRT
<213> Homo sapiens

<400> 1268

Gln Val Gln Leu Val 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 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 Val 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 Tyr Cys Ser Ser Thr Ser Cys Tyr Arg Gly Met Asp Val Trp
100 105 110

Gly Lys Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 1269
<211> 119
<212> PRT
<213> Homo sapiens

<400> 1269

Gln Val Gln Leu Val Gln 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 Arg Gly Arg Ala Ala Arg Pro Pro Phe Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 1270
<211> 119
<212> PRT
<213> Homo sapiens

<400> 1270

Gln Val Gln Leu Val Gln 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 Pro 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 Asn Gly Gly Thr 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 Asn Gly Asn Tyr Arg Gly Ala Phe Asp Ile Trp Gly Gln Gly
            100                 105                 110

Thr Met Val Thr Val Ser Ser
        115
```

<210> 1271
<211> 121
<212> PRT
<213> Homo sapiens

<400> 1271

```
Gln Val Gln Leu Val Gln Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

Ser Leu Arg Leu Ser Cys Ala Ala Pro Glu Phe Thr Phe Ser Lys Tyr
            20                  25                  30

Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ser Gly 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 Lys Ser Ser Arg Ser Gly Tyr Phe Leu Pro Leu Asp Tyr Trp Gly
            100                 105                 110

Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 1272
<211> 118
<212> PRT
<213> Homo sapiens

<400> 1272

```
Glu 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

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 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 Ala Ala Val Thr Gly Gly Phe Asp Pro Trp Gly Gln Gly Thr
            100                 105                 110

Leu Val Thr Val Ser Ser
        115
```

<210> 1273
<211> 112
<212> PRT
<213> Homo sapiens

<400> 1273

```
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

Phe Asp Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

Leu Ile Tyr Gly 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 Thr Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Arg
                85                  90                  95

Leu Ser Ala Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110
```

<210> 1274
<211> 111
<212> PRT
<213> Homo sapiens

<400> 1274

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 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 Ser Ser Ala Ser Leu Ala Ile Thr Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala His Tyr Tyr Cys Gln Ser Tyr Asp Arg Ser
85 90 95

Leu Ser Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

<210> 1275
<211> 112
<212> PRT
<213> Homo sapiens

<400> 1275

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 Gln Leu Pro Gly Thr Ala Pro Lys Leu
35 40 45

Leu Ile Tyr Gly 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 Ile Gly Leu
65 70 75 80

Gln Ala Asp Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Thr
85 90 95

Leu Arg Val Trp Met Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

<210> 1276
<211> 112
<212> PRT
<213> Homo sapiens

<400> 1276

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 Ser Arg Ser Asn Ile 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 Ala Asn Asn Asn Arg Pro Ser Gly Val Pro Gly 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

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser
85 90 95

Leu Arg Ala Trp Val Phe Gly Gly Gly Thr Lys Leu Ala Val Leu Gly
100 105 110

<210> 1277
<211> 112
<212> PRT
<213> Homo sapiens

<400> 1277

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 Ser Arg Ser Asn Ile 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 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 Thr Asp Tyr Phe Cys Gln Ser Tyr Asp Ser Ser
85 90 95

Leu Ser Ala Trp Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu Gly
100 105 110

<210> 1278
<211> 111
<212> PRT
<213> Homo sapiens

<400> 1278

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 Arg Gly
20 25 30

Tyr Asn Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
35 40 45

Leu Ile Tyr Asp Asn Thr Asn Arg Pro Ser Gly Val Pro Ala Arg Phe
50 55 60

Ser Gly Ser Lys Ser Ala Thr 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 Gly
85 90 95

Leu Arg Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Leu Leu Gly
100 105 110

<210> 1279
<211> 111
<212> PRT
<213> Homo sapiens

<400> 1279

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 Ser Ser Ser Asn Ile Gly Ala Gly
20 25 30

Tyr Asp Val His Trp Tyr Gln Gln Val Pro Gly Lys Ala Pro Lys Val
35 40 45

Val Ile Tyr Gly Asn Asn Asn Arg Pro Ser Gly Val Pro Asp Arg Phe
50 55 60

Ser Gly Ser Lys Ser Gly Ala 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 Lys Ser
85 90 95

Leu Thr Trp Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu Gly
100 105 110

<210> 1280
<211> 111
<212> PRT
<213> Homo sapiens

<400> 1280

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 Thr Ser Ser Asn Ile Gly Ala Gly
20 25 30

Tyr Asp Val His Trp Tyr Gln Gln Leu Pro Gly Ala Ala Pro Arg Val
35 40 45

Leu Ile Tyr Gly 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 Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Lys Ser
85 90 95

Leu Ser Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Arg
100 105 110

<210> 1281
<211> 112
<212> PRT
<213> Homo sapiens

<400> 1281

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

Phe Asp Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Arg Leu
35 40 45

Leu Ile Tyr Gly 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 Thr Asp Tyr Phe Cys Gln Ser Tyr Asp Ser Ser
                85                  90                  95

Leu Ser Ala Trp Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu Arg
            100                 105                 110
```

<210> 1282
<211> 112
<212> PRT
<213> Homo sapiens

<400> 1282

```
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 Arg Gly
            20                  25                  30

Tyr Asn Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

Leu Ile Tyr Asp Asp Thr Asn Arg Pro Ser Gly Val Pro His 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 Arg Ala Trp Val Phe Gly Gly Gly Thr Lys Leu Ala Val Leu Gly
            100                 105                 110
```

<210> 1283
<211> 111
<212> PRT
<213> Homo sapiens

<400> 1283

```
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 Arg Gly
            20                  25                  30

Tyr Asn Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
        35                  40                  45

Leu Ile Tyr Asp Asn Thr Asn Arg Pro Ser Gly Val Pro Ala Arg Phe
    50                  55                  60
```

Ser Gly Ser Lys Ser Ala 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 Gly
85 90 95

Leu Arg Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Leu Leu Arg
100 105 110

<210> 1284
<211> 111
<212> PRT
<213> Homo sapiens

<400> 1284

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 Arg Gly
20 25 30

Tyr Asn 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 Ser Ser Gly Asn Thr Ala Ser Leu Thr Ile Thr Gly Ala
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys His Ser Arg Asp Asn Asn
85 90 95

Gly His His Ile Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Ser
100 105 110

<210> 1285
<211> 112
<212> PRT
<213> Homo sapiens

<400> 1285

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 Arg Gly
20 25 30

Tyr Asn Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
35 40 45

Leu Ile Tyr Gly 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 Gly Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser
85 90 95

Leu Ser Ala Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

<210> 1286
<211> 112
<212> PRT
<213> Homo sapiens

<220>
<221> misc_feature
<222> (83)..(83)
<223> Xaa can be any naturally occurring amino acid

<400> 1286

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 Arg Gly
20 25 30

Tyr Asn Val His Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu
35 40 45

Leu Ile Tyr Gly 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 Xaa Asp Glu Gly Asp Tyr Tyr Cys Gln Ser Tyr Asp Ser Ser
85 90 95

Leu Ser Ala Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

<210> 1287
<211> 110
<212> PRT
<213> Homo sapiens

<400> 1287

Leu Pro 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 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

His Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110
```

<210> 1288
<211> 112
<212> PRT
<213> Homo sapiens

<400> 1288

```
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 Gln Leu Pro Gly 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 Ser Ser
                85                  90                  95

Leu Arg Ala Trp Val Phe Gly Gly Gly Thr Lys Leu Ala Val Leu Gly
            100                 105                 110
```

<210> 1289
<211> 112
<212> PRT
<213> Homo sapiens

<400> 1289

```
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 Gln Leu Pro Gly 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 Ser Ser
                85   90   95

Leu Arg Ala Trp Val Phe Gly Gly Gly Thr Lys Leu Ala Val Leu Gly
            100   105   110

<210> 1290
<211> 111
<212> PRT
<213> Homo sapiens

<400> 1290

Gln Pro 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 Pro
        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

Asn Gly Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Arg
            100   105   110

<210> 1291
<211> 112
<212> PRT
<213> Homo sapiens

<400> 1291

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 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 Thr Asp Tyr Phe Cys Gln Ser Tyr Asp Ser Ser
                85                  90                  95

Leu Ser Ala Trp Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu Gly
            100                 105                 110


<210>  1292
<211>  109
<212>  PRT
<213>  Homo sapiens

<400>  1292

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 Asn Ser Leu Arg Tyr Tyr Tyr Pro
            20                  25                  30

Ser Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
        35                  40                  45

Gly Lys 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 Thr Gln Ala Glu
65                  70                  75                  80

Asp Glu Ala Asp Tyr Tyr Cys Ser Ser Arg Asp Asn Thr Asp Asn Arg
                85                  90                  95

Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105


<210>  1293
<211>  109
<212>  PRT
<213>  Homo sapiens

<400>  1293
```

```
Gln Pro Gly 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 Asp Asn Ile Gly Arg Lys Ser Val
            20                  25                  30

His Trp Tyr Gln Gln Arg Pro Gly Gln Ala Pro Ile Leu Val Ile Arg
        35                  40                  45

Asp Asp Arg Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

Ser Ser Val Asn Thr Ala Thr Leu Ile 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 Lys His
                85                  90                  95

Tyr Val Phe Gly Pro Gly Thr Lys Val Thr Ala Leu Gly
            100                 105
```

<210> 1294
<211> 458
<212> PRT
<213> Homo sapiens

<400> 1294

```
Met Ala Pro Leu Cys Pro Ser Pro Trp Leu Pro Leu Leu Ile Pro Ala
1               5                   10                  15

Pro Ala Pro Gly Leu Thr Val Gln Leu Leu Leu Ser Leu Leu Leu Leu
            20                  25                  30

Met Pro Val His Pro Gln Arg Leu Pro Arg Met Gln Glu Asp Ser Pro
        35                  40                  45

Leu Gly Gly Gly Ser Ser Gly Glu Asp Asp Pro Leu Gly Glu Glu Asp
    50                  55                  60

Leu Pro Ser Glu Glu Asp Ser Pro Arg Glu Glu Asp Pro Pro Gly Glu
65                  70                  75                  80

Glu Asp Leu Pro Gly Glu Glu Asp Leu Pro Gly Glu Glu Asp Leu Pro
                85                  90                  95

Glu Val Lys Pro Lys Ser Glu Glu Glu Gly Ser Leu Lys Leu Glu Asp
            100                 105                 110

Leu Pro Thr Val Glu Ala Pro Gly Asp Pro Gln Glu Pro Gln Asn Asn
        115                 120                 125

Ala His Arg Asp Lys Glu Gly Asp Asp Gln Ser His Trp Arg Tyr Gly
```

130 135 140

Gly Asp Pro Pro Trp Pro Arg Val Ser Pro Ala Cys Ala Gly Arg Phe
145 150 155 160

Gln Ser Pro Val Asp Ile Arg Pro Gln Leu Ala Ala Phe Cys Pro Ala
165 170 175

Leu Arg Pro Leu Glu Leu Leu Gly Phe Gln Leu Pro Pro Leu Pro Glu
180 185 190

Leu Arg Leu Arg Asn Asn Gly His Ser Val Gln Leu Thr Leu Pro Pro
195 200 205

Gly Leu Glu Met Ala Leu Gly Pro Gly Arg Glu Tyr Ala Leu Gln Leu
210 215 220

His Leu His Trp Gly Ala Ala Gly Arg Pro Gly Ser Glu His Thr Val
225 230 235 240

Glu Gly His Arg Phe Pro Ala Glu Ile His Val Val His Leu Ser Thr
245 250 255

Ala Phe Ala Arg Val Asp Glu Ala Leu Gly Arg Pro Gly Gly Leu Ala
260 265 270

Val Leu Ala Ala Phe Leu Glu Glu Gly Pro Glu Glu Asn Ser Ala Tyr
275 280 285

Glu Gln Leu Leu Ser Arg Leu Glu Glu Ile Ala Glu Glu Gly Ser Glu
290 295 300

Thr Gln Val Pro Gly Leu Asp Ile Ser Ala Leu Leu Pro Ser Asp Phe
305 310 315 320

Ser Arg Tyr Phe Gln Tyr Glu Gly Ser Leu Thr Thr Pro Pro Cys Ala
325 330 335

Gln Gly Val Ile Trp Thr Val Phe Asn Gln Thr Val Met Leu Ser Ala
340 345 350

Lys Gln Leu His Thr Leu Ser Asp Thr Leu Trp Gly Pro Gly Asp Ser
355 360 365

Arg Leu Gln Leu Asn Phe Arg Ala Thr Gln Pro Leu Asn Gly Arg Val
370 375 380

Ile Glu Ala Ser Phe Pro Ala Gly Val Asp Ser Ser Pro Arg Ala Ala
385 390 395 400

Glu Pro Val Gln Leu Asn Ser Cys Leu Ala Ala Gly Asp Ile Leu Ala

405 410 415

Leu Val Phe Gly Leu Leu Phe Ala Val Thr Ser Val Ala Phe Leu Val
420 425 430

Gln Met Arg Arg Gln His Arg Arg Gly Thr Lys Gly Gly Val Ser Tyr
435 440 445

Arg Pro Ala Glu Val Ala Glu Thr Gly Ala
450 455

<210> 1295
<211> 437
<212> PRT
<213> Mus musculus

<400> 1295

Met Ala Ser Leu Gly Pro Ser Pro Trp Ala Pro Leu Ser Thr Pro Ala
1 5 10 15

Pro Thr Ala Gln Leu Leu Leu Phe Leu Leu Leu Gln Val Ser Ala Gln
20 25 30

Pro Gln Gly Leu Ser Gly Met Gln Gly Glu Pro Ser Leu Gly Asp Ser
35 40 45

Ser Ser Gly Glu Asp Glu Leu Gly Val Asp Val Leu Pro Ser Glu Glu
50 55 60

Asp Ala Pro Glu Glu Ala Asp Pro Pro Asp Gly Glu Asp Pro Pro Glu
65 70 75 80

Val Asn Ser Glu Asp Arg Met Glu Glu Ser Leu Gly Leu Glu Asp Leu
85 90 95

Ser Thr Pro Glu Ala Pro Glu His Ser Gln Gly Ser His Gly Asp Glu
100 105 110

Lys Gly Gly Gly His Ser His Trp Ser Tyr Gly Gly Thr Leu Leu Trp
115 120 125

Pro Gln Val Ser Pro Ala Cys Ala Gly Arg Phe Gln Ser Pro Val Asp
130 135 140

Ile Arg Leu Glu Arg Thr Ala Phe Cys Arg Thr Leu Gln Pro Leu Glu
145 150 155 160

Leu Leu Gly Tyr Glu Leu Gln Pro Leu Pro Glu Leu Ser Leu Ser Asn
165 170 175

Asn Gly His Thr Val Gln Leu Thr Leu Pro Pro Gly Leu Lys Met Ala
180 185 190

```
Leu Gly Pro Gly Gln Glu Tyr Arg Ala Leu Gln Leu His Leu His Trp
        195                 200                 205

Gly Thr Ser Asp His Pro Gly Ser Glu His Thr Val Asn Gly His Arg
    210                 215                 220

Phe Pro Ala Glu Ile His Val Val His Leu Ser Thr Ala Phe Ser Glu
225                 230                 235                 240

Leu His Glu Ala Leu Gly Arg Pro Gly Gly Leu Ala Val Leu Ala Ala
                245                 250                 255

Phe Leu Gln Glu Ser Pro Glu Glu Asn Ser Ala Tyr Glu Gln Leu Leu
            260                 265                 270

Ser His Leu Glu Glu Ile Ser Glu Glu Gly Ser Lys Ile Glu Ile Pro
        275                 280                 285

Gly Leu Asp Val Ser Ala Leu Leu Pro Ser Asp Phe Ser Arg Tyr Tyr
    290                 295                 300

Arg Tyr Glu Gly Ser Leu Thr Thr Pro Pro Cys Ser Gln Gly Val Ile
305                 310                 315                 320

Trp Thr Val Phe Asn Glu Thr Val Lys Leu Ser Ala Lys Gln Leu His
                325                 330                 335

Thr Leu Ser Val Ser Leu Trp Gly Pro Arg Asp Ser Arg Leu Gln Leu
            340                 345                 350

Asn Phe Arg Ala Thr Gln Pro Leu Asn Gly Arg Thr Ile Glu Ala Ser
        355                 360                 365

Phe Pro Ala Ala Glu Asp Ser Ser Pro Glu Pro Val His Val Asn Ser
    370                 375                 380

Cys Phe Thr Ala Gly Asp Ile Leu Ala Leu Val Phe Gly Leu Leu Phe
385                 390                 395                 400

Ala Val Thr Ser Ile Ala Phe Leu Leu Gln Leu Arg Arg Gln His Arg
                405                 410                 415

His Arg Ser Gly Thr Lys Asp Arg Val Ser Tyr Ser Pro Ala Glu Met
            420                 425                 430

Thr Glu Thr Gly Ala
        435
```

<210> 1296
<211> 38

<212> DNA
<213> Artificial sequence

<220>
<223> Chemically synthesized primer

<400> 1296
atcgacgcgt gcctgagcga ggtgcagctg gtgcagtc 38

<210> 1297
<211> 32
<212> DNA
<213> Artificial sequence

<220>
<223> Chemically synthesized primer

<400> 1297
caatggtcac cgtctcttca gctagcacca gg 32

<210> 1298
<211> 35
<212> DNA
<213> Artificial sequence

<220>
<223> Chemically synthesized primer

<400> 1298
atcccaagct taagccagtc tgtgctgact cagcc 35

<210> 1299
<211> 31
<212> DNA
<213> Artificial sequence

<220>
<223> Chemically synthesized primer

<400> 1299
ggagggacca aattgaccgt cctaggtcag c 31

<210> 1300
<211> 41
<212> DNA
<213> Artificial sequence

<220>
<223> Chemically synthesized primer

<400> 1300
tagggcacgc gtgtgctgag cgaggtgcag ctggtgcagt c 41

<210> 1301
<211> 32
<212> DNA
<213> Artificial sequence

<220>
<223> Chemically synthesized primer

<400> 1301
tctagtgcta gctgaagaga cggtgaccat tg 32

<210> 1302
<211> 35
<212> DNA
<213> Artificial sequence

<220>
<223> Chemically synthesized primer

<400> 1302
ctagcaagct tatcccagtc tgtgctgact cagcc 35

<210> 1303
<211> 26
<212> DNA
<213> Artificial sequence

<220>
<223> Chemically synthesized primer

<400> 1303
atagcaccta ggacggtcag cttggt 26

<210> 1304
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> Portion of CDR1 heavy chain sequence

<400> 1304

Ser Tyr Ala Met Ser
1 5

<210> 1305
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> Portion of CDR1 heavy chain sequence

<220>
<221> misc_feature
<222> (1)..(1)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (5)..(5)
<223> Xaa can be any naturally occurring amino acid

<400> 1305

Xaa Tyr Ala Met Xaa
1 5

<210> 1306
<211> 5
<212> PRT

<213> Artificial sequence

<220>
<223> Portion of CDR1 heavy chain sequence

<220>
<221> misc_feature
<222> (3)..(3)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (5)..(5)
<223> Xaa can be any naturally occurring amino acid

<400> 1306

Ser Tyr Xaa Met Xaa
1 5

<210> 1307
<211> 17
<212> PRT
<213> Artificial sequence

<220>
<223> Portion of CDR2 heavy chain sequence

<220>
<221> misc_feature
<222> (4)..(5)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (8)..(8)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (10)..(11)
<223> Xaa can be any naturally occurring amino acid

<400> 1307

Ala Ile Ser Xaa Xaa Gly Gly Xaa Thr Xaa Xaa Ala Asp Ser Val Lys
1 5 10 15

Gly

<210> 1308
<211> 17
<212> PRT
<213> Artificial sequence

<220>
<223> Portion of CDR2 heavy chain sequence

<400> 1308

Ala Ile Ser Gly Ser Gly Gly Ser Thr Thr Thr Ala Asp Ser Val Lys
1 5 10 15

Gly

<210> 1309
<211> 13
<212> PRT
<213> Artificial sequence

<220>
<223> Portion of CDR3 heavy chain sequence

<220>
<221> misc_feature
<222> (9)..(9)
<223> Xaa can be any naturally occurring amino acid

<400> 1309

Asn Gly Asn Tyr Arg Gly Ser Leu Xaa Ala Phe Asp Ile
1 5 10

<210> 1310
<211> 14
<212> PRT
<213> Artificial sequence

<220>
<223> Portion of CDR1 light chain sequence

<400> 1310

Thr Gly Ser Ser Ser Asn Ile Gly Ala Gly Tyr Asp Val His
1 5 10

<210> 1311
<211> 7
<212> PRT
<213> Artificial sequence

<220>
<223> Portion of CDR2 light chain sequence

<400> 1311

Gly Asn Asn Asn Arg Pro Ser
1 5

<210> 1312
<211> 12
<212> PRT
<213> Artificial sequence

<220>
<223> Portion of CDR3 light chain sequence

<400> 1312

Gln Ser Tyr Asp Ser Ser Leu Ser Ala Trp Val Val
1 5 10

<210> 1313
<211> 6
<212> PRT
<213> Artificial sequence

<220>
<223> Consensus sequence

<400> 1313

Glu Glu Asp Leu Pro Glu
1 5

<210> 1314
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Portion of the CDR3 heavy chain sequence

<400> 1314

Asn Gly Asn Tyr Arg Gly Ala Phe Asp Ile
1 5 10

<210> 1315
<211> 354
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1315
caggtgcagc tggtgcagag cggcgcggaa gtgaaaaaac cgggcgcgag cgtgaaagtg 60

agctgcaaag cgagcggcta tacctttgcg agcgcgtgga tgcattggat gcgccaggcg 120

ccgggccagg gcctggaatg gattggctgg attaacccgg gcaacgtgaa caccaaatat 180

aacgaaaaat ttaaaggccg cgcgaccctg accgtggata ccagcaccaa caccgcgtat 240

atggaactga gcagcctgcg cagcgaagat accgcggtgt attattgcgc gcgcagcacc 300

tattatcgcc cgctggatta ttggggccag ggcaccctgg tgaccgtgag cagc 354

<210> 1316
<211> 118
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1316

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 Ala Ser Ala
20 25 30

Trp Met His Trp Met Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Trp Ile Asn Pro Gly Asn Val Asn Thr Lys Tyr Asn Glu Lys Phe
50 55 60

Lys Gly Arg Ala Thr Leu Thr Val Asp Thr Ser Thr Asn 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 Ser Thr Tyr Tyr Arg Pro Leu Asp Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 1317
<211> 336
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1317
gatattgtga tgacccagag cccggatagc ctggcggtga gcctgggcga acgcgcgacc 60

attaactgca aaagcagcca gagcattctg tatagcagca accagaaaaa ctatctggcg 120

tggtatcagc agaaaccggg ccagagcccg aaactgctga tttattgggc gagcacccgc 180

gaaagcggcg tgccggatcg ctttagcggc agcggcagcg gcaccgattt taccctgacc 240

attagcagcc tgcaggcgga agatgtggcg gtgtattatt gccatcagta tatgagcagc 300

tataccttg gccagggcac caaactggaa attaaa 336

<210> 1318
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1318

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 Ile Leu Tyr Ser
20 25 30

Ser Asn Gln Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
35 40 45

Ser 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 Met Ser Ser Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105 110

<210> 1319
<211> 981
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1319
gcgagcacca aaggcccgag cgtgtttccg ctggcgccgt gcagccgcag caccagcgaa 60

agcaccgcgg cgctgggctg cctggtgaaa gattattttc cggaaccggt gaccgtgagc 120

tggaacagcg gcgcgctgac cagcggcgtg catacctttc cggcggtgct gcagagcagc 180

ggcctgtata gcctgagcag cgtggtgacc gtgccgagca gcagcctggg caccaaaacc 240

tatacctgca acgtggatca taaaccgagc aacaccaaag tggataaacg cgtggaaagc 300

aaatatggcc cgccgtgccc gagctgcccg gcgccggaat ttctgggcgg cccgagcgtg 360

tttctgtttc cgccgaaacc gaaagatacc ctgatgatta gccgcacccc ggaagtgacc 420

tgcgtggtgg tggatgtgag ccaggaagat ccggaagtgc agtttaactg gtatgtggat 480

ggcgtggaag tgcataacgc gaaaaccaaa ccgcgcgaag aacagtttaa cagcacctat 540

cgcgtggtga gcgtgctgac cgtgctgcat caggattggc tgaacggcaa agaatataaa 600

tgcaaagtga gcaacaaagg cctgccgagc agcattgaaa aaaccattag caaagcgaaa 660

ggccagccgc gcgaaccgca ggtgtatacc ctgccgccga gcccggaaga aatgaccaaa 720

aaccaggtga gcctgacctg cctggtgaaa ggcttttatc cgagcgatat tgcggtggaa 780

tgggaaagca acggccagcc ggaaaacaac tataaaacca ccccgccggt gctggatagc 840

gatggcagct tttttctgta tagccgcctg accgtggata aaagccgctg gcaggaaggc 900

aacgtgttta gctgcagcgt gatgcatgaa gcgctgcata accattatac ccagaaaagc 960

ctgagcctga gcctgggcaa a 981

<210> 1320
<211> 327
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1320

```
Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg
1               5                  10                  15

Ser Thr Ser Glu Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
            20                  25                  30

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
        35                  40                  45

Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
    50                  55                  60

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Lys Thr
65                  70                  75                  80

Tyr Thr Cys Asn Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys
                85                  90                  95

Arg Val Glu Ser Lys Tyr Gly Pro Pro Cys Pro Ser Cys Pro Ala Pro
            100                 105                 110

Glu Phe Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys
        115                 120                 125

Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val
    130                 135                 140

Asp Val Ser Gln Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp
145                 150                 155                 160

Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe
                165                 170                 175

Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp
            180                 185                 190

Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu
        195                 200                 205

Pro Ser Ser Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg
    210                 215                 220

Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Pro Glu Glu Met Thr Lys
225                 230                 235                 240

Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp
                245                 250                 255

Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys
            260                 265                 270
```

Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser
275 280 285

Arg Leu Thr Val Asp Lys Ser Arg Trp Gln Glu Gly Asn Val Phe Ser
290 295 300

Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser
305 310 315 320

Leu Ser Leu Ser Leu Gly Lys
325

<210> 1321
<211> 975
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1321
accaaaggcc cgagcgtgtt tccgctggcg ccgtgcagcc gcagcaccag cgaaagcacc 60

gcggcgctgg gctgcctggt gaaagattat tttccggaac cggtgaccgt gagctggaac 120

agcggcgcgc tgaccagcgg cgtgcatacc tttccggcgg tgctgcagag cagcggcctg 180

tatagcctga gcagcgtggt gaccgtgccg agcagcagcc tgggcaccaa aacctatacc 240

tgcaacgtgg atcataaacc gagcaacacc aaagtggata aacgcgtgga aagcaaatat 300

ggcccgccgt gcccgccgtg cccggcgccg gaatttctgg gcggcccgag cgtgtttctg 360

tttccgccga aaccgaaaga taccctgatg attagccgca ccccggaagt gacctgcgtg 420

gtggtggatg tgagccagga agatccggaa gtgcagttta actggtatgt ggatggcgtg 480

gaagtgcata acgcgaaaac caaaccgcgc gaagaacagt ttaacagcac ctatcgcgtg 540

gtgagcgtgc tgaccgtgct gcatcaggat tggctgaacg gcaaagaata taaatgcaaa 600

gtgagcaaca aaggcctgcc gagcagcatt gaaaaaacca ttagcaaagc gaaaggccag 660

ccgcgcgaac cgcaggtgta taccctgccg ccgagcccgg aagaaatgac caaaaaccag 720

gtgagcctga cctgcctggt gaaaggcttt atccgagcg atattgcggt ggaatgggaa 780

agcaacggcc agccggaaaa caactataaa accaccccgc cggtgctgga tagcgatggc 840

agctttttc tgtatagcaa actgaccgtg gataaaagcc gctggcagga aggcaacgtg 900

tttagctgca gcgtgatgca tgaagcgctg cataaccatt atacccagaa aagcctgagc 960

ctgagcctgg gcaaa 975

<210> 1322
<211> 325
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Polypeptide

<400> 1322

```
Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr
1               5                  10                  15

Ser Glu Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
            20                  25                  30

Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
        35                  40                  45

His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
    50                  55                  60

Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr
65                  70                  75                  80

Cys Asn Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
                85                  90                  95

Glu Ser Lys Tyr Gly Pro Pro Cys Pro Pro Cys Pro Ala Pro Glu Phe
            100                 105                 110

Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
        115                 120                 125

Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val
    130                 135                 140

Ser Gln Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val
145                 150                 155                 160

Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser
                165                 170                 175

Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu
            180                 185                 190

Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ser
        195                 200                 205

Ser Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro
    210                 215                 220

Gln Val Tyr Thr Leu Pro Pro Ser Pro Glu Glu Met Thr Lys Asn Gln
225                 230                 235                 240

Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala
                245                 250                 255
```

Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr
260 265 270

Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu
275 280 285

Thr Val Asp Lys Ser Arg Trp Gln Glu Gly Asn Val Phe Ser Cys Ser
290 295 300

Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser
305 310 315 320

Leu Ser Leu Gly Lys
325

<210> 1323
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1323

Gly Tyr Thr Phe Ala Ser Ala Trp
1 5

<210> 1324
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1324

Gln Ser Ile Leu Tyr Ser Ser Asn Gln Lys Asn Tyr
1 5 10

<210> 1325
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1325

Ile Asn Pro Gly Asn Val Asn Thr
1 5

<210> 1326
<211> 6
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Oligopeptide

<400> 1326

Trp Ala Ser Thr Arg Glu
1 5

<210> 1327
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1327

Ser Thr Tyr Tyr Arg Pro Leu Asp Tyr
1 5

<210> 1328
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1328

His Gln Tyr Met Ser Ser Tyr Thr
1 5

<210> 1329
<211> 354
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1329
caggtgcagc tggtgcagag cggagccgag gtgaagaagc ctggagcttc cgtcaaggtg 60

tcctgcaagg ccagcggcta caccttcgcc agccaatgga tgcactggat gcggcaggca 120

cctggacagg gcctcgaatg gatcggctgg atcaaccccg gcaacgtgaa caccaagtac 180

aacgagaagt tcaagggcag ggccaccctg accgtggaca ccagcaccaa caccgcctac 240

atggaactga gcagcctgcg gagcgaggac accgccgtgt actactgcgc cagaagcacc 300

tggtaccggc cgctggacta ctggggccag ggcaccctgg tgaccgtgag cagc 354

<210> 1330
<211> 118
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1330

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 Ala Ser Gln
20 25 30

Trp Met His Trp Met Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Trp Ile Asn Pro Gly Asn Val Asn Thr Lys Tyr Asn Glu Lys Phe
50 55 60

Lys Gly Arg Ala Thr Leu Thr Val Asp Thr Ser Thr Asn 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 Ser Thr Trp Tyr Arg Pro Leu Asp Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 1331
<211> 336
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1331
gacatcgtga tgacccagag ccccgacagc ctggccgtga gcctgggcga gcgggccacc 60

atcaactgca agagcagcca gagcatcctg tacagcagca accagaagaa ctacctggcc 120

tggtatcagc agaagcccgg ccagagcccc aagctgctga tctactgggc cagcacccgg 180

gagagcggcg tgcccgaccg gtttagcggc agcggctccg gcaccgactt caccctgacc 240

atcagcagcc tgcaggccga ggacgtggcc gtgtactact gccaccagta catcagcagc 300

tacaccttcg gccagggcac aaagctggaa atcaag 336

<210> 1332
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1332

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 Ile Leu Tyr Ser
20 25 30

Ser Asn Gln Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
35 40 45

Ser 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 Ile Ser Ser Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105 110

<210> 1333
<211> 354
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1333
caggtgcagc tggtgcagag cggagccgag gtgaagaagc ctggagcttc cgtcaaggtg 60

tcctgcaagg ccagcggcta caccttcgcc agcagctgga tgcactggat gcggcaggca 120

cctggacagg gcctcgaatg gatcggctgg atcaaccccg gcaacgtgaa caccaagtac 180

aacgagaagt tcaagggcag ggccaccctg accgtggaca ccagcaccaa caccgcctac 240

atggaactga gcagcctgcg gagcgaggac accgccgtgt actactgcgc cagaagcacg 300

tggtatcggc cgaatgacta ctggggccag ggcaccctgg tgaccgtgag cagc 354

<210> 1334
<211> 118
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1334

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 Ala Ser Ser
20 25 30

Trp Met His Trp Met Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

```
Gly Trp Ile Asn Pro Gly Asn Val Asn Thr Lys Tyr Asn Glu Lys Phe
    50                  55                  60

Lys Gly Arg Ala Thr Leu Thr Val Asp Thr Ser Thr Asn 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 Ser Thr Trp Tyr Arg Pro Asn Asp Tyr Trp Gly Gln Gly Thr
            100                 105                 110

Leu Val Thr Val Ser Ser
        115
```

<210> 1335
<211> 336
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1335

```
gacatcgtga tgacccagag ccccgacagc ctggccgtga gcctgggcga gcgggccacc       60

atcaactgca agagcagcca gagcatcctg tacagcagca accagaagaa ctacctggcc      120

tggtatcagc agaagcccgg ccagagcccc aagctgctga tctactgggc cagcacccgg      180

gagagcggcg tgcccgaccg gtttagcggc agcggctccg gcaccgactt caccctgacc      240

atcagcagcc tgcaggccga ggacgtggcc gtgtactact gccaccagta caaaagcagc      300

tacaccttcg gccagggcac aaagctggaa atcaag                                336
```

<210> 1336
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1336

```
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 Ile Leu Tyr Ser
            20                  25                  30

Ser Asn Gln Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
        35                  40                  45

Ser 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 Lys Ser Ser Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105 110

<210> 1337
<211> 354
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1337
caggtgcagc tggtgcagag cggagccgag gtgaagaagc ctggagcttc cgtcaaggtg 60

tcctgcaagg ccagcggcta caccttcgcc agcagctgga tgcactggat gcggcaggca 120

cctggacagg gcctcgaatg gatcggctgg atcaaccccg gcaacgtgaa caccaagtac 180

aacgagaagt tcaagggcag ggccaccctg accgtggaca ccagcaccaa caccgcctac 240

atggaactga gcagcctgcg gagcgaggac accgccgtgt actactgcgc cagaaccacc 300

cgttatcggc ccctggacta ctggggccag ggcaccctgg tgaccgtgag cagc 354

<210> 1338
<211> 118
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1338

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 Ala Ser Ser
20 25 30

Trp Met His Trp Met Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Trp Ile Asn Pro Gly Asn Val Asn Thr Lys Tyr Asn Glu Lys Phe
50 55 60

Lys Gly Arg Ala Thr Leu Thr Val Asp Thr Ser Thr Asn 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 Thr Thr Arg Tyr Arg Pro Leu Asp Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 1339
<211> 336
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1339
gacatcgtga tgacccagag ccccgacagc ctggccgtga gcctgggcga gcgggccacc 60

atcaactgca agagcagcca gagcatcctg tacagcagca accagaagaa ctacctggcc 120

tggtatcagc agaagcccgg ccagagcccc aagctgctga tctactgggc cagcacccgg 180

gagagcggcg tgcccgaccg gtttagcggc agcggctccg gcaccgactt caccctgacc 240

atcagcagcc tgcaggccga ggacgtggcc gtgtactact gccaccagta ccgtagcagc 300

tacaccttcg gccagggcac aaagctggaa atcaag 336

<210> 1340
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1340

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 Ile Leu Tyr Ser
20 25 30

Ser Asn Gln Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
35 40 45

Ser 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 Arg Ser Ser Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105 110

<210> 1341
<211> 354
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1341
caggtgcagc tggtgcagag cggagccgag gtgaagaagc ctggagcttc cgtcaaggtg 60

tcctgcaagg ccagcggcta caccttcgcc agccaatata tgcactggat gcggcaggca 120

cctggacagg gcctcgaatg gatcggctgg atcaaccccg gcaacgtgaa caccaagtac 180

aacgagaagt tcaagggcag ggccaccctg accgtggaca ccagcaccaa caccgcctac 240

atggaactga gcagcctgcg gagcgaggac accgccgtgt actactgcgc cagactgacc 300

tattatcggc cgccggacta ctggggccag ggcaccctgg tgaccgtgag cagc 354

<210> 1342
<211> 118
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1342

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 Ala Ser Gln
20 25 30

Tyr Met His Trp Met Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Trp Ile Asn Pro Gly Asn Val Asn Thr Lys Tyr Asn Glu Lys Phe
50 55 60

Lys Gly Arg Ala Thr Leu Thr Val Asp Thr Ser Thr Asn 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 Leu Thr Tyr Tyr Arg Pro Pro Asp Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 1343
<211> 336
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1343
gacatcgtga tgacccagag ccccgacagc ctggccgtga gcctgggcga gcgggccacc 60

atcaactgca agagcagcca gagcatcctg tacagcagca accagaagaa ctacctggcc 120

tggtatcagc agaagcccgg ccagagcccc aagctgctga tctactgggc cagcacccgg 180

gagagcggcg tgcccgaccg gtttagcggc agcggctccg gcaccgactt caccctgacc 240

atcagcagcc tgcaggccga ggacgtggcc gtgtactact gccaccagta ctatagcagc 300

tacaccttcg gccagggcac aaagctggaa atcaag 336

<210> 1344
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1344

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 Ile Leu Tyr Ser
20 25 30

Ser Asn Gln Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
35 40 45

Ser 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 Ser Ser Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105 110

<210> 1345
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1345

Gly Tyr Thr Phe Ala Ser Tyr Tyr
1 5

<210> 1346
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1346

Gly Tyr Thr Phe Ala Ser Tyr Tyr
1 5

<210> 1347
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1347

Gly Tyr Thr Phe Ala Ser Ser Trp
1 5

<210> 1348
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1348

Ser Thr Trp Tyr Arg Pro Leu Asp Tyr
1 5

<210> 1349
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1349

Ser Thr Trp Tyr Arg Pro Asn Asp Tyr
1 5

<210> 1350
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1350

Thr Thr Arg Tyr Arg Pro Leu Asp Tyr
1 5

<210> 1351
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1351

Leu Thr Tyr Tyr Arg Pro Pro Asp Tyr
1 5

<210> 1352
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1352

His Gln Tyr Leu Ser Ser Tyr Thr
1 5

<210> 1353
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1353

His Gln Tyr Ile Ser Ser Tyr Thr
1 5

<210> 1354
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1354

His Gln Tyr Lys Ser Ser Tyr Thr
1 5

<210> 1355
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1355

His Gln Tyr Arg Ser Ser Tyr Thr
1 5

<210> 1356
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1356

His Gln Tyr Tyr Ser Ser Tyr Thr
1 5

<210> 1357
<211> 354
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1357
caggtgcagc tggtgcagag cggagccgag gtgaagaagc ctggagcttc cgtcaaggtg 60

tcctgcaagg ccagcggcta caccttcgcc agctactaca tgcactggat gcggcaggca 120

cctggacagg gcctcgaatg gatcggctgg atcaaccccg gcaacgtgaa caccaagtac 180

aacgagaagt tcaagggcag ggccaccctg accgtggaca ccagcaccaa caccgcctac 240

atggaactga gcagcctgcg gagcgaggac accgccgtgt actactgcgc cagaagcacc 300

tactaccggc ccctggacta ctggggccag ggcaccctgg tgaccgtgag cagc 354

<210> 1358
<211> 118
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1358

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 Ala Ser Tyr
20 25 30

Tyr Met His Trp Met Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Trp Ile Asn Pro Gly Asn Val Asn Thr Lys Tyr Asn Glu Lys Phe
50 55 60

Lys Gly Arg Ala Thr Leu Thr Val Asp Thr Ser Thr Asn 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 Ser Thr Tyr Tyr Arg Pro Leu Asp Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 1359
<211> 336
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1359
gacatcgtga tgacccagag ccccgacagc ctggccgtga gcctgggcga gcgggccacc 60

atcaactgca agagcagcca gagcatcctg tacagcagca accagaagaa ctacctggcc 120

tggtatcagc agaagcccgg ccagagcccc aagctgctga tctactgggc cagcacccgg 180

gagagcggcg tgcccgaccg gtttagcggc agcggctccg gcaccgactt caccctgacc 240

atcagcagcc tgcaggccga ggacgtggcc gtgtactact gccaccagta cctgagcagc 300

tacaccttcg gccagggcac aaagctggaa atcaag 336

<210> 1360
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1360

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 Ile Leu Tyr Ser
20 25 30

Ser Asn Gln Lys Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
35 40 45

Ser 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 Leu Ser Ser Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105 110

<210> 1361
<211> 360
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1361
gaggtgcagc tggtggagtc tggggctgag gtgaagaagc ctggggcctc agtgaaggtc 60

tcctgcaaga cttctggata caccttcacc gaccactata tccactgggt gcgacaggcc 120

cctggacaag ggcttgagtg gatgggatgg atcaacccta gcagtggtgg cacagagtat 180

gcacagaagt ttcagggcag ggtcaccatg accagggaca cgcccattag cacggcctac 240

atggatctga gcgggctgag atctgacgac acggccgttt attactgtgc gagagagact 300

atcggtggct ggaacgcttt ggacgtctgg ggccaaggaa ccctggtcac cgtctcctca 360

<210> 1362
<211> 120
<212> PRT
<213> Artificial Sequence

<220>
<223> Artificial Polypeptide

<400> 1362

Glu Val Gln Leu Val Glu 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 Asp His
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 Ser Ser Gly Gly Thr Glu Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Met Thr Arg Asp Thr Pro Ile Ser Thr Ala Tyr
65 70 75 80

Met Asp Leu Ser Gly Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Thr Ile Gly Gly Trp Asn Ala Leu Asp Val Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 1363
<211> 333
<212> DNA
<213> Artificial Sequence

<220>
<223> Artificial Polynucleotide

<400> 1363
cagcctgtgc tgactcagcc accctcagcg tctgggaccc ccgggcagag ggtcaccatc 60

tcttgttctg gaagcagctc caacatcgga attaatactg taaactggta ccagcagctc 120

ccaagaacgc cccccaaact cctcatctat actaataatc agcggccctc aggggtccct 180

gaccgattct ctggctccaa gtctgacacc tcagcctccc tggccatcag tggcctccag 240

tctgaggatg aggctgatta ttactgtgca gcttgggatg acaccctgaa tggtccacta 300

ttcggcggag ggaccaaggt gaccgtccta ggt 333

<210> 1364
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1364

Gln Pro 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 Ile Asn
20 25 30

Thr Val Asn Trp Tyr Gln Gln Leu Pro Arg Thr Pro Pro Lys Leu Leu
35 40 45

Ile Tyr Thr Asn Asn Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
50 55 60

Gly Ser Lys Ser Asp 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 Thr Leu
85 90 95

Asn Gly Pro Leu Phe Gly Gly Gly Thr Lys Val Thr Val Leu Gly
100 105 110

<210> 1365
<211> 357
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1365
gaggtgcagc tggtgcagtc tgggtctgag ttgaagaagc ctggggcctc agtgaaggtc 60

tcctgcaagg cttctggata caccttcacc ggctactata tgcactgggt gcgacaggcc 120

cctggacaag ggcttgagtg gatgggatgg atcaacccta acagtggtgg cacaaactat 180

gcacagaagt ttcagggcag ggtcaccgtg accacagaca cgtccacgag cacagcctac 240

atggagctga ggagcctgag atctgacgac acggccgtct attactgtgc gagagagggt 300

gttcactcgg atgcttttga tgtgtggggc caagggacca cggtcaccgt ctcctca 357

<210> 1366
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1366

Glu 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 Lys Ala Ser Gly Tyr Thr Phe Thr Gly 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 Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Val 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 Glu Gly Val His Ser Asp Ala Phe Asp Val Trp Gly Gln Gly
100 105 110

Thr Thr Val Thr Val Ser Ser
115

<210> 1367
<211> 321
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1367
gaaacgacac tcacgcagtc tccagccacc ctgtctgtgt ctccagggga aagggccacc 60

ctctcctgca gggccagtca gagtgtttac accaacttag cctggtacca acagaaacct 120

ggccaggctc ccagtctcct catctatggt gcatccagcc gggccaccgg catcccagac 180

agattcagtg gcagcgggtc tgggacagac ttcactctca ccatcagcag actggagcct 240

gaagattttg cagtgtatta ctgtcagcag tatggtagct cacatttcac tttcggccct 300

gggaccaaag tggatatcaa a 321

<210> 1368
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1368

Glu Thr Thr Leu 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 Tyr Thr Asn
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Ser Leu Leu Ile
35 40 45

Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro
65 70 75 80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser His Phe
85 90 95

Thr Phe Gly Pro Gly Thr Lys Val Asp Ile Lys
100 105

<210> 1369
<211> 360
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1369
gaggtgcagc tggtgcagtc tggggctgag gtgaagaagc ctggggcctc agtgaaggtc 60

tcctgcaaga cttctggata caccttcacc gaccactata tccactgggt gcgacaggcc 120

cctggacaag ggcttgagtg gatgggatgg atcaacccta gcagtggtgg cacagagtat 180

gcacagaagt ttcagggcag ggtcaccatg accagggaca cgcccattag cacggcctac 240

atggatctga gcgggctgag atctgacgac acggccgttt attactgtgc gagagagact 300

atcggtggct ggaacgcttt ggacgtctgg ggccaaggga ccacggtcac cgtctcctca 360

<210> 1370
<211> 120
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1370

Glu 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 Thr Ser Gly Tyr Thr Phe Thr Asp His
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 Ser Ser Gly Gly Thr Glu Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Met Thr Arg Asp Thr Pro Ile Ser Thr Ala Tyr
65 70 75 80

Met Asp Leu Ser Gly Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Thr Ile Gly Gly Trp Asn Ala Leu Asp Val Trp Gly Gln
100 105 110

Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 1371
<211> 333
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1371
cagtctgtgc tgactcagcc accctcagcg tctgggtccc ccgggcagag ggtcaccatg 60

tcttgctctg gaagcagctc caccatcggg aggcattctg taaactggta ccagcagctc 120

ccaggaacgg cccccaaact cctcatctat gctaacaatc agcggccctc aggggtccct 180

ggccgattct ctgcctccaa gtctgacacc tcagcctccc tggccatcag tgggctccgg 240

tccgaggatg aggctaatta ttactgtgca gcgtgggatg acagtctcag tggcgtgctc 300

tttggcggtg ggaccaaggt gaccgtccta ggt 333

<210> 1372
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1372

Gln Ser Val Leu Thr Gln Pro Pro Ser Ala Ser Gly Ser Pro Gly Gln
1 5 10 15

Arg Val Thr Met Ser Cys Ser Gly Ser Ser Ser Thr Ile Gly Arg His
20 25 30

Ser Val Asn Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
35 40 45

Ile Tyr Ala Asn Asn Gln Arg Pro Ser Gly Val Pro Gly Arg Phe Ser
50 55 60

Ala Ser Lys Ser Asp Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Arg
65 70 75 80

Ser Glu Asp Glu Ala Asn Tyr Tyr Cys Ala Ala Trp Asp Asp Ser Leu
85 90 95

Ser Gly Val Leu Phe Gly Gly Gly Thr Lys Val Thr Val Leu Gly
100 105 110

<210> 1373
<211> 360
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1373
gaggtgcagc tggtggagtc tggggctgag gtgaagaagc ctggggcctc agtgaaggtc 60

tcctgcaaga cttctggata caccttcacc gaccactata tccactgggt gcgacaggcc 120

cctggacaag ggcttgagtg gatgggatgg atcaacccta gcagtggtgg cacagagtat 180

gcacagaagt ttcagggcag ggtcaccatg accagggaca cgcccattag cacggcctac 240

atggatctga gcgggctgag atctgacgac acggccgttt attactgtgc gagagagact 300

atcggtggct ggaacgcttt ggacgtctgg ggccaaggca ccctggtcac cgtctcctca 360

<210> 1374
<211> 120
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Polypeptide

<400> 1374

```
Glu Val Gln Leu Val Glu 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 Asp His
            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 Ser Ser Gly Gly Thr Glu Tyr Ala Gln Lys Phe
    50                  55                  60

Gln Gly Arg Val Thr Met Thr Arg Asp Thr Pro Ile Ser Thr Ala Tyr
65                  70                  75                  80

Met Asp Leu Ser Gly Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Glu Thr Ile Gly Gly Trp Asn Ala Leu Asp Val Trp Gly Gln
            100                 105                 110

Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 1375
<211> 327
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1375

```
ctgcctgtgc tgactcagcc accctcagtg tcagtggccc caggacagac ggccaggata       60

acctgtgggg gacacaagat tggaactaaa agtgtgcact ggtaccagca gaagccaggc      120

caggcccctg tactggtcgt ctatgatgat cgcgaccggc cctcagggat ccctgagcga      180

ttctctggct ccaactctgg gggcacggcc accctgacca tcagcagggt cgaagccggg      240

gatgaggccg actattactg tcaggtgtgg gatagtaata gtgatcatgt ggtgttcggc      300

ggagggacca agctgaccgt cctaagt                                          327
```

<210> 1376
<211> 109
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1376

Met Pro 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 His Lys Ile Gly Thr 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 Arg Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

Asn Ser Gly Gly 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 Ser Asp His
85 90 95

Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Ser
100 105

<210> 1377
<211> 360
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1377
gaggtgcagc tggtgcagtc tggggctgat gtgaagaagc ctggggcctc agtgaaggtc 60

tcctgcaagg cttctggata caccttcacc ggctactata tacactgggt gcgacaggcc 120

cctggacaag ggcttgagtg gatgggatgg atcaacccta acagtggtgg cacaaactat 180

gcacagaagt ttcagggcag ggtcaccatg accagggaca cgtccatcag cacagcctac 240

atggagctga gcaggctgag atctgacgac acggccgtct atttttgtgt gagagaggtg 300

aaagattact attattacat ggacgtctgg ggcagaggga ccacggtcac cgtctcctca 360

<210> 1378
<211> 120
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1378

Glu Val Gln Leu Val Gln Ser Gly Ala Asp 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 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 Tyr
65 70 75 80

Met Glu Leu Ser Arg Leu Arg Ser Asp Asp Thr Ala Val Tyr Phe Cys
85 90 95

Val Arg Glu Val Lys Asp Tyr Tyr Tyr Tyr Met Asp Val Trp Gly Arg
100 105 110

Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 1379
<211> 336
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1379
aattttatgc tgactcagcc ccactctgtg tcggaatctc cggggaagac ggttaccatc 60

tcgtgcaccc gcagcagcgg cagcattgcc agcaactccg tgcagtggta cctgcagcgc 120

ccgggcagtg cccccaccac tctgatcttt gacaataaac aaagaccgtc tggggtccct 180

gatcgcttct ctggctccat cgacagctcc tccaactctg cctccctcag catctctggg 240

ctgacgactg aggacgaggc tgactatttc tgtcagtctt atgatgacag tgagcaagtg 300

gtgttcggcg gagggaccaa gctgaccgtc ctaagt 336

<210> 1380
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1380

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 Ser Asn
20 25 30

Ser Val Gln Trp Tyr Leu Gln Arg Pro Gly Ser Ala Pro Thr Thr Leu
35 40 45

Ile Phe Asp Asn Lys Gln 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 Ser Ile Ser Gly
65 70 75 80

Leu Thr Thr Glu Asp Glu Ala Asp Tyr Phe Cys Gln Ser Tyr Asp Asp
85 90 95

Ser Glu Gln Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Ser
100 105 110

<210> 1381
<211> 363
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1381
gaggtgcagc tggtggagtc tggggctgag gtgaagaagc ctggggcctc agtgaaggtc 60

tcctgcaagg cttctggata caccttcacc ggctactata tgcactgggt gcgacaggcc 120

cctggacaag ggcttgagtg gttggggtgg gtcaaccctc acagtggtgg cacaaactat 180

gcacagaagt ttcagggcag ggtcaccatg accagggaca cgtccatcag cacagcctac 240

atggagctga gcagactgag atctgacgac acggccgtat attactgtgc gagagagact 300

gatatctctg ctaattatca ctttgactac tggggccagg gcaccctggt caccgtctcc 360

tca 363

<210> 1382
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1382

Glu Val Gln Leu Val Glu 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 Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Leu
35 40 45

Gly Trp Val Asn Pro His 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 Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Thr Asp Ile Ser Ala Asn Tyr His Phe Asp Tyr Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 1383
<211> 336
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1383
cagtctgccc tgactcagcc tgcctccgtg tctgggtctc ctggacagtc gatcaccatc 60

tcctgcactg gaaccagcag tgatgttggg agttataacg ctgtctcctg gtaccaacac 120

cacccaggca aagcccccaa actcatgatt tatgaggtca gtaagcggcc ctcaggggtt 180

tctaatcggt tctctggctc caagtctggc aacacggcct ccctgacaat ctctgggctc 240

cgggctgagg acgaggctga ttattattgt gcaacatggg atgacagcct gaaaggtccg 300

gtgttcggcg gagggaccaa gctgaccgtc ctgggt 336

<210> 1384
<211> 113
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1384

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 Ala Val Ser Trp Tyr Gln His His Pro Gly Lys Ala Pro Lys Leu
35 40 45

Met Ile Tyr Glu Val 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

Arg Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Thr Trp Asp Asp Ser
85 90 95

Leu Lys Gly Pro Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

Glu

<210> 1385
<211> 360
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1385
gaggtgcagc tggtgcagtc tggggctgag gtgaagaagc ctggggcctc agtgaaggtc 60

tcctgcaagg cttctggata caccttcacc ggctactata tgcactgggt gcgacaggcc 120

cctggacaag ggcttgaatg gatgggatgg atcaacccta aaactggtga cacaaactat 180

gcacagaagt ttcagggcag ggtcgccttg agcagggaca cgtccttcaa cacagcctac 240

atggacctga gcagcctcag atctgacgac acggccgtct attactgtgc gagagagggc 300

ctgtcgacca gcagtcccct tgactactgg ggccagggaa ccctggtcac cgtctcctca 360

<210> 1386
<211> 120
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1386

Glu 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 Met 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 Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Ala Leu Ser Arg Asp Thr Ser Phe Asn Thr Ala Tyr
65 70 75 80

Met Asp Leu Ser Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Gly Leu Ser Thr Ser Ser Pro Leu Asp Tyr Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser
        115   120

<210> 1387
<211> 327
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1387
cagcctgggc tgactcagcc accctcagtg tcagtggccc caggacagtc ggccaagatt 60

acctgtggag aaaacgaact tgcaacaaat attgtacact ggtaccagca gaagccaggc 120

caggcccctg tgctggtcat ctatcatgat aacgaccggc cctcagggat ccctgagcga 180

ttctctggct ccaacgctgg gaacacggcc accctgacca tcagcagggt cgaagccggg 240

gatgaggccg acttttactg tcagctgtgg gatagtgcta gtgatcaagt ggtcttcggc 300

ggagggacca cgttgaccgt cctaggt   327

<210> 1388
<211> 109
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1388

Gln Pro Gly Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Gln
1   5   10   15

Ser Ala Lys Ile Thr Cys Gly Glu Asn Glu Leu Ala Thr Asn Ile Val
            20   25   30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
        35   40   45

His Asp Asn Asp Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50   55   60

Asn Ala Gly Asn Thr Ala Thr Leu Thr Ile Ser Arg Val Glu Ala Gly
65   70   75   80

Asp Glu Ala Asp Phe Tyr Cys Gln Leu Trp Asp Ser Ala Ser Asp Gln
                85   90   95

Val Val Phe Gly Gly Gly Thr Thr Leu Thr Val Leu Gly
            100   105

<210> 1389
<211> 363

<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1389
gaggtgcagc tggtgcagtc aggggctgag gtgaagaggc ctggggcctc attgaaggtt 60

tcctgcaagg catctggata caccttcacc agccactata tacactgggt gcgacaggcc 120

cccggacaag ggcttgagtg gatgggatgg atcaacactg gcaatggtga cacaagatat 180

tcacagaggt tccagggcag agtcaccgtt accagggaca catccgcgag cacagtctac 240

atggaactga gcagcctgag atctgaagac acggccgtgt attactgtgc gagagagtct 300

agcagcagct ggtttgttgc ttttgatgtc tggggccaag ggaccacggt caccgtctcc 360

tca 363

<210> 1390
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1390

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Arg Pro Gly Ala
1 5 10 15

Ser Leu Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser His
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 Thr Gly Asn Gly Asp Thr Arg Tyr Ser Gln Arg Phe
50 55 60

Gln Gly Arg Val Thr Val Thr Arg Asp Thr Ser Ala 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 Ser Ser Ser Trp Phe Val Ala Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 1391
<211> 327
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1391
cagcctgtgc tgactcagcc accctcggtg tcattggccc caggacagac ggccaggatt 60

acctgttcgg aaaagaacat tcgaagtaaa agagtgcact ggtaccagca gaagccaggc 120

caggcccctg tcctggtcat gtattctgat aacggccggc gctcagggat ccctgaccga 180

ttttctggct ccaactctgg gaacacggcc accctgacca tcaccagggt cgaagccggt 240

gatgagggcg acttttactg tcaggtgtgg gatccgatta ctgatcaggt ggttttcggc 300

ggagggacca agctgaccgt cctaggt 327

<210> 1392
<211> 109
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1392

Gln Pro Val Leu Thr Gln Pro Pro Ser Val Ser Leu Ala Pro Gly Gln
1 5 10 15

Thr Ala Arg Ile Thr Cys Ser Glu Lys Asn Ile Arg Ser Lys Arg Val
20 25 30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Met Tyr
35 40 45

Ser Asp Asn Gly Arg Arg Ser Gly Ile Pro Asp Arg Phe Ser Gly Ser
50 55 60

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Thr Arg Val Glu Ala Gly
65 70 75 80

Asp Glu Gly Asp Phe Tyr Cys Gln Val Trp Asp Pro Ile Thr Asp Gln
85 90 95

Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105

<210> 1393
<211> 372
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1393
caggtgcagc tggtgcagtc tggggctgag gtgaagcagc ctgggtcctc agtgaaggtc 60

tcctgtaagg cttctggata caccttcacc ggctactata tgcactgggt gcgacaggcc 120

cctggagaag ggcttgagtg gctgggatgg atcaaccctc acagtggtgg cacaaactat 180

gcacagaagt tccagggcag agtcacgatt accgcggaca aatccacgag cacagcctac 240

atggagctga gcagcctgag atctgaggac acggctgtgt attactgtgc gagggagatt 300

gtggtggtga ctgctccggc tgctgcggct atggacgtct ggggccaagg caccctggtc 360

accgtctcct ca 372

<210> 1394
<211> 124
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1394

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Gln Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Gly Tyr
20 25 30

Tyr Met His Trp Val Arg Gln Ala Pro Gly Glu Gly Leu Glu Trp Leu
35 40 45

Gly Trp Ile Asn Pro His Ser Gly Gly Thr Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys 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 Ile Val Val Val Thr Ala Pro Ala Ala Ala Ala Met Asp
100 105 110

Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 1395
<211> 333
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1395
cagtctgtgc tgactcagcc accctccgcg tccgggtctc ctggacagtc agtcaccatc 60

tcctgcactg gaagcagcag tgacgttgct atttatgacc gtgtctcctg gtaccagcag 120

cccccaggca cagcccccaa actcattctt tatgatgtcc atgatcggcc ctcaggggtc 180

cctgatcgct tctctgggtc caagtctggc aacacggcct ccctgaccat ctctgggctc 240

caggctgagg acgaggctga ttattactgc agttcataca caaccagcgg cacttttgtc 300

ttcggaagtg ggaccaaggt caccgtccta ggt 333

<210> 1396
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1396

Gln Ser Val 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 Ser Ser Ser Asp Val Ala Ile Tyr
20 25 30

Asp Arg Val Ser Trp Tyr Gln Gln Pro Pro Gly Thr Ala Pro Lys Leu
35 40 45

Ile Leu Tyr Asp Val His Asp 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 Thr Thr Ser
85 90 95

Gly Thr Phe Val Phe Gly Ser Gly Thr Lys Val Thr Val Leu Gly
100 105 110

<210> 1397
<211> 366
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1397
gaggtgcagc tggtgcagtc tggggctgag gtgaagaagc ctggggcctc agtgaacgtc 60

tcctgtaagg cttctggata caccttcacc ggctactata tgcactgggt gcgacaggcc 120

cctggacaag ggcttgagtg gatgggatgg atcaacccca acagtggtgg cacaaactat 180

gcacagaagt ttcagggcag ggtcaccgtg accacagaca cgtccaacag cacagcctac 240

atggagctga acaggctgaa atctgacgac acggccgtgt attattgtgc gagagagggg 300

tccggggacc ttgattcctt atacatggac gtctggggca aagggacaat ggtcaccgtc 360

tcttca 366

<210> 1398
<211> 324
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1398
tcctatgagc tgactcagcc accctcggtg tcagtggccc caggacagac ggccaggatt 60

acctgtgggg caaacaacat tggaagtaaa agtgtgcact ggtaccagca gaagccaggc 120

caggcccctg tgctggtcgt ctatgatgat agcgaccggc cctcagggat ccctgagcga 180

ttctctggct ccaactctgg gaacacggcc accctgacca tcaccagggt cgaagccggg 240

gatgaggccg actattactg tcagctatgg gatggtggga gtgatgtggt tttcggcgga 300

gggaccaagc tgaccgtcct aggt 324

<210> 1399
<211> 122
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1399

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Ser Val Asn Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Gly 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 Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Val Thr Thr Asp Thr Ser Asn Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Asn Arg Leu Lys Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Gly Ser Gly Asp Leu Asp Ser Leu Tyr Met Asp Val Trp
100 105 110

Gly Lys Gly Thr Met Val Thr Val Ser Ser
115 120

<210> 1400
<211> 108

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1400

Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ala Pro Gly Gln
1 5 10 15

Thr Ala Arg Ile Thr Cys Gly Ala 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 Thr Arg Val Glu Ala Gly
65 70 75 80

Asp Glu Ala Asp Tyr Tyr Cys Gln Leu Trp Asp Gly Gly Ser Asp Val
85 90 95

Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105

<210> 1401
<211> 360
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1401
gaggtgcagc tggtggagtc tggggctgag gtgaagaagc ctggggcctc agtgaaggtc 60

tcctgcaaga cttctggata caccttcacc gaccactata tccactgggt gcgacaggcc 120

cctggacaag ggcttgagtg gatgggatgg atcaacccta gcagtggtgg cacagagtat 180

gcacagaagt ttcagggcag ggtcaccatg accagggaca cgcccattag cacggcctac 240

atggatctga gcgggctgag atctgacgac acggccgttt attactgtgc gagagagact 300

atcggtggct ggaacgcttt ggacgtctgg ggccaaggaa ccctggtcac cgtctcctca 360

<210> 1402
<211> 120
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1402

Glu Val Gln Leu Val Glu 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 Asp His
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 Ser Ser Gly Gly Thr Glu Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Met Thr Arg Asp Thr Pro Ile Ser Thr Ala Tyr
65 70 75 80

Met Asp Leu Ser Gly Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Thr Ile Gly Gly Trp Asn Ala Leu Asp Val Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 1403
<211> 333
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1403
cagcctgtgc tgactcagcc accctcagcg tctgggaccc ccgggcagag ggtcaccatc 60

tcttgttctg gaagcagctc caacatcgga attaatactg taaactggta ccagcagctc 120

ccaagaacgc cccccaaact cctcatctat actaataatc agcggccctc aggggtccct 180

gaccgattct ctggctccaa gtctgacacc tcagcctccc tggccatcag tggcctccag 240

tctgaggatg aggctgatta ttactgtgca gcttgggatg acaccctgaa tggtccacta 300

ttcggcggag ggaccaaggt gaccgtccta ggt 333

<210> 1404
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1404

Gln Pro 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 Ile Asn
20 25 30

Thr Val Asn Trp Tyr Gln Gln Leu Pro Arg Thr Pro Pro Lys Leu Leu
35 40 45

Ile Tyr Thr Asn Asn Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
50 55 60

Gly Ser Lys Ser Asp 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 Thr Leu
85 90 95

Asn Gly Pro Leu Phe Gly Gly Gly Thr Lys Val Thr Val Leu Gly
100 105 110

<210> 1405
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1405

Gly Tyr Thr Phe Thr Asp His Tyr
1 5

<210> 1406
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1406

Ile Asn Pro Ser Ser Gly Gly Thr
1 5

<210> 1407
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1407

Ala Arg Glu Thr Ile Gly Gly Trp Asn Ala Leu Asp Val
1 5 10

<210> 1408
<211> 8

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1408

Ser Ser Asn Ile Gly Ile Asn Thr
1 5

<210> 1409
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1409

Thr Asn Asn
1

<210> 1410
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1410

Ala Ala Trp Asp Asp Thr Leu Asn Gly Pro Leu
1 5 10

<210> 1411
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1411

Gly Tyr Thr Phe Thr Gly Tyr Tyr
1 5

<210> 1412
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1412

Ile Asn Pro Asn Ser Gly Gly Thr
1 5

<210> 1413
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1413

Ala Arg Glu Gly Val His Ser Asp Ala Phe Asp Val
1 5 10

<210> 1414
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1414

Gln Ser Val Tyr Thr Asn
1 5

<210> 1415
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1415

Gly Ala Ser
1

<210> 1416
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> 57

<400> 1416

Gln Gln Tyr Gly Ser Ser His Phe Thr
1 5

<210> 1417
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1417

Gly Tyr Thr Phe Thr Asp His Tyr
1 5

<210> 1418
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1418

Ile Asn Pro Ser Ser Gly Gly Thr
1 5

<210> 1419
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1419

Ala Arg Glu Thr Ile Gly Gly Trp Asn Ala Leu Asp Val
1 5 10

<210> 1420
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1420

Ser Ser Thr Ile Gly Arg His Ser
1 5

<210> 1421
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1421

Ala Asn Asn
1

<210> 1422
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1422

Ala Ala Trp Asp Asp Ser Leu Ser Gly Val Leu
1 5 10

<210> 1423
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1423

Gly Tyr Thr Phe Thr Asp His Tyr
1 5

<210> 1424
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1424

Ile Asn Pro Ser Ser Gly Gly
1 5

<210> 1425
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1425

Ala Arg Glu Thr Ile Gly Gly Trp Asn Ala Leu Asp Val
1 5 10

<210> 1426
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1426

Lys Ile Gly Thr Lys Ser
1 5

<210> 1427
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1427

Asp Asp Arg
1

<210> 1428
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1428

Gln Val Trp Asp Ser Asn Ser Asp His Val Val
1 5 10

<210> 1429
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1429

Gly Tyr Thr Phe Thr Gly Tyr Tyr
1 5

<210> 1430
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1430

Ile Asn Pro Asn Ser Gly Gly Thr
1 5

<210> 1431
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1431

Val Arg Glu Val Lys Asp Tyr Tyr Tyr Tyr Met Asp Val
1 5 10

<210> 1432
<211> 8
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Oligopeptide

<400> 1432

Ser Gly Ser Ile Ala Ser Asn Ser
1 5

<210> 1433
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1433

Asp Asn Lys
1

<210> 1434
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1434

Gln Ser Tyr Asp Asp Ser Glu Gln Val Val
1 5 10

<210> 1435
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1435

Gly Tyr Thr Phe Thr Gly Tyr Tyr
1 5

<210> 1436
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1436

Val Asn Pro His Ser Gly Gly Thr
1 5

<210> 1437
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1437

Ala Arg Glu Thr Asp Ile Ser Ala Asn Tyr His Phe Asp Tyr
1 5 10

<210> 1438
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1438

Ser Ser Asp Val Gly Ser Tyr Asn Ala
1 5

<210> 1439
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1439

Glu Val Ser
1

<210> 1440
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1440

Ala Thr Trp Asp Asp Ser Leu Lys Gly Pro Val
1 5 10

<210> 1441
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1441

Gly Tyr Thr Phe Thr Gly Tyr Tyr
1 5

<210> 1442
<211> 8

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1442

Ile Asn Pro Lys Thr Gly Asp Thr
1 5

<210> 1443
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1443

Ala Arg Glu Gly Leu Ser Thr Ser Ser Pro Leu Asp Tyr
1 5 10

<210> 1444
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1444

Glu Leu Ala Thr Asn Ile
1 5

<210> 1445
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1445

His Asp Asn
1

<210> 1446
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1446

Gln Leu Trp Asp Ser Ala Ser Asp Gln Val Val
1 5 10

<210> 1447
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1447

Gly Tyr Thr Phe Thr Ser His Tyr
1 5

<210> 1448
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1448

Ile Asn Thr Gly Asn Gly Asp Thr
1 5

<210> 1449
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1449

Ala Arg Glu Ser Ser Ser Ser Trp Phe Val Ala Phe Asp Val
1 5 10

<210> 1450
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1450

Asn Ile Arg Ser Lys Arg
1 5

<210> 1451
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1451

Ser Asp Asn
1

<210> 1452
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1452

Gln Val Trp Asp Pro Ile Thr Asp Gln Val Val
1 5 10

<210> 1453
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1453

Gly Tyr Thr Phe Thr Gly Tyr Tyr
1 5

<210> 1454
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1454

Ile Asn Pro His Ser Gly Gly Thr
1 5

<210> 1455
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1455

Ala Arg Glu Ile Val Val Val Thr Ala Pro Ala Ala Ala Ala Met Asp
1 5 10 15

Val

<210> 1456
<211> 9
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Oligopeptide

<400> 1456

Ser Ser Asp Val Ala Ile Tyr Asp Arg
1 5

<210> 1457
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1457

Asp Val His
1

<210> 1458
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1458

Ser Ser Tyr Thr Thr Ser Gly Thr Phe Val
1 5 10

<210> 1459
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1459

Gly Tyr Thr Phe Thr Gly Tyr Tyr
1 5

<210> 1460
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1460

Ile Asn Pro Asn Ser Gly Gly Thr
1 5

<210> 1461
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1461

Ala Arg Glu Gly Ser Gly Asp Leu Asp Ser Leu Tyr Met Asp Val
1 5 10 15

<210> 1462
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1462

Asn Ile Gly Ser Lys Ser
1 5

<210> 1463
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1463

Asp Asp Ser
1

<210> 1464
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1464

Gln Leu Trp Asp Gly Gly Ser Asp Val Val
1 5 10

<210> 1465
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1465

Gly Tyr Thr Phe Thr Asp His Tyr
1 5

<210> 1466
<211> 8

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1466

Ile Asn Pro Ser Ser Gly Gly Thr
1 5

<210> 1467
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1467

Ala Arg Glu Thr Ile Gly Gly Trp Asn Ala Leu Asp Val
1 5 10

<210> 1468
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1468

Ser Ser Asn Ile Gly Ile Asn Thr
1 5

<210> 1469
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1469

Thr Asn Asn
1

<210> 1470
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1470

Ala Ala Trp Asp Asp Thr Leu Asn Gly Pro Leu
1 5 10

<210> 1471
<211> 390
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1471
caggtgcagc tgttggagtc tgggggaggc gtggtccagc ctgggaggtc cctgagactc 60

tcctgtgcag cctctggatt caccttcagt aactatggca tgcactgggt ccgccaggct 120

ccaggcaagg ggctggagtg ggtggcaatt atatcatttg atggaagtaa aaaatattat 180

gcaaactccg tgaagggccg atccaccatc tccagagaca attccaagaa cacgctgtct 240

ctgcaaatga acagcctggg acctgaggac acggctctat attactgtgc gaaactgccc 300

tccccgtatt actttgatag tcggttcgtg tgggtcgccg ccagcgcatt tcacttctgg 360

ggccagggaa tcctggtcac cgtctcttca 390

<210> 1472
<211> 130
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Polypeptide

<400> 1472

Gln Val Gln Leu Leu 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

Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Ile Ile Ser Phe Asp Gly Ser Lys Lys Tyr Tyr Ala Asn Ser Val
50 55 60

Lys Gly Arg Ser Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Ser
65 70 75 80

Leu Gln Met Asn Ser Leu Gly Pro Glu Asp Thr Ala Leu Tyr Tyr Cys
85 90 95

Ala Lys Leu Pro Ser Pro Tyr Tyr Phe Asp Ser Arg Phe Val Trp Val
100 105 110

Ala Ala Ser Ala Phe His Phe Trp Gly Gln Gly Ile Leu Val Thr Val
115 120 125

Ser Ser
130

<210> 1473
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic polypeptide

<400> 1473

Asn Phe Met 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 Gly Asn
20 25 30

Thr Val His Trp Phe Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
35 40 45

Ile Tyr Thr Asn Ser Leu 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 Gln Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 1474
<211> 330
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Polynucleotide

<400> 1474
aattttatgc tgactcagcc accctcagcg tctgggaccc ccgggcagag ggtcaccatc 60

tcttgctctg gaagcagctc caacatcgga ggtaatactg tacactggtt ccagcagctc 120

ccaggaacgg cccccaaact cctcatctat actaatagtc tgcggccctc aggggtccct 180

gaccgattct ctggctccaa gtctggcacc tcagcctccc tggccatcag tgggctccag 240

tctgaggatg aggctgatta ttactgtgca gcatgggata acagcctaaa tggtcaggtg 300

ttcggcggag ggaccaagct gaccgtccta 330

<210> 1475
<211> 110
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Polypeptide

<400> 1475

Asn Phe Met 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 Gly Asn
20 25 30

Thr Val His Trp Phe Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
35 40 45

Ile Tyr Thr Asn Ser Leu 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 Asn Ser Leu
85 90 95

Asn Gly Gln Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 1476
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 1476

Gly Phe Thr Phe Ser Asn Tyr Gly
1 5

<210> 1477
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic oligopeptide

<400> 1477

Ile Ser Phe Asp Gly Ser Lys Lys
1 5

<210> 1478
<211> 25
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 1478

Cys Ala Lys Leu Pro Ser Pro Tyr Tyr Phe Asp Ser Arg Phe Val Trp
1 5 10 15

Val Ala Ala Ser Ala Phe His Phe Trp
20 25

<210> 1479
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic oligopeptide

<400> 1479

Ser Ser Asn Ile Gly Gly Asn Thr
1 5

<210> 1480
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic oligopeptide

<400> 1480

Thr Asn Ser
1

<210> 1481
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic oligopeptide

<400> 1481

Cys Ala Ala Trp Asp Asp Ser Leu Asn Gly Gln Val Phe
1 5 10

<210> 1482
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> 1453

<400> 1482

Cys Ala Ala Trp Asp Asn Ser Leu Asn Gly Gln Val Phe
1 5 10

<210> 1483
<211> 7

<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligopeptide

<400> 1483

Gly Asn Thr Asn Arg Pro Ser
1 5

<210> 1484
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Oligonucleotide

<400> 1484

Gly Gly Gly Gly Ser
1 5

<210> 1485
<211> 372
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-14

<400> 1485
caggtgcagc tggtgcagtc tggagctgag gtgaagaagc ctggggcctc agtgaaggtc 60

tcctgcaagg cttctggtta cacctttacc agctatggta tcagctgggt gcgacaggcc 120

cctggacaag ggcttgagtg gatgggatgg atcagcgctt acaatggtaa cacaaactat 180

gcacagaagc tccagggcag agtcaccatg accacagaca catccacgag cacagcctac 240

atggagctga ggagcctgag atctgacgac acggccgtgt attactgtgc gagagctcta 300

cctagtggga ctatactggt cggaggttgg ttcgacccct ggggccaggg aaccctggtc 360

accgtctcct ca 372

<210> 1486
<211> 124
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-14

<400> 1486

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 Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Ala Leu Pro Ser Gly Thr Ile Leu Val Gly Gly Trp Phe Asp
100 105 110

Pro Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 1487
<211> 333
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-14

<400> 1487
aattttatgc tgactcagcc ccactctgtg tcggagtctc cggggaagac ggtaaccatc 60

tcctgcaccc gcagcagtgg caacattgcc agcaattatg tgcagtggta ccaacagcgc 120

ccgggcagtg cccccaccac tgtgatctat gaggataacc aaagaccctc tggggtccct 180

gatcggttct ctggctccat cgacagctcc tccaactctg cctccctcac catctctgga 240

ctgaagactg aggacgaggc tgactactac tgtcagtctt atgatagcag caatctttgg 300

gtgttcggcg gagggaccaa gctgaccgtc cta 333

<210> 1488
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-14

<400> 1488

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 Asn Ile Ala Ser Asn
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 Asn Gln 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 Ser
85 90 95

Ser Asn Leu Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 1489
<211> 372
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-16

<400> 1489
gaggtgcagc tggtgcagtc tgggggaggc gtggtccagc ctgggaggtc cctgagactc 60

tcctgtgcag cctctggatt cacctttagc agctatgccc tgagctgggt ccgccaggct 120

ccagggaagg ggctggagtg ggtctcagct attagtggtg gtggtggtag cacatactac 180

gcagactccg tgaagggccg gttcaccatc tccagagaca attccaagaa cacgctgtat 240

ctgcaaatga acagcctgag agccgaggac acggccgtat attactgtgc gaaagacgtg 300

tttccagaga ctttttcgat gaactacggt atggacgtct ggggccaagg aaccctggtc 360

accgtctcct ca 372

<210> 1490
<211> 124
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain Ab-16

<400> 1490

Glu Val Gln Leu Val Gln 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 Leu Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Ala Ile Ser Gly Gly 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 Lys Asp Val Phe Pro Glu Thr Phe Ser Met Asn Tyr Gly Met Asp
100 105 110

Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 1491
<211> 324
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-16

<400> 1491
tcttctgagc tgactcagga ccctgctgtg tctgtggcct tgggacagac agtcaggatc 60

acatgccaag gagacagcct cagaagctat tatgcaagct ggtaccagca gaagccagga 120

caggcccctg tacttgtcat ctatggtaaa aacaaccggc cctcagggat cccagaccga 180

ttctctggct ccagctcagg aaacacagct tccttgacca tcactggggc tcaggcggaa 240

gatgaggctg actattactg taactcccgg gacagcagtg gtaaccatta tgtcttcgga 300

actgggacca aggtcaccgt ccta 324

<210> 1492
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-16

<400> 1492

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 Tyr Tyr Ala
20 25 30

Ser Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Val Leu Val Ile Tyr
35 40 45

Gly Lys 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

Tyr Val Phe Gly Thr Gly Thr Lys Val Thr Val Leu
100 105

<210> 1493
<211> 384
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-22

<400> 1493
caggtgcagc tggtgcagtc tgggggaggc gtggtacagc ctgggggtc cctgagactc 60

tcctgtgcag cctctggatt cacctttgat gattatgcca tgcactgggt ccgtcaagct 120

ccagggaagg gtctggagtg ggtctctctt attagtgggg atggtggtag cacatactat 180

gcagactctg tgaagggccg attcaccatc tccagagaca acagcaaaaa ctccctgtat 240

ctgcaaatga acagtctgag aactgaggac accgccttgt attactgtgc aaaagtgctc 300

ctcccctgta gtagtaccag ctgctatgga agcgtcggtg cttttgatat ctggggccaa 360

gggaccacgg tcaccgtctc ctca 384

<210> 1494
<211> 128
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-22

<400> 1494

Gln Val Gln Leu Val Gln 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 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 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 Val Leu Leu Pro Cys Ser Ser Thr Ser Cys Tyr Gly Ser Val
100 105 110

Gly Ala Phe Asp Ile Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
115 120 125

<210> 1495
<211> 324
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable light chain Ab-22

<400> 1495
taggacgatg agctcggtcc cagctccgaa gacataatga tcactattat tatcccacac 60

ctgacagtaa taatcggcct catcaccggc ttcgaccctg ctgatggtca gggtggccgt 120

gttcccagag ttggagccag agaatcgctc agagatccct gagggccggt ccctatcaga 180

gtagatgacc aacgcagggg cctggcctgg cttctgctgg taccagtgca cactcttcct 240

tccaatgtcg cttcccccac aggtaatcct ggccgtcttt cctggggcca ctgacactga 300

gggtgcctga gtcagcacag gcag 324

<210> 1496
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-22

<400> 1496

Leu Pro Val Leu Thr Gln Ala Pro Ser Val Ser Val Ala Pro Gly Lys
1 5 10 15

Thr Ala Arg Ile Thr Cys Gly Gly Ser Asp Ile Gly Arg Lys Ser Val
20 25 30

His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Ala Leu Val Ile Tyr
35 40 45

Ser Asp Arg 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 Asn Asn Ser Asp His
85 90 95

Tyr Val Phe Gly Ala Gly Thr Glu Leu Ile Val Leu
100 105

<210> 1497
<211> 351
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-30

<400> 1497
caggtgcagc tggtgcagtc tgggggaagt gtggtacggc ctggggaatc cctcagactc 60

tcctgtgtag cctctggatt catctttgat aattatgaca tgagttgggt ccgccaagtt 120

ccagggaagg ggctggagtg ggtctctcgt gttaattgga atggtggtag cacaacttat 180

gcagacgctg tgaagggccg attcaccatc tccagagaca acaccaagaa ctccctgtat 240

ctacaaatga acaacctgag agccgaagac acggccgtgt attactgtgt gcgcgagttt 300

gtcggtgctt atgatctctg gggccagggg accacggtca ccgtctcctc a 351

<210> 1498
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-30

<400> 1498

Gln Val Gln Leu Val Gln Ser Gly Gly Ser Val Val Arg Pro Gly Glu
1 5 10 15

Ser Leu Arg Leu Ser Cys Val Ala Ser Gly Phe Ile Phe Asp Asn Tyr
20 25 30

Asp Met Ser Trp Val Arg Gln Val Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ser Arg Val Asn Trp Asn Gly Gly Ser Thr Thr Tyr Ala Asp Ala 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 Asn Asn Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Val Arg Glu Phe Val Gly Ala Tyr Asp Leu Trp Gly Gln Gly Thr Thr
100 105 110

Val Thr Val Ser Ser
115

<210> 1499
<211> 327
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-30

<400> 1499
cagtctgccc tgactcagcc tgcctccgtg tctgggtctc ctggacagtc gatcaccatc 60

tcctgcactg gaaccagcag tgacgttggt ggttataact atgtctcctg gtaccaacaa 120

cacccaggca aagcccccaa actcatgatt tatgatgtca gtaatcggcc ctcaggggtt 180

tctaatcgct tctctggctc caagtctggc aacacggcct ccctgaccat ctctgggctc 240

caggctgagg acgaggctga ttattactgc agctcatata caagcagcac tctgccgttc 300

ggcggaggga ccaagctgac cgtccta 327

<210> 1500
<211> 109
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-30

<400> 1500

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

Thr Leu Pro Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105

<210> 1501
<211> 363
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-31

<400> 1501
caggtgcagc tggtgcagtc tggggctgag gtgaagaagc caggggccac agtgaaggtc 60

tcctgcaagg tttttggaga caccttccgc ggcctctata tacactgggt gcgacaggcc 120

cctggacaag ggcttgagtg gatgggaggg atcatcccta tctttggtac agcaaactac 180

gcacagaagt tccagggcag agtcacgatt accacggacg aatccacgag cacagcctac 240

atggagctga gcagcctgag atctgaggac acggccgtgt attactgtgc gagcggacta 300

cgttggggga tctggggctg gttcgacccc tggggccagg gcaccctggt caccgtctcc 360

tca 363

<210> 1502
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-31

<400> 1502

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15

Thr Val Lys Val Ser Cys Lys Val Phe Gly Asp Thr Phe Arg Gly Leu
20 25 30

Tyr Ile His 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 Thr 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 Ser Gly Leu Arg Trp Gly Ile Trp Gly Trp Phe Asp Pro Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 1503
<211> 321
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-31

<400> 1503
gaaattgtgt tgacgcagtc tccagccacc ctgtctttgt ctccagggga aagagccacc 60

ctctcctgca gggccagtca gagtattggc aacagcttag cctggtacca gcagaaacct 120

ggccaggctc ccaggctcct catgtatggt gcatccagca gggccactgg catcccagac 180

aggttcagtg gcagtggggc tgggacagac ttcactctca ccatcagcag cctagagcct 240

gaagattttg caacgtatta ctgtcagcag catactatcc caacattctc tttcggccct 300

gggaccaaag tggaagtcaa a 321

<210> 1504
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-31

<400> 1504

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 Gly Asn Ser
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 Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly
50 55 60

Ser Gly Ala Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln His Thr Ile Pro Thr Phe
85 90 95

Ser Phe Gly Pro Gly Thr Lys Val Glu Val Lys
100 105

<210> 1505
<211> 363
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-32

<400> 1505
gaggtgcagc tggtgcagtc tggggctgag ctgaagaagc ctgggtcctc ggtgaaggtc 60

tcctgcaagg cttttggagg caccttcagt gacaatgcta tcagctgggt gcgacaggcc 120

cctggacaag ggcctgagtg gatgggggggc atcattccta tctttggaaa accaaactac 180

gcacagaagt tccagggcag agtcacgatt accgcggacg aatccacgag cactgcctac 240

atggtcctga gcagcctgag atctgaggac acggccgtat attactgtgc gagaactatg 300

gttcggggct ttcttggggt tatggacgtc tggggccaag ggaccacggt caccgtctcc 360

tca 363

<210> 1506
<211> 121

<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-32

<400> 1506

Glu Val Gln Leu Val Gln Ser Gly Ala Glu Leu Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Phe Gly Gly Thr Phe Ser Asp Asn
20 25 30

Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Pro Glu Trp Met
35 40 45

Gly Gly Ile Ile Pro Ile Phe Gly Lys Pro 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 Val Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Thr Met Val Arg Gly Phe Leu Gly Val Met Asp Val Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 1507
<211> 321
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-32

<400> 1507
gatattgtga tgacccagac tccatccttc ctgtccgcat ccataggaga cagagtcacc 60

atcacttgcc gggccagtca gggcattggc agttatttag cctggtatca gcaaagacca 120

ggggaagccc ctaagctcct gatctatgct gcatcgactt tgcaaagtgg agtcccatca 180

aggttcagcg gcagtggatc tgggacggac ttcactctca caatcagcaa cctgcagcct 240

gaagattttg caacttatta ctgtcaacag cttaataatt acccgatcac cttcggccaa 300

gggacacgac tggagattaa a 321

<210> 1508
<211> 107
<212> PRT
<213> Artificial Sequence

<220>

<223> Variable light chain of Ab-32

<400> 1508

Asp Ile Val Met Thr Gln Thr Pro Ser Phe Leu Ser Ala Ser Ile Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Gly Ile Gly Ser Tyr
20 25 30

Leu Ala Trp Tyr Gln Gln Arg Pro Gly Glu 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 Ser Asn Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Leu Asn Asn Tyr Pro Ile
85 90 95

Thr Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys
100 105

<210> 1509
<211> 375
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-38

<400> 1509
caggtgcagc tggtgcagtc tgggggaggc ttggtacagc ctgggggtc cctgagactc 60

tcctgtgcag cctctggatt cacctttagc agctatgcca tgagctgggt ccgccaggct 120

ccagggaagg ggctggagtg ggtctcagct attagtggta gtggtggtag cacatactac 180

gcagactccg tgaagggccg gttcaccatc tccagagaca attccaagaa cacgctgtat 240

ctgcaaatga acagcctgag agccgaggac acggccgtat attactgtgc gaaagatcag 300

ttcgttacga tttttggagt gccaagatac ggtatggacg tctggggcca agggaccacg 360

gtcaccgtct cctca 375

<210> 1510
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-38

<400> 1510

Gln Val Gln Leu Val 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 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 Lys Asp Gln Phe Val Thr Ile Phe Gly Val Pro Arg Tyr Gly Met
100 105 110

Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
115 120 125

<210> 1511
<211> 315
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-38

<400> 1511
cagtctgccc tgactcagcc accctcagtg tccgtgtccc caggacagac agccaacatc 60

ccctgctctg gagataaatt ggggaataaa tatgcttact ggtatcagca gaagccaggc 120

cagtcccctg tactgctcat ctatcaagat atcaagcggc cctcaaggat ccctgagcga 180

ttctctggct ccaactctgc ggacacagcc actctgacca tcagcgggac ccaggctatg 240

gatgaggctg actattactg tcagacgtgg gacaacagcg tggtcttcgg cggcgggacc 300

aagctgaccg tcctc 315

<210> 1512
<211> 105
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-38

<400> 1512

Gln Ser Ala Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1 5 10 15

Thr Ala Asn Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Tyr Ala
20 25 30

```
Tyr Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Leu Ile Tyr
        35                  40                  45

Gln Asp Ile Lys Arg Pro Ser Arg Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60

Asn Ser Ala Asp 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 Asn Ser Val Val Phe
                85                  90                  95

Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105
```

<210> 1513
<211> 360
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-42

<400> 1513

```
caggtgcagc tggtgcagtc tggggctgag gtgaagaagc ctgggtcctc ggtgaaggtc       60

tcctgcaagg cttctggagg caccttcagc agctatgcta tcagctgggt gcgacaggcc      120

cctggacaag ggcttgagtg gatgggaggg atcatcccta tctttggtac agcaaactac      180

gcacagaagt tccagggcag agtcacgatt accgcggaca aatccacgag cacagcctac      240

atggagctga gcagcctgag atctgaggac acggccgtct attactgtgc gagagggcgt      300

caaatgttcg gtgcgggaat tgatttctgg ggcccgggca ccctggtcac cgtctcctca      360
```

<210> 1514
<211> 120
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-42

<400> 1514

```
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 Lys 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 Arg Gln Met Phe Gly Ala Gly Ile Asp Phe Trp Gly Pro
            100                 105                 110

Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 1515
<211> 336
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-42

<400> 1515

```
aattttatgc tgactcagcc ccactctgtg tcggagtctc cggggaagac ggtaaccatc        60

tcctgcaccc gcagcagtgg cagcattgac agcaactatg tgcagtggta ccagcagcgc       120

ccgggcagcg cccccaccac tgtgatctat gaggataacc aaagaccctc tggggtccct       180

gatcggttct ctggctccat cgacagctcc tccaactctg cctccctcac catctctgga       240

ctgaagactg aggacgaggc tgactactac tgtcagtctt atgatagcaa caatcgtcat       300

gtgatattcg gcggagggac caagctgacc gtccta                                 336
```

<210> 1516
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-42

<400> 1516

```
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 Asp Ser Asn
            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 Asn Gln 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 Ser
85 90 95

Asn Asn Arg His Val Ile Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 1517
<211> 354
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-46

<400> 1517
gaggtgcagc tggtggagtc tggggctgaa gtaaagaagc ctgggtcctc ggtgaaagtc 60

tcctgcaagg tttcaggagg cacattcggc acctatgctc tcaactgggt gcgccaggcc 120

cctggacaag ggcttgagtg gatgggaagg atcgtccctc tcattggtct agtaaactac 180

gcacataact ttgagggcag aatctcgatt accgcggaca agtccacggg cacagcctac 240

atggaactga gcaacctgag atctgacgac acggccgtgt attactgtgc gagagaggtc 300

tacggtggta actccgacta ctggggccag ggaaccctgg tcaccgtctc ctca 354

<210> 1518
<211> 118
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-46

<400> 1518

Glu Val Gln Leu Val Glu 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 Thr Phe Gly Thr Tyr
20 25 30

Ala Leu Asn Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Arg Ile Val Pro Leu Ile Gly Leu Val Asn Tyr Ala His Asn Phe
50 55 60

Glu Gly Arg Ile Ser Ile Thr Ala Asp Lys Ser Thr Gly Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Asn Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Val Tyr Gly Gly Asn Ser Asp Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser
        115

<210> 1519
<211> 330
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-46

<400> 1519
aattttatgc tgactcagcc ccactcagtg tcggagtctc cggggaagac ggtaaccatc 60

tcctgcactc gcagtagtgg caacattggc accaactatg tgcagtggta ccagcagcgc 120

ccgggcagtg cccccgtcgc tttgatctac gaggattatc gaagaccctc tggggtccct 180

gatcggttct ctggctccat cgacagctcc tccaactctg cctccctcat catctctgga 240

ctgaagcctg aggacgaggc tgactactac tgtcagtctt atcatagcag cggttgggaa 300

ttcggcggag ggaccaagct gaccgtcctc   330

<210> 1520
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-46

<400> 1520

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 Asn Ile Gly Thr Asn
            20   25   30

Tyr Val Gln Trp Tyr Gln Gln Arg Pro Gly Ser Ala Pro Val Ala Leu
        35   40   45

Ile Tyr Glu Asp Tyr Arg 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 Ile Ile Ser Gly
65   70   75   80

Leu Lys Pro Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr His Ser
                85   90   95

Ser Gly Trp Glu Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100   105   110

<210> 1521
<211> 360

<212> DNA
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-50

<400> 1521
caggtgcagc tggtgcagtc tggaggtgag gtgaagaagc cgggggcctc agtgaaggtc 60

tcctgcaagg cttctggtta caccttgagc agtcatggta taacctgggt gcgacaggcc 120

cctggacaag ggcttgagtg gatgggatgg atcagcgctc acaatggtca cgctagcaat 180

gcacagaagg tggaggacag agtcactatg actactgaca catccacgaa cacagcctac 240

atggaactga ggagcctgac agctgacgac acggccgtgt attactgtgc gagagtacat 300

gctgccctct actatggtat ggacgtctgg ggccaaggaa ccctggtcac cgtctcctca 360

<210> 1522
<211> 120
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-50

<400> 1522

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 Thr Leu Ser Ser His
20 25 30

Gly Ile Thr Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Trp Ile Ser Ala His Asn Gly His Ala Ser Asn Ala Gln Lys Val
50 55 60

Glu Asp Arg Val Thr Met Thr Thr Asp Thr Ser Thr Asn Thr Ala Tyr
65 70 75 80

Met Glu Leu Arg Ser Leu Thr Ala Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Val His Ala Ala Leu Tyr Tyr Gly Met Asp Val Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 1523
<211> 324
<212> DNA
<213> Artificial Sequence

<220>

<223> Variable light chain of Ab-50

<400> 1523
cagtctgtgc tgactcagcc accctcggtg tcagtggccc caggacagac ggccaggatt 60

acctgtgggg gaaacaacat tggaagtaaa ggtgtgcact ggtatcagca gaagccaggc 120

caggcccctg tactggtcgt ctatgatgat agtgaccggc cctcagggat ccctgagcga 180

ttctctggct ccaactctgg gaacacggcc accctgacca tcagcagggt cgaagccggg 240

gatgaggccg actattactg tcaggtgtgg gatagtagta gtgatcattg ggtgttcggc 300

ggagggacca agctgaccgt ccta 324

<210> 1524
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-50

<400> 1524

Gln Ser 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 Gly 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 Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105

<210> 1525
<211> 363
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-52

<400> 1525
caggtgcagc tgcaggagtc gggggggaggc gtggtgcagc ctgggaggtc cctgagactc 60

tcctgttcag cctctggatt caccttcagc agacatggca tgcactgggt ccgccaggct 120

ccaggcaagg ggctggagtg ggtggcagtg atatcacatg atggaagtgt aaaatactat 180

gcagactcca tgaagggccg attcagcatc tccagagaca attccaacaa cacactgtat 240

ctccaaatgg acagcctgag agctgacgac acggccgttt attactgtgc gagaggactg 300

tcgtaccagg tgtcggggtg gttcgacccc tggggccagg gcaccctggt caccgtctcc 360

tca 363

<210> 1526
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-52

<400> 1526

Gln Val Gln Leu Gln Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1 5 10 15

Ser Leu Arg Leu Ser Cys Ser Ala Ser Gly Phe Thr Phe Ser Arg 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 His Asp Gly Ser Val Lys Tyr Tyr Ala Asp Ser Met
50 55 60

Lys Gly Arg Phe Ser Ile Ser Arg Asp Asn Ser Asn Asn Thr Leu Tyr
65 70 75 80

Leu Gln Met Asp Ser Leu Arg Ala Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Gly Leu Ser Tyr Gln Val Ser Gly Trp Phe Asp Pro Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 1527
<211> 333
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-52

<400> 1527
aattttatgc tgactcagcc ccactctgtg tcggagtctc cggggaagac ggtaaccatc 60

tcctgcaccc gcagcagtgg cagcattgcc agcaactatg tgcagtggta ccagcagcgc 120

ccgggcagtg cccccaccac tgtgatctat gaggataacc aaagaccctc tggggtccct 180

gatcggttct ctggctccat cgacagctcc tccaactctg cctccctcac catctctgga 240

ctgaagactg aggacgaggc tgactactac tgtcagtctt atgatagcac cacccttcg 300

gtgttcggcg gcgggaccaa gctgaccgtc cta 333

<210> 1528
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-52

<400> 1528

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 Ser Asn
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 Asn Gln 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 Ser
85 90 95

Thr Thr Pro Ser Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 1529
<211> 360
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-55

<400> 1529
caggtgcagc tggtgcagtc tggagctgag gtgaagaagc ctggggcctc agtgaaggtc 60

tcctgcaagg cttctggtta cacctttacc agctatggta tcagctgggt gcgacaggcc 120

cctggacaag ggcttgagtg gatgggatgg accagccctc ataatggtct cacagcattt 180

gcacagatcc tagagggccg agtcaccatg accacagaca catccacgaa cacagcctac 240

atggaattga ggaacctgac atttgatgac acggccgttt atttctgtgc gaaagtacat 300

cctgtcttct cttatgcgtt ggacgtctgg ggccaaggca ccctggtcac cgtctcctca 360

<210> 1530
<211> 120

<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-55

<400> 1530

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 Thr Ser Pro His Asn Gly Leu Thr Ala Phe Ala Gln Ile Leu
50 55 60

Glu Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Asn Thr Ala Tyr
65 70 75 80

Met Glu Leu Arg Asn Leu Thr Phe Asp Asp Thr Ala Val Tyr Phe Cys
85 90 95

Ala Lys Val His Pro Val Phe Ser Tyr Ala Leu Asp Val Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 1531
<211> 330
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-55

<400> 1531
aattttatgc tgactcagcc ccactctgtg tcggagtccc cggggaagac ggtaaccatc 60

tcctgcaccc gcagcagtgg cagcattgcc agcaactatg tacagtggta ccagcagcgc 120

ccgggcagtt cccccaccac tgtgatctat gaagataacc aaagaccctc tggggtccct 180

gatcggttct ctggctccat cgacacctcc tccaactctg cctccctcac catctctgga 240

ctgaagacta aggacgaggc ggactactac tgtcagtctt atgatggcat cactgtgatt 300

ttcggcggag ggaccaagtt gaccgtccta 330

<210> 1532
<211> 110
<212> PRT
<213> Artificial Sequence

<220>

<223> Variable light chain of Ab-55

<400> 1532

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 Ser Asn
20 25 30

Tyr Val Gln Trp Tyr Gln Gln Arg Pro Gly Ser Ser Pro Thr Thr Val
35 40 45

Ile Tyr Glu Asp Asn Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
50 55 60

Gly Ser Ile Asp Thr Ser Ser Asn Ser Ala Ser Leu Thr Ile Ser Gly
65 70 75 80

Leu Lys Thr Lys Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Gly
85 90 95

Ile Thr Val Ile Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 1533
<211> 354
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-56

<400> 1533
gaggtgcagc tggtggagtc tggagctgag gtgatgaacc ctgggtcctc ggtgagggtc 60

tcctgcaggg gttctggagg cgacttcagt acctatgctt tcagctgggt gcgacaggcc 120

cctggacaag ggcttgagtg gatgggaagg atcatcccta tccttggtat agcaaactac 180

gcacagaagt tccagggcag ggtcacgatt accgcggaca aatccacgag cacagcctac 240

atggagctga gcagcctgag atctgacgat acggccgtgt attactgtgc gagagatggc 300

tatggttcgg acccggtgct atggggccag ggcaccctgg tcaccgtctc ctca 354

<210> 1534
<211> 118
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-56

<400> 1534

Glu Val Gln Leu Val Glu Ser Gly Ala Glu Val Met Asn Pro Gly Ser
1 5 10 15

Ser Val Arg Val Ser Cys Arg Gly Ser Gly Gly Asp Phe Ser Thr Tyr
20 25 30

Ala Phe Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Arg Ile Ile Pro Ile Leu Gly Ile Ala Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser Thr Ala 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 Asp Gly Tyr Gly Ser Asp Pro Val Leu Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 1535
<211> 333
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-56

<400> 1535
aattttatgc tgactcagcc ccactctgtg tcggggtctc cggggaagac ggtaaccctc 60

ccctgcaccc gcagcagtgg cagcattgcc agccactatg tccagtggta ccagcagcgc 120

ccgggcagtg cccccaccac tgtgatctat gaggataaca agagaccctc tggggtccct 180

gatcggttct ctggctccat cgacagctcc tccaactctg cctccctcag catctctgga 240

ctgaagactg aggacgaggc tgactactac tgtcagtctt atgatagcag caatcgttgg 300

gtgttcggcg gagggaccaa gctgaccgtc cta 333

<210> 1536
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-56

<400> 1536

Asn Phe Met Leu Thr Gln Pro His Ser Val Ser Gly Ser Pro Gly Lys
1 5 10 15

Thr Val Thr Leu Pro Cys Thr Arg Ser Ser Gly Ser Ile Ala Ser His
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 Asn 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 Ser 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

Ser Asn Arg Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105                 110
```

<210> 1537
<211> 354
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-65

<400> 1537

```
gaggtgcagc tggtgcagtc tggagctgag gtgaagaagc ctggggcctc agtgaaggtc       60

tcctgcaagg cttctggtta cacctttacc aactatggta tcagctgggt gcgacaggcc      120

cctggacaag ggcttgagtg gatgggatgg atcagcgctt acaatggtaa cacaaactat      180

gcacagaagg tccagggcag agtcaccatg accacagaca catccacgag cacaggctac      240

atggagctga ggagcctgag atctgacgac acggccgtgt attactgtgc gagaggagat      300

tttcggaaac cctttgacta ctggggccag ggaaccctgg tcaccgtctc ctca            354
```

<210> 1538
<211> 118
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable heavy chain of Ab-65

<400> 1538

```
Glu 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 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 Val
    50                  55                  60
```

Gln Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Ser Thr Gly 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 Gly Asp Phe Arg Lys Pro Phe Asp Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 1539
<211> 345
<212> DNA
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-65

<400> 1539
ctgcctgtgc tgactcagcc ggcttccctc tctgcatccc ccggagcatc agccagtctc 60

acctgcacct tacgcagtgg cctcaatgtt ggttcctaca ggatatactg gtaccagcag 120

aagccaggga gtcgtcccca gtatctcctg aactacaaat cagactcaaa taaacagcag 180

gcctctggag tccccagccg cttctctgga tccaaggatg cttcggccaa tgcagggatt 240

ttactcatct ccgggctcca gtctgaggat gaggctgact attactgtat gatttggtac 300

agcagcgctg tggtattcgg cggagggacc aagctgaccg tccta 345

<210> 1540
<211> 115
<212> PRT
<213> Artificial Sequence

<220>
<223> Variable light chain of Ab-65

<400> 1540

Leu Pro Val Leu Thr Gln Pro Ala Ser Leu Ser Ala Ser Pro Gly Ala
1 5 10 15

Ser Ala Ser Leu Thr Cys Thr Leu Arg Ser Gly Leu Asn Val Gly Ser
20 25 30

Tyr Arg Ile Tyr Trp Tyr Gln Gln Lys Pro Gly Ser Arg Pro Gln Tyr
35 40 45

Leu Leu Asn Tyr Lys Ser Asp Ser Asn Lys Gln Gln Ala Ser Gly Val
50 55 60

Pro Ser Arg Phe Ser Gly Ser Lys Asp Ala Ser Ala Asn Ala 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 Tyr Ser Ser Ala Val Val Phe Gly Gly Gly Thr Lys Leu
100 105 110

Thr Val Leu
115

<210> 1541
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR1 consensus, Ab-42

<400> 1541

Ser Tyr Ala Ile Ser
1 5

<210> 1542
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR1 of Ab-14, Ab-55

<400> 1542

Ser Tyr Gly Ile Ser
1 5

<210> 1543
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR1 of Ab-16

<400> 1543

Ser Tyr Ala Leu Ser
1 5

<210> 1544
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR1 of Ab-22

<400> 1544

Asp Tyr Ala Met His
1 5

<210> 1545
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR1 of Ab-30

<400> 1545

Asn Tyr Asp Met Ser
1 5

<210> 1546
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR1 of Ab-31

<400> 1546

Gly Leu Tyr Ile His
1 5

<210> 1547
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR1 of Ab-32

<400> 1547

Asp Asn Ala Ile Ser
1 5

<210> 1548
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR1 of Ab-38

<400> 1548

Ser Tyr Ala Met Ser
1 5

<210> 1549
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR1 of Ab-46

<400> 1549

Thr Tyr Ala Leu Asn
1 5

<210> 1550
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR1 of Ab-50

<400> 1550

Ser His Gly Ile Thr
1 5

<210> 1551
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR1 Ab-52

<400> 1551

Arg His Gly Met His
1 5

<210> 1552
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR1 of Ab-56

<400> 1552

Thr Tyr Ala Phe Ser
1 5

<210> 1553
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR1 of Ab-65

<400> 1553

Asn Tyr Gly Ile Ser
1 5

<210> 1554
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR2 consensus

<400> 1554

Trp Ile Ser Pro Ile Gly Gly Ser Thr Asn Tyr Ala Gln Lys Val Gln
1 5 10 15

Gly

<210> 1555
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR2 of Ab-14

<400> 1555

Trp Ile Ser Ala Tyr Asn Gly Asn Thr Asn Tyr Ala Gln Lys Leu Glu
1 5 10 15

Asp

<210> 1556
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR2 of Ab-16

<400> 1556

Ala Ile Ser Gly Gly Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val Lys
1 5 10 15

Asp

<210> 1557
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR2 of Ab-22

<400> 1557

Leu Ile Ser Gly Asp Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val Lys
1 5 10 15

Asp

<210> 1558
<211> 17
<212> PRT
<213> Artificial Sequence

<220>

<223> Heavy chain CDR2 of Ab-30

<400> 1558

Arg Val Asn Trp Asn Gly Gly Ser Thr Thr Tyr Ala Asp Ala Val Lys
1   5   10   15

Asp

<210> 1559
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR2 of Ab-31

<400> 1559

Trp Ile Ile Pro Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe Glu
1   5   10   15

Asp

<210> 1560
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR2 of Ab-32

<400> 1560

Trp Ile Ile Pro Ile Phe Gly Lys Pro Asn Tyr Ala Gln Lys Phe Glu
1   5   10   15

Asp

<210> 1561
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR2 of Ab-38

<400> 1561

Ala Ile Ser Gly Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val Lys
1   5   10   15

Asp

<210> 1562
<211> 17

<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR2 of Ab-42

<400> 1562

Trp Ile Ile Pro Ile Phe Gly Thr Ala Asn Tyr Ala Gln Lys Phe Glu
1 5 10 15

Asp

<210> 1563
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR2 of Ab-46

<400> 1563

Arg Ile Val Pro Leu Ile Gly Leu Val Asn Tyr Ala His Asn Phe Glu
1 5 10 15

Asp

<210> 1564
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR2 of Ab-50

<400> 1564

Trp Ile Ser Ala His Asn Gly His Ala Ser Asn Ala Gln Lys Val Glu
1 5 10 15

Asp

<210> 1565
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR2 of Ab-52

<400> 1565

Val Ile Ser His Asp Gly Ser Val Lys Tyr Tyr Ala Asp Ser Met Lys
1 5 10 15

Asp

<210> 1566
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR2 of Ab-55

<400> 1566

Trp Thr Ser Pro His Asn Gly Leu Thr Ala Phe Ala Gln Ile Leu Glu
1 5 10 15

Asp

<210> 1567
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR2 of Ab-56

<400> 1567

Arg Ile Ile Pro Ile Leu Gly Ile Ala Asn Tyr Ala Gln Lys Phe Glu
1 5 10 15

Asp

<210> 1568
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR2 of Ab-65

<400> 1568

Trp Ile Ser Ala Tyr Asn Gly Asn Thr Asn Tyr Ala Gln Lys Val Glu
1 5 10 15

Asp

<210> 1569
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR3 consensus

<220>
<221> misc_feature
<222> (3)..(17)

<223> Xaa can be any naturally occurring amino acid

<400> 1569

Gly Leu Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1   5   10   15

Xaa Asp Val

<210> 1570
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR3 of Ab-14

<400> 1570

Ala Leu Pro Ser Gly Thr Ile Leu Val Gly Gly Trp Phe Asp Pro
1   5   10   15

<210> 1571
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR3 of Ab-16

<400> 1571

Asp Val Phe Pro Glu Thr Phe Ser Met Asn Tyr Gly Met Asp Val
1   5   10   15

<210> 1572
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR3 of Ab-22

<400> 1572

Val Leu Leu Pro Cys Ser Ser Thr Ser Cys Tyr Gly Ser Val Gly Ala
1   5   10   15

Phe Asp Ile

<210> 1573
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR3 of Ab-30

<400> 1573

Glu Phe Val Gly Ala Tyr Asp Leu
1 5

<210> 1574
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR3 of Ab-31

<400> 1574

Gly Leu Arg Trp Gly Ile Trp Gly Trp Phe Asp Pro
1 5 10

<210> 1575
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR3 of Ab-32

<400> 1575

Thr Met Val Arg Gly Phe Leu Gly Val Met Asp Val
1 5 10

<210> 1576
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR3 of Ab-38

<400> 1576

Asp Gln Phe Val Thr Ile Phe Gly Val Pro Arg Tyr Gly Met Asp Val
1 5 10 15

<210> 1577
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR3 of Ab-42

<400> 1577

Gly Arg Gln Met Phe Gly Ala Gly Ile Asp Phe
1 5 10

<210> 1578
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR3 of Ab-46

<400> 1578

Glu Val Tyr Gly Gly Asn Ser Asp Tyr
1 5

<210> 1579
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR3 of Ab-50

<400> 1579

Val His Ala Ala Leu Tyr Tyr Gly Met Asp Val
1 5 10

<210> 1580
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR3 of Ab-52

<400> 1580

Gly Leu Ser Tyr Gln Val Ser Gly Trp Phe Asp Pro
1 5 10

<210> 1581
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR3 of Ab-55

<400> 1581

Val His Pro Val Phe Ser Tyr Ala Leu Asp Val
1 5 10

<210> 1582
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Heavy chain CDR3 of Ab-56

<400> 1582

Asp Gly Tyr Gly Ser Asp Pro Val Leu
1 5

<210> 1583
<211> 9
<212> PRT
<213> Artificial Sequence

<220>

<223> Heavy chain CDR3 of Ab-65

<400> 1583

Gly Asp Phe Arg Lys Pro Phe Asp Tyr
1 5

<210> 1584
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR1 consensus

<400> 1584

Thr Arg Ser Ser Gly Ser Ile Gly Ser Asn Tyr Val Gln
1 5 10

<210> 1585
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR1 of Ab-14

<400> 1585

Thr Arg Ser Ser Gly Asn Ile Ala Ser Asn Tyr Val Gln
1 5 10

<210> 1586
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR1 of Ab-16

<400> 1586

Gln Gly Asp Ser Leu Arg Ser Tyr Tyr Ala Ser
1 5 10

<210> 1587
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR1 of Ab-22

<400> 1587

Gly Gly Ser Asp Ile Gly Arg Lys Ser Val His
1 5 10

<210> 1588
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR1 of Ab-30

<400> 1588

Thr Gly Thr Ser Ser Asp Val Gly Gly Tyr Asn Tyr Val Ser
1 5 10

<210> 1589
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR1 of Ab-31

<400> 1589

Arg Ala Ser Gln Ser Ile Gly Asn Ser Leu Ala
1 5 10

<210> 1590
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR1 of Ab-32

<400> 1590

Arg Ala Ser Gln Gly Ile Gly Ser Tyr Leu Ala
1 5 10

<210> 1591
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR1 of Ab-38

<400> 1591

Ser Gly Asp Lys Leu Gly Asn Lys Tyr Ala Tyr
1 5 10

<210> 1592
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR1 of Ab-42

<400> 1592

Thr Arg Ser Ser Gly Ser Ile Asp Ser Asn Tyr Val Gln
1 5 10

<210> 1593
<211> 13

<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR1 of Ab-46

<400> 1593

Thr Arg Ser Ser Gly Asn Ile Gly Thr Asn Tyr Val Gln
1 5 10

<210> 1594
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR1 of Ab-50

<400> 1594

Gly Gly Asn Asn Ile Gly Ser Lys Gly Val His
1 5 10

<210> 1595
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR1 of Ab-52

<400> 1595

Thr Arg Ser Ser Gly Ser Ile Ala Ser Asn Tyr Val Gln
1 5 10

<210> 1596
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR1 of Ab-55

<400> 1596

Thr Arg Ser Ser Gly Ser Ile Ala Ser Asn Tyr Val Gln
1 5 10

<210> 1597
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR1 of Ab-56

<400> 1597

Thr Arg Ser Ser Gly Ser Ile Ala Ser His Tyr Val Gln
1 5 10

<210> 1598
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR1 of Ab-65

<400> 1598

Thr Leu Arg Ser Gly Leu Asn Val Gly Ser Tyr Arg Ile Tyr
1 5 10

<210> 1599
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR2 of consensus, Ab-14, Ab-42, Ab-52, Ab-55

<400> 1599

Glu Asp Asn Gln Arg Pro Ser
1 5

<210> 1600
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR2 of Ab-16

<400> 1600

Gly Lys Asn Asn Arg Pro Ser
1 5

<210> 1601
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR2 of Ab-22

<400> 1601

Ser Asp Arg Asp Arg Pro Ser
1 5

<210> 1602
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR2 of Ab-30

<400> 1602

Asp Val Ser Asn Arg Pro Ser
1 5

<210> 1603
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR2 of Ab-31

<400> 1603

Gly Ala Ser Ser Arg Ala Thr
1 5

<210> 1604
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR2 of Ab-32

<400> 1604

Ala Ala Ser Thr Leu Gln Ser
1 5

<210> 1605
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR2 of Ab-38

<400> 1605

Gln Asp Ile Lys Arg Pro Ser
1 5

<210> 1606
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR2 of Ab-46

<400> 1606

Glu Asp Tyr Arg Arg Pro Ser
1 5

<210> 1607
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR2 of Ab-50

<400> 1607

Asp Asp Ser Asp Arg Pro Ser
1 5

<210> 1608
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR2 of Ab-56

<400> 1608

Glu Asp Asn Lys Arg Pro Ser
1 5

<210> 1609
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR2 of Ab-65

<400> 1609

Tyr Lys Ser Asp Ser Asn Lys Gln Gln Ala Ser
1 5 10

<210> 1610
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR3 consensus

<400> 1610

Gln Ser Tyr Asp Ser Ser Thr Trp Val
1 5

<210> 1611
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR3 of Ab-14

<400> 1611

Gln Ser Tyr Asp Ser Ser Asn Leu Trp Val
1 5 10

<210> 1612
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR3 of Ab-16

<400> 1612

Asn Ser Arg Asp Ser Ser Gly Asn His Tyr Val
1 5 10

<210> 1613
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR3 of Ab-22

<400> 1613

Gln Val Trp Asp Asn Asn Ser Asp His Tyr Val
1 5 10

<210> 1614
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR3 of Ab-30

<400> 1614

Ser Ser Tyr Thr Ser Ser Thr Leu Pro
1 5

<210> 1615
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR3 of Ab-31

<400> 1615

Gln Gln His Thr Ile Pro Thr Phe Ser
1 5

<210> 1616
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR3 of Ab-32

<400> 1616

Gln Gln Leu Asn Asn Tyr Pro Ile Thr
1 5

<210> 1617
<211> 8
<212> PRT
<213> Artificial Sequence

<220>

<223> Light chain CDR3 of Ab-38

<400> 1617

Gln Thr Trp Asp Asn Ser Val Val
1 5

<210> 1618
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR3 of Ab-42

<400> 1618

Gln Ser Tyr Asp Ser Asn Asn Arg His Val Ile
1 5 10

<210> 1619
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR3 of Ab-46

<400> 1619

Gln Ser Tyr His Ser Ser Gly Trp Glu
1 5

<210> 1620
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR3 of Ab-50

<400> 1620

Gln Val Trp Asp Ser Ser Ser Asp His Trp Val
1 5 10

<210> 1621
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR3 of Ab-52

<400> 1621

Gln Ser Tyr Asp Ser Thr Thr Pro Ser Val
1 5 10

<210> 1622
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR3 of Ab-55

<400> 1622

Gln Ser Tyr Asp Gly Ile Thr Val Ile
1 5

<210> 1623
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR3 of Ab-56

<400> 1623

Gln Ser Tyr Asp Ser Ser Asn Arg Trp Val
1 5 10

<210> 1624
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Light chain CDR3 of Ab-65

<400> 1624

Met Ile Trp Tyr Ser Ser Ala Val Val
1 5

<210> 1625
<211> 717
<212> DNA
<213> Homo sapiens

<400> 1625
gaggtgcagc tggtgcagtc tgggggaggc gtggtccagc ctgggaagtc cctgagactc 60

tcctgtgcag cctctggatt cgccttcagt agttatgcta tgcactgggt ccgccaggct 120

ccaggcaagg ggctggagtg ggtggcagtt atatcatatg atggaagtaa taaatactac 180

gcagactccg tgaagggccg attcaccatc tccagagaca attccaagaa cacgctgtat 240

ctgcaaatga acagcctgag agctgaggac acggctgtgt attactgtgc gagggacagg 300

agctactacc ttgactactg gggccaggga accctggtca ccgtctcctc aggtggcggc 360

ggttccggag gtggtggttc tggcggtggt ggcagcgaaa cgacactcac gcagtctcca 420

gccaccctgt ctttgtctcc aggggaaagg gccaccctct cctgcagggc cagtcagagt 480

gttaggagca acttagcctg gtaccagcag aaacctggcc aggctcccag gcccctcatc 540

tatgatgcat ccaccagggc cactggcatc ccagacaggt tcagtggcag tgggtctggg 600

acagacttca ctctcaccat cagcagactg gagcctgaag attttgcagt ttattactgt 660

cagcagcgta gcaactggcc tccgacgttc ggccaaggga ccaaggtgga agtcaaa 717

<210> 1626
<211> 351
<212> DNA
<213> Homo sapiens

<400> 1626
gaggtgcagc tggtgcagtc tgggggaggc gtggtccagc ctgggaagtc cctgagactc 60

tcctgtgcag cctctggatt cgccttcagt agttatgcta tgcactgggt ccgccaggct 120

ccaggcaagg ggctggagtg ggtggcagtt atatcatatg atggaagtaa taaatactac 180

gcagactccg tgaagggccg attcaccatc tccagagaca attccaagaa cacgctgtat 240

ctgcaaatga acagcctgag agctgaggac acggctgtgt attactgtgc gagggacagg 300

agctactacc ttgactactg gggccaggga accctggtca ccgtctcctc a 351

<210> 1627
<211> 987
<212> DNA
<213> Homo sapiens

<400> 1627
gctagcacca agggcccatc ggtcttcccc ctggcaccct cctccaagag cacctctggg 60

ggcacagcgg ccctgggctg cctggtcaag gactacttcc ccgaaccggt gacggtgtcg 120

tggaactcag gcgccctgac cagcggcgtg cacaccttcc cggctgtcct acagtcctca 180

ggactctact ccctcagcag cgtggtgacc gtgccctcca gcagcttggg cacccagacc 240

tacatctgca acgtgaatca caagcccagc accaaggtgg acaagaaagc agagcccaaa 300

tcttgtgaca aaactcacac atccccaccg tgcccagcac ctgaactcct gggggggaccg 360

tcagtcttcc tcttcccccc aaaacccaag gacaccctca ggatctcccg gacccctgag 420

gtcacatgcg tggtggtgga cgtgagccac gaagaccctg aggtcaagtt caactggtac 480

gtggacggcg tggaggtgca taatgccaag acaaagccgc gggaggagca gtacagcacg 540

taccgggtgg tcagcgtcct caccgtcctg caccaggact ggctgaatgg caaggagtac 600

aagtgcaagg tctccaacaa agccctccca gcccccatcg agaaaaccat ctccaaagcc 660

aaagggcagc cccgagaacc acaggtgtac accctgcccc catcccggga tgagctgacc 720

aagaaccagg tcagcctgac ctgcctggtc aaaggcttct atcccagcga catcgccgtg 780

gagtgggaga gcaatgggca gccggagaac aactacaaga ccacgcctcc cgtgctggac 840

tccgacggct ccttcttcct ctacagcaag ctcaccgtgg acaagagcag gtggcagcag 900

gggaacgtct tctcatgctc cgtgatgcat gaggctctgc acaaccacta cacgcagaag 960

agcctctccc tgtctccggg taaatga 987

<210> 1628
<211> 318
<212> DNA
<213> Homo sapiens

<400> 1628
acgacactca cgcagtctcc agccaccctg tctttgtctc caggggaaag ggccaccctc 60

tcctgcaggg ccagtcagag tgttaggagc aacttagcct ggtaccagca gaaacctggc 120

caggctccca ggcccctcat ctatgatgca tccaccaggg ccactggcat cccagacagg 180

ttcagtggca gtgggtctgg gacagacttc actctcacca tcagcagact ggagcctgaa 240

gattttgcag tttattactg tcagcagcgt agcaactggc ctccgacgtt cggccaaggg 300

accaaggtgg aagtcaaa 318

<210> 1629
<211> 348
<212> DNA
<213> Homo sapiens

<400> 1629
gatggtacca aggtggaaat caaacgtacg gtggctgcac catctgtctt catcttcccg 60

ccatctgatg agcagttgaa atctggaact gcctctgttg tgtgcctgct gaataacttc 120

tatcccagag aggccaaagt acagtggaag gtggataacg ccctccaatc gggtaactcc 180

caggagagtg tcacagagca ggacagcaag gacagcacct acagcctcag cagcaccctg 240

acgctgagca aagcagacta cgagaaacac aaagtctacg cctgcgaagt cacccatcag 300

ggcctgagct cgcccgtcac aaagagcttc aacaggggag agtgttga 348

<210> 1630
<211> 102
<212> PRT
<213> Homo sapiens

<400> 1630

Gln Val Gln Leu Val Gln Ser Gly Gly Gly Val Pro Gly Ser Leu Arg
1 5 10 15

Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr Met Ser Trp
20 25 30

Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ile Ser Gly Ser
35 40 45

Tyr Tyr Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn
50 55 60

Ser Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp
65 70 75 80

Thr Ala Val Tyr Tyr Cys Ala Arg Asp Asp Tyr Trp Gly Gln Gly Thr
85 90 95

Leu Val Thr Val Ser Ser
100

<210> 1631
<211> 116

<212> PRT
<213> Homo sapiens

<400> 1631

Gln Val Gln Leu Val Gln 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 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 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 Asp Tyr Gly Glu Gly Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
100 105 110

Thr Val Ser Ser
115

<210> 1632
<211> 117
<212> PRT
<213> Homo sapiens

<400> 1632

Glu Val Gln 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 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 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 Gly Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Trp Gly Tyr Ser Phe Gly Asp Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser Ser
115

<210> 1633
<211> 127
<212> PRT
<213> Homo sapiens

<400> 1633

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 Thr 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 Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Val Gly Tyr Tyr Gly Asp Tyr Ala Trp Gly Tyr Tyr Tyr Tyr
100 105 110

Gly Met Asp Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120 125

<210> 1634
<211> 122
<212> PRT
<213> Homo sapiens

<400> 1634

Gln Val Gln Leu Gln 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 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 Glu Arg Trp Leu Gln Ile Gly Glu Asp Ala Phe Asp Ile Trp
            100                 105                 110


Gly Gln Gly Thr Thr Val Thr Val Ser Ser
        115                 120


<210>  1635
<211>  116
<212>  PRT
<213>  Homo sapiens

<400>  1635

Gln Val Gln Leu Val Gln 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 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 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


Arg Asn Phe Gly Glu Asp Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
            100                 105                 110


Thr Val Ser Ser
        115


<210>  1636
<211>  117
<212>  PRT
<213>  Homo sapiens

<400>  1636

Glu Val Gln Leu Val Gln Ser Gly Gly Gly Val Val Gln Pro Gly Lys
1               5                   10                  15
```

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Ala 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 Arg Asp Arg Ser Tyr Tyr Leu Asp Tyr Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser Ser
115

<210> 1637
<211> 124
<212> PRT
<213> Homo sapiens

<400> 1637

Gln Val Gln Leu Val 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 Ser
20 25 30

Trp Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Tyr 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 Asp Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Gln Gly Trp Gly Trp Asp Gly Thr Glu Tyr Tyr Ser Asp
100 105 110

Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 1638

<211> 123
<212> PRT
<213> Homo sapiens

<400> 1638

```
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 Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Asp Asp Leu Ser Asp Tyr Gly Glu Trp Leu Gly Pro Asp Tyr
            100                 105                 110

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 1639
<211> 81
<212> PRT
<213> Homo sapiens

<400> 1639

```
Gln Leu Thr Gln Pro Ser Ser Gly Ser Pro Gly Gln Arg Thr Ile Ser
1               5                   10                  15

Cys Gly Ser Ser Gly Asn Val Ser Trp Tyr Gln Gln Pro Gly Ala Pro
            20                  25                  30

Lys Leu Leu Ile Tyr Arg Pro Ser Gly Val Pro Asp Arg Phe Ser Gly
        35                  40                  45

Ser Lys Ser Gly Thr Ala Ser Leu Thr Ile Ser Gly Leu Gln Glu Asp
    50                  55                  60

Glu Ala Asp Tyr Tyr Cys Val Phe Gly Gly Thr Lys Leu Thr Val Leu
65                  70                  75                  80

Gly
```

<210> 1640
<211> 106
<212> PRT
<213> homo sapiens

<400> 1640

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 Thr Gln Ser Ile Ser Thr His Leu
20 25 30

Asn Trp Tyr Gln Gln Arg Gly Gly Lys Ala Pro Lys Leu Leu Ile Tyr
35 40 45

Gly Ala Ser Thr Leu Glu Ser Gly Val Pro Ser Arg Phe Ser Gly Ser
50 55 60

Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu
65 70 75 80

Asp Phe Ala Thr Tyr Tyr Cys Leu Gln His Arg Ser Tyr Pro Trp Thr
85 90 95

Phe Gly Gln Gly Thr Asn Val Glu Ile Lys
100 105

<210> 1641
<211> 112
<212> PRT
<213> Homo sapiens

<400> 1641

Ser Tyr Glu 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 Ser Ile Gly Ser Glu
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 Thr Ala Trp Asp Asp Thr Leu
85 90 95

Asn Gly Arg Val Ile Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly

100 105 110

<210> 1642
<211> 111
<212> PRT
<213> Homo sapiens

<400> 1642

Gln Thr Val Val Thr Gln Glu Pro Ser Phe Ser Val Ser Pro Gly Gly
1 5 10 15

Thr Ile Thr Leu Thr Cys Asp Leu Asn Ser Gly Leu Val Ser Ser Ser
20 25 30

His Tyr Pro Ser Trp Tyr Gln Gln Thr Pro Gly Gln Ala Pro Arg Thr
35 40 45

Leu Ile Tyr Asn Thr Asn Ile Arg Ser Ser Gly Val Pro Asp Arg Phe
50 55 60

Ser Gly Ala Ile Leu Gly Asn Lys Ala Ala Leu Thr Ile Thr Gly Ala
65 70 75 80

Gln Ala Glu Asp Glu Ser Asp Tyr Tyr Cys Val Leu Tyr Met Gly Ser
85 90 95

Gly Ile Ser Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

<210> 1643
<211> 111
<212> PRT
<213> Homo sapiens

<400> 1643

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 Leu Gly Gly His
20 25 30

Asn Phe Val Ser Trp Tyr Gln Gln His Pro Gly Lys Ala Pro Lys Leu
35 40 45

Met Ile Tyr Asp Val Phe Asn 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 Phe Cys Ser Ser Tyr Thr Ile Thr
85 90 95

Asn Ile Val Val Phe Gly Arg Gly Thr Lys Leu Thr Val Leu Gly
100 105 110

<210> 1644
<211> 106
<212> PRT
<213> Homo sapiens

<400> 1644

Thr Thr Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly Glu
1 5 10 15

Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Arg Ser Asn Leu
20 25 30

Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Pro Leu Ile Tyr
35 40 45

Asp Ala Ser Thr Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Ser
50 55 60

Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro Glu
65 70 75 80

Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ser Asn Trp Pro Pro Thr
85 90 95

Phe Gly Gln Gly Thr Lys Val Glu Val Lys
100 105

<210> 1645
<211> 111
<212> PRT
<213> Homo sapiens

<400> 1645

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 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 Ile Ser Gly Leu
65 70 75 80

Gln Ala Glu Asp Glu Ala Asp Tyr Phe Cys Ser Ser Tyr Thr Ile Thr

85 90 95

Asp Ile Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Arg
100 105 110

<210> 1646
<211> 111
<212> PRT
<213> Homo sapiens

<400> 1646

Gln Pro Gly 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 Arg Ser Asn Ile Gly Gly Asn
20 25 30

Thr Val Asn Trp Tyr Gln His Val 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 Arg
65 70 75 80

Ser Glu Asp Glu Ala Glu Tyr Tyr Cys Ala Thr Trp Glu Asp Ser Leu
85 90 95

Ser Gly Tyr Val Phe Gly Pro Gly Thr Lys Val Thr Val Leu Gly
100 105 110

<210> 1647
<211> 15
<212> PRT
<213> Homo sapiens

<400> 1647

Arg Thr Met His Pro Ser Asp Glu Phe Leu Pro Leu Gly Met Pro
1 5 10 15

<210> 1648
<211> 15
<212> PRT
<213> Homo sapiens

<400> 1648

Val Val Pro Leu Gly Arg Cys Val Ser His Pro Ala Ile Cys Ala
1 5 10 15

<210> 1649
<211> 15
<212> PRT
<213> Homo sapiens

<400> 1649

Ser Val Asp Asp Cys Arg Trp Asn Leu Asn Cys Glu Pro Pro Pro
1 5 10 15

<210> 1650
<211> 13
<212> PRT
<213> Homo sapiens

<400> 1650

Cys Leu Ser Ala Thr Cys Asp Cys Thr Leu Cys Gly Pro
1 5 10

<210> 1651
<211> 15
<212> PRT
<213> Homo sapiens

<400> 1651

Gly Thr Gly Leu Val Pro Leu Phe Asp Pro Arg Tyr Arg Phe Leu
1 5 10 15

<210> 1652
<211> 15
<212> PRT
<213> Homo sapiens

<400> 1652

Pro Asn Cys Trp Val Gly Leu Thr Gly Ala His Ser Cys Phe Leu
1 5 10 15

<210> 1653
<211> 14
<212> PRT
<213> Homo sapiens

<400> 1653

Tyr Gln Ala Asp Cys Leu Met Asn Arg Cys Pro Thr Ala Glu
1 5 10

<210> 1654
<211> 669
<212> PRT
<213> Homo sapiens

<400> 1654

Met Phe Ile Phe Leu Leu Phe Leu Thr Leu Thr Ser Gly Ser Asp Leu
1 5 10 15

Asp Arg Cys Thr Thr Phe Asp Asp Val Gln Ala Pro Asn Tyr Thr Gln
20 25 30

His Thr Ser Ser Met Arg Gly Val Tyr Tyr Pro Asp Glu Ile Phe Arg
35 40 45

```
Ser Asp Thr Leu Tyr Leu Thr Gln Asp Leu Phe Leu Pro Phe Tyr Ser
    50                  55                  60

Asn Val Thr Gly Phe His Thr Ile Asn His Thr Phe Gly Asn Pro Val
65                  70                  75                  80

Ile Pro Phe Lys Asp Gly Ile Tyr Phe Ala Ala Thr Glu Lys Ser Asn
                85                  90                  95

Val Val Arg Gly Trp Val Phe Gly Ser Thr Met Asn Asn Lys Ser Gln
            100                 105                 110

Ser Val Ile Ile Ile Asn Asn Ser Thr Asn Val Val Ile Arg Ala Cys
        115                 120                 125

Asn Phe Glu Leu Cys Asp Asn Pro Phe Phe Ala Val Ser Lys Pro Met
    130                 135                 140

Gly Thr Gln Thr His Thr Met Ile Phe Asp Asn Ala Phe Asn Cys Thr
145                 150                 155                 160

Phe Glu Tyr Ile Ser Asp Ala Phe Ser Leu Asp Val Ser Glu Lys Ser
                165                 170                 175

Gly Asn Phe Lys His Leu Arg Glu Phe Val Phe Lys Asn Lys Asp Gly
            180                 185                 190

Phe Leu Tyr Val Tyr Lys Gly Tyr Gln Pro Ile Asp Val Val Arg Asp
        195                 200                 205

Leu Pro Ser Gly Phe Asn Thr Leu Lys Pro Ile Phe Lys Leu Pro Leu
    210                 215                 220

Gly Ile Asn Ile Thr Asn Phe Arg Ala Ile Leu Thr Ala Phe Ser Pro
225                 230                 235                 240

Ala Gln Asp Ile Trp Gly Thr Ser Ala Ala Ala Tyr Phe Val Gly Tyr
                245                 250                 255

Leu Lys Pro Thr Thr Phe Met Leu Lys Tyr Asp Glu Asn Gly Thr Ile
            260                 265                 270

Thr Asp Ala Val Asp Cys Ser Gln Asn Pro Leu Ala Glu Leu Lys Cys
        275                 280                 285

Ser Val Lys Ser Phe Glu Ile Asp Lys Gly Ile Tyr Gln Thr Ser Asn
    290                 295                 300

Phe Arg Val Val Pro Ser Gly Asp Val Val Arg Phe Pro Asn Ile Thr
305                 310                 315                 320
```

```
Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Pro Ser Val Tyr Ala Trp
                325                 330                 335

Glu Arg Lys Lys Ile Ser Asn Cys Val Ala Asp Tyr Ser Val Leu Tyr
            340                 345                 350

Asn Ser Thr Phe Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser Ala Thr
        355                 360                 365

Lys Leu Asn Asp Leu Cys Phe Ser Asn Val Tyr Ala Asp Ser Phe Val
    370                 375                 380

Val Lys Gly Asp Asp Val Arg Gln Ile Ala Pro Gly Gln Thr Gly Val
385                 390                 395                 400

Ile Ala Asp Tyr Asn Tyr Lys Leu Pro Asp Asp Phe Met Gly Cys Val
                405                 410                 415

Leu Ala Trp Asn Thr Arg Asn Ile Asp Ala Thr Ser Thr Gly Asn Tyr
            420                 425                 430

Asn Tyr Lys Tyr Arg Tyr Leu Arg His Gly Lys Leu Arg Pro Phe Glu
        435                 440                 445

Arg Asp Ile Ser Asn Val Pro Phe Ser Pro Asp Gly Lys Pro Cys Thr
    450                 455                 460

Pro Pro Ala Leu Asn Cys Tyr Trp Pro Leu Asn Asp Tyr Gly Phe Tyr
465                 470                 475                 480

Thr Thr Thr Gly Ile Gly Tyr Gln Pro Tyr Arg Val Val Val Leu Ser
                485                 490                 495

Phe Glu Leu Leu Asn Ala Pro Ala Thr Val Cys Gly Pro Lys Leu Ser
            500                 505                 510

Thr Asp Leu Ile Lys Asn Gln Cys Val Asn Phe Asn Phe Asn Gly Leu
        515                 520                 525

Thr Gly Thr Gly Val Leu Thr Pro Ser Ser Lys Arg Phe Gln Pro Phe
    530                 535                 540

Gln Gln Phe Gly Arg Asp Val Ser Asp Phe Thr Asp Ser Val Arg Asp
545                 550                 555                 560

Pro Lys Thr Ser Glu Ile Leu Asp Ile Ser Pro Cys Ala Phe Gly Gly
                565                 570                 575

Val Ser Val Ile Thr Pro Gly Thr Asn Ala Ser Ser Glu Val Ala Val
            580                 585                 590
```

```
Leu Tyr Gln Asp Val Asn Cys Thr Asp Val Ser Thr Ala Ile His Ala
        595                 600                 605


Asp Gln Leu Thr Pro Ala Trp Arg Ile Tyr Ser Thr Gly Asn Asn Val
    610                 615                 620


Phe Gln Thr Gln Ala Gly Cys Leu Ile Gly Ala Glu His Val Asp Thr
625                 630                 635                 640


Ser Tyr Glu Cys Asp Ile Pro Ile Gly Ala Gly Ile Cys Ala Ser Tyr
                645                 650                 655


His Thr Val Ser Leu Leu Arg Ser Thr Ser Gln Lys Ser
            660                 665


<210>  1655
<211>  20
<212>  PRT
<213>  Homo sapiens

<400>  1655

Arg Val Val Val Leu Ser Phe Glu Leu Gly Pro Pro Gly Gly Pro Phe
1               5                   10                  15


Gly Glu Val Phe
            20


<210>  1656
<211>  14
<212>  PRT
<213>  Homo sapiens

<400>  1656

Val Val Val Ser Phe Glu Leu Asn Leu Cys Pro Phe Gly Glu
1               5                   10


<210>  1657
<211>  11
<212>  PRT
<213>  Homo sapiens


<220>
<221>  MISC_FEATURE
<222>  (5)..(7)
<223>  Wherein Xaa is any amino acid.

<400>  1657

Ser Phe Glu Leu Xaa Xaa Xaa Pro Phe Gly Glu
1               5                   10


<210>  1658
<211>  13
<212>  PRT
```

<213> Homo sapiens

<220>
<221> MISC_FEATURE
<222> (5)..(9)
<223> Wherein Xaa is any amino acid.

<400> 1658

Ser Phe Glu Leu Xaa Xaa Xaa Xaa Xaa Pro Phe Gly Glu
1 5 10

<210> 1659
<211> 5
<212> PRT
<213> Homo sapiens

<400> 1659

Val Tyr Asp Asn Lys
1 5

<210> 1660
<211> 5
<212> PRT
<213> Homo sapiens

<400> 1660

Arg Ser Tyr Tyr Leu
1 5

<210> 1661
<211> 10
<212> PRT
<213> Homo sapiens

<400> 1661

Arg Ala Ser Gln Val Arg Ser Asn Leu Ala
1 5 10

<210> 1662
<211> 6
<212> PRT
<213> Homo sapiens

<400> 1662

Asp Ala Ser Thr Ala Thr
1 5

<210> 1663
<211> 9
<212> PRT
<213> Homo sapiens

<400> 1663

Gln Gln Arg Ser Asn Trp Pro Pro Thr
1 5

<210> 1664
<211> 13
<212> PRT
<213> Homo sapiens

<400> 1664

Cys Leu Ser Ala Thr Cys Asp Cys Thr Leu Cys Gly Pro
1 5 10