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(51) International Patent Classification ⁷ : C12N 15/12, C07K 14/47, C12N 5/10, C07K 16/18, C12N 15/62, C12Q 1/68, G01N 33/50, 33/53, A61K 38/02, 48/00	A2	(11) International Publication Number: WO 00/37643 (43) International Publication Date: 29 June 2000 (29.06.00)															
(21) International Application Number: PCT/US99/30909 (22) International Filing Date: 23 December 1999 (23.12.99) (30) Priority Data: <table border="0"> <tr> <td>09/221,298</td> <td>23 December 1998 (23.12.98)</td> <td>US</td> </tr> <tr> <td>09/347,496</td> <td>2 July 1999 (02.07.99)</td> <td>US</td> </tr> <tr> <td>09/401,064</td> <td>22 September 1999 (22.09.99)</td> <td>US</td> </tr> <tr> <td>09/444,242</td> <td>19 November 1999 (19.11.99)</td> <td>US</td> </tr> <tr> <td>09/454,150</td> <td>2 December 1999 (02.12.99)</td> <td>US</td> </tr> </table> (71) Applicant (for all designated States except US): CORIXA CORPORATION [US/US]; Suite 200, 1124 Columbia Street, Seattle, WA 98104 (US). (72) Inventors; and (75) Inventors/Applicants (for US only): XU, Jiangchun [US/US]; 15805 SE 43rd Place, Bellevue, WA 98006 (US). LODES, Michael, J. [US/US]; 9223 - 36th Avenue SW, Seattle, WA 98126 (US). SECRIST, Heather [US/US]; 3844 - 35th Avenue West, Seattle, WA 98199 (US). BENSON, Darin, R. [US/US]; 723 N. 48th Street, Seattle, WA 98104 (US). MEAGHER, Madeleine, Joy [US/US]; 3819 Interlake Avenue N., Seattle, WA 98103 (US). STOLK, John [US/US]; 7436 NE 144th Place, Bothell, WA 98011		09/221,298	23 December 1998 (23.12.98)	US	09/347,496	2 July 1999 (02.07.99)	US	09/401,064	22 September 1999 (22.09.99)	US	09/444,242	19 November 1999 (19.11.99)	US	09/454,150	2 December 1999 (02.12.99)	US	(US). WANG, Tongtong [CN/US]; 8049 NE 28th Street, Medina, WA 98039 (US). YUQIU, Jiang [CN/US]; 5001 South 232nd Street, Kent, WA 98032 (US). (74) Agents: MAKI, David, J. et al.; Seed and Berry LLP, Suite 6300, 701 Fifth Avenue, Seattle, WA 98104-7092 (US). (81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>Without international search report and to be republished upon receipt of that report.</i>
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(54) Title: COMPOUNDS FOR IMMUNOTHERAPY AND DIAGNOSIS OF COLON CANCER AND METHODS FOR THEIR USE																	
(57) Abstract Compositions and methods for the therapy and diagnosis of cancer, such as colon cancer, are disclosed. Compositions may comprise one or more colon tumor proteins, immunogenic portions thereof, or polynucleotides that encode such portions. Alternatively, a therapeutic composition may comprise an antigen presenting cell that expresses a colon tumor protein, or a T cell that is specific for cells expressing such a protein. Such compositions may be used, for example, for the prevention and treatment of diseases such as colon cancer. Diagnostic methods based on detecting a colon tumor protein, or mRNA encoding such a protein, in a sample are also provided.																	

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COMPOUNDS FOR IMMUNOTHERAPY AND DIAGNOSIS OF COLON CANCER AND METHODS FOR THEIR USE

TECHNICAL FIELD

5 The present invention relates generally to therapy and diagnosis of cancer, such as colon cancer. The invention is more specifically related to polypeptides comprising at least a portion of a colon tumor protein, and to polynucleotides encoding such polypeptides. Such polypeptides and polynucleotides may be used in vaccines and pharmaceutical compositions for prevention and treatment of colon cancer, and for the
10 diagnosis and monitoring of such cancers.

BACKGROUND OF THE INVENTION

 Cancer is a significant health problem throughout the world. Although advances have been made in detection and therapy of cancer, no vaccine or other universally successful method for prevention or treatment is currently available. Current therapies, which
15 are generally based on a combination of chemotherapy or surgery and radiation, continue to prove inadequate in many patients.

 Colon cancer is the second most frequently diagnosed malignancy in the United States as well as the second most common cause of cancer death. An estimated 95,600 new cases of colon cancer will be diagnosed in 1998, with an estimated 47,700 deaths.
20 The five-year survival rate for patients with colorectal cancer detected in an early localized stage is 92%; unfortunately, only 37% of colorectal cancer is diagnosed at this stage. The survival rate drops to 64% if the cancer is allowed to spread to adjacent organs or lymph nodes, and to 7% in patients with distant metastases.

 The prognosis of colon cancer is directly related to the degree of penetration of
25 the tumor through the bowel wall and the presence or absence of nodal involvement, consequently, early detection and treatment are especially important. Currently, diagnosis is aided by the use of screening assays for fecal occult blood, sigmoidoscopy, colonoscopy and double contrast barium enemas. Treatment regimens are determined by the type and stage of the cancer, and include surgery, radiation therapy and/or chemotherapy. Recurrence
30 following surgery (the most common form of therapy) is a major problem and is often the

ultimate cause of death. In spite of considerable research into therapies for the disease, colon cancer remains difficult to diagnose and treat. In spite of considerable research into therapies for these and other cancers, colon cancer remains difficult to diagnose and treat effectively. Accordingly, there is a need in the art for improved methods for detecting and treating such cancers. The present invention fulfills these needs and further provides other related advantages.

SUMMARY OF THE INVENTION

Briefly stated, the present invention provides compositions and methods for the diagnosis and therapy of cancer, such as colon cancer. In one aspect, the present invention provides polypeptides comprising at least a portion of a colon tumor protein, or a variant thereof. Certain portions and other variants are immunogenic, such that the ability of the variant to react with antigen-specific antisera is not substantially diminished. Within certain embodiments, the polypeptide comprises a sequence that is encoded by a polynucleotide sequence selected from the group consisting of: (a) sequences recited in SEQ ID NO: 1-121, 123-197 and 205-486; (b) variants of a sequence recited in SEQ ID NO: 1-121, 123-197 and 205-486; and (c) complements of a sequence of (a) or (b).

The present invention further provides polynucleotides that encode a polypeptide as described above, or a portion thereof (such as a portion encoding at least 15 amino acid residues of a colon tumor protein), expression vectors comprising such polynucleotides and host cells transformed or transfected with such expression vectors.

Within other aspects, the present invention provides pharmaceutical compositions comprising a polypeptide or polynucleotide as described above and a physiologically acceptable carrier.

Within a related aspect of the present invention, vaccines are provided. Such vaccines comprise a polypeptide or polynucleotide as described above and an immunostimulant.

The present invention further provides pharmaceutical compositions that comprise: (a) an antibody or antigen-binding fragment thereof that specifically binds to a colon tumor protein; and (b) a physiologically acceptable carrier.

Within further aspects, the present invention provides pharmaceutical compositions comprising: (a) an antigen presenting cell that expresses a polypeptide as described above and (b) a pharmaceutically acceptable carrier or excipient. Antigen presenting cells include dendritic cells, macrophages, monocytes, fibroblasts and B cells.

5 Within related aspects, vaccines are provided that comprise: (a) an antigen presenting cell that expresses a polypeptide as described above and (b) an immunostimulant.

The present invention further provides, in other aspects, fusion proteins that comprise at least one polypeptide as described above, as well as polynucleotides encoding such fusion proteins.

10 Within related aspects, pharmaceutical compositions comprising a fusion protein, or a polynucleotide encoding a fusion protein, in combination with a physiologically acceptable carrier are provided.

Vaccines are further provided, within other aspects, that comprise a fusion protein, or a polynucleotide encoding a fusion protein, in combination with an
15 immunostimulant.

Within further aspects, the present invention provides methods for inhibiting the development of a cancer in a patient, comprising administering to a patient a pharmaceutical composition or vaccine as recited above.

The present invention further provides, within other aspects, methods for
20 removing tumor cells from a biological sample, comprising contacting a biological sample with T cells that specifically react with a colon tumor protein, wherein the step of contacting is performed under conditions and for a time sufficient to permit the removal of cells expressing the protein from the sample.

Within related aspects, methods are provided for inhibiting the development of
25 a cancer in a patient, comprising administering to a patient a biological sample treated as described above.

Methods are further provided, within other aspects, for stimulating and/or expanding T cells specific for a colon tumor protein, comprising contacting T cells with one or more of: (i) a polypeptide as described above; (ii) a polynucleotide encoding such a
30 polypeptide; and/or (iii) an antigen presenting cell that expresses such a polypeptide; under

conditions and for a time sufficient to permit the stimulation and/or expansion of T cells. Isolated T cell populations comprising T cells prepared as described above are also provided.

Within further aspects, the present invention provides methods for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective
5 amount of a T cell population as described above.

The present invention further provides methods for inhibiting the development of a cancer in a patient, comprising the steps of: (a) incubating CD4⁺ and/or CD8⁺ T cells isolated from a patient with one or more of: (i) a polypeptide comprising at least an immunogenic portion of a colon tumor protein; (ii) a polynucleotide encoding such a
10 polypeptide; and (iii) an antigen-presenting cell that expresses such a polypeptide; and (b) administering to the patient an effective amount of the proliferated T cells, and thereby inhibiting the development of a cancer in the patient. Proliferated cells may, but need not, be cloned prior to administration to the patient.

Within further aspects, the present invention provides methods for determining
15 the presence or absence of a cancer in a patient, comprising: (a) contacting a biological sample obtained from a patient with a binding agent that binds to a polypeptide as recited above; (b) detecting in the sample an amount of polypeptide that binds to the binding agent; and (c) comparing the amount of polypeptide with a predetermined cut-off value, and therefrom determining the presence or absence of a cancer in the patient. Within preferred
20 embodiments, the binding agent is an antibody, more preferably a monoclonal antibody. The cancer may be colon cancer.

The present invention also provides, within other aspects, methods for monitoring the progression of a cancer in a patient. Such methods comprise the steps of: (a) contacting a biological sample obtained from a patient at a first point in time with a binding
25 agent that binds to a polypeptide as recited above; (b) detecting in the sample an amount of polypeptide that binds to the binding agent; (c) repeating steps (a) and (b) using a biological sample obtained from the patient at a subsequent point in time; and (d) comparing the amount of polypeptide detected in step (c) with the amount detected in step (b) and therefrom monitoring the progression of the cancer in the patient.

30 The present invention further provides, within other aspects, methods for determining the presence or absence of a cancer in a patient, comprising the steps of: (a)

contacting a biological sample obtained from a patient with an oligonucleotide that hybridizes to a polynucleotide that encodes a colon tumor protein; (b) detecting in the sample a level of a polynucleotide, preferably mRNA, that hybridizes to the oligonucleotide; and (c) comparing the level of polynucleotide that hybridizes to the oligonucleotide with a predetermined cut-off value, and therefrom determining the presence or absence of a cancer in the patient. Within certain embodiments, the amount of mRNA is detected via polymerase chain reaction using, for example, at least one oligonucleotide primer that hybridizes to a polynucleotide encoding a polypeptide as recited above, or a complement of such a polynucleotide. Within other embodiments, the amount of mRNA is detected using a hybridization technique, employing an oligonucleotide probe that hybridizes to a polynucleotide that encodes a polypeptide as recited above, or a complement of such a polynucleotide.

In related aspects, methods are provided for monitoring the progression of a cancer in a patient, comprising the steps of: (a) contacting a biological sample obtained from a patient with an oligonucleotide that hybridizes to a polynucleotide that encodes a colon tumor protein; (b) detecting in the sample an amount of a polynucleotide that hybridizes to the oligonucleotide; (c) repeating steps (a) and (b) using a biological sample obtained from the patient at a subsequent point in time; and (d) comparing the amount of polynucleotide detected in step (c) with the amount detected in step (b) and therefrom monitoring the progression of the cancer in the patient.

Within further aspects, the present invention provides antibodies, such as monoclonal antibodies, that bind to a polypeptide as described above, as well as diagnostic kits comprising such antibodies. Diagnostic kits comprising one or more oligonucleotide probes or primers as described above are also provided.

These and other aspects of the present invention will become apparent upon reference to the following detailed description and attached figures. All references disclosed herein are hereby incorporated by reference in their entirety as if each was incorporated individually.

SEQUENCE IDENTIFIERS

SEQ ID NO: 1 is a first determined cDNA sequence for Contig 1, showing homology to Neutrophil Gelatinase Associated Lipocalin.

SEQ ID NO: 2 is the determined cDNA sequence for Contig 2, showing no significant homology to any known genes.

SEQ ID NO: 3 is the determined cDNA sequence for Contig 4, showing homology to Carcinoembryonic antigen.

5 SEQ ID NO: 4 is the determined cDNA sequence for Contig 5, showing homology to Carcinoembryonic antigen.

SEQ ID NO: 5 is the determined cDNA sequence for Contig 9, showing homology to Carcinoembryonic antigen.

10 SEQ ID NO: 6 is the determined cDNA sequence for Contig 52, showing homology to Carcinoembryonic antigen.

SEQ ID NO: 7 is the determined cDNA sequence for Contig 6, showing homology to Villin.

SEQ ID NO: 8 is the determined cDNA sequence for Contig 8, showing no significant homology to any known genes.

15 SEQ ID NO: 9 is the determined cDNA sequence for Contig 10, showing homology to Transforming Growth Factor (BIGH3).

SEQ ID NO: 10 is the determined cDNA sequence for Contig 19, showing homology to Transforming Growth Factor (BIGH3).

20 SEQ ID NO: 11 is the determined cDNA sequence for Contig 21, showing homology to Transforming Growth Factor (BIGH3).

SEQ ID NO: 12 is the determined cDNA sequence for Contig 11, showing homology to CO-029.

SEQ ID NO: 13 is the determined cDNA sequence for Contig 55, showing homology to CO-029.

25 SEQ ID NO: 14 is the determined cDNA sequence for Contig 12, showing homology to Chromosome 17, clone hRPC.1171_I_10, also referred to as C798P.

SEQ ID NO: 15 is the determined cDNA sequence for Contig 13, showing no significant homology to any known gene.

30 SEQ ID NO: 16 is the determined cDNA sequence for Contig 14, also referred to as 14261, showing no significant homology to any known gene.

SEQ ID NO: 17 is the determined cDNA sequence for Contig 15, showing homology to Ets-Related Transcription Factor (ERT).

SEQ ID NO: 18 is the determined cDNA sequence for Contig 16, showing homology to Chromosome 5, PAC clone 228g9 (LBNL H142).

5 SEQ ID NO: 19 is the determined cDNA sequence for Contig 24, showing homology to Chromosome 5, PAC clone 228g9 (LBNL H142).

SEQ ID NO: 20 is the determined cDNA sequence for Contig 17, showing homology to Cytokeratin.

10 SEQ ID NO: 21 is the determined cDNA sequence for Contig 18, showing homology to L1-Cadherin.

SEQ ID NO: 22 is the determined cDNA sequence for Contig 20, showing no significant homology to any known gene.

SEQ ID NO: 23 is the determined cDNA sequence for Contig 22, showing homology to Bumetanide-sensitive Na-K-Cl cotransporter (NKCC1).

15 SEQ ID NO: 24 is the determined cDNA sequence for Contig 23, showing no significant homology to any known gene.

SEQ ID NO: 25 is the determined cDNA sequence for Contig 25, showing homology to Macrophage Inflammatory Protein 3 alpha.

20 SEQ ID NO: 26 is the determined cDNA sequence for Contig 26, showing homology to Laminin.

SEQ ID NO: 27 is the determined cDNA sequence for Contig 48, showing homology to Laminin.

SEQ ID NO: 28 is the determined cDNA sequence for Contig 27, showing homology to Mytobularin (MTM1).

25 SEQ ID NO: 29 is the determined cDNA sequence for Contig 28, showing homology to Chromosome 16 BAC clone CIT987SK-A-363E6.

SEQ ID NO: 30 is the determined cDNA sequence for Contig 29, also referred to as C751P and 14247, showing no significant homology to any known gene, but partial homology to Rat GSK-3 β -interacting protein Axil homolog.

30 SEQ ID NO: 31 is the determined cDNA sequence for Contig 30, showing homology to Zinc Finger Transcription Factor (ZNF207).

SEQ ID NO: 32 is the determined cDNA sequence for Contig 31, showing no significant homology to any known gene, but partial homology to Mus musculus GOB-4 homolog.

5 SEQ ID NO: 33 is the determined cDNA sequence for Contig 35, showing no significant homology to any known gene, but partial homology to Mus musculus GOB-4 homolog.

SEQ ID NO: 34 is the determined cDNA sequence for Contig 32, showing no significant homology to any known gene.

10 SEQ ID NO: 35 is the determined cDNA sequence for Contig 34, showing homology to Desmoglein 2.

SEQ ID NO: 36 is the determined cDNA sequence for Contig 36, showing no significant homology to any known gene.

SEQ ID NO: 37 is the determined cDNA sequence for Contig 37, showing homology to Putative Transmembrane Protein.

15 SEQ ID NO: 38 is the determined cDNA sequence for Contig 38, also referred to as C796P and 14219, showing no significant homology to any known gene.

SEQ ID NO: 39 is the determined cDNA sequence for Contig 40, showing homology to Nonspecific Cross-reacting Antigen.

20 SEQ ID NO: 40 is the determined cDNA sequence for Contig 41, also referred to as C799P and 14308, showing no significant homology to any known gene.

SEQ ID NO: 41 is the determined cDNA sequence for Contig 42, also referred to as C794P and 14309, showing no significant homology to any known gene.

SEQ ID NO: 42 is the determined cDNA sequence for Contig 43, showing homology to Chromosome 1 specific transcript KIAA0487.

25 SEQ ID NO: 43 is the determined cDNA sequence for Contig 45, showing homology to hMCM2.

SEQ ID NO: 44 is the determined cDNA sequence for Contig 46, showing homology to ETS2.

30 SEQ ID NO: 45 is the determined cDNA sequence for Contig 49, showing homology to Pump-1.

SEQ ID NO: 46 is the determined cDNA sequence for Contig 50, also referred to as C792P and 18323, showing no significant homology to any known gene.

SEQ ID NO: 47 is the determined cDNA sequence for Contig 51, also referred to as C795P and 14317, showing no significant homology to any known gene.

5 SEQ ID NO: 48 is the determined cDNA sequence for 11092, showing no significant homology to any known gene.

SEQ ID NO: 49 is the determined cDNA sequence for 11093, showing no significant homology to any known gene.

10 SEQ ID NO: 50 is the determined cDNA sequence for 11094, showing homology to Human Putative Enterocyte Differentiation Protein.

SEQ ID NO: 51 is the determined cDNA sequence for 11095, showing homology to Human Transcriptional Corepressor hKAP1/TIF1B mRNA.

SEQ ID NO: 52 is the determined cDNA sequence for 11096, showing no significant homology to any known gene.

15 SEQ ID NO: 53 is the determined cDNA sequence for 11097, showing homology to Human Nonspecific Antigen.

SEQ ID NO: 54 is the determined cDNA sequence for 11098, showing no significant homology to any known gene.

20 SEQ ID NO: 55 is the determined cDNA sequence for 11099, showing homology to Human Pancreatic Secretory Inhibitor (PST) mRNA.

SEQ ID NO: 56 is the determined cDNA sequence for 11186, showing homology to Human Pancreatic Secretory Inhibitor (PST) mRNA.

SEQ ID NO: 57 is the determined cDNA sequence for 11101, showing homology to Human Chromosome X.

25 SEQ ID NO: 58 is the determined cDNA sequence for 11102, showing homology to Human Chromosome X.

SEQ ID NO: 59 is the determined cDNA sequence for 11103, showing no significant homology to any known gene.

30 SEQ ID NO: 60 is the determined cDNA sequence for 11174, showing no significant homology to any known gene.

SEQ ID NO: 61 is the determined cDNA sequence for 11104, showing homology to Human mRNA for KIAA0154.

SEQ ID NO: 62 is the determined cDNA sequence for 11105, showing homology to Human Apurinic/Apyrimidinic Endonuclease (hap1)mRNA.

5 SEQ ID NO: 63 is the determined cDNA sequence for 11106, showing homology to Human Chromosome 12p13.

SEQ ID NO: 64 is the determined cDNA sequence for 11107, showing homology to Human 90 kDa Heat Shock Protein.

10 SEQ ID NO: 65 is the determined cDNA sequence for 11108, showing no significant homology to any known gene.

SEQ ID NO: 66 is the determined cDNA sequence for 11112, showing no significant homology to any known gene.

SEQ ID NO: 67 is the determined cDNA sequence for 11115, showing no significant homology to any known gene.

15 SEQ ID NO: 68 is the determined cDNA sequence for 11117, showing no significant homology to any known gene.

SEQ ID NO: 69 is the determined cDNA sequence for 11118, showing no significant homology to any known gene.

20 SEQ ID NO: 70 is the determined cDNA sequence for 11119, showing homology to Human Elongation Factor 1-alpha.

SEQ ID NO: 71 is the determined cDNA sequence for 11121, showing homology to Human Lamin B Receptor (LBR) mRNA.

SEQ ID NO: 72 is the determined cDNA sequence for 11122, showing homology to H. sapiens mRNA for Novel Glucocorticoid.

25 SEQ ID NO: 73 is the determined cDNA sequence for 11123, showing homology to H. sapiens mRNA for snRNP protein B.

SEQ ID NO: 74 is the determined cDNA sequence for 11124, showing homology to Human Cisplatin Resistance Associated Beta-protein.

30 SEQ ID NO: 75 is the determined cDNA sequence for 11127, showing homology to M. musculus Calumenin mRNA.

SEQ ID NO: 76 is the determined cDNA sequence for 11128, showing homology to Human ras-related small GTP binding protein.

SEQ ID NO: 77 is the determined cDNA sequence for 11130, showing homology to Human Cosmid U169d2.

5 SEQ ID NO: 78 is the determined cDNA sequence for 11131, showing homology to H. sapiens mRNA for protein homologous to Elongation 1-g.

SEQ ID NO: 79 is the determined cDNA sequence for 11134, showing no significant homology to any known gene.

10 SEQ ID NO: 80 is the determined cDNA sequence for 11135, showing homology to H. sapiens Nieman-Pick (NPC1) mRNA.

SEQ ID NO: 81 is the determined cDNA sequence for 11137, showing homology to H. sapiens mRNA for Niecin b-chain.

SEQ ID NO: 82 is the determined cDNA sequence for 11138, showing homology to Human Endogenous Retroviral Protease mRNA.

15 SEQ ID NO: 83 is the determined cDNA sequence for 11139, showing homology to H. sapiens mRNA for DMBT1 protein.

SEQ ID NO: 84 is the determined cDNA sequence for 11140, showing homology to H. sapiens ras GTPase activating-like protein.

20 SEQ ID NO: 85 is the determined cDNA sequence for 11143, showing homology to Human Acidic Ribosomal Phosphoprotein PO mRNA.

SEQ ID NO: 86 is the determined cDNA sequence for 11144, showing homology to H. sapiens U21 mRNA.

SEQ ID NO: 87 is the determined cDNA sequence for 11145, showing homology to Human GTP-binding protein.

25 SEQ ID NO: 88 is the determined cDNA sequence for 11148, showing homology to H. sapiens U21 mRNA.

SEQ ID NO: 89 is the determined cDNA sequence for 11151, showing no significant homology to any known gene.

30 SEQ ID NO: 90 is the determined cDNA sequence for 11154, showing no significant homology to any known gene.

SEQ ID NO: 91 is the determined cDNA sequence for 11156, showing homology to H. sapiens Ribosomal Protein L27.

SEQ ID NO: 92 is the determined cDNA sequence for 11157, showing homology to H. sapiens Ribosomal Protein L27.

5 SEQ ID NO: 93 is the determined cDNA sequence for 11158, showing no significant homology to any known gene.

SEQ ID NO: 94 is the determined cDNA sequence for 11162, showing homology to Ag-X antigen.

10 SEQ ID NO: 95 is the determined cDNA sequence for 11164, showing homology to H. sapiens mRNA for Signal Recognition Protein sub14.

SEQ ID NO: 96 is the determined cDNA sequence for 11165, showing homology to Human PAC 204e5/127h14.

SEQ ID NO: 97 is the determined cDNA sequence for 11166, showing homology to Human mRNA for KIAA0108.

15 SEQ ID NO: 98 is the determined cDNA sequence for 11167, showing homology to H. sapiens mRNA for Neutrophil Gelatinase asst. Lipocalin.

SEQ ID NO: 99 is the determined cDNA sequence for 11168, showing no significant homology to any known gene.

20 SEQ ID NO: 100 is the determined cDNA sequence for 11172, showing no significant homology to any known gene.

SEQ ID NO: 101 is the determined cDNA sequence for 11175, showing no significant homology to any known gene.

SEQ ID NO: 102 is the determined cDNA sequence for 11176, showing homology to Human maspin mRNA.

25 SEQ ID NO: 103 is the determined cDNA sequence for 11177, showing homology to Human Carcinoembryonic Antigen.

SEQ ID NO: 104 is the determined cDNA sequence for 11178, showing homology to Human A-Tubulin mRNA.

30 SEQ ID NO: 105 is the determined cDNA sequence for 11179, showing homology to Human mRNA for proton-ATPase-like protein.

SEQ ID NO: 106 is the determined cDNA sequence for 11180, showing homology to Human HepG2 3' region cDNA clone hmd.

SEQ ID NO: 107 is the determined cDNA sequence for 11182, showing homology to Human MHC homologous to Chicken B-Complex Protein.

5 SEQ ID NO: 108 is the determined cDNA sequence for 11183, showing homology to Human High Mobility Group Box (SSRP1) mRNA.

SEQ ID NO: 109 is the determined cDNA sequence for 11184, showing no significant homology to any known gene.

10 SEQ ID NO: 110 is the determined cDNA sequence for 11185, showing no significant homology to any known gene.

SEQ ID NO: 111 is the determined cDNA sequence for 11187, showing no significant homology to any known gene.

SEQ ID NO: 112 is the determined cDNA sequence for 11190, showing homology to Human Replication Protein A 70kDa.

15 SEQ ID NO: 113 is the determined cDNA sequence for Contig 47, also referred to as C797P, showing homology to Human Chromosome X clone bW XD342.

SEQ ID NO: 114 is the determined cDNA sequence for Contig 7, showing homology to Equilibrative Nucleoside Transporter 2 (ent2).

20 SEQ ID NO: 115 is the determined cDNA sequence for 14235.1, also referred to as C791P, showing homology to H. sapiens chromosome 21 derived BAC containing ets-2 gene.

SEQ ID NO: 116 is the determined cDNA sequence for 14287.2, showing no significant homology to any known gene, but some degree of homology to Putative Transmembrane Protein.

25 SEQ ID NO: 117 is the determined cDNA sequence for 14233.1, also referred to as Contig 48, showing no significant homology to any known gene.

SEQ ID NO: 118 is the determined cDNA sequence for 14298.2, also referred to as C793P, showing no significant homology to any known gene.

30 SEQ ID NO: 119 is the determined cDNA sequence for 14372, also referred to as Contig 44, showing no significant homology to any known gene.

SEQ ID NO: 120 is the determined cDNA sequence for 14295, showing homology to secreted cement gland protein XAG-2 homolog.

SEQ ID NO: 121 is the determined full-length cDNA sequence for a clone showing homology to Beta IG-H3.

5 SEQ ID NO: 122 is the predicted amino acid sequence for the clone of SEQ ID NO: 121.

SEQ ID NO: 123 is a longer determined cDNA sequence for C751P.

SEQ ID NO: 124 is a longer determined cDNA sequence for C791P.

SEQ ID NO: 125 is a longer determined cDNA sequence for C792P.

10 SEQ ID NO: 126 is a longer determined cDNA sequence for C793P.

SEQ ID NO: 127 is a longer determined cDNA sequence for C794P.

SEQ ID NO: 128 is a longer determined cDNA sequence for C795P.

SEQ ID NO: 129 is a longer determined cDNA sequence for C796P.

SEQ ID NO: 130 is a longer determined cDNA sequence for C797P.

15 SEQ ID NO: 131 is a longer determined cDNA sequence for C798P.

SEQ ID NO: 132 is a longer determined cDNA sequence for C799P.

SEQ ID NO: 133 is a first partial determined cDNA sequence for CoSub-3 (also known as 23569).

20 SEQ ID NO: 134 is a second partial determined cDNA sequence for CoSub-3 (also known as 23569).

SEQ ID NO: 135 is a first partial determined cDNA sequence for CoSub-13 (also known as 23579).

SEQ ID NO: 136 is a second partial determined cDNA sequence for CoSub-13 (also known as 23579).

25 SEQ ID NO: 137 is the determined cDNA sequence for CoSub-17 (also known as 23583).

SEQ ID NO: 138 is the determined cDNA sequence for CoSub-19 (also known as 23585).

30 SEQ ID NO: 139 is the determined cDNA sequence for CoSub-22 (also known as 23714).

SEQ ID NO: 140 is the determined cDNA sequence for CoSub-23 (also known as 23715).

SEQ ID NO: 141 is the determined cDNA sequence for CoSub-26 (also known as 23717).

5 SEQ ID NO: 142 is the determined cDNA sequence for CoSub-33 (also known as 23724).

SEQ ID NO: 143 is the determined cDNA sequence for CoSub-34 (also known as 23725).

10 SEQ ID NO: 144 is the determined cDNA sequence for CoSub-35 (also known as 23726).

SEQ ID NO: 145 is the determined cDNA sequence for CoSub-37 (also known as 23728).

SEQ ID NO: 146 is the determined cDNA sequence for CoSub-39 (also known as 23730).

15 SEQ ID NO: 147 is the determined cDNA sequence for CoSub-42 (also known as 23766).

SEQ ID NO: 148 is the determined cDNA sequence for CoSub-44 (also known as 23768).

20 SEQ ID NO: 149 is the determined cDNA sequence for CoSub-47 (also known as 23771).

SEQ ID NO: 150 is the determined cDNA sequence for CoSub-54 (also known as 23778).

SEQ ID NO: 151 is the determined cDNA sequence for CoSub-55 (also known as 23779).

25 SEQ ID NO: 152 is the determined cDNA sequence for CT1 (also known as 24099).

SEQ ID NO: 153 is the determined cDNA sequence for CT2 (also known as 24100).

SEQ ID NO: 154 is the determined cDNA sequence for CT3 (also known as 24101).

SEQ ID NO: 155 is the determined cDNA sequence for CT6 (also known as 24104).

SEQ ID NO: 156 is the determined cDNA sequence for CT7 (also known as 24105).

30 SEQ ID NO: 157 is the determined cDNA sequence for CT12 (also known as 24110).

SEQ ID NO: 158 is the determined cDNA sequence for CT13 (also known as 24111).

SEQ ID NO: 159 is the determined cDNA sequence for CT14 (also known as 24112).
SEQ ID NO: 160 is the determined cDNA sequence for CT15 (also known as 24113).
SEQ ID NO: 161 is the determined cDNA sequence for CT17 (also known as 24115).
SEQ ID NO: 162 is the determined cDNA sequence for CT18 (also known as 24116).
5 SEQ ID NO: 163 is the determined cDNA sequence for CT22 (also known as 23848).
SEQ ID NO: 164 is the determined cDNA sequence for CT24 (also known as 23849).
SEQ ID NO: 165 is the determined cDNA sequence for CT31 (also known as 23854).
SEQ ID NO: 166 is the determined cDNA sequence for CT34 (also known as 23856).
SEQ ID NO: 167 is the determined cDNA sequence for CT37 (also known as 23859).
10 SEQ ID NO: 168 is the determined cDNA sequence for CT39 (also known as 23860).
SEQ ID NO: 169 is the determined cDNA sequence for CT40 (also known as 23861).
SEQ ID NO: 170 is the determined cDNA sequence for CT51 (also known as 24130).
SEQ ID NO: 171 is the determined cDNA sequence for CT53 (also known as 24132).
SEQ ID NO: 172 is the determined cDNA sequence for CT63 (also known as 24595).
15 SEQ ID NO: 173 is the determined cDNA sequence for CT88 (also known as 24608).
SEQ ID NO: 174 is the determined cDNA sequence for CT92 (also known as 24800).
SEQ ID NO: 175 is the determined cDNA sequence for CT94 (also known as 24802).
SEQ ID NO: 176 is the determined cDNA sequence for CT102 (also known as
24805).
20 SEQ ID NO: 177 is the determined cDNA sequence for CT103 (also known as
24806).
SEQ ID NO: 178 is the determined cDNA sequence for CT111 (also known as
25520).
SEQ ID NO: 179 is the determined cDNA sequence for CT118 (also known as
25 25522).
SEQ ID NO: 180 is the determined cDNA sequence for CT121 (also known as
25523).
SEQ ID NO: 181 is the determined cDNA sequence for CT126 (also known as
25527).
30 SEQ ID NO: 182 is the determined cDNA sequence for CT135 (also known as
25534).

SEQ ID NO: 183 is the determined cDNA sequence for CT140 (also known as 25537).

SEQ ID NO: 184 is the determined cDNA sequence for CT145 (also known as 25542).

5 SEQ ID NO: 185 is the determined cDNA sequence for CT147 (also known as 25543).

SEQ ID NO: 186 is the determined cDNA sequence for CT148 (also known as 25544).

10 SEQ ID NO: 187 is the determined cDNA sequence for CT502 (also known as 26420).

SEQ ID NO: 188 is the determined cDNA sequence for CT507 (also known as 26425).

SEQ ID NO: 189 is the determined cDNA sequence for CT521 (also known as 27366).

15 SEQ ID NO: 190 is the determined cDNA sequence for CT544 (also known as 27375).

SEQ ID NO: 191 is the determined cDNA sequence for CT577 (also known as 27385).

20 SEQ ID NO: 192 is the determined cDNA sequence for CT580 (also known as 27387).

SEQ ID NO: 193 is the determined cDNA sequence for CT594 (also known as 27540).

SEQ ID NO: 194 is the determined cDNA sequence for CT606 (also known as 27547).

25 SEQ ID NO: 195 is the determined cDNA sequence for CT607 (also known as 27548).

SEQ ID NO: 196 is the determined cDNA sequence for CT599 (also known as 27903).

30 SEQ ID NO: 197 is the determined cDNA sequence for CT632 (also known as 27922).

SEQ ID NO: 198 is the predicted amino acid sequence for CT502 (SEQ ID NO: 187).

SEQ ID NO: 199 is the predicted amino acid sequence for CT507 (SEQ ID NO: 188).
SEQ ID NO: 200 is the predicted amino acid sequence for CT521 (SEQ ID NO: 189).
SEQ ID NO: 201 is the predicted amino acid sequence for CT544 (SEQ ID NO: 190).
SEQ ID NO: 202 is the predicted amino acid sequence for CT606 (SEQ ID NO: 194).
5 SEQ ID NO: 203 is the predicted amino acid sequence for CT607 (SEQ ID NO: 195).
SEQ ID NO: 204 is the predicted amino acid sequence for CT632 (SEQ ID NO: 197).
SEQ ID NO: 205 is the determined cDNA sequence for clone 25244.
SEQ ID NO: 206 is the determined cDNA sequence for clone 25245.
SEQ ID NO: 207 is the determined cDNA sequence for clone 25246.
10 SEQ ID NO: 208 is the determined cDNA sequence for clone 25248.
SEQ ID NO: 209 is the determined cDNA sequence for clone 25249.
SEQ ID NO: 210 is the determined cDNA sequence for clone 25250.
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SEQ ID NO: 212 is the determined cDNA sequence for clone 25252.
15 SEQ ID NO: 213 is the determined cDNA sequence for clone 25253.
SEQ ID NO: 214 is the determined cDNA sequence for clone 25254.
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SEQ ID NO: 216 is the determined cDNA sequence for clone 25256.
SEQ ID NO: 217 is the determined cDNA sequence for clone 25257.
20 SEQ ID NO: 218 is the determined cDNA sequence for clone 25259.
SEQ ID NO: 219 is the determined cDNA sequence for clone 25260.
SEQ ID NO: 220 is the determined cDNA sequence for clone 25261.
SEQ ID NO: 221 is the determined cDNA sequence for clone 25262.
SEQ ID NO: 222 is the determined cDNA sequence for clone 25263.
25 SEQ ID NO: 223 is the determined cDNA sequence for clone 25264.
SEQ ID NO: 224 is the determined cDNA sequence for clone 25265.
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SEQ ID NO: 226 is the determined cDNA sequence for clone 25267.
SEQ ID NO: 227 is the determined cDNA sequence for clone 25268.
30 SEQ ID NO: 228 is the determined cDNA sequence for clone 25269.
SEQ ID NO: 229 is the determined cDNA sequence for clone 25271.

SEQ ID NO: 230 is the determined cDNA sequence for clone 25272.
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5 SEQ ID NO: 234 is the determined cDNA sequence for clone 25276.
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20 SEQ ID NO: 249 is the determined cDNA sequence for clone 25292.
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25 SEQ ID NO: 254 is the determined cDNA sequence for clone 25297.
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10 SEQ ID NO: 270 is the determined cDNA sequence for clone 25434.
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30 SEQ ID NO: 290 is the determined cDNA sequence for clone 25850.
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10 SEQ ID NO: 301 is the determined cDNA sequence for clone 25861.
SEQ ID NO: 302 is the determined cDNA sequence for clone 25862.
SEQ ID NO: 303 is the determined cDNA sequence for clone 25863.
SEQ ID NO: 304 is the determined cDNA sequence for clone 25864.
SEQ ID NO: 305 is the determined cDNA sequence for clone 25865.
15 SEQ ID NO: 306 is the determined cDNA sequence for clone 25866.
SEQ ID NO: 307 is the determined cDNA sequence for clone 25867.
SEQ ID NO: 308 is the determined cDNA sequence for clone 25868.
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20 SEQ ID NO: 311 is the determined cDNA sequence for clone 25871.
SEQ ID NO: 312 is the determined cDNA sequence for clone 25872.
SEQ ID NO: 313 is the determined cDNA sequence for clone 25873.
SEQ ID NO: 314 is the determined cDNA sequence for clone 25875.
SEQ ID NO: 315 is the determined cDNA sequence for clone 25876.
25 SEQ ID NO: 316 is the determined cDNA sequence for clone 25877.
SEQ ID NO: 317 is the determined cDNA sequence for clone 25878.
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30 SEQ ID NO: 321 is the determined cDNA sequence for clone 25882.
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5 SEQ ID NO: 327 is the determined cDNA sequence for clone 25888.
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10 SEQ ID NO: 332 is the determined cDNA sequence for clone 25895.
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SEQ ID NO: 334 is the determined cDNA sequence for clone 25897.
SEQ ID NO: 335 is the determined cDNA sequence for clone 25899.
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15 SEQ ID NO: 337 is the determined cDNA sequence for clone 25901.
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20 SEQ ID NO: 342 is the determined cDNA sequence for clone 25907.
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25 SEQ ID NO: 347 is the determined cDNA sequence for clone 25912.
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30 SEQ ID NO: 383 is the determined cDNA sequence for clone 31980.
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10 SEQ ID NO: 394 is the determined cDNA sequence for clone 31986.
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15 SEQ ID NO: 399 is the determined cDNA sequence for clone 32012.
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20 SEQ ID NO: 404 is the determined cDNA sequence for clone 32011.
SEQ ID NO: 405 is the determined cDNA sequence for clone 32022.
SEQ ID NO: 406 is the determined cDNA sequence for clone 32014.
SEQ ID NO: 407 is the determined cDNA sequence for clone 31963.
SEQ ID NO: 408 is the determined cDNA sequence for clone 31989.
25 SEQ ID NO: 409 is the determined cDNA sequence for clone 32015.
SEQ ID NO: 410 is the determined cDNA sequence for clone 32002.
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30 SEQ ID NO: 414 is the determined cDNA sequence for clone 32007.
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SEQ ID NO: 416 is the determined cDNA sequence for clone 31935.
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5 SEQ ID NO: 420 is the determined cDNA sequence for clone 31971.
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10 SEQ ID NO: 425 is the determined cDNA sequence for clone 32006.
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SEQ ID NO: 427 is the determined cDNA sequence for clone 31995.
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SEQ ID NO: 434 is the determined cDNA sequence for clone 31996.
20 SEQ ID NO: 435 is the determined cDNA sequence for clone 32010.
SEQ ID NO: 436 is the determined cDNA sequence for clone 31974.
SEQ ID NO: 437 is the determined cDNA sequence for clone 31983.
SEQ ID NO: 438 is the determined cDNA sequence for clone 31999.
SEQ ID NO: 439 is the determined cDNA sequence for clone 31949.
25 SEQ ID NO: 440 is the determined cDNA sequence for clone 31947.
SEQ ID NO: 441 is the determined cDNA sequence for clone 31994.
SEQ ID NO: 442 is the determined cDNA sequence for clone 31958.
SEQ ID NO: 443 is the determined cDNA sequence for clone 31975.
SEQ ID NO: 444 is the determined cDNA sequence for clone 31984.
30 SEQ ID NO: 445 is the determined cDNA sequence for clone 32024.
SEQ ID NO: 446 is the determined cDNA sequence for clone 31972.

SEQ ID NO: 447 is the determined cDNA sequence for clone 31943.
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SEQ ID NO: 449 is the determined cDNA sequence for clone 32026.
SEQ ID NO: 450 is the determined cDNA sequence for clone 32009.
5 SEQ ID NO: 451 is the determined cDNA sequence for clone 32019.
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SEQ ID NO: 454 is the determined cDNA sequence for clone 31968.
SEQ ID NO: 455 is the determined cDNA sequence for clone 31955.
10 SEQ ID NO: 456 is the determined cDNA sequence for clone 31951.
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SEQ ID NO: 458 is the determined cDNA sequence for clone 31962.
SEQ ID NO: 459 is the determined cDNA sequence for clone 32001.
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15 SEQ ID NO: 461 is the determined cDNA sequence for clone 31944.
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SEQ ID NO: 463 is the determined cDNA sequence for clone 31828.
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SEQ ID NO: 465 is the determined cDNA sequence for clone 31841.
20 SEQ ID NO: 466 is the determined cDNA sequence for clone 31847.
SEQ ID NO: 467 is the determined cDNA sequence for clone 31850.
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SEQ ID NO: 469 is the determined cDNA sequence for clone 31855.
SEQ ID NO: 470 is the determined cDNA sequence for clone 31858.
25 SEQ ID NO: 471 is the determined cDNA sequence for clone 31861.
SEQ ID NO: 472 is the determined cDNA sequence for clone 31868.
SEQ ID NO: 473 is the determined cDNA sequence for clone 31870.
SEQ ID NO: 474 is the determined cDNA sequence for clone 31872.
SEQ ID NO: 475 is the determined cDNA sequence for clone 31873.
30 SEQ ID NO: 476 is the determined cDNA sequence for clone 31877.
SEQ ID NO: 477 is the determined cDNA sequence for clone 31878.

SEQ ID NO: 478 is the determined cDNA sequence for clone 31885.
SEQ ID NO: 479 is the determined cDNA sequence for clone 31888.
SEQ ID NO: 480 is the determined cDNA sequence for clone 31890.
SEQ ID NO: 481 is the determined cDNA sequence for clone 31893.
5 SEQ ID NO: 482 is the determined cDNA sequence for clone 31898.
SEQ ID NO: 483 is the determined cDNA sequence for clone 31901.
SEQ ID NO: 484 is the determined cDNA sequence for clone 31909.
SEQ ID NO: 485 is the determined cDNA sequence for clone 31910.
SEQ ID NO: 486 is the determined cDNA sequence for clone 31914.

10

DETAILED DESCRIPTION OF THE INVENTION

As noted above, the present invention is generally directed to compositions and methods for the therapy and diagnosis of cancer, such as colon cancer. The compositions described herein may include colon tumor polypeptides, polynucleotides encoding such
15 polypeptides, binding agents such as antibodies, antigen presenting cells (APCs) and/or immune system cells (*e.g.*, T cells). Polypeptides of the present invention generally comprise at least a portion (such as an immunogenic portion) of a colon tumor protein or a variant thereof. A "colon tumor protein" is a protein that is expressed in colon tumor cells at a level that is at least two fold, and preferably at least five fold, greater than the level of expression in
20 a normal tissue, as determined using a representative assay provided herein. Certain colon tumor proteins are tumor proteins that react detectably (within an immunoassay, such as an ELISA or Western blot) with antisera of a patient afflicted with colon cancer. Polynucleotides of the subject invention generally comprise a DNA or RNA sequence that encodes all or a portion of such a polypeptide, or that is complementary to such a sequence.
25 Antibodies are generally immune system proteins, or antigen-binding fragments thereof, that are capable of binding to a polypeptide as described above. Antigen presenting cells include dendritic cells, macrophages, monocytes, fibroblasts and B-cells that express a polypeptide as described above. T cells that may be employed within such compositions are generally T cells that are specific for a polypeptide as described above.

The present invention is based on the discovery of human colon tumor proteins. Sequences of polynucleotides encoding specific tumor proteins are provided in SEQ ID NO: 1-121, 123-197 and 205-486.

5 COLON TUMOR PROTEIN POLYNUCLEOTIDES

Any polynucleotide that encodes a colon tumor protein or a portion or other variant thereof as described herein is encompassed by the present invention. Preferred polynucleotides comprise at least 15 consecutive nucleotides, preferably at least 30 consecutive nucleotides and more preferably at least 45 consecutive nucleotides, that encode
10 a portion of a colon tumor protein. More preferably, a polynucleotide encodes an immunogenic portion of a colon tumor protein. Polynucleotides complementary to any such sequences are also encompassed by the present invention. Polynucleotides may be single-stranded (coding or antisense) or double-stranded, and may be DNA (genomic, cDNA or synthetic) or RNA molecules. RNA molecules include HnRNA molecules, which contain
15 introns and correspond to a DNA molecule in a one-to-one manner, and mRNA molecules, which do not contain introns. Additional coding or non-coding sequences may, but need not, be present within a polynucleotide of the present invention, and a polynucleotide may, but need not, be linked to other molecules and/or support materials.

Polynucleotides may comprise a native sequence (*i.e.*, an endogenous
20 sequence that encodes a colon tumor protein or a portion thereof) or may comprise a variant of such a sequence. Polynucleotide variants may contain one or more substitutions, additions, deletions and/or insertions such that the immunogenicity of the encoded polypeptide is not diminished, relative to a native tumor protein. The effect on the immunogenicity of the encoded polypeptide may generally be assessed as described herein.
25 Variants preferably exhibit at least about 70% identity, more preferably at least about 80% identity and most preferably at least about 90% identity to a polynucleotide sequence that encodes a native colon tumor protein or a portion thereof.

Two polynucleotide or polypeptide sequences are said to be "identical" if the sequence of nucleotides or amino acids in the two sequences is the same when aligned for
30 maximum correspondence as described below. Comparisons between two sequences are typically performed by comparing the sequences over a comparison window to identify and

compare local regions of sequence similarity. A "comparison window" as used herein, refers to a segment of at least about 20 contiguous positions, usually 30 to about 75, in which a sequence may be compared to a reference sequence of the same number of contiguous positions after the two sequences are optimally aligned.

5 Optimal alignment of sequences for comparison may be conducted using the Megalign program in the Lasergene suite of bioinformatics software (DNASTAR, Inc., Madison, WI), using default parameters. This program embodies several alignment schemes described in the following references: Dayhoff, M.O. (1978) A model of evolutionary change in proteins – Matrices for detecting distant relationships. In Dayhoff, M.O. (ed.) Atlas of
10 Protein Sequence and Structure, National Biomedical Research Foundation, Washington DC Vol. 5, Suppl. 3, pp. 345-358; Hein J. (1990) Unified Approach to Alignment and Phylogenesis pp. 626-645 *Methods in Enzymology* vol. 183, Academic Press, Inc., San Diego, CA; Higgins, D.G. and Sharp, P.M. (1989) *CABIOS* 5:151-153; Myers, E.W. and Muller W. (1988) *CABIOS* 4:11-17; Robinson, E.D. (1971) *Comb. Theor* 11:105; Santou, N. Nes, M.
15 (1987) *Mol. Biol. Evol.* 4:406-425; Sneath, P.H.A. and Sokal, R.R. (1973) *Numerical Taxonomy – the Principles and Practice of Numerical Taxonomy*, Freeman Press, San Francisco, CA; Wilbur, W.J. and Lipman, D.J. (1983) *Proc. Natl. Acad., Sci. USA* 80:726-730.

 Preferably, the "percentage of sequence identity" is determined by comparing
20 two optimally aligned sequences over a window of comparison of at least 20 positions, wherein the portion of the polynucleotide or polypeptide sequence in the comparison window may comprise additions or deletions (i.e. gaps) of 20 percent or less, usually 5 to 15 percent, or 10 to 12 percent, as compared to the reference sequence (which does not comprise additions or deletions) for optimal alignment of the two sequences. The percentage is
25 calculated by determining the number of positions at which the identical nucleic acid bases or amino acid residue occurs in both sequences to yield the number of matched positions, dividing the number of matched positions by the total number of positions in the reference sequence (i.e. the window size) and multiplying the results by 100 to yield the percentage of sequence identity.

30 Variants may also, or alternatively, be substantially homologous to a native gene, or a portion or complement thereof. Such polynucleotide variants are capable of

hybridizing under moderately stringent conditions to a naturally occurring DNA sequence encoding a native colon tumor protein (or a complementary sequence). Suitable moderately stringent conditions include prewashing in a solution of 5 X SSC, 0.5% SDS, 1.0 mM EDTA (pH 8.0); hybridizing at 50°C-65°C, 5 X SSC, overnight; followed by washing twice at 65°C
5 for 20 minutes with each of 2X, 0.5X and 0.2X SSC containing 0.1% SDS.

It will be appreciated by those of ordinary skill in the art that, as a result of the degeneracy of the genetic code, there are many nucleotide sequences that encode a polypeptide as described herein. Some of these polynucleotides bear minimal homology to the nucleotide sequence of any native gene. Nonetheless, polynucleotides that vary due to
10 differences in codon usage are specifically contemplated by the present invention. Further, alleles of the genes comprising the polynucleotide sequences provided herein are within the scope of the present invention. Alleles are endogenous genes that are altered as a result of one or more mutations, such as deletions, additions and/or substitutions of nucleotides. The resulting mRNA and protein may, but need not, have an altered structure or function. Alleles
15 may be identified using standard techniques (such as hybridization, amplification and/or database sequence comparison).

Polynucleotides may be prepared using any of a variety of techniques. For example, a polynucleotide may be identified, as described in more detail below, by screening a microarray of cDNAs for tumor-associated expression (*i.e.*, expression that is at least two
20 fold greater in a colon tumor than in normal tissue, as determined using a representative assay provided herein). Such screens may be performed using a Synteni microarray (Palo Alto, CA) according to the manufacturer's instructions (and essentially as described by Schena et al., *Proc. Natl. Acad. Sci. USA* 93:10614-10619, 1996 and Heller et al., *Proc. Natl. Acad. Sci. USA* 94:2150-2155, 1997). Alternatively, polypeptides may be amplified from cDNA
25 prepared from cells expressing the proteins described herein, such as colon tumor cells. Such polynucleotides may be amplified via polymerase chain reaction (PCR). For this approach, sequence-specific primers may be designed based on the sequences provided herein, and may be purchased or synthesized.

An amplified portion may be used to isolate a full length gene from a suitable
30 library (*e.g.*, a colon tumor cDNA library) using well known techniques. Within such techniques, a library (cDNA or genomic) is screened using one or more polynucleotide

probes or primers suitable for amplification. Preferably, a library is size-selected to include larger molecules. Random primed libraries may also be preferred for identifying 5' and upstream regions of genes. Genomic libraries are preferred for obtaining introns and extending 5' sequences.

5 For hybridization techniques, a partial sequence may be labeled (*e.g.*, by nick-translation or end-labeling with ^{32}P) using well known techniques. A bacterial or bacteriophage library is then screened by hybridizing filters containing denatured bacterial colonies (or lawns containing phage plaques) with the labeled probe (*see* Sambrook et al., *Molecular Cloning: A Laboratory Manual*, Cold Spring Harbor Laboratories, Cold Spring
10 Harbor, NY, 1989). Hybridizing colonies or plaques are selected and expanded, and the DNA is isolated for further analysis. cDNA clones may be analyzed to determine the amount of additional sequence by, for example, PCR using a primer from the partial sequence and a primer from the vector. Restriction maps and partial sequences may be generated to identify one or more overlapping clones. The complete sequence may then be determined using
15 standard techniques, which may involve generating a series of deletion clones. The resulting overlapping sequences are then assembled into a single contiguous sequence. A full length cDNA molecule can be generated by ligating suitable fragments, using well known techniques.

Alternatively, there are numerous amplification techniques for obtaining a full
20 length coding sequence from a partial cDNA sequence. Within such techniques, amplification is generally performed via PCR. Any of a variety of commercially available kits may be used to perform the amplification step. Primers may be designed using, for example, software well known in the art. Primers are preferably 22-30 nucleotides in length, have a GC content of at least 50% and anneal to the target sequence at temperatures of about
25 68°C to 72°C. The amplified region may be sequenced as described above, and overlapping sequences assembled into a contiguous sequence.

One such amplification technique is inverse PCR (*see* Triglia et al., *Nucl. Acids Res.* 16:8186, 1988), which uses restriction enzymes to generate a fragment in the known region of the gene. The fragment is then circularized by intramolecular ligation and
30 used as a template for PCR with divergent primers derived from the known region. Within an alternative approach, sequences adjacent to a partial sequence may be retrieved by

amplification with a primer to a linker sequence and a primer specific to a known region. The amplified sequences are typically subjected to a second round of amplification with the same linker primer and a second primer specific to the known region. A variation on this procedure, which employs two primers that initiate extension in opposite directions from the known sequence, is described in WO 96/38591. Another such technique is known as "rapid amplification of cDNA ends" or RACE. This technique involves the use of an internal primer and an external primer, which hybridizes to a polyA region or vector sequence, to identify sequences that are 5' and 3' of a known sequence. Additional techniques include capture PCR (Lagerstrom et al., *PCR Methods Applic. 1*:111-19, 1991) and walking PCR (Parker et al., *Nucl. Acids Res. 19*:3055-60, 1991). Other methods employing amplification may also be employed to obtain a full length cDNA sequence.

In certain instances, it is possible to obtain a full length cDNA sequence by analysis of sequences provided in an expressed sequence tag (EST) database, such as that available from GenBank. Searches for overlapping ESTs may generally be performed using well known programs (*e.g.*, NCBI BLAST searches), and such ESTs may be used to generate a contiguous full length sequence.

Certain nucleic acid sequences of cDNA molecules encoding portions of colon tumor proteins are provided in SEQ ID NO: 1-121, 123-197 and 205-486. These polynucleotides were isolated from colon tumor cDNA libraries using conventional and/or PCR-based subtraction techniques, as described below.

Polynucleotide variants may generally be prepared by any method known in the art, including chemical synthesis by, for example, solid phase phosphoramidite chemical synthesis. Modifications in a polynucleotide sequence may also be introduced using standard mutagenesis techniques, such as oligonucleotide-directed site-specific mutagenesis (*see* Adelman et al., *DNA 2*:183, 1983). Alternatively, RNA molecules may be generated by *in vitro* or *in vivo* transcription of DNA sequences encoding a colon tumor protein, or portion thereof, provided that the DNA is incorporated into a vector with a suitable RNA polymerase promoter (such as T7 or SP6). Certain portions may be used to prepare an encoded polypeptide, as described herein. In addition, or alternatively, a portion may be administered to a patient such that the encoded polypeptide is generated *in vivo* (*e.g.*, by transfecting

antigen-presenting cells, such as dendritic cells, with a cDNA construct encoding a colon tumor polypeptide, and administering the transfected cells to the patient).

A portion of a sequence complementary to a coding sequence (*i.e.*, an antisense polynucleotide) may also be used as a probe or to modulate gene expression. cDNA constructs that can be transcribed into antisense RNA may also be introduced into cells of tissues to facilitate the production of antisense RNA. An antisense polynucleotide may be used, as described herein, to inhibit expression of a tumor protein. Antisense technology can be used to control gene expression through triple-helix formation, which compromises the ability of the double helix to open sufficiently for the binding of polymerases, transcription factors or regulatory molecules (*see* Gee et al., *In Huber and Carr, Molecular and Immunologic Approaches*, Futura Publishing Co. (Mt. Kisco, NY; 1994)). Alternatively, an antisense molecule may be designed to hybridize with a control region of a gene (*e.g.*, promoter, enhancer or transcription initiation site), and block transcription of the gene; or to block translation by inhibiting binding of a transcript to ribosomes.

A portion of a coding sequence, or of a complementary sequence, may also be designed as a probe or primer to detect gene expression. Probes may be labeled with a variety of reporter groups, such as radionuclides and enzymes, and are preferably at least 10 nucleotides in length, more preferably at least 20 nucleotides in length and still more preferably at least 30 nucleotides in length. Primers, as noted above, are preferably 22-30 nucleotides in length.

Any polynucleotide may be further modified to increase stability *in vivo*. Possible modifications include, but are not limited to, the addition of flanking sequences at the 5' and/or 3' ends; the use of phosphorothioate or 2' O-methyl rather than phosphodiesterase linkages in the backbone; and/or the inclusion of nontraditional bases such as inosine, queosine and wybutosine, as well as acetyl-, methyl-, thio- and other modified forms of adenine, cytidine, guanine, thymine and uridine.

Nucleotide sequences as described herein may be joined to a variety of other nucleotide sequences using established recombinant DNA techniques. For example, a polynucleotide may be cloned into any of a variety of cloning vectors, including plasmids, phagemids, lambda phage derivatives and cosmids. Vectors of particular interest include expression vectors, replication vectors, probe generation vectors and sequencing vectors. In

general, a vector will contain an origin of replication functional in at least one organism, convenient restriction endonuclease sites and one or more selectable markers. Other elements will depend upon the desired use, and will be apparent to those of ordinary skill in the art.

Within certain embodiments, polynucleotides may be formulated so as to permit entry into a cell of a mammal, and expression therein. Such formulations are particularly useful for therapeutic purposes, as described below. Those of ordinary skill in the art will appreciate that there are many ways to achieve expression of a polynucleotide in a target cell, and any suitable method may be employed. For example, a polynucleotide may be incorporated into a viral vector such as, but not limited to, adenovirus, adeno-associated virus, retrovirus, or vaccinia or other pox virus (*e.g.*, avian pox virus). Techniques for incorporating DNA into such vectors are well known to those of ordinary skill in the art. A retroviral vector may additionally transfer or incorporate a gene for a selectable marker (to aid in the identification or selection of transduced cells) and/or a targeting moiety, such as a gene that encodes a ligand for a receptor on a specific target cell, to render the vector target specific. Targeting may also be accomplished using an antibody, by methods known to those of ordinary skill in the art.

Other formulations for therapeutic purposes include colloidal dispersion systems, such as macromolecule complexes, nanocapsules, microspheres, beads, and lipid-based systems including oil-in-water emulsions, micelles, mixed micelles, and liposomes. A preferred colloidal system for use as a delivery vehicle *in vitro* and *in vivo* is a liposome (*i.e.*, an artificial membrane vesicle). The preparation and use of such systems is well known in the art.

COLON TUMOR POLYPEPTIDES

Within the context of the present invention, polypeptides may comprise at least an immunogenic portion of a colon tumor protein or a variant thereof, as described herein. As noted above, a "colon tumor protein" is a protein that is expressed by colon tumor cells. Proteins that are colon tumor proteins also react detectably within an immunoassay (such as an ELISA) with antisera from a patient with colon cancer. Polypeptides as described herein may be of any length. Additional sequences derived from the native protein and/or

heterologous sequences may be present, and such sequences may (but need not) possess further immunogenic or antigenic properties.

An "immunogenic portion," as used herein is a portion of a protein that is recognized (*i.e.*, specifically bound) by a B-cell and/or T-cell surface antigen receptor. Such immunogenic portions generally comprise at least 5 amino acid residues, more preferably at least 10, and still more preferably at least 20 amino acid residues of a colon tumor protein or a variant thereof. Certain preferred immunogenic portions include peptides in which an N-terminal leader sequence and/or transmembrane domain have been deleted. Other preferred immunogenic portions may contain a small N- and/or C-terminal deletion (*e.g.*, 1-30 amino acids, preferably 5-15 amino acids), relative to the mature protein.

Immunogenic portions may generally be identified using well known techniques, such as those summarized in Paul, *Fundamental Immunology*, 3rd ed., 243-247 (Raven Press, 1993) and references cited therein. Such techniques include screening polypeptides for the ability to react with antigen-specific antibodies, antisera and/or T-cell lines or clones. As used herein, antisera and antibodies are "antigen-specific" if they specifically bind to an antigen (*i.e.*, they react with the protein in an ELISA or other immunoassay, and do not react detectably with unrelated proteins). Such antisera and antibodies may be prepared as described herein, and using well known techniques. An immunogenic portion of a native colon tumor protein is a portion that reacts with such antisera and/or T-cells at a level that is not substantially less than the reactivity of the full length polypeptide (*e.g.*, in an ELISA and/or T-cell reactivity assay). Such immunogenic portions may react within such assays at a level that is similar to or greater than the reactivity of the full length polypeptide. Such screens may generally be performed using methods well known to those of ordinary skill in the art, such as those described in Harlow and Lane, *Antibodies: A Laboratory Manual*, Cold Spring Harbor Laboratory, 1988. For example, a polypeptide may be immobilized on a solid support and contacted with patient sera to allow binding of antibodies within the sera to the immobilized polypeptide. Unbound sera may then be removed and bound antibodies detected using, for example, ¹²⁵I-labeled Protein A.

As noted above, a composition may comprise a variant of a native colon tumor protein. A polypeptide "variant," as used herein, is a polypeptide that differs from a native colon tumor protein in one or more substitutions, deletions, additions and/or insertions, such

that the immunogenicity of the polypeptide is not substantially diminished. In other words, the ability of a variant to react with antigen-specific antisera may be enhanced or unchanged, relative to the native protein, or may be diminished by less than 50%, and preferably less than 20%, relative to the native protein. Such variants may generally be identified by modifying one of the above polypeptide sequences and evaluating the reactivity of the modified polypeptide with antigen-specific antibodies or antisera as described herein. Preferred variants include those in which one or more portions, such as an N-terminal leader sequence or transmembrane domain, have been removed. Other preferred variants include variants in which a small portion (*e.g.*, 1-30 amino acids, preferably 5-15 amino acids) has been removed from the N- and/or C-terminal of the mature protein.

Polypeptide variants preferably exhibit at least about 70%, more preferably at least about 90% and most preferably at least about 95% identity (determined as described above) to the identified polypeptides.

Preferably, a variant contains conservative substitutions. A "conservative substitution" is one in which an amino acid is substituted for another amino acid that has similar properties, such that one skilled in the art of peptide chemistry would expect the secondary structure and hydropathic nature of the polypeptide to be substantially unchanged. Amino acid substitutions may generally be made on the basis of similarity in polarity, charge, solubility, hydrophobicity, hydrophilicity and/or the amphipathic nature of the residues. For example, negatively charged amino acids include aspartic acid and glutamic acid; positively charged amino acids include lysine and arginine; and amino acids with uncharged polar head groups having similar hydrophilicity values include leucine, isoleucine and valine; glycine and alanine; asparagine and glutamine; and serine, threonine, phenylalanine and tyrosine. Other groups of amino acids that may represent conservative changes include: (1) ala, pro, gly, glu, asp, gln, asn, ser, thr; (2) cys, ser, tyr, thr; (3) val, ile, leu, met, ala, phe; (4) lys, arg, his; and (5) phe, tyr, trp, his. A variant may also, or alternatively, contain non-conservative changes. In a preferred embodiment, variant polypeptides differ from a native sequence by substitution, deletion or addition of five amino acids or fewer. Variants may also (or alternatively) be modified by, for example, the deletion or addition of amino acids that have minimal influence on the immunogenicity, secondary structure and hydropathic nature of the polypeptide.

As noted above, polypeptides may comprise a signal (or leader) sequence at the N-terminal end of the protein which co-translationally or post-translationally directs transfer of the protein. The polypeptide may also be conjugated to a linker or other sequence for ease of synthesis, purification or identification of the polypeptide (*e.g.*, poly-His), or to enhance binding of the polypeptide to a solid support. For example, a polypeptide may be conjugated to an immunoglobulin Fc region.

Polypeptides may be prepared using any of a variety of well known techniques. Recombinant polypeptides encoded by DNA sequences as described above may be readily prepared from the DNA sequences using any of a variety of expression vectors known to those of ordinary skill in the art. Expression may be achieved in any appropriate host cell that has been transformed or transfected with an expression vector containing a DNA molecule that encodes a recombinant polypeptide. Suitable host cells include prokaryotes, yeast and higher eukaryotic cells. Preferably, the host cells employed are *E. coli*, yeast or a mammalian cell line such as COS or CHO. Supernatants from suitable host/vector systems which secrete recombinant protein or polypeptide into culture media may be first concentrated using a commercially available filter. Following concentration, the concentrate may be applied to a suitable purification matrix such as an affinity matrix or an ion exchange resin. Finally, one or more reverse phase HPLC steps can be employed to further purify a recombinant polypeptide.

Portions and other variants having fewer than about 100 amino acids, and generally fewer than about 50 amino acids, may also be generated by synthetic means, using techniques well known to those of ordinary skill in the art. For example, such polypeptides may be synthesized using any of the commercially available solid-phase techniques, such as the Merrifield solid-phase synthesis method, where amino acids are sequentially added to a growing amino acid chain. See Merrifield, *J. Am. Chem. Soc.* 85:2149-2146, 1963. Equipment for automated synthesis of polypeptides is commercially available from suppliers such as Perkin Elmer/Applied BioSystems Division (Foster City, CA), and may be operated according to the manufacturer's instructions.

Within certain specific embodiments, a polypeptide may be a fusion protein that comprises multiple polypeptides as described herein, or that comprises at least one polypeptide as described herein and an unrelated sequence, such as a known tumor protein. A

fusion partner may, for example, assist in providing T helper epitopes (an immunological fusion partner), preferably T helper epitopes recognized by humans, or may assist in expressing the protein (an expression enhancer) at higher yields than the native recombinant protein. Certain preferred fusion partners are both immunological and expression enhancing fusion partners. Other fusion partners may be selected so as to increase the solubility of the protein or to enable the protein to be targeted to desired intracellular compartments. Still further fusion partners include affinity tags, which facilitate purification of the protein.

Fusion proteins may generally be prepared using standard techniques, including chemical conjugation. Preferably, a fusion protein is expressed as a recombinant protein, allowing the production of increased levels, relative to a non-fused protein, in an expression system. Briefly, DNA sequences encoding the polypeptide components may be assembled separately, and ligated into an appropriate expression vector. The 3' end of the DNA sequence encoding one polypeptide component is ligated, with or without a peptide linker, to the 5' end of a DNA sequence encoding the second polypeptide component so that the reading frames of the sequences are in phase. This permits translation into a single fusion protein that retains the biological activity of both component polypeptides.

A peptide linker sequence may be employed to separate the first and the second polypeptide components by a distance sufficient to ensure that each polypeptide folds into its secondary and tertiary structures. Such a peptide linker sequence is incorporated into the fusion protein using standard techniques well known in the art. Suitable peptide linker sequences may be chosen based on the following factors: (1) their ability to adopt a flexible extended conformation; (2) their inability to adopt a secondary structure that could interact with functional epitopes on the first and second polypeptides; and (3) the lack of hydrophobic or charged residues that might react with the polypeptide functional epitopes. Preferred peptide linker sequences contain Gly, Asn and Ser residues. Other near neutral amino acids, such as Thr and Ala may also be used in the linker sequence. Amino acid sequences which may be usefully employed as linkers include those disclosed in Maratea et al., *Gene* 40:39-46, 1985; Murphy et al., *Proc. Natl. Acad. Sci. USA* 83:8258-8262, 1986; U.S. Patent No. 4,935,233 and U.S. Patent No. 4,751,180. The linker sequence may generally be from 1 to about 50 amino acids in length. Linker sequences are not required when the first and

second polypeptides have non-essential N-terminal amino acid regions that can be used to separate the functional domains and prevent steric interference.

The ligated DNA sequences are operably linked to suitable transcriptional or translational regulatory elements. The regulatory elements responsible for expression of DNA are located only 5' to the DNA sequence encoding the first polypeptides. Similarly, stop codons required to end translation and transcription termination signals are only present 3' to the DNA sequence encoding the second polypeptide.

Fusion proteins are also provided that comprise a polypeptide of the present invention together with an unrelated immunogenic protein. Preferably the immunogenic protein is capable of eliciting a recall response. Examples of such proteins include tetanus, tuberculosis and hepatitis proteins (*see, for example, Stoute et al. New Engl. J. Med.*, 336:86-91, 1997).

Within preferred embodiments, an immunological fusion partner is derived from protein D, a surface protein of the gram-negative bacterium *Haemophilus influenza B* (WO 91/18926). Preferably, a protein D derivative comprises approximately the first third of the protein (*e.g.*, the first N-terminal 100-110 amino acids), and a protein D derivative may be lipidated. Within certain preferred embodiments, the first 109 residues of a Lipoprotein D fusion partner is included on the N-terminus to provide the polypeptide with additional exogenous T-cell epitopes and to increase the expression level in *E. coli* (thus functioning as an expression enhancer). The lipid tail ensures optimal presentation of the antigen to antigen presenting cells. Other fusion partners include the non-structural protein from influenzae virus, NS1 (hemagglutinin). Typically, the N-terminal 81 amino acids are used, although different fragments that include T-helper epitopes may be used.

In another embodiment, the immunological fusion partner is the protein known as LYTA, or a portion thereof (preferably a C-terminal portion). LYTA is derived from *Streptococcus pneumoniae*, which synthesizes an N-acetyl-L-alanine amidase known as amidase LYTA (encoded by the *LytA* gene; *Gene* 43:265-292, 1986). LYTA is an autolysin that specifically degrades certain bonds in the peptidoglycan backbone. The C-terminal domain of the LYTA protein is responsible for the affinity to the choline or to some choline analogues such as DEAE. This property has been exploited for the development of *E. coli* C-LYTA expressing plasmids useful for expression of fusion proteins. Purification of hybrid

proteins containing the C-LYTA fragment at the amino terminus has been described (*see Biotechnology 10:795-798, 1992*). Within a preferred embodiment, a repeat portion of LYTA may be incorporated into a fusion protein. A repeat portion is found in the C-terminal region starting at residue 178. A particularly preferred repeat portion incorporates residues 188-305.

5 In general, polypeptides (including fusion proteins) and polynucleotides as described herein are isolated. An "isolated" polypeptide or polynucleotide is one that is removed from its original environment. For example, a naturally-occurring protein is isolated if it is separated from some or all of the coexisting materials in the natural system. Preferably, such polypeptides are at least about 90% pure, more preferably at least about 95%
10 pure and most preferably at least about 99% pure. A polynucleotide is considered to be isolated if, for example, it is cloned into a vector that is not a part of the natural environment.

BINDING AGENTS

The present invention further provides agents, such as antibodies and antigen-
15 binding fragments thereof, that specifically bind to a colon tumor protein. As used herein, an antibody, or antigen-binding fragment thereof, is said to "specifically bind" to a colon tumor protein if it reacts at a detectable level (within, for example, an ELISA) with a colon tumor protein, and does not react detectably with unrelated proteins under similar conditions. As used herein, "binding" refers to a noncovalent association between two separate molecules
20 such that a complex is formed. The ability to bind may be evaluated by, for example, determining a binding constant for the formation of the complex. The binding constant is the value obtained when the concentration of the complex is divided by the product of the component concentrations. In general, two compounds are said to "bind," in the context of the present invention, when the binding constant for complex formation exceeds about 10^3
25 L/mol. The binding constant may be determined using methods well known in the art.

Binding agents may be further capable of differentiating between patients with and without a cancer, such as colon cancer, using the representative assays provided herein. In other words, antibodies or other binding agents that bind to a colon tumor protein will generate a signal indicating the presence of a cancer in at least about 20% of patients with the
30 disease, and will generate a negative signal indicating the absence of the disease in at least about 90% of individuals without the cancer. To determine whether a binding agent satisfies

this requirement, biological samples (*e.g.*, blood, sera, sputum, urine and/or tumor biopsies) from patients with and without a cancer (as determined using standard clinical tests) may be assayed as described herein for the presence of polypeptides that bind to the binding agent. It will be apparent that a statistically significant number of samples with and without the disease should be assayed. Each binding agent should satisfy the above criteria; however, those of ordinary skill in the art will recognize that binding agents may be used in combination to improve sensitivity.

Any agent that satisfies the above requirements may be a binding agent. For example, a binding agent may be a ribosome, with or without a peptide component, an RNA molecule or a polypeptide. In a preferred embodiment, a binding agent is an antibody or an antigen-binding fragment thereof. Antibodies may be prepared by any of a variety of techniques known to those of ordinary skill in the art. *See, e.g.*, Harlow and Lane, *Antibodies: A Laboratory Manual*, Cold Spring Harbor Laboratory, 1988. In general, antibodies can be produced by cell culture techniques, including the generation of monoclonal antibodies as described herein, or via transfection of antibody genes into suitable bacterial or mammalian cell hosts, in order to allow for the production of recombinant antibodies. In one technique, an immunogen comprising the polypeptide is initially injected into any of a wide variety of mammals (*e.g.*, mice, rats, rabbits, sheep or goats). In this step, the polypeptides of this invention may serve as the immunogen without modification. Alternatively, particularly for relatively short polypeptides, a superior immune response may be elicited if the polypeptide is joined to a carrier protein, such as bovine serum albumin or keyhole limpet hemocyanin. The immunogen is injected into the animal host, preferably according to a predetermined schedule incorporating one or more booster immunizations, and the animals are bled periodically. Polyclonal antibodies specific for the polypeptide may then be purified from such antisera by, for example, affinity chromatography using the polypeptide coupled to a suitable solid support.

Monoclonal antibodies specific for an antigenic polypeptide of interest may be prepared, for example, using the technique of Kohler and Milstein, *Eur. J. Immunol.* 6:511-519, 1976, and improvements thereto. Briefly, these methods involve the preparation of immortal cell lines capable of producing antibodies having the desired specificity (*i.e.*, reactivity with the polypeptide of interest). Such cell lines may be produced, for example,

from spleen cells obtained from an animal immunized as described above. The spleen cells are then immortalized by, for example, fusion with a myeloma cell fusion partner, preferably one that is syngeneic with the immunized animal. A variety of fusion techniques may be employed. For example, the spleen cells and myeloma cells may be combined with a nonionic detergent for a few minutes and then plated at low density on a selective medium that supports the growth of hybrid cells, but not myeloma cells. A preferred selection technique uses HAT (hypoxanthine, aminopterin, thymidine) selection. After a sufficient time, usually about 1 to 2 weeks, colonies of hybrids are observed. Single colonies are selected and their culture supernatants tested for binding activity against the polypeptide. Hybridomas having high reactivity and specificity are preferred.

Monoclonal antibodies may be isolated from the supernatants of growing hybridoma colonies. In addition, various techniques may be employed to enhance the yield, such as injection of the hybridoma cell line into the peritoneal cavity of a suitable vertebrate host, such as a mouse. Monoclonal antibodies may then be harvested from the ascites fluid or the blood. Contaminants may be removed from the antibodies by conventional techniques, such as chromatography, gel filtration, precipitation, and extraction. The polypeptides of this invention may be used in the purification process in, for example, an affinity chromatography step.

Within certain embodiments, the use of antigen-binding fragments of antibodies may be preferred. Such fragments include Fab fragments, which may be prepared using standard techniques. Briefly, immunoglobulins may be purified from rabbit serum by affinity chromatography on Protein A bead columns (Harlow and Lane, *Antibodies: A Laboratory Manual*, Cold Spring Harbor Laboratory, 1988) and digested by papain to yield Fab and Fc fragments. The Fab and Fc fragments may be separated by affinity chromatography on protein A bead columns.

Monoclonal antibodies of the present invention may be coupled to one or more therapeutic agents. Suitable agents in this regard include radionuclides, differentiation inducers, drugs, toxins, and derivatives thereof. Preferred radionuclides include ^{90}Y , ^{123}I , ^{125}I , ^{131}I , ^{186}Re , ^{188}Re , ^{211}At , and ^{212}Bi . Preferred drugs include methotrexate, and pyrimidine and purine analogs. Preferred differentiation inducers include phorbol esters and butyric acid.

Preferred toxins include ricin, abrin, diphtheria toxin, cholera toxin, gelonin, *Pseudomonas* exotoxin, *Shigella* toxin, and pokeweed antiviral protein.

A therapeutic agent may be coupled (*e.g.*, covalently bonded) to a suitable monoclonal antibody either directly or indirectly (*e.g.*, via a linker group). A direct reaction
5 between an agent and an antibody is possible when each possesses a substituent capable of reacting with the other. For example, a nucleophilic group, such as an amino or sulfhydryl group, on one may be capable of reacting with a carbonyl-containing group, such as an anhydride or an acid halide, or with an alkyl group containing a good leaving group (*e.g.*, a halide) on the other.

10 Alternatively, it may be desirable to couple a therapeutic agent and an antibody via a linker group. A linker group can function as a spacer to distance an antibody from an agent in order to avoid interference with binding capabilities. A linker group can also serve to increase the chemical reactivity of a substituent on an agent or an antibody, and thus increase the coupling efficiency. An increase in chemical reactivity may also facilitate
15 the use of agents, or functional groups on agents, which otherwise would not be possible.

It will be evident to those skilled in the art that a variety of bifunctional or polyfunctional reagents, both homo- and hetero-functional (such as those described in the catalog of the Pierce Chemical Co., Rockford, IL), may be employed as the linker group. Coupling may be effected, for example, through amino groups, carboxyl groups, sulfhydryl
20 groups or oxidized carbohydrate residues. There are numerous references describing such methodology, *e.g.*, U.S. Patent No. 4,671,958, to Rodwell et al.

Where a therapeutic agent is more potent when free from the antibody portion of the immunoconjugates of the present invention, it may be desirable to use a linker group which is cleavable during or upon internalization into a cell. A number of different cleavable
25 linker groups have been described. The mechanisms for the intracellular release of an agent from these linker groups include cleavage by reduction of a disulfide bond (*e.g.*, U.S. Patent No. 4,489,710, to Spitler), by irradiation of a photolabile bond (*e.g.*, U.S. Patent No. 4,625,014, to Senter et al.), by hydrolysis of derivatized amino acid side chains (*e.g.*, U.S. Patent No. 4,638,045, to Kohn et al.), by serum complement-mediated hydrolysis (*e.g.*, U.S.
30 Patent No. 4,671,958, to Rodwell et al.), and acid-catalyzed hydrolysis (*e.g.*, U.S. Patent No. 4,569,789, to Blattler et al.).

It may be desirable to couple more than one agent to an antibody. In one embodiment, multiple molecules of an agent are coupled to one antibody molecule. In another embodiment, more than one type of agent may be coupled to one antibody. Regardless of the particular embodiment, immunoconjugates with more than one agent may be prepared in a variety of ways. For example, more than one agent may be coupled directly to an antibody molecule, or linkers which provide multiple sites for attachment can be used. Alternatively, a carrier can be used.

A carrier may bear the agents in a variety of ways, including covalent bonding either directly or via a linker group. Suitable carriers include proteins such as albumins (*e.g.*, U.S. Patent No. 4,507,234, to Kato et al.), peptides and polysaccharides such as aminodextran (*e.g.*, U.S. Patent No. 4,699,784, to Shih et al.). A carrier may also bear an agent by noncovalent bonding or by encapsulation, such as within a liposome vesicle (*e.g.*, U.S. Patent Nos. 4,429,008 and 4,873,088). Carriers specific for radionuclide agents include radiohalogenated small molecules and chelating compounds. For example, U.S. Patent No. 4,735,792 discloses representative radiohalogenated small molecules and their synthesis. A radionuclide chelate may be formed from chelating compounds that include those containing nitrogen and sulfur atoms as the donor atoms for binding the metal, or metal oxide, radionuclide. For example, U.S. Patent No. 4,673,562, to Davison et al. discloses representative chelating compounds and their synthesis.

A variety of routes of administration for the antibodies and immunoconjugates may be used. Typically, administration will be intravenous, intramuscular, subcutaneous or in the bed of a resected tumor. It will be evident that the precise dose of the antibody/immunoconjugate will vary depending upon the antibody used, the antigen density on the tumor, and the rate of clearance of the antibody.

T CELLS

Immunotherapeutic compositions may also, or alternatively, comprise T cells specific for a colon tumor protein. Such cells may generally be prepared *in vitro* or *ex vivo*, using standard procedures. For example, T cells may be isolated from bone marrow, peripheral blood, or a fraction of bone marrow or peripheral blood of a patient, using a commercially available cell separation system, such as the ISOLEX™ system, available from

Nexell Therapeutics Inc., Irvine, CA . Alternatively, T cells may be derived from related or unrelated humans, non-human mammals, cell lines or cultures.

T cells may be stimulated with a colon tumor polypeptide, polynucleotide encoding a colon tumor polypeptide and/or an antigen presenting cell (APC) that expresses such a polypeptide. Such stimulation is performed under conditions and for a time sufficient to permit the generation of T cells that are specific for the polypeptide. Preferably, a colon tumor polypeptide or polynucleotide is present within a delivery vehicle, such as a microsphere, to facilitate the generation of specific T cells.

T cells are considered to be specific for a colon tumor polypeptide if the T cells kill target cells coated with the polypeptide or expressing a gene encoding the polypeptide. T cell specificity may be evaluated using any of a variety of standard techniques. For example, within a chromium release assay or proliferation assay, a stimulation index of more than two fold increase in lysis and/or proliferation, compared to negative controls, indicates T cell specificity. Such assays may be performed, for example, as described in Chen et al., *Cancer Res.* 54:1065-1070, 1994. Alternatively, detection of the proliferation of T cells may be accomplished by a variety of known techniques. For example, T cell proliferation can be detected by measuring an increased rate of DNA synthesis (*e.g.*, by pulse-labeling cultures of T cells with tritiated thymidine and measuring the amount of tritiated thymidine incorporated into DNA). Contact with a colon tumor polypeptide (100 ng/ml - 100 µg/ml, preferably 200 ng/ml - 25 µg/ml) for 3 - 7 days should result in at least a two fold increase in proliferation of the T cells. Contact as described above for 2-3 hours should result in activation of the T cells, as measured using standard cytokine assays in which a two fold increase in the level of cytokine release (*e.g.*, TNF or IFN-γ) is indicative of T cell activation (*see* Coligan et al., *Current Protocols in Immunology*, vol. 1, Wiley Interscience (Greene 1998)). T cells that have been activated in response to a colon tumor polypeptide, polynucleotide or polypeptide-expressing APC may be CD4⁺ and/or CD8⁺. Colon tumor protein-specific T cells may be expanded using standard techniques. Within preferred embodiments, the T cells are derived from either a patient or a related, or unrelated, donor and are administered to the patient following stimulation and expansion.

For therapeutic purposes, CD4⁺ or CD8⁺ T cells that proliferate in response to a colon tumor polypeptide, polynucleotide or APC can be expanded in number either *in vitro*

or *in vivo*. Proliferation of such T cells *in vitro* may be accomplished in a variety of ways. For example, the T cells can be re-exposed to a colon tumor polypeptide, or a short peptide corresponding to an immunogenic portion of such a polypeptide, with or without the addition of T cell growth factors, such as interleukin-2, and/or stimulator cells that synthesize a colon tumor polypeptide. Alternatively, one or more T cells that proliferate in the presence of a colon tumor protein can be expanded in number by cloning. Methods for cloning cells are well known in the art, and include limiting dilution.

PHARMACEUTICAL COMPOSITIONS AND VACCINES

Within certain aspects, polypeptides, polynucleotides, T cells and/or binding agents disclosed herein may be incorporated into pharmaceutical compositions or immunogenic compositions (*i.e.*, vaccines). Pharmaceutical compositions comprise one or more such compounds and a physiologically acceptable carrier. Vaccines may comprise one or more such compounds and an immunostimulant. An immunostimulant may be any substance that enhances or potentiates an immune response to an exogenous antigen. Examples of immunostimulants include adjuvants, biodegradable microspheres (*e.g.*, polylactic galactide) and liposomes (into which the compound is incorporated; *see e.g.*, Fullerton, U.S. Patent No. 4,235,877). Vaccine preparation is generally described in, for example, M.F. Powell and M.J. Newman, eds., "Vaccine Design (the subunit and adjuvant approach)," Plenum Press (NY, 1995). Pharmaceutical compositions and vaccines within the scope of the present invention may also contain other compounds, which may be biologically active or inactive. For example, one or more immunogenic portions of other tumor antigens may be present, either incorporated into a fusion polypeptide or as a separate compound, within the composition or vaccine.

A pharmaceutical composition or vaccine may contain DNA encoding one or more of the polypeptides as described above, such that the polypeptide is generated *in situ*. As noted above, the DNA may be present within any of a variety of delivery systems known to those of ordinary skill in the art, including nucleic acid expression systems, bacteria and viral expression systems. Numerous gene delivery techniques are well known in the art, such as those described by Rolland, *Crit. Rev. Therap. Drug Carrier Systems* 15:143-198, 1998, and references cited therein. Appropriate nucleic acid expression systems contain the

necessary DNA sequences for expression in the patient (such as a suitable promoter and terminating signal). Bacterial delivery systems involve the administration of a bacterium (such as *Bacillus-Calmette-Guerrin*) that expresses an immunogenic portion of the polypeptide on its cell surface or secretes such an epitope. In a preferred embodiment, the DNA may be introduced using a viral expression system (e.g., vaccinia or other pox virus, retrovirus, or adenovirus), which may involve the use of a non-pathogenic (defective), replication competent virus. Suitable systems are disclosed, for example, in Fisher-Hoch et al., *Proc. Natl. Acad. Sci. USA* 86:317-321, 1989; Flexner et al., *Ann. N.Y. Acad. Sci.* 569:86-103, 1989; Flexner et al., *Vaccine* 8:17-21, 1990; U.S. Patent Nos. 4,603,112, 4,769,330, and 5,017,487; WO 89/01973; U.S. Patent No. 4,777,127; GB 2,200,651; EP 0,345,242; WO 91/02805; Berkner, *Biotechniques* 6:616-627, 1988; Rosenfeld et al., *Science* 252:431-434, 1991; Kolls et al., *Proc. Natl. Acad. Sci. USA* 91:215-219, 1994; Kass-Eisler et al., *Proc. Natl. Acad. Sci. USA* 90:11498-11502, 1993; Guzman et al., *Circulation* 88:2838-2848, 1993; and Guzman et al., *Cir. Res.* 73:1202-1207, 1993. Techniques for incorporating DNA into such expression systems are well known to those of ordinary skill in the art. The DNA may also be "naked," as described, for example, in Ulmer et al., *Science* 259:1745-1749, 1993 and reviewed by Cohen, *Science* 259:1691-1692, 1993. The uptake of naked DNA may be increased by coating the DNA onto biodegradable beads, which are efficiently transported into the cells.

While any suitable carrier known to those of ordinary skill in the art may be employed in the pharmaceutical compositions of this invention, the type of carrier will vary depending on the mode of administration. Compositions of the present invention may be formulated for any appropriate manner of administration, including for example, topical, oral, nasal, intravenous, intracranial, intraperitoneal, subcutaneous or intramuscular administration. For parenteral administration, such as subcutaneous injection, the carrier preferably comprises water, saline, alcohol, a fat, a wax or a buffer. For oral administration, any of the above carriers or a solid carrier, such as mannitol, lactose, starch, magnesium stearate, sodium saccharine, talcum, cellulose, glucose, sucrose, and magnesium carbonate, may be employed. Biodegradable microspheres (e.g., polylactate polyglycolate) may also be employed as carriers for the pharmaceutical compositions of this invention. Suitable biodegradable microspheres are disclosed, for example, in U.S. Patent Nos. 4,897,268 and

5,075,109.

Such compositions may also comprise buffers (*e.g.*, neutral buffered saline or phosphate buffered saline), carbohydrates (*e.g.*, glucose, mannose, sucrose or dextrans), mannitol, proteins, polypeptides or amino acids such as glycine, antioxidants, chelating agents such as EDTA or glutathione, adjuvants (*e.g.*, aluminum hydroxide) and/or preservatives. Alternatively, compositions of the present invention may be formulated as a lyophilizate. Compounds may also be encapsulated within liposomes using well known technology.

Any of a variety of immunostimulants may be employed in the vaccines of this invention. For example, an adjuvant may be included. Most adjuvants contain a substance designed to protect the antigen from rapid catabolism, such as aluminum hydroxide or mineral oil, and a stimulator of immune responses, such as lipid A, *Bordetella pertussis* or *Mycobacterium tuberculosis* derived proteins. Suitable adjuvants are commercially available as, for example, Freund's Incomplete Adjuvant and Complete Adjuvant (Difco Laboratories, Detroit, MI); Merck Adjuvant 65 (Merck and Company, Inc., Rahway, NJ); aluminum salts such as aluminum hydroxide gel (alum) or aluminum phosphate; salts of calcium, iron or zinc; an insoluble suspension of acylated tyrosine; acylated sugars; cationically or anionically derivatized polysaccharides; polyphosphazenes; biodegradable microspheres; monophosphoryl lipid A and quil A. Cytokines, such as GM-CSF or interleukin-2, -7, or -12, may also be used as adjuvants.

Within the vaccines provided herein, the adjuvant composition is preferably designed to induce an immune response predominantly of the Th1 type. High levels of Th1-type cytokines (*e.g.*, IFN- γ , TNF α , IL-2 and IL-12) tend to favor the induction of cell mediated immune responses to an administered antigen. In contrast, high levels of Th2-type cytokines (*e.g.*, IL-4, IL-5, IL-6 and IL-10) tend to favor the induction of humoral immune responses. Following application of a vaccine as provided herein, a patient will support an immune response that includes Th1- and Th2-type responses. Within a preferred embodiment, in which a response is predominantly Th1-type, the level of Th1-type cytokines will increase to a greater extent than the level of Th2-type cytokines. The levels of these cytokines may be readily assessed using standard assays. For a review of the families of cytokines, see Mosmann and Coffman, *Ann. Rev. Immunol.* 7:145-173, 1989.

Preferred adjuvants for use in eliciting a predominantly Th1-type response include, for example, a combination of monophosphoryl lipid A, preferably 3-de-O-acylated monophosphoryl lipid A (3D-MPL), together with an aluminum salt. MPL adjuvants are available from Ribi ImmunoChem Research Inc. (Hamilton, MT) (*see* US Patent Nos. 4,436,727; 4,877,611; 4,866,034 and 4,912,094). CpG-containing oligonucleotides (in which the CpG dinucleotide is unmethylated) also induce a predominantly Th1 response. Such oligonucleotides are well known and are described, for example, in WO 96/02555. Another preferred adjuvant is a saponin, preferably QS21, which may be used alone or in combination with other adjuvants. For example, an enhanced system involves the combination of a monophosphoryl lipid A and saponin derivative, such as the combination of QS21 and 3D-MPL as described in WO 94/00153, or a less reactogenic composition where the QS21 is quenched with cholesterol, as described in WO 96/33739. Other preferred formulations comprises an oil-in-water emulsion and tocopherol. A particularly potent adjuvant formulation involving QS21, 3D-MPL and tocopherol in an oil-in-water emulsion is described in WO 95/17210. Any vaccine provided herein may be prepared using well known methods that result in a combination of antigen, immune response enhancer and a suitable carrier or excipient.

The compositions described herein may be administered as part of a sustained release formulation (*i.e.*, a formulation such as a capsule, sponge or gel (composed of polysaccharides, for example) that effects a slow release of compound following administration). Such formulations may generally be prepared using well known technology and administered by, for example, oral, rectal or subcutaneous implantation, or by implantation at the desired target site. Sustained-release formulations may contain a polypeptide, polynucleotide or antibody dispersed in a carrier matrix and/or contained within a reservoir surrounded by a rate controlling membrane. Carriers for use within such formulations are biocompatible, and may also be biodegradable; preferably the formulation provides a relatively constant level of active component release. The amount of active compound contained within a sustained release formulation depends upon the site of implantation, the rate and expected duration of release and the nature of the condition to be treated or prevented.

Any of a variety of delivery vehicles may be employed within pharmaceutical

compositions and vaccines to facilitate production of an antigen-specific immune response that targets tumor cells. Delivery vehicles include antigen presenting cells (APCs), such as dendritic cells, macrophages, B cells, monocytes and other cells that may be engineered to be efficient APCs. Such cells may, but need not, be genetically modified to increase the capacity for presenting the antigen, to improve activation and/or maintenance of the T cell response, to have anti-tumor effects *per se* and/or to be immunologically compatible with the receiver (*i.e.*, matched HLA haplotype). APCs may generally be isolated from any of a variety of biological fluids and organs, including tumor and peritumoral tissues, and may be autologous, allogeneic, syngeneic or xenogeneic cells.

Certain preferred embodiments of the present invention use dendritic cells or progenitors thereof as antigen-presenting cells. Dendritic cells are highly potent APCs (Banchereau and Steinman, *Nature* 392:245-251, 1998) and have been shown to be effective as a physiological adjuvant for eliciting prophylactic or therapeutic antitumor immunity (*see* Timmerman and Levy, *Ann. Rev. Med.* 50:507-529, 1999). In general, dendritic cells may be identified based on their typical shape (stellate *in situ*, with marked cytoplasmic processes (dendrites) visible *in vitro*), their ability to take up, process and present antigens with high efficiency, and their ability to activate naïve T cell responses. Dendritic cells may, of course, be engineered to express specific cell-surface receptors or ligands that are not commonly found on dendritic cells *in vivo* or *ex vivo*, and such modified dendritic cells are contemplated by the present invention. As an alternative to dendritic cells, secreted vesicles antigen-loaded dendritic cells (called exosomes) may be used within a vaccine (*see* Zitvogel et al., *Nature Med.* 4:594-600, 1998).

Dendritic cells and progenitors may be obtained from peripheral blood, bone marrow, tumor-infiltrating cells, peritumoral tissues-infiltrating cells, lymph nodes, spleen, skin, umbilical cord blood or any other suitable tissue or fluid. For example, dendritic cells may be differentiated *ex vivo* by adding a combination of cytokines such as GM-CSF, IL-4, IL-13 and/or TNF α to cultures of monocytes harvested from peripheral blood. Alternatively, CD34 positive cells harvested from peripheral blood, umbilical cord blood or bone marrow may be differentiated into dendritic cells by adding to the culture medium combinations of GM-CSF, IL-3, TNF α , CD40 ligand, LPS, flt3 ligand and/or other compound(s) that induce differentiation, maturation and proliferation of dendritic cells.

Dendritic cells are conveniently categorized as "immature" and "mature" cells, which allows a simple way to discriminate between two well characterized phenotypes. However, this nomenclature should not be construed to exclude all possible intermediate stages of differentiation. Immature dendritic cells are characterized as APC with a high capacity for antigen uptake and processing, which correlates with the high expression of Fcγ receptor and mannose receptor. The mature phenotype is typically characterized by a lower expression of these markers, but a high expression of cell surface molecules responsible for T cell activation such as class I and class II MHC, adhesion molecules (*e.g.*, CD54 and CD11) and costimulatory molecules (*e.g.*, CD40, CD80, CD86 and 4-1BB).

APCs may generally be transfected with a polynucleotide encoding a colon tumor protein (or portion or other variant thereof) such that the colon tumor polypeptide, or an immunogenic portion thereof, is expressed on the cell surface. Such transfection may take place *ex vivo*, and a composition or vaccine comprising such transfected cells may then be used for therapeutic purposes, as described herein. Alternatively, a gene delivery vehicle that targets a dendritic or other antigen presenting cell may be administered to a patient, resulting in transfection that occurs *in vivo*. *In vivo* and *ex vivo* transfection of dendritic cells, for example, may generally be performed using any methods known in the art, such as those described in WO 97/24447, or the gene gun approach described by Mahvi et al., *Immunology and cell Biology* 75:456-460, 1997. Antigen loading of dendritic cells may be achieved by incubating dendritic cells or progenitor cells with the colon tumor polypeptide, DNA (naked or within a plasmid vector) or RNA; or with antigen-expressing recombinant bacterium or viruses (*e.g.*, vaccinia, fowlpox, adenovirus or lentivirus vectors). Prior to loading, the polypeptide may be covalently conjugated to an immunological partner that provides T cell help (*e.g.*, a carrier molecule). Alternatively, a dendritic cell may be pulsed with a non-conjugated immunological partner, separately or in the presence of the polypeptide.

CANCER THERAPY

In further aspects of the present invention, the compositions described herein may be used for immunotherapy of cancer, such as colon cancer. Within such methods, pharmaceutical compositions and vaccines are typically administered to a patient. As used herein, a "patient" refers to any warm-blooded animal, preferably a human. A patient may or

may not be afflicted with cancer. Accordingly, the above pharmaceutical compositions and vaccines may be used to prevent the development of a cancer or to treat a patient afflicted with a cancer. A cancer may be diagnosed using criteria generally accepted in the art, including the presence of a malignant tumor. Pharmaceutical compositions and vaccines may
5 be administered either prior to or following surgical removal of primary tumors and/or treatment such as administration of radiotherapy or conventional chemotherapeutic drugs.

Within certain embodiments, immunotherapy may be active immunotherapy, in which treatment relies on the *in vivo* stimulation of the endogenous host immune system to react against tumors with the administration of immune response-modifying agents (such as
10 polypeptides and polynucleotides disclosed herein).

Within other embodiments, immunotherapy may be passive immunotherapy, in which treatment involves the delivery of agents with established tumor-immune reactivity (such as effector cells or antibodies) that can directly or indirectly mediate antitumor effects and does not necessarily depend on an intact host immune system. Examples of effector cells
15 include T cells as discussed above, T lymphocytes (such as CD8⁺ cytotoxic T lymphocytes and CD4⁺ T-helper tumor-infiltrating lymphocytes), killer cells (such as Natural Killer cells and lymphokine-activated killer cells), B cells and antigen-presenting cells (such as dendritic cells and macrophages) expressing a polypeptide provided herein. T cell receptors and antibody receptors specific for the polypeptides recited herein may be cloned, expressed and
20 transferred into other vectors or effector cells for adoptive immunotherapy. The polypeptides provided herein may also be used to generate antibodies or anti-idiotypic antibodies (as described above and in U.S. Patent No. 4,918,164) for passive immunotherapy.

Effector cells may generally be obtained in sufficient quantities for adoptive immunotherapy by growth *in vitro*, as described herein. Culture conditions for expanding
25 single antigen-specific effector cells to several billion in number with retention of antigen recognition *in vivo* are well known in the art. Such *in vitro* culture conditions typically use intermittent stimulation with antigen, often in the presence of cytokines (such as IL-2) and non-dividing feeder cells. As noted above, immunoreactive polypeptides as provided herein may be used to rapidly expand antigen-specific T cell cultures in order to generate a sufficient
30 number of cells for immunotherapy. In particular, antigen-presenting cells, such as dendritic, macrophage, monocyte, fibroblast and/or B cells, may be pulsed with immunoreactive

polypeptides or transfected with one or more polynucleotides using standard techniques well known in the art. For example, antigen-presenting cells can be transfected with a polynucleotide having a promoter appropriate for increasing expression in a recombinant virus or other expression system. Cultured effector cells for use in therapy must be able to grow and distribute widely, and to survive long term *in vivo*. Studies have shown that cultured effector cells can be induced to grow *in vivo* and to survive long term in substantial numbers by repeated stimulation with antigen supplemented with IL-2 (*see*, for example, Cheever et al., *Immunological Reviews* 157:177, 1997).

Alternatively, a vector expressing a polypeptide recited herein may be introduced into antigen presenting cells taken from a patient and clonally propagated *ex vivo* for transplant back into the same patient. Transfected cells may be reintroduced into the patient using any means known in the art, preferably in sterile form by intravenous, intracavitary, intraperitoneal or intratumor administration.

Routes and frequency of administration of the therapeutic compositions disclosed herein, as well as dosage, will vary from individual to individual, and may be readily established using standard techniques. In general, the pharmaceutical compositions and vaccines may be administered by injection (*e.g.*, intracutaneous, intramuscular, intravenous or subcutaneous), intranasally (*e.g.*, by aspiration) or orally. Preferably, between 1 and 10 doses may be administered over a 52 week period. Preferably, 6 doses are administered, at intervals of 1 month, and booster vaccinations may be given periodically thereafter. Alternate protocols may be appropriate for individual patients. A suitable dose is an amount of a compound that, when administered as described above, is capable of promoting an anti-tumor immune response, and is at least 10-50% above the basal (*i.e.*, untreated) level. Such response can be monitored by measuring the anti-tumor antibodies in a patient or by vaccine-dependent generation of cytolytic effector cells capable of killing the patient's tumor cells *in vitro*. Such vaccines should also be capable of causing an immune response that leads to an improved clinical outcome (*e.g.*, more frequent remissions, complete or partial or longer disease-free survival) in vaccinated patients as compared to non-vaccinated patients. In general, for pharmaceutical compositions and vaccines comprising one or more polypeptides, the amount of each polypeptide present in a dose ranges from about 25 μ g to 5 mg per kg of host. Suitable dose sizes will vary with the size of the patient,

but will typically range from about 0.1 mL to about 5 mL.

In general, an appropriate dosage and treatment regimen provides the active compound(s) in an amount sufficient to provide therapeutic and/or prophylactic benefit. Such a response can be monitored by establishing an improved clinical outcome (e.g., more frequent remissions, complete or partial, or longer disease-free survival) in treated patients as compared to non-treated patients. Increases in preexisting immune responses to a colon tumor protein generally correlate with an improved clinical outcome. Such immune responses may generally be evaluated using standard proliferation, cytotoxicity or cytokine assays, which may be performed using samples obtained from a patient before and after treatment.

METHODS FOR DETECTING CANCER

In general, a cancer may be detected in a patient based on the presence of one or more colon tumor proteins and/or polynucleotides encoding such proteins in a biological sample (for example, blood, sera, sputum, urine and/or tumor biopsies) obtained from the patient. In other words, such proteins may be used as markers to indicate the presence or absence of a cancer such as colon cancer. In addition, such proteins may be useful for the detection of other cancers. The binding agents provided herein generally permit detection of the level of antigen that binds to the agent in the biological sample. Polynucleotide primers and probes may be used to detect the level of mRNA encoding a tumor protein, which is also indicative of the presence or absence of a cancer. In general, a colon tumor sequence should be present at a level that is at least three fold higher in tumor tissue than in normal tissue

There are a variety of assay formats known to those of ordinary skill in the art for using a binding agent to detect polypeptide markers in a sample. See, e.g., Harlow and Lane, *Antibodies: A Laboratory Manual*, Cold Spring Harbor Laboratory, 1988. In general, the presence or absence of a cancer in a patient may be determined by (a) contacting a biological sample obtained from a patient with a binding agent; (b) detecting in the sample a level of polypeptide that binds to the binding agent; and (c) comparing the level of polypeptide with a predetermined cut-off value.

In a preferred embodiment, the assay involves the use of binding agent immobilized on a solid support to bind to and remove the polypeptide from the remainder of

the sample. The bound polypeptide may then be detected using a detection reagent that contains a reporter group and specifically binds to the binding agent/polypeptide complex. Such detection reagents may comprise, for example, a binding agent that specifically binds to the polypeptide or an antibody or other agent that specifically binds to the binding agent, such as an anti-immunoglobulin, protein G, protein A or a lectin. Alternatively, a competitive assay may be utilized, in which a polypeptide is labeled with a reporter group and allowed to bind to the immobilized binding agent after incubation of the binding agent with the sample. The extent to which components of the sample inhibit the binding of the labeled polypeptide to the binding agent is indicative of the reactivity of the sample with the immobilized binding agent. Suitable polypeptides for use within such assays include full length colon tumor proteins and portions thereof to which the binding agent binds, as described above.

The solid support may be any material known to those of ordinary skill in the art to which the tumor protein may be attached. For example, the solid support may be a test well in a microtiter plate or a nitrocellulose or other suitable membrane. Alternatively, the support may be a bead or disc, such as glass, fiberglass, latex or a plastic material such as polystyrene or polyvinylchloride. The support may also be a magnetic particle or a fiber optic sensor, such as those disclosed, for example, in U.S. Patent No. 5,359,681. The binding agent may be immobilized on the solid support using a variety of techniques known to those of skill in the art, which are amply described in the patent and scientific literature. In the context of the present invention, the term "immobilization" refers to both noncovalent association, such as adsorption, and covalent attachment (which may be a direct linkage between the agent and functional groups on the support or may be a linkage by way of a cross-linking agent). Immobilization by adsorption to a well in a microtiter plate or to a membrane is preferred. In such cases, adsorption may be achieved by contacting the binding agent, in a suitable buffer, with the solid support for a suitable amount of time. The contact time varies with temperature, but is typically between about 1 hour and about 1 day. In general, contacting a well of a plastic microtiter plate (such as polystyrene or polyvinylchloride) with an amount of binding agent ranging from about 10 ng to about 10 μ g, and preferably about 100 ng to about 1 μ g, is sufficient to immobilize an adequate amount of binding agent.

Covalent attachment of binding agent to a solid support may generally be achieved by first reacting the support with a bifunctional reagent that will react with both the support and a functional group, such as a hydroxyl or amino group, on the binding agent. For example, the binding agent may be covalently attached to supports having an appropriate polymer coating using benzoquinone or by condensation of an aldehyde group on the support with an amine and an active hydrogen on the binding partner (*see, e.g.*, Pierce Immunotechnology Catalog and Handbook, 1991, at A12-A13).

In certain embodiments, the assay is a two-antibody sandwich assay. This assay may be performed by first contacting an antibody that has been immobilized on a solid support, commonly the well of a microtiter plate, with the sample, such that polypeptides within the sample are allowed to bind to the immobilized antibody. Unbound sample is then removed from the immobilized polypeptide-antibody complexes and a detection reagent (preferably a second antibody capable of binding to a different site on the polypeptide) containing a reporter group is added. The amount of detection reagent that remains bound to the solid support is then determined using a method appropriate for the specific reporter group.

More specifically, once the antibody is immobilized on the support as described above, the remaining protein binding sites on the support are typically blocked. Any suitable blocking agent known to those of ordinary skill in the art, such as bovine serum albumin or Tween 20™ (Sigma Chemical Co., St. Louis, MO). The immobilized antibody is then incubated with the sample, and polypeptide is allowed to bind to the antibody. The sample may be diluted with a suitable diluent, such as phosphate-buffered saline (PBS) prior to incubation. In general, an appropriate contact time (*i.e.*, incubation time) is a period of time that is sufficient to detect the presence of polypeptide within a sample obtained from an individual with colon cancer. Preferably, the contact time is sufficient to achieve a level of binding that is at least about 95% of that achieved at equilibrium between bound and unbound polypeptide. Those of ordinary skill in the art will recognize that the time necessary to achieve equilibrium may be readily determined by assaying the level of binding that occurs over a period of time. At room temperature, an incubation time of about 30 minutes is generally sufficient.

Unbound sample may then be removed by washing the solid support with an appropriate buffer, such as PBS containing 0.1% Tween 20™. The second antibody, which contains a reporter group, may then be added to the solid support. Preferred reporter groups include those groups recited above.

5 The detection reagent is then incubated with the immobilized antibody-polypeptide complex for an amount of time sufficient to detect the bound polypeptide. An appropriate amount of time may generally be determined by assaying the level of binding that occurs over a period of time. Unbound detection reagent is then removed and bound detection reagent is detected using the reporter group. The method employed for detecting
10 the reporter group depends upon the nature of the reporter group. For radioactive groups, scintillation counting or autoradiographic methods are generally appropriate. Spectroscopic methods may be used to detect dyes, luminescent groups and fluorescent groups. Biotin may be detected using avidin, coupled to a different reporter group (commonly a radioactive or fluorescent group or an enzyme). Enzyme reporter groups may generally be detected by the
15 addition of substrate (generally for a specific period of time), followed by spectroscopic or other analysis of the reaction products.

To determine the presence or absence of a cancer, such as colon cancer, the signal detected from the reporter group that remains bound to the solid support is generally compared to a signal that corresponds to a predetermined cut-off value. In one preferred
20 embodiment, the cut-off value for the detection of a cancer is the average mean signal obtained when the immobilized antibody is incubated with samples from patients without the cancer. In general, a sample generating a signal that is three standard deviations above the predetermined cut-off value is considered positive for the cancer. In an alternate preferred embodiment, the cut-off value is determined using a Receiver Operator Curve, according to
25 the method of Sackett et al., *Clinical Epidemiology: A Basic Science for Clinical Medicine*, Little Brown and Co., 1985, p. 106-7. Briefly, in this embodiment, the cut-off value may be determined from a plot of pairs of true positive rates (*i.e.*, sensitivity) and false positive rates (100%-specificity) that correspond to each possible cut-off value for the diagnostic test result. The cut-off value on the plot that is the closest to the upper left-hand corner (*i.e.*, the value
30 that encloses the largest area) is the most accurate cut-off value, and a sample generating a signal that is higher than the cut-off value determined by this method may be considered

positive. Alternatively, the cut-off value may be shifted to the left along the plot, to minimize the false positive rate, or to the right, to minimize the false negative rate. In general, a sample generating a signal that is higher than the cut-off value determined by this method is considered positive for a cancer.

5 In a related embodiment, the assay is performed in a flow-through or strip test format, wherein the binding agent is immobilized on a membrane, such as nitrocellulose. In the flow-through test, polypeptides within the sample bind to the immobilized binding agent as the sample passes through the membrane. A second, labeled binding agent then binds to the binding agent-polypeptide complex as a solution containing the second binding agent
10 flows through the membrane. The detection of bound second binding agent may then be performed as described above. In the strip test format, one end of the membrane to which binding agent is bound is immersed in a solution containing the sample. The sample migrates along the membrane through a region containing second binding agent and to the area of immobilized binding agent. Concentration of second binding agent at the area of
15 immobilized antibody indicates the presence of a cancer. Typically, the concentration of second binding agent at that site generates a pattern, such as a line, that can be read visually. The absence of such a pattern indicates a negative result. In general, the amount of binding agent immobilized on the membrane is selected to generate a visually discernible pattern when the biological sample contains a level of polypeptide that would be sufficient to
20 generate a positive signal in the two-antibody sandwich assay, in the format discussed above. Preferred binding agents for use in such assays are antibodies and antigen-binding fragments thereof. Preferably, the amount of antibody immobilized on the membrane ranges from about 25 ng to about 1 μ g, and more preferably from about 50 ng to about 500 ng. Such tests can typically be performed with a very small amount of biological sample.

25 Of course, numerous other assay protocols exist that are suitable for use with the tumor proteins or binding agents of the present invention. The above descriptions are intended to be exemplary only. For example, it will be apparent to those of ordinary skill in the art that the above protocols may be readily modified to use colon tumor polypeptides to detect antibodies that bind to such polypeptides in a biological sample. The detection of such
30 colon tumor protein specific antibodies may correlate with the presence of a cancer.

A cancer may also, or alternatively, be detected based on the presence of T cells that specifically react with a colon tumor protein in a biological sample. Within certain methods, a biological sample comprising CD4⁺ and/or CD8⁺ T cells isolated from a patient is incubated with a colon tumor polypeptide, a polynucleotide encoding such a polypeptide and/or an APC that expresses at least an immunogenic portion of such a polypeptide, and the presence or absence of specific activation of the T cells is detected. Suitable biological samples include, but are not limited to, isolated T cells. For example, T cells may be isolated from a patient by routine techniques (such as by Ficoll/Hypaque density gradient centrifugation of peripheral blood lymphocytes). T cells may be incubated *in vitro* for 2-9 days (typically 4 days) at 37°C with one or more representative polypeptides (*e.g.*, 5 - 25 µg/ml). It may be desirable to incubate another aliquot of a T cell sample in the absence of colon tumor polypeptide to serve as a control. For CD4⁺ T cells, activation is preferably detected by evaluating proliferation of the T cells. For CD8⁺ T cells, activation is preferably detected by evaluating cytolytic activity. A level of proliferation that is at least two fold greater and/or a level of cytolytic activity that is at least 20% greater than in disease-free patients indicates the presence of a cancer in the patient.

As noted above, a cancer may also, or alternatively, be detected based on the level of mRNA encoding a colon tumor protein in a biological sample. For example, at least two oligonucleotide primers may be employed in a polymerase chain reaction (PCR) based assay to amplify a portion of a colon tumor cDNA derived from a biological sample, wherein at least one of the oligonucleotide primers is specific for (*i.e.*, hybridizes to) a polynucleotide encoding the colon tumor protein. The amplified cDNA is then separated and detected using techniques well known in the art, such as gel electrophoresis. Similarly, oligonucleotide probes that specifically hybridize to a polynucleotide encoding a colon tumor protein may be used in a hybridization assay to detect the presence of polynucleotide encoding the tumor protein in a biological sample.

To permit hybridization under assay conditions, oligonucleotide primers and probes should comprise an oligonucleotide sequence that has at least about 60%, preferably at least about 75% and more preferably at least about 90%, identity to a portion of a polynucleotide encoding a colon tumor protein that is at least 10 nucleotides, and preferably at least 20 nucleotides, in length. Preferably, oligonucleotide primers and/or probes will

hybridize to a polynucleotide encoding a polypeptide disclosed herein under moderately stringent conditions, as defined above. Oligonucleotide primers and/or probes which may be usefully employed in the diagnostic methods described herein preferably are at least 10-40 nucleotides in length. In a preferred embodiment, the oligonucleotide primers comprise at least 10 contiguous nucleotides, more preferably at least 15 contiguous nucleotides, of a DNA molecule having a sequence recited in SEQ ID NO: 1-121, 123-197 and 205-486. Techniques for both PCR based assays and hybridization assays are well known in the art (see, for example, Mullis et al., *Cold Spring Harbor Symp. Quant. Biol.*, 51:263, 1987; Erlich ed., *PCR Technology*, Stockton Press, NY, 1989).

One preferred assay employs RT-PCR, in which PCR is applied in conjunction with reverse transcription. Typically, RNA is extracted from a biological sample, such as biopsy tissue, and is reverse transcribed to produce cDNA molecules. PCR amplification using at least one specific primer generates a cDNA molecule, which may be separated and visualized using, for example, gel electrophoresis. Amplification may be performed on biological samples taken from a test patient and from an individual who is not afflicted with a cancer. The amplification reaction may be performed on several dilutions of cDNA spanning two orders of magnitude. A two-fold or greater increase in expression in several dilutions of the test patient sample as compared to the same dilutions of the non-cancerous sample is typically considered positive.

In another embodiment, the disclosed compositions may be used as markers for the progression of cancer. In this embodiment, assays as described above for the diagnosis of a cancer may be performed over time, and the change in the level of reactive polypeptide(s) or polynucleotide evaluated. For example, the assays may be performed every 24-72 hours for a period of 6 months to 1 year, and thereafter performed as needed. In general, a cancer is progressing in those patients in whom the level of polypeptide or polynucleotide detected increases over time. In contrast, the cancer is not progressing when the level of reactive polypeptide or polynucleotide either remains constant or decreases with time.

Certain *in vivo* diagnostic assays may be performed directly on a tumor. One such assay involves contacting tumor cells with a binding agent. The bound binding agent may then be detected directly or indirectly via a reporter group. Such binding agents may

also be used in histological applications. Alternatively, polynucleotide probes may be used within such applications.

As noted above, to improve sensitivity, multiple colon tumor protein markers may be assayed within a given sample. It will be apparent that binding agents specific for different proteins provided herein may be combined within a single assay. Further, multiple primers or probes may be used concurrently. The selection of tumor protein markers may be based on routine experiments to determine combinations that results in optimal sensitivity. In addition, or alternatively, assays for tumor proteins provided herein may be combined with assays for other known tumor antigens.

DIAGNOSTIC KITS

The present invention further provides kits for use within any of the above diagnostic methods. Such kits typically comprise two or more components necessary for performing a diagnostic assay. Components may be compounds, reagents, containers and/or equipment. For example, one container within a kit may contain a monoclonal antibody or fragment thereof that specifically binds to a colon tumor protein. Such antibodies or fragments may be provided attached to a support material, as described above. One or more additional containers may enclose elements, such as reagents or buffers, to be used in the assay. Such kits may also, or alternatively, contain a detection reagent as described above that contains a reporter group suitable for direct or indirect detection of antibody binding.

Alternatively, a kit may be designed to detect the level of mRNA encoding a colon tumor protein in a biological sample. Such kits generally comprise at least one oligonucleotide probe or primer, as described above, that hybridizes to a polynucleotide encoding a colon tumor protein. Such an oligonucleotide may be used, for example, within a PCR or hybridization assay. Additional components that may be present within such kits include a second oligonucleotide and/or a diagnostic reagent or container to facilitate the detection of a polynucleotide encoding a colon tumor protein.

The following Examples are offered by way of illustration and not by way of limitation.

EXAMPLES

5

Example 1

ISOLATION AND CHARACTERIZATION OF COLON TUMOR POLYPEPTIDES BY
PCR-BASED SUBTRACTION AND MICROARRAY ANALYSIS

A cDNA library was constructed in the PCR2.1 vector (Invitrogen, Carlsbad,
10 CA) by subtracting a pool of three colon tumors with a pool of normal colon, spleen, brain,
liver, kidney, lung, stomach and small intestine using PCR subtraction methodologies
(Clontech, Palo Alto, CA). The subtraction was performed using a PCR-based protocol,
which was modified to generate larger fragments. Within this protocol, tester and driver
double stranded cDNA were separately digested with five restriction enzymes that recognize
15 six-nucleotide restriction sites (MluI, MscI, PvuII, SalI and StuI). This digestion resulted in
an average cDNA size of 600 bp, rather than the average size of 300 bp that results from
digestion with RsaI according to the Clontech protocol. This modification did not affect the
subtraction efficiency. Two tester populations were then created with different adapters, and
the driver library remained without adapters.

20 The tester and driver libraries were then hybridized using excess driver cDNA.
In the first hybridization step, driver was separately hybridized with each of the two tester
cDNA populations. This resulted in populations of (a) unhybridized tester cDNAs, (b) tester
cDNAs hybridized to other tester cDNAs, (c) tester cDNAs hybridized to driver cDNAs, and
(d) unhybridized driver cDNAs. The two separate hybridization reactions were then
25 combined, and rehybridized in the presence of additional denatured driver cDNA. Following
this second hybridization, in addition to populations (a) through (d), a fifth population (e) was
generated in which tester cDNA with one adapter hybridized to tester cDNA with the second
adapter. Accordingly, the second hybridization step resulted in enrichment of differentially
expressed sequences which could be used as templates for PCR amplification with adaptor-
30 specific primers.

The ends were then filled in, and PCR amplification was performed using
adaptor-specific primers. Only population (e), which contained tester cDNA that did not

hybridize to driver cDNA, was amplified exponentially. A second PCR amplification step was then performed, to reduce background and further enrich differentially expressed sequences.

This PCR-based subtraction technique normalizes differentially expressed cDNAs so that rare transcripts that are over-expressed in colon tumor tissue may be recoverable. Such transcripts would be difficult to recover by traditional subtraction methods.

To characterize the complexity and redundancy of the subtracted library, 96 clones were randomly picked and 65 were sequenced, as previously described. These sequences were further characterized by comparison with the most recent Genbank database (April, 1998) to determine their degree of novelty. No significant homologies were found to 21 of these clones, hereinafter referred to as 11092, 11093, 11096, 11098, 11103, 11174, 11108, 11112, 11115, 11117, 11118, 11134, 11151, 11154, 11158, 11168, 11172, 11175, 11184, 11185 and 11187. The determined cDNA sequences for these clones are provided in SEQ ID NO: 48, 49, 52, 54, 59, 60, 65-69, 79, 89, 90, 93, 99-101 and 109-111, respectively.

Two-thousand clones from the above mentioned cDNA subtraction library were randomly picked and submitted to a round of PCR amplification. Briefly, 0.5 μ l of glycerol stock solution was added to 99.5 μ l of pcr MIX (80 μ l H₂O, 10 μ l 10X PCR Buffer, 6 μ l 25 mM MgCl₂, 1 μ l 10 mM dNTPs, 1 μ l 100 mM M13 forward primer (CACGACGTTGTAAAACGACGG), 1 μ l 100 mM M13 reverse primer (CACAGGAAACAGCTATGACC)), and 0.5 μ l 5 u/ml Taq polymerase (primers provided by (Operon Technologies, Alameda, CA). The PCR amplification was run for thirty cycles under the following conditions: 95°C for 5 min., 92°C for 30 sec., 57°C for 40 sec., 75°C for 2 min. and 75°C for 5 minutes.

mRNA expression levels for representative clones were determined using microarray technology (Synteni, Palo Alto, CA) in colon tumor tissues (n=25), normal colon tissues (n=6), kidney, lung, liver, brain, heart, esophagus, small intestine, stomach, pancreas, adrenal gland, salivary gland, resting PBMC, activated PBMC, bone marrow, dendritic cells, spinal cord, blood vessels, skeletal muscle, skin, breast and fetal tissues. The number of tissue samples tested in each case was one (n=1), except where specifically noted above; additionally, all the above-mentioned tissues were derived from humans. The PCR

amplification products were dotted onto slides in an array format, with each product occupying a unique location in the array. mRNA was extracted from the tissue sample to be tested, and fluorescent-labeled cDNA probes were generated by reverse transcription according to the protocol provided by Synteni. The microarrays were probed with the labeled cDNA probes, the slides scanned, and fluorescence intensity was measured. This intensity correlates with the hybridization intensity.

One hundred and forty nine clones showed two or more fold over-expression in the colon tumor probe group as compared to the normal tissue probe group. These cDNA clones were further characterized by DNA sequencing with a Perkin Elmer/Applied Biosystems Division Automated Sequencer Model 373A and/or Model 377 (Foster City, CA). These sequences were compared to known sequences in the most recent GenBank database. No significant homologies to human gene sequences were found in forty nine of these clones, represented by the following sixteen cDNA consensus sequences: SEQ ID NO: 2, 8, 15, 16, 22, 24, 30, 32-34, 36, 38, 40, 41, 46 and 47, hereinafter referred to as Contig 2, 8, 13, 14, 20, 23, 29, 31, 35, 32, 36, 38, 41, 42, 50 and 51, respectively). Contig 29 (SEQ ID NO: 30) was found to be a Rat GSK-3- β -interacting protein Axil homolog. Also, Contigs 31 and 35 (SEQ ID NO: 32 and 33, respectively) were found to be a *Mus musculus* GOB-4 homolog. The determined cDNA sequences of SEQ ID NO: 1, 3-7, 9-14, 17-21, 23, 25-29, 31, 35, 37, 39, 42-45, 50, 51, 53, 55-58, 61-64, 70-78, 80-88, 91, 92, 94-98, 102-108 and 112 were found to show some homology to previously identified genes sequences.

Microarray analysis demonstrated Contig 2 (SEQ ID NO: 2) showed over-expression in 34% of colon tumors tested, as well as increased expression in normal pancreatic tissue, with no over-expression in normal colon tissues. Upon further analysis, Contigs 2, 8 and 23 were found to share homology to the known gene GW112. Contigs 4, 5, 9 and 52 showed homology to carcinoembryonic antigen (SEQ ID NO: 3, 4, 5 and 6, respectively). A representative sampling of these fragments showed over-expression in 85% of colon tumors, with over-expression in normal bone marrow and 3/6 normal colon tissues. Contig 6 (SEQ ID NO: 7), showing homology to the known gene sequence for villin, and was over-expressed in about half of all colon tumors tested, with a limited degree of low level over-expression in normal colon. Contig 12 (SEQ ID NO: 14), showing homology to Chromosome 17, clone hRPC.1171_I_10, also referred to as C798P, was over-expressed in

approximately 70% of colon tumors tested, with low over-expression in 1/6 normal colon samples. Contig 14, also referred to as 14261 (SEQ ID NO: 16), showing no significant homology to any known gene, showed over-expression in 44% of colon tumors tested, with low level expression in half of normal colon tissues, as well as small intestine and pancreatic tissue. Contig 18 (SEQ ID NO: 21), showing homology to the known gene for L1-cadherin, showed over-expression in approximately half of colon tumors and low level over-expression in 3/6 normal colon tissues tested. Contig 22 (SEQ ID NO: 23), showing homology to Bumetanide-sensitive Na-K-Cl cotransporter was over-expressed in 70% of colon tumors and no over-expression in all normal tissues tested. Contig 25 (SEQ ID NO: 25), showing homology to macrophage inflammatory protein-3 α , was over-expressed in over 40% of colon tumors and in activated PBMC. Contigs 26 and 48 (SEQ ID NOS: 25 and 26), showing homology to the sequence for laminin, was over-expressed in 48% of colon tumors and with low over-expression in stomach tissue. Contig 28 (SEQ ID NO: 29), showing homology to the known gene sequence for Chromosome 16 BAC clone CIT987SK-A-363E6, was over-expressed in 33% of colon tumors tested with normal stomach and 2/6 normal colon tissues showing low level over-expression. Contigs 29, 31 and 35 (SEQ ID NOS: 30, 32 and 33, respectively), also referred to as C751P, an unknown sequence showing limited and partial homology to Rat GSK-3 β -interacting protein Axil homolog and Mus musculus GOB-4 homolog, was over-expressed in 74% of colon tumors and no over-expression in all normal tissues tested. Contig 34 (SEQ ID NO: 35), showing homology to the known sequence for desmoglein 2, was over-expressed in 56% of colon tumors and showed low level over-expression in 1/6 normal colon tissues. Contig 36 (SEQ ID NO: 36), an unknown sequence also referred to as C793P, showed over-expression in 30% of colon tumor tissues tested. Contig 37 and 14287.2 (SEQ ID NOS: 37 and 116), an unknown sequence, but with limited (89%) homology to the known sequence for putative transmembrane protein was over-expressed in 70% of colon tumors, as well as in normal lung tissue and 3/6 normal colon tissues tested. Contig 38, also referred to as C796P and 14219 (SEQ ID NO: 38), showing no significant homology to any known gene, was over-expressed in 38% in colon tumors and no elevated over-expression in any normal tissues. Contig 41 (SEQ ID NO: 40), also referred to as C799P and 14308, an unknown sequence showing no significant homology to any known gene, was over-expressed in 22% of colon tumors. Contig 42, (SEQ ID NO: 41), also

referred to as C794P and 14309, an unknown sequence with no significant homology to any known gene, was over-expressed in 63% of colon tumors tested, as well as in 3/6 normal colon tissues. Contig 43 (SEQ ID NO: 42), showing homology to the known sequence for Chromosome 1 specific transcript KIAA0487 was over-expressed in 85% of colon tumors tested and in normal lung and 4/6 normal colon tissues. Contig 49 (SEQ ID NO: 45), showing homology to the known sequence for pump-1, was over-expressed in 44% of colon tumors and no over-expression in all normal tissues tested. Contig 50 (SEQ ID NO: 46), also referred to as C792P and 18323, showing no significant homology to any known gene, was over-expressed in 33% of colon tumors with no detectable over-expression in any normal tissues tested. Contig 51 (SEQ ID NO: 47), also referred to as C795P and 14317 was over-expressed in 11% of colon tumors.

Additional microarray analysis yielded seven clones showing two or more fold over-expression in the colon tumor probe group as compared to the normal tissue probe group. Three of these clones demonstrated particularly good colon tumor specificity, and are represented by SEQ ID NO: 115, 116 and 120. Specifically, SEQ ID NO: 115, referred to as C791P or 14235, which shows homology to the known gene sequence for H. sapiens chromosome 21 derived BAC containing ets-2 gene, was over-expressed in 89% of colon tumors tested and in 5/6 normal colon tissues, as well as over-expressed at low levels in normal lung and activated PBMC. Microarray analysis for SEQ ID NO: 116 is discussed above. SEQ ID NO: 120, referred to as 14295, showing homology to the known gene sequence for secreted cement gland protein XAG-2 homolog, was over-expressed in 70% of colon tumors and in 5/6 normal colon tissues, as well as low level over-expression in normal small intestine, stomach and lung. All clones showing over-expression in colon tumor were sequenced and these sequences compared to the most recent Genbank database (February 12, 1999). Of the seven clones, three contained sequences that did not share significant homology to any known gene sequences, represented by SEQ ID NO: 116, 117 and 119. To the best of the inventors' knowledge, none of these sequences have been previously shown to be present in colon. The determined cDNA sequences of the remaining clones (SEQ ID NO: 113-115 and 120) were found to show some homology to previously identified genes.

Further analysis identified a clone which was recovered several times by PCR subtraction and by expression screening using a mouse anti-scld antiserum. The determined

full length cDNA sequence for this clone is provided in SEQ ID NO: 121, with the corresponding predicted amino acid sequence being provided in SEQ ID NO: 122. This clone is homologous with the known gene Beta IG-H3, as disclosed in U.S. Patent No. 5,444,164. Microarray analysis demonstrated this clone to be over-expressed in 75 to 80% of colon tumors tested (n=27), with no over-expression in normal colon samples (n=6), but with some low level over-expression in other normal tissues tested.

Further analysis of the PCR-subtraction library described above led to the isolation of longer cDNA sequences for the clones of SEQ ID NO: 30, 115, 46, 118, 41, 47, 38, 113, 14 and 40 (known as C751P, C791P, C792P, C793P, C794P, C795P, C796P, C797P, C798P and C799P, respectively). These determined cDNA sequences are provided in SEQ ID NO: 123-132, respectively.

Using PCR subtraction methodology described above with minor modifications, transcripts from a pool of three moderately differentiated colon adenocarcinoma samples were subtracted with a set of transcripts from normal brain, pancreas, bone marrow, liver, heart, lung, stomach and small intestine. Modifications of the above protocol were included at the cDNA digestion steps and in the tester to drive hybridization ratios. In a first subtraction, the restriction enzymes PvuII, DraI, MscI and StuI were used to digest cDNAs, and the tester to driver ratio was 1:40, as suggested by Clontech. In a second subtraction, DraI, MscI and StuI were used for cDNA digestion and a tester to driver ratio of 1:76 was used. Following the PCR amplification steps, the cDNAs were clones into pCR2.1 plasmid vector. The determined cDNA sequences of 167 isolated clones are provided in SEQ ID NO: 205-371. These sequences were compared to sequences in the public databases as described above. The sequences of SEQ ID NO: 205, 207, 210-212, 214, 215, 218, 224-226, 228, 233, 234, 236, 238, 241, 242, 245, 246, 248, 250, 253, 254, 256, 259, 260, 262, 263, 266, 267, 270-273, 279, 282, 291, 293, 294, 298, 300, 302, 303, 310-313, 315, 317, 320, 322, 324, 332-335, 345, 347, 356, 358, 361, 362, 366, 369 and 371 were found to show some homology to previously identified ESTs. The remaining sequences were found to show some homology to previously identified genes.

Using the PCR subtraction technology described above, a cDNA library from a pool of primary colon tumors was subtracted with a cDNA library prepared from normal tissues, including brain, bone marrow, kidney, heart, lung, liver, pancreas, small intestine,

stomach and trachea. The determined cDNA sequences for 90 clones isolated in this subtraction are provided in SEQ ID NO: 372-461. Comparison of these sequences with those in the public databases as described above, revealed no homologies to the sequences of SEQ ID NO: 426, 445 and 453. The sequences of SEQ ID NO: 372-378, 380-404, 406, 409-417, 419-423, 425, 427-429, 433-436, 438-441, 443, 446-451, 454, 455 and 457-461 showed some homology to previously identified genes, while the sequences of SEQ ID NO: 379, 405, 407, 408, 418, 424, 430-432, 437, 442, 444, 452 and 456 showed some homology to previously isolated ESTs.

Example 2

ISOLATION OF TUMOR POLYPEPTIDES USING SCID-PASSAGED TUMOR RNA

Human colon tumor antigens were obtained using SCID mouse passaged colon tumor RNA as follows. Human colon tumor was implanted in SCID mice and harvested, as described in Patent Application Serial No. 08/556,659 filed 11/13/95, U.S. Patent No. 5,986,170 . First strand cDNA was synthesized from poly A+ RNA from three SCID mouse-passaged colon tumors using a Lambda ZAP Express cDNA synthesis kit (Stratagene). The reactions were pooled and digested with RNase A, T1 and H to cleave the RNA and then treated with NaOH to degrade the RNA. The resulting cDNA was annealed with biotinylated (Vector Labs, Inc., Burlingame, CA) cDNA from a normal resting PBMC plasmid library (constructed from Superscript plasmid System, Gibco BRL), and subtracted with streptavidin by phenol/chloroform extraction. Second strand cDNA was synthesized from the subtracted first strand cDNA and digested with S1 nuclease (Gibco BRL). The cDNA was blunted with Pfu polymerase and EcoRI adaptors (Stratagene) were ligated to the ends. The cDNA was phosphorylated with T4 polynucleotide kinase, digested with restriction endonuclease XhoI, and size selected with Sephacryl S-400 (Sigma). Fractions were pooled, ligated to Lambda ZAP Express arms (Stratagene) and packaged with Gigapack Gold III extract (Stratagene). Random plaques were picked, phagemid was excised, transformed into XL0LR cells (Stratagene) and resulting plasmid DNA (Qiagen Inc., Valencia, CA) was sequenced as described above. The determined cDNA sequences for 17

clones isolated as described above are provided in SEQ ID NO: 133-151, wherein 133 and 134 represent partial sequences of a clone referred to as CoSub-3 and SEQ ID NO: 135 and 136 represent partial sequences of a clone referred to as CoSub-13. These sequences were compared with those in the public databases as described above. The sequences of SEQ ID NO: 139 and 149 showed no significant homologies to any previously identified sequences. The sequences of SEQ ID NO: 138, 140, 141, 142, 143, 148 and 149 showed some homology to previously isolated expressed sequence tags (ESTs). The sequences of SEQ ID NO: 133-137, 144-147, 150 and 151 showed some homology to previously isolated gene sequences.

Example 3

USE OF MOUSE ANTISERA TO IDENTIFY DNA SEQUENCES ENCODING COLON TUMOR ANTIGENS

This example illustrates the isolation of cDNA sequences encoding colon tumor antigens by screening of colon tumor cDNA libraries with mouse anti-tumor sera.

A cDNA expression library was prepared from SCID mouse-passaged human colon tumor poly A+ RNA using a Stratagene (La Jolla, CA) Lambda ZAP Express kit, following the manufacturer's instructions. Sera was obtained from the colon tumor-bearing SCID mouse. This serum was injected into normal mice to produce anti-colon tumor serum. Approximately 600,000 PFUs were screened from the unamplified library using this antiserum. Using a goat anti-mouse IgG-A-M (H+L) alkaline phosphatase second antibody developed with NBT/BCIP (BRL Labs.), positive plaques were identified. Phage was purified and phagemid excised for several clones with inserts in a pBK-CMV vector for expression in prokaryotic or eukaryotic cells.

The determined cDNA sequences for 46 of the isolated clones are provided in SEQ ID NO: 152-197. The predicted amino acid sequences for the cDNA sequences of SEQ ID NO: 187, 188, 189, 190, 194, 195 and 197 are provided in SEQ ID NO: 198-204, respectively. The determined cDNA sequences were compared with those in the public database as described above. The sequences of SEQ ID NO: 156, 168, 184, 189, 192 and 196 showed some homology to previously isolated ESTs. The sequences of SEQ ID NO: 152-

155, 157-167, 169-182, 183, 185-188, 190, 194, 195 and 197 showed some homology to previously identified genes.

Example 4

5 ISOLATION AND CHARACTERIZATION OF COLON TUMOR POLYPEPTIDES BY CONVENTIONAL SUBTRACTION

Two cDNA libraries were constructed and used to create a subtracted cDNA library as follows.

10 Using the GibcoBRL Superscript Plasmid System with minor modifications, two cDNA libraries were created. The first library, referred to as CTCL, was prepared from a pool of mRNA samples from three colon adenocarcinoma tissue samples. Two of the samples were described as Duke's stage C and one as Duke's stage B. All three samples were grade III in histological status. A second library (referred to as DriverLibpcDNA3.1+) 15 was prepared from a pool of normal tissues, namely liver, pancreas, skin, bone marrow, resting PBMC, stomach and brain. Both libraries were prepared using the manufacturer's instructions with the following modifications: an EcoRI-NotI 5' cDNA adapter was used instead of the provided reagent; the vector pCDNA3.1(+) (Invitrogen) was substituted for the pSPORT vector; and the ligated DNA molecules were transformed into ElectroMaxDH10B 20 electrocompetent cells. Clones from the libraries were analyzed by restriction digest and sequencing to determine average insert size, quality of the library and complexity of the library. DNA was prepared from each library and digested.

The driver DNA was biotinylated and hybridized with the colon library tester DNA at a ratio of 10:1. After two rounds of hybridizations, streptavidin incubations and 25 extractions, the remaining colon cDNAs were size-selected by column chromatography and cloned into the pCMV-Script vector from Stratagene. Clones from this subtracted library (referred to as CTCL-S1) were characterized as described above for the unsubtracted libraries.

The determined cDNA sequences for 18 clones isolated from the CTCL-S1 library are provided in SEQ ID NO: 462-479. Comparison of these sequences with those in 30 the public databases, as described above, revealed no significant homologies to the sequences

of SEQ ID NO: 476, 477 and 479. The remaining sequences showed some homology to previously identified genes.

In further studies, a cDNA library was prepared from a pool of mRNA from three metastatic colon adenocarcinomas derived from liver tissue samples. All samples were described as Duke's stage D. Conventional subtraction was performed as described above, using the DriverLibpcDNA3.1+ library described above as the driver. The resulting subtracted library (referred to as CMCL-S1) was characterized by isolating a set of clones for restriction analysis and sequencing.

The determined cDNA sequences for 7 clones isolated from the CMCL-S1 library are provided in SEQ ID NO: 480-486. Comparison of these sequences with those in the public databases revealed no significant homologies to the sequence of SEQ ID NO: 483. The sequences of SEQ ID NO: 480-482 and 484-486 were found to show some homology to previously identified genes.

Example 5

SYNTHESIS OF POLYPEPTIDES

Polypeptides may be synthesized on a Perkin Elmer/Applied Biosystems Division 430A peptide synthesizer using FMOC chemistry with HPTU (O-Benzotriazole-N,N,N',N'-tetramethyluronium hexafluorophosphate) activation. A Gly-Cys-Gly sequence may be attached to the amino terminus of the peptide to provide a method of conjugation, binding to an immobilized surface, or labeling of the peptide. Cleavage of the peptides from the solid support may be carried out using the following cleavage mixture: trifluoroacetic acid:ethanedithiol:thioanisole:water:phenol (40:1:2:2:3). After cleaving for 2 hours, the peptides may be precipitated in cold methyl-t-butyl-ether. The peptide pellets may then be dissolved in water containing 0.1% trifluoroacetic acid (TFA) and lyophilized prior to purification by C18 reverse phase HPLC. A gradient of 0%-60% acetonitrile (containing 0.1% TFA) in water (containing 0.1% TFA) may be used to elute the peptides. Following lyophilization of the pure fractions, the peptides may be characterized using electrospray or other types of mass spectrometry and by amino acid analysis.

From the foregoing it will be appreciated that, although specific embodiments of the invention have been described herein for purposes of illustration, various modifications may be made without deviating from the spirit and scope of the invention. Accordingly, the invention is not limited except as by the appended claims.

CLAIMS

1. An isolated polypeptide comprising at least an immunogenic portion of a colon tumor protein, or a variant thereof, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide sequence selected from the group consisting of:

(a) sequences recited in SEQ ID NO: 2, 8, 15, 16, 22, 24, 30, 32-34, 36, 38, 40, 41, 46-49, 52, 54, 59, 60, 65-69, 79, 89, 90, 93, 99-101, 109-111, 116-119, 123-132, 138-142, 143, 148, 149, 156, 168, 170-182, 184, 189, 191-193, 196, 205, 207, 210-212, 214, 215, 218, 224-226, 228, 233, 234, 236, 238, 241, 242, 245, 246, 248, 250, 253, 254, 256, 259, 260, 262, 263, 266, 267, 270-273, 279, 282, 291, 293, 294, 298, 300, 302, 303, 310-313, 315, 317, 320, 322, 324, 332-335, 345, 347, 356, 358, 361, 362, 366, 369, 371-378, 380-404, 406, 409-417, 419-423, 425, 427-429, 433-436, 438-441, 443, 446-451, 454, 455, 457-461, 476, 477, 479 and 483;

(b) sequences that hybridize to a sequence of SEQ ID NO: 2, 8, 15, 16, 22, 24, 30, 32-34, 36, 38, 40, 41, 46-49, 52, 54, 59, 60, 65-69, 79, 89, 90, 93, 99-101, 109-111, 116-119, 123-132, 138-142, 143, 148, 149, 156, 168, 170-182, 184, 189, 191-193, 196, 205, 207, 210-212, 214, 215, 218, 224-226, 228, 233, 234, 236, 238, 241, 242, 245, 246, 248, 250, 253, 254, 256, 259, 260, 262, 263, 266, 267, 270-273, 279, 282, 291, 293, 294, 298, 300, 302, 303, 310-313, 315, 317, 320, 322, 324, 332-335, 345, 347, 356, 358, 361, 362, 366, 369, 371-378, 380-404, 406, 409-417, 419-423, 425, 427-429, 433-436, 438-441, 443, 446-451, 454, 455, 457-461, 476, 477, 479 and 483 under moderately stringent conditions; and

(c) a complement of a sequence of (a) or (b).

2. An isolated polypeptide according to claim 1, wherein the polypeptide comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NO: 2, 8, 15, 16, 22, 24, 30, 32-34, 36, 38, 40, 41, 46-49, 52, 54, 59, 60, 65-69, 79, 89, 90, 93, 99-101, 109-111, 116-119, 123-132, 138-142, 143, 148, 149, 156, 168,

170-182, 184, 189, 191-193, 196, 205, 207, 210-212, 214, 215, 218, 224-226, 228, 233, 234, 236, 238, 241, 242, 245, 246, 248, 250, 253, 254, 256, 259, 260, 262, 263, 266, 267, 270-273, 279, 282, 291, 293, 294, 298, 300, 302, 303, 310-313, 315, 317, 320, 322, 324, 332-335, 345, 347, 356, 358, 361, 362, 366, 369, 371-378, 380-404, 406, 409-417, 419-423, 425, 427-429, 5 433-436, 438-441, 443, 446-451, 454, 455, 457-461, 476, 477, 479 and 483 or a complement of any of the foregoing polynucleotide sequences.

3. An isolated polypeptide comprising a sequence recited in any one of SEQ ID NO: 122 and 198-204.

10 4. An isolated polynucleotide encoding at least 15 amino acid residues of a colon tumor protein, or a variant thereof that differs in one or more substitutions, deletions, additions and/or insertions such that the ability of the variant to react with antigen-specific antisera is not substantially diminished, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide comprising a sequence recited in any one of 15 SEQ ID NO: 2, 8, 15, 16, 22, 24, 30, 32-34, 36, 38, 40, 41, 46-49, 52, 54, 59, 60, 65-69, 79, 89, 90, 93, 99-101, 109-111, 116-119, 123-132, 138-142, 143, 148, 149, 156, 168, 170-182, 184, 189, 191-193, 196, 205, 207, 210-212, 214, 215, 218, 224-226, 228, 233, 234, 236, 238, 241, 242, 245, 246, 248, 250, 253, 254, 256, 259, 260, 262, 263, 266, 267, 270-273, 279, 282, 291, 293, 294, 298, 300, 302, 303, 310-313, 315, 317, 320, 322, 324, 332-335, 345, 347, 356, 20 358, 361, 362, 366, 369, 371-378, 380-404, 406, 409-417, 419-423, 425, 427-429, 433-436, 438-441, 443, 446-451, 454, 455, 457-461, 476, 477, 479 and 483 or a complement of any of the foregoing sequences.

5. An isolated polynucleotide encoding a colon tumor protein, or a variant 25 thereof, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide comprising a sequence recited in any one of SEQ ID NO: 2, 8, 15, 16, 22, 24, 30, 32-34, 36, 38, 40, 41, 46-49, 52, 54, 59, 60, 65-69, 79, 89, 90, 93, 99-101, 109-111, 116-119, 123-132, 138-142, 143, 148, 149, 156, 168, 170-182, 184, 189, 191-193, 196, 205, 207, 210-212, 214, 215, 218, 224-226, 228, 233, 234, 236, 238, 241, 242, 245, 246, 248, 250, 253, 30 254, 256, 259, 260, 262, 263, 266, 267, 270-273, 279, 282, 291, 293, 294, 298, 300, 302, 303,

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5 6. An isolated polynucleotide comprising a sequence recited in any one of SEQ ID NO: 2, 8, 15, 16, 22, 24, 30, 32-34, 36, 38, 40, 41, 46-49, 52, 54, 59, 60, 65-69, 79, 89, 90, 93, 99-101, 109-111, 116-119, 123-132, 138-142, 143, 148, 149, 156, 168, 170-182, 184, 189, 191-193, 196, 205, 207, 210-212, 214, 215, 218, 224-226, 228, 233, 234, 236, 238, 241, 242, 245, 246, 248, 250, 253, 254, 256, 259, 260, 262, 263, 266, 267, 270-273, 279,
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 7. An isolated polynucleotide comprising a sequence that hybridizes to a
15 sequence recited in any one of SEQ ID NO: 2, 8, 15, 16, 22, 24, 30, 32-34, 36, 38, 40, 41, 46-49, 52, 54, 59, 60, 65-69, 79, 89, 90, 93, 99-101, 109-111, 116-119, 123-132, 138-142, 143, 148, 149, 156, 168, 170-182, 184, 189, 191-193, 196, 205, 207, 210-212, 214, 215, 218, 224-226, 228, 233, 234, 236, 238, 241, 242, 245, 246, 248, 250, 253, 254, 256, 259, 260, 262, 263, 266, 267, 270-273, 279, 282, 291, 293, 294, 298, 300, 302, 303, 310-313, 315, 317, 320,
20 322, 324, 332-335, 345, 347, 356, 358, 361, 362, 366, 369, 371-378, 380-404, 406, 409-417, 419-423, 425, 427-429, 433-436, 438-441, 443, 446-451, 454, 455, 457-461, 476, 477, 479 and 483 under moderately stringent conditions.

 8. An isolated polynucleotide complementary to a polynucleotide
25 according to any one of claims 4-7.

 9. An expression vector comprising a polynucleotide according to any one of claims claim 4-8.

30 10. A host cell transformed or transfected with an expression vector according to claim 9.

11. An isolated antibody, or antigen-binding fragment thereof, that specifically binds to a colon tumor protein that comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NO: 2, 8, 15, 16, 22, 24, 30, 32-34, 36, 38, 40, 41, 46-49, 52, 54, 59, 60, 65-69, 79, 89, 90, 93, 99-101, 109-111, 116-119, 123-132, 138-142, 143, 148, 149, 156, 168, 170-182, 184, 189, 191-193, 196, 205, 207, 210-212, 214, 215, 218, 224-226, 228, 233, 234, 236, 238, 241, 242, 245, 246, 248, 250, 253, 254, 256, 259, 260, 262, 263, 266, 267, 270-273, 279, 282, 291, 293, 294, 298, 300, 302, 303, 310-313, 315, 317, 320, 322, 324, 332-335, 345, 347, 356, 358, 361, 362, 366, 369, 371-378, 380-404, 406, 409-417, 419-423, 425, 427-429, 433-436, 438-441, 443, 446-451, 454, 455, 457-461, 476, 477, 479 and 483 or a complement of any of the foregoing polynucleotide sequences.

12. A fusion protein comprising at least one polypeptide according to claim 1.

13. A fusion protein according to claim 12, wherein the fusion protein comprises an expression enhancer that increases expression of the fusion protein in a host cell transfected with a polynucleotide encoding the fusion protein.

14. A fusion protein according to claim 12, wherein the fusion protein comprises a T helper epitope that is not present within the polypeptide of claim 1.

15. A fusion protein according to claim 12, wherein the fusion protein comprises an affinity tag.

16. An isolated polynucleotide encoding a fusion protein according to claim 12.

17. A pharmaceutical composition comprising a physiologically acceptable carrier and at least one component selected from the group consisting of:

- (a) a polypeptide according to claim 1;
- (b) a polynucleotide according to claim 4;
- (c) an antibody according to claim 11;
- (d) a fusion protein according to claim 12; and
- (e) a polynucleotide according to claim 16.

18. A vaccine comprising an immunostimulant and at least one component selected from the group consisting of:

- (a) a polypeptide according to claim 1;
- (b) a polynucleotide according to claim 4;
- (c) an antibody according to claim 11;
- (d) a fusion protein according to claim 12; and
- (e) a polynucleotide according to claim 16.

19. A vaccine according to claim 18, wherein the immunostimulant is an adjuvant.

20. A vaccine according to any claim 18, wherein the immunostimulant induces a predominantly Type I response.

21. A method for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of a pharmaceutical composition according to claim 17.

22. A method for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of a vaccine according to claim 20.

23. A pharmaceutical composition comprising an antigen-presenting cell that expresses a polypeptide according to claim 1, in combination with a pharmaceutically acceptable carrier or excipient.

24. A pharmaceutical composition according to claim 23, wherein the antigen presenting cell is a dendritic cell or a macrophage.

25. A vaccine comprising an antigen-presenting cell that expresses a polypeptide according to claim 1, in combination with an immunostimulant.

26. A vaccine according to claim 25, wherein the immunostimulant is an adjuvant.

27. A vaccine according to claim 25, wherein the immunostimulant induces a predominantly Type I response.

28. A vaccine according to claim 25, wherein the antigen-presenting cell is a dendritic cell.

29. A method for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of an antigen-presenting cell that expresses a polypeptide encoded by a polynucleotide recited in any one of SEQ ID NO: 1-121, 123-197 and 205-486, and thereby inhibiting the development of a cancer in the patient.

30. A method according to claim 29, wherein the antigen-presenting cell is a dendritic cell.

31. A method according to any one of claims 21, 22 and 29, wherein the cancer is colon cancer.

32. A method for removing tumor cells from a biological sample, comprising contacting a biological sample with T cells that specifically react with a colon tumor protein, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide sequence selected from the group consisting of:

(i) polynucleotides recited in any one of SEQ ID NO: 1-121, 123-

197 and 205-486; and

(ii) complements of the foregoing polynucleotides;

wherein the step of contacting is performed under conditions and for a time sufficient to permit the removal of cells expressing the antigen from the sample.

5

33. A method according to claim 32, wherein the biological sample is blood or a fraction thereof.

34. A method for inhibiting the development of a cancer in a patient, comprising administering to a patient a biological sample treated according to the method of claim 50.

35. A method for stimulating and/or expanding T cells specific for a colon tumor protein, comprising contacting T cells with at least one component selected from the group consisting of:

- (i) a polypeptide according to claim 1;
- (ii) a polypeptide encoded by a polynucleotide comprising a sequence provided in any one of SEQ ID NO: 1-121, 123-197 and 205-486;
- (iii) a polynucleotide encoding a polypeptide of (i) or (ii); and
- (iv) an antigen presenting cell that expresses a polypeptide of (i) or (ii), under conditions and for a time sufficient to permit the stimulation and/or expansion of T cells.

36. An isolated T cell population, comprising T cells prepared according to the method of claim 35.

37. A method for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of a T cell population according to claim 36.

30

38. A method for inhibiting the development of a cancer in a patient,

comprising the steps of:

(a) incubating CD4⁺ and/or CD8⁺ T cells isolated from a patient with at least one component selected from the group consisting of:

(i) a polypeptide according to claim 1;

5 (ii) a polypeptide encoded by a polynucleotide comprising a sequence of any one of SEQ ID NO: 1-121, 123-197 and 205-486;

(iii) a polynucleotide encoding a polypeptide of (i) or (ii); and

10 (iv) an antigen-presenting cell that expresses a polypeptide of (i) or (ii);

such that T cells proliferate; and

(b) administering to the patient an effective amount of the proliferated T cells, and thereby inhibiting the development of a cancer in the patient.

15 39. A method for inhibiting the development of a cancer in a patient, comprising the steps of:

(a) incubating CD4⁺ and/or CD8⁺ T cells isolated from a patient with at least one component selected from the group consisting of:

(i) a polypeptide according to claim 1;

20 (ii) a polypeptide encoded by a polynucleotide comprising a sequence of any one of SEQ ID NO: 1-121, 123-197 and 205-486;

(iii) a polynucleotide encoding a polypeptide of (i) or (ii); and

25 (iii) an antigen-presenting cell that expresses a polypeptide of (i) or (ii);

such that T cells proliferate;

(b) cloning at least one proliferated cell to provide cloned T cells; and

(c) administering to the patient an effective amount of the cloned T cells, and thereby inhibiting the development of a cancer in the patient.

30

40. A method for determining the presence or absence of a cancer in a

patient, comprising the steps of:

(a) contacting a biological sample obtained from a patient with a binding agent that binds to a colon tumor protein, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide sequence selected from the group consisting of:

(i) polynucleotides recited in any one of SEQ ID NO: 1-121, 123-197 and 205-486; and

(ii) complements of the foregoing polynucleotides;

(b) detecting in the sample an amount of polypeptide that binds to the binding agent; and

(c) comparing the amount of polypeptide to a predetermined cut-off value, and therefrom determining the presence or absence of a cancer in the patient.

41. A method according to claim 40, wherein the binding agent is an antibody.

42. A method according to claim 43, wherein the antibody is a monoclonal antibody.

43. A method according to claim 40, wherein the cancer is colon cancer.

44. A method for monitoring the progression of a cancer in a patient, comprising the steps of:

(a) contacting a biological sample obtained from a patient at a first point in time with a binding agent that binds to a colon tumor protein, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NO: 1-121, 123-197 and 205-486 or a complement of any of the foregoing polynucleotides;

(b) detecting in the sample an amount of polypeptide that binds to the binding agent;

(c) repeating steps (a) and (b) using a biological sample obtained from the patient at a subsequent point in time; and

(d) comparing the amount of polypeptide detected in step (c) to the amount detected in step (b) and therefrom monitoring the progression of the cancer in the patient.

45. A method according to claim 44, wherein the binding agent is an antibody.

46. A method according to claim 45, wherein the antibody is a monoclonal antibody.

47. A method according to claim 44, wherein the cancer is a colon cancer.

48. A method for determining the presence or absence of a cancer in a patient, comprising the steps of:

(a) contacting a biological sample obtained from a patient with an oligonucleotide that hybridizes to a polynucleotide that encodes a colon tumor protein, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NO: 1-121, 123-197 and 205-486 or a complement of any of the foregoing polynucleotides;

(b) detecting in the sample an amount of a polynucleotide that hybridizes to the oligonucleotide; and

(c) comparing the amount of polynucleotide that hybridizes to the oligonucleotide to a predetermined cut-off value, and therefrom determining the presence or absence of a cancer in the patient.

49. A method according to claim 48, wherein the amount of polynucleotide that hybridizes to the oligonucleotide is determined using a polymerase chain reaction.

50. A method according to claim 48, wherein the amount of polynucleotide that hybridizes to the oligonucleotide is determined using a hybridization assay.

30

51. A method for monitoring the progression of a cancer in a patient,

comprising the steps of:

(a) contacting a biological sample obtained from a patient with an oligonucleotide that hybridizes to a polynucleotide that encodes a colon tumor protein, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NO: 1-121, 123-197 and 205-486 or a complement of any of the foregoing polynucleotides;

(b) detecting in the sample an amount of a polynucleotide that hybridizes to the oligonucleotide;

(c) repeating steps (a) and (b) using a biological sample obtained from the patient at a subsequent point in time; and

(d) comparing the amount of polynucleotide detected in step (c) to the amount detected in step (b) and therefrom monitoring the progression of the cancer in the patient.

52. A method according to claim 51, wherein the amount of polynucleotide that hybridizes to the oligonucleotide is determined using a polymerase chain reaction.

53. A method according to claim 51, wherein the amount of polynucleotide that hybridizes to the oligonucleotide is determined using a hybridization assay.

54. A diagnostic kit, comprising:

- (a) one or more antibodies according to claim 11; and
- (b) a detection reagent comprising a reporter group.

55. A kit according to claim 54, wherein the antibodies are immobilized on a solid support.

56. A kit according to claim 54, wherein the detection reagent comprises an anti-immunoglobulin, protein G, protein A or lectin.

57. A kit according to claim 54, wherein the reporter group is selected

from the group consisting of radioisotopes, fluorescent groups, luminescent groups, enzymes, biotin and dye particles.

58. An oligonucleotide comprising 10 to 40 contiguous nucleotides that
5 hybridize under moderately stringent conditions to a polynucleotide that encodes a colon
tumor protein, wherein the tumor protein comprises an amino acid sequence that is encoded
by a polynucleotide sequence recited in any one of SEQ ID NO: 2, 8, 15, 16, 22, 24, 30, 32-
34, 36, 38, 40, 41, 46-49, 52, 54, 59, 60, 65-69, 79, 89, 90, 93, 99-101, 109-111, 116-119,
123-132, 138-142, 143, 148, 149, 156, 168, 170-182, 184, 189, 191-193, 196, 205, 207, 210-
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310-313, 315, 317, 320, 322, 324, 332-335, 345, 347, 356, 358, 361, 362, 366, 369, 371-378,
380-404, 406, 409-417, 419-423, 425, 427-429, 433-436, 438-441, 443, 446-451, 454, 455,
457-461, 476, 477, 479 and 483 or a complement of any of the foregoing polynucleotides.

15

59. A oligonucleotide according to claim 58, wherein the oligonucleotide
comprises 10-40 contiguous nucleotides recited in any one of SEQ ID NO: 2, 8, 15, 16, 22,
24, 30, 32-34, 36, 38, 40, 41, 46-49, 52, 54, 59, 60, 65-69, 79, 89, 90, 93, 99-101, 109-111,
116-119, 123-132, 138-142, 143, 148, 149, 156, 168, 170-182, 184, 189, 191-193, 196, 205,
20 207, 210-212, 214, 215, 218, 224-226, 228, 233, 234, 236, 238, 241, 242, 245, 246, 248, 250,
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303, 310-313, 315, 317, 320, 322, 324, 332-335, 345, 347, 356, 358, 361, 362, 366, 369, 371-
378, 380-404, 406, 409-417, 419-423, 425, 427-429, 433-436, 438-441, 443, 446-451, 454,
455, 457-461, 476, 477, 479 and 483.

25

60. A diagnostic kit, comprising:

(a) an oligonucleotide according to claim 59; and

(b) a diagnostic reagent for use in a polymerase chain reaction or
hybridization assay.

SEQUENCE LISTING

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DIAGNOSIS OF COLON CANCER AND METHODS FOR THEIR USE

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 gcaatattcc cgggtgtgta catgttgacg tacatgttgt tgttgtaaac tgctgtacca 1140
 ctaccttggg c 1151

<210> 9
 <211> 604
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(604)
 <223> n = A,T,C or G

<400> 9
 ctgtgcaagg gctttacaaa aactgtgcca ggacttccca tgaggctgga ttgcttgatt 60
 catgttttat gagccccaca atactgaagc tccttttcca gggacttggc ataggcagtc 120
 aattccacat ttgggatagg tcctctcttg aagtgaatgt caggcagtya catccaagtt 180
 tctgcatgca gtgggttaac agccatgttt agggggaaca tgatttaaaa agtacatctc 240

tctccctcct	ccccacatg	cacaaggctc	acatctcatt	atggtgkcg	cccatgtcac	300
attaaagtgt	gatacttkgg	ttttgaaaac	attcaaacag	tctctgtgga	aatctggaga	360
gaaattggcg	gagagctgcc	gtggtgcatt	cctcctgtag	tgcttcaagn	taatgcttca	420
tcctttntta	ataacttttg	atagacaggg	gctagtgcga	cagacctctg	ggaagccctg	480
gaaaacgctg	atgcttggtt	gaagatctca	agcgagaggt	ctgcaagtgc	atccctctt	540
tcctgaggtc	tggtggctgg	aggctgcaga	acattggtga	tgacatggac	cacgccattt	600
gtgg						604

<210> 10

<211> 473

<212> DNA

<213> Homo sapien

<400> 10

tcgagaagat	ccctagttag	actttgaacc	gtatcctggg	cgacccagaa	gccctgagag	60
acctgctgaa	caaccacatc	ttgaagtcag	ctatgtgtgc	tgaagccatc	gttgcggggc	120
tgtctgtgga	gaccttgag	ggcacgacac	tggaggtggg	ctgcagcggg	gacatgctca	180
ctatcaacgg	gaaggcgatc	atctccaata	aagacatcct	agccaccaac	ggggtgatcc	240
actacattga	tgagctactc	atcccagact	cagccaagac	actatttgaa	ttggctgcag	300
agtctgatgt	gtccacagcc	attgaccttt	tcagacaagc	cgccctcggc	aatcatctct	360
ctggaagtga	gcggttgacc	ctcctgggct	cccctgaatt	ctgtattcaa	agatggaacc	420
cctccaattg	atgcccatat	aagggaatttg	cttcggaacc	acataattaa	aga	473

<210> 11

<211> 411

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (411)

<223> n = A,T,C or G

<400> 11

tcctcattgg	tcggggccaa	aagcgtgtac	tggccgttac	cttcaagcat	cgtgttgagc	60
cctgatgcag	ccacagcagc	ccgaagggtc	tcaaagggtgt	cctcgatctc	aatgatctgc	120
tggatgttgt	tggtgatggg	ggagatgacc	ttatcgatga	ggtgcaccac	cccgttggtt	180
gcatgggtgg	cggctttyar	carccgggca	cagttcacag	ttacaatccc	attaggatag	240
tggtggatct	nggatgttg	aattctggta	catagnaggt	gaggggtcat	gcccggtgtt	300
cagctcatca	gtcaggactc	gcctgcccac	catatggtaa	gcsgragggc	atttgagcag	360
ctcaatgttt	gacattgctg	gaccagggga	gttcacgac	ttctangang	a	411

<210> 12

<211> 560

<212> DNA

<213> Homo sapien

<400> 12

tacttgcttg	gagatwgcyt	tykckwtmtg	ytcwrawgtc	cgtggatata	gaaatctctg	60
caggcaagtt	gctccagagc	atattgcagg	acaagcctgt	aacgaatagt	taaaattcacg	120
gcatctggat	tcctaattct	tttccgaaat	ggcaggtgtg	agtgcctgta	taaaatattc	180
tatgtttacc	ttcaacttct	tggtctggct	atgtggatgc	ttgatcctag	cattagcaat	240
atgggtacga	gtaagcaatg	actctcaagc	aatttttggt	tctgaagatg	taggctctag	300
ctcctacgtt	gctgtggaca	tattgattgc	tgtaggtgcc	atcatcatga	ttctgggctt	360
cctgggatgc	tgcggtgcta	taaaagaaag	tcgctgcatg	cttctgttgt	ttttcatagg	420

cttgcttctg atcctgctcc tgcaggtggg cgacaggtat cctaggagct gttttcaa	480
ctaatctga tcgcattgtg aatgaaactc tctatgaaaa cacaaagctt ttgagcgcca	540
caggggaaag tgaaaaacaa	560

<210> 13
 <211> 150
 <212> DNA
 <213> Homo sapien

<400> 13	
gggcaggctg tcttttttaa atgtctcggc tagctagacc acagatatct tctagacata	60
ttgaacacat ttaagatttg agggatataa gggaaaatga tatgaatgtg tttttttact	120
caaaataaaa gtaactgttt acgttggtga	150

<210> 14
 <211> 403
 <212> DNA
 <213> Homo sapien

<400> 14	
ctgctgcctg tggcgtgtgt gggctggatc ccttgaaggc tgagtttttg agggcagaaa	60
gctagctatg gtagccagg tgttacaaag gtgctgctcc ttctccaacc cctacttggt	120
ttccctcacc ccaagcctca tgttcatacc agccagtggg ttcagcagaa cgcattgacac	180
cttatcacct ccctccttgg gtgagctctg aacaccagct ttggcccctc cacagtaagg	240
ctgctacatc aggggcaacc ctggctctat ctttttcctt ttttgccaaa aggaccagta	300
gcataggtga gccctgagca ctaaaaggag gggctccctga agctttccca ctatagtgtg	360
gagttctgtc cctgaggtgg gtacagcagc cttgggttct ctg	403

<210> 15
 <211> 688
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(688)
 <223> n = A,T,C or G

<400> 15	
caaagcacat tttaatcatt ttttttaaaa gggggagtaa agcatttaaa ctgccaatcc	60
tatagactag gacttgaaca tcaaaggaaa aatagacaaa gactagatga taaagtcatt	120
caaaagcaca gaagcacatc acatacacca gcaaggtttc caactactgc actgattaac	180
tagatactct caatagcttt tctatagctc gtcctagaaa aaaaaattaa attttcattt	240
tcttacaagt tccaggctta aacaaaggca aaaattacat gcaacaactg atacactcat	300
aagttgcaca tatgctccaa ggtctttatt agataacaat aaatgctagc actttgtcac	360
tgccatcaga ttttccttat agtcttagag tcatgtaaat aaaagtcca taatgaaatt	420
aaagaaaatt aatttttcta atcttagatc agttccatag aaaactatta atttttttaa	480
agtaggcagt agaagggggg tgggtggggg tggaattggg tagtaagtct ggttctaate	540
ttctgagctg cctttggaag gaagttatga ggtagaagat tctactgact tttagtaagg	600
tggacaatga gagaaaagaa aaagcaggtg cctcatcnnn agatccttnt ggtatttatn	660
tgccangtnc nanntaatnc atanaaag	688

<210> 16
 <211> 408
 <212> DNA

<213> Homo sapien

<400> 16

caggtcatca	agatgactta	caggatgtaa	tagggagagc	tgtcgagatt	ggtgttaaaa	60
agtttatgat	tacaggtgga	aatctacaag	acagtaaaga	tgactgcat	ttggcacaaa	120
caaattggtat	gtttttcagt	acagttggat	gtcgtcctac	aagatgtggg	gaatttgaaa	180
agaataaccc	tgatctttac	ttaaaggagt	tgctaaatct	tgctgaaaac	aataaaggga	240
aagttgtggc	aataggagaa	tgcggacttg	attttgaccc	gactgcagtt	ttgtcccaaa	300
gatactcaac	tcaaataattt	tgaaaaacag	tttgaactgt	cagaacaaac	aaaattacca	360
atgtttcttc	attgtccgaa	actcacatgc	tgaatttttg	gacataat		408

<210> 17

<211> 407

<212> DNA

<213> Homo sapien

<400> 17

ggtcctgggg	aggccctagg	ggagcacctg	gatggagagg	acagagcagg	ggctccagca	60
ccttctttct	ggactggcgt	tcacctccct	gctcagtgtc	tgggctccac	gggcaggggt	120
cagagcactc	cctaatttat	gtgctatata	aatatgtcag	atgtacatag	agatctatct	180
tttctaaaac	attcccctyc	ccactcctct	cccacagagt	gctggactgt	tccaggccct	240
ccagtgggct	gatgctggga	cccttaggat	ggggctccca	gctcctttct	cctgtgaatg	300
gaggcagaag	acctccaata	aagtgccttc	tgggcttttt	ctaacctttg	tcttagctac	360
ctgtgtactg	aaatttgggc	ctttggatcg	aatatgggtc	agaggtt		407

<210> 18

<211> 405

<212> DNA

<213> Homo sapien

<400> 18

tgaagagtca	acttgggcct	ggaggactga	taaagtttgt	gattttgagg	gcctctaaaa	60
gtattaaagc	agcggcagcc	gctgcacgca	gacatgaggg	ctagggttaa	acagtaagat	120
caagttgttt	ggacagaaa	gctacagagt	gtggtcctgg	ctcttggtga	agaattacga	180
ccacgctaac	catgcctagg	aaggaaagga	gttattgttt	tgtagaaagg	tgctgggggt	240
tgagagatca	gtcggacacg	attggcaggg	agagcacgtg	tgtttttatg	agaattatgc	300
ccgagatagg	taacagatga	ggaagaaatt	tgggcttgat	tgaagtaatg	ggggctgtct	360
gtgaagcttt	gcagcagtag	agcctaggta	atttgctgag	cctaa		405

<210> 19

<211> 401

<212> DNA

<213> Homo sapien

<400> 19

tcttgacatt	cctgccttct	tatattaata	agacaaataa	aacaaaatag	tgttgaagtg	60
ttggggcagc	gaaaattttt	ggggggtggt	atggagagat	aatgggcat	gtttctcagg	120
gctgcttcaa	gcgggattag	gggcggcgtg	ggagcctaga	gtgggagaga	ttaaagctgaa	180
gggaggtctt	gtggttaagg	gtgatatcat	gggatgttta	gaagaaacat	ttgtcgtata	240
gaatgattgg	tgatggcctg	gatacggttt	tggatgattt	gagaagctaa	atggaagata	300
caaggtccga	ataaaaggag	gagaaaaatg	ggtattaaat	gtctaagaat	tgggaggacc	360
taggacatct	gattagagag	tgccctaagg	gattcagcat	a		401

<210> 20

<211> 331

<212> DNA

<213> Homo sapien

<400> 20

aggtccagct	ctgtctcata	cttgactcta	aagtcacag	cagcaagacg	ggcattgtca	60
atctgcagaa	cgatgcgggc	attgtccaca	gtatttgcca	agatctgagc	cctcaggtcc	120
tcgatgatct	tgaagtaatg	gctccagtct	ctgacctggg	gtcccttctt	ctccaagtgc	180
tcccggtatt	tgtctccag	cctccggttc	tcggtctcca	ggctcctcac	tctgtccagg	240
taagaggcca	ggcggtcgtt	caggctttgc	atgggtctct	tctcgttctg	gatgcctccc	300
attcctgcca	gacccccggc	tatccccggtg	g			331

<210> 21

<211> 346

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(346)

<223> n = A,T,C or G

<400> 21

ggtccaccac	rtgtacccga	tatggacttc	cggtctctct	gtccaatgga	gccacactaa	60
agatctcacc	agtcacgtgg	tcaattttaa	gccaacctct	tgtgtctccc	ctcagtgaat	120
agcttatgtc	cagaccttct	ggatccttgg	cagtcacatt	gccacttta	gtgcctatag	180
ctacatcctc	actgactttc	gcttggaata	cgtgttgga	aaattgaggt	gcttcattca	240
catctgtcac	aataagncgt	gaacttgga	aaagaacttg	cattgtactt	cacaccaaac	300
actagaggct	caggattttc	tgctttgaac	acaatgttgg	aaacag		346

<210> 22

<211> 360

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(360)

<223> n = A,T,C or G

<400> 22

gaagactccc	tctctcgga	gccggatccc	gagccgggca	ggatggatca	ccaccagccg	60
gggactgggc	gctaccaggt	gcttcttaat	gaagaggata	actcagaatc	atcggctata	120
gagcagccac	ctacttcaaa	cccagcacc	gcagattgtg	caggctgcgt	cttcagcacc	180
agcacttgaa	actgactctt	ccccccacc	atatagtagt	attactgggtg	gaagtaccta	240
caacttcaga	tacagaagtt	tacggtgagt	tttatcccgt	gccacctccc	tatagcggtg	300
ctacctctct	tcctacnwta	cgatgaaagc	tgagaaggct	aaagctgctg	caatggcatg	360

<210> 23

<211> 251

<212> DNA

<213> Homo sapien

<400> 23

ggcggagctc	cacgacgagc	tggaaaagga	accttttgag	gatggctttg	caaatgggga	60
agaaagtact	ccaaccagag	atgctgtggt	cacgtatact	gcagaaagta	aaggagtcgt	120

```

gaagtttggc tggatcaagg gtgtattagt acgttgtatg ttaaacattt ggggtgtgat      180
gcttttcatt agattgtcat ggattgtggg tcaagctgga ataggctctat cagtccttgt      240
aataatgatg g                                     251

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<210> 24
<211> 421
<212> DNA
<213> Homo sapien

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<220>
<221> misc_feature
<222> (1)...(421)
<223> n = A,T,C or G

```

```

<400> 24
caggtctttc ccaggtgttg actccagctc cagcttcagc tccagctcca ggtcgggctc      60
cagctccagc cgcagcttar gcagcgggag gttctgtgtc ccagttgttt tccaatttca      120
ccggctcccg tggatgamcg ygggacctgy caswgctcct gktycctgc yagsacacca      180
cnytttyccg tggacacrar kggaacckct tggaattcac agctyatgtt ctttctcara      240
agtttgagaa agaactttct aaagtgaggg aatatgtcca attaattagt gtgtatgaaa      300
agaaactgtt aaacctaact gtccgaattg acatcatgga raaaggatac catttcttac      360
actgaactgg acttcgagct gatcaaggta gaagtgaagg agatggaaaa actggtcata      420
c                                     421

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<210> 25
<211> 381
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1)...(381)
<223> n = A,T,C or G

```

```

<400> 25
gaactttttg tttctttatt ttcaatattt gtcttattaa tatttttctt attttataat      60
gcaattacaa caatttagga nacaaaacaa tataaacaaa agaatgttaa atagtttttt      120
ttaaaaaata gcttggttgc tgcaanaaag tccatataat cttattcccc cccaaatata      180
attttatact ttgcactaaa ccaaaatagc ttatggaaaa ttagtattaa atagctaaac      240
acagaaaacc tacagctata aataacataa aatacagttt aactttaatg ngatgcttaa      300
acaaaagcaa ctatgatgca atatgaatca acttcattaa ttggacaagt ccagngggagg      360
cacaaattag ataagcacta a                                     381

```

```

<210> 26
<211> 401
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1)...(401)
<223> n = A,T,C or G

```

```

<400> 26
ggaaaaggga ctggcctctc tgaagagtga gatgagggaa gtggaaggag agctggaaa      60

```

gaaggagctg	gagtttgaca	cgaatatgga	tgcagtacag	atggtgatta	cagaagccca	120
gaaggttgat	accagaagcc	aagaacgctg	gggttacaat	ccaagacaca	ctcaacacat	180
tagacgggct	cctgcattct	gatggaccaa	ccttttcang	tggttaagatt	gaagangggg	240
cctgggctta	cctgggaagc	aaaaactttt	cccganccaa	ggaaccagcag	attcaaccan	300
gcnaacttgc	ggccaaggaa	ggcanaactn	ggaanaaaaag	gccccttaag	caaaaagggnc	360
accttcattt	gctnggaaan	cagcctttan	ttggaatctt	g		401

<210> 27

<211> 383

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (383)

<223> n = A,T,C or G

<400> 27

aattgcaact	ggacttttat	tgggcagtta	cnacaacnaa	tgttttcana	aaaatatttg	60
gaaaaaatat	accacttcat	agctaagtct	tacagagaan	aggatttgct	aataaaactt	120
aagttttgaa	aattaagatg	cnggtanagc	ttctgaacta	atgccacag	ctccaaggaa	180
nacatgtcct	atttagttat	tcaaatacca	gttgagggca	ttgtgattaa	gcaaacaata	240
tatttgttan	aactttgntt	ttaaattact	gntncttgac	attacttata	aaggagnctc	300
taactttcga	tttctaaaac	tatgtaatac	aaaagtatan	ntttcccat	tttgataaaa	360
gggcnanga	tactgantag	gaa				383

<210> 28

<211> 401

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (401)

<223> n = A,T,C or G

<400> 28

ggtcgcgttt	cccttggctc	acagtctgcc	attatttgca	tttttaaagt	aagaaaagtt	60
taacgtggat	ggatggacag	tttacaatcc	agtgaagaa	tacaggaggc	agggcttgcc	120
caatcaccat	tggagaataa	cttttattaa	taagtgtctat	gagctctgcg	acacttacc	180
tgctcttttg	gtggttccgt	atcgtgcctc	anatgatgac	ctccggagag	ttgcaacttt	240
taggtcccga	aatcgaattc	cagtgtgtgc	atggattcat	ccagaaaata	agacgggtcat	300
tgtgcgttgc	agtcagcctc	ttgtcggtat	gagtgggaaa	cgaaataaag	atgatgagaa	360
atatctcgat	gttatcaggg	agactaataa	acaaatttct	a		401

<210> 29

<211> 401

<212> DNA

<213> Homo sapien

<400> 29

atatgagttt	gcatctcca	tggatgccat	ttcaatgcct	tcagggtaat	cattctctcc	60
ccaaagactg	cccacggggt	catcactcct	gtgacgaaat	gagggctgga	ttgaagatgt	120
tctgctgagc	acccccttgg	tcatcttttg	ggtctcagaa	gagccataat	catgaccatt	180
ctcagcatct	gaataatcag	gttctctcca	agtgtctggc	aagttctgat	tgtcctcagc	240

actgggatag	tctggctccc	caaaaaaggg	tggagagtta	ggttgaatgt	cagcgcttgg	300
ataatcaggc	tttcccagag	agtctgcgta	tggattgatt	ctaaaacttg	tatgttccag	360
attctttctg	gactctggat	ggttcaaatt	ggctctgggt	c		401

<210> 30
 <211> 401
 <212> DNA
 <213> Homo sapien

<400> 30						
cctgaactat	ttattaaaaa	catgaccact	cttggctatt	gaagatgctg	cctgtatttg	60
agagactgcc	atacataata	tatgacttcc	tagggatctg	aaatccataa	actaagagaa	120
actgtgtata	gcttacctga	acaggaatcc	ttactgatat	ttatagaaca	gttgatttcc	180
cccatcccca	gtttatggat	atgctgcttt	aaacttggaa	gggggagaca	ggaagtttta	240
attgtttctga	ctaaacttag	gagttgagct	aggagtgcgt	tcatggtttc	ttcactaaca	300
gaggaattat	gctttgcact	acgtccctcc	aagtgaagac	agactgtttt	agacagactt	360
tttaaaatgg	tgcctacca	ttgacacatg	cagaaattgg	t		401

<210> 31
 <211> 297
 <212> DNA
 <213> Homo sapien

<400> 31						
acctccatta	atgccagggtg	ttcctcctct	gatgccagga	atgccaccag	ttatgccagg	60
catgccacct	ggattgcatc	atcagagaaa	atacacccag	tcattttgctg	gtgaaaacat	120
aatgatgcca	atgggtggaa	tgatgccacc	tggaccagga	ataccacctc	tgatgcctgg	180
aatgccacca	ggtatgcccc	cacctgttcc	acgtcctgga	attcctccaa	tgactcaagc	240
acaggctgtt	tcagcgccag	gtattcttaa	tagaccacct	gcaccaacag	caactgt	297

<210> 32
 <211> 401
 <212> DNA
 <213> Homo sapien

<400> 32						
caaacctgga	gccaaaaagg	acacaaagga	ctctcgaccc	aaactgcccc	agaccctctc	60
cagagggttg	ggtgaccaac	tcatctggac	tcagacatat	gaagaagctc	tatataaatc	120
caagacaagc	aacaaaccct	tgatgattat	tcatcacttg	ggtgagtgcc	cacacagtca	180
agcttttaaag	aaagtgtttg	ctgaaaataa	agaaatccag	aaattggcag	agcagtttgt	240
cctcctcaat	ctggtttatg	aaacaactga	caaacacctt	tctcctgatg	gccagtatgt	300
ccccaggatt	atgtttgttg	acccatctct	gacagttaga	gcccgatatc	actggaagat	360
attcaaaccg	tctctatgct	tacgaacctg	cagatacagc	t		401

<210> 33
 <211> 401
 <212> DNA
 <213> Homo sapien

<400> 33						
agcagaggga	caggaatcat	tcggccactg	ttcagacggg	agccacaccc	ttctccaatc	60
caagcctggc	cccagaagat	cacaaagagc	caaagaaact	ggcaggtgtc	cacgcgtcc	120
aggccagtga	gttggttgtc	acttactttt	tctgtgggga	agaaattcca	taccggagga	180
tgctgaaggc	tcagagcttg	accctgggcc	acttttaaaga	gcagctcagc	aaaaagggaa	240
attataggta	ttacttcaaa	aaagcaagcg	atgagtttgc	ctgtggagcg	gtgtttgagg	300

agatctggga ggatgagacg gtgctcccg tgtatgaagg ccggattctg ggcaaagtgg 360
agcggatcga ttgagccctg gggctctggc ttggtgaact g 401

<210> 34
<211> 401
<212> DNA
<213> Homo sapien

<400> 34
aacaatggct atgaaggcat tgtcgttgca atcgacccca atgtgccaga agatgaaaca 60
ctcattcaac aaataaagga catggtgacc caggcatctc tgtatctgtt tgaagctaca 120
ggaaagcgat tttatttcaa aaatggtgcc attttgattc ctgaaacatg gaagacaaag 180
gctgactatg tgagaccaa acttgagacc tacaaaaatg ctgatgttct gggtgcttga 240
gtctactcct ccaggtaatg atgaacccta cactgagcag atggggcaac tgtggagaga 300
aggggtgaaa ggatcccacc tcactcctga tttcattgca ggaaaaaagt tagcttgaat 360
atggaccaca aggtaagggc atttgtccat gaatggggct c 401

<210> 35
<211> 401
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(401)
<223> n = A,T,C or G

<400> 35
catttcttcc tactagactg cccccttgat ccactggcag aaatgatggc accaccttgt 60
cttcaggtgg tgctccttca ttattccaag gatgcagcat ctctatggtg ccagggtatgg 120
gggtaaagcc tttggcgccc tttccgcaat ggcacatcag cagtaaaagt ggtaccaata 180
gcangaacag aaagggcaaa atcatganeg caattgctgc gggccccaaag cccacatagg 240
aatcatgctg ngcttccctg canccgctgc catgcaagac actnacaaac tngngantgta 300
aggacctgct tttcaggaca actaaaacc tgattgntctg aaatcaggaa ctgaatttca 360
cttctcccaa gctttttctc actttggtgc aacancacac t 401

<210> 36
<211> 401
<212> DNA
<213> Homo sapien

<400> 36
cctgctagaa tcaactgccgc tgtgctttcg tggaaatgac agttccttgt tttttttgtt 60
tctgtttttg ttttacatta gtcattggac cacagccatt caggaactac cccctgcccc 120
acaaagaaat gaacagttgt agggagacc agcagcacct ttcctccaca caccttcatt 180
ttgaagttcg ggtttttgtg ttaagttaat ctgtacattc tgtttgccat tgttacttgt 240
actatacatc tgtatatagt gtacggcaaa agagtattaa tccactatct ctagtgttgg 300
actttaaatc agtacagtac ctgtacctgc acggtcaccc gctccgtgtg tcgccctata 360
ttgagggctc aagctttccc ttgttttttg aaaggggttt a 401

<210> 37
<211> 401
<212> DNA
<213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(401)
 <223> n = A,T,C or G

<400> 37
 cncctntgna atggantnnt tgnctaaaaan ganttgatga tgatgaanat ccctangang 60
 antaagcatg gancntgac ntttncntng cactccttta cgacacggaa acangnatca 120
 ncatgatggt accaganacc ttatcacna cgcgcacnga nctgactnat tccaaagagt 180
 tngggttacg gncatccggt cattgctcgt gccattgct gcagggtga tncactggt 240
 gcttattatg ntggccctga ggatgctcca caatgaatat aagcatgctg catgatcagc 300
 ggcaacanat gctctgccgt ttgcactaca tctttcacgg acacnatntc gaanacgggc 360
 acnttgcanat gttagacttg gaatgcatgg ngccggncan n 401

<210> 38
 <211> 401
 <212> DNA
 <213> Homo sapien

<400> 38
 aattggctca ctctctcaag gcaagcactg tctcaaggca gtctcaaggc agagatgaca 60
 cagcaaaaaa cagaggggga gaaaaaagtc tattattggc ttgtgattta caaaagccaa 120
 agtccttttag ataaaaggcc aggagtcgta ccaacataga taccaaatcc aggagaacac 180
 agaccagcga taagagggac gcttcccat gaccagacc agcctaaagc ccctgtgggg 240
 gcagccagtg gggagctgct agaccttggg catgggtggc tttgagaatg ggtctgccct 300
 tctctcctg accagttggg atagacacct gactggaatc cttgacactg gcagggtgtt 360
 ctatgaacag agaggactgt gcctgtcttc ctgaatccca a 401

<210> 39
 <211> 401
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(401)
 <223> n = A,T,C or G

<400> 39
 tctgggtangg agcaattcta ttatttggca ttgcatggct ggggtgaatt aaaacagggg 60
 gtgagaacag gtgagtctag aagtccaact ctgaaaagga ccactgtaca tttgaacaca 120
 cggctgtgtt aaagatgctg ctaatgtcag tcaactgggtg cactaaagga tctcttattt 180
 tatgtaaaac gttgggaatg acaagatana actgatactc tggtaagtta ccctctgaag 240
 ctacttcttg tgaaatacta atgacagcat catcctgcc aagcgaagag gcaggcataa 300
 gcaaggacaa attaaaaggg ggtaagagcc ttatcatgat gaggagtctt gttttgacat 360
 cttgggaaaa gctgtccata gtgtgaagtc gtcaatttct c 401

<210> 40
 <211> 401
 <212> DNA
 <213> Homo sapien

<400> 40
 tctggtcacc caactcttgt ggaagagggg aattgagatc gagtactgaa tatctggcag 60
 agaggctgga atccttcagc cccagagccc agggaccact ccagtagatg cagagagggg 120

```

cctgcccagg ggtcagggca gtgggtatca ctggtgacat caagaatata agggctgggg      180
agggcatcttt gtttcctggg gccctcctca aagttgctga cactttgggg acgggaaggg      240
gtagaagtag ggctgctcct tttggagctg gagggaaatag acctggagac agagttgagg      300
cagtcgggct gtccaggttc taagcatcac agcttctgca ctgggctctg aggagattct      360
cagccagagg atcccagcct cctcctcctt caaatgtcaa g                                401

```

<210> 41

<211> 401

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(401)

<223> n = A,T,C or G

<400> 41

```

ctggactaaa aatgtccact atggggtgca ctctacagtt tttgaaatgc taggaggcag      60
aaggggagcaga gagtaaaaaa catgacctgg tagaaggaag agaggcaaag gaaactaggt      120
ggggaggatc aattagagag gaggcacctg ggatccacct tcttccttan gtcccctcct      180
ccatcagcaa aggagcactt ctctaatacat gccctcccga agactggctg ggagaagggt      240
taaaaacaaa aaatccagga gtaagagcct taggtcagtt tgaaattgga gacaaactgt      300
ctggcaaagg gtgcganagg gagcttgtgc tcangagtcc agcccgtcca gctcgggggt      360
gtangtttct gaagtgtgcc attggggcct caccttctct g                                401

```

<210> 42

<211> 310

<212> DNA

<213> Homo sapien

<400> 42

```

ggttcgacaa atccccaaaa atggcaaatt aagccctgtg acaaaaataag ttattggatc      60
atacagaaat agcccaaatac tggaaatttt gaattaaaat tgtaatcctg taaaacaagt      120
tttgggggtga atggatttct ttaataccaa taatattttt aattcccacc acagatggat      180
ttgctgaata tgctaatgct gtgaatgaga aaacaatttt ggggtaggta taccacaag      240
taatctgatg acaaaaataaa ccacagactg atgtcaaata gacaaaaaac tgaaaatatg      300
ctgtgagaaa                                310

```

<210> 43

<211> 401

<212> DNA

<213> Homo sapien

<400> 43

```

aggtcactta cacttgtgac cagtgtgggg cagagacctt ccagccgatc cagtctccca      60
ctttcatgcc tctgatcatg tgcccaagcc aggagtgcc aaccaaccgc tcaggagggc      120
ggctgtatct gcagacacgg ggctccagat tcatcaaatt ccaggagatg aagatgcaag      180
aacatagtga tcaggtgcct gtgggaaata tccctcgtag tatcacgggt ctggtagaag      240
gagagaacac aaggattgcc cagcctggag accacgtcag cgtcactggg attttcttgc      300
caatcctgcg cactgggttc cgacaggtgg tacaggggtt actctcagaa acctacctgg      360
aagcccatcg gattgtgaag atgaacaaga gtgaggatga t                                401

```

<210> 44

<211> 401

<212> DNA

<213> Homo sapien

<400> 44

```
atccctgtaa gtctattaaa tgtaaataat acatacttta caacttctct tagtcggccc      60
ttggcagatt aaatctttgc aaaattccat atgtgctatt gaaaaatgaa ataaaacctc      120
agatgtctga attcttattt caaatacagt tatataatta ttttaaatta caatatacaa      180
tttctgttaa atacaactgt taagggattc tgagaacaat tataagatta taataatata      240
tacaaactaa cttctgaaat gacatgggtt gtttccttcc caccctccta ccctctcaaa      300
gagtttttgc atttgctggt cctggttgca aaaggcaaaa gaaaatctaa aaatagtctg      360
tgtgtgtcca cgacatgctc gctcctttga gaatctcaaa c                          401
```

<210> 45

<211> 401

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(401)

<223> n = A,T,C or G

<400> 45

```
gtgcctgctg cctggcagcc tggccctgcc gctgcctcag gaggcgggag gcatgagtga      60
gctacagtgg gaacaggctc aggactatct caagagattt tatctctatg actcagaaac      120
aaaaaatgcc aacagtttag aagccaaact caaggagatg caaaaaattc tttggcctac      180
ctatactgga atggttaaact cccgcgtcat anaaataatg caanaagccc agatgtggag      240
tgccagatgt tgcagaatac tcaactattc caaatagccc aaaatggact tccaaagtgg      300
tcacctacag gatcgatatc tatactcgag acttaccgca tattacagtg gatcgattag      360
tgtcaaaggc tttaaacatg tggggcaaag agatccccct g                          401
```

<210> 46

<211> 401

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(401)

<223> n = A,T,C or G

<400> 46

```
gtcagaattg tctttctgaa aggaagcact cggaatcctt ccgaactttc caagtccatc      60
catgattcan agatactgcc ttctctctct ctgggatttt atgtgtttct gatagtgaat      120
tgttgatgta tttgctactt tgcttctttt ctctttcaag acttgatcat tttatatgct      180
gnttggagaa aaaaagaact tttggttagc aggaggtttc aagaaatgat tttggatttt      240
ctgctgcgga atttctcggc acctacctgt agtatggggc acttggtttg gttgcagagt      300
aagaagggtg aagaatgagc tgtacttggg taagcagttg aaaccttttt tgagcaggat      360
ctgtaaaagc ataattgaat ttgtttcacc cccgtggatt c                          401
```

<210> 47

<211> 401

<212> DNA

<213> Homo sapien

<400> 47

```

ggctctgcagc aatgcacttc aaccatacat actgcttcca ctagctaata ccaaatgcag      60
gttctcagat ccagacaaat ggaggaaaag aacatttatg cttccgtttc agaaagccaa      120
gtcgtagttt tggcccttcc tttctctaaa gtttattccc aaaaacaggt agcattcctg      180
attgggcaga gaagaggata ttttcagccc acatctgctg caggtagtgc attttctccc      240
atcttctactg tgactagtaa agatctcacc acttctcttt ggaatttcca actttgcttg      300
tgattgaatg tcacttcgtg aatttgtatt atgtcagatc acttggcatt gctcttccat      360
atgcatcaag ttgccaggca ctaaacccaa tgttcatgaa c                        401

```

```

<210> 48
<211> 430
<212> DNA
<213> Homo sapien

```

```

<400> 48
acataacttg taaacttttt ctgcttgggg gctgtaacag acagaagagt aaagactaca      60
aggattttct gaagatgctt caatgaaaat catcatttcc tcttttagtca tcccaagtct      120
tggtttgaaa aacttgggca tggacttata cagaccttga accaccactg acttatcatt      180
gggtggcaga ccttgaaacc aagctctctg tgttacttct gaaagtgcac caattctgat      240
ttggctaaga acagaagaca aatactggga tcgtgattct gtgttatact ctagccacag      300
catagcagct tctcgaacgg tttcttcttt ttctacattt aaattgtcac tactgagaat      360
atctatcagt aggtcatgtg acagacctgc cccggggccg gcccgctcga tgcttgccga      420
atatcatggg                                     430

```

```

<210> 49
<211> 57
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1) ... (57)
<223> n = A,T,C or G

```

```

<400> 49
ggtattaaca atatcangca ctctattctt ccctcttatg aaanggatna atttttta      57

```

```

<210> 50
<211> 327
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1) ... (327)
<223> n = A,T,C or G

```

```

<400> 50
gatggnggtn tccacaagan tnaangtnen tattaantan nncttgtaga nccacttnna      60
ttaattgnnn tatgnntgnc cttctgggtg ntgtngaage ttcatatnnt ntttggacat      120
cattacacgt cttagctctt tnaagnacaa ctttaatgct atatgaattt tgccattttt      180
gctaacactg gtatgctccn ngcatccacc atnccacntg gaattattta ttncnttcat      240
attaatnttt tgtttaccaa atctnacttg acccgaacga aactttctgn gtattttang      300
gcccncctat tcttactttt caagcct                                     327

```

```

<210> 51

```

<211> 236
 <212> DNA
 <213> Homo sapien

<400> 51
 cgtctcgaag aagcgctgca ggccgatgat ggactgcacg tctgccttgt cctcagttaa 60
 cttgttgaat tgcttgaaca tgcggcccac atcctgggca aactcctgtg gggagctgta 120
 gggaggtgac aacttctcct ggaggcgggc acggatcagg gtcagatcca gggtgccacc 180
 gggctggtcc agggagaagg tggagtcgta gccagacctg cccgggcggc cgctcg 236

<210> 52
 <211> 291
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(291)
 <223> n = A,T,C or G

<400> 52
 ctacacatcct gggtcgggct gtagagctgc accatgggtgc tgagcgcccc ctccagctcc 60
 ttgtagatgt aaaggacggc gaaggagctg tagtctgtgt ccacgatgcg cacgtccagg 120
 tagcccaagg ccgggactct gaagttgtcc ctcgagagccc accttcangt actcgggcat 180
 ccacctggtt acagccnttc gncctcggna actccatntg gactttacag gccgccctcc 240
 tctgtggggc tgatggncct tgcaggacat nggaacacgg gagctcnctt t 291

<210> 53
 <211> 95
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(95)
 <223> n = A,T,C or G

<400> 53
 gtctgtgcag tttctgacac ttgttgttga acatggntaa atacaatggg tatcgctgan 60
 cactaagttg tanaanttaa caaatgtgct gnttg 95

<210> 54
 <211> 66
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(66)
 <223> n = A,T,C or G

<400> 54
 cctnaatnat ntnaatggta tcaatnnccc tgaangangg gancggngga agccggnttt 60
 gtccgg 66

<210> 55
 <211> 265
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(265)
 <223> n = A,T,C or G

<400> 55
 atcttttcttc tcagtgcctt ggccntgttg agtctatctg gtaacactgg agctgactcc 60
 ctgggaagag aggccaaatg ttacaatgaa cttaatggat gcaccaagat atatgaccct 120
 gtctgtggga ctgatggaaa tacttatccc aatgaatgcc gtgttatgtt ttgaaaatc 180
 ggaaacgcca gacttctatc ctcatcctaaa aatctggggc ttcttgaaaa ccaggggttt 240
 naaaatccca ttctnggtcnc cggcgc 265

<210> 56
 <211> 420
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(420)
 <223> n = A,T,C or G

<400> 56
 gagcggccgc ccgggcaggt cctcgcggtg acctgatggg atttcaaaac cttgggttctc 60
 agcaaggccc agatttttga atgangatag aagtctggcg ttcccgattt tcaaaacata 120
 acacgcattc attgggataa gtatttccat cagtcaccaca gacngggica tatatcttgg 180
 gtgcatccat taagttcntt tgtaaacatt tgggcctctc ttccccangg gaattcagct 240
 cccagttgtt taccaanatt naactccacc gggggccaaag gcnccttgaaa aaaaaaanaa 300
 ttccctgttt accttccttg ggcttnaagt tctggcgctc aaaagttcaa ttgaaaact 360
 gcaccgcact taccacgtct cttcnagaan cctggggaca cctcgycgcg gaccacgcta 420

<210> 57
 <211> 170
 <212> DNA
 <213> Homo sapien

<400> 57
 gaagcggagt tgcagcgctt ggtggccgcc gagcagcaga aggcgcagtt tactgcacag 60
 gtgcatcact tcatggagtt atgttgggat aaatgtgtgg agaagccagg gaatcgcccta 120
 gactctcgca ctgaaaattg tctctccaga cctcgccgcg gaccacgcta 170

<210> 58
 <211> 193
 <212> DNA
 <213> Homo sapien

<400> 58
 attttcagtg cgagagtcta ggcgattccc tggcttctcc acacatttat cccaacataa 60
 ctccatgaag tgatgcacct gtgcagtaaa ctgcgccttc tgctgctcgg cggccaccag 120
 gcgctgcaac tccgcttcat cggcttcgcc cagctccgcc attgttcgcc acctgcccgg 180

gcggccgctc gaa

193

<210> 59

<211> 229

<212> DNA

<213> Homo sapien

<400> 59

cgcaactctc	gagcatttat	atacaatagc	aaatcatcca	gtgtggttga	cagtctataa	60
tactccaaca	gtctcccatc	tgtattcaat	ggcgccaccc	aatacagtc	tttgtttga	120
tgctggggag	agtaatccct	acccaagca	ccatatagat	aagaaaacc	tctccagttg	180
agctgaacca	cagacggttt	gctgatacct	gcccgggcgg	ccgctcgaa		229

<210> 60

<211> 340

<212> DNA

<213> Homo sapien

<400> 60

tcgagcggcc	gcccgggcag	gtcctctaaa	gatcaaaaaca	ccctgtcgt	ccaccctcct	60
cccaactccag	ggaagctgtg	gtcatggtgg	tgtggtgaac	atcagcaaac	cgtctgtggt	120
tcagctcaac	tggagagggt	tttcttatct	atatggtgct	tggggtaggg	attactctcc	180
ccagcatcca	acaaaaggac	tgtattgggt	ggcgccattg	aatacagatg	ggaaactgtt	240
ggagtattat	aaactggtac	aacacactgg	atgatttgct	attgtatata	aatgctcgag	300
aattgcggat	cacctatgga	cctcggccgc	gaccacgctg			340

<210> 61

<211> 179

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(179)

<223> n = A,T,C or G

<400> 61

tttttgtgac	ggacgnnttg	agtacatgtc	ccaggatcac	atccagcagc	tagagtggct	60
gggacaagct	ggcgngggcc	aagcactgtt	gaaacnatag	gggtctgggn	gnactcgggt	120
tnaagtgggt	ggcccgantn	ttnataacct	tgtcngaacc	nancatctcg	gttgncang	179

<210> 62

<211> 78

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(78)

<223> n = A,T,C or G

<400> 62

agggcggttcg	taacgggaat	gccgaagcgt	gggaaaaagg	gagcggtggc	nggaagacgg	60
ggatgagctt	angacaga					78

<210> 63
 <211> 410
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(410)
 <223> n = A,T,C or G

<400> 63
 cccagttact tggggaggct gaggcagggg gaatcctttg aacccggngg gtgggaggtt 60
 gcagtgagcc cgagatagca ccattgcact tccancatgg ggtggacaga gtgagactct 120
 atctcaaaaa aaaagaaaag aaaaggaaaag agattagatt aagattaagt acctacttcc 180
 tntccccattt caagtcctga aaatagagga tcagaaatgt tgaggaattc tttaggatag 240
 aaagggagat gggattttac ttatggggaa agaccgcaa taaagactgn aacttaacca 300
 cattccccaa gtgnaaggtg ttacccaaga agtaggaacc cttttggctn ttaccttacc 360
 ttcnngaaaa aaacttattn cttaaaatgg aaacccttaa agcccgggca 410

<210> 64
 <211> 199
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(199)
 <223> n = A,T,C or G

<400> 64
 cttgttctca aaaaggtcaa agggagcccc acgaggaata aatagcaatg cccrngaattc 60
 caactgacct tctacagaaa agtgcttgac tgccaagtgg tcttcccagt cattagttag 120
 gctctttagt aattctccat actcctcttg ggngangnca tnagggtttn nggccccaaat 180
 aggntggggc tngttaagt 199

<210> 65
 <211> 125
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(125)
 <223> n = A,T,C or G

<400> 65
 agcggtagac ttctgtcctg gcatcatcat tcattgtagt atgggtcaata ggtgccatga 60
 aactcagtag cttgctaagg acatgaaacc gaagtttctt gcctttgctg gcctngtngn 120
 gggta 125

<210> 66
 <211> 204
 <212> DNA
 <213> Homo sapien

<400> 66
 attcagaatt ctggcatcgg tattttctata aagtccatca gttagagcag gagcaggccc 60
 ggagggacgc cctgaagcag cgggcggaac agagcatctc tgaagagccc ggctgggagg 120
 aggaggaaga ggagctcatg ggcatttcac ccatactctc aaaagaggca aaggttcctg 180
 tggacctcgg ccgcgaccac gcta 204

<210> 67
 <211> 383
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(383)
 <223> n = A,T,C or G

<400> 67
 tcagggcctc caggcagcca gttttgcagg anattcagca cctagngtct tcctgcctna 60
 cgctcccaag aacctgctcc tgcaggggga acatcagaac tcgtccttga tgtaaaaatg 120
 gggctgggtct tnaggcttga agtccagggt agggctgcca tcctcattga gaattctccg 180
 ggcagtgtan ccgacgatgg ggtatttggc tttgtacact ttggtgaaaa cctnatccag 240
 ggcctccagt tccttggccg tganaccctg antgtcatgg gtgaggctctg caggatccaa 300
 ggacatcttg gctaccctc tagtggagtc cttccccgtc aaggcattgt aaggggctcc 360
 tcgtccataa aactcctttt cgg 383

<210> 68
 <211> 99
 <212> DNA
 <213> Homo sapien

<400> 68
 tcacatctcc tttttttttt aactttttca aatttttgtg ttaaatagaa ggctaaaggg 60
 tttagatttaa gtttctgcta cattgaccct atttaccta 99

<210> 69
 <211> 37
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(37)
 <223> n = A,T,C or G

<400> 69
 gagaaggacn tacggnctg ntantanang aatctcc 37

<210> 70
 <211> 222
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(222)

<223> n = A,T,C or G

<400> 70

gtgggtcatt	tttgctgtca	ccagcaacgt	tgccacgacg	aacatccttg	acagacacat	60
tcttgacatt	gaagcccaca	ttgtccccag	gaagagcttc	actcaaagct	tcatggcgca	120
tttcgacaga	ttttacttcc	gttgtaacgt	tgactggagc	aaaggtgacc	accataccgg	180
gtttgagaac	accantcac	ctgccccggg	cgggcgctcg	aa		222

<210> 71

<211> 428

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(428)

<223> n = A,T,C or G

<400> 71

caggagtatt	ttgtagaaaa	gccagaagag	cattagtaga	tgtatggaaa	tatacggtag	60
ggcacacgct	gacagtactt	ttcccaagcc	acgccgtatt	tcttcttaca	gtggtactcg	120
tcacgagctt	ctcgggtggac	aagcaacatg	gtgaaataaa	ttatgtagaa	ataaggcaga	180
atgtgggttaa	aaccacatgg	gagggaccac	gccaaaggcca	tgatgagatc	accaagtaa	240
ttgggggtggc	gaacaaagcc	ccaccatcca	gaaactagaa	naatttttcc	cgttgaaata	300
tgaatggntt	ttaaattgtgc	aagctttgga	tcactgggaa	ttttcccgaa	tgcttttttc	360
tganaattgc	accttnggaa	gantccttac	cccaagnttc	agaccattat	ttnaaaagcn	420
ttggaact						428

<210> 72

<211> 264

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(264)

<223> n = A,T,C or G

<400> 72

gaataaagag	cttactggaa	tccagcaggg	ttttctgccc	aaggatttgc	aagctgaagc	60
tctctgcaaa	cttgatagga	gagtaaaaag	ccacaataga	gcagtttatg	aagatcttgg	120
aggagattga	cacacttgat	cctgccagaa	aatttcaaag	acagtagatt	gaaaaggaaa	180
ggctttggta	aaaaaagggt	caggcattcc	tagccgantg	tgacacagtg	gagcanaaca	240
tctgcangag	actgancggc	tgca				264

<210> 73

<211> 442

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(442)

<223> n = A,T,C or G

```

<400> 73
ggcgaatccg gcgggtatca gagccatcag aaccgccacc atgacggtgg gcaagagcag      60
caagatgctg cagcatattg attacaggat gaggtgcac ctgcaggacg gccggatctt      120
cattggcacc ttcaaggctt ttgacaagca catgaatttg atcctctgtg actgtgatga      180
gttcagaaaag atcaagccaa agaacttcaa acaagcagaa agggaagaga agcgagtcct      240
cggctctggng ctgctgccaa gggagaatct ggtctcaatg acngtagaag gaccttcttc      300
caaagatact ggnattgctc gagttccact tgctggaact tcccggggcc caaggatcgc      360
aaggcttctg gcaaaagaaa tccanacttn ggccgggacc acctaanca attcacacac      420
tggcggccgt actagtggat cc                                         442

```

```

<210> 74
<211> 337
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1) ... (337)
<223> n = A,T,C or G

```

```

<400> 74
ggtagcagcg tctccagagc ctgatctggg gtcccagata cccaggcagc agcagccctg      60
gaggtaaagg gcaagctccc caatgtgagg ggagacccca ttccctggta gccaggcttt      120
cagaggagat agcaggtcga gggagccaac gaagaagaga ctgccancag ggggaaggact      180
gtcccgccaa ggacagaact gattcagggg ggtcaatgct cctctagaga agagccacac      240
agaactgggg ggtccaggaa ccatgaanct tggctgtggt ctaaggagcc aggaatctgg      300
acagtgttct gggtcatacc aggattctgg aattgta                                         337

```

```

<210> 75
<211> 588
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1) ... (588)
<223> n = A,T,C or G

```

```

<400> 75
catgatgagt tctgagctac ggaggaaccc tcatttcctc aaaagtaatt tattttttaca      60
gcttctggtt tcacatgaaa ttgtttgcgc tactgagact gttactacaa actttttaag      120
acatgaaaag gcgtaatgaa aaccatcccc tccccattcc tccctctctc tgagggactg      180
gagggaaagg gtgcttctga ggaacaactc taattagtag acttgtgttt gtagatttac      240
actttgtatt atgtattaac atggcgtgtt tatttttgta tttttctctg gttgggagta      300
tgatatgaag gatcaagatc ctcaactcac acatgtagac aaacattagc tctttactct      360
ttctcaaccc cttttatgat tttaataatt ctcaactaac taattttgta agcctgagat      420
caataagaaa tgttcaggag agangaaaga aaaaaaatat atgttcccca tttatatatta      480
gagagagacc cttantcttg cctgcaaaaa gtccaccttt catagtagta ngggccacat      540
attacattca gttgctatag gncagcactg aactgcatta cctgggca                                         588

```

```

<210> 76
<211> 196
<212> DNA
<213> Homo sapien

```

```

<400> 76
gcggtatcac agcctggccc ccatgtacta tcggggggcc caggctgcca tcgtggtcta    60
tgacatcacc aacacagata catttgcacg ggccaagaac tgggtgaagg agctacagag    120
gcaggccagc cccaacatcg tcattgcact cgcgggtaac aaggcagacc tggacctgcc    180
cgggcgggcg ctcgaa                                         196

```

```

<210> 77
<211> 458
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1)...(458)
<223> n = A,T,C or G

```

```

<400> 77
agtagagatg gggtttctact gtgttaacca ggatggtctt gatctcctgg cctcgtgata    60
tgcccgccctc ggccctccaa agtggtggga ttacaggcgt gaaccaccgc acccggccag    120
aaatggttagt ttttccctat tctctctcct ttttcttatt atatacttgg tcaaccagac    180
agccatccta cccanaatg gtaatgcctc ttcattcctc atatgaggga ataaaagaga    240
aaaaagcttt tggaaaacat ccacttatct aatcatccca aatatgtaat caaaagtata    300
caactcatgt gaagaatata ctggtaaaat gttantatag gccaaaggat cttgaattcc    360
tatatagaaa gctggtaaat gcccttttgg ctggaaccgc catcttcenn taattcnccc    420
aaaatgacca aacacaaagg gnaagangan aagccccc                                         458

```

```

<210> 78
<211> 464
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1)...(464)
<223> n = A,T,C or G

```

```

<400> 78
tccgcaaatt tcctgccggc aaggtcccag catttgaggg tgatgatgga ttctgtgtgt    60
ttgagagcaa cgccattgcc tactatgtga gcaatgagga gctgcgggga agtactccag    120
aggcagcagc ccagggtggt cagtgggtga gctttgctga ttccgatata gtgccccag    180
ccagtacctg ggtgttcccc accttgggca tcatgcacca caacaaacag gccactgaga    240
atgcaaagga ggaagtgagg cgaattcttg ggctgctgga tgcttacttg aagacgagga    300
cttttctggt gggcgaacga gtgacattgg ctgacatcac agttgtctgc accctgttgt    360
ggctctataa gcaggntcta gaaccttctt ttcgcangac cttcggccgg accacgctta    420
acccaaattc cacacacttg cnggccgtac taanggaatc ccac                                         464

```

```

<210> 79
<211> 380
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1)...(380)
<223> n = A,T,C or G

```

```

<400> 79
ctgtatgacc agttttttcca tctccttcac ttctaccttg atcagctcga agtccagttc      60
agtgtaaaga atgggtatcct tctccatgat gtcaattcgg acagttaggt ttaacagttt      120
cttttcatac acactaatta attggacata ttccctcact ttanaaaagt ctttctcaaa      180
cttctganaa aagaacatga actgtgaatt ccaagcggtc ccactctgtc cacgggaaaa      240
ggtggtgtct ggcagggaaa cagaacactg gcagggtccac ggtcatccac ggagccgggtg      300
aaattgggaa aacaactggg acacagaacc tccgctgcct aagctgcggn tgggagcttg      360
gaacccgacc tggaactgga

```

<210> 80

<211> 360

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (360)

<223> n = A,T,C or G

```

<400> 80
tcgagcgggc gcccgggcag gtcctcagag agctgtttgt tncgcttctt caaaaactcc      60
tattctccac ttctgctaaa ggactggatg acatcaattg tgatagcaat atttgtgggt      120
gttctgtcan ncancatcgc actcctgaac aaagtagatg ttggattgga tcagtctctt      180
tccacccaga tgactcctan atggtggatn atttcaaate catcantcag tacctgcatg      240
cgnggtccgc ctgtgtncct tgtcctgcag gangggcnct actacacttc ttccnagggg      300
canaacatgg tgtgcngcgg ccatgggctg gcaacantga ttcnctgctg cacccanatn      360

```

<210> 81

<211> 440

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (440)

<223> n = A,T,C or G

```

<400> 81
acgtggtccg gcgagtctga cctgcagata tgaactcctt gggaaaccta cattctgcct      60
cagacatact gggggcaaat ggctttaaaa gtctggctca gggagccaag attacagaaa      120
nccgttgagt cnccatacat ggacactgac aaaggaactg aagatatcca aacaagccct      180
cctggtcccg ngcctgcata aagatcgggg ncggaacggt accngacgtc tgtggtcagg      240
ggttgtggaa aattggaaaa aaccagtcct gccacattg acaggaagc ctcaacggaa      300
attgaacaga tngtcttatc accagtctcc cctcctggat cntgtctcgg ctcnngggan      360
tcagtgatca gtcctttcag gtggaagaag caaagaagat caacaanaag cngatcctct      420
cacctgntac cagcatatgg

```

<210> 82

<211> 264

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(264)

<223> n = A,T,C or G

<400> 82

agcgtgggtcg	cggccgangt	cctgacattc	ctgccttctt	atattaatta	tacnaataaa	60
acaaaatagt	gttgaagtgt	tggagcggcg	aaaattttttg	gggggtggta	tggacagaga	120
atgggcatn	ttctcanggc	tgcttcaagt	gggattgggg	cngcgtggga	tcatncagtg	180
gganagattn	cnctgaccgg	antctnttgg	tanggatnat	cttgtgggga	tgtgcaagag	240
ncattcgtct	cctgaatgan	tggt				264

<210> 83

<211> 410

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(410)

<223> n = A,T,C or G

<400> 83

ancgtgggtcg	cggccgangt	ccacagttgt	gggagagcca	gccattgtgg	gggcagctcc	60
acaggtaaga	ctcgtgtcct	gagcagcgca	catcatccag	gacaatgggt	cctgagccct	120
gaccaaaccg	ggcatttcct	ggggctgaca	tggcccagcc	acagcccant	tgctgcaga	180
cgaaattggc	atcattgggtg	tcccagtant	catcacacac	ggtgccccag	gaacctccgg	240
tatangaact	ccactcggcc	tcnanacctg	tcgcctccat	tcncagcct	cagggggcaa	300
actgggatc	agatccttct	gtgggtacag	gtggtgatat	cctgacaggc	caactttctg	360
gcctgagtgt	tgactgangc	tgggcagacc	tgcccgggcg	gccgctcgaa		410

<210> 84

<211> 320

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(320)

<223> n = A,T,C or G

<400> 84

tcgaacggcc	gcccgggcag	gtctgcccc	ggtgtatcca	tttgccgccc	atctctatca	60
naaggagctg	gctaccctgc	nncgacgaan	tcctgaanat	aatctcacc	ncccagatct	120
ctctgtcgca	atggagatgt	cgtcatcggt	ggnctgatc	acagggcatt	ggactcagag	180
anangtnanc	acagtgtnga	agcgattgan	nnagttcagt	tgctgggtct	acccgatntt	240
ggaaggaagg	aaaacgtggt	angacgtatc	tcgatgnant	tgaccaaanc	tgaangctnc	300
agggggcatc	gcaaaganan					320

<210> 85

<211> 218

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(218)

<223> n = A,T,C or G

<400> 85

tcgagcggcc	gcccgggcag	gtctgctgcc	cgtgctgggtg	ccattgcccc	atgtgaagtc	60
actgtgccag	cccagaacac	tggtctcggg	cccgagaaga	ctcctttctc	caggctntan	120
gtatcaccac	taaaatctcc	aggggcacca	tnganatcct	gggtgtccgc	aatgttgcca	180
atgtctgtcc	gcnnattggc	tacccaactg	ttgcatca			218

<210> 86

<211> 283

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(283)

<223> n = A,T,C or G

<400> 86

tcgacttctt	gtgaagggtt	tgganaaata	tgtatcagtt	cgttttat	gggtattcaa	60
taatatcctt	ggtgataatg	ctgactccat	ggcttctgac	cccaaaaatt	gaccctgctg	120
ccactgggtg	tagccctgag	attgattttt	gtagccacga	ttgtttcctc	gtcctctgaa	180
gtnctgggtg	tanttccttc	tgtngggcat	tcccctctgt	tgtanttccc	tctgtttgan	240
taactaccac	ggccaggaaa	aacaggggca	cgaaggatg	gat		283

<210> 87

<211> 179

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(179)

<223> n = A,T,C or G

<400> 87

agcgtgggtc	cggccgatgt	ctttctgtgt	aagtgcataa	cactccacat	acttgacatc	60
cttcangtca	cgggccagct	nttcagcant	ctctggagtg	ataggctact	gtntgttctn	120
ggcaagtgtc	tcaanaatac	aggggtcntc	tctgagatga	ntttcagtcc	cgaaccctc	179

<210> 88

<211> 512

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(512)

<223> n = A,T,C or G

<400> 88

tcgagcggcc	gcccgggcag	gtcctanacan	agaatcacca	aatttatgga	gagttaacag	60
gggtttaaca	ggaangaagt	gccttttagta	agttctcaag	ccagangctg	gaggcagcag	120
ctaaatcaga	ggacaggatc	ctcagtgaag	gtgagccatt	cgggggtggc	tgtcactcca	180
ggaataagca	caacttanaa	acaaatgatt	tcgtangata	gcacagtgc	attgggtgc	240

```

ttgtgaacct gagggcactg tgtcaaactg tgcactgggt gtgaataggg aganccaaaa 300
attatgtcct actgggtaat gagctttcaa tgggctcgat cctctcacnc tgaaagctct 360
gtagagcagc tcagaaccac aaccactccc aacattgacc cttctggggg tactgtctgt 420
ggcaccacaca ggaaggagct ggagatcccc attaggactg tccaccacaca cttgaagcca 480
caaaactgca cctcggccgc gaccaccgct ta 512

```

```

<210> 89
<211> 358
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1)...(358)
<223> n = A,T,C or G

```

```

<400> 89
tcgagcgggc cgcccgggca ggtctgccag tccccatccc agacattctt tgcattctaag 60
ctgangtctg aactgagtgg ggtgggctgg tgtttccatc ctcacaactc cagtgagccg 120
ggtgtggccg tggcctgcgt ctctctggcg gttagtgatg ttggcatcat ccaccttttt 180
caaaacaaaa gcactggact gaagaanaat ccncacctgt ntccaccag tccatggttt 240
ttaataaaaag ggttatnnaa gttgancaag ncatcaccac acacaancct aagaacnttt 300
ttcatcnntc cccaaaacaa acccncaccc tgggaactcc gggcgcggaac cagcgcta 358

```

```

<210> 90
<211> 250
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1)...(250)
<223> n = A,T,C or G

```

```

<400> 90
cgagcgggccc cccgggagcag tctggatggg gagacggact ggaactgcgg cttcccgtgg 60
cctgcacgca caaggtcccc cacggccgcc gacctttctc agattcgatc gtatgtgtac 120
gcacnaagag ccaaattattg acattcacia cttcgtggga atnttaccac anaagactgc 180
gacccccga tcaggcgana gcctgagcat agaagaacac cgctgtgggc ttggcactgt 240
gggncccatc 250

```

```

<210> 91
<211> 133
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1)...(133)
<223> n = A,T,C or G

```

```

<400> 91
tcgagcggcc gnccgggag gtcccgggtg gttgtttgcc gaaatgggca agttcntnaa 60
ncctgggaag gtggtgcntg tncgtggtgg acgctactcc ggacgcnaag ctgtcntcgt 120
gangancatt gat 133

```

<210> 92
 <211> 232
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(232)
 <223> n = A,T,C or G

<400> 92
 agcgtggctc cggccgangt ctgtcacttt gcgggggtag cggtcattc cagccaccag 60
 agcatggctg taggggcgat ctgaggtgcc atcatcaatg ttcttcacga tgacaagctt 120
 tgcgtccgga gtagcgtcca gccaggacaa gcaccacctt cccacgtntt cangaactng 180
 cccatttcgg cataaccacc cgggacctgc ccggggcggn cgtcgaagaa cc 232

<210> 93
 <211> 480
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(480)
 <223> n = A,T,C or G

<400> 93
 agcgtgggtc gcggccgang tctgtangct caccggccag agaagaccac tgtgagcatt 60
 ttgccgtata tcctgccctg ccatttgttc acttttttaa ctaaaatagg aacatccgac 120
 acacaccgtt tgcacgtct tctcccttga tattttaagc attttcccat gtcgtgagtt 180
 tctcagaaac atgtttttaa caattgtact atttagtcac ngtcatttta ctataattta 240
 tctgaccatt tccctactgt taaaatactt aagacgggtt ctgatttttc cactatttta 300
 ataatgctgt gatgaatgc tttaaaatct tctgatttct tacttttttc ccccttagat 360
 gcttggaagt ggtattttga ggtgaaagag tttgttcatt ttgaanatat ttctgtctct 420
 ctctcgacct gatgtgtana cgctcacttc cagtttagcag aaccacctta gtttgtgtct 480

<210> 94
 <211> 472
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(472)
 <223> n = A,T,C or G

<400> 94
 tcgagcggn cggcgggcag ggtctgatgt cantcacaac ttgaagggat gccaatgatg 60
 taccaatccn atgtgaaatc tctcctctta tctcctatgc tgganaaggg attacaaagt 120
 tatgtggcng ataannaatt ccattgcacct ctantcatcg atgagaatgg agttcatgan 180
 ctggtgaach atggtatctg aaccggatgc cangttttgt ttgccacgat angantagct 240
 tttatttttg atagaccaac tgtgaacctt ccacacgtct tggacnactg anntctaact 300
 atccncaggg ttttattttg cttgttgaac tcttncagct nttgcaaact tcccaagatc 360
 canatgactg antttcagat agcattttta tgattcccan ctcatgaag gtcttatnta 420

tntcntttttt tccaagccaa ggagaccatt ggacctcggc cgcgaccacc tn 472

<210> 95
 <211> 309
 <212> DNA
 <213> Homo sapien
 <220>
 <221> misc_feature
 <222> (1)...(309)
 <223> n = A,T,C or G

<400> 95
 tcgagcggcc gcccgggcag agtgtcgagc cagcgtcgcc gcgatggtgt tgttggagag 60
 cgagcagttc ctgacggaac tgaccagact ttccanaag tgccggacgt cgggcancgt 120
 ctatatcacc ttgaagaant atgacggtcg aaccaaacc attccaaaga aangtactgt 180
 gganggcttt gancccgag acaacnagt tctgttaaga actaccgatn ggaaanaana 240
 anacgagcac tgtgggtgag ctccnaggga agttaataan ttccggatgg gcttattcna 300
 acctcctta 309

<210> 96
 <211> 371
 <212> DNA
 <213> Homo sapien
 <220>
 <221> misc_feature
 <222> (1)...(371)
 <223> n = A,T,C or G

<400> 96
 tcgagcggcc gcccgggcag gtccaccact cacctactcc cegtctctat agatttgcct 60
 gttctgggca gttctcagca atggaatcct actgtgtatc tttttgtgac tggttcttta 120
 actcagcatc acattttcaa ggttcaccca tgctgcagcc tggctccgta ctggtgacag 180
 tacttcattt ctctctccct tttgttcaga ccaaggtctc cctctgtccc caaggctaaa 240
 gtgcagttgg tgtgatcatg gctcactgca gcctcaaact cctggactca aacagtcctc 300
 ccatctcagc ctcccaaagt gctgatntta taagttgcaa gccctgcacc cagcctgtat 360
 ctccagtttg t 371

<210> 97
 <211> 430
 <212> DNA
 <213> Homo sapien
 <220>
 <221> misc_feature
 <222> (1)...(430)
 <223> n = A,T,C or G

<400> 97
 tcgancggcc gcccgggcag gttntttttt tttntttttt nnnngntagt atttaaagan 60
 atttattaaa tcatcttata accaaaatgg aaacatnttc caactagaaa catgcnacca 120
 tcatcttccc cagtccagtc ncaangtcca atatttttntc tgctctgca gataaaaagt 180
 tcnnattttt ataccactc ttactcccc ccaaaatttt aattcngtcc tncctaaaa 240
 ttncnccggg taacaantta ccaaaatggc naaccaatta ttttaaanaa aagttgcncn 300

```

ttnaaaangg aaactttntg gcaanttanc ctcttttccc ttcccacccc ccantttaag      360
gggaaaacaa tggcactttg ctcttgcttn aacccaaaat tgtcttccaa aaactattaa      420
aatgttnaa                                     430

```

```

<210> 98
<211> 307
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1)...(307)
<223> n = A,T,C or G

```

```

<400> 98
tcnaacggcc gccnngcnn gtctngcngc acctgtgcct canccgtcga tacctgggtcg      60
attgggacan ggaanacaat ntggttttca gggaggccac anatttggag aaacggatga      120
attctccttt attccgaant cagctccttg gtctccgtag anggtgatct tgaaattctc      180
ctgttttgaa aactttcttg aanaaacctt acctgtctgt tgtatttggg ctcccactcg      240
gacaagtact cgttatccnn ggtactctta atgtgcccac gtnaactccc cgggntggca      300
actggaa                                     307

```

```

<210> 99
<211> 207
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1)...(207)
<223> n = A,T,C or G

```

```

<400> 99
gtccnggacc gatgttgcn aaganntttct tgggtccanta gggttcnaaaa aatgataanc      60
naggtntanc acgtgaagat ntntatanag tcttantnaa aacnctaga tctgnatgac      120
gataantcga anacnggggg aggggntgag gngaggtggn gtganggaag anntgttgat      180
aaaaganna gntgataaga annagac                                     207

```

```

<210> 100
<211> 200
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1)...(200)
<223> n = A,T,C or G

```

```

<400> 100
acntnnacta gaantaacag ncnttctang aacactacca tctgtnttca catgaaatgc      60
cacacacata naaactccaa catcaatttc attgcacaga ctgactgtaa ttaattttgt      120
cacaggaatc tatggactga atctaatgcn nccccaaatg ttgttngttt gcaatntcaa      180
acatnnttat tccancagat                                     200

```

```

<210> 101

```

```

<211> 51
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(51)
<223> n = A,T,C or G

<400> 101
tcgagcggcc gcccgggcag gtctgaccag tgganaaatg cccagttatt g          51

<210> 102
<211> 385
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(385)
<223> n = A,T,C or G

<400> 102
aacgtggctcg cggccgaagt ccatggtgct gggattaatc cactgtgacn gtgactctga      60
gttgagttgt ttttcaatct tctccaagcc tgtggactca tcttccacat ccttgggtag      120
taggatgaac atgctgaaga tgctnatttt gaaaaggaac tctatgaatc ttacaattga      180
atactgtcaa tgtttcccca tnacagaacg tggnccccca aggttccatc atctgcactg      240
ggtttggttg ttctgtcttg gttgactctt gaaaagggac atttcttttt gttttcttga      300
attcanggaa attttcttca tccacttttg ccacaaaagt taggcagcat ttaaccccca      360
anggatcttg ggtctgggtc ctccc                                     385

<210> 103
<211> 189
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(189)
<223> n = A,T,C or G

<400> 103
agcgtggctcg cggccgaagt ctgcagcctg ggactgaccg ggaagctctg attatttacc      60
caccacaggt angttggtt ctgaatctca agttcacagg ttaaggctac agcatcctca      120
tctccacgg ggttggantt gttgctggtg atgaanggtt tggggtggct ctgcataact      180
gttgatctc                                     189

<210> 104
<211> 181
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(181)
<223> n = A,T,C or G

```

<400> 104
 tcgagcggcc gcccgggcag gtccaggtct ccaccaangc accaccgtgg gaagctggta 60
 attgatgccc accttgaagc cnntggggca ccatccncca actggatgct gcgcttggtt 120
 ttgatggtgg caatggcaca ttgactcttt tgggaaccac ttcaccacgg tacaacaggc 180
 a 181

<210> 105
 <211> 327
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(327)
 <223> n = A,T,C or G

<400> 105
 tcgagcggcc gcccgggcag gtcttctgtg gagtctgcgt gggcatcgtg ggcagtgggg 60
 ctgccctggc cgatgtctan aaccccagcc tctttgtaaa gattctcatc gtgganatct 120
 ttggcagcgc cattggcctc tttgggggtca tcgtcgcaat tcttcanacc tccanaatga 180
 anatgggtga ctanataata tgtgtgggtg gggccgtgcc tcaactttat ttattgctgg 240
 ttttctctgg acagaactcg ggcgcgaaca cgcttanceg aattccaaca cactggcggg 300
 cgttactagt ggatccgagc tcggtac 327

<210> 106
 <211> 268
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(268)
 <223> n = A,T,C or G

<400> 106
 agcgtggtcg cggccgangt ctggcgtgtg ccacatcggt cccacctcgc tttacaaaac 60
 agtctgaac ttnatctaataaaaattattg tacacnacat ttacattaga aaaaganagc 120
 tgggtgtang aaaccggggc tgggtgtccc ttttaagcgaa ngtggctcca cagttggggc 180
 atcgtcgctt cctcnaagca aaaacgcca tgaacccna agggggaaaa aggaatgaag 240
 gaactgnccn gggangnccg ctccgaaa 268

<210> 107
 <211> 353
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(353)
 <223> n = A,T,C or G

<400> 107
 tcgagcggcc gcccgggcag gtggccaggc catgttatgg gatctcaacg aaggcaaaca 60
 cctttacacn ctagatgggtg gggacatcat caacgcctg tgcttcagcc ctaaccgcta 120

```

ctggctgtgt gctgccgcag gccccagcat caagatctgg gatttanagg gaaagatcnt 180
tgttnatgaa ctgaancnta aattatcagt tccannacca ngcaaaaacc acccngtgca 240
ctccctggcc tggctctgctg atgggacctc gggcgcgaac acgctnancc caattccanc 300
acactgggcg gncgttacta ntggatccga actcnggtac caancttggc gtt 353

```

<210> 108

<211> 360

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(360)

<223> n = A,T,C or G

<400> 108

```

agcgtggctc cgcccggaagt cctggcctca catgaccctg ctccagcaac ttgaacagga 60
naagcagcag ctacatcctt aaggctccgga aagtttagatg aagatttgga tcctgcattg 120
ncctgcctcc cacctatctc tccnaatta taaacagcct ccttgggaag cagcagaatt 180
taaaaaactct cccnctgccc tnttgaacta cacaccnacc gggaaaacct ttttcanaat 240
ggcacaaaaa tncnagggaa tgcatttcca tgaangaana aactgggtta cccaaaatta 300
ttgggttggg gaaatccngg gggggttttt aaaaaagggc aanccnccaa anaaaaaac 360

```

<210> 109

<211> 101

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(101)

<223> n = A,T,C or G

<400> 109

```

atcgtggctc cgcccggaagt cctgtgtcct ggatgggccc tgtgcancga atccgttggc 60
gactcctaac taccaanaaa angactctcg gaagaaattt c 101

```

<210> 110

<211> 300

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(300)

<223> n = A,T,C or G

<400> 110

```

ccanggaaac ccagagtcac atgagatagg gtggctttcg ggacaggggg tcagangaat 60
ggtacatgga tctcagcccc tgatggacac ggaacagggtg tggtcagAAC tcccangatt 120
ctgcatccan gatccagtct ctatagaagt tatggatcat tccttcattt cattcccccc 180
ttcatgaaaa aacttctgaa caagcctttt ttctcacttt ggggccctgt ttggcncaag 240
gtnttnantt ggggaaaaaa aaacaaatcc ntccnttan ccctccgtgg ggaatgacct 300

```

<210> 111

<211> 366
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(366)
 <223> n = A,T,C or G

<400> 111
 cgagcggccg cccgggcagg tccttgtgtt gccatctgtt ancattgatt tctggaatgg 60
 aacancctttc tcaaagtttg gtcttgctan tcatgaagtc atgtcagtggt cttaagtcac 120
 tgctgtcac ttccttacc agggaatata ctgcataagt ttctgaacac ctgttttcan 180
 tattcactgt tcctctcctg cccaaaattg gaagggacct catttaaaaa tcaaatttga 240
 atcctgaaan aaaaacngga aatntttctc ttggaatttg gaatagaatt attcanttga 300
 ataacatgtt ttttccctt gccttgctct tcncaanaac atctggacct cgcccgcgac 360
 acctta 366

<210> 112
 <211> 405
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(405)
 <223> n = A,T,C or G

<400> 112
 ctgactncta aacttctaata tcnatcaana taactactct ccttccgtct tncagagtgt 60
 tcacaataaaa tctgtgaatc tggcatacac agttgtctgga aaattgttct tcctccacna 120
 aaaggtcaat tgctcncnc atgaaanaag ataaattgtt catccatcac tinctgaacca 180
 tccaaaacgc cggcggaatt attnccccgt tattatgggg aacggaattt tnaataaatt 240
 tgggaangaa tggggctttt attgttttgt tttccccctt tcttggcatt gattggggccg 300
 caatgggccc cctcgtctcan aanntgcccc ggggcccggc gtcctcaaac cgaaattccc 360
 anccacactt ggcgggcccgt tactanttgg atccgaactc ggtta 405

<210> 113
 <211> 401
 <212> DNA
 <213> Homo sapien

<400> 113
 ggatagaaga gtatatgggt ttggcaccac ggggtggata ggcaaaacat ttggttgata 60
 aggcgagat tctgaactaa cttgtaaggc ttgtctggtt ttaggacagg taaaatgggg 120
 gaatggtaag gagagtttat aggttttagg agcccatgct gtagcaggca agtgataaca 180
 ggctttaatc ctttcaaagc atgctgtggg atgagatatt ggcatttgag cggggtaagg 240
 gtgattaggt tttaatgaga tggtaagggg tgcgatgcc ggtccgcaa ggaaggggaag 300
 tagaggtatc ttatacttgt ggggttaagg tgggggggat ataagaggga ggacgccaaa 360
 ggaggctttg gattaggaat aagggggcgc aatgagatgc a 401

<210> 114
 <211> 401
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(401)
 <223> n = A,T,C or G

<400> 114
 angtcacag gangcangag gccaggctcc gtcccancca gtccatgatg ttgaagagga 60
 ggaagcagca catgggggtg aagaactgac tccacttccc aggactggtg gagctggtca 120
 ccatggctgt ggtggcgggg aagacggaca gggtgacttc tggaagacag tgaagactga 180
 aggttttctt ggcttctggg gctcatctgg ctctgattcc ggctccttct ccagggtcaag 240
 atccagggtt cagagctact ttcttggggg actactnggg aatcccgttc tcatctgggg 300
 gtngaggggg gacggggnaa gggncatgct tgtgaccag gtttcccacc tcggcccgcg 360
 accacgctaa ggcccgaatt ncagcacact tggcggcccg t 401

<210> 115
 <211> 401
 <212> DNA
 <213> Homo sapien

<400> 115
 atccctgtaa gtctattaaa tgtaaataat acatacttta caacttctct tagtcggccc 60
 ttggcagatt aaatctttgc aaaattccat atgtgctatt gaaaaatgaa ataaaacctc 120
 agatgtctga attcttattt caaatacagt tatataatta ttttaaatta caatatacaa 180
 tttctgttaa atacaactgt taagggattc tgagaacaat tataagatta taataatata 240
 taaaaactaa cttctgaaat gacatgggtt gtttccctcc caccctccta cctctcraaa 300
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<210> 116
 <211> 301
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(301)
 <223> n = A,T,C or G

<400> 116
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 aatatcccta ggaggagtta gcatggannn tgatcatttt cttngnactc ctttangaca 120
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 gattctagtg ntgcttatta tgctggccct gaggatgctt ccaanatgaa aataagangc 300
 t 301

<210> 117
 <211> 383
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(383)

<223> n = A,T,C or G

<400> 117

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gaaaaaatat	accacttcat	agctaagtct	tacagagaan	aggatttgct	aataaaactt	120
aagttttgaa	aattaagatg	cnggtanagc	ttctgaacta	atgcccacag	ctccaaggaa	180
nacatgtcct	atthagttat	tcaaatacca	gttgagggca	ttgtgattaa	gcaaacaata	240
tatttgttan	aactttgntt	ttaaattact	gntncttgac	attacttata	aaggagnctc	300
taactttcga	tttctaaaac	tatgtaatac	aaaagtatan	ntttcccat	tttgataaaa	360
gggcnanga	tactgantag	gaa				383

<210> 118

<211> 301

<212> DNA

<213> Homo sapien

<400> 118

ctgctagaat	cactgccgct	gtgctttcgt	ggaaatgaca	gttccttggt	ttttttgttt	60
ctgtttttgt	tttacattag	tcattggacc	acagccattc	aggaactacc	ccctgcccc	120
caaagaaatg	aacagttgta	gggagacca	gcagcacctt	tcctccacac	accttcattt	180
tgaagtccg	gtttttgtgt	taagttaatc	tgtacattct	gtttgccatt	gttacttgta	240
ctatacatct	gtatatagt	tacggcaaaa	gagtattaat	ccactatctc	tagtgcttga	300
c						301

<210> 119

<211> 401

<212> DNA

<213> Homo sapien

<400> 119

taaggacatg	gacccccggc	tgattgcatg	gaaaggagg	gcagtgttg	cttgtttgg	60
tacaacacag	gaactgtgga	tttatcagcg	agagtggcag	cgctttggtg	tccgcatgtt	120
acgagagcgg	gctgcgtttg	tgtggtgaat	gggaggaaa	tgctactgcc	gaagacaaaa	180
aacaagcttc	ttggtataaa	agactcttac	agaatatgtg	tattgtaatt	tattgatctg	240
gatgcttaag	tgtcatggac	agtaaatgaa	tttgaacttt	atgtttgagg	acatgacatt	300
gggtttgaaa	atataaactg	cttttgagca	gtttaagtca	gggcatttga	gaataaaata	360
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<210> 120

<211> 301

<212> DNA

<213> Homo sapien

<400> 120

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gaagctctat	ataaatccaa	gacaagcaac	aaacccttga	tgattattca	tcacttgggt	180
gagtgcccac	acagtcaagc	tttaaagaaa	gtgtttgctg	aaaataaaga	aatccagaaa	240
ttggcagagc	agtttgtcct	cctcaatctg	gtttatgaaa	caactgacaa	acacctttct	300
c						301

<210> 121

<211> 2691

<212> DNA

<213> Homo sapien

<400> 121

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<210> 122

<211> 683

<212> PRT

<213> Homo sapien

<400> 122

Met Ala Leu Phe Val Arg Leu Leu Ala Leu Ala Leu Ala Leu

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	20	25	30
Val Leu Gln His Ser Arg Leu Arg Gly Arg Gln His Gly Pro Asn Val			
	35	40	45
Cys Ala Val Gln Lys Val Ile Gly Thr Asn Arg Lys Tyr Phe Thr Asn			
	50	55	60
Cys Lys Gln Trp Tyr Gln Arg Lys Ile Cys Gly Lys Ser Thr Val Ile			
65	70	75	80
Ser Tyr Glu Cys Cys Pro Gly Tyr Glu Lys Val Pro Gly Glu Lys Gly			
	85	90	95
Cys Pro Ala Ala Leu Pro Leu Ser Asn Leu Tyr Glu Thr Leu Gly Val			
	100	105	110
Val Gly Ser Thr Thr Thr Gln Leu Tyr Thr Asp Arg Thr Glu Lys Leu			
	115	120	125
Arg Pro Glu Met Glu Gly Pro Gly Ser Phe Thr Ile Phe Ala Pro Ser			
	130	135	140
Asn Glu Ala Trp Ala Ser Leu Pro Ala Glu Val Leu Asp Ser Leu Val			
145	150	155	160
Ser Asn Val Asn Ile Glu Leu Leu Asn Ala Leu Arg Tyr His Met Val			
	165	170	175
Gly Arg Arg Val Leu Thr Asp Glu Leu Lys His Gly Met Thr Leu Thr			
	180	185	190
Ser Met Tyr Gln Asn Ser Asn Ile Gln Ile His His Tyr Pro Asn Gly			
	195	200	205
Ile Val Thr Val Asn Cys Ala Arg Leu Leu Lys Ala Asp His His Ala			
	210	215	220
Thr Asn Gly Val Val His Leu Ile Asp Lys Val Ile Ser Thr Ile Thr			
225	230	235	240
Asn Asn Ile Gln Gln Ile Ile Glu Ile Glu Asp Thr Phe Glu Thr Leu			
	245	250	255
Arg Ala Ala Val Ala Ala Ser Gly Leu Asn Thr Met Leu Glu Gly Asn			
	260	265	270
Gly Gln Tyr Thr Leu Leu Ala Pro Thr Asn Glu Ala Phe Glu Lys Ile			
	275	280	285
Pro Ser Glu Thr Leu Asn Arg Ile Leu Gly Asp Pro Glu Ala Leu Arg			
	290	295	300
Asp Leu Leu Asn Asn His Ile Leu Lys Ser Ala Met Cys Ala Glu Ala			
305	310	315	320
Ile Val Ala Gly Leu Ser Val Glu Thr Leu Glu Gly Thr Thr Leu Glu			
	325	330	335
Val Gly Cys Ser Gly Asp Met Leu Thr Ile Asn Gly Lys Ala Ile Ile			
	340	345	350
Ser Asn Lys Asp Ile Leu Ala Thr Asn Gly Val Ile His Tyr Ile Asp			
	355	360	365
Glu Leu Leu Ile Pro Asp Ser Ala Lys Thr Leu Phe Glu Leu Ala Ala			
	370	375	380
Glu Ser Asp Val Ser Thr Ala Ile Asp Leu Phe Arg Gln Ala Gly Leu			
385	390	395	400
Gly Asn His Leu Ser Gly Ser Glu Arg Leu Thr Leu Leu Ala Pro Leu			
	405	410	415
Asn Ser Val Phe Lys Asp Gly Thr Pro Ile Asp Ala His Thr Arg			
	420	425	430
Asn Leu Leu Arg Asn His Ile Ile Lys Asp Gln Leu Ala Ser Lys Tyr			
	435	440	445

Leu Tyr His Gly Gln Thr Leu Glu Thr Leu Gly Gly Lys Lys Leu Arg
 450 455 460
 Val Phe Val Tyr Arg Asn Ser Leu Cys Ile Glu Asn Ser Cys Ile Ala
 465 470 475 480
 Ala His Asp Lys Arg Gly Arg Tyr Gly Thr Leu Phe Thr Met Asp Arg
 485 490 495
 Val Leu Thr Pro Pro Met Gly Thr Val Met Asp Val Leu Lys Gly Asp
 500 505 510
 Asn Arg Phe Ser Met Leu Val Ala Ala Ile Gln Ser Ala Gly Leu Thr
 515 520 525
 Glu Thr Leu Asn Arg Glu Gly Val Tyr Thr Val Phe Ala Pro Thr Asn
 530 535 540
 Glu Ala Phe Arg Ala Leu Pro Pro Arg Glu Arg Ser Arg Leu Leu Gly
 545 550 555 560
 Asp Ala Lys Glu Leu Ala Asn Ile Leu Lys Tyr His Ile Gly Asp Glu
 565 570 575
 Ile Leu Val Ser Gly Gly Ile Gly Ala Leu Val Arg Leu Lys Ser Leu
 580 585 590
 Gln Gly Asp Lys Leu Glu Val Ser Leu Lys Asn Asn Val Val Ser Val
 595 600 605
 Asn Lys Glu Pro Val Ala Glu Pro Asp Ile Met Ala Thr Asn Gly Val
 610 615 620
 Val His Val Ile Thr Asn Val Leu Gln Pro Pro Ala Asn Arg Pro Gln
 625 630 635 640
 Glu Arg Gly Asp Glu Leu Ala Asp Ser Ala Leu Glu Ile Phe Lys Gln
 645 650 655
 Ala Ser Ala Phe Ser Arg Ala Ser Gln Arg Ser Val Arg Leu Ala Pro
 660 665 670
 Val Tyr Gln Lys Leu Leu Glu Arg Met Lys His
 675 680

<210> 123

<211> 1205

<212> DNA

<213> Homo sapien

<400> 123

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ggaggatgct gaaggtcag agcttgaccc tgggccactt taaagagcag ctccagcaaaa      240
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tttattaaaa acatgaccac tcttggctat tgaagatgct gcctgtattt gagagactgc      660
catacataat atatgatttc ctagggatct gaaatccata aactaagaga aactgtgtat      720
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gtgccctacc attgacacat gcagaaattg gtgcgttttg tttttttttc ctatgctgct      1020
ctgttttgtc ttaaagggtc tgaggattga ccatgttgcg tcatcatcaa cattttgggg      1080
  
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gttgtgttgg atgggatgat ctgttgacaga	gggagaggca gggaaccctg ctccttcggg	1140
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tgagg		1205

<210> 124
 <211> 583
 <212> DNA
 <213> Homo sapien

<400> 124		
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agaggcacca ggaagccgtc ctggcgccgtg	gcagtcctgt ggacgggatg gttctggctg	180
tttgagattc tcaaaggagc gagcatgtcg	tggacacaca cagactatct ttagattttc	240
ttttgccttt tgcaaccagg aacagcaaatt	gcaaaaaactc tttgagaggg taggaggggtg	300
ggaaggaaac aaccatgtca tttcagaagt	tagtttgtat atattattat aatcttataa	360
ttgtttctcag aatcccttaa cagttgtatt	taacagaaat tgtatattgt aattttaaatt	420
aattatataa ctgtatttga aataagaatt	cagacatctg aggttttatt tcatttttca	480
atagcacata tggaattttg caaagattta	atctgccaaag ggccgactaa gagaagttgt	540
aaagtatgta ttattttacat ttaatagact	tacagggata agg	583

<210> 125
 <211> 783
 <212> DNA
 <213> Homo sapien

<400> 125		
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cctttctcta aagttttattc ccaaaaacag	gtagcattcc tgattgggca gagaagagga	180
tattttcagc ccacatctgc tgcagggtatg	tcattttctc ccatcttcac tgtgactagt	240
aaagatctca ccacttctct ttggaatttc	caactttgct tgtgattgaa tgtcacttcg	300
tgaattttgta ttatgtcaga tcacttggca	ttgctcttcc atatgcatca agttgccagg	360
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cttcttactc tgcaacccaa ccaagtgcc	catactacag gtaggtgccg agaaattccg	540
cagcagaaaa tccaaaatca tttctgaaac	ctccttgcta acaaaaagttc tttttttctc	600
caaacagcat ataaaatgat caagtcttga	aagagaaaag aagcaaagta gcaaatacat	660
caacaattca ctatcagaaa cacataaaat	cccagagaga gagaaggcag tatctctgaa	720
tcattggatgg acttggaagg ttcggaagga	ttccgagtgc ttcctttcag aaagacaatt	780
ctg		783

<210> 126
 <211> 604
 <212> DNA
 <213> Homo sapien

<400> 126		
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acaaagaaat gaacagttgt agggagacc	agcagcacct ttcctccaca caccttcatt	180
ttgaagttcg ggtttttgtg ttaaagttaa	tctgtacatt ctgtttgcc a ttgttacttg	240
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gactttaaat cagtacagta cctgtacctg	cacggtcacc cgctccgtgt gtcgccctat	360
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gcctttttat	tacaagtctt	gtactcaatg	acttttgtca	tgacattttg	ttctacttat	480
actgtaaatt	atgcattata	aagagttcat	ttaaggaaaa	ttacttggta	caataattat	540
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aaaa						604

<210> 127

<211> 417

<212> DNA

<213> Homo sapien

<400> 127

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tttgtctcca	atttcaaact	gacctaaagg	tcttactcct	ggattttttg	tttttaaacc	180
ttctcccagc	cagtcttcgg	gagggcatga	ttagagaagt	gctcctttgc	tgatggagga	240
ggggacctaa	ggaagaaggt	ggatcccagg	tgctcctctc	ctaattgatc	ctccccacct	300
agtttccttt	gcctctcttc	cttctaccag	gtcatgtttt	ttactctctg	ccccttctgc	360
ctcctagcat	ttcaaaaact	gtagagtgca	ccccatagtg	gacattttta	gtccagg	417

<210> 128

<211> 657

<212> DNA

<213> Homo sapien

<400> 128

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acatcaacgt	gtggcctgaa	atttttatta	ttgttccctc	ttctcctcca	ttaaaaaaaa	120
aatctccttg	tggtattttag	tcattttacca	ttaacacata	ttatggctta	aaaagggcca	180
tcccttcctt	ttctgagctg	gagttcttca	cgctcacctt	tgatgcatgg	ccttagctgg	240
ttactttgcc	ttggtttggt	catgaacatt	ggggtttagt	gcctggcaac	ttgaatgcat	300
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caagcaaagt	tggaaattcc	aaagagaagt	ggtgagatct	ttactagtca	cagtgaagat	420
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<210> 129

<211> 1220

<212> DNA

<213> Homo sapien

<400> 129

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gccacggaag	gagcctctct	tgttttttct	ataaaatggg	taggcaggag	aaaagcaggt	240
gccctaagat	tgctctaagg	cccagcatgt	ggttacagtt	ctctgacttg	cagaacctgc	300
caggtgtatg	gctacaagtt	atcctcgtgc	tgatctgtct	cattactaag	ttaatggaga	360
agacagaaa	gtaaaaatca	cgtgtagcaa	gaacaactct	tatttcacaa	actcaggtat	420
gaaacgaaac	gcctgtcctt	catggaactg	cttttagctc	ctgtcttttc	aaaatggcag	480
agggagttcc	tacacacact	ttttccctgg	aggccaaggt	ctaggggtag	aaaggggagg	540
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ctgtccacag	tgataacctgc	caagatgacc	actgaccac	atctggctct	agtcattggg	660
ctcctcagat	ttctggggcc	acctgcaagc	cccatccat	tcctacagat	ctctcagcca	720

cctgtaagtc	ctttgtgaag	atgtgggtga	cacaggggga	caggaaaacc	catttctcaa	780
cccagatcca	tgtctccact	gcttctactc	tgggttgga	ttcaggaaga	caggcacagt	840
cctctctgtt	catagaaaca	cctgccagtg	tcaaggattc	cagtcagggtg	tctatcccaa	900
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tcttatcgct	ggctctgtgt	ctcctggatt	tggatatctat	gttggtagca	ctcctggcct	1080
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ctctgttttt	tgctgtgtca	tctctgcctt	gagactgcct	tgagacagtg	cttgccttga	1200
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<210> 130

<211> 1274

<212> DNA

<213> Homo sapien

<400> 130

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gttctgctga	gcacccccct	ggcatctttt	ggggtctcag	aagagccata	atcatgacca	180
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cctgcatagt	ttccactgct	gctggagcct	gcaaaatcag	gatttcgttg	agatccaggg	540
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ggctctggta	gagaggtagg	atggtctggg	cttgttctag	aggctgcaga	gtatgcattg	660
cttctgggtc	cagaatagtc	tggattactc	agagatctag	gataatttgg	ttctgccaga	720
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ccctgcgtac	ggttctgaga	ccctgaatag	tcagggtaat	ctgggtcttc	ctcagaccag	900
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agaacactgg	agtcacgtgt	ccatgggtcc	ttcagggctgg	cttttgatgg	gagctgggat	1140
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<210> 131

<211> 554

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(554)

<223> n = A,T,C or G

<400> 131

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gaaattcctc	ctttctacct	ctctgggact	ctgagacagg	aaatcttcaa	ggaggagttt	120
ttccctcccc	actattctta	ttctcaaccc	ccagaggaac	caaggctgct	gtaccacact	180
caggacagag	actccacact	atagtgggaa	agcttcaggg	accctcctt	ttagtgtctca	240
gggctcacct	atgctactgg	tccttttggc	aaaaaaggaa	aatgatagag	ccagggttgc	300

ccctgatgta	gcagccttac	tgtggagggg	ccaaagctgg	tgttcagagc	tcacccaagg	360
agggaggtga	taaggtgtca	tgcgttctgc	tgaaccact	ggntggatg	aacatgaggc	420
ttggggtgag	ggaaaccaag	taggggttgg	agaaggagca	gcacctttgt	macacctggc	480
tacccatagc	tagctttctg	ccctcaaaaa	ctcagccttc	aagggatcca	gccacacac	540
gccacaggca	gcag					554

<210> 132
 <211> 787
 <212> DNA
 <213> Homo sapien

<400> 132						
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gaggctggaa	tccttcagcc	ccagagccca	gggaccactc	cagtagatgc	agagaggggc	120
ctgcccaggg	gtcagggcag	tgggtatcac	tggtgacatc	aagaatatca	gggctgggga	180
ggcatctttg	tttcttggtg	ccctcctcaa	agttgctgac	actttgggga	cgggaagggg	240
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caagcctgcc	atggcttgag	ctggggtgag	gagtggtctt	tatcttcttt	gggagatcct	600
gactggttgc	gcacttgcta	agggcaggaa	gtctggaggg	ctgcaggaat	ggtgccgttg	660
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cctccag						787

<210> 133
 <211> 219
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(219)
 <223> n = A,T,C or G

<400> 133						
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aacattggaa	gcaggttaaa	tgttttgtaa	actttgaaat	atatggtcta	atgtttaagc	180
agaattggaa	nagactaata	tcggttaaca	aataacaac			219

<210> 134
 <211> 234
 <212> DNA
 <213> Homo sapien

<400> 134						
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ttagtaattc	acatttaagc	aagtttagcg	cttgctgaat	acagcctttg	taaaaaagag	180
acttagtgca	tattttaatg	gtacattgtg	gttttggtacc	atttggttga	gttg	234

<210> 135

<211> 414
 <212> DNA
 <213> Homo sapien

<400> 135
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 ggccccggg gtgaaggagg tgccatgtcg gagaacatct ggagcaccct gcgtttggca 180
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 ctccctaacta tgtttggcct gccccagtga cagtgggacg ggctgcctg tgagtgtcca 300
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 ggggcctttg aagtagttct ggccaggctt gcaatacaca caacacaaga gccca 414

<210> 136
 <211> 461
 <212> DNA
 <213> Homo sapien

<400> 136
 gaagtgatta ataggtttat ttgcatatac acagagaaga gtcagcattg ttgggtgaga 60
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 agactcctat taaatcagca cagttgcaaa cttcacctgc ctcaagccaa cagctcattg 180
 aactcatatg tcgattgaga atcatttaca aaaccaggag agaaacaatg ggaagagcaa 240
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 ctgtctgatc agtgccctct cctgctggga aaaacacca tcacggaaga atttggggat 360
 taaatatgtc ttcaacaagg gaggcctggc ttctacaatg gtttaggtaa aggggccttt 420
 gaagtagttc tggccaggct tgcaatacac acaacacaag a 461

<210> 137
 <211> 269
 <212> DNA
 <213> Homo sapien

<400> 137
 atagcaaatt gacacaaatt acaaattgtgt gtgcgtggga cgaagacatc tttgaaggtc 60
 atgagtttgt tagtttaaca tcatatattt gtaatagtga aacctgtact caaaatataa 120
 gcagcttgaa actggcttta ccaatcttga aatttgacca caagtgtctt atatatgcag 180
 atctaattgt aaatccagaa cttggactcc atcgttaaaa ttattttatgt gtaacattca 240
 aatgtgtgca ttaaatatgc ttccacagt 269

<210> 138
 <211> 452
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1) ... (452)
 <223> n = A,T,C or G

<400> 138
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 taatcttccc tggtaactat gcaacatttg gacagaaagg cacacaaaaa agtttaataa 120
 tttcatgtgc caatctggaa aaaaataatt taaatcaaca gaacagacag tacatctaca 180
 caaatgagga aagcagaaaa gatacctcac attcatttat ctacaggttc aaagtggctt 240

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caatgctaaa gtaaattgtat taacatttgg aaaatataag acaatttttt tgtttgtttt 300
caattttttt agctctatac aatgattaca acataagaca aaaaaaaaaa aaaaacacaa 360
aaaacaaaac aaaaaaggag ttcaggactt gttatcagtg tccaagtggc taanaactgg 420
ttcccataac aagcattgaa agttaaggcc cc 452

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<210> 139

<211> 474

<212> DNA

<213> Homo sapien

<400> 139

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atattcctcc acaaaccact gtaccatatt accttatttt atcttcttga aattcttatt 120
cattggcttg tttgttgtct ctttgcatta gatatatgta agctccttgg cataaatttg 180
acattggtag gggactgaca ttctaacctg gcccaggccc taggagagag ataatccac 240
aaagcagcac atactatctt aggttagcag ggagctaact caccatgtag cagatgaaaa 300
aaaccaaacc cagcactgtg cataaatacc acttgccaag aagtcaggtc ctcggaacc 360
gagaatcaac ctgagcacia acgcagggtg ctgggctctg ttccccctta gccaccacct 420
cagcctctcc cctcccctgc cccaagtgcc caagagcttg gctctctgtg cttt 474

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<210> 140

<211> 487

<212> DNA

<213> Homo sapien

<400> 140

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cttccctgcc tcgtgttctt gagaaacgga ttaatagccc tttatcccc tgcaccctcc 60
tgcaggggat ggcactttga gccctctgga gccctcccct tgctgagcct tactctcttc 120
agactttctg aatgtacagt gccgttggtt gggattttgg gactggaagg gaccaaggac 180
actgaccca agctgtcctg cctagcgtcc agcgtcttct aggaggggtg ggtctgcctg 240
tcctgggtgtg gttgggttgg cctgtttgc tgtgactacc cccccccctc cccgaaccga 300
gggacggctg cttttgtctc tgctcagat gccacctgcc ccgcccattg tccccatcag 360
cagcatccag actttcagga agggcagggc cagccagtc agaaccgat cctcagcag 420
ggactgataa gccatctctc ggagggcccc ctaataccca agtggagtct ggttcacacc 480
ctggggg 487

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<210> 141

<211> 248

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(248)

<223> n = A,T,C or G

<400> 141

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ttaaagatgg ggaaatgagg cctgnaaata gaaaagattt gcctagagtc acacacactg 60
tcaggtcagg tagagtcaaa atcaggcacc ccgactcaca gactgcttca cattgccatc 120
agagattgtc ctgcaacaat attatgttta gttctactgc agaataata ctggatctta 180
cccccttgc ctgatctggc caciaacttg tttttcaggt ctttccatta ggctctcttc 240
agctaatt 248

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<210> 142

<211> 173

<212> DNA

<213> Homo sapien

<400> 142

tactaagatt	gtccaagcct	cctctttaaa	actttctttc	ccttttagagg	aatcattact	60
tcgtattaaa	agtttctact	tccttgtaga	atatctacat	ccaatgggcc	atggcacaaa	120
atttaagtct	agaaagaatc	ttaaaggctc	atcttatagt	aaccagaggc	agg	173

<210> 143

<211> 511

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(511)

<223> n = A,T,C or G

<400> 143

cctcgtcaga	ggggtggttc	ctggtnacct	gtactccacg	gacctcgggtg	aagcaaaagc	60
ttcagggcag	agggaatgag	gcaacccagt	ggcagccccc	ctgggccccg	tggctcctgc	120
tctcctattg	gacgtagagg	caggggagag	acttctctat	acaaatattc	tcatcacaga	180
agggatgatc	cttgctgctc	tgccgtaggg	tttttgatgc	tgagctatgc	tgacacatgac	240
gttaacctaa	agaacttgga	ctgagctttt	aaaaaaggac	agcaaacaat	tttataatcc	300
ttaaagtgtg	atagacgggt	acactagtgc	agggtattgg	ggaggctctt	tgggtgtgga	360
ggctgtcact	tgtattttatt	gtgactctaa	atctttgata	gtaaaacaaa	tgtaaaaaga	420
aatgtttgcc	accagatggg	aatagaagtt	ccaataagca	ggctggaatg	ggtggctata	480
cgttgtatca	cgaggaagtt	ttagactctg	a			511

<210> 144

<211> 190

<212> DNA

<213> Homo sapien

<400> 144

cattcttctg	tcacatgcca	attcagttgt	caatcccatt	gtctatgctt	accggaaccg	60
agacttccgc	tacacttttc	acaaaattat	ctccaggtat	cttctctgcc	aagcagatgt	120
caagagtggg	aatggtcagg	ctggggtaca	gcctgctctc	ggtgtgggcc	tatgatctag	180
gctctgcct						190

<210> 145

<211> 169

<212> DNA

<213> Homo sapien

<400> 145

gatgtgggta	tctcctcaga	tggccagttt	gccctctcag	gctcctggga	tggaaacctg	60
cgctctggg	atctcacaa	gggcaccacc	acgaggcgat	ttgtgggcca	taccaaggat	120
gtgctgagtg	tggccttctc	ctctgacaac	cggcagattg	tctctggat		169

<210> 146

<211> 511

<212> DNA

<213> Homo sapien

<400> 146
 atctagagaa gatttgggaa acacatgata gctatgggta aataacttaac agggcaatca 60
 caggggaagat gactagattt cctaacatcc atgagtgaag tttatagaag tatactctct 120
 gacttgatat aaaggaagat tttaaaaaac atgactgttc aggagtgttc aagtagggtc 180
 agatgaccag tgattgggaa tacttcgtaa gcaggagcaa gtaagatctg agccactgtt 240
 ctatcggtag ggtgtctgtg gtattccttg gtcaaagaag tactctaagc aacttcagtc 300
 tcacgaatta ctatcacccct cgtgggcata catgatgggt accctaaaga ggaagtttca 360
 gaaggcagta atattggatc ctggaatagt cagacaggag ccttcatgca gatacccttt 420
 tcagttctcc atacacccat tcacaagtgg tcacaaaaac acccagtacc tttacttggc 480
 tttaccctact taacaatatg ctcaatatga g 511

<210> 147

<211> 421

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(421)

<223> n = A,T,C or G

<400> 147
 gaccagtga gttcttcctg gctattgtat aatccacagc cacactgtga aagcaaactct 60
 ggccagttag caacacaggg agaactctgcc tgaactgacc aaagggtgtcc atacttcagtg 120
 tcagtgaagaa tttcacctcc atcatgttct aaagagccaa caacagattc tagggcactg 180
 caaaatgctt cagcaattaa ttgaagttct gtttgagtac attcatcatc tttgagaatg 240
 ctttctgggt cgttgtgtagt cttgtgtctg atatatgcag ccaaagagt ttcagtacag 300
 ccacctccca acaaagccca tggttccttg agtggttaact gcaggacatg cagtgccgtc 360
 tgacacgtga gcttcagctc atcccangca gtgtcatttc tgttcagag aagccaagct 420
 g 421

<210> 148

<211> 237

<212> DNA

<213> Homo sapien

<400> 148
 acacaccact gttggccttc catctgggtt aagtcaactg tgagtagaaa ccgaagataa 60
 cagttttgta ttcataatgg ctttttcata ctccaagtac ttttgagcac agagcctctt 120
 gcttctgacc tggcacttgg aacacagata tatatatctt ttgttctgtc cctgggaaac 180
 tgatatttgt gtaagacaac caccagatat tttctctaata aaaatcttct aaaatta 237

<210> 149

<211> 168

<212> DNA

<213> Homo sapien

<400> 149
 agagaaaagt aaagtgcaat aatgtttgaa gacaataagt ggtgggtgtat cttgtttcta 60
 ataagataaa cttttttgtc tttgctttat cttattaggg agttgtatgt cagtgtataa 120
 aacatactgt gtgggtataac aggcttaata aattctttaa aaggagag 168

<210> 150

<211> 68

<212> DNA

```

<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(68)
<223> n = A,T,C or G

<400> 150
gggtggggttt ggcagagatg antttaagtg ctgtggccag aagcgggggg ggggtttggt      60
ggaaattt                                         68

<210> 151
<211> 421
<212> DNA
<213> Homo sapien

<400> 151
aggtgacacg tattcgggat gaaagtataa tagtcattcc ttcaaccctt gcatttatgg      60
actctggaaa tcgaagatcc acagtgagta aagatgttcg tccaaagaca aaaaatagaa      120
acagctcaac aaagcgagag acaaaaaaac aaaatggcac tgtggctctg cctttgaagt      180
ctgggctcca gcagaggggt gatcttccca caggagacga gacggcctat gacactctcc      240
agaactgttg tcagtccga attttacttc ccttgcccat tctaaatgag caccaggaga      300
agtgccagag gttagctcac caaaagaaac tccagtgggg ctggtgagat ggctcagcgg      360
gtaagagcac ccgactgctc ttccgaaggt ccggagttca aatcccagca accacatggt      420
g                                         421

<210> 152
<211> 507
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(507)
<223> n = A,T,C or G

<400> 152
gaattcggca cnagctcgtg ccgccagggt nggtcctttt tttgctccgc ctcgccanga      60
cttcctacag ctatcgccag tcgtcggcca cgtctcctt cngaggcctg ggccggcggt      120
ccgtgcgttn tgggcggggg gtcgcctttc nctcnccag cattcacggg ggctccggcg      180
gccgcggcgt atccgtgtcc tccgcccgct ntgtgtctc gtccctctcn ggggcctacg      240
gctngctgct acngcggcct cctgaccgct tccnacgggc tgctggcnng caacgagaag      300
ctaaccatgc agaacctnaa cnaccgcctg gcctcctacc tgnacaaggt gcgcncctg      360
taggcggcca acggcnagct agaggtgaag atccnctact gggtagcaga agcagggggc      420
tgggccctgc ccgactacag cactnctnc acnaccatgc agtacctgcn ggganaagat      480
tntngggngc caccatngag aactgca                                         507

<210> 153
<211> 513
<212> DNA
<213> Homo sapien

<400> 153
gaattcggca cgaggtgggt cagatgtcca ctactgggag tatggtcgaa ttgggaattt      60
tattgtgaaa aagcccatgg tgctgggaca tgaagcttcg ggaacagtcg aaaaagtggg      120

```

```

atcatcggta aagcacctaa aaccaggtga tcgtgttgcc atcgagcctg gtgctccccg      180
agaaaatgat gaattctgca agatgggccg atacaatctg tcaccttcca tcttcttctg      240
tgccgcgccc cccgatgacg ggaacctctg ccggttctat aagcacaatg cagccttttg      300
ttacaagctt cctgacaatg tcacctttga ggaaggcgcc ctgatcgagc cactttctgt      360
ggggatccat gcctgcagga gaggcggagt taccctggga cacaagggtc ttgtgtgtgg      420
agctgggcca atcgggatgg tcactttgct cgtggccaaa gcaatgggag cagctcaagt      480
agtggtgact gatctgtctg ctacccgatt gtc                                     513

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<210> 154

<211> 507

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(507)

<223> n = A,T,C or G

<400> 154

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ggcacgagct cgtgccgaat tcggcncgag cagacacaat ggtaagaatg gtgcctgtcc      60
tgctgtctct gctgctgctt ctgggtcctg ctgtcccca ggagaaccaa gatggtcgtt      120
actctctgac ctatatctac actgggctgt ccaagcatgt tgaagacgtc cccgcgtttc      180
aggcccttgg ctactcaat gacctccagt tctttagata caacagtaaa gacaggaagt      240
ctcagcccat gggactctgg agacaggtgg aaggaatgga ggattggaag caggacagcc      300
aacttcagaa ggccagggag gacatcttta tggagaccct gaaagacatc gtggagtatt      360
acaacgacag taacgggtct cacgtattgc agggaagggt tggttgtgag atcgagaata      420
acagaagcag cggagcattc tggaaatatt actatgatgg aaaggactac attgaattca      480
acaaagaaat cccagcctgg gtccccct                                     507

```

<210> 155

<211> 507

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(507)

<223> n = A,T,C or G

<400> 155

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ggcacgagga gacctaaggg ctgagtntcg ggaacaggag aaagctctgt tggccctcca      60
gcagcagtgt gctgagcagg cacaggagca tgagggtggag accagggccc tgcaggacag      120
ctggctgcag gcccaggcag tgctcaagga acgggaccag gagctggaag ctctgcgggc      180
agaaagtcag tcctcccggc atcaggagga ggctgcccgg gcccgggctg aggctctgca      240
ggaggccctt ggcaaggctc atgctgccct gcaggggaaa gaggcagcat tcctcgagca      300
ggcagaattg agccgcagtc tggaggccag cactgcaacc ctgcaagcct ccctggatgc      360
ctgccaggca cacagtcggc agctggagga ggctctgagg atacaagaag gtgagatcca      420
ggaccaggat ctccgatacc aggaggatgt gcagcagctg cagcaggcac ttgccagag      480
ggatgaagag ctgagacatc agcagga                                     507

```

<210> 156

<211> 509

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(509)

<223> n = A,T,C or G

<400> 156

ggcacgagga	cagagagaac	cctgtngaaa	gagcgttacc	aggaggtcct	ggacaaacag	60
aggcaagtgg	agaatcagct	ccaagtgcaa	ttaaagcagc	ttcagcaaag	gagagaagag	120
gaaatgaaga	atcaccagga	gatattaaag	gctattcagg	atgtgacaat	aaagcgggaa	180
gaaacaaaga	agaagataga	gaaagagaag	aaggagtttt	tgcagaagga	gcaggatctg	240
aaagctgaaa	ttgagaagct	ttgtgagaag	ggcagaagag	aggtgtggga	aatggaactg	300
gatagactca	agaatcagga	tggcgaaata	aataggaaca	ttatggaaga	gactgaacgg	360
gcctggaagg	cagagatctt	atcactagag	agccggaaaag	agttactggt	actgaaacta	420
gaagaagcag	aaaaagaggc	agaattgcac	cttacttacc	tcaagtcaac	tcccccaaca	480
ctggagacag	ttcgttccaa	acaggagtg				509

<210> 157

<211> 507

<212> DNA

<213> Homo sapien

<400> 157

ggcacgaggg	cagccctcct	accggcgcac	gtgggtgccgc	cgctgctgac	tcccgcctgc	60
cctgaaccca	gtgcctgcag	ccatggctcc	cggccagctc	gccttattta	gtgtctctga	120
caaaaccggc	cttgtggaat	ttgcaagaaa	cctgaccgct	cttggtttga	atctggtcgc	180
ttccggaggg	actgcaaaaag	ctctcagggg	tgctgggtctg	gcagtcagag	atgtctctga	240
gttgacggga	tttccctgaaa	tgttgggggg	acgtgtgaaa	actttgcatc	ctgcagtcca	300
tgctggaatc	ctagctcgta	atattccaga	agataatgct	gacatggcca	gacttgattt	360
caatcttata	agagttgttg	cctgcaatct	ctatcccttt	gtaaagacag	tggcttctcc	420
aggtgtaagt	gttgaggagg	ctgtggagca	aattgacatt	ggtggagtaa	ccttactgag	480
agctgcagcc	aaaaaccacg	ctcgagt				507

<210> 158

<211> 507

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(507)

<223> n = A,T,C or G

<400> 158

ggcacgagtc	gagctgtgcc	tattcgngtc	aatccaagag	tgagtaatgt	gaagtctgtc	60
tacaaaaccc	acattgatgt	cattcattat	cggaaaacgg	atgcaaaacg	tctgcatggc	120
cttgatgaag	aagcagaaca	gaaacttttt	tcagagaaac	gtgtggaatt	gcttaaggaa	180
ctttccagga	aaccagacat	ttatgagagg	cttgcttcag	ccttggctcc	aagcatttat	240
gaacatgaag	atataaagaa	gggaattttg	cttcagctct	ttggcgggac	aaggaaggat	300
tttagtcaca	ctggaagggg	caaatttcgg	gctgagatca	acatcttgct	gtgtggcgac	360
cctggtacca	gcaagtccca	gctgctgcag	tacgtgtaca	acctcgctcc	cagggggccag	420
tacacgtntg	ggaagggctc	cagtgcannt	ggcctnactg	cntacgtaat	gaaagaccct	480
gagacaaggn	anctggnnct	gnnacag				507

<210> 159

<211> 508

<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(508)
<223> n = A,T,C or G

<400> 159
ggcacnanaa accaggatta tggtnnggat ccaaagattg ctaatgcaat aatgaaggca 60
gcagatgagg tagctgaagg taaattaaat gatcattttc ctctcgtggg atggcagact 120
ggatcaggaa ctgagacaaa tatgaatgta aatgaagtca ttagcaatag agcaattgaa 180
atgttaggag gtgaacttgg cagcaagata cctgtgcatc ccaacgatca tgtaataaaa 240
agccagagct caaatgatac ttttcccaca gcaatgcaca ttgctgctgc aatagaagtt 300
catgaagtac tgttaccagg actacagaag ttacatgatg ctcttgatgc aaaatccaaa 360
gagtttgcac agatcatcaa gattggacgt actcatactc aggatgctgt tccacttact 420
cttgggcagg aatttagtgg ttatgttcaa caagtaaaat atgcaatgac aagaataaaa 480
gctgccatgc caagaatcta tgagctcg 508

<210> 160
<211> 508
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(508)
<223> n = A,T,C or G

<400> 160
ggcacgagct tggagcaaag tcactctnaag gaattagagg acacacttca ggtaggcac 60
atacaagagt ttgagaaggt tatgacagac cacagagttt ctttgaggga attaaaaaag 120
gaaaaccaac aaataattaa tcaaatataa gaatctcatg ctgaaattat ccaggaaaaa 180
gaaaacagt tacaggaatt aaaactcaag gtttctgatt tgtcagacac gagatgcaag 240
ttagagggtg aacttgcggt gaaggaagca gaaactgatg aaataaaaaat ttgctggaa 300
gaaagcagag cccagcagaa ggagaccttg aaatctcttc ttgaacaaga gacagaaaat 360
ttgagaacag aaattagtaa actcaacca aagattcagg ataataatga aaattatcag 420
gtgggcttag cagagctaag aactttaatg acaattgaaa aagatcagtg tatttccgag 480
ttaattagta gacatgaaga agaatcta 508

<210> 161
<211> 507
<212> DNA
<213> Homo sapien

<400> 161
ggcacgagcg ctaccggcgc ctctctcgcg gccactgagc cggagccggc ctgagcagcg 60
ctctcggttg cagtaccac tggaaggact taggcgctcg cgtggacacc gcaagccct 120
cagtgcctc ggccaagag gcctgcttc cactcgctag cccgcggg ggtccgtgtc 180
ctgtctcgtt ggccggaccc gggcccgagc ccgagcagta gccggcgcca tgcggtgtg 240
gggcatagac ctgggcttcc agagctgcta cgtcgctgtg gccgcgccc gcggcatcga 300
gactatcgct aatgagtata gcgaccgctg cagcgggct tgcatttctt ttggtcctaa 360
gaatcgttca attggagcag cagctaaaag ccaggtaatt tctaatacaa agaacacagt 420
ccaaggattt aaaagattcc atggccgagc attctctgat ccatttgttg aggcagaaaa 480
atctaaccctt gcatatgata ttgtgca 507

<210> 162
 <211> 507
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(507)
 <223> n = A,T,C or G

<400> 162
 ggcacgagca gctgtgcacc gacatgntct cagtgtcctg agtaagacca aagaagctgg 60
 caagatcctc tctaataatc ccagcaaggg actggccctg ggaattgcc aagcctggga 120
 gctctacggc tcaccaatg ctctgggtgct actgattgct caagagaagg aaagaaacat 180
 atttgaccag cgtgccatag agaatgagct actggccagg aacatccatg tgatccgacg 240
 aacatttgaa gatattctctg aaaaggggtc tctggaccaa gaccgaaggc tgtttgtgga 300
 tggccaggaa attgctgtgg ttacttccg ggatggctac atgcctcgtc agtacagtct 360
 acagaattgg gaagcacgtc tactgctgga gaggtcacat gctgccaaagt gccagacat 420
 tgccaccag ctggctggga ctaagaaggc gcagcaggag ctaagcaggc cgggcatgct 480
 ggagatgttg ctccctggcc agcctga 507

<210> 163
 <211> 460
 <212> DNA
 <213> Homo sapien

<400> 163
 ggcacgagaa ataactttat ttcattgtgg gtgcgggttc ttgtttgtgg atcgctgtga 60
 tcgtcacttg acaatgcaga tcttcgtgaa gactctgact ggtaagacca tcaccctcga 120
 gggtgagccc agtgacacca tcgagaatgt caaggcaaag atccaagata aggaaggcat 180
 cctcctgac cagcagaggc tgatctttgc tggaaaacag ctggaagatg ggcgccacct 240
 gtctgactac aacatccaga aagagtccac cctgcacctg gtgctccgtc tcagaggtgg 300
 gatgcaaadc ttcgtgaaga cactcactgg caagaccatc acccttgagg tggagcccag 360
 tgacaccatc gagaacgtca aagcaaagat ccaggacaag gaaggcattc ctctgacca 420
 gcagaggttg atctttgccg gaaagcagct ggaagatggg 460

<210> 164
 <211> 462
 <212> DNA
 <213> Homo sapien

<400> 164
 ggcacgagcc ggatctcatt gccacgcgcc cccgacgacc gcccgcagtg cattcccgat 60
 tccttttggg tccaagtcca atatggcaac tctaaaggat cagctgattt ataattctct 120
 aaaggaagaa cagaccccc agaataagat tacagttggt ggggttggtg ctgttggcat 180
 ggctgtgccc atcagtatct taatgaagga cttggcagat gaacttgctc ttgttgatgt 240
 catcgaagac aaattgaagg gagagatgat ggatctccaa catggcagcc ttttccttag 300
 aacaccaaag attgtctctg gcaaagacta taatgtaact gcaaactcca agctggatcat 360
 tatcacggct ggggcacgtc agcaagaggg agaaagccgt cttaatttgg tccagcgtaa 420
 cgtgaacatc ttttaattca tcattcctaa tgttgtaaaa ta 462

<210> 165
 <211> 462
 <212> DNA

<213> Homo sapien

<400> 165

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ggcacgagga agccatgagc agcaaagtct ctcgcgacac cctgtacgag gcggtgcggg      60
aagtcctgca cgggaaccag cgcaagcgcc gcaagttcct ggagacggtg gagttgcaga      120
tcagcttgaa gaactatgat ccccagaagg acaagcgctt ctcgggcacc gtcaggctta      180
agtccactcc ccgccctaag ttctctgtgt gtgtcctggg ggaccagcag cactgtgacg      240
aggctaaggc cgtggatata ccccatatgg acatcgaggc gctgaaaaaa ctcaacaaga      300
ataaaaaact ggtcaagaag ctggccaaga agtatgatgc gtttttggcc tcagagtctc      360
tgatcaagca gattccacga atcctcggcc caggttttaa taaggcagga aagttccctt      420
ccctgctcac acacaacgaa aacatggtgg ccaaagtgga tg                          462
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<210> 166

<211> 459

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(459)

<223> n = A,T,C or G

<400> 166

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ggcacgagag ggacctgtnt gaatggntcc actagggttn anntgnetct tacttttaac      60
cantnaaata gacctgcccg tgaanangcg ggcntgacac annaanaaga gaagacccta      120
tgagagcttta atttattaat gcanacagna cctaacaaac ccacangtcc taaactacca      180
agcctgcatt aaaaatttcg gntggggcna cctcnnagca naacccaacc tccgagcaac      240
tcatgctaag acttcaccag tcaaagctga actactatac tcaattgatc caataacttg      300
accaacagan caagntaccc tagggataac ancacaatcc tattctagac cccttatnac      360
caatangntt tacacctcna tngnggaacc aggacatccg atggggcagn cgttattaaa      420
gttngttgnt aacnataaag tctacgtgat ctgagtttag                          459
```

<210> 167

<211> 464

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(464)

<223> n = A,T,C or G

<400> 167

```
gaattgggac caacganaan cntgcggntc ttnttttgcg tccanngccc agctnattgc      60
tcagacacac atggggaagg tnaaggtcgg gagtcaacng atttggtngt attgnagcgt      120
ttggtcacca gngctgcttt taactctggn aaagtggata ttgttgatcat naatgacccc      180
tncattgacc tnaactacat ggtttacatg ttccaatatg attccaccca tggcaaattc      240
catngcaccg tnaaggctga gaacgggaag cttgtnatca atggaaatcc catcaccatc      300
tttcangaac ganatccntn caaaaatcaa anttgggggc gatgcttggc cncttgaagt      360
accgttcaan gggaannncc ccactttggc cgntntttnc aancecacc caatttgggn      420
aaaaaaaaag ggnnttttgg gggggggcct tttanntttt tttt                          464
```

<210> 168

<211> 462

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(462)

<223> n = A,T,C or G

<400> 168

```
ggcacgaggn nnaacctncc gggctggggc agcacgcctt gngcaancct gcactgcact      60
gaagaccggg tgccggaagc cgnnggcngc nacatgcagn aactgaacca gctggggcgcg      120
cancagttct cagacctgac agaggtgctt ttacacttcc taactgatcc anantangtg      180
gaaatattnt tngttnatnt catntgaatn atccancncc aatcatanca nntttnattn      240
cctcataanc nttgagaana gcnnccctnt gnttncanan ggtgctntga anangagtct      300
cacangcaan caggtccaag cggatttntt aactntgggt cttantgang agaaagncaac      360
ttacttttct gaaancngga agcagaatgc tcccaccctt gctc'gatggg ccatacgtca      420
agactctgat gattaaccag ctttanatat ggacnggaaa tt                          462
```

<210> 169

<211> 460

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(460)

<223> n = A,T,C or G

<400> 169

```
ggcacgaggg acagcagacn agacagtcac agcagccttg acaaaacggt cctggaactc      60
aagntcttnt ncncaaagga ggacagagca nacagcagag accatggant ctncctcggc      120
ccctcccccac agatgggtgca tcccctggca naggtccttg ctcacagcct cacttctaac      180
cttctggaac ccgcccacca ctgccaagct cactattgaa tccacgcctg tcaatgnntc      240
ntaggggaag gagngccttt ctactnttnc acaatctgan ccccttcttn tttgggttact      300
ancatggctc tncatgtnaa aatactggna tggntaacct gtcaaattta taggnantnt      360
gctaattggg aaactnccnn tngtctaccc caggggnccc agattcctnn gttcncataa      420
cnattaattt aaccctaat gncaancct tngttaaaga                          460
```

<210> 170

<211> 508

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(508)

<223> n = A,T,C or G

<400> 170

```
ggcacgaggg ggatttttag gtggtcnggt gtggtatcag gaataatgtg ggaggccaga      60
ttgaagtcca ggccaggaac aatggtaatt gtgggactta agaaagtgtg agtacagctg      120
aatgagccgg ggagcagaaa gtatatgctt caggtatgag gaagaaaata gattttggaa      180
gttatgagaa atgtagagag tgagttgagc atagtgtgtg attttgaggg cctctaacag      240
tattaaagca gcggcagcgg ctgcacacag acatgatggc taggctaaaa caggaaggtc      300
aagttgtttg gacagaaagg ctacaggggt cagtcctggc tcttgtgtaa gaattctgac      360
cacactaacc atgcctagga aggaaaggag ttgttctttt gtaagggatt gaggtttggg      420
```

agattaatcg gacacgatca gcagggagag cacctgtgtt tttatgagaa ttatgctgag 480
ataggtaaca gatgaggatg aaatttgg 508

<210> 171
<211> 507
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(507)
<223> n = A,T,C or G

<400> 171
ggcacgagac cagccactag cgcagnctcg agcgatggcc tatgtccccg caccgggcta 60
ccagcccacc tacaaccga cgctgcctta ctaccagccc atcccgggcy ggctcaacgt 120
gggaatgtct gtttacatcc aaggagtggc cagcgagcac atgaagcggc tcttcgtgaa 180
ctttgtgggt gggcaggatc cgggctcaga cgtcgccttc cacttcaatc cgcggtttga 240
cggctgggac aaggtgggtc tcaacacgtt gcagggcggg aagtggggca gcgaggagag 300
gaagaggagc atgcccctca aaaagggtgc cgcctttgag ctggtcttca tagtccctggc 360
tgagcactac aaggtgggtg taaatggaaa tcccttctat gagtacgggc accggcttcc 420
cctacagatg gtcaccacc tgcaagtgga tggggatctg caacttcaat caatcaactt 480
catcggaggc cagcccctcc ggcccca 507

<210> 172
<211> 409
<212> DNA
<213> Homo sapien

<400> 172
ggcacgagct ggagtgtctg ctgccacccc ctcgctctct gcagaaatgt ctgtcaccta 60
cgatgactct gtgggagtgg aagtgtccag cgacagcttc tgggaggttg ggaactacaa 120
acggactgtg aagcggattg acgatggcca ccgcctgtgt ggtgacctca tgaactgtct 180
gcatgagcgg gcacgcctcg agaaggcgtg tgcacagcag ctactgagt gggcccgcag 240
ctggaggcag ctggtagaga agggaccaca gtatgggacc gtggagaagg cctggatagc 300
tgtcatgtct gaagcagaga gggtagtgga actgcacctg gaagtgaagg catcactgat 360
gaatgaagac tttgagaaga tcaagaactg gcagaaggaa gcctttcac 409

<210> 173
<211> 409
<212> DNA
<213> Homo sapien

<400> 173
ggcacgaggg cagctagagg aagagtccaa ggccaagaac gcaactggccc acgccctgca 60
gtcagctcgc catgactgtg acctgctgcg ggaacagtat gaagaggagc aggaagccaa 120
ggctgagctg cagagggcca tgtccaaggc caacagcgag gtagcccagt ggaggacgaa 180
atatgagacg gatgccatcc agcgacaga ggagctggaa gaggccaaga agaagctggc 240
tcagcgtctg caggatgtcg aggaacatgt agaagctgtg aattccaaat gcgcttctct 300
tgaaaagacg aagcagcgac ttcagaatga agtggaggac ctcatgattg acgtggagag 360
gtctaattgct gcctgcgctg cgcttgataa gaagcagagg aactttgac 409

<210> 174
<211> 407
<212> DNA

<213> Homo sapien

<400> 174

```

ggcacgagcc ggggcggggc ggggcgctcc ggctcgaggc attcggagct gcgggagccg      60
ggctggcagg agcaggatgg cggcgggcggc ggctgcaggc gaggcgcgcc ggggtgctggt      120
gtacggcggc aggggcgctc tgggttctcg atgcgtgcag gcttttcggg cccgcaactg      180
gtgggttgcc agcgttgatg tgggtggagaa tgaagaggcc agcgcctagca tcattgttaa      240
aatgacagac tcgttctactg agcaggctga ccagggtgact gctgagggttg gaaagctctt      300
gggtgaagag aagggtggatg caattctttg cgttgctgga ggatgggccg ggggcaatgc      360
caaatccaag tctctcttta agaactgtga cctgatgtgg aagcaga                      407

```

<210> 175

<211> 407

<212> DNA

<213> Homo sapien

<400> 175

```

ggcacgagct tgcccgtcgg tcgctagctc gctcgggtgcg cgtcgtcccg ctccatggcg      60
ctcttcgtgc ggctgctggc tctcgccctg gctctggccc tgggccccgc cgcgacctg      120
gcgggtcccg ccaagtcgcc ctaccagctg gtgctgcagc acagcaggct ccggggccgc      180
cagcacggcc ccaacgtgtg tgctgtgcag aagggtattg gactaataag gaagtacttc      240
accaactgca agcagtggta ccaaaggaaa atctgtggca aatcaacagt catcagctac      300
gagtgtgtc ctggatatga aaaggtccct ggggagaagg gctgtccagc agccctacca      360
ctctcaaacc ttacgagac cctgggagtc gttggatcca ccaccac                      407

```

<210> 176

<211> 409

<212> DNA

<213> Homo sapien

<400> 176

```

ggcacgagtg gtgcaaaac gggaccatgc cctcctggag gagcagagca agcagcagtc      60
caacgagcac ctgcgccgcc agttcgccag ccaggccaat gttgtggggc cctggatcca      120
gaccaagatg gaggagatcg ggcgcattc cattgagatg aacgggacct tggaggacca      180
gctgagccac ctgaagcagt atgaacgcag catcgtggac tacaagccca acctggacct      240
gctggagcag cagcaccagc tcatccagga ggccctcacc ttcgacaaca agcacaccaa      300
ctataccatg gagcacatcc gcgtgggctg ggagcagctg ctcaccacca ttgccgcgac      360
catcaacgag gtggagaacc agatcctcac ccgcgacgcc aagggcatac                      409

```

<210> 177

<211> 408

<212> DNA

<213> Homo sapien

<400> 177

```

ggcacgaggt ccaggtaact gcaaaaacaa tggctcagca tgaagaactg atgaagaaaa      60
ctgaaacaat gaatgtagtt atggagacca ataaaatgct aagagaagag aaggagcagg      120
tttcaaaaat ggcatacgtc cgtcagcatt tggaagaaac aacacagaaa gcagaatcac      180
agttgttggg gtgtaaagca tcttgggagg aaagagagag aatgttaaag gatgaagttt      240
ccaaatgtgt atgtcgctgt gaagatctgg agaaacaaaa cagattactt catgatcaga      300
tcgaaaaatt aagtgacaag gtcgttgect ctgtgaagga aggtgtacaa ggtccactga      360
atgtatctct cagtgaagaa ggaaaatctc aagaacaaat tttggaat                      408

```

<210> 178

<211> 92

<212> DNA

<213> Homo sapien

<400> 178

ggcacgagaa gaaattaaga gctaaagaca aggagaatga aaatatgggtt gcaaagctga	60
acaaaaaagt taaagagcta gaagaggaga tg	92

<210> 179

<211> 411

<212> DNA

<213> Homo sapien

<400> 179

ggcacgagga gacacgccac ctataccaca gttctcagaa tgaattagct aagttggaat	60
cagaacttaa gagtctcaaa gaccagttga ctgatttaag taactcttta gaaaaatgta	120
aggaacaaaa aggaaacttg gaagggatca taaggcagca agaggctgat attcaaaatt	180
ctaagttcag ttatgaacaa ctggagactg atcttcaggc ctccagagaa ctgaccagta	240
ggctgcatga agaaataaat atgaaagagc aaaagattat aagcctgctt tctggcaagg	300
aagaggcaat ccaagtagct attgctgaac tgcgtcagca acatgataaa gaaattaaag	360
agctggaaaa cctgctgtcc caggaggaag aggagaatat tgttttagaa g	411

<210> 180

<211> 411

<212> DNA

<213> Homo sapien

<400> 180

ggcacgaggt tgttcggagc gggcgagcgg agttagcagg gctttactgc agagcgcgcc	60
gggcactcca gcgaccgtgg ggatcagcgt aggtgagctg tggccttttg cgaggtgctg	120
cagccatagc tacgtgcgtt cgctacgagg attgagcgtc tccacccatc ttctgtgctt	180
caccatctac ataatgaatc ccagtatgaa gcagaaacaa gaagaaatca aagagaatat	240
aaagactagt tctgtcccaa gaagaactct gaagatgatt cagccttctg catctggatc	300
tcttgttgga agagaaaatg agctgtccgc aggttgtcc aaaaggaaac atcggaatga	360
ccacttaaca tctacaactt ccagccctgg ggttattgtc ccagaatcta g	411

<210> 181

<211> 411

<212> DNA

<213> Homo sapien

<400> 181

ggcacgaggc gggacagggc gaagcggcct gcgcccacgg agcgcgcgac actgcccgga	60
agggaccgcc acccttgccc cctcagctgc ccactcgtga tttccagcgg cctccgcgcg	120
cgcacgatgc cctcggccac cagccacagc gggagcggca gcaagtcgtc cggaccgcca	180
ccgccgtcgg gttcctccgg gagtgaggcg gccgcgggag ccggggccgc cgcgccggct	240
tctcagcacc ccgcaaccgg caccggcgct gtccagaccg aggccatgaa gcagattctc	300
ggggtgatcg acaagaaact tcggaacctg gagaagaaaa agggtaagct tgatgattac	360
caggaacgaa tgaacaaagg ggaaaggctt aatcaagatc agctggatgc c	411

<210> 182

<211> 411

<212> DNA

<213> Homo sapien

<400> 182

```

ggcacgagcc gacatggagc tgttcctcgc gggccgcccgg gtgctgggtca ccggggacagg      60
caaaggtata gggcgccggca cgggtccaggc gctgcacgcg acgggcccgc ggggtgggtggc      120
tgtgagccgg actcaggcgg atcttgacag ccttgccgcg gagtgcccgg ggatagaacc      180
cgtgtgcgtg gacctgggtg actgggaggc caccgagcgg gcgctgggca gcgtgggccc      240
cgtggacctg ctgggtgaaca acgcccgtgt cgccctgctg cagcccttcc tggagggtcac      300
caaggaggcc tttgacagat cctttgaggt gaacctgcgt gcggtcatcc aggtgtcgca      360
gattgtggcc aggggcttaa tagcccgggg agtcccaggg gccatcgtga a      411

```

<210> 183

<211> 409

<212> DNA

<213> Homo sapien

<400> 183

```

ggcacgagcc tacactctgg ccagagatac cacagtcaaa cctggagcca aaaaggacac      60
aaaggactct cgacccaaac tgcccagac cctctccaga gggtgggggtg accaactcat      120
ctggactcag acatatgaag aagctctata taaatccaag acaagcaaca aacccttgat      180
gattattcat cacttggtat agtgcccaca cagtcaagct ttaaagaaag tgtttgctga      240
aaataaagaa atccagaaat tggcagagca gtttgtcctc ctcaatctgg tttatgaaac      300
aactgacaaa cacctttctc ctgatggcca gtatgtcccc aggattatgt ttgttgacct      360
atctctgaca gttagagccg atatcactgg aagatattca aatcgtctc      409

```

<210> 184

<211> 410

<212> DNA

<213> Homo sapien

<400> 184

```

ggcacgaggt cattccagca ccaacaggat ccaagccaga ttgattgggc tgcattggcc      60
caagcttgga ttgccc aaag agaagcttca ggacagcaaa gcatggtaga acaaccacca      120
ggaatgatgc caaatggaca agatatgtct acaatggaat ctgggtccaaa caatcatggg      180
aatttccaag gggattcaaa cttcaacaga atgtggcaac cagaatgggg aatgcatcag      240
caacccccac acccccctcc agatcagcca tggatgccac caacaccagg cccaatggac      300
attgttctc cttctgaaga cagcaacagt caggacagtg gggaatttgc ccctgacaac      360
aggcatatat ttaaccagaa caatcacaa ctttgggtggac caccgataa      410

```

<210> 185

<211> 411

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(411)

<223> n = A,T,C or G

<400> 185

```

ggcacgagca cagatgtagt tttctctgcg cgtgtgcgtt ttccctcctc ccccgccctc      60
agggtccacg gccaccatgg cgtattaggg gcagcagtg cgtgcggcagc attggccttt      120
gcagcggcgg cagcagcacc aggctctgca gcggcaacct ccagcggctt aagccatggc      180
gcttctcacg gcattcagca gcagcgttgc tgtaaccgac aaagacacct tcgaattaag      240
cacattcctc gattccagca aagcaccgca acatgaccga aatgagcttc ctgagcagcg      300
agggtgttggg gggggacttg atgtccccct tcgacccgctc ggggtttgggg gctgaagaaa      360
gcctangtct cttagatgat tacctggagg tggccaagca cttcaaacct c      411

```

<210> 186
 <211> 410
 <212> DNA
 <213> Homo sapien

<400> 186
 ggcacgagct tctagtcccc ccattggccgc tctcaccgag gacccccagt tccagaagct 60
 gcagcaatgg taccgcgagc accgctccga gctgaacctg cgccgcctct tcgatgcaa 120
 caaggaccgc ttcaaccact tcagcttgac cctcaacacc aaccatgggc atatcctggt 180
 ggattactcc aagaacctgg tgacggagga cgtgatgcgg atgctggtgg acttggccaa 240
 gtccaggggc gtggaggccg cccgggagcg gatgttcaat ggtgagaaga tcaactacac 300
 cgagggtcga gccgtgctgc acgtggctct gcggaaccgg tcaaacacac ccatacctggt 360
 agacggcaag gatgtgatgc cagaggtcaa caaggttctg gacaagatga 410

<210> 187
 <211> 506
 <212> DNA
 <213> Homo sapien

<400> 187
 ctttcgtggc tcactccctt tcctctgctg ccgctcggtc acgcttgtgc ccgaaggagg 60
 aaacagtgc agacctggag actgcagttc tctatccttc acacagctct tccaccatgc 120
 ctggatcact tcctttgaat gcagaagctt gctggccaaa agatgtggga attgttgccc 180
 ttgagatcta ttttccttct caatatgttg atcaagcaga gttggaaaaa tatgatggtg 240
 tagatgctgg aaagtatacc attggcttgg gccaggccaa gatgggcttc tgcacagata 300
 gagaagatat taactctctt tgcattgactg ttggttcagaa tcttatggag agaaataacc 360
 tttcctatga ttgcattggg cggctggaag ttggaacaga gacaatcatc gacaaatcaa 420
 agtctgtgaa gactaatttg atgcagctgt ttgaagagtc tgggaatata gatatagaag 480
 gaatcgacac aactaatgca tgctat 506

<210> 188
 <211> 506
 <212> DNA
 <213> Homo sapien

<400> 188
 gccacagagg cggcggagag atggccttca gcggttccca ggctccctac ctgagtcag 60
 ctgtcccttt ttctgggact attcaaggag gtctccagga cggacttcag atcactgtca 120
 atgggaccgt tctcagctcc agtggaaaca gggttgctgt gaactttcag actggcttca 180
 gtggaaatga cattgccttc cacttcaacc ctcggtttga agatggaggg tacgtggtgt 240
 gcaacacgag gcagaacgga agctgggggc ccgaggagag gaagacacac atgccttttc 300
 agaaggggat gccctttgac ctctgcttcc tgggtgcagag ctccagatttc aaggatgatg 360
 tgaacgggat cctcttcgtg cagtacttcc accgcgtgcc ctccaccgt gtggacacca 420
 tctccgtcaa tggctctgtg cagctgtcct acatcagctt ccagcctccc ggcgtgtggc 480
 ctgccaacc ccgctccatt acccag 506

<210> 189
 <211> 399
 <212> DNA
 <213> Homo sapien

<400> 189
 ctggacagga gaagagcctg gctgctgaag gcagggctga caccaccacg ggcagcattg 60
 ctggagcccc agaggatgaa agatcgagga gcacagcccc ccaggcacca gactgcttcg 120
 accctgccgg accggtctgg ctcgtgaggg cgacatctgg cctttccag ggcacaggaa 180

aggaaacctt	ggaaagtgct	ctaatacgctc	tagactctga	aaaacccaag	aaacttcgct	240
tccacccaaa	gcagctgtac	ttctctgcc	ggcaggggtga	gctgcagaag	gtgcttctca	300
tgctgggtga	tggaattgat	cccaacttca	aaatggagca	ccaaagtaag	cgttcccat	360
tacatgctgc	tgcgagggt	ggccacgtg	acatctgcc			399

<210> 190

<211> 401

<212> DNA

<213> Homo sapien

<400> 190

cggcgacggt	ggtggtgact	gagcggagcc	cggtgacagg	atgttggtgt	tggtattagg	60
agatctgcac	atcccacacc	ggtgcaacag	tttgccagct	aaattcaaaa	aactcctggt	120
gccagyaaaa	attcagcaca	ttctctgcac	aggaaacctt	tgcaccaaag	agagttatga	180
ctatctcaag	actctggctg	gtgatgttca	tattgtgaga	ggagacttcg	atgagaatct	240
gaattatcca	gaacagaaaag	ttgtgactgt	tggacagttc	aaaattgggtc	tgatccatgg	300
acatcaagtt	attccatggg	gagatatggc	cagcttagcc	ctgttgcaga	ggcaatttga	360
tgtggacatt	cttatctcgg	gacacacaca	caaatttgaa	g		401

<210> 191

<211> 406

<212> DNA

<213> Homo sapien

<400> 191

tggcagccta	agccgtggga	gggttccagt	cgagaatggg	aagatgaaag	acttcagatg	60
gaacagaaat	aaatgccttt	tttgacaaac	gcagcagtcg	gtgcctctag	cttgcaagag	120
cgttactccc	cttcataget	ttaaaagggt	ttcgactcgc	gtgcagttag	agtagctaaa	180
tcttgtgtga	cgctccacaa	acacttgtaa	gaattttgca	gagaaagata	accgttgcca	240
cccaatgccc	cccacaggca	ttctactccc	cagtacctct	taggggtggga	gaaatggtga	300
agagttgttc	ctacaacttg	ctaacctagt	ggacagggta	gtagattagc	atcatccgga	360
tagatgtgaa	gaggacgggt	gtttggataa	taattaagga	taaaat		406

<210> 192

<211> 316

<212> DNA

<213> Homo sapien

<400> 192

cccggggagg	ccctgggtcat	aaaactttta	attttactag	tgttacttaa	tgtatattct	60
aaaaagagaa	tgcagtaact	aatgccctaa	atgtttgatc	tctgtttgtc	attacttttt	120
caaaattatt	tttttctgta	aagtataata	tataaaactt	cttgcttaaa	ttgaatttct	180
atattagtgg	ttaattgcag	tttattaaag	ggatcattat	cagtaatttc	atagcaactg	240
ttctagtgtt	ttgtgttttt	aaaacagaat	taggaatttg	agatatctga	ttatattttt	300
catatgaatc	acagac					316

<210> 193

<211> 146

<212> DNA

<213> Homo sapien

<400> 193

gaaacatgga	ctgccccctta	aattttgact	gtcctaataaa	cctattttctg	atttataata	60
tgctgcctga	taaagtgaca	ctagatgtac	cagctgagtg	tttaatcttc	ccatcacaga	120
tcagatttga	gcattaacag	gtattt				146

<210> 194
 <211> 405
 <212> DNA
 <213> Homo sapien

<400> 194
 cggatgtgct cactgacatt ctactccaag tcggagatgc agatccactc caagtccacac 60
 accgagacca agccccacaa gtgcccacat tgctccaaga ccttcgcca cagtcctac 120
 ctggcccagc acatccgtat acactcaggg gctaagccct acagttgtaa cttctgtgag 180
 aaatccttcc gccagctctc ccaccttcag cagcacaccc gaatccacac tggatgata 240
 ccatacaaat gtgcacaccc aggctgtgag aaagccttca cacaactctc caatctgcag 300
 tcccacagac ggcaacacaa caaagataaa cccttcaagt gccacaactg tcatcgggcg 360
 tacacggatg cagcctcact agaggtgcac ctgtctacgc acaca 405

<210> 195
 <211> 421
 <212> DNA
 <213> Homo sapien

<400> 195
 agaattcggc acgagctact ccttgccgcg tggcactccg cagcctttaa gggtccgcg 60
 gggggcaggc aagagttagc catgaagagc ctcaagtcgc gcctgaggag gcaggagtg 120
 cccggccccg cgtcgtctgg cgcgcgcgc gccagcgcgc atgcagcaga ttggaataaa 180
 tatgatgacc gattgatgaa agcagcagaa aggggggatg tagaaaaagt gacgtcaatc 240
 cttgctaaaa aggggggtcaa tccaggcaaa ctagatgtgg aaggcagatc tgtcttccat 300
 gttgtgacct caaaggggaa tcttgagtgt ttgaatgcc tcttataca tggagttgat 360
 attacaacca gtgacactgc agggagaaat gctcttcacc tggctgctaa gtatggacat 420
 g 421

<210> 196
 <211> 476
 <212> DNA
 <213> Homo sapien

<400> 196
 agaattgatc tatagattta atgcaatgcc tactaaaatc ccagtacgat tttttacagg 60
 catagacaat agacatagcc aaaacttatt ctaaaataca tatgaagatg cacaggccct 120
 agttatacaa tcttgacaaa gaagaataaa gtgggaagaa tctatttgat ttttaaggctt 180
 accatgtaac tacagtcac cagagagtgt ggtatcggca gacggtcaga catacagatc 240
 aatggaatgt aacagaggac ccagaaatag gccacacag atatgctcaa tggatatttg 300
 acaagcgtgc aaaacaattc aatggaagaa taagctttca aaaaaatggc gttggagcaa 360
 ccggacatcc ataggaaaaa atgaacccat acctaaacca taaaccttat ataaaaataa 420
 acacaaaaatg aatcataggc ttaaattgaa gctataaaac ttttagagaa aaacac 476

<210> 197
 <211> 503
 <212> DNA
 <213> Homo sapien

<400> 197
 tagccctcgg tgaagcccca gaccacagct atgagtcctt tcgtgtgacg tctgcgcaga 60
 aacatgttct gcatgtccag ctcaaccggc ccaacaagag gaatgccatg aacaaggctc 120
 tctggagaga gatggtagag tgcttcaaca agatttcgag agacgtgac tctcgggcgg 180
 tggatgatctc tgggtgcagga aaaatgttca ctgcaggtat tgacctgatg gacatggctt 240

```

cggacatcct gcagcccaaa ggagatgatg tggcccggat cagctggtac ctccgtgaca      300
tcatcactcg ataccaggag accttcaacg tcatcgagag gtgcccgaag cccgtgattg      360
ctgccgtcca tgggggctgc attggcggag gtgtggacct tgtcacccgc tgtgacatcc      420
ggtagctgtgc ccaggatgct ttcttccagg tgaaggaggt ggacgtgggt ttggctgccc      480
atgtaggaac actgcagcgc ctg                                           503

```

<210> 198
 <211> 168
 <212> PRT
 <213> Homo sapien

```

<400> 198
Phe Val Ala His Ser Leu Ser Ser Ala Ala Ala Arg Ser Arg Leu Cys
 1              5              10              15
Pro Lys Glu Glu Thr Val Thr Asp Leu Glu Thr Ala Val Leu Tyr Pro
              20              25              30
Ser His Ser Ser Phe Thr Met Pro Gly Ser Leu Pro Leu Asn Ala Glu
              35              40              45
Ala Cys Trp Pro Lys Asp Val Gly Ile Val Ala Leu Glu Ile Tyr Phe
              50              55              60
Pro Ser Gln Tyr Val Asp Gln Ala Glu Leu Glu Lys Tyr Asp Gly Val
65              70              75              80
Asp Ala Gly Lys Tyr Thr Ile Gly Leu Gly Gln Ala Lys Met Gly Phe
              85              90              95
Cys Thr Asp Arg Glu Asp Ile Asn Ser Leu Cys Met Thr Val Val Gln
              100             105             110
Asn Leu Met Glu Arg Asn Asn Leu Ser Tyr Asp Cys Ile Gly Arg Leu
              115             120             125
Glu Val Gly Thr Glu Thr Ile Ile Asp Lys Ser Lys Ser Val Lys Thr
              130             135             140
Asn Leu Met Gln Leu Phe Glu Glu Ser Gly Asn Thr Asp Ile Glu Gly
145             150             155             160
Ile Asp Thr Thr Asn Ala Cys Tyr
              165

```

<210> 199
 <211> 168
 <212> PRT
 <213> Homo sapien

```

<400> 199
His Arg Gly Gly Gly Glu Met Ala Phe Ser Gly Ser Gln Ala Pro Tyr
 1              5              10              15
Leu Ser Pro Ala Val Pro Phe Ser Gly Thr Ile Gln Gly Gly Leu Gln
              20              25              30
Asp Gly Leu Gln Ile Thr Val Asn Gly Thr Val Leu Ser Ser Gly
              35              40              45
Thr Arg Phe Ala Val Asn Phe Gln Thr Gly Phe Ser Gly Asn Asp Ile
              50              55              60
Ala Phe His Phe Asn Pro Arg Phe Glu Asp Gly Gly Tyr Val Val Cys
65              70              75              80
Asn Thr Arg Gln Asn Gly Ser Trp Gly Pro Glu Glu Arg Lys Thr His
              85              90              95
Met Pro Phe Gln Lys Gly Met Pro Phe Asp Leu Cys Phe Leu Val Gln
              100             105             110

```

Ser Ser Asp Phe Lys Val Met Val Asn Gly Ile Leu Phe Val Gln Tyr
 115 120 125
 Phe His Arg Val Pro Phe His Arg Val Asp Thr Ile Ser Val Asn Gly
 130 135 140
 Ser Val Gln Leu Ser Tyr Ile Ser Phe Gln Pro Pro Gly Val Trp Pro
 145 150 155 160
 Ala Asn Pro Ala Pro Ile Thr Gln
 165

<210> 200
 <211> 132
 <212> PRT
 <213> Homo sapien

<400> 200
 Gly Gln Glu Lys Ser Leu Ala Ala Glu Gly Arg Ala Asp Thr Thr Thr
 1 5 10 15
 Gly Ser Ile Ala Gly Ala Pro Glu Asp Glu Arg Ser Gln Ser Thr Ala
 20 25 30
 Pro Gln Ala Pro Glu Cys Phe Asp Pro Ala Gly Pro Ala Gly Leu Val
 35 40 45
 Arg Pro Thr Ser Gly Leu Ser Gln Gly Pro Gly Lys Glu Thr Leu Glu
 50 55 60
 Ser Ala Leu Ile Ala Leu Asp Ser Glu Lys Pro Lys Lys Leu Arg Phe
 65 70 75 80
 His Pro Lys Gln Leu Tyr Phe Ser Ala Arg Gln Gly Glu Leu Gln Lys
 85 90 95
 Val Leu Leu Met Leu Val Asp Gly Ile Asp Pro Asn Phe Lys Met Glu
 100 105 110
 His Gln Ser Lys Arg Ser Pro Leu His Ala Ala Ala Glu Ala Gly His
 115 120 125
 Val Asp Ile Cys
 130

<210> 201
 <211> 120
 <212> PRT
 <213> Homo sapien

<400> 201
 Met Leu Val Leu Val Leu Gly Asp Leu His Ile Pro His Arg Cys Asn
 1 5 10 15
 Ser Leu Pro Ala Lys Phe Lys Lys Leu Leu Val Pro Gly Lys Ile Gln
 20 25 30
 His Ile Leu Cys Thr Gly Asn Leu Cys Thr Lys Glu Ser Tyr Asp Tyr
 35 40 45
 Leu Lys Thr Leu Ala Gly Asp Val His Ile Val Arg Gly Asp Phe Asp
 50 55 60
 Glu Asn Leu Asn Tyr Pro Glu Gln Lys Val Val Thr Val Gly Gln Phe
 65 70 75 80
 Lys Ile Gly Leu Ile His Gly His Gln Val Ile Pro Trp Gly Asp Met
 85 90 95
 Ala Ser Leu Ala Leu Leu Gln Arg Gln Phe Asp Val Asp Ile Leu Ile
 100 105 110
 Ser Gly His Thr His Lys Phe Glu

115

120

<210> 202

<211> 135

<212> PRT

<213> Homo sapien

<400> 202

Arg	Met	Cys	Ser	Leu	Thr	Phe	Tyr	Ser	Lys	Ser	Glu	Met	Gln	Ile	His
1				5					10					15	
Ser	Lys	Ser	His	Thr	Glu	Thr	Lys	Pro	His	Lys	Cys	Pro	His	Cys	Ser
			20					25					30		
Lys	Thr	Phe	Ala	Asn	Ser	Ser	Tyr	Leu	Ala	Gln	His	Ile	Arg	Ile	His
		35					40					45			
Ser	Gly	Ala	Lys	Pro	Tyr	Ser	Cys	Asn	Phe	Cys	Glu	Lys	Ser	Phe	Arg
	50					55				60					
Gln	Leu	Ser	His	Leu	Gln	Gln	His	Thr	Arg	Ile	His	Thr	Gly	Asp	Arg
65					70					75					80
Pro	Tyr	Lys	Cys	Ala	His	Pro	Gly	Cys	Glu	Lys	Ala	Phe	Thr	Gln	Leu
				85					90					95	
Ser	Asn	Leu	Gln	Ser	His	Arg	Arg	Gln	His	Asn	Lys	Asp	Lys	Pro	Phe
			100					105					110		
Lys	Cys	His	Asn	Cys	His	Arg	Ala	Tyr	Thr	Asp	Ala	Ala	Ser	Leu	Glu
		115					120					125			
Val	His	Leu	Ser	Thr	His	Thr									
	130					135									

<210> 203

<211> 135

<212> PRT

<213> Homo sapien

<400> 203

Leu	Leu	Leu	Ala	Arg	Trp	His	Ser	Ala	Ala	Phe	Lys	Val	Arg	Ala	Gly
1				5					10					15	
Ala	Arg	Gln	Glu	Leu	Ala	Met	Lys	Ser	Leu	Lys	Ser	Arg	Leu	Arg	Arg
		20						25					30		
Gln	Asp	Val	Pro	Gly	Pro	Ala	Ser	Ser	Gly	Ala	Ala	Ala	Ala	Ser	Ala
		35					40					45			
His	Ala	Ala	Asp	Trp	Asn	Lys	Tyr	Asp	Asp	Arg	Leu	Met	Lys	Ala	Ala
	50					55				60					
Glu	Arg	Gly	Asp	Val	Glu	Lys	Val	Thr	Ser	Ile	Leu	Ala	Lys	Lys	Gly
65					70					75					80
Val	Asn	Pro	Gly	Lys	Leu	Asp	Val	Glu	Gly	Arg	Ser	Val	Phe	His	Val
			85					90					95		
Val	Thr	Ser	Lys	Gly	Asn	Leu	Glu	Cys	Leu	Asn	Ala	Ile	Leu	Ile	His
		100						105					110		
Gly	Val	Asp	Ile	Thr	Thr	Ser	Asp	Thr	Ala	Gly	Arg	Asn	Ala	Leu	His
		115					120					125			
Leu	Ala	Ala	Lys	Tyr	Gly	His									
	130					135									

<210> 204

<211> 167

<212> PRT

<213> Homo sapien

<400> 204

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Ala Leu Gly Glu Ala Pro Asp His Ser Tyr Glu Ser Leu Arg Val Thr
 1           5           10           15
Ser Ala Gln Lys His Val Leu His Val Gln Leu Asn Arg Pro Asn Lys
          20           25           30
Arg Asn Ala Met Asn Lys Val Phe Trp Arg Glu Met Val Glu Cys Phe
          35           40           45
Asn Lys Ile Ser Arg Asp Ala Asp Cys Arg Ala Val Val Ile Ser Gly
          50           55           60
Ala Gly Lys Met Phe Thr Ala Gly Ile Asp Leu Met Asp Met Ala Ser
65           70           75           80
Asp Ile Leu Gln Pro Lys Gly Asp Asp Val Ala Arg Ile Ser Trp Tyr
          85           90           95
Leu Arg Asp Ile Ile Thr Arg Tyr Gln Glu Thr Phe Asn Val Ile Glu
          100          105          110
Arg Cys Pro Lys Pro Val Ile Ala Ala Val His Gly Gly Cys Ile Gly
          115          120          125
Gly Gly Val Asp Leu Val Thr Ala Cys Asp Ile Arg Tyr Cys Ala Gln
          130          135          140
Asp Ala Phe Phe Gln Val Lys Glu Val Asp Val Gly Leu Ala Ala His
145          150          155          160
Val Gly Thr Leu Gln Arg Leu
          165

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<210> 205

<211> 381

<212> DNA

<213> Homo sapien

<400> 205

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aaatttgga tcacgcctg ttctgaaac tagatgcacc aaccgtatca ttatttggtt      60
gaggaaaaaa agaaatctgc attttaattc atgttggtca aagtcgaatt actatctatt    120
tatcttatat cgtagatctg ataaccctat ctaaaagaaa gtcacacgct aaatgtattc    180
ttacatagtg cttgtatcgt tgcatttggt ttaatttggt gaaaagtatt gtatctaact    240
tgtattactt tggtagtttc atctttatgt attattgata tttgtaattt tctcaactat    300
aacaatgtag ttacgctaca acttgccctaa aacattcaaa cttggtttct tttttctggt    360
gttttctttg ttaattcatt t

```

<210> 206

<211> 514

<212> DNA

<213> Homo sapien

<400> 206

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aaaagtaaat tgcataaaat tacatccaat ttctttctct aaaccaacat attcttcacc      60
ttcaciaaagc aaacacatgg tgcactgaaa ccgaggtggt accagcttta catactgttc    120
tgccatttgt ggggggtgca accacaacat aagtcagaaa aaaagctatc cagcttttcg    180
tggaatctgg tgaagtttac acttagcgat aagcctctaa gcctgaactt agcagggcta    240
gcaaaacttt atttatttcc taactcctat tattttagaa tgggttttcaa aataatactg    300
caagttccta attgaaatac aaaacagAAC aaaaagctgt gagaaatctt ttttttctt    360
tggctcctta aagacttggg ataatttata ttagtggtgc atacatttta ccttctacat    420
tttgatgtac ttgctcttga aagcactaga acaaattaat tgaaataaaa cctctctgaa    480
accatttgaa tctttgatcc taccatagag tttt

```

<210> 207
<211> 522
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(522)
<223> n = A,T,C or G

<400> 207
caagctttttg gtgcatagca gccngcctgg aagcattctg agtgctctgt ctgccctggg 60
gggttttcatt atccgtgtctg tcaaacaggg cacccttaaat cctgcctcac tgcagtgtga 120
gttggacaaa aataatatac caacaagaag ttatgtttct tacttttatc atgattcact 180
ttataccacg gactgctata cagccaaagc cagtctggct ggaactctct ctctgatgct 240
gatttgcact ctgctggaat tctgcctagc tgtgtcact gctgtgctgc ggtggaaaaca 300
ggcttactct gacttccctg ggagtgtact tttcctgect cacagttaca ttggtaattc 360
tggcatgtcc tcaaaaatga ctcatgactg tggatatgaa gaactattga cttcttaaga 420
aaaaagggag aaatattaat cagaaagttg attccttatga taatatggaa aagttaacca 480
ttatagaaaa gcaaagcttg agtttcctaa atgtaagctt tt 522

<210> 208
<211> 278
<212> DNA
<213> Homo sapien

<400> 208
aaaatgcact accccttttt tccaacacgg agcttaaaac aaattaatga aagagtggaa 60
aattcaaaat aagggaaga gataagggtt tttttttttt tctttaaga tagactcagg 120
ataggtagat agctttcact gatgtagatg tggataaat tactacttca ggaaaaaaat 180
tcccaaacat cttatgaaaa agtatacaac tctacttcaa aatatgctat ttactcactg 240
ccaaagacag ttttatttga aatcttgttt ctgtattt 278

<210> 209
<211> 234
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(234)
<223> n = A,T,C or G

<400> 209
cctcccaaat ttagcaggtg ctgggnagga ccctagggag tggtttatgg gggctagctg 60
gtgaaactgc cctttccttt ctgttctatg agtgtgatgg tgtttgagaa aatgtggggc 120
tatggttcag gcgcacttca catgtgcaa gatggagaaa gcactcacct acacgttttag 180
gctcagaatg ttgattgaaa cattttgaat gatcaaaaat aaaatgttat tttt 234

<210> 210
<211> 186
<212> DNA
<213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(186)
 <223> n = A,T,C or G

<400> 210
 aaaataactg atggcaaaat aaanatttta catcacatca tactgtgtaa acatgtaagg 60
 tctctgtaca aagaaatata catgcaaaat aatgtaaaaa tttaactgaa ataataaaag 120
 aaacaatata caaataaaaa ttatgagggt acgaatacac atccagtttc gaatccaatt 180
 tctttt 186

<210> 211
 <211> 403
 <212> DNA
 <213> Homo sapien

<400> 211
 aaaaattggt aaaatatttta agtacaaaat aagtagcttc cagcgagggt tttataccat 60
 agtaagagca cacaatagat attactagca cacatggggt atctgggagc gctatagcta 120
 caataaacct aattatggaa cagaaatttg cattctgttt ccagtgtac tacactccta 180
 ctttctcaaa agtctgtctt attaatatca gctcagtgc gtttactatg aatagtttat 240
 gtctgtgatg caaagcatta attgttctct ttttacaac atacattttt ttcataagga 300
 agactggggg aaaaccaga aacatacaga gaaaaggaaa gcatcatcaa atatatgtta 360
 aaaattaaga tgatgtttac tactagtcac cttacaacaa ttt 403

<210> 212
 <211> 345
 <212> DNA
 <213> Homo sapien

<400> 212
 cctctttatg agttcattac tgctgttcag tctcggcaca cagacacccc tgtgcaccgg 60
 ggtgtacttt ctactctgat cgctgggcct gtgggttgaga taagtcacca gctacggaag 120
 gtttctgacg tagaagagct taccctcca gagcatcttt ctgatcttcc accattttca 180
 aggtgtttta taggaataat aataaagtct tcgaatgtgg tcaggtcatt tttggatgaa 240
 ttaaaggcat gtgtggcttc taatgatatt gaaggcattg tgtgcctcac ggctgctgtg 300
 catattatcc tggttattaa tgcaggtaaa cataaaagct caaaa 345

<210> 213
 <211> 318
 <212> DNA
 <213> Homo sapien

<400> 213
 aaaatgtttt attattttga aaataatggt gtaattcatg ccagggactg acaaaagact 60
 tgagacagga tggttattct tgtcagctaa ggtcacattg tgcctttttg accttttctt 120
 cctggactat tgaaatcaag cttattggat taagtgatat ttctatagcg attgaaaggg 180
 caatagttaa agtaatgagc atgatgagag tttctgttaa tcatgtatta aaactgattt 240
 ttagctttac aaatatgtca gtttgaggt atgcagaatc caaagtaaatt gtcctgctag 300
 ctagttaagg attgtttt 318

<210> 214
 <211> 462
 <212> DNA
 <213> Homo sapien

<400> 214

aaacacatct	ggttctggca	gcaagttata	ttatgcattt	agagcaatag	gtgccctgaa	60
agttattgtt	gctttttttg	tttttttttt	cagtttggtc	gtgtcacttg	aatcagaaac	120
caaacacatg	taaaaaaata	tcacctcaa	tgcccccat	taactctctc	tccagaagg	180
gacaatgtta	gtgaactcaa	gactctcact	gatgatggta	ttttacaatg	aaaacacaag	240
gaaacccttt	gaggtccaat	tttcacatca	tattctccaa	atagtaaaat	agcagctcta	300
catgttgatg	aaaagaaatt	tcaatttctt	cctatttggt	tttactcata	tcaacattaa	360
tatgtatctg	gatttattaa	tttccaaaaa	gaaaatttta	gttaccaa	atttcagaaa	420
tttaataaag	cattatatat	atgtaattag	cacttatcta	cc		462

<210> 215

<211> 280

<212> DNA

<213> Homo sapien

<400> 215

aaacttttct	gaaacgatta	gctgtagcca	aattatgtgg	ttacgttttg	ctacattaga	60
atttgaaaat	gcaatatgtg	tggtaaatct	actgtttgaa	atttataatg	gtctctgata	120
tgattcgaat	tttggttaact	tttgaaagtt	attttcccc	tttagtcatg	gatttctatt	180
tgttttttaa	tgtaattttt	tctagaaagc	atctgaattg	actaggcttt	tcctatataa	240
aaaactcaaa	acttgtaaac	tctgtacttt	aataaaattt			280

<210> 216

<211> 210

<212> DNA

<213> Homo sapien

<400> 216

aaaatctctg	gcttcaaagt	ttcttgggga	aaggctcggt	tacctcacat	tttttgtttc	60
cattagtaat	attctaggta	cctcacaaaa	tgtattatgg	tgccatggct	gttagttttt	120
agtgagtgtc	gtaggattaa	ttcgaaaata	ggcagaattc	cattcctccc	aagggtggca	180
aaattagcta	tactgatgta	attgtcattt				210

<210> 217

<211> 398

<212> DNA

<213> Homo sapien

<400> 217

ctggagctgc	tagaacttga	gatgagggca	agagcgatta	aagcccta	gaaagctggt	60
gatataaaaa	agccagccta	ggtattttaac	ttgattttga	attttaggta	tgtttgaaca	120
aagccacatc	atttaatttt	gtatctaaaa	tttatttggg	gtcttatatg	ttattttctca	180
tgtaaccctt	attaggactc	attttagccc	taaattacct	gtggctgttt	ctttttattt	240
ttttgactac	ttttatatta	taaatgtgtg	ttactgtctt	atgaattcat	ggcaatatag	300
ttggatagcc	tggtactttt	gttagatgag	tatttagctg	tgtctgcaaa	tcttaaaagc	360
cattagcaaa	gagtcgtggt	atttttttct	ttattttt			398

<210> 218

<211> 487

<212> DNA

<213> Homo sapien

<400> 218

ctgccgccgg	tcaggctggt	taaagatcag	gtcccccagg	accttgcgat	ttatgtcgcc	60
------------	------------	------------	------------	------------	------------	----

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attctccagc aagacctcag tgccgaagac ctctacgatg cgccggtggg caggggtatcc 120
tggctgcacg acgtgccggg ccatcacgtc cacgtcaatc accgcacagc ccagtttcag 180
tgtttttaca cattatattg ttataatctc acaataacta taaattaggt agaacaggaa 240
atgagggtttg gagaagatac ttgacttatc cgaccatctg tacttggtccc atagtaagga 300
gcctcaagca gagacaaagg aggaagttgc ctatgttgta tggtttacag gccataaatg 360
aatgtcatct ttttcctccc ctggggaaaa atgtctcaaa aatcccacca taggacatga 420
catctccaga acctctatta caaaatacac atttcctgta gaggggtaac aaatttgggg 480
taacctg 487

```

```

<210> 219
<211> 390
<212> DNA
<213> Homo sapien

```

```

<400> 219
aaaaaataca ccacacgata caactcaata caggagtatt tcttctcaaa ttcttcttagc 60
accatcaaca ttcttcaagt atctgaaata ctattaatta gcacctttgt attatgaaca 120
aaacaaaaca aggacctcag ttcctctctg tctaggtcag cacctaacaa tgtggatcac 180
actcatggga aagtgttttg aggtagttaa aacctttgga agtttggttt ttaaacttcc 240
ctctgtggaa gatattcaaa agccacaagt ggtgcaaatg tttatggttt ttatttttca 300
atttttatth tggttttctt acaaagggtg acattttcca taacagggtg aagagtgttg 360
aaaaaaaaagt tcaaattttt gggggagcgg 390

```

```

<210> 220
<211> 341
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1)...(341)
<223> n = A,T,C or G

```

```

<400> 220
aaaacaggca aagtttttaca gagaggatac atttaataaaa actgcgagga catcaaagtg 60
gtaaatactg tgaaatacct tttctnnnca aaaggcaaat attgaagttg tttatcaact 120
tcgctagaaa aaaaaaaaaca cttggcatac aaaatatatta agtgaaggag aagtctaacg 180
ctgaactnnn aatgaaggga aattgtttat gtgttatgaa catccaagtc tttcttcttt 240
tttaagttgt caaagaagct tccacaaaat tagaaaggac aacagttctg agctgtaatt 300
tcgccttaaa ctctggacac tctatatgta gtgcattttt a 341

```

```

<210> 221
<211> 234
<212> DNA
<213> Homo sapien

```

```

<400> 221
ccagggggaa ttgagggagg ctctaagcta ggggcactgc atggtgggac aggatggccc 60
cttgaggact gaacctgtgg gagaagacaa acagtaataa taaaaacaaa taacaagtac 120
tttaagaatg gattgtatga cctatagtga cagatgacat cactaatact gaaagcttct 180
tatattaata attttggcaa aatgtcattt tgtaatatag tatatgcttt ccag 234

```

```

<210> 222
<211> 186
<212> DNA

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<213> Homo sapien

<400> 222

aaattttcat	tgagttgtcc	atctccagca	tatagggcct	caggagcaga	gcagaccttg	60
tttttagtgg	ttccatggga	taaaatggga	ttggaggagc	tagaagaatt	cagggctctgg	120
tccaatctgc	cagtcttctt	gaaatatcga	aaatacacca	gggctgctat	atcagagcca	180
ccctgg						186

<210> 223

<211> 486

<212> DNA

<213> Homo sapien

<400> 223

ccataagcag	ataagtagca	gttcaactgg	atgtctctct	tctccaaatg	ctacagtaca	60
aagccctaag	catgagtggg	aaatcggtgc	ttcagaaaag	acttcaaata	acacttactt	120
gtgcctggct	gtgctggatg	gtatattctg	tgctattttt	cttcatggga	gaaacagccc	180
acagagctca	ccaacaagta	ctccaaaact	aagtaagagt	ttaagctttg	agatgcaaca	240
agatgagcta	atcgaaaagc	ccatgtctcc	tatgcagtac	gcacgatctg	gtctgggaac	300
agcagagatg	aatggcaaac	tcatagctgc	aggtggctat	aacagagagg	aatgtcttcg	360
aacagtcgaa	tgctataatc	cacatacaga	tactgggtcc	tttcttgctc	ccatgagaac	420
accaagagcc	cgatttcaaa	tggctgtact	catggggccag	ctctatgtgg	taggtggatc	480
aatgg						486

<210> 224

<211> 322

<212> DNA

<213> Homo sapien

<400> 224

aaatgttcac	tatgtcattt	agtgtccaac	tttacggata	ggttgactat	ctaaataggc	60
attttttagtc	attaaaaaaa	aatctagtca	ccaggaggat	ccctataact	caaaaataact	120
tgtttgtaaa	agaaaatttg	tttacttacc	cattagtaag	ttcctgcata	ttcattataa	180
gatggcaaat	caaacttttc	taggatgaag	acagcttatt	tttaagttgt	atagtcttag	240
ttggtttagg	gtctcaattt	taattaataa	aatacttggg	ttttatttgc	ttgtcccttt	300
gaattcctgt	tttaataatt	tt				322

<210> 225

<211> 489

<212> DNA

<213> Homo sapien

<400> 225

aaatgtagga	ataaaatggc	tggcatctaa	gcactttagt	aaaagagggt	tttacaata	60
actaaggatt	gtagagcttc	cttctctttt	tttttctttt	tctttctttt	gttttacatg	120
aactcaactt	attcctaaca	tttgtctacc	tcaaagaaat	ttcaagatta	tttagataac	180
atggatatgt	gccaaatcct	ttgagctgtt	aagatgataa	tttcttgctt	tcctcctaca	240
tcttctcctc	ccactccctc	ctttgggtgtg	aatattggct	tcccaattaa	gacctttttt	300
ttttttttcc	agtttgtttt	agcttattat	aggtttttgg	ggaactttgc	cattttgtaa	360
tctttcaaat	cattcttcac	ccttcctcac	atcagcttcc	tgcttttccc	agtgttttac	420
tgtaaatgtg	gtagcatatg	acaaatcttg	agctgacttt	cctcttcact	gatgtcatct	480
tgagctctt						489

<210> 226

<211> 398

<212> DNA

<213> Homo sapien

<400> 226

caagggccca ccgcagagca cacctatgct atggggagcc ctgctggcag ccccgagagc	60
catgccatgg cctgcaggag ccaggctcct gtgtggatga agtccctctt cctctgtgcc	120
ttgatccctt gggggtgctt ttggtcatct cttctgtcct ttcctgtctc tgaaatagtc	180
atcactcccc ttgactctct ctgttcacgt cttctcagtc tgcagagtta acttctgtaa	240
ggagtttaat ctgggggttcc aagaaaacaa gttccttggt aacatagcac tgactttgca	300
acaatagaaa actaacaat gagcaacaat ataaagagta gaggtagttc tcattgggtg	360
taacttcaac ccattctgct tgtggttaga atttataa	398

<210> 227

<211> 535

<212> DNA

<213> Homo sapien

<400> 227

ctgctgcata gaaaatatgc taacatacaa cagtcaagtt taagcctgtg catagagaag	60
ataaagcact tatggtaact gcaaatggta acgagtcctt aaggtttgta caacctagta	120
tgggtccata aggaaaaact gtagtagaaa tggttaggac aaacaataaa gtagaacag	180
gggggaaact tgagaagaga agaaagaagc aagaaaaaaa gactttcaat tgtataaaat	240
tcacaaacca gtaaagtata aagacaccat ggagaaatgg ttaactctgc cccaaacacc	300
caacagcaaa caaaaccaga atgaataagc ctttggcaga caattttaga aatttgaatg	360
ttacatttct caataattca caaacaatat attatatggt atatttatat taaatattgg	420
gaaaccaatg ttgtaaattt gatgcttata atgcttttagc caatgagagc acaatgatat	480
caatcaagct aaatgaatgc tgggtgttatc acaacagtgct tcattttatga aacaa	535

<210> 228

<211> 301

<212> DNA

<213> Homo sapien

<400> 228

aaacaataaa caccatcaac cttattgact ttattgtccc tcaaattata ttgactggtg	60
tgattccatc aagtittgtac actcttttct ctcctgtgtt tgcagcaaca aattgcgaag	120
tgttttgggt tgtttgtttt cgtttgggta aagcttattg ccatgctggg gcggctatgg	180
agactgtctg gaaggcttgg aatggtttat tgcattatgg aaaatttgcc tgatttctta	240
caggcagcgt ttggaaacct tttattatat agttgtttac atacttataa gtctatcatt	300
t	301

<210> 229

<211> 420

<212> DNA

<213> Homo sapien

<400> 229

aaagttgctt tgctggaagt ttttataagg aatctcagat taaaccttta gaagtttaat	60
tgacactagg aagccaaacc aaggctgact tcagactttg tttgtagtac ctgtgggttt	120
attacctatg ggtttatata ctcaaatacg acattctagt caaagtcttg gtaatataac	180
caatgttttc aaatgtattc tgtcatacaa agagcagatt tttattgaac ttgtgcaata	240
actatattac catacaatat aaatattcat gaatagtttc ccaagtctgg agcgaccaca	300
tagggagaaa atgcaaatgt ctcaattttt gttcacaaaa gtatatttta tcaaatgtct	360
gtaagctgtg gatagcttaa aagaaaaaaa gtttcctgaa atctgggaaa caagacattt	420

<210> 230
 <211> 419
 <212> DNA
 <213> Homo sapien

<400> 230
 gtgaagtcct aaagcttgca ttccaccagc ttctacaata gccggcttat tactagagca 60
 gacagatagc accttcagca ctctgcttgt ggtccacagt agtttttcgt aagtataggt 120
 cctcattata ttactaaag cttgggggtcc accactagcc agtatgatga gcttgctttc 180
 ttggttgcca taagctaaaa tttgaaggca gtctgtcgta atagccaaga atttaacatt 240
 tgttttggtg agcaaggcaa ccattttctg cagcccacca gctaaacgca ctgccatttt 300
 agctccttct tgatgtaata aaaggttggt gagagttgta atggcataaa acaacacaga 360
 atccactggg gaaccaagca ttttcaccag ggcagyaatg cctccagact taaagatgg 419

<210> 231
 <211> 389
 <212> DNA
 <213> Homo sapien

<400> 231
 ttgttcagag ccctgggtgga tcttgcaatc cagtgccta caaaggctag aacactacag 60
 gggatgaatt cttcaaatag gagccgatgg atctgtggtc ctttgggact catcaaagcc 120
 ttggttttagc attttgtcag ttttatcttc agaaattctc tgcgattaag aagataattt 180
 attaaagggtg gtcttctcta cctctgtggt gtgtgtcgcg cacacagctt agaagtgcta 240
 taaaaaagga aagagctcca aattgaatca cctttataat ttaccattt ctatacaaca 300
 ggcagtggaa gcagtttcag agaacttttt gcagtcttat ggttgatcag ttaaaaaaga 360
 atgttacagt aacaaataaa gtgcagttt 389

<210> 232
 <211> 397
 <212> DNA
 <213> Homo sapien

<400> 232
 ccaggataat atacacaggt ttgcagctaa aactgtgcac agtgggtcat tgatgctagt 60
 cacagtggaa ctgaagggaag gctctacagc ccagcttatc ataaacactg agaaaactgt 120
 gattggctct gttctgctgc gggaactgaa gcctgtcctg tctcaggggt aacctgctta 180
 catctggact ttagaatctg gcacacaaca aaagtgcctg gcattccacta ctgctgcctt 240
 tcatttataa taatagcctt tccatctggc agtgggggaa gaatacactc ttgacattct 300
 tgtctcctgc tttagaatgc tagtgtgtat ctatcatgta tgcaatactt tccccctttt 360
 tgctttgcta accaaagagc atatatttta ctgtcag 397

<210> 233
 <211> 508
 <212> DNA
 <213> Homo sapien

<400> 233
 cgaggagtgc cttaagtgcg aggacctcaa agtgggacaa tatattttgta aagatccaaa 60
 aataaatgac gctacgcaag aaccagttaa ctgtacaaac tacacagctc atgtttcctg 120
 ttttcagca cccaacataa cttgtaagga ttccagtggc aatgaaacac attttactgg 180
 gaacgaagt ttgtttttca agcccatatc ttgccgaaat gtaaattggct attcctacaa 240
 agtggcagtc gcattgtctc tttttcttgg atggttggga gcagatcgat ttaccttgg 300
 ataccctgct ttgggtttgt taaagttttg cactgtaggg ttttgtggaa ttgggagcct 360
 aattgatttc attcttattt caatgcagat tgttggacct tcagatggaa gtagttacat 420

tatagattac tatggaacca gacttacaag actgagtatt actaatgaaa catttagaaa 480
aacgcaatta tatccataaa tatttttt 508

<210> 234
<211> 358
<212> DNA
<213> Homo sapien

<400> 234
aaatgttggg attcaaaacc aaagatataa ccgaaaggaa aaacagatga gacataaaat 60
gatttgcaag atgggaaata tagtagttta tgaatgtaaa ttaaattcca gttataatag 120
tggctacaca ctctcactac acacacagac cccacagtcc tatatgccac aaacacattt 180
ccataacttg aaaatgagta ttttgcatat ctacgttcag gatatgtttt ttacaagtta 240
atcctaaagt cataaagcaa gaagctattc atagtacaag attttatttg ctaagcttta 300
caaattaaac tctaaaaaat tattacaatg atactgaaag ata'ttttatt ggccctttt 358

<210> 235
<211> 482
<212> DNA
<213> Homo sapien

<400> 235
gaagaaagtt agatttacgc cgatgaatat gatagtgaat tggatttttg cgtaggtttg 60
gtctaggggtg tagcctgaga ataggggaaa tcagtgaatg aagcctccta tgatggcaaa 120
tacagctcct attgatagga catagtggaa gtgagctaca acgtagtacg tgcgtgtag 180
tacgatgtct agtgatgagt ttgctaatac aatgccagtc aggccaccta cggtgaaaag 240
aaagatgaat cctagggctc agagcactgc agcagatcat ttcattattgc ttcgtggag 300
tgtggcgagt cagctaaata ctttgacgcc ggtggggata gcgatgatta tggtagcgga 360
ggtgaaatat gtcgtgtgt ctacgtctat tcctactgta aatatatggg gtgctcacac 420
gataaacctt aggaagccaa ttgatatcat agctcagacc atacctatgt atccaaatgg 480
tt 482

<210> 236
<211> 149
<212> DNA
<213> Homo sapien

<400> 236
cctcttcatt gttcacatgt cacaggagga ggctctgagc aaaggccact ggcaagttag 60
ggcaacacca agaaggctct gcggagagac tccctgtggg ttggggcctg gcaggaacgg 120
tgccctgtgga ctgtttatgg tctgtccag 149

<210> 237
<211> 391
<212> DNA
<213> Homo sapien

<400> 237
gaagctaaat ccaaagaaat atgaaggtgg ccgtgaatta agtgatttta ttagctatct 60
acaaagagaa gctacaaacc cccctgtaat tcaagaagaa aaaccaaga agaagaagaa 120
ggcacaggag gatctctaaa gcagttagcca aacaccattt tgtaaaagga ctcttccatc 180
agagatggga aaaccatttg ggaggactag gaccatattg ggaattatta cctctcaggg 240
ccgagaggac agaattggata taatctgaat cctgttaaata tttctctaaa ctgtttctta 300
gctgcactgt ttatggaaat accaggacca gtttatgttt gtgggttttg gaaaaattat 360
ttgtgttggg ggaaatgttg tgggggtggg g 391

<210> 238
 <211> 374
 <212> DNA
 <213> Homo sapien

<400> 238
 aaaaaacaaa acaatgtaag taaaggatat ttctgaatct taaaattcat cccatgtgtg 60
 atcataaact cataaaaaata attttaagat gccggaaaag gatactttga ttaaataaaa 120
 acaactcatgg atatgtaaaa actgtcaaga ttaaaattta atagtttcat ttatttgta 180
 ttttatttgt aagaaatagt gatgaacaaa gatccttttt catactgata cctgggttga 240
 tattatttga tgcaacagtt ttctgaaatg atatttcaaa ttgcatcaag aaattaaaat 300
 catctatctg agtagtcaaa atacaagtaa aggagagcaa ataaacaaca tttggaaaaa 360
 aaaaaaaaaa aaaa 374

<210> 239
 <211> 200
 <212> DNA
 <213> Homo sapien

<400> 239
 aaagatgtct ttgaccgcat atgtactgga aatttcaaac gtggatcttc ccaggttgta 60
 gtctttgtgt tatgatcaat gaagaagggc cggccgtttg gcgctatcct catttcccag 120
 ccgggtggca agaagctctg tgtgactttg tgttgtgggt tgggggagtt gtaaggtgat 180
 ggctgtgggg actgtgggtt 200

<210> 240
 <211> 314
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)... (314)
 <223> n = A,T,C or G

<400> 240
 ctggtaaact gtccaaaaca aggttccaaa taacacctct tactgattta ccctacccat 60
 acatatncca natagntttt gatcaaaaac atgaaatana tccacctgct tattttaagc 120
 atattaaaaa ggaaactaat tggaccattt tctatttgtc tattttatac aaaaaggcta 180
 cacaattgat aactctatt cagataacaa tcaattagag tgantatgaa ttactggcga 240
 caccatcact caattcttaa aaattagaaa ttgctgtagc agtattcact ataacttaac 300
 actaccgaga gact 314

<210> 241
 <211> 375
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)... (375)
 <223> n = A,T,C or G

<400> 241

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ccaagtcctt ggagttatag gatattcatt acttcctctc attgtaatag cccctgtact      60
tttggtggtt ggatcatttg aagtgggtgc tacacttata aaactgtttg gtgtgttttg      120
ggctgcctac agtgcctgctt cattgttagt ggggtgaagaa ttcaagacca aaaagcctct      180
tctgatttat ccaatctttt tattatacat ttatcttttg tcgttatata ctggtgtgtg      240
atccaagtta tacatgaata gaaaaagatg gtgttaaatt tgtgtgtagg ctgggaattc      300
tngctaaagg aatggnaaaa aacctgtntt tgnaaaattn acntgtccca aagnnaagga      360
anctaaacgc tttttt                                     375

```

<210> 242
 <211> 387
 <212> DNA
 <213> Homo sapien

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<400> 242
aaaggcattc tctgatttac atgagaattg agaaactgag atgtatgatt tgtctgttag      60
tcaatttcac accctttcat tctcataagc cccaaatttt gctcagttaa ggagcttgct      120
ttaggccac ctatgtaagt ctgttatact agctaattgtg cccatttgaa tagttcaagg      180
gtcagctaatt gctctgagct tcatggctcc agtataaaga acaaatttaa caaaattaag      240
ctgttactgt agccgagtta ccttctgct ccacacatat gtagtgggat cttgcaggat      300
ttccatagtg ccaattatca aaggccttga ctacttagca ttgctgtatt acagatgtgc      360
aaactgaggc actgaaaagt caaattt                                     387

```

<210> 243
 <211> 536
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(536)
 <223> n = A,T,C or G

```

<400> 243
aaaccaaaag gacgaagaaa aaacactttn aaaaaaaaaa aaaaaaaga aaaaccaaac      60
catattttgc cacatgtgag agtacggtca agcagtattt acaaaaagggt taacggaaca      120
acactctgac acatgctctg agaatactgg gactgctgtt tcaaaaaaaa aggttcaaac      180
ttattgtcac agcatcatca caaaatagag gatcaccatt ggtttgcttg gcttttcttt      240
ttttttttcc cccaagtgag gacctaaact caaataatac aatagaatat gcaaattatc      300
ttcacatcaa gagtacccca agaaaaacga aatccatggc acanacactg tacaaggggtg      360
cagggcaggg ctctgagggg cccaaacccc attttgccaa ctcgattttc tagcattgaa      420
gggagcaagg ggtcagggcat atgatggaga tgatactgaa atgattttat caaaatccat      480
gcaaatacaag ttctttggat agaggtgaan aacttggaca tggctgtttc aggcag      536

```

<210> 244
 <211> 397
 <212> DNA
 <213> Homo sapien

```

<400> 244
ccaggataat atacacaggt ttgcagctaa aactgtgcac agtgggtcat tgatgctagt      60
cacagtggaa ctgaagggaag gctctacagc ccagcttatt ataaacactg agaaaactgt      120
gattggctct gttctgctgc gggaaactgaa gcctgtcctg tctcaggggt aacctgctta      180
catctggact ttagaatctg gcacacaaca aaagtgcctg gcatccacta ctgctgcctt      240
tcatttataa taatagccct tccatctggc agtgggggaa gaatacactc ttgacattct      300
tgtctcctgc tttagaatgc tagtgtgtat ctatcatgta tgcaatactt tccccctttt      360

```

tgcttttgcta accaaagagc atatatttta ctgtcag

397

<210> 245

<211> 508

<212> DNA

<213> Homo sapien

<400> 245

cgaggagtcg	cttaagtgcg	aggacctcaa	agtgggacaa	tatattttgta	aagatccaaa	60
aataaatgac	gctacgcaag	aaccagttaa	ctgtacaaac	tacacagctc	atgtttcctg	120
ttttccagca	cccaacataa	cttgtaagga	ttccagtggc	aatgaaacac	atcttactgg	180
gaacgaagtt	ggttttttca	agcccatatc	ttgccgaaat	gtaaatggct	attcctacaa	240
agtggcagtc	gcattgtctc	tttttcttgg	atgggtggga	gcagatcgat	tttaccttgg	300
ataccctgct	ttgggtttgt	taaagttttg	cactgtaggg	ttttgtggaa	ttgggagcct	360
aattgatttc	attcttattt	caatgcagat	tgttggacct	tcagatggaa	gtagttacat	420
tatagattac	tatggaacca	gacttacaag	actgagtatt	actaatgaaa	catttagaaa	480
aacgcaatta	tatccataaa	tatttttt				508

<210> 246

<211> 358

<212> DNA

<213> Homo sapien

<400> 246

aaatgtttgt	attcaaaacc	aaagatatata	ccgaaaggaa	aaacagatga	gacataaaaat	60
gatttgcaag	atgggaaata	tagtagttta	tgaatgtaaa	ttaaattcca	gttataaatag	120
tggctacaca	ctctcactac	acacacagac	cccacagctc	tatatgccac	aaacacattt	180
ccataacttg	aaaatgagta	ttttgcatat	ctcagttcag	gatatgtttt	ttacaagtta	240
atcctaaagt	cataaagcaa	gaagctattc	atagtacaag	atctttattg	ctaagcttta	300
caaattaaac	tctaaaaaat	tattacaatg	atactgaaag	atattttatt	ggcctttt	358

<210> 247

<211> 673

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(673)

<223> n = A,T,C or G

<400> 247

gaagaaaagt	agatttacgc	cgatgaatat	gatagtgaag	tggatttttg	cgtaggtttg	60
gtctagggtg	tagcctgaga	ataggggaaa	tcagtgaatg	aagcctccta	tgatggcaaa	120
tacagctcct	attgatagga	catagtggaa	gtgagctaca	acgtagtacg	tgtcgtgtag	180
tacgatgtct	agtgatgagt	ttgctaatac	aatgccagtc	aggccaccta	cggtgaaaag	240
aaagatgaat	cctagggctc	agagcactgc	agcagatcat	ttcatattgc	ttccgtggag	300
tgtggcgagt	cagctaaata	ctttgacgcc	gggtggggata	gcgatgatta	tggtagcgga	360
ggtgaaatat	gctcgtgtgt	ctacgtctat	tcctactgta	aatatatggt	gtgctcacac	420
gataaaccct	aggaagccaa	ttgatatcat	agctcagacc	atacctatgt	atccaaatgg	480
ttcttttttt	ccggagtagt	aagttacaat	atgggagatt	attccgaagc	ctggtaggat	540
aagaatataa	acttcagggg	gaccgaaaaa	tcagaatagg	tgttgggtata	gaatgggggtc	600
tcctnctccg	cgggggtcnaa	gaaggtggtg	ttgangttgc	cggngctgta	ntagtatagn	660
gatgccanca	gct					673

<210> 248
 <211> 149
 <212> DNA
 <213> Homo sapien

<400> 248
 cctcttcatt gttcacatgt cacaggagga ggctctgagc aaaggccact ggcaagttag 60
 ggcaacacca agaaggctct gcggagagac tccctgtggg ttggggcctg gcaggaacgg 120
 tgccctgtgga ctgtttatgg tctgtccag 149

<210> 249
 <211> 458
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(458)
 <223> n = A,T,C or G

<400> 249
 gaagctaaat ccaaagaaat atgaagggtgg ccgtgaatta agtgatttta ttagctatct 60
 acaaagagaa gctacaaacc cccctgtaat tcaagaagaa aaacccaaga agaagaagaa 120
 ggcaacaggag gatctctaaa gcagtagcca aacaccactt tgtaaaagga ctcttccatc 180
 agagatggga aaaccattgg ggaggactag gaccatattg ggaattatta cctctcaggg 240
 ccgagaggac agaattggata taatctgaat cctgttaaat tttctctaaa ctgtttctta 300
 gctgcactgt ttatggaaat accaggacca gtttatgttt gtgggttttg gaaaaattat 360
 ttgtgttggg ggaaatgttg tgggggtggg gttgagttgg gggtattttc taattttttt 420
 tgtacatttg gaacagtgc aataaatgan accccttt 458

<210> 250
 <211> 374
 <212> DNA
 <213> Homo sapien

<400> 250
 aaaaaacaaa acaatgtaag taaaggatat ttctgaatct taaaattcat cccatgtgtg 60
 atcataaact cataaaaaata attttaagat gccggaaaag gatactttga ttaataaaaa 120
 acactcatgg atatgtaaaa actgtcaaga ttaaaattta atagtttcat ttattttgta 180
 ttttatttgg aagaaatagt gatgaacaaa gatccttttt cactactgata cctgggttgta 240
 tattatttga tgcaacagtt ttctgaaatg atatttcaaa ttgcatcaag aaattaaaaat 300
 catctatctg agtagtcaaa atacaagtaa aggagagcaa ataaacaaca tttggaaaaa 360
 aaaaaaaaaa aaaa 374

<210> 251
 <211> 356
 <212> DNA
 <213> Homo sapien

<400> 251
 aaagatcttc tctaacaagc tatgggaatt tggcttcata ctctttcttt gcaacagcag 60
 tgttctgggt gataattttg aattgatacc tgttcctttt tctgggtttt gttggctttt 120
 tgaaaaattg tctttcctta tcattgggtg gaggcttggt agcaaagtaa catttttttg 180
 aaaagaggac agaaaaattg aactacagct tgagaacgta ttcttttttt cctactttgt 240
 tattgcaaat tgaggaatca cttttaactg ttttaggtgt gtgtgtccag agtgagcaag 300

gattatgttt ttggattgtc aaagaggatg cttagtctta aaataaaaat aaattt 356

<210> 252
 <211> 484
 <212> DNA
 <213> Homo sapien

<400> 252
 ctggtaaact gtccaaaaca aggttccaaa taacacctct tactgattta cccatcccat 60
 acatatccca aatagttttt gatcaaaaac atgaaataga tccacctgct tattttaagc 120
 atattaaaaa ggaaactaat tggaccattt tctatttgtc tattttatac aaaaaggcta 180
 cacaattgtt acactttatt cagattacaa ttaattagag tgattatgaa ttagtggtct 240
 acaccattac tcaattctta aaaattagaa attgctgtag cagtattcac tataacttaa 300
 cactacgaga gacttaaaaa acagttactg caaaaaaaaa aaagagctac ttcaaagcaa 360
 gcaaagtcag taccattaca gatattctta aaaaaaaaaa aaaatttaac aagcaaggct 420
 agggtttgat aaattccatc ttgtgatcca ttcttggtgca ttcttcactt cttgagtcac 480
 tccc 484

<210> 253
 <211> 379
 <212> DNA
 <213> Homo sapien

<400> 253
 aaaaagcgct tagacttccc tttccatctg gaacatgtaa aattttgcag caacagggtt 60
 tctccaattc cttcagcaag aattcccagc ctacacacaa atttaacacc atctttttct 120
 attcatgtat aacttggatc acacaccagt atataacgac aaaagataaa tgtataataa 180
 aaagattgga taaatcagaa gaggtttttt ggtcttgaat tcttcacca ctaacaatga 240
 agcagcactg taggcagccc aaaacacacc aaacagtttt ataagtgtag acaccacttc 300
 aatgatcca accaccaaaa gtacagggggc tattacaatg agaggaagta atgaatatcc 360
 tataactcca aggacttgg 379

<210> 254
 <211> 387
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(387)
 <223> n = A,T,C or G

<400> 254
 aaatttgact tttcagtgcc tcagtttgca catctgtaat acagcaatgc taagtagtca 60
 aggccnttga taattggcac tatggaaatc ctgcaagatc ccactacata tgtgtggagc 120
 agaagggtaa ctcggctaca gtaacagctt aattttgtta aatttggtct ttatactgga 180
 gccatgaagc tcagagcatt agctgacct tgaactattc aaatgggcac attagctagt 240
 ataacagact tacataggtg ggcctaaagc aagctcctta actgagcaaa atttggggct 300
 tatgagaatg aaagggtgtg aaattgacta acagacaaat catacatctc agtttctcaa 360
 ttctcatgta aatcagagaa tgccttt 387

<210> 255
 <211> 225
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(225)
 <223> n = A,T,C or G

<400> 255
 aaatgtcttg tttcccagat ttcaggaaan tttttttctt ttaagctatc cacagcttac 60
 agcacctttg ataaaatata cttttgtgaa caaaaattga gacatttaca ttttctccct 120
 atgtggctgc tccagacttg ggaaactatt catgaatatt tatattgtat ggtaatatag 180
 ttattgcaca agttcaataa aaatctgctc tttgtatgac agaatt 225

<210> 256
 <211> 544
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(544)
 <223> n = A,T,C or G

<400> 256
 ccttgcttaa agcccagaag tggtttaggc ntttggaana tctgggtcac atcataaaga 60
 acttgatttg aaatgttttc tatagaaaca agtgctaagt gtaccgtatt atacttgatg 120
 ttgggtcattt ctcagtccta tttctcagtt ctattatttl agaacctagt cagttcttta 180
 agattataac tggctcctaca ttaaaataat gcttctcgat gtcagatttt acctgtttgc 240
 tgctgagAAC atctctgcct aattttaccaa agccagacct tcagttcaac atgcttcctt 300
 agctttttcat agttgtctga cattttccatg aaaacaaagg aaccaacttt gttttaacca 360
 aactttgttt gggttacagtt ttcaggggag cgtttcttcc atgacacaca gcaacatccc 420
 aaagaaataa acaagtgtga caaanaaaaa aacaaaccta aatgctactg ttccaaagag 480
 caacttgatg gtttttttta atactgagtg caaaaggncA cccaaattcc tatgatgaaa 540
 tttt 544

<210> 257
 <211> 420
 <212> DNA
 <213> Homo sapien

<400> 257
 aaatgtcttg tttcccagat ttcaggaaac tttttttctt ttaagctatc cacagcttac 60
 agcaatttga taaaatatac ttttgtgaac aaaaattgag acattttacat tttctcccta 120
 tgtggctcgt ccagacttgg gaaactattc atgaatattt atattgtatg gtaatatagt 180
 tattgcacaa gttcaataaa aatctgctct ttgtatgaca gaatacattt gaaaacattg 240
 gttatattac caagactttg actagaatgt cgtattttgag gatataaacc cataggtaat 300
 aaacccacag gtactacaaa caaagtctga agtcagcctt ggtttggtt cctagtgtca 360
 attaaacttc taaaagttta atctgagatt ccttataaaa acttccagca aagcaacttt 420

<210> 258
 <211> 736
 <212> DNA
 <213> Homo sapien

<400> 258
 aaacaaaatg ctaaacttaa aaacattggt ctgtcagttc ccaaattaaa tctacttaga 60

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acaaaaacaa aaatttatag ctcggtcaca tactacttaa ataatatgtg tcaggcatct 120
ctaaaatcct ccatgttttc aagtatggaa atagaactca aatattccac aatacagtac 180
taaacagatg gagtatttag gaaagacttt gttgtcatat ggcacaatat taatatattg 240
ttgcttcaat acgttttgaa ataaatatca gatttttgtt tttttttcct aaaagaccaa 300
aattataatc tacattaaga taattctgac tgtgggtaag acttaagagt gtaaaatata 360
acatcaatat tttatcacaa aagtaaagct ggtaacaaat tataaaaagga gccagtactc 420
tactgagaca ggctcggaga ttaaagctca tcatgataga aatagtcatc atggagctgt 480
ctgccataat ctgtggcttc actgggtgaga aacaagtcgg ggttttccag aatctcttct 540
tcagagagct ttttgtcacc attcaaattc atttcatcaa ttagatgaag cgctcctct 600
tgtgcaatgc cctgattatt aggtctaccc aaggtaacag ctcttgggga tcaagcctgc 660
catcgttatc tttgtcataa tcattcaccc aatctgtctt tctcacaagt atcccattct 720
ggatcttcat ttgcag 736

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<210> 259

<211> 437

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(437)

<223> n = A,T,C or G

<400> 259

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aaaaccatac tgaaatcatt taccaaataa cnaagatctt aatctaaaag atagtgaata 60
catcatcatc atgaaatctg gttttatgtg ctctatgaag tacttggaga attgcttttt 120
tatttttctt ttgctttatt aggtcacaca aaacagaatg aattaycaga aaaatgtatg 180
ttataaaaca gcatttacta cttcaattta atttttttta ctaacaattg tggacctttt 240
tgatgacact tatgtatgtt ttttaataaat tatgtactta ttagtactta atgagccctt 300
cctgcctcaa tataaaatta cttaaacttg agaattacag attttattgt aggccttgat 360
gttagtcact ttggagaagc taaaaatttg gaaatgatgt aattcccact gtaatagcat 420
agggattttg gaagcag 437

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<210> 260

<211> 592

<212> DNA

<213> Homo sapien

<400> 260

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tttttttttt gaaaaatata aaattttaat aaagggtaca tctcttaatt acaataatta 60
ttgtaccaag taattttcct taaatgaact ctttataatg cataatttac agtataagta 120
gaacaaaatg tcatgacaaa agtcattgag tacaagactt gtaataaaaa ggcataaaat 180
atatttatac ataaaccctt ttcaaaaaaac aagggaagc ttgagccctc aatatagggc 240
gacacacgga gcgggtgacc gtgcaggtag aggtactgta ctgatttaaa gtcaagcact 300
agagatagtg gattaatact cttttgccgt acactatata cagatgtata gtacaagtaa 360
caatggcaaa cagaatgtac agattaactt aacacaaaaa cccgaacatc aaaatgaagg 420
tgtgtggagg aaaggtgctg ctgggtctcc ctacaactgt tcatttcttt gtggggcagg 480
gggtagttcc tgaatggctg tgggtccaat actaatgtaa aacaaaaaca gaaacaaaaa 540
aaacaaggaa ctgtcatttc cacgaaagca cagcggcagt gattctagca gg 592

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<210> 261

<211> 450

<212> DNA

<213> Homo sapien

<400> 261
 gtggcagggc ccagccccga accagacaag ggacccctca aggagcttca ttctagcatg 60
 agaaaattga gaagtaaacc agaaagttac agaatgtctg aaggggacag tgtgggagaa 120
 tccgtccatg ggaaaccttc ggtgggtgtac agatttttca caagacttgg acagatttat 180
 cagtccctggc tagacaagtc cacaccctac acggctgtgc gatgggtcgt gacactgggc 240
 ctgagctttg tctacatgat tcgagttttac ctgctgcagg gttggtacat tgtgacctat 300
 gccttgggga tctaccatct aaatcttttc atagcttttc tttctcccaa agtggatcct 360
 tccttaatgg aagactcaga tgacggtcct tcgctaccca ccaaacagaa cgaggaattc 420
 cgcccttca ttcgaaggct cccagagttt 450

<210> 262
 <211> 239
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(239)
 <223> n = A,T,C or G

<400> 262
 taactttgat gacaaaatct aaaattaaag anttagtctt aaaagcctat agtgacttgt 60
 ttacttgcac aaataatatt ttcacttagt acaggctatt aatataagta atgagaattt 120
 aagtattaac tcaaaaaaag atagaggctc caaacttttc taagaaatta atgcattttc 180
 aaagtaataa tataatcaat ctgtaagtca aaagtaattt catattcatt gccaaattt 239

<210> 263
 <211> 376
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(376)
 <223> n = A,T,C or G

<400> 263
 aaaaaaaaaa aaaaaaatt ccttgtngtt tnttagagga aaaaaagaaa aaccccaact 60
 ttancactg atactacata ttgctctgtt aaagaatttt ctctgccaaa aaaaagaaaa 120
 aacaaaaaaa cgcttaaagc tggagtttga cattctgctt tcagatgctg tctttttatt 180
 agtgagtgat gatggtttgc taataatcaa taggtaataa ttttttgtaa tcccatcaag 240
 tggctccata tgtttctgct ctctcgtgac tgtgttaatg ttttaactgt gtaccttaaa 300
 gccgaaatca gtaactatgc atactgtaac caaggatttg ggcttacaga gttgtttgtt 360
 gnataaagaa aatttt 376

<210> 264
 <211> 207
 <212> DNA
 <213> Homo sapien

<400> 264
 aaattagcat tccacaaata tacaggtaat ttaataatta ttgtgcatga atacatacac 60
 aatgcttata tatacaaatt ccagtttgtt ttcattgtgt ggcaagggat ttgtatacaa 120
 tcataagctg tgttcatatt ggtccatttg aatattcaca atacaaaagc acaaaagaac 180
 cattgattta caaaaggaaa tctattt 207

<210> 265
 <211> 388
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(388)
 <223> n = A,T,C or G

<400> 265
 naactgcact ttatttggtta ctgtaacatt nttttttaac tgatcaacca taagcatgca 60
 aaagncnct gaaactgctt ccactgcctg ttgtatagaa atgggtaaat tataaagggtg 120
 attcaatttg gagtccttc cttttttata gcacttctaa gctgtgtgcg cyacacacac 180
 cacagaggta ggaaggacca cttttaataa attatcttct taatcgaga gaatttctga 240
 agataaaact gacaaaatgc taaaccaagg ctttgatgag tcccaaagga ccacagatcc 300
 atcggctcct atttgaagaa ttcacccct gtagtggtct agcctttgta gggcactgga 360
 ttacaagatc caccagggt ctgaacaa 388

<210> 266
 <211> 616
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(616)
 <223> n = A,T,C or G

<400> 266
 aaatacagag tcaaaagatg atttataaaa tntaaaacat tttctgcttg gccgtatttg 60
 aagacaagct gaatacatat ctatgttctg aataagtcca ctatggatat atataggaag 120
 agatatacat atatccatcc acagatacac acacacatat atatttctgc atgtatatat 180
 acataattct ttctatagtt acaggaaata cttcttctat aattctgatt ttgactccca 240
 tcttccacca tttactcatc cactcattac ctaaaatcttg gctttcttcc ctatattgta 300
 aataatccat ccaaacttct agccagtact gtcaggaggg ttcttgctcg agtgagctgt 360
 taatactatt ttccactgac aacttctgca catcgaggac acagtgtatc tgaagactcc 420
 gctgtatact tccaacaacg ggggcatttt tctttcgtag tcggcatgac aattacttta 480
 taggaagact cttcacgaat atcaccacct tctaagttga tgaggaattt ccctttaagc 540
 tcgattacat ctgcagtcac ctctcgtggt tcttgaccag taaagttgac tcagaagcca 600
 tcattaattc attcaa 616

<210> 267
 <211> 341
 <212> DNA
 <213> Homo sapien

<400> 267
 ccattatgta tgtattttct tgaaaaatac ttatttcagc tacttatttt taatagttac 60
 ttattcttgt tgtattgtca tttgagtttt gtatatattt ttgatattaa ccccttgcca 120
 catgtataat ttgcaaatat tttctccctt tttttagttg tcacattctg ttcatgtat 180
 cagattctgt gcagcagctt ttttaatttg agtgatctga ctgacttggt cttccttttg 240
 tgtcctggga tattttaggtt aaatcaaaaa acttgctgcc cagaccaatg ttatggggct 300
 ttcactctat tttttggtag tagtagttta agagttttag g 341

<210> 268
 <211> 367
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(367)
 <223> n = A,T,C or G

<400> 268
 ttgtagattg gaatagcaaa agtgaatgct ntgaccaaaa tttttgccct cctaaataaa 60
 gacgtntcct tctagagagc aaatctatca taaaatgtca aaactagaag agaataaaat 120
 gaaaggaaaa aacctagaaa aatatacctaa aatatcaaat gcagtcattt ctaaatataa 180
 gccataatta tagctttacc tattgttctt attgttccta tgctgcttct acaatgttac 240
 atcaactata cttagcttta ctctcccaaa atcttgggtga tgaagccttc tgagtgtgct 300
 ttccaargtg ccagaaccag aagggcattc caaggcttcc ccacatttcc tccatttacg 360
 gagacag 367

<210> 269
 <211> 270
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(270)
 <223> n = A,T,C or G

<400> 269
 caaatctctc cctcactaga cgtaagccnt ttnctcactc tctcaatctt atgcatcata 60
 gnaangengn tgaggtggat taaaccaaac ccagctacgc aaaatcttag catactcctc 120
 aattaccac ataggatgaa taatagcagt tctaccgtac aaccctaaca taaccattct 180
 taatttaact atttatatta tcctaactac taccgcatcc ctactactca acttaaactc 240
 cagcaccacg accctactac tatntcgac 270

<210> 270
 <211> 368
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(368)
 <223> n = A,T,C or G

<400> 270
 ctgaatcatg aataacacta tataatagag tntaaggaac acaagcatta gatgtgatcc 60
 ttgccccata cccttagatt atgtcagact aaagctgaca attctgccag gctctgaacc 120
 cctagtgcc ccaacccaaa tcttggaagc aaagaatatg ccctgtcata caactttgta 180
 caagttgtag taaaacaaag cttaagtttt ctcactcttc tacagcaaat ggtcagttat 240
 ttaataaaca ctaaaatgct cctaagaatc cattttgagt ttgtttacca aacacattgt 300
 gcaagaactg actacacaaa aagttccttt gaaatttggg ccacaaattc acttaaggtt 360
 ggaaattt 368

<210> 271
 <211> 313
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(313)
 <223> n = A,T,C or G

<400> 271
 aaatattatat aaaactctgt acatgtttcac tttattattg cataaacagc ataattcttca 60
 agacaaanngt ttgcaaacac atgtccaatt caggaaaaaa aatttcacgt ttctcgtctg 120
 gctttttttct tcttttttat ttgtttggga gattcccagc tagtttcaga cttgggtctgt 180
 gaaggaggca cactattttg cttgggtattt gacttggatt tatctgtctc ttgtagtatt 240
 ggcggcactt gggaagagct cttgtcagaa tcactttttg ataagattac agatggctcg 300
 gtagaagtag cag 313

<210> 272
 <211> 462
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(462)
 <223> n = A,T,C or G

<400> 272
 aaaaaacatt tattttaata agactattgc naacacatta aaaaaactaa atagtaatat 60
 tacaaaatct atatacttgc acatttagta tttgtcaatg tgccagaggt tttcttcatg 120
 aaatttgact tctttgaagt gaaggctttt ttctatcatc tcttatagct ctgactgaat 180
 aagtcttaat gctttcttca tgttttctat caataggggt aaatcccag gctcatatgt 240
 gtacaatctg ttagagtatc ttccagctat gtcagctcta actgttaaag aagggtctac 300
 aaacatgatt ctaggcacat attgcccac aggtgataaa ttcttatcag tggtttcatg 360
 cataaggttt agcatgatga acttattctg agccatttct tgtatttctt cattttgggc 420
 aaatactttc tttagtgtct gagagtattg acaatcctcc ag 462

<210> 273
 <211> 282
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(282)
 <223> n = A,T,C or G

<400> 273
 ctgatcaaag catgggatat tttaatagtn ttatacataa tattttttaca tagaaaactt 60
 tacatnncat ttcataattat ataattctgc ttattctttc aaaaatttat acatccattg 120
 ggcaaggaat ggttttcatt aaattaccaa tattaatgc acttaatcat tgtgtatagg 180
 ttaaaccaaa gtaactatta actaactttt aggcatttta aggaggtaaa acatacat 240
 tacacataag tatttgatgc aaatatgcag ataaaatttt tt 282

<210> 274
 <211> 125
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(125)
 <223> n = A,T,C or G

<400> 274
 cagccctaga cctcaactac ctaaccaach ttncctaaaa taaaatcccc actatgcaca 60
 ttnaatcnct ccaacatact cggattctac cctagcatca cacaccgcac aatcccctat 120
 ctagg 125

<210> 275
 <211> 528
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(528)
 <223> n = A,T,C or G

<400> 275
 aaagctgtgg aaaagcttta ttatagattt ttntacagaa ttaaaaaagt tcaaacaata 60
 ataagcngg aaccacaaat aattaaaagg aaacacagca atcccataaa caagcattct 120
 ggcattctgtt agaaattttc cctcaaatta tgaaatgtag ctctccatgc tttccaatga 180
 ttgttataat acccacaat atctgtgatt tcagtggat actttaacaa aagttttctt 240
 ttttaaggcat gatcctgatt ctttttttct tcaatatctc agtcatttca ggaactacct 300
 taaataaatc tgcaactatt ccataatctg ccacttggaa aattggagct tctgggtctt 360
 tattaattgc cacaattgtc ttgctgtctt tcatcccagc taaatgttgg atggctccag 420
 atattccaac agcaatataa agttctggtg ctactatttt tcccgctctgn ccaacttgca 480
 tgtcattggg aacaaagcca gcaccaacag cagcacggga agcaccaa 528

<210> 276
 <211> 420
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(420)
 <223> n = A,T,C or G

<400> 276
 aaatgtcttg tttcccgat ttcaggaaan tttttttctt ttaagctatc cacagcttac 60
 agaaacctga taaaatatac ttttgtgaac aaaaattgag acatttacat tttctcccta 120
 tgtggtcgct ccagacttgg gaaactattc atgaatattt atattgtatg gtaatatagt 180
 tattgcacaa gttcaataaa aatctgctct ttgtatgaca gaatacattt gaaaacattg 240
 gttatattac caagactttg actagaatgt cgtatttgag gatataaacc cataggtaat 300
 aaaccacag gtactacaaa caaagtctga agtcagcctt gggttggtt cctagtgtca 360
 attaaacttc taaaagttaa atctgagatt ctttataaaa acttccagca aagcaacttt 420

<210> 277
 <211> 668
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(668)
 <223> n = A,T,C or G

<400> 277
 ccagggtggc tctgatatag cagccctggg ntatttttcca tatttcagga agactggcag 60
 atngcaccag accctgaatt cttctagctc ctccaatccc attttatccc atggaaccac 120
 taaaaacaag gtctgctctg ctctgaagc cctatatgct ggagatggac aactcaatga 180
 aaattttaag ggaaaaccct caggcctgag gtgtgtgcca ctacagagact tcacctaact 240
 agagacaggc aaactgcaaa ccatgggtgag aaattgacga cttcacacta tggacagctt 300
 ttcccaagat gtcaaaacaa gactcctcat catgataagg ctcttaccct cttttaattt 360
 gtccttgctt atgcctgcct ctttcgcttg gcaggatgat gctgtcatta gtatttcaca 420
 agaagtagct tcagagggtg acttaacaga gtatcagatc tatcttgta atcccaacgt 480
 ttacataaaa ataagagatc ctttagtgca ccagtgact gacattagca gcattctttaa 540
 cacagccgtg tgttcaaagt tacagnggtc cttttcagag ttggacttct agactcacct 600
 gttctcactc cctgttttaa ttcaaccag ccatgcaatg ccaaataata gaaattgctc 660
 cctaccag 668

<210> 278
 <211> 202
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(202)
 <223> n = A,T,C or G

<400> 278
 aaattggtat cgacggcaac caggggaagn tntaaactc ctaattctatt ctggatccaa 60
 ttngcnaagt ggggtcccat caagggtcag tggcagtggg tctgggacag atttcactct 120
 cagatcagc agtctgcaac ccgaagattt tgcaacttac tactgtcaac agagttacat 180
 gtccccgtac acttttggac cc 202

<210> 279
 <211> 694
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(694)
 <223> n = A,T,C or G

<400> 279
 ctgtacttgg acaaaaataag ttaattctat ttggttgctc attaaagttt tatgtggcta 60
 tgnaccact ggagctaaaa attggctttt aactgtttcc aaatcagaac tagcagagga 120
 gagaagtaaa taaagccaat ggcactccct tcagaggctc aaaatgggta gattttgatg 180

cagattttaac	cttagcgagt	ttcagtcagt	ccatttagat	gatcctgtag	gttcatacaa	240
atacactgaa	ccgttggttt	aacttctctt	ccttcctcaa	agtttatgat	aaagagactc	300
atccctgtat	tgggagtgac	tgacataagt	tcagatctgc	tcagagtggc	tggtaaggaa	360
caactaaggt	cagtcagaaa	ataatcaaac	agacttctca	tgtaagcacc	gtgactcaca	420
actaagacac	tggctgctaa	tcctggaata	ccgctgtctg	aattaacttt	agagctgtga	480
ttttttccta	aaggaaatat	ctctgccaaa	gaagtttcca	gacagntgct	tgggagatcc	540
ttggggaaaa	ctgggtctttt	tgatccggtt	ctttcangan	taggtngaca	aaagaaatnc	600
aaaaaagnct	atcccacgcn	ttnttcacct	gggccacgcg	gnnctcctcc	nggggggggn	660
aaacacangg	gactcttccc	ngggctngct	tnng			694

<210> 280

<211> 441

<212> DNA

<213> Homo sapien

<400> 280

aaaaaacttc	catgcaactt	ctggtttatt	gtttggcaac	tccacatgat	aaaaaaataa	60
aaacagccca	accgagtttc	ggaattaagt	actcttctag	taagtgattc	aaacttgtaa	120
tatttgccac	aggactgact	tatttattta	ctagctagaa	gctcttaagt	tcacttggtt	180
atcagggcat	atacagaagg	gtttgttaaa	actcgatgtt	aactttacaa	ctttctgacc	240
tgggtgcatga	attctcaagt	actgtatttc	actgtgttgg	tgtgtctgat	ggaaatttcg	300
aggtgggtccc	acaaaaatat	tttatgtagt	gtgccttcaa	agagaaccat	ttatttctct	360
tcacttatcg	tcccacaaag	tcacatttgg	tgggtggtcag	ccaagtcgca	tctgggtctag	420
ttttactctt	gtcccaattt	t				441

<210> 281

<211> 398

<212> DNA

<213> Homo sapien

<400> 281

aaatttggtta	ggtctgaaga	atctaaaact	gttaatttaa	cccttaactt	gtgcctagaa	60
actacagcac	atataaaaata	tgtaaacacc	agcctgttgc	tgtaacttttc	tgcttatttt	120
acagcctcaa	atatttctca	ttatcttgct	acttagttct	tcattgtttct	ccttctgact	180
tttaataatg	gtaataggaa	aacaaaaccc	aaagcttttc	agaacttcag	tgtgagggtt	240
cctattttga	caagttaact	tgtaaaatact	cagggttttac	gatgtataat	ttacctaata	300
gaccaaacta	actcatggag	atattttgaa	ctattattta	ggtacaaaact	ttataaagaa	360
tgtagtatg	tcataaaaata	taacattaca	gcttattt			398

<210> 282

<211> 226

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(226)

<223> n = A,T,C or G

<400> 282

aaaacaatat	tctctttttg	aaaatagtat	naacaggcca	tgcatataat	gtacagtgta	60
ttacnccaat	atgtaaagat	tcttcaaggt	aacaagggtt	tgggttttga	aataaacatc	120
tggatcttat	agaccgttca	tacaatgggt	ttagcaagtt	catagtaaga	caaacaagtc	180
ctatcttttt	ttttggctgg	ggtggggggcg	cccaggccga	ggctgg		226

<210> 283
 <211> 358
 <212> DNA
 <213> Homo sapien

<400> 283
 aaacaaaaat actcaagatc atttatatatt ttttggagag aaaactgtcc taatttagaa 60
 tttccctcaa atctgaggga cttttaagaa atgctaacag atttttctgg aggaaattta 120
 gacaaaacaa tgtcatttag tagaatattt cagtatttaa gtggaatttc agtatactgt 180
 actatccttt ataagtcatt aaaataatgt ttcatacaat gggttaaagg accactgggt 240
 tcttagagaa atgttttttag gcttaattca ttcaattgtc aagtacactt agtcttaata 300
 cactcagggt tgaacagatt attctgaata ttaaaattta atccattctt aatatttt 358

<210> 284
 <211> 288
 <212> DNA
 <213> Homo sapien

<400> 284
 aaaacttttg ttaagaaaaa ctgccagttt gtgcttttga aatgtctgtt ttgacatcat 60
 agtctagtaa aattttgaca gtgcatatgt actgttacta aaagctttat atgaaattat 120
 taatgtgaag tttttcattt ataattcaag gaaggatttc ctgaaaacat ttcaagggat 180
 ttatgtctac atattttgtgt gtgtgtgtgt gtatatatat gtaatatgca tacacagatg 240
 catatgtgta tatataatga aatttatgtt gctgggtattt tgcatttt 288

<210> 285
 <211> 629
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(629)
 <223> n = A,T,C or G

<400> 285
 cctaaaagca gccaccaatt aacaaagcgt ncannctcaa caccactac ctaaaaaatc 60
 ccaaacatat aactgaactc ctcacacca attggaccaa tctatcaccc tatanaagaa 120
 ctaatgttag tataagtaac atgaaaacat tctcctctgc ataagcctgc gtcagattaa 180
 aacactgaac tgacaattaa cagcccaata tctacaatca accaacaagt cattattacc 240
 ctcaactgtca acccaacaca ggcatgtc taaggaaagg ttaaaaaaag taaaaggaac 300
 tgggcaaatac ttaccccgcc tgtttacca aaacatcacc tctagcatca ccagtattag 360
 aggcaccgcc tgcccagtga cacatgttta acggccgcgg taccctaacc gtgcaaagggt 420
 agcataatca cttgntcctt aattagggac ctgtatgaat ggcttcacga gggttcagct 480
 gtctcttact tttaaccagt gaaattgacc tgcccgtaga gaggcnggca tgacacagca 540
 agacgagaag accctatgga gctttaattt attaatgcaa acagnaccta acaaacccca 600
 caggtcctaa acttacccaa accctggca 629

<210> 286
 <211> 485
 <212> DNA
 <213> Homo sapien

<400> 286
 aaatgtactt gctcagctca actgcatttc agttgtatta tagtccagtt cttatcaaca 60

ttaaaaccta	tagcaatcat	ttcaaatacta	ttctgcaaat	tgtataagaa	taaagttaga	120
attaacaatt	ttattttgta	caacagtggg	atcttctgtc	atggataatg	tgcttgagtc	180
cctataatct	atagacatgt	gatagcaaaa	gaaacaaaca	aaagccagga	aaacactcat	240
tttcgccttg	aatatgtaaa	tgggattaat	tttgtcctgt	gccttatgtg	gaaagggaact	300
tctttgggtt	tccttttttg	ttctgggtgga	agcatgtgca	ggagacatat	catccaaaca	360
taaaccatta	aaatgtttgt	ggtttgcttg	gctgtaattt	tcaaagtagt	taattgagga	420
caaagggtaa	tgacagaagt	atagctttgg	tttgctgagt	cttgttttaa	gtggccttga	480
tattt						485

<210> 287

<211> 340

<212> DNA

<213> Homo sapien

<400> 287

cctggagtc	aataaccacc	cctcatacc	acaccctgtg	catacaccag	ccaagccttt	60
cctgggtctg	gaaggggaaga	gaaaaaagac	gcaggccacc	tgggggttct	gcagtctttg	120
gtcagtcag	ccttctatct	tagctgcctt	tggcttcctg	agtgtaaacc	ttgcctgccc	180
ggaggcagga	ggcccagctg	gacctccgag	ggccatgagc	aggcagcagc	catcttgccc	240
tcaagcttgc	ctttcccttg	agtcctctc	tccctcggc	tctagccaga	ggtgtagcct	300
gcagatctag	gaagagaaga	gctggggagg	aggatgaagg			340

<210> 288

<211> 290

<212> DNA

<213> Homo sapien

<400> 288

aaacagtctc	tcctcgggtg	tctccttgct	aaactgttca	tcccagtttc	ctctgaaata	60
gacagcattc	accagaacca	gccttgctca	tggatccact	gagcccggag	agagcaactc	120
cgcaatttta	ccttctgtct	tttcagctac	ccagggtgtt	atgtgttttc	tggactttct	180
tacggcgctg	ataaagtcaa	gctcctccat	ctctgcttgg	tagaattttt	ggcaggaatc	240
tctaaaagat	gagaggaaat	cacaagactt	ttccccaag	agcctgttgg		290

<210> 289

<211> 404

<212> DNA

<213> Homo sapien

<400> 289

ccacccacgc	ttagggtccc	atcacactga	tgactccggg	tttggcgagc	acaggagcgc	60
aaaccttttc	acattctttc	tgtgatccaa	atctgttttc	gtttccacca	caacctccat	120
accagaatct	tgcacagctt	ttggtgtttg	gatcatagta	ccattttaat	atgaaatccc	180
tgcaagtccc	ttcgtctttc	ggcaacttgc	atatatctgt	ttcagtgaga	gccaatgggt	240
ctgtgctcac	cattagattg	atggttgaa	tagaagctga	ccttgctggc	tgtggagggtg	300
ggggctgaga	tttctttgta	ctgaaacttc	cgtggtaggt	ggctctgacc	tgagacctca	360
ggtagcagac	cacagccaca	tggtatgtct	gccagcgag	cagg		404

<210> 290

<211> 384

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(384)

<223> n = A,T,C or G

<400> 290

```

ccaggcgctc cttgtcggca tcagggaggg tggccttgaa ctgctcatgg gctgtgggtca    60
gtccctggat ctctcaatg gtgtgcacaa tgaagggtgc ctgcagggtcc tccatggccc    120
cctccatcca gttgttgaag ggtgcagccc gcttggcata ctccaagtac agctgggtcaa    180
tgggtctccag cagtttctcg gtccgctcca gagcttccct tcgcttctga gttagggccc    240
ccagattgtc ccactgggtca cagatctttt ggcaacgggc gttgacactg ggtgagtcac    300
aatantccag ctcatgtgag tcctgtgcga tggcggcaat ctgctccaca cggtcctggt    360
gggcagccag gccactctcg aagg                                     384

```

<210> 291

<211> 278

<212> DNA

<213> Homo sapien

<400> 291

```

aaagtttatt tttactatct ctttatcact ttattgtatc atcaccattg gtttcataat    60
gtaaatacta tatgttgaac aaattaaatg tcaaaatttt ttattaccat agtccatgtt    120
aatagtgggg ctttcaggtg tttagagatt ttttttggtg ttgttaacat tcattgcaaa    180
agtactagat ggtgtataac tctagagttg aattttaagg gattccctaa tatgtatact    240
atctttttat ctgaagtaat aaataaacia tgatcttg                                     278

```

<210> 292

<211> 177

<212> DNA

<213> Homo sapien

<400> 292

```

ccttggcccg gtcattcttg tccagtttga taggttcagg aaattcggtg tacagctcca    60
cctccgtttc ctgcttaagt gcattccgtg caatcgctct gaacgcctgc tccacgttga    120
tggcctcctt ggcactgggt tcaaagtagg gaatgttggt tttgctgtag caccagg      177

```

<210> 293

<211> 403

<212> DNA

<213> Homo sapien

<400> 293

```

aaaaagaagg acttaggggt tcgttttcac atatgacaat gttgcattta tgatgcagtt    60
tcaagtacca aaacgttgaa ttgatgatgc agttttcata tatcgagatg ttcgctcgtg    120
cagtactgtt ggtaaattga caatttatgt ggattttgca tgtaatacac agtgagacac    180
agtaatttta tctaaattac agtgcagttt agttaatcta ttaatactga ctacgtgtct    240
gcctttaaat ataaatgata tgttgaaaac ttaaggaagc aaatgctaca tatatgcaat    300
ataaaatagt aatgtgatgc tgatgctgtt aaccaaaggg cagaataaat aagcaaaatg    360
ccaaaagggg tcttaattga aatgaaaatt taattttgtt ttt                                     403

```

<210> 294

<211> 305

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(305)

<223> n = A,T,C or G

<400> 294

aaagcaatct	ggcatggtgt	cctgtagtga	agcagaggat	cataacataa	gtaaactctc	60
tatgggtgga	agttggagag	aaggacattt	tggcttttga	catgaaaaga	ctctccagat	120
agaaacagat	tctgcccata	agtgaaataa	aatgctttgt	gggggtaatg	agtgacttat	180
agtattcagg	cagatgttac	ataactgcta	attaagtttc	cctggattga	ntttanncaa	240
anaattgaaa	gtngattttg	gtcangtgct	agnaaactac	tgctataaaa	cccatatcnt	300
accca						305

<210> 295

<211> 397

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(397)

<223> n = A,T,C or G

<400> 295

cctatctggt	tggccttttt	gaagacacca	acctgtgtgc	tatccatgcc	aaacgtgtaa	60
caattatgcc	aaaagacatc	cagctagcac	gcgcatacgc	tggagaacgt	gcttaagaat	120
ccactatgat	gggaaacatt	tcattcccaa	aaaaaaaaaa	aaaaaaaaat	tctcttctt	180
cctgttattg	gtagttctga	acgttagata	ttttttttcc	atgggggtcaa	aaggtaccta	240
agtatatgat	tgccgagtg	aaaaataggg	gacagaaatc	aggtattggc	agtttttcca	300
tttncatttg	tggnggaatt	tttaataataa	atgcggagac	gtaaagcatt	aatgcnagtt	360
aaaatgtttc	agtgaacaag	tttcagcggt	tcaactt			397

<210> 296

<211> 447

<212> DNA

<213> Homo sapien

<400> 296

ccatcctcga	tgttgaagtt	gtcgtggggc	ccgaagacgt	tgggtggggat	gacagcgggtg	60
aaggtgcagc	cgtactgctg	gaagtaggcc	ctgttctgca	cgtecatcat	cctcttggca	120
tacgagtacc	caaaattgct	gttgtgggga	ggcccattgt	ggatcatggt	ctcatctatc	180
gggtaggctg	tcttgtcagg	gaagatacag	gtggacaggc	aggacaccac	cttgccgggcg	240
cccacctcga	aggccgagtg	caggacgttg	tcgttcatgt	gcacgttttt	cctccagaag	300
tccaaattgt	atttgatatt	ccggaacagg	ccccccacca	ttgcagcaag	atggatgacg	360
tgtgtgagtt	ggaccttctc	aaacagggcg	cgggtctgtg	ctgtatccgt	gagatcggcg	420
tctttagagg	agacaaacac	ccagtc				447

<210> 297

<211> 681

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(681)

<223> n = A,T,C or G

<400> 297

aaataacagc	atgtaaaata	ttaaaataca	agctttcaaa	aataaataca	taaataagta	60
gaaccctcgt	aagaaatagt	caaacacatt	aagtcctttc	cagctgtccc	tagaaagctg	120
ctgttctctt	tttcattttc	agctctggta	agggcagggg	ccaccctgca	ggaagtgtca	180
atgatacgct	gataagcttc	ttacttctct	cctgtcagtt	ggtgctcccc	ctgtgatgag	240
aaaaggggta	ctgttgacag	tgctaaggaa	ggctgctctt	ctgtcactct	gaagttgctt	300
ggagggatgt	ccccatgcag	actctctccc	agccctccac	tcagggaagg	tctgtctgta	360
cccactgcct	tctatagcag	aaaacttgca	ctcctgaatg	cttttttttt	ttttcaagaa	420
agaagnggct	gnngactcaa	ctagattctt	ggtttgaaaa	agccaaaaca	tattgggtcac	480
tgattgtcac	attgggttag	aaatgtccat	tcatgatctc	ccttaagctg	cacacaaccc	540
tatgaaataa	ctaccattat	ctaccctatt	ttgctaaagc	tcaaagagat	taaataatgt	600
tgacagggat	cttagccttg	aactcactga	aggngttact	gcaaagttct	gctcttcacc	660
aagaaggntt	acaggccaaa	g				681

<210> 298

<211> 353

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(353)

<223> n = A,T,C or G

<400> 298

cctggcttaa	gaccagacat	ttgaagaagg	ctccaggcag	ggaaaggaaa	ggagaggcca	60
gccccacnct	gnccccctcc	tgcccccacg	tctccagcaa	cacaaggcgg	ccagtggacc	120
gtgaaccatt	tattttccaaa	ctataaagaa	acctgctctc	tgagaaaana	cactgcccag	180
gngatgaagc	tccagccccct	ggaggtccaa	aacccagtc	aaactcagtc	ccttttagaaa	240
gctgctgtgc	cttggaatg	annntcggnt	gtcanagcct	gggaagtggg	gggaagaacc	300
agcccactcc	cctctcctgc	tgcgattcca	gcgcncgttg	ggnccagatc	tgg	353

<210> 299

<211> 560

<212> DNA

<213> Homo sapien

<400> 299

aaagttcaag	gactaacctt	atattatttg	gaaaggggag	gaggaaggaa	atgatatgg	60
acccagacac	tgggctaggc	tgcaacttta	tctcatttaa	tactcccagc	tgtcatgtga	120
gaaagaaagc	aggctaggca	tgtgaaatca	ctttcatgga	ttattaatgg	atttaagagg	180
gcatcaatca	gtcgaactca	agatttcata	atcattttta	gtatttagat	tgtgcctcaa	240
agttgtagta	cctcacaata	cctccactgg	tttcctgttg	taaaaacctt	cagtgaagttt	300
gaccattgtg	ctcttggtgc	ttgggctgga	gtaccgtggg	gagggagtaa	acactagaag	360
tcttttagtac	aaaactgtc	tagggacacc	tggtgattcc	tacacaagtg	atgtttatat	420
ttctcataaa	gagtcttccc	tatcccaagg	tcttcatgat	gccagtagcc	atatatgata	480
aattatgttc	agtataact	tagttatcag	aaatcagctc	agtggctctc	cccgccatga	540
ttcacatttg	atgagttttt					560

<210> 300

<211> 165

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(165)

<223> n = A,T,C or G

<400> 300

```

aaaaactaca taggggtgtg tgtgtgtgtg tatgtttatt ttatacacac atatttgtat      60
attctaatat attactaagg caattttaat gaattaccat gtatataaaa aaatatctgn      120
cacttggcac acagggttgt atgtatgtgt atatatatat gtatg                      165

```

<210> 301

<211> 438

<212> DNA

<213> Homo sapien

<400> 301

```

aaaatatatg tatttaaaaa caaaaagcaa cagtaatcta tgtgtttctg taacaaattg      60
ggatctgtct tggcattaaa ccacatcatg gaccaaatgt gccatactaa tgatgagcat      120
ttagcacaat ttgagactga aatttagtac actatgttct aggtcagtct aacagtttgc      180
ctgctgtatt tatagtaacc attttccttt ggactgttca agcaaaaaag gtaactaact      240
gcttcacatc cttttgcgct tttttgaaa ttttagttat agtgtttaac tggcatggat      300
taatagagtt ggagttttat ttttaagaaa aattcacaag ctaacttcca ctaatccatt      360
atccttttatt ttattgaaat gtataattaa cttaactgaa gaaaagggtc ttcttgggag      420
tatgttgtca taacattt                                     438

```

<210> 302

<211> 172

<212> DNA

<213> Homo sapien

<400> 302

```

ccaaaacagg agtcctgggt gatatcatca tgagaccag ctgtgtcctt ggatgggttt      60
accacaagtc caattgctat ggttacttca ggaagctgag gaactgggtc gatgccgagc      120
tcgagtgtca gtcttacgga aacggagccc acctggcatc tctcctgagt tt              172

```

<210> 303

<211> 552

<212> DNA

<213> Homo sapien

<400> 303

```

ccagcctggt gcaggctgct tcgtagcggg cgtcggctgc ggacttccct tcccgggtct      60
ggatcttttc atcctaccag atgagaaagg gaatgagtga atggagtgc cccgcaccct      120
gtcacttttc tgagacatga ctgccaggaa gaagagctgc tctggtctcc atcagggctg      180
gcaggacaaa ctgaccagtg agtcagtagg cagagttcac actgaaaaag ggcacaaggg      240
ctgtcccaca atgggaggaa atggggcttc agaacttcta cttctctgaa aactaagaca      300
caattgggac aaccaccacc cccgtgtgag atttctcacc tcgagacagg acaagatgaa      360
gttcacggct tcttctgggg taaagacctt gaagagccca tcacaggcca acaaaatgaa      420
cctacaacac cagggagaaa tataaacggg ttttaggcc aaccaaaaaa taaaaaataa      480
aaaaagggcc tggagatgga gataaaataa atatttgtcc aactattcaa aggctaaggt      540
ttttttttct tt                                     552

```

<210> 304

<211> 601

<212> DNA

<213> Homo sapien

<400> 304

cctttgattc	ttggtagtac	attgcatgta	aaatgtttat	aagaagctac	ttttccttca	60
tgggaagaaa	ttcccacatg	agattcataa	attcttagac	tccgtggctt	ctttgggtccg	120
gaatgcttaa	actcatatga	gtgttctgga	tcccagtgta	tccaatcata	attcacatta	180
tcaccttcac	gaaccacata	ctttgccac	ggtgaaatac	gatacaagat	ctctccgctt	240
ttactagtaa	taactacctt	taatttggat	ccatgaggca	cgagtacaga	tttattctgc	300
tttgggtgga	tatacagctc	ccattttcca	taatccagtt	ttttgtatgg	gtacgaaaat	360
ggattccaac	cattaaaatc	tccagtaaga	aaaactcctt	ctgctcccgg	ggcccattct	420
ttgcagtata	aaccaccatc	agcacatctg	tggacgccaa	atgattcata	gcctctggaa	480
aacttatcaa	taccaccttc	attttctcca	atgttcttca	aaatttggct	aaactgctta	540
tacctgcgct	ggaagtccac	ggcgtagggc	ttcaagtacc	ggtcgatctc	caggagtctg	600
g						601

<210> 305

<211> 401

<212> DNA

<213> Homo sapien

<400> 305

aaataacagc	atgtaaaata	ttaaaatata	agctttcaaa	aataaatata	taaataagta	60
gaaccctcgt	aagaaatagt	caaacacatt	aagtcctttc	cagctgtccc	tagaaagctg	120
ctgttctctt	tttcattttc	agctctggta	agggcagggg	ccacctgca	ggaagtgtca	180
atgatacgct	gataagcttc	ttacttctct	cctgtcagtt	ggtgctcccc	ctgtgatgag	240
aaaaggggta	ctgttgcaag	tgctaaggaa	ggctgctctt	ctgtcactct	gaagttgctt	300
ggaggggatgt	ccccatgcag	actctctccc	agccctccac	tcagggaagg	tctgtctgta	360
cccactgcct	tctatagcag	aaaacttgca	ctcctgaatg	c		401

<210> 306

<211> 313

<212> DNA

<213> Homo sapien

<400> 306

aaactgacta	tggattcctt	gaaggtctgg	cagttgttga	tgatggcgat	catgtactga	60
acgtagcagt	gaggggtgctg	ccgattcctc	aggtgctctt	ctttatacag	ctgcgcttca	120
tctttatata	tgaggacaga	caggcttcgg	tcagacagca	ctaagggcaa	catggagctg	180
tttcaaatac	cacgctgacg	tcacgcctgg	cctgaaattt	cacatcacta	acatctgacc	240
ggatgagcct	ctaaaaataa	aacaatcttt	agacgatcca	gactaatgga	aggacagaga	300
ggttgattac	ttt					313

<210> 307

<211> 366

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(366)

<223> n = A,T,C or G

<400> 307

aaagatgctg	ntaatgaaca	ttacggacaa	ttcatggtgt	ggctagttgg	taacacttca	60
gctgattttt	cttatgagat	ggaaaaaaaa	aatcagccaa	gtaagggcac	atcttcactt	120
catttataag	tcagcatcca	aggtaaaaga	attctctgtt	ggacttgaca	tcactcccat	180

cctctgatac	tcgectactc	tcttctcaaa	gaagttagnt	ctttccttcc	antgaaatat	240
tctcataaaa	gtcaaaggg	ttctctactc	tgaaaacctt	gctaaaaccc	aattccagca	300
taagtttgtc	tgncacaaac	ncaatgnatt	gcttcattaa	antgcaattc	atcccaatga	360
gcttcc						366

<210> 308

<211> 534

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(534)

<223> n = A,T,C or G

<400> 308

ccagctatca	gctgatcgtc	ttctgtctgg	acgctcgtcc	tgcttctgac	atcaaaatct	60
tctgtctcaa	agtcagagtc	atccaactcc	tcaggggtcc	ttatcatcag	cactgctttc	120
ctgatgtccc	ggatgccatc	atataccagg	cgggaagcat	cgataaactc	attctcatcc	180
atgggctggg	caggggccga	gctgagggct	tccacggctg	cttctacttg	ctcagtaaaa	240
cgtggcatga	ctgtgttggg	gagcagctta	gtggcttcca	gaaccttctc	tgtgtagact	300
cctggctcat	agtcgtccat	ctctgaggtg	actacgtgaa	tgacccgggc	tgcccggcct	360
cgaattgcac	cagctgtgcy	gccaggccat	ccacatcctt	ctcttgagga	gcaatgacac	420
atttggtcac	atcttccaaa	atgtgattct	ctgagacagc	caagaagtca	tcaatggaag	480
taatgncatc	gacagcatct	gtgagaacac	cgacttggtt	ttccattgnt	cttt	534

<210> 309

<211> 164

<212> DNA

<213> Homo sapien

<400> 309

catactcctt	acactattcc	tcatacccca	actaaaaata	ttaaacacaa	actaccacct	60
acctcctca	ccaaagccca	taaaaataaa	aaattataac	aaaccctgag	aacccaaatg	120
aacgaaaatc	tgttcgcttc	attcattgcc	cccacaatcc	tagg		164

<210> 310

<211> 131

<212> DNA

<213> Homo sapien

<400> 310

aaaaatcatt	tatcttttcg	tgcttcaaca	tgatgccaaa	caaaaatcta	ctgaataaaa	60
atagcaagga	agggaaatcaa	acatttataa	gatataattta	ttatttttct	gaccaaaagt	120
caatgatatt	t					131

<210> 311

<211> 626

<212> DNA

<213> Homo sapien

<400> 311

cctatgtgcy	ccagtttcag	gtcatcgaca	accagaacct	cctcttcgag	ctctcctaca	60
agctggaggc	aaacagtcag	tgagagtggg	ggctccagtc	agaccgcca	gatccttggy	120
cacctggcac	tcaagcactt	tgacgatgt	ctcaaccaac	atctgacatc	tttcccgtyg	180

agcaacttcc	tgctccacgg	gaaagaggtc	gatggattta	cccctggacc	cataagtctg	240
ttcatcctgc	tgaagtcccc	tcccatttgc	tccttcaagc	caaaactaca	ctttgctggg	300
tcctgtcccc	tctgagaaag	gggatagaaa	gctccttcc	ctatgtcctc	ccatcgagat	360
ctgttctggg	gatggagctt	ccaacttcc	cttgacgacg	gaaagaatgc	tgctcaccct	420
tctgtcttgc	agagtgggat	tgtgggaggg	attggcagcc	ttcttctcca	ccacctgtcc	480
agcttcctcc	tggtcagggc	tgggaccccc	aggaatatta	tgttgccgtg	tgtgtgtgtg	540
tgtgtgtgtg	tcttctttta	gggagcagga	gtgcatctgg	taattgaggg	tagatgttgt	600
gtgtgctggg	gaggggtcct	tctgtt				626

<210> 312

<211> 616

<212> DNA

<213> Homo sapien

<400> 312

aaaccaaaga	aattaagaaa	aaagacttca	ttgcttgaat	gacgcgaaca	gctgtctgag	60
tcacctagac	tttaacacca	cctggggccc	tgggaatgac	gctgacgaga	gatctgcaca	120
tagtaggcgt	gggtccaaa	tgtgtctatc	agctgacttc	acatcctcac	aagtcagcct	180
cagatatgac	ccaagggata	cgtaccatct	cttcttgaaa	cagcgtgtca	aattaratat	240
atgtatgcaa	aaaagagtaa	tgtactaagc	aaaccaagtt	tcgtcttttt	cttctgaatc	300
tgggtttaat	gtgacctgtc	atccccatct	ttcgaattta	tgagctccat	cttctctaga	360
ctgttaactt	cttgaggaaa	acatgctatt	ttaccacctt	tcactgctga	atccctagcc	420
cttaagcaca	gtctctggca	cagaataaat	acgaaatgaa	tgagtgaatg	aatggatgga	480
tgggtgaaga	gaaaaggcaa	tgcacaagat	ttacctatca	aaatccacca	atggtcctta	540
aaaatggttt	tgtcagtaga	gatgctgaat	atattcatat	aatacattta	tttcaatact	600
attaagaatt	ctagtg					616

<210> 313

<211> 553

<212> DNA

<213> Homo sapien

<400> 313

aaaaaatggc	agcattgtac	ttgaatcaga	aagcttactg	ggatttcctc	atcgaaagta	60
gagattgcag	ctaatectag	taccttttgt	tagtaattac	ttaaggcaca	gtgcaaagtt	120
gaaggactgt	tttggtagaa	actcaagcca	gctacatgta	tgcttgccct	ggtatccttg	180
ctagagcaca	tgcgggtata	ataccgtatt	atacacaaca	aggccaccct	gttgtatctg	240
tgttacaatt	aaacatcagt	cccagaaagt	gaacctagtt	catttattat	aggtgcccac	300
ctctgacttg	gaacaaaatg	ccactccatt	catgttcatt	tttgccttgg	agaggattta	360
tttcctaaaa	gattctgaaa	gccaacaaat	caatgtagtt	cttcatagag	aacttaagag	420
taaggctcaa	aatggcctca	aaatgggctt	cttggatgac	ttccaacagt	gactggcctt	480
ctcaacactg	cagatgtctg	agcactacca	taacctaacg	aagtgaggaa	ggaggaggca	540
aattgggtatt	ttt					553

<210> 314

<211> 330

<212> DNA

<213> Homo sapien

<400> 314

ccagcgactc	cagcgggtggc	agcaggcagt	gcacgtactc	tgggcctccc	accagggtag	60
tgaagggtcc	cagctgttct	gccagggccca	ggaggacctc	atcttcatca	tagatgggtat	120
ctgtaaggaa	aggcagaagc	tcacttcggg	tcctttcaac	cccaagggcc	aaggcgatgg	180
tggacagctt	cttgatgctg	ttgaggcgaa	gctgaacgtc	ctcattgcgg	agttcgtcta	240
tgagcaccgc	gatgggggtac	agcgagtcgt	cgccgtcggc	cgccgccatc	ttggctccgt	300

ccctttcctg tcagactgcg gccagcgctg

330

<210> 315

<211> 380

<212> DNA

<213> Homo sapien

<400> 315

aaaaatgaca ttgcgttttag cttattgtaa gaggttgaac ttttgtattt tgtaactatc	60
tttaagccct tcagtttata attcatataa aatgcctttt gtatttataa taatcctatt	120
ttaatcagtg catgaaattt gcttttttaa agttcatttg aatgattatt ccttcctctt	180
aaagaaatga ttttggtaat gttgagaggt accttaccac aaatcctaac tgtaagtgtg	240
ttcatggtta ttttcaaaag aattatgact cttcccaaaa agaactccta aaaacttgta	300
ataaacctat aaagctgatt tgcataatga caaaattttg aatagcaaat ataggcaact	360
catatatgta tataattttt	380

<210> 316

<211> 222

<212> DNA

<213> Homo sapien

<400> 316

aaactacaga ggggttttcca gctattattt ccttttagttt ctaaaagtaa cgacttatat	60
taatgtttta taaaagatag tgatgaaaaa aaggtaatgc tgaaataaag gcgcttttag	120
aaatatttaa ggacaacata aggtattaat attggaaaaa aactgtacat attttcaagc	180
acaacactga aatattgcag cagtgtttta ctgaattgtt tt	222

<210> 317

<211> 490

<212> DNA

<213> Homo sapien

<400> 317

ccttgaatga gcgtggagag cgattaggcc gagcagagga gaagacagaa gacctgaaga	60
acagcgccca gcagtttgca gaaactgcgc acaagcttgc catgaagcac aaatgttgag	120
aaactgccta tccctggtgac tcttcttaag agaaactgaa gagtttggtc agcagttttt	180
acaagaattc gggacctccg cttgcttctt tttttccaat atttggacac ttagagtggg	240
ttttgttttt tcttttcaga tggttaatgtg aaagaaaggg tgttgcatth ttacatttcc	300
ctaataatct tgctaataaa tgctacaata gcacggcctt catthttgggt ttttgccctc	360
tcccactgtg tgatgtgtg tatatgtatg ttttgaatat gttttcttta ttaaaaaata	420
ttttttgtag tttgaatatg aaatttggac caaatgataa actgcgctga gtctaaactg	480
gcaacatgta	490

<210> 318

<211> 340

<212> DNA

<213> Homo sapien

<400> 318

cctggagtcc aataaccacc cctcataacc acaccctgtg catacaccag ccaagccttt	60
cctggtcttg gaaggggaaga gaaaaaagac gcaggccacc tgggggttct gcagtccttg	120
gtcagtcag ctttctatct tagctgcctt tggcttccgc agtgtaaacc ttgcctgccc	180
ggaggcagga gggccagctg gacctccgag ggccatgagc aggcagcagc catcttgccc	240
tcaagcttgc ctttcccttg agtccctctc tcccctcggc tctagccaga ggtgtagcct	300
gcagatctag gaagagaaga gctggggagg aggatgaagg	340

<210> 319
 <211> 373
 <212> DNA
 <213> Homo sapien

<400> 319
 aaagatgctg ttaatgaaca ttacggacaa ttcattggtg ggctagttgg taacacttca 60
 gctgattttt cttatgagat ggaaaaaaaa atcagccaag taagggcaca tcttcagttc 120
 atttagaagt cagcatccaa ggtaaaagaa ttctctggtg gacttgacat cactcccatc 180
 ctctgatact cgcctactct ctctctcaaag aagttagtct ttccttccag tgaaatattc 240
 tccataaagt caaatgggtt ctctactctg aaaaccttgc taaaacccag ttcagcata 300
 agtctgtctg ccacaaactc aatgtattgc ttcattagag tgcaattcat gccaatgagc 360
 ttcacaggca agg 373

<210> 320
 <211> 509
 <212> DNA
 <213> Homo sapien

<400> 320
 aaaaacaaaa ttaaattttc atttcaatta agaccctttt tggcattttg cttacttatt 60
 ctgccctttg gttaacagca tcagcatcac attactattt tatattgcat atatgtagca 120
 tttgcttctt taagttttca acatattcatt tatattttaa ggcagacact gagtcagtat 180
 taatagatta actaaactgc actgtaattt agataaaatt actgtgtctc actgtgtatt 240
 acatgcaaaa tccacataaa ttgtcattta accaacagta ctgcacgagc gaacatctcg 300
 atatatgaaa actgcatcat caattcaacg ttttggtact tgaaactgca tcataaatgc 360
 aacattgtca tatgtgaaaa cgacacccta agtccttctt tttaaaaatg acattgcgtt 420
 tagcttattg taagagggtg aacttttgta ttttgtaact atctttaagc tcttcagttt 480
 ataattcata taaaatgcct tttgtattt 509

<210> 321
 <211> 617
 <212> DNA
 <213> Homo sapien

<400> 321
 ccaaggcccc ttttgcagcc cacggctatg gtgccttctt gactctcagt atcctcgacc 60
 gatactacac accgactatc tcacgtgaga gggcagtgga actccttagg aaatgtctgg 120
 aggagctcca gaaacgcttc atcctgaatc tgccaacctt cagtgttcga atcattgaca 180
 aaaatggcat ccatgacctg gataacattt ccttcccaa acagggtccc taacatcatg 240
 tcttccctcc cacttgccag ggaacttttt tttgatgggc tcttttattt ttttctactc 300
 ttttcaggcg cactcttgat aaatggttaa ttcagaataa aggtgactat ggatataatt 360
 gagccctctg gtccaggctc cagtttacct aatattacct cagaaaggat atggagggaa 420
 gatgatcttt ttgccaggtc tgacttttct tctgtctccg ccctccatta acgctcagta 480
 cccttttagca gctgacggcc ccacgttcta ctccatgctt ggcttccctt ccaactagct 540
 ctttcatata ttttacttgc tagtatctcc attctctcta aagtagtggt tctttttgcc 600
 cttaaactta aattttt 617

<210> 322
 <211> 403
 <212> DNA
 <213> Homo sapien

<400> 322

```

aaaaagaagg acttaggggtg tcgttttcac atatgacaat gttgcattta tgatgcagtt      60
tcaagtacca aaacggttgaa ttgatgatgc agttttcata tatcgagatg ttcgctcgtg      120
cagtactgtt gggttaaata caatttatgt ggattttgca tgtaatacac agtgagacac      180
agtaatttta tctaaattac agtgcagttt agttaatcta ttaataactga ctgagtgtct      240
gccttttaaa ataaatgata tgttgaaaac ttaaggaagc aaatgctaca tatatgcaat      300
ataaaatagt aatgtgatgc tgatgctgtt aaccaaaggg cagaataaat aagcaaaatg      360
ccaaaagggg tcttaattga aatgaaaatt taattttggt ttt .                      403

```

<210> 323

<211> 298

<212> DNA

<213> Homo sapien

<400> 323

```

ccagaattag ggaatcagaa tcaaaccagt gtaaggcagt gctggctgcc attgcctggg      60
cacattgaaa ttgggtggctt cattctagat gtagcttggt cagatgtagc aggaaaatag      120
gaaaacctac catctcagtg agcaccagct gcctcccaaa ggaggggcag cctgtcttat      180
atTTTTatgg ttacaatggc acaaaattat tatcaacctt actaaaacat tctttttctc      240
ttttttcctg aattatcatg gagttttcta attctctctt ttggaatgta gatttttt      298

```

<210> 324

<211> 78

<212> DNA

<213> Homo sapien

<400> 324

```

ccatgggaag gtttaccagt agaatccttg ctaggttgat gtggggcata cattccttta      60
ataaaccatt gtgtacat                                                    78

```

<210> 325

<211> 174

<212> DNA

<213> Homo sapien

<400> 325

```

ccatcatggt caggaactcc gggaagtcaa tgggtccggt cccatctgca tccacctcat      60
tgatcatatc ctgcagctct gcttcagtgg ggttctgtcc cagggatctc atcactgtcc      120
ccaactcctt ggtggtgata gtgccatctc catcctgttc aaagagggag aagg          174

```

<210> 326

<211> 679

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(679)

<223> n = A,T,C or G

<400> 326

```

aaaactgaaa tacctcttaa aataatttga tccccagcgt ttgctctttt tgaagtaacc      60
aacttactct taaaaaggat ggntgccaaag atggaaagtc ttactgggtt ttcagtgtta      120
cctattcttt ggacataact atgaattttg tatacaatgc acttcatgaa aagttgtggc      180
tccccagat tgcccaacaag tgtgatcttg aagtcctaaa catttgcca tgtaagcttc      240
aaaacagcgt taactgagtt attcaagtag cagtacttaa agatacaatt cttgaagcag      300

```

```

tttcaatggt ttctgatcca aataatcagt ttctgaacat tactacttca cataatagag      360
tccatcttca gtttcttctc actttctctt tcccttttgg gtttcctttt tgtggcctga      420
ggccaccagt tctttgggta ctatcaagat acttccatca tgggtacact ggagagcata      480
gtggttggga ttgactggcc taccttggtc atctcttaat ctactaaaaa tatcatgata      540
aaggatcatgc agtttctggt tcattatggt aatagctttg gtacattgtg cttgctctct      600
cttaanagtt tccttctttg cttgcaagtt acatacatca tcttctaaat tcaaaattat      660
gtccattttg gcgtttacc                                     679

```

<210> 327

<211> 619

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(619)

<223> n = A,T,C or G

<400> 327

```

aaaataagtt actggtaaat ggagttgcat tctatagtca cttataaat attaacaaaa      60
tatttataac tggaacctta atgaaatgta tcatcaaatc aggtaaaagc aacttgctcg      120
cagttaccaaa agcctanata cgcgttagat gcgccttttc cggcctgtgc gtctgctctg      180
gttcctctca ggcagcaaag ctggggaagg aagctcaggc aggagcctcc cggacgccac      240
aacggcacaa gcagcagcta aagcaccgca ctttgtctta ctaacctttt acttaaatga      300
ggttttgcca aatccacatc tggaaccgcg tcacacccat ttgcaaggat gtttgttctt      360
tgatgaaact gcatctctac tgcacatgag ggctttcatt gtaggacaag aggagagttc      420
gtttattttt gtaactgttt tacatgttcc gattagttaa tcggtagctt atgtcatttg      480
ctatgcctgn agncttctaa tctctcctta ctaaaacatt acttcaaatt tgaattgacc      540
cttggttata atttatttag ccgggatttg tgtgtcattg tagagcaact ctaattcaag      600
aatagtgaac acttttaag                                     619

```

<210> 328

<211> 132

<212> DNA

<213> Homo sapien

<400> 328

```

aaatccaaat acaaaagcat agtctctgca agattttgtt ctttgaattt cttgatattg      60
taattgatta ttgataactg tcatcatgaa attatctctc aataataaga taaataaact      120
agcatatgaa tc                                           132

```

<210> 329

<211> 854

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(854)

<223> n = A,T,C or G

<400> 329

```

ccttgaggta actattgcaa aatatacagt gtaagttcag tctgatggaa accccagatt      60
catcaaggat acaaatctac agtagcccaa tggcggtttc atagtgtata atttattatc      120
aataaaaatta actccgttac aatcagcatt catttcctcc aattaaaatt aagcataaac      180

```

cctaggtagt	aaccttctgc	acatatgtat	agctccgaat	ttcctcactg	ttcgtctggt	240
gcaaaaacaa	tattcaagct	tgtctgatta	tgcataat	ctttaatcat	atagattata	300
tatacaatag	acaagacagg	actatataga	taatggacag	acttaaatgc	ccgcattttt	360
aagggtggaga	aaatgatgaa	tctatgcata	cccgagaaca	cttaaaat	ttttttattt	420
cactgggaaa	ttcttacagc	tactttacaa	tcataggtta	acagcctagt	tatacagaag	480
acatatccca	ctacagagct	atactctatg	caactgtttt	ttcccctcat	aaacaacctg	540
agttcaaatt	gaattctatc	ttccacaatc	acaatgggtg	catcacccag	tacacagaag	600
tttgaatcac	aaaacataat	taccacaata	aaacacagtg	ttcaagtatc	ttggcagagc	660
aatctgccgc	acaaactgca	aattaaatta	actacacaga	ctaaaaacta	tacagcctac	720
catcacagtt	gtgcattata	aaaaagggag	tttctttcct	ttggttttta	gtcaggaaca	780
gggtaggatt	ttttaccctc	nggccgggga	ccacgctaaa	ggggcgaaat	ttcttgccan	840
natattccnt	tcac					854

<210> 330

<211> 299

<212> DNA

<213> Homo sapien

<400> 330

ccaatgaata	actgacttta	taatcctggg	caatcagctt	ttggcgggtt	gtaagtgtt	60
ctcgacactt	ttcactcatg	gattcttcaa	atctatgggt	aaagaggcac	ttatacactc	120
tgcctcacc	agcttgtgta	ttttcacaaa	aacgctcccg	atcatctcgg	caagcaaat	180
ataaatgccg	gtctaagtga	aagtcacccg	atgacagctc	agccaccggg	agaatggctt	240
tcttgccagag	ttcagaaaact	tgaatcttgg	gttctctttc	ttctgcttct	ttcaccagg	299

<210> 331

<211> 573

<212> DNA

<213> Homo sapien

<400> 331

aaagatatga	acagcttaat	tttccgtgtg	attatcta	taaaaaagaa	aaacaaaaca	60
agcaaaatgt	tcaagttaaa	aaaaaaacat	accgggtgag	caatgcacta	aaattatcca	120
catgaaaaca	aatgggtctgt	aatctttata	accaacatag	catttcactg	tcaacaatgt	180
gaaaatttaa	tatctttctca	aacaggcata	agatgaagaa	gtgctatttt	ttaattgtaa	240
aaggaactta	tgtaatgtaa	aattacatta	taatttttca	ttccgaattg	acaaatgatt	300
tcaaaaacaa	ggatcaaagt	ttgactgcaa	atagtaatgc	aatataat	cataaaaaatc	360
cttcaatttc	tatttttttc	cttttctgta	gttgacatat	gaagaccact	tcaatttcta	420
aaaaagggaa	ccattccaat	tttccctccc	caagaaaatg	tctcacaatt	acaaagtaga	480
aaaacagccg	ttcataaatg	caaaaaaatt	ctgatttata	tatgaaataa	tttctagatc	540
aattcaacat	atttgatgac	atttggttgag	ttt			573

<210> 332

<211> 555

<212> DNA

<213> Homo sapien

<400> 332

aaatttgaaa	gttgtaagca	ctgatgttaa	tgtgattgat	cagcatgggc	atatgtaaaa	60
tgtccttttc	tggttgccctc	tctatgctat	tgtgttcaga	tacttacacc	ataattaaac	120
agtaagttat	agacttgctg	agtttggcat	agatagtgcg	ctcattta	ctgtgcctct	180
caaaacttca	gaatattagc	atattaccac	aaataatttt	tggtgaaact	attgagatat	240
taaaattttt	gaaatcacta	ctgttacctg	ttatagaaaa	tagtgttggc	ttagtctagt	300
ctctgtgtaa	ctggttacat	tttgatgggt	gtctatactc	aactggatat	gtgtatgtaa	360
attagaaaat	acatacctat	ccagacataa	atgctaagta	acattttttt	cttcctccaa	420

ctacataatt	tgtagctcat	catttttcct	taatcctttc	ctaacttgtc	gcagcagttt	480
gaatttccca	gatatttatg	tttgaacata	atggctcaga	atacatat	gaacatcata	540
gttgtatata	ttttt					555

<210> 333

<211> 460

<212> DNA

<213> Homo sapien

<400> 333

aaattttcttt	caacagtcta	ttgggggtcca	aaaagcatat	atcaaaacaa	aaataacaaa	60
agcaaaacaa	aatgctacat	gtaaaagcta	aagaaagaaa	atgcagcata	ttcaggttct	120
ttttcttgag	gtacctatat	aaatttaatc	acctgcccc	aagtcctctc	gttaggttaa	180
aaacacaatg	cgctctgggg	agccaattgc	ccggcacgtc	ttattactga	gaaagtgcaa	240
gaatgctgat	catcttatgc	agcatactaa	aggatgattt	actctttaca	aaatagagct	300
taagtatcaa	cctgatggaa	gttagaaaat	taaaaacatt	taagtagaat	catctctctc	360
tctatttttg	agatcctgca	gcaaaaagcc	tcccaaatac	actttcaaag	ttctgccatt	420
aaggaatgtt	ggttctcttg	taaaattcag	agatctcttt			460

<210> 334

<211> 190

<212> DNA

<213> Homo sapien

<400> 334

ccaaggaagg	ctgtgctcta	gcccattctga	ccctgtctgc	aaaccacctg	ggggacaagg	60
ctgatagaga	cctgtgcaga	tgtctctctc	tgtgccccct	actcatctca	ctggatctgt	120
ctgccaaccc	tgagatcagc	tgtgccagct	tggaagagct	cctgtccacc	ctccaaaagc	180
ggccccaagg						190

<210> 335

<211> 394

<212> DNA

<213> Homo sapien

<400> 335

aaatttggac	agacttctag	cggacagtta	cttctcaaga	attttctata	caaaagctgt	60
gccaggcata	tattttctca	ccaggacaca	tggggcagcg	gacctctggg	gtcagtaaga	120
acacacccag	aatgatataa	ccagatattt	ttcagtttct	aaattaaggc	atattcaaaa	180
aattccatgt	acaagtttac	accacttttc	taagttactc	accaggtaat	taaagcagat	240
tcacagatga	attactctca	gtttaactat	atgcaacaac	catgccataa	acttttcttc	300
taaattttgc	ataataatgg	ttaaaaaaag	tggtagttaa	actatcatgt	tcacaattgt	360
cattttttcaa	ggcagtagaa	gaccaagaca	tttt			394

<210> 336

<211> 429

<212> DNA

<213> Homo sapien

<400> 336

aaaagctatc	accattgtag	tagaatcatc	cttctttttt	gaaatttgaa	gcattcccagg	60
cttaaaatct	tgtgtttcag	aaagacagtt	tataccatga	ctgcttaatt	atccccccaa	120
agaccttctg	attgaagtca	tgtacagttc	agtggcctaa	attctctgcc	tttttaactt	180
gctttgcaag	cctactctga	aaataagtta	tttagtcaag	ttattctcaa	agatgtccca	240
gttgccatga	aaggatcaaa	tggaacattt	gacacacata	ctcaaaaaaa	tgtaactgac	300

tataaacact	ttaaccta	catctgtatc	aaacttttcta	aaaatcaa	ctcaggattg	360
ttccacttta	gagattctat	gtaaagtta	tataactata	cttgtcaa	agcacctatc	420
tatgcattt						429

<210> 337

<211> 373

<212> DNA

<213> Homo sapien

<400> 337

aaagatgctg	ttaatgaaca	ttacggacaa	ttcatggtgt	ggctagttgg	taacacttca	60
gctgattttt	cttatgagat	ggaaaaaaaa	atcagccaag	taagggcaca	tcttcagttc	120
atttagaagt	cagcatccaa	ggtaaaagaa	ttctctgttg	gacttgacat	cactcccatc	180
ctctgatact	cgcctactct	cttcccaaag	aagttagtct	ttccttccag	tgaaatattc	240
tccataaagt	caaatgggtt	ctctactctg	aaaaccttgc	taaaaccag	ttccagcata	300
agtctgtctg	ccacaaactc	aatgtattgc	ttcatcagag	tgcaattcat	cccaatgagt	360
ttcacaggca	agg					373

<210> 338

<211> 366

<212> DNA

<213> Homo sapien

<400> 338

ccatccccct	atgagcgggc	gcagtgatta	taggccttctg	ctctaagatt	aaaaatgccc	60
tagcccactt	cttaccacaa	ggcacaccta	caccccttat	ccccatacta	gttattatcg	120
aaaccatcag	cctactcatt	caaccaatag	ccctggccgt	acgcctaacc	gctaaccatta	180
ctgcaggcca	cctactcatg	cacctaattg	gaagcgccac	cctagcaata	tcaaccatta	240
accttccctc	tacacttatc	atcttcacaa	ttctaattct	actgactatc	ctagaaatcg	300
ctgtcgccct	aatccaagcc	tacgttttca	cactttctagt	aagcctctac	ctgracgaca	360
acacat						366

<210> 339

<211> 319

<212> DNA

<213> Homo sapien

<400> 339

ccttccctcc	ccaccaccat	caacctcttc	aaaacctact	ccctccctct	aagtatctct	60
caacacagta	tgtctggggc	tagatttcaa	aaccacgta	atgaaaaagt	cagttttaca	120
agcctaattt	tgttgTTTT	TTTTTatat	caattaacgt	taaaaattgc	atcaactatt	180
taattcatga	ggatctttca	tattaaaatt	taaccttaag	attcaaccgc	catgtgcttt	240
tataaaggaa	acatttttta	gagacgtctg	agctcacttt	tacatggtgg	tgccactgct	300
cgtaaatggt	tgtgattttt					319

<210> 340

<211> 278

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (278)

<223> n = A,T,C or G

<400> 340

ctaataaaat	gaattaacca	ctcattcatn	natctaccca	cccnatccaa	catctccnca	60
tgatgaaacn	ncggctcact	ccttggcgcc	tgctgatcc	tccaantcac	cacaggacta	120
ttcctagcca	tgactactn	accagacncc	tcaacngcct	tttnatcaat	nggncacatn	180
actcganacn	taaatnatgg	ctgaatcatc	cgctacctnc	acgccaatgg	cagcctcaat	240
attcttttatg	ctgcctcttc	ctacacatgc	gggcgagg			278

<210> 341

<211> 400

<212> DNA

<213> Homo sapien

<400> 341

ccagcatggg	gctgcagctg	aacctcacct	atgagaggaa	ggacaacacg	acggtgacaa	60
ggcttctcaa	catcaacccc	aacaagacct	cggccagcgg	gagctgcggc	gcccacctgg	120
tgactctgga	gctgcacagc	gagggcacca	ccgtcctgct	cttccagttc	gggatgaatg	180
caagttctag	ccggtttttc	ctacaaggaa	ttcagttgaa	tacaattctt	cctgacgcca	240
gagaccctgc	ctttaaagct	gccaacggct	ccctgcgagc	gctgcaggcc	acagtcggca	300
attcctacaa	gtgcaacgcg	gaggagcacg	tccgtgtcac	gaaggcggtt	tcagtcaata	360
tattcaaaagt	gtgggtccag	gctttcaagg	tggaaggtgg			400

<210> 342

<211> 536

<212> DNA

<213> Homo sapien

<400> 342

aaagaacaat	gggaaaaaca	agtcctgtgt	ctcacagatg	ctgtcgatga	cattacttcc	60
attgatgact	tcttggctgt	ctcagagaat	cacatttttg	aagatgtgaa	caaatgtgtc	120
attgctctcc	aagagaagga	tytggaatgg	ctggaccgca	cagctggtgc	aattcgaggc	180
cgggcagccc	gggtcattca	cgtagtcacc	tcagagatgg	acaactatga	gccaggagtc	240
tacacagaga	aggttctgga	agccactaag	ctgctctcca	acacagtcac	gccacgtttt	300
actgagcaag	tagaagcagc	cgtggaagcc	ctcagctcgg	accctgcccc	gcccattggat	360
gagaatgagt	ttatcgatgc	ttcccgcctg	gtatatgatg	gcacccggga	catcaggaaa	420
gcagtgtctga	tgataaggac	ccctgaggag	ttggatgact	ctgactttga	gacagaagat	480
tttgatgtca	gaagcaggac	gagcgtccag	acagaagacg	atcagctgat	agctgg	536

<210> 343

<211> 646

<212> DNA

<213> Homo sapien

<400> 343

aaaacttcta	ttcatcaaaa	gacataaaga	aaacagtcaa	gccacagact	aggtgtaata	60
tctcaatata	tatatccgac	aagagaattg	catctagaat	gtataaagaa	tttctatgac	120
ccaattatag	ctatcaggga	tatacaaat	aaaacaaaaa	tgaaacatca	ctacacaccg	180
attggaatgg	ttaaaaagga	aaaatactga	caacaccaat	atttgtaaag	acaggaggta	240
ccagaactct	cattcattat	attcataaat	tgacaaatat	aaaaactgct	atagttagggc	300
agtcttctct	agaaagggat	tgtgggcatg	acagagaaca	atattaatct	gtccattata	360
ttccttaact	gtaaaatgga	gaccatatgt	tccaccagct	tcacttggtg	attatgatac	420
atggctatta	agagactcaa	atgactccat	ttcatcaact	aatatgccct	gtcaattcta	480
cttctaaagt	atcccatggt	ctatccaatg	tcataccact	atcataattt	aagtgttcat	540
aactctctat	aatatttcaa	taatctaact	ggctctcaatg	cctgtagtag	aaattgcaga	600
ttgggctccc	caatttctgt	tccctaggaa	ggctgagaaa	gctttt		646

<210> 344
 <211> 383
 <212> DNA
 <213> Homo sapien

<400> 344
 cctgcacccc agtataaggg cctccccagc tgagtaagaa gctgcttccc ctctctcat 60
 aggccaagcc tatttgtgtga aaccatctca tggctcttggg gacgtagacc atttttgaaa 120
 ccgtctcatg gtcttggtga cgtagaccgt ttgcttcttt aactccagcc gcggaatgac 180
 attagtggaa ccgggctagg gaactgctgg aagttcagga tgccaccacc ttgaacacct 240
 aggccaggga tccccacat gtcccggtt tctttcttcg agagtataga accgttcatt 300
 ctgctttgt gtccattcc atctcttgaa aaaatgtagt ctttgaatgt gtgaaaatct 360
 agggacattc aatctagtct ttt 383

<210> 345
 <211> 263
 <212> DNA
 <213> Homo sapien

<400> 345
 cctccccctt ccctttgctg gtgggaggag ctctgtgct ccttggccgc ttactggaag 60
 ggcgtttttc agagctgcag ggacaggggtg agcagctgaa gggctaggag ggaagccggc 120
 ccccgctctg cagaagctgc atttcagctg aatctgtgtt tcagcctcag ttggttgac 180
 cgttageccc tctctcccg gatggctcatg tttttgtcac attagagaat aaacagccac 240
 acacacattt ttttttttcc ttt 263

<210> 346
 <211> 132
 <212> DNA
 <213> Homo sapien

<400> 346
 aaatccaaat acaaaaagcat agtctctgca agattttgtt ctttgaattt cttgatattg 60
 taattgatta ttgataactg tcatcatgaa attatctctc aataataaga taaataaaact 120
 agcatatgaa tc 132

<210> 347
 <211> 564
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(564)
 <223> n = A,T,C or G

<400> 347
 cctgggtatc cagggaggct ctgcagccct gctgaagggc cctaactaga gttctagagt 60
 ttctgattct gtttctcagt agtcctttta gaggccttgc atacttggtc tgcttcaagg 120
 aggtcgacct tctaattgat gaagaatggg atgcatttga tctcaagacc aaagacagat 180
 gtcagtgggc tgctctggcc ctggtgtgca cggctgtggc agctgttgat gccagtgtcc 240
 tctaactcat gctgtccttg tgattaaaca cctctatctc ccttgggaat aagcacatac 300
 aggcttaagc tctaagatag ataggtgttt gtcccttttac catcgagcta cttcccataa 360
 taaccacttt gcatccaaca ctcttcaccc acctcccata cgcaagggga tgtggatact 420
 tggcccaaag taactggtgg taggaatctt agaaacaaga ccacttatac tgtctgtctg 480

aggnagaaga taacagcagc atctcgacca gcctctgcct taaaggaaat ctttattaat 540
cacgtatggt tcacaagata attc 564

<210> 348
<211> 321
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(321)
<223> n = A,T,C or G

<400> 348
gcncatgaac anggagcaac ganaagagat gtcgggctaa gggcccgga cgggcggcac 60
ccatcctgcn acggaacacn ttcgggttnt ggttttgatt ngttcacctc tgtttatatg 120
canctatttg ntccctcctc cccaccccag nccccactt catgcttntc ttccgcctc 180
agccnccctg cctgtcctc gcggtgagtc antgaccacn gnttccctg cangagccgc 240
cgggcgtgag acncngaccc tcnntgcata caccaggccg ggcccnngct ggctccccc 300
gnggcctgt gaaanagctg g 321

<210> 349
<211> 255
<212> DNA
<213> Homo sapien

<400> 349
ccatgacagt gaaggggctg ttaggaatat caacaccacc gaagcgcaca tagatcacat 60
atgtgcccg cttggcagct gtgtagaaga tgtcataggt tccatcttca ttctcaatga 120
catcggcctc ggctcagtg ccatctgggg tcagaaccgt gcaggtaact ttacccttcc 180
cggcagctctt ggcatcaacc acaaagccta cttcttcgcc agttttcaca gtggaggcga 240
ttccaggacc cgtag 255

<210> 350
<211> 496
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(496)
<223> n = A,T,C or G

<400> 350
gggcttattn gctcacaaaa tcattcnctt ttggaactat ggccaattga agctacacac 60
tgaatttatt aatacagcat taagtttctt tgtgtnaaaa aatctttgtn cncagtaata 120
aaaaaagata aggcaagatg cattaaacat gaaaccttct ggctcttttc ctctgcgttt 180
ttacagagcc actgatgact atctgcaaca aaagagttaa gtttctgatt ttccgtatca 240
agcatcttat gcctttgctg tggtagaagt tctggccaag caccctgaag gacagatgct 300
ggtgatggnc tttggcactt atgctggcaa actgagcttc tttcccttga gtacttttgn 360
aatgtacaag tagaagaagt cacaagtata ggatggctctg gactacgccg gccaccacag 420
caatgaggtc aaagaagccc tcaaagnaga agcgnccaga tccagttgac aagatacaaa 480
gcacgataga ggccca 496

<210> 351

<211> 109
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(109)
 <223> n = A,T,C or G

<400> 351
 ccatagtgaa gcctgggaat gagtgttact gcagcatctg ggctgccanc cacaggggaag 60
 ggccaagccc catgtagccc cagtcatact gccagcccc gcctcctgg 109

<210> 352
 <211> 384
 <212> DNA
 <213> Homo sapien

<400> 352
 ccttcgagag tgacctggct gccaccagg accgtgtgga gcagattgcc gccatcgcac 60
 aggagctcaa tgagctggac tattatgact caccagtggt caacgcccgt tgccaaaaga 120
 tctgtgacca gtgggacaat ctggggggccc taactcagaa gcgaagggaa gctctggagc 180
 ggaccgagaa actgctggag accattgacc agctgtactt ggagtatgcc aagcgggctg 240
 cacccttcaa caactggatg gagggggcca tggaggacct gcaggacacc ttcattgtgc 300
 acaccattga ggagatccag ggactgacca cagcccatga gcagttcaag gccaccctcc 360
 ctgatgccga caaggagcgc ctgg 384

<210> 353
 <211> 345
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(345)
 <223> n = A,T,C or G

<400> 353
 ccttggtcag gatgaagtng gctgacacac cttagcttgg ntttgcttat tcaaaagana 60
 aaataactac acatggaaat gaaactagct gaagcctttt cttgttttan caactgaaaa 120
 ttgnacttgg ncaactttgt gcttgaggag gccattttc tgctggcag ggggcaggta 180
 tgtgccctcc cgctgactcc tgctgtgtcc tgaggtgcat ttctgttgn ncacacaang 240
 gccangntcc attctccctc ccttttcacc agngccacan cctnntctgg aaaaangacc 300
 agnggtcccg gaggaacca tttgngctct gcttgagacag canag 345

<210> 354
 <211> 712
 <212> DNA
 <213> Homo sapien

<400> 354
 ccattctaaa tagcatcaat ggtgccatca cccagttctc ttgcaacatc tcccacctca 60
 gcagcctgat cgctcagcta gaagagaagc agcagcagcc caccagggag ctctgcagg 120
 acattgggga cacattgagc agggctgaaa gaatcaggat tcctgaacct tggatcacac 180
 ctccagattt gcaagagaaa atccacattt ttgccccaaa atgtctattt ttgacggaga 240

gtctaaagca	gttcacagaa	aaaatgcagt	cagatatgga	gaaaatccaa	gaattaagag	300
aggctcagtt	atactcagtg	gacgtgactc	tggacccaga	cacggcctac	cccagcctga	360
tcctctctga	taatctgcgg	caagtgcggg	acagttacct	ccaacaggac	ctgcctgaca	420
accccgagag	gttcaatctg	tttccctgtg	tcttgggctc	tccatgcttc	atcgccggga	480
gacattattg	ggaggtagag	gtgggagata	aagccaagtg	gaccataggt	gtctgtgaag	540
actcagtggt	cagaaaaggt	ggagtaacct	cagcccccca	gaatggattc	tgggcagtggt	600
ctttgtggta	tgggaaagaa	tattgggctc	ttacctccca	atgactgcc	taccctgcg	660
gaccccgctc	cagcgggtgg	gggattttct	tggactatga	tgctggggga	gg	712

<210> 355

<211> 385

<212> DNA

<213> Homo sapien

<400> 355

cctcatagcc	gcttagcaca	gttacagaat	gtctgaaggg	gacagtgtgg	gagaatccgt	60
ccatgggaaa	ccttcggtgg	tgtacagatt	tttcacaaga	cttggacaga	tttatcagtc	120
ctggctagac	aagtccacac	cctacacggc	tgtgcgatgg	gtcgtgacac	tgggcctgag	180
ctttgtctac	atgattcgag	tttacctgct	gcagggttgg	tacattgtga	cctatgcctt	240
ggggatctac	catctaaatc	ttttcatagc	ttttctttct	cccaaagtgg	atccttcctt	300
aatggaagac	tcagatgacg	gtccttcgct	acccaccaaa	cagaacgagg	aattccgccc	360
cttcattcga	aggctcccag	agttt				385

<210> 356

<211> 347

<212> DNA

<213> Homo sapien

<400> 356

aatgagata	aagaaagtct	ccttttgttt	ttagatggaa	aagaaagcac	aagttttttc	60
tacctgtgaa	tgaactttgg	tgacctatat	gtgccattca	tgacgcattc	ttgttcatat	120
tggcttagaa	ttcagtgcat	gaatatcatt	acattcttat	atctaacatt	cctagtttagc	180
tttgattcaa	aatatacaaaa	atctgatata	tgaatacttt	gctagattaa	tgacttgatc	240
atctttggaa	tgagtaggca	agacgatttt	tacctattat	ttctatgttg	tgggtaatgt	300
taaaactaaa	tacagatgat	aataattgct	atttcacagt	gatgttt		347

<210> 357

<211> 313

<212> DNA

<213> Homo sapien

<400> 357

aaagtaatca	acctctctgt	ccttccatta	gtctggatcg	tctaaagatt	gttttatttt	60
tagaggctca	tccggtcaga	tgtagtgat	gtgaaatttc	aggccaggcg	tgacgtcagc	120
gtggcatttg	aaacagctcc	atgttgccct	tagtgctgtc	tgaccgaagc	ctgtctgtcc	180
tcagatataa	agatgaagcg	cagctgtata	aagaagagca	cctgaggaat	cggcagcacc	240
ctcactgcta	cgttcagtac	atgatcgcca	tcacaaacaa	ctgccagacc	ttcaaggaat	300
ccatagtcag	ttt					313

<210> 358

<211> 403

<212> DNA

<213> Homo sapien

<400> 358

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aaaaagaagg acttaggggtg tcgttttcac atatgacaat gttgcattta tgatgcagtt      60
tcaagtacca aaacggttgaa ttgatgatgc agttttcata tategagatg ttcgctcgtg      120
cagtactgtt gggttaaatga caatttatgt ggattttgca tgtaatacac agtgagacac      180
agtaatttta tctaaattac agtgcagttt agttaatcta ttaatactga ctcagtgtct      240
gcctttaaat ataaatgata tgttgaaaac ttaaggaagc aaatgctaca tatatgcaat      300
ataaaatagt aatgtgatgc tgatgctgtt aaccaaaggg cagaataaat aagcaaaatg      360
ccaaaagggg tcttaattga aatgaaaatt taattttgtt ttt                          403

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<210> 359

<211> 411

<212> DNA

<213> Homo sapien

<400> 359

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aaataaatac ttagaacacg acttggctcc tacaagcatc tggactctag gtctcagtac      60
tggagtgctc caccatggg cccacgcag ggacgccacg gttccctccc acccgtgat      120
caagacacgg aatcggtgc cgatggttg atcgcaatgc gcccttttc tagagccttc      180
cccgccatc tacaggcagg atgcggctgg gaaaaagaca actggaattt ctggaagggt      240
gatggctcgc acggttgagg attctacgtg gttctcttgg ttccctggg gtgtgtgtgt      300
gtggaggagg ccgcgccct tagatcacct tcttgagctc gtcgtacagg accagcacga      360
aggcgcccc catgccccgc aggacgttg accacgcacc cttgaagaag g                          411

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<210> 360

<211> 378

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(378)

<223> n = A,T,C or G

<400> 360

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cctcttcagg ggcccagacc agggacagg ccttggtttc cttctccctg gcttctgcct      60
cagctctgtc cctctcatcc gcgtatttgg aagagatgtt tttctcctcg gctaacaact      120
gatcaaatth cctctgcttc tttccagggt tggacacgag ttgccgctgg ttgtccaaat
180caacaaccag gtcgtccagc tctgctgaa gcctgttctt ggtcttttcc agtttatcat
240
aagcgggcgc cttctcctcg tactgctggg tgaggntctc gatctccttc tggaacctct      300
tcttcccttc ttccagagct tccacgngc tggcaaagtc ctgcagcttc ttcttcgagt      360
cggagagctg gatgttga                          378

```

<210> 361

<211> 372

<212> DNA

<213> Homo sapien

<400> 361

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aaatactggg ggccattaag agtggatgta gctaagagct tagctaacat tgccttttca      60
ctctatthtt ctcagatatt gtaagcattc tgthtttcaa tattgtagtt aattttttgg      120
ctttcaacag cagccctagt aatgggtggag ttgttaatta atgtgtatat tgtactgaat      180
ttctgtcagt taaggggttc actgctttgg tggaaattgg tggaaattgc tagcaggttc      240
cacgatgttt atthttttct ccatgttgta tatcattacc atthcacata cgcgttttcta      300
thtttcttcc tctcctcctg atctccttaa aaatgaatct agagttgggt gctthtttccc      360
cctcctcttt gg                          372

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<210> 362
 <211> 544
 <212> DNA
 <213> Homo sapien

<400> 362
 cctgagtcac ctagcatagg gttgcagcaa gccctggatt cagagtgtta aacagaggct 60
 tgccctcttc aggacaacag ttccaattcc aaggagccta cctgaggtcc ctactctcac 120
 tgggggtcccc aggatgaaaa cgacaatgtg ccttttttatt attattttatt tgggtggctct 180
 gtgtttattta agagatcaaa tgtataacca cctagctctt ttcacctgac ttagtaataa 240
 ctcatactaa ctggtttgya tgcctgggtt gtgacttcta ctgaccgcta gataaacgtg 300
 tgcctgtccc ccaggtggtg ggaataattt acaatctgtc caaccagaaa agaattgtgtg 360
 tgtttgagca gcattgacac atatctactt tgataagaga cttcctgatt ctctaggctc 420
 gttcgtgggt atcccattgt ggaaattcat cttgaatccc attgtcctat agtcctagca 480
 ataagagaaa tttcctcaag tttccatgtg cggttctcct agctgcagca atactttgac 540
 attt 544

<210> 363
 <211> 328
 <212> DNA
 <213> Homo sapien

<400> 363
 aaactgggtta tgacaaaaagc ctttagttgt gtttcttgaa ctataaagaa aacaaatttt 60
 ggcagtcctt aagtatatat agcttaaaat ataattttta gcatttggca ccatatgtat 120
 gccattarat ttgatitttg attactgttt cacaatgaag ctttctttaa ggctttgatt 180
 tttatgatta tgaaagaaat aaggcacaac cacagttttt ctttcttaaa tttcatcact 240
 gttgatgtgg ttcttttgtg ttaaaaaaaa aaagtgaac tatcaaaact aaaaaattat 300
 agagtaatat tgccgttctg ctgatttt 328

<210> 364
 <211> 569
 <212> DNA
 <213> Homo sapien

<400> 364
 cctgggcacc tctttgcttg aaatatggca agacttggaa aaatgtttgc ccttagaatc 60
 tatctcacta ctttagtttag ttgtctcctt tgggcctggg cacagttctg gccctgatct 120
 ggaacagact cccttttcta aaactgaact tgaccacatc aaaagtttgt aaaacaatct 180
 ccatggtaat taaacttgca ttcaacacca tatggtaaca gaagatggca aaggataaga 240
 ttcagatctt agatctttcc aagtagggca tgtagatga tagaaggatt agttgcaagc 300
 tggatctgag ctgaggcttg ggcataaagg aaactgtctc ccatgtggtt tggagagatt 360
 aggggctccc tgagctctat tgtgaactat acgggtttca tccaaggaat ggtatgatgt 420
 gggcataaaa ccattcttca gacaactgaa gatgggtccc ttctgtagcc agaaacacta 480
 gctgtcctgc attgtccatt tcttttagcc ccaggcggtc ctgtgtgtac agggaggtct 540
 cctgtaaggg aatgggtttcc ttggcttgg 569

<210> 365
 <211> 151
 <212> DNA
 <213> Homo sapien

<400> 365
 aaaaaaaaaa atcctttttat tatggaattt gtcaaacaca cacacaagca taacaaaccc 60

ctaggtaccc atctccaagt ttgacccct attataatTT catcttcagt gttttattat 120
ccacttcttc tctctctatc tttagtattt t 151

<210> 366
<211> 508
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(508)
<223> n = A,T,C or G

<400> 366
agtataaaga tatattccat aaaagagttt ggcagtcaa ganaagcatc gcacttccga 60
aaaacacaag cattcttctc ctagtctaca gagaattgng taaaaaaaaa aaaaaatcat 120
catcaacagc cnccantnta cnccacacta gaagtacac tccggcaagt aaattaaggn 180
tgcagtccat cctgaacga tganaagngg tctgagctat ggcagagngt tanaaagtag 240
cccagctana caaatgcccc agctatcccc aggggagtta ttcagtactt aanacttcat 300
ttccaananc agccccggaa aagccctgac aggaaggggg gaccagngat caccgatntc 360
ccattagggg cggncaccaa aaacaaaatg cctggagctt ntgagcagct gcagcctggg 420
gttggtggcta ggcncngggg gnggttgcaa aaaaacggct gtntccgagg agaggcaaat 480
ggcaggccag ccagccctgg gtacatgg 508

<210> 367
<211> 382
<212> DNA
<213> Homo sapien

<400> 367
cctgagcggc tagtctttaa gatgcgcttc tatcgtttgc tgcaaattccg agcagaagcc 60
ctcctggcgg caggcagcca tgtgatcatt ctgggtgacc tgaatacagc ccaccgcccc 120
attgaccact gggatgcagt caacctggaa tgctttgaag aggacccagg gcgcaagtgg 180
atggacagct tgctcagtaa cttggggtgc cagtctgctc ctcatgtagg gcccttcac 240
gatagctacc gctgcttcca accaaagcag gagggggcct tcacctgctg gtcagcagtc 300
actggcgccc gccatctcaa ctatggctcc cggttgact atgtgctggg ggacaggacc 360
ctggtcatag acacctttca gg 382

<210> 368
<211> 174
<212> DNA
<213> Homo sapien

<400> 368
ccttctccct ctttgacaag gatggagatg gcactatcac caccaaggag ttggggacag 60
tgatgagatc cctgggacag aacccactg aagcagagct gcaggatatg atcaatgagg 120
tggatgcaga tgggaacggg accattgact tcccggagtt cctgacctg atgg 174

<210> 369
<211> 216
<212> DNA
<213> Homo sapien

<400> 369
aaatctcatg ggttctatta aaaaaatata tatatagggc cccaatccat tgccatcaaa 60

ttgcccttgg	acttttccaa	ggtatattat	ggggttttat	gcaaaattcc	aagctaccat	120
gtaacttttt	ttaaccattt	aacaaggagg	gggaactggt	tcctaccttc	tttacatggt	180
gtgcattggt	gtggtccaga	aatgccaaac	cttttt			216

<210> 370
 <211> 344
 <212> DNA
 <213> Homo sapien

<400> 370						
ccttggtcag	gatgaagttg	gctgacacag	cttagcttgg	ttttgcttat	tcaaaagaga	60
aaataactac	acatggaaat	gaaactagct	gaagcctttt	cttgtttttag	caactgaaaa	120
ttgtacttgg	tcacttttgt	gcttgaggag	gccatttttc	tgcttggcag	ggggcaggtc	180
tgtgccctcc	cgctgactcc	tgctgtgtcc	tgagggtgcat	ttcctgttgt	acacacaagg	240
gccaggctcc	attctccctc	cctttccacc	agtgccacag	cctcgtctgg	aaaaaggacc	300
aggggtcccg	gaggaaccca	tttgtgctct	gcttggacag	cagg		344

<210> 371
 <211> 741
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(741)
 <223> n = A,T,C or G

<400> 371						
aaattacata	tctaattgtg	tgatttggtta	aatgcccatt	tcttcatcta	agtgcctaagt	60
gctaagtgtg	gcagtttggt	cctgctaca	ctccaaggca	caaaggaggt	caagggaatgt	120
gcaatggaaa	tcagtttagat	gaatgtgtta	ggaaccttcc	ctttaataaa	gctggatccc	180
acactagccc	ctacaccctc	tcatacccaa	atattcctgc	ttcctctcac	ctgcacttgc	240
tgtctctctc	tctgccacac	aaatctacct	ctcaagccta	ggccccacct	gcttcatgac	300
aactttccag	actattccag	aacctttaac	catctctgac	ctctcatcag	atctatgttg	360
tacataacac	caattaatga	gatacttact	gctttatgct	ctaattgctt	cctgtattca	420
aaatcttctc	tccaaccaca	taatgactcc	ctaaacttct	cttgtatttt	ccaatgcctt	480
gtacaagcac	agaactggtc	aatcaataaa	tactcactgg	ttatttgagg	aaaaaatgtt	540
gccaagcacc	atctttatca	gaaaataaat	caattcttct	aaacttggag	aaatcaccct	600
attcctagta	tgtgatctta	attagaacaa	ttcagattga	gaangngaca	gcatgctggc	660
agtcctcaga	gccctcgctt	gctctcggna	cctccctgcc	tgggctccca	ctttggtggc	720
atttgaggag	cccttcagcc	t				741

<210> 372
 <211> 218
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(218)
 <223> n = A,T,C or G

<400> 372						
ccgccagtgt	gctggaattc	gcccttggcc	gccccgggcag	gtaccacaac	agcaggnctg	60

```

agtgagaaat ctaccacctt ctacagtagc cccagatcac cggacacaac actctcacct    120
gccagcacga caagctcagg cgtcagtga  gaatccacca cctcccacag cggaccaggc    180
tcaacgcaca caacagcatt ccctggcagt accttggn                               218

```

```

<210> 373
<211> 168
<212> DNA
<213> Homo sapien

```

```

<400> 373
actgctaggg aatgctgttg tgtgcattga gcctggtcgg ctgtgggagg tgggtggattc    60
ttcactgacg cctgagcttg tcgtgctggc aggtgagagt gttgtgtccg gtgatctggg    120
gctactgtag aaggtggtag atttctcact caggcctgct gttgtggt                    168

```

```

<210> 374
<211> 154
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1)...(154)
<223> n = A,T,C or G

```

```

<400> 374
tgagaaatct accaccttct acagngagcc ccanatcacc ggacacaaca ctctcacctg    60
ccagcacgac aagctcaggc gtcagtgaag aatccaccac ctcccacagc cgaccaggct    120
caacgcacac aacagcattc cctggcagta cctc                               154

```

```

<210> 375
<211> 275
<212> DNA
<213> Homo sapien

```

```

<400> 375
actgccaggg gacagtgctg tgtcagttga acctgggctg ctgtgggaag ttgttgattc    60
ctgactgggg cctgaggtgg tggctgtggc aggtaacagt gttgtatccg ttgagcctgg    120
gctgctgtgg gaagttgtag aatgccgact gaggcctggc gtggtggtgc tgtcagggaa    180
tgctgttgtg tgcgttgagc ctggtcggct gtgggaggtg gtggattctt cactgacgcc    240
tgagcttgtc gtgctggcag gtgagagtgt tgtgg                               275

```

```

<210> 376
<211> 191
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1)...(191)
<223> n = A,T,C or G

```

```

<400> 376
actgccaggg gacagtgctg tgtcagttga acctgagctg ctgtgggaag ttgttgattc    60
ctgactggag cctgaggtgg tggctgtggc aggtaacagt gttgtatccg ttgagcctgg    120
gctgctgtgg gaagttgtag aatgccgact gaggcctgcc gtggtggtgc tgntagggaa    180

```

tgctgctagc g

191

<210> 377

<211> 476

<212> DNA

<213> Homo sapien

<400> 377

ccgccagtgt gctggaattc gcccttggcc gcccgggcag gtacatttcc ttgtagactc	60
tgtaatttc ctgcagctcc tggttggttc tggagcagat gatctcaatg agagagtcct	120
cgtcgggttc cagccccttc atggaagctt ttagctcaga agcgtcatac tgagcagggtg	180
tcttcaatag gcccaaaatc accgtctcca ggtggccaga taaggctgac ttcagtgtctg	240
atgcaagttc ctttttgggt cttctctggt aggcgaaggc aatatacctgt ctctgtgcat	300
tgctgcggtt ggtcaaaatg ttgacaatgg tgacctcatc cacacctttg gtcttgatgg	360
ctgtttcaat gttcaaagca tcccgctcag catcaaagtt agtataggct ttgacagacc	420
catatgcact tgggggtgta gagtgatcac cctccaagcc gagcttgcat aggatt	476

<210> 378

<211> 455

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(455)

<223> n = A,T,C or G

<400> 378

agtgtgctgg aattcgccct tggccgcccg ggcaggtaca catcccatct tcaaatttaa	60
aatcatattg tcagttgtcc aaagcagctt gaatttaaag tttgtgctat aaaattgtgc	120
aaatatgtta aggattgaga cccaccaatg cactactgta ataattcgct tcctaaattt	180
cttcaccta cagataatag acaacaagtc tgagaaacta aggctaacca aacttagata	240
taaactctac caataaaatt tttcagtttt aagttttaca gtttgattta aaaacaaaac	300
agaaacaaat ttcaaaataa atcacatctt ctcttaaaac ttggcaaacc cttccctaac	360
tgtccaagtn tgagcataca ctgccactgg ctttagatac tccaattaaa tgcactactc	420
tttactgggt ctgaatgaag tatggtgaaa caagc	455

<210> 379

<211> 297

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(297)

<223> n = A,T,C or G

<400> 379

agctcggatc cctagnacgg ccgccagtgt gctggaattc gcccttagcg gcggccccggg	60
caggtacaaa gaatccttag acgccatact gagttttaag ttccttaatt cctaatttaa	120
ggcttctagt gaagcctcct cacagtaggc ttcactaggc ccacagtgcc cctagacctc	180
tgacaatccc accctagaca gactttattg caaaatgcgc ctgaagaggc agatgattcc	240
caagagaact caccaaatac agacaaatgt cctagatctc tagtgtgna gaactat	297

<210> 380

<211> 144
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(144)
 <223> n = A,T,C or G

<400> 380
 acttttgctga aaattctttt tcccagggtc tataaaacat taatttgttt ttatatattta 60
 ctattttttt gngttttttt gtttttaaat caataagtaa tctaggacta gcattatggt 120
 tgctagacct ggcatttgct cggc 144

<210> 381
 <211> 424
 <212> DNA
 <213> Homo sapien

<400> 381
 actcttgaat acaagtttct gataccactg cactgtctga gaatttccaa aactttaatg 60
 aactaactga cagcttcatg aaactgtcca ccaagatcaa gcagagaaaa taattaattt 120
 catgggacta aatgaactaa tgaggataat attttcataa ttttttattt gaaattttgc 180
 tgattcttta aatgtcttgt ttcccagatt tcaggaaact ttttttcttt taagctatcc 240
 acagcttaca gcaatttgat aaaatatact tttgtgaaca aaaattgaga catttacatt 300
 ttctccctat gtggtcgctc cagacttggg aaactattca tgaatattta tattgtatgg 360
 taatatagtt attgcacaag ttcaataaaa atctgctctt tgtataacag aatacatttg 420
 aaaa 424

<210> 382
 <211> 408
 <212> DNA
 <213> Homo sapien

<400> 382
 actcttgaat acaagtttct gataccactg cactgtctga gaatttccaa aactttaatg 60
 aactaactga cagcttcatg aaactgtcca ccaagatcaa gcagagaaaa taattaattt 120
 catgggacta aatgaactaa tgaggataat attttcataa ttttttattt gaaattttgc 180
 tgattcttta aatgtcttgt ttcccagatt tcaggaaact ttttttcttt taagctatcc 240
 acagcttaca gcaatttgat aaaatatact tttgtgaaca aaaattgaga catttacatt 300
 ttctccctat gtggtcgctc cagacttggg aaactattca tgaatattta tattgtatgg 360
 taatatagtt attgcacaag ttcaataaaa atctgctctt tgtatgac 408

<210> 383
 <211> 455
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(455)
 <223> n = A,T,C or G

<400> 383
 actcttgaat acaagtttct gataccactg cactgtctga gaatttccaa aactttaatg 60

```
<210> 384
<211> 376
<212> DNA
<213> Homo sapien
```

```
<220>
<221> misc_feature
<222> (1) ... (376)
<223> n = A,T,C or G
```

<400> 384						
actcttgaat	acaaggttct	gatatcactg	cactgtctga	gaattttccaa	aactttaatg	60
aactaactga	cagcttcacg	aaactgtcca	ccaagatcaa	gcagagaaaa	taattaattt	120
catgggacta	aatgaactaa	tgaggataat	attttcataa	ttttttattt	gaaattttgc	180
tgattcttta	aatgtcttgt	ttcccagatt	tcaggaaact	tttttttctt	ttaagctatc	240
cacagcttac	agcaatttga	taaaatatac	ttttgngaac	aaaaattgag	acattttacat	300
ttttcccta	tgtgggcgct	ccagacttgg	gaaactattc	atgaatatatt	atattgnatg	360
ggaatatagc	attgcc					376

```
<210> 385
<211> 422
<212> DNA
<213> Homo sapien
```

<400>	385						
acctgtgggt	ttattaccta	tgggtttata	tcttcaaata	cgacattcta	gtcaaagtct		60
tggtaatata	accaatgttt	tcaaagtgtat	tctgtcatatc	aaagagcaga	tttttattga		120
acttgtgcaa	taactatatt	accatacaat	ataaatattc	atgaatagtt	tcccaagtct		180
ggagcgacca	catagggaga	aaatgtaaat	gtctcaattt	ttgttcacaa	aagtatattt		240
tatcaaattg	ctgtaagctg	tggatagctt	aaaagaaaaa	aagtttcctg	aaatctggga		300
aacaagacat	ttaaagaatc	agcaaaaattt	caaataaaaa	attatgaaaa	tattatcctc		360
attagttcat	ttagtcccat	gaaattaatt	atcttctctg	cttgatcttg	gtggacagtt		420
tc							422

```
<210> 386
<211> 313
<212> DNA
<213> Homo sapien
```

<400>	386						
caagtaggtc	tacaagagcg	tacttcccct	atcatagaag	agcttatcac	ctttcatgat		60
cacgccctca	taatcatttt	ccttatctgc	ttcctagtcc	tgtatgccct	tttcctaaca		120
ctcacaacaa	aactaactaa	tactaacatc	tcagacgctc	aggaaataga	aaccgtctga		180
actatcctgc	ccgccatcat	cctagtcttc	atcgccctcc	catccctacg	catcctttac		240
ataacagacg	aggtcaacga	tccctccctt	accatcaaat	caattggcca	ccaatggtac		300
tgaacctacg	agt						313

<210> 387
<211> 236
<212> DNA
<213> Homo sapien

<400> 387
cgccctcata atcattttcc ttatctgctt cctagtcctg tatgcccttt tccaaact 60
cacaacaaaa ctaactaata ctaacatctc agacgctcag gaaatagaaa ccgtctgaac 120
tatcctgccc gccatcatcc tagtcctcat cgccctccca tccctacgca tccctttacat 180
aacagacgag gtcaacgata cctcccttac catcaaatca attggccacc aatggt 236

<210> 388
<211> 195
<212> DNA
<213> Homo sapien

<400> 388
acgccctttt cctaactctc acaacaaaaa taactaatac taacatctca gagcctcagg 60
aaatagaaac cgtctgaact atcctgcccg ccatcatcct agtcctcacc gccctcccat 120
ccctacgcat cctttacata acagacgagg tcaacgatcc ctcccttacc atcaaatcaa 180
ttggccacca atggt 195

<210> 389
<211> 183
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(183)
<223> n = A,T,C or G

<400> 389
taacactcac aacaaaaacta actaatacta nnatctcaga cgctcaggaa atagaaaccn 60
cctgaactat cctgcccgcg atcatcctag tctcctcgcg cctcccatcc ctacncatcc 120
tttacataac agacgaggtc aacgatccct cctttaccat caaatcaatt ggccaccaat 180
ggt 183

<210> 390
<211> 473
<212> DNA
<213> Homo sapien

<400> 390
acaaagcagc aactgcaata ctcaagggtta aaacattaga aaagcatttg tgtgacaggt 60
atattacagt attatcaaaa tattacattt tcagacttac ttagcagata atcatccacc 120
agagcttaaa tcttttaaatt atttccatag tcttaaaaaa tatgtaatgt cagaatgcat 180
ataaaaaagaa tgtaaaaagga aacctaaaat acaaatggaa taatgtaaca aataaatatt 240
tgatttcagt aactgttaat aatcagctca acaccaccat tctctctaaa ctcaatttaa 300
ttcttatagg aataatgaac tgtcaaatgc catggcataa ttatttattt ccaagctatc 360
atcaatgatt agaactaaaa aaaatttggc ataaaaaaat cacaattcag cataaataaa 420
gctatttttta gcttcaacac tagctagcat ctctaagaat tgttgaaata agt 473

<210> 391
<211> 216

<212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(216)
 <223> n = A,T,C or G

<400> 391
 atttgtattt taggtttcct ttacattct ttttatatgc nntctgacat tacatatttt 60
 ttaagactat ggaaataatt taaagattta agctctggtg gatgattatc tgctaagtaa 120
 gtctgaaaat gtaatatttt gataatactg taatatacct gtcacacaaa tgcttttcta 180
 atgttttaac cttgagtatt gcagttgctg ctttgt 216

<210> 392
 <211> 98
 <212> DNA
 <213> Homo sapien

<400> 392
 acttatttca acaattctta gagatgctag ctagtggtga agctaaaaat agctttattt 60
 atgctgaatt gtgatttttt tatgccaaat ttttttaa 98

<210> 393
 <211> 397
 <212> DNA
 <213> Homo sapien

<400> 393
 tgccgatata ctctagatga agttttacat tggttagcta ttgctgttct cttgggaact 60
 gaactcactt tcctcctgag gctttggatt tgacattgca ttlgacctt tatgtagtaa 120
 ttgacatgtg ccagggcaat gatgaatgag aatctacccc cagatccaag catcctgagc 180
 aactcttgat tatccatatt gagtcaaagtg gtaggcattt cctatcacct gtttccattc 240
 aacaagagca ctacattcat ttagctaaac ggattccaaa gagtagaatt gcattgaccg 300
 cgactaattt caaaatgctt tttattatta ttatttttta gacagtctca ctttgtcgcc 360
 caggccggag tgcagtgggtg cgatctcaga tcagtggt 397

<210> 394
 <211> 373
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(373)
 <223> n = A,T,C or G

<400> 394
 ttacattgtt gagctattgc tgttctcttg ggaactgaac tcactttcct cctgaggctt 60
 tggatttgac attgcatttg accttttatg tagtaattga catgtgccag ggcaatgatg 120
 aatgagaatc tacccccaga tccaagcacc ctgagcaact cttgattatc catattgagt 180
 caaatggtag gcatttccta tcacctgttt ccattcaaca agagcactac attcatttag 240
 ctaaacggat tccaaagagt agaattgcat tgaccacgac tantttcaaa atgcttttta 300
 ttattattat tttttagaca gtctcacttt gtcgcccagg ccggagtgca gtggtgcgat 360
 ctcagatcag tgt 373

<210> 395
 <211> 411
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(411)
 <223> n = A,T,C or G

<400> 395
 actgatcatt ctatttcccc ctctattgat cccacacctc aaatatctca tcaacaaccg 60
 actaatcacc acccaacaat gactaatcaa actaacctca aaacaaatga taaccataca 120
 caacactaaa ggacgaacct gatctcttat actagtatcc ttaatcattt ttattgccac 180
 aactaacctc ctcggaactc tgctcactc atttacacca accaccaat tatctataaa 240
 cctagccatg gccatcccc tctgagcggg cgcagtgatt ataggctttc gctctaagat 300
 taaaaatgcc ctagcccact tcttacngca aggcacacct acaccctta tccccatact 360
 agttattatc gaaaccatca gctactcat tcaaccaata gccctggccg t 411

<210> 396
 <211> 411
 <212> DNA
 <213> Homo sapien

<400> 396
 actgatcatt ctatttcccc ctctattgat cccacacctc aaatatctca tcaacaaccg 60
 actaattacc acccaacaat gactaatcaa actaacctca aaacaaatga tagccataca 120
 caacactaaa ggacgaacct gatctcttat actagtatcc ttaatcattt ttattgccac 180
 aactaacctc ctcggaactc tgctcactc atttacacca accaccaac tatctataaa 240
 cctagccatg gccatcccc tctgagcggg cgcagtgatt ataggctttc gctctaagat 300
 taaaaatgcc ctagcccact tcttaccaca aggcacacct acaccctta tccccatact 360
 agttattatc gaaaccatca gctactcat tcaaccaata gccctggccg t 411

<210> 397
 <211> 351
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(351)
 <223> n = A,T,C or G

<400> 397
 ngccgangta caaaaaaaag cacattccta gaaaaaggta ttggcaaata gtaaaaatgg 60
 gaggtcaaaa ncaaaaaaaaa aaaaaacaaa acnaaaaaaa gaaaaaacca acaattcttc 120
 aattcagtg gcaaacatta tataaaaaata gaaatactaa ctctacaggc agtatttcct 180
 gataaattat ttaaatagca tatctacnca atctgagata tctattccaa tggcaatgag 240
 aaaaatattt ataaaaataa agcaatggta taccanatga tagaaaaaaa cataactttc 300
 agaaattgta tttaacattt caatgctatt tccttattgn gaatncttct c 351

<210> 398
 <211> 363
 <212> DNA

<213> Homo sapien

<400> 398

```

acaaaaaaaaa gcacattcct agaaaaaggt attggcaa atgtaaaaatg ggaggtcaaa      60
agcaaaaaaaaa aaaaaaacaa acaaaaaaaaaa agaaaaaacc aacaattcct caattcagtg    120
tgcaaacatt atataaaaat agaaatacta actctacagg cagtatttcc tgataaatta      180
tttaaatagc atatctacac aatctgagat atctattcca atggcaatga gaaaataatt      240
tataaaaaata aagcaatggg ataccagatg atagaaaaaa acataacttt cagaaattgt      300
atttaacatt tcaatgctat ttccttattg ggaatacttc tctgcagagt ttttatgcta      360
tgt

```

<210> 399

<211> 360

<212> DNA

<213> Homo sapien

<400> 399

```

actgtttcct cgtgggttcag ggggtgtgcat gaaggctcct aggagagcaa acacctgttc      60
ctattctgta tgcccctccc tcatttcaaa tgagagtaac caattgagta aaataaccaa      120
ataaccattg cccaccatg aacatggggc ttgggaagac agtcctacaa tcttcatcat      180
atatttaggt ttttaggccg gccagctcct tttttccaaa gctttctttt gaataccgcg      240
ccggggcggc cctaaggggc aattctgcag atatccatca cactggcggc cgctcgagca      300
tgcattctaga gggcccaatt cgccctatag tgagtcgtat tacaattcac tggccgctcg      360

```

<210> 400

<211> 87

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(87)

<223> n = A,T,C or G

<400> 400

```

ctgcacatat cnattacact ggcggccgct cgagcatgca tgnagagggc ccaattctcc      60
ctatattgag tggaattaca atnncct

```

<210> 401

<211> 328

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(328)

<223> n = A,T,C or G

<400> 401

```

accaggggac acaaacactc tgcctaggaa aaccagagac ctttgttcac ttgtttatct      60
gctgaccttc cttccactat tgtcctatga ccctgccaaa tccccctctg cgagaaacac      120
ccaagaatga tcaataaaaa ataaaaataa attaaattaa aaaaaaaaaa agagaggaac      180
ccacaaaaaa aaaaaaaaaa aaagtntata aaataaaata ttgaagtcct ttccattaa      240
aaaaaaaaaa aagaaaaagc acggactcct tcatccagtt ctgatgtgat tatctctgga      300
aggcattttc tcctcctcct cctcccc

```

<210> 402
 <211> 268
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(268)
 <223> n = A,T,C or G

<400> 402
 nacataatga caacatcttc actagactga gtgttcaagg atttgagatg attcgctatt 60
 catcacaccc cgaagattga gatccactgt atttacacaa agcaaagcca tgtcagcaag 120
 ggactgtcaa cctgattctg agaacataaa cattcaaaat ttattttcca gtgttccttt 180
 ttggaaacca acaacacatc ttaataacct acacacacac acatctntac ctttaaaaaa 240
 aaaaaaaaaa tgnaacttca cagatagt 268

<210> 403
 <211> 538
 <212> DNA
 <213> Homo sapien

<400> 403
 acagtgatag ctccccctgg gcaatacaat acaagaacag tgggttttgt caaattggaa 60
 caaggaaaca gaaccacaga aataaataca ttggttaaca tcagattagt tcaggttact 120
 tttttgtaaa agttaagta gaggggactt ctgtattatg ctaactcaag tagactggaa 180
 tctcctgtgt tctttttttt tttaaattgg ttttaatttt ttttaattgg atctatcttc 240
 ttccttaaca tttcagttgg agtatgtagc atttagcacc actgggtcaa tgcgctcacc 300
 taggtgagag tgtgaccaa tcttaaagca ttagtgctat tatcagttac caccatttgg 360
 ggctttttatc cttcatgggt tatgatgttc tctgatgac acatttctct gagttttgta 420
 attccagcca aagagagacc attcactatt tgatggctgg ctgcatgcag acattttaaag 480
 cttttagaga atacactaca ccaggagta tgactactag tatgactatt aggagggt 538

<210> 404
 <211> 310
 <212> DNA
 <213> Homo sapien

<400> 404
 tttttttata gatacaattg gcttttattt gtgattcatg agtcagggca gtttccattc 60
 tgcaaaatat agtgatagct cctactgggc aatacaacag tagaacagtg ggttttgtaa 120
 aatgggaatc caggaacaga agaataataa taaattgatt taaataaact gattgggtta 180
 tttcagaata cttcatatta cttttttcta agagttaaag cagaaaggac tttcttactg 240
 tgctgactca gacagcctgg actctcatgt ttttaggaaa attttgtctg ttctgggatc 300
 tacctgcttc 310

<210> 405
 <211> 559
 <212> DNA
 <213> Homo sapien

<400> 405
 acaaatcaca attattaact cactggtagg gcagtgatga tcaaaccaat tgcattcatc 60
 catgctgtaa tgttctctct tggcactaaa ggctgactgc agccggcaaa aaagaatgta 120

```

agtatgaatt tataaaaaaca ttttagatgg ctgacaacgg atcttatttt taaagaatat      180
gtctaattca gaggatcgac aactaatcca tttcaataaaa acaatgggga attttttatt      240
gaataaaaaat gtaatatgca taaaaactca agaaggcttt ttaaaaatac ttctctccca      300
atcattatcc catacttcat gctaattttt aaaagaatct tgaaatcttg aaaacaagat      360
gaagagaatc ttgttttaag tgacaagtta acattattcc tatattaaat gtcaaaactgc      420
tattaatgag tagaagtagg aacaaacccg gatcttagga tctgtccag ggctcattcc      480
ataactccta tatcacaag acaagatctg gaaccagaaa acagtcacat tccaatgtgc      540
atcagccttg cggcaacag                                     559

```

<210> 406

<211> 427

<212> DNA

<213> Homo sapien

<400> 406

```

acaacagaat atctcgggaa tggactcaga agtatgccat gtgatgctac cttaaagtca      60
gaataacctg cattatagct ggaataaact ttaaattact gtctcttttt tgattttctt      120
atccggctgc tccctatca gacctcatct tttttaattt tattttttgt ttacctccct      180
ccattcattc acatgctcat ctgagaagac ttaagttctt ccagcttttg acaataactg      240
cttttagaaa ctgtaaagta gttacaagag aacagttgcc caagactcag aattttttaa      300
aaaaaaaaatg gagcatgtgt attatgtggc caatgtcttc actctaactt gggtatgaga      360
ctaaaaccat tctcactgc tctaacatgc tgaagaaatc atctgagggg gagggagatg      420
gatgctc                                     427

```

<210> 407

<211> 419

<212> DNA

<213> Homo sapien

<400> 407

```

acaatttgta gttgtttcca ggtttggtta ataatcattc cttaacctag aattcagatg      60
atcctggaat taaggcaggt cagaggactg taatgataga attaaattag tgctactaaa      120
aactgtccca aagtgtctgt tctaatagg aattcattaa cctaaaacaa gatgttacta      180
ttatatgat agactatgaa tgctatttct agaaaaagtc tagtgccaaa ttgtcttat      240
taaataaaaa caatgtagga gcagcttttc ttctagtttg atgtcattta agaattacta      300
acacagtggc agtgttaaat gaagatgctg tctacaaggt agataatata ctgtttgata      360
ctcaaaacat ttttcatttt gtttaaagta gaagttacat aattctatat ttttaagtct      419

```

<210> 408

<211> 523

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(523)

<223> n = A,T,C or G

<400> 408

```

acatttgatg ttatgtgaat gttgagtttt tttcttctaa ttttcacttc agcagtgttt      60
agggctttca gatgccttat tccagtgtga acagaaaaag ttcataattt atgtgggtta      120
tgctttgatg tgtcacataa agagtagttt gtagaaaaatg ttggcacaat tttacttct      180
tagtggcttg tgacattata tattatatat atatgtatat atatctttat aacattcctg      240
tgtttagtag tgtaaagtgt ctgggcaagt tttaatattt tgaatgcctt tggatattcc      300
agcaataaag gcatcatggt ctgcaatagg atttcttact catttaccta ttttaacact      360

```

```

aaaatagacc acaactgagc acaaattcct tttataaatg ttatagaagc agggaagaat      420
aataaacaca tttgtgaatt gtgggttcagt ttatttatct ttagggaagg ctgatcattt      480
atcttatagc acataacccc agcctcttat tcattatggn taa                          523

```

```

<210> 409
<211> 191
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1)...(191)
<223> n = A,T,C or G

```

```

<400> 409
accccgtagt gatgagcact gactgggttca ctggccacat tttagttctt cataataata      60
ggccacaaaa gggctctgtg gtttgccctcc atgtgcactg gcccctcccc acccctaggg      120
ggcactcagt agctgctgag aaggcctgtc cacgangctg ttggaacccc ttcaataaat      180
acttagaagn a                          191

```

```

<210> 410
<211> 403
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1)...(403)
<223> n = A,T,C or G

```

```

<400> 410
acactggcca gtgtgttttt ggcgattaaa cataatcctg tgaatcagat taattcactt      60
gctgagtgtt catttgcggc atccctctgt tgggtcttg gggccctcca cgacctcgtg      120
gggctccccg tgggtccactc tgcccagagc ctgcttgaa attctgctga tatccatccc      180
gttgatagcc agagtaatcc cggggagcac tgaactgaga ctgtgtataa ccaactgtttg      240
gagtgttaga gaatgaaggg cggttaaccat catatcctcc tctgaatcca ttggcagggc      300
cccggtatcc attcatcaag cctctagcac cacgggagcc tccacgagac acaccacgac      360
tattgtaata gggctgattg ctacgtggaa atccagtgn tctg                          403

```

```

<210> 411
<211> 384
<212> DNA
<213> Homo sapien

```

```

<400> 411
acgtgaaatc ataacaacat gttctcttgt gtttggcttc tcttgctcag catgatattt      60
ttacgggttca cccatattgc atgtatcagg aatataatcc tttttattat tgagtagtgt      120
tctattgtat gtatatacca cagtttattt ctcccttcat cctttgctag attttggggt      180
tttttcacat tgcgctattc aagtataaac ctgctctcaa cattcatgtg caagtctttg      240
agtggacata tatttgccgt ttctcttgag tgaatgcacc ttgttgggtc acgtggctta      300
atttaaaaaa attttaatca ctgtggtgca tatgtagtga ttattagtga ttatctcata      360
attttatttt cttgatgact aatg                          384

```

```

<210> 412
<211> 315

```

<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(315)
<223> n = A,T,C or G

<400> 412
acaatattttc tcctttgaga agataggata tatgatatttc ccaaaaaatca caacttttgaa 60
ggaagactta nttgctgact tcaattatat cctggaactg gcaacttggt cccttccttt 120
gcttcaaaaa aagtgtgaaga aagagtgata agatcaactt taatcattct tggatcttca 180
gcaaattcag gatcaatgta gaaaaacact ggcatactta ctccctcttg gggattaagc 240
ctttgttctt caaaacagaa gcactgtatt ttattgaaat actgtccacc ttcaaattgga 300
acaatattgt atgna 315

<210> 413
<211> 554
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(554)
<223> n = A,T,C or G

<400> 413
acaggtttca ctattacaaa tatatgatgt taaactaaca aactcatgac cttcaaagat 60
gtcttcgtcc cagcacacac catttgtaat ttgtgtccat ttgtatattc ccttccttcta 120
taatcttcaa attatatagt tatgcattga gtccctatg catctcacc atctccttta 180
tctcagcctt ctcatacttt gccattctct tctttctgga aataaccagc acaacaattc 240
cagcaacaac tgctatcacc acaaccacaa taacagcaat aacaccagct tttagaccct 300
gcattgagaa ttcaggtgct ttttcatcaa cataataaat taaagtttga ccaggatcca 360
gatccagttg ttccccattt actgtcaggt gccattttct tagaatgaaa caaggattca 420
cctttaacat ctttttcaaa ataataagcc acatcagcta tgtrcacatc attctgagnt 480
ttttgagaag aattttgaac cagatcaata gtgataacat tattctcata caaaatactc 540
gngataaatt ntgg 554

<210> 414
<211> 267
<212> DNA
<213> Homo sapien

<400> 414
accagaaagg cacacgattt tacaatattt gttggaatta ccttactttt taacctcttc 60
atagcagttt tggtttgagt atattgatga aagccaaagt ctggtatcta aaacttgggc 120
caatgtttcc caactggtat atgtcaggct ttcccaatag cttaactgtg accctatacg 180
gatggctttt tagatagttc tatactgctg tattgtgtta gcacttttct ttgtcattaa 240
caacacactt taaatgacat ttggtga 267

<210> 415
<211> 454
<212> DNA
<213> Homo sapien

<400> 415
accggaacct gcagaaacag tgtgagaaat taagtcctgg ttcactgcgc agtagcaaag 60
atgggtcaagg ccatggaaaa agcagaaatt taccaagaaa gctgataccc atgtatagtt 120
cccactcatc tcaaatatcat ctgctatctt tttaagctaa gtcctagaca tatcggggat 180
aacatggggg ttgattagtg accacagtta tcagaagcag agaaatgtaa ttccatattt 240
tatttgaaac ttattccata ttttaattgg atattgagtg attgggttat caaacaccca 300
caaacctttaa ttttgttaaa tttatatggc tttgaaatag aagtataagt tgctaccatt 360
ttttgataac attgaaagat agtattttac catctttaat catcttgga aatacaagtc 420
ctgtgaacaa ccactctttc acctagcagt atga 454

<210> 416

<211> 370

<212> DNA

<213> Homo sapien

<400> 416
ccgacacggg gccagcgccc tgctgcgtgc ccgccagcta caatcccatg gtgctcattc 60
aaaagaccga taccgggggtg tcgctccaga cctatgatga cttgttagcc aaagactgcc 120
actgcatatg agcagtcctg gtccttcac tgtgcacctg cgcggaggac gcgacctcag 180
ttgtcctgcc ctgtggaatg ggctcaaggt tcctgagaca cccgattcct gcccacacag 240
ctgtatttat ataagtctgt tatttattat taatttattg gggtgacctt cttggggact 300
cgggggctgg tctgatggaa ctgtgtattt atttaaaact ctggtgataa aaataaagct 360
gtctgaactg 370

<210> 417

<211> 463

<212> DNA

<213> Homo sapien

<400> 417
acactttata tattccaaat tgatcagata tatgggtttgc aaattcatct caatctgtag 60
cttatctttt cctcttctta aatcacaagt ttttaaattt tgaagaagtc caatatatca 120
gattttgtct tttatggatg tgctttcggg gcaaagtcca agaacttgct acctagccca 180
agatcctgaa gatttttctc ctgtggcttt tttcaaagtt atctagtttt atgtatcaca 240
tttaagtccg ttatacatct tgagttaaatt tttatataag atgtgaggtt taagtagagg 300
ttcttttttc tcttcgccat ggggtgtctaa ttgctctagc ataatttgct agaaaggcta 360
ttcttctctc attgaattgc tttttcactt tttcaaaatc agctgagcat atttatatgg 420
gtttatttct ggggttctctc atctgttcca ttgacgtatg tgt 463

<210> 418

<211> 334

<212> DNA

<213> Homo sapien

<400> 418
ttagcatttg cttttatttt ttacttttga tgccttttca aattggcatg tctttaaagt 60
atttttcttc ctgattaaaa atgtgtgtgt atgtgtgtgt gtgtgtgtat atatatattt 120
ttttaaatca cattaatttt accaagtga accaagccat actgtttttg agccaattaa 180
gaaaattgcc attttttaaag tgtagcattt cagggtaaag acccatgaaa tggcttgatg 240
tattctagac tactgaaaga aaaccacttc aaagattttg ttgaaagttt tagtgttgtc 300
tgaaatgcaa gaggggaagg gattggtagt gagg 334

<210> 419

<211> 297

<212> DNA

<213> Homo sapien

<400> 419

acttctttga	ccaaggaata	ccacagacac	cctaccgata	gaacagtggc	tcagatctta	60
cttgctcctg	cttacgaagt	attcccaatc	actgggtcatc	tgaccctact	tgaacactcc	120
tgaacagtca	tgTTTTTTaa	aatcttcctt	tatatcaagt	cagagagtat	acttctataa	180
atttacttca	tggatgttag	gaaatctagt	catcttcctt	gtgattgccc	tgTTAAGtat	240
ttaaccatag	ctatcatgtg	tttcccaaat	cttctctaga	ttaaatatct	tcagtta	297

<210> 420

<211> 418

<212> DNA

<213> Homo sapien

<400> 420

acgagaggaa	ccgcagggtc	agacatttgg	tgtatgtcct	atcaatagga	gctgtatttg	60
ccatcatagg	agggttcatt	cactgatttc	ccctattctc	aggctacacc	ctagacccaa	120
cctacgccaa	aatccatttc	gctatcatat	tcctcggtgt	aaatctaact	ttcttccac	180
aacactttct	cggcctatcc	ggaatgcccc	gacgttactc	ggactacccc	gatacataca	240
ccacatgaaa	tatcctatca	tctgtaggct	cattcatttc	tctaacagca	gtaatatata	300
taattttcat	gatttgagaa	gccttcgctt	cgaagcgaaa	agtcctaata	gtagaagaac	360
cctccataaa	cctggagtga	ctatatggat	gccccccacc	ctaccacaca	ttcgaaga	418

<210> 421

<211> 304

<212> DNA

<213> Homo sapien

<400> 421

acgcctggac	ccctgtgact	tgacgcctat	ctttgatgac	atgctccact	ttctaaatcc	60
tgaggagctg	cgggtgattg	aagagattcc	ccaggctgag	gacaaactag	accggtctatt	120
cgaaattatt	ggagtcaaga	gccaggaagc	cagccagacc	ctcctggact	ctgtttatag	180
ccatcttctt	gacctgctgt	agaacatagg	gatactgcat	tctggaaatt	actcaattta	240
gtggcagggt	ggtTTTTTaa	ttttcttctg	tttctgattt	ttgttgtttg	gggtgtgtgt	300
gtgt						304

<210> 422

<211> 578

<212> DNA

<213> Homo sapien

<400> 422

actgtgcagg	cagattcaca	gggtggtggt	aaagcatcca	caatggctct	ggcagcatca	60
ggatcacact	tgaaggggct	ctcagacaaa	gttgatttca	tgcaactgat	tccttttcca	120
ttcgttttct	tagtactaa	tgctttccaa	tggtcatgag	tgcttttaat	aatatcaatg	180
gcaaagtcc	tatctttaaa	ttctgcatta	aacgcaaact	cattttctgg	tttccatca	240
ggaaccttat	accttttaaa	ccagtcacac	gtagcttcta	agtagccagg	tttcagccgt	300
ttgacatcat	tgatattcatt	ataattggct	gcatcaggat	catccacatt	aatggcaatg	360
actttccagt	cggtttcccc	ttcgtcaatc	atagccaata	tgccatagaac	tttcaattat	420
ttatttcacc	tcttgacat	accttgcttc	caatttcaca	cacatcaatt	gggtcattgt	480
caccacaaca	gccagtatgt	ttatcattgt	gccctgggtc	ttcccaagtc	tgagggatgg	540
caccatagtt	ccagatatat	cctttatagc	ggaacaaa			578

<210> 423

<211> 327

<212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(327)
 <223> n = A,T,C or G

<400> 423
 acagtatatt tttagaaact cttttttcta ctaaaacaaa cacagtttac tttagagaga 60
 ctgcaataga atcaaaatct gaaactgaaa tctttgttta aaaggggttaa gttgaggcaa 120
 gaggaagcc ctttctctct cttataaaaa ggcacaacct cattggggag ctaagctagg 180
 tcattgtcat ggtgaagaag agaagcatcg tttttatatt taggaaattt taaaagatga 240
 tggaaagcac atttagcttg gtctgaggca gggtctgttg gggcagtggt aatggaaagg 300
 gctcactgnt gntactacta gaaaaat 327

<210> 424
 <211> 384
 <212> DNA
 <213> Homo sapien

<400> 424
 acgaaaaata aatctcctta aaaactaaat aaaatgcact gtattcttac agttaatggt 60
 tataactata gtaaaaaatt aatatatata ctattacata aatgttatct cttaggtggt 120
 ccattaagaa gagcaataga ataatgctaa aaaataatgc ctataaatct tcagagata 180
 aagacatcca ttcagaaaca aaaattagca ctaaaatttt tataaaatag accagatgac 240
 aaaatttatt ttatttttaa acagtgggtt tgacacaaat tatgttattg aaagcatta 300
 ttaatgttta atttatttaa aattttggaa ttgcccatt ctcagagaat gatcaggcct 360
 taggaaatta atacagtagt agta 384

<210> 425
 <211> 255
 <212> DNA
 <213> Homo sapien

<400> 425
 actatcaggc tttgtgctga tttcctgaac aaactgcatt atattatgaa aacaaaagga 60
 aaagaagaaa taataaaaac tatactccca ttttctactt acagtgttg agttcctgga 120
 aggacctata taatggaggc agcattcaaa caagaaatta tgccaatcaa ctgtcaaatt 180
 ttcactataa ttttcctaaa aaggcgtttt tcccccaata tctattaatc tcaaagaaac 240
 ataagttgtg aatgt 255

<210> 426
 <211> 196
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(196)
 <223> n = A,T,C or G

<400> 426
 acatgaantn nccaggccca cacagccaga cagcaacaga accaagacct agggctcttc 60
 actcctgtta catcacacca tggcaatgat ttacattct ccaactgatt caaatcatat 120

ggcagctagg gatttggggg ctccatgttt tatttcaatt gcaagttcaa gatttctttt 180
tatctttgtg ggctga 196

<210> 427
<211> 163
<212> DNA
<213> Homo sapien

<400> 427
acagaagatc catggaggca agtgctgtca ggaaggacac tgcctccctc caccctccca 60
aatgtcacca ccaagttcct tcaggtgaga cctcacacaa tgtcaagtc tttctaggaa 120
atactaagat caggttgaga gattctgctt ggtctagtca atc 163

<210> 428
<211> 315
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(315)
<223> n = A,T,C or G

<400> 428
nactgagtan agatgctggg gaatgtgcaa tatgccttga agaattgcag cagggagata 60
ctatagcacg actgccttgt ctatgcatat atcataaagg ctgcatagat gaatgggttg 120
aagtaaatag atcttgccct gagcacctt cagattaagc gtcagcttcc tgttttatag 180
gttttcttgt cttgacaaga tgcttgaaaa accaagagga tatgaaaatc tgtctctgga 240
gaaacaaaga cgcaggcata ctcagccaga aatctgagtt ttgtgagact tggtaataca 300
gagatggaca atcgt 315

<210> 429
<211> 131
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(131)
<223> n = A,T,C or G

<400> 429
acagttaggn actagaacat ttgttaagcc tcccaaagta gngtgcattg aagattctag 60
agtgtccagc tcttgcaact caaatgtaat aataacagaa taaatacact taccctgatg 120
atattgaggg t 131

<210> 430
<211> 503
<212> DNA
<213> Homo sapien

<400> 430
actgattttt aataaaagaa ataagggttca aagtttagca caacaacaca gcaataagaa 60
gctgacaact tggataaaaa tacaagaaag taacacagag cccaggctac ccattattta 120
ctgtgtgcat acaggaatgc tatacttcag atgtataaat tagagactga ttttaagtta 180

ttaattttaac tactttttgt ccactgtgct aaactaaatt ttataactaat gtgctactgc	240
gtaaactactt caaagcaatc ttcattaaaa tgctgcaaag aaaaacaaga atacacatca	300
tccaaaacta aggatgtcat tgcagttcac agtttgtata ataaataccc tccctttcaa	360
tcactactaa gatcactaca tcctatctac tcatcagcac aaccttgaag caacttatac	420
ttacaaatat tagcaatgca gccaaacatt tgttttttgc aaagcaacta gtaaaaatca	480
agaattttta ttaagacggg gca	503

<210> 431

<211> 207

<212> DNA

<213> Homo sapien

<400> 431

acaagtgtgg cctcatcaag ccctgccag ccaactactt tgcgtttaaa atctgcagtg	60
gggcccgcga cgctgtgggc cctactatgt gctttgaaga ccgcatgac atgagtcctg	120
tgaaaaacaa tgtgggcaga ggccaaaca tcgccctggg gaatggaacc acgggagctg	180
tgctgggaca gaaggcattt gacatgt	207

<210> 432

<211> 485

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1) ... (485)

<223> n = A,T,C or G

<400> 432

aaaaaaagta atggaaaaat gggtgcaggt ttaatcncaa aangaactta attttngtng	60
attttgtttt atctgctaaa acactaatat ctataaatat gaactgacag catcgttcta	120
aatttacttc tgaagagctg tcgagacttc aataaaatat aagcaagtta ctggatcata	180
tttatggact gctgaattaa ctacccgaaa agtatcagtt actttcaaag aacacaaaac	240
aaagtgaacg tggaaaaaag ccttctttgc aaaagtcctt ttattagtcc taccctctaa	300
aatccaagc cacagagcct tgatattcct ggattctgtt ttaagtaacc ttagttttta	360
atagacact tgggatatgc acaatgggaa agggtaggat atgtgaacaa aatttaattt	420
ctttttcca aaggnagnca ttttctttta atncatccta tccacttttg cccacttccc	480
catgt	485

<210> 433

<211> 280

<212> DNA

<213> Homo sapien

<400> 433

actgtcacta caatattaca ttctgcaaat gttattctgt tgtatcagat acaaaatttt	60
agtgaggtat ctctaaggca catagtagaa aacaaaattg gttaattact caagttcctt	120
tcactgtgat ttggaaatga tttaatcttt atagaatgag aacctttttt ggactagctt	180
ttttattaaa atggctcaat ttgtgttgat aaggattgca ttaatattta atagtgcctg	240
cttttctctt gggcacacca ttttgatcat taaccagagt	280

<210> 434

<211> 234

<212> DNA

<213> Homo sapien

<400> 434

ctttgctgcg	catcaggtgc	tttaagcttc	ggaacaactg	tgcaggattc	tattttagta	60
ttctggaagc	atcattgagg	aagtagtcca	gtgaagttag	ctctaaaaaa	actctttact	120
ctaacaatta	aaagaaatat	gccaaaggat	ccataaggga	tgaataaatt	attaaactat	180
taagaagttg	ctataaatat	gcagtgttaa	ttcaataatt	cataacggac	tggt	234

<210> 435

<211> 330

<212> DNA

<213> Homo sapien

<400> 435

acctcccgtg	tcaccagttc	ccacagaagc	actgcaaaac	tcacatgtc	tgctgagcgt	60
ctgttttgt	cttcaggctt	cttctgcaga	gcttcggggg	ctaccagggc	aggtgcatac	120
atgcgaccag	gacattggaa	agagaacttg	acatcagcca	tgctaattcg	ggcagtcagt	180
tcctcatcaa	tcattacact	acggctattg	agtgcattgc	gtgggatgag	gggctctagt	240
gtgtgtagga	aagccatgcc	ccttgccatg	tccaaagcaa	acttcacagc	ctggctctgg	300
tcacgacga	aattggtgcc	ttcatgtagt				330

<210> 436

<211> 311

<212> DNA

<213> Homo sapien

<400> 436

acaactttac	aatggaattg	tatttcaatg	attattttga	tatcagatta	aaccttccaa	60
aaagttacac	ataattcagg	tctatTTTTT	ctaccagtaa	gagttctgct	aaattacaaa	120
accccataat	cacagtgttc	agtttttaaa	aaattaaaca	cacagtaatc	ctgtcaatgt	180
taatcaaaat	caaaaacttcg	gaatgccgtg	gcatttatgt	gaccaatctg	agtttttagat	240
acaaatacca	gctgtttatc	ccatgaacca	tttttcctag	gctgaggctg	tgaaaaatcg	300
aaagtcggcg	t					311

<210> 437

<211> 355

<212> DNA

<213> Homo sapien

<400> 437

actagtggat	gggggtcagg	gtgtcactcc	aaggccctct	acagacccag	agaagaggaa	60
agtcaaaaaa	gccagatatg	agactgctga	agtggtgtta	agaaatatag	gcaaggtaaa	120
gggaacaaga	tctgggctcc	ctcctacttg	tgtccctcac	tggaacctag	acaccctacc	180
tctaagactg	gttcttagaa	ggctgaacag	taaggagcat	tccaatagct	tctgaaactc	240
ccaaggctgt	ttcaagtagt	cgaaagccat	ccctggactg	ttcaggtgcc	ttttctatTT	300
cccacctgag	ctctctgccc	tttcttttag	cctcacaggt	ttccagaatt	acagt	355

<210> 438

<211> 431

<212> DNA

<213> Homo sapien

<400> 438

acagtaactt	taactttaca	tagagctgag	ataaaaaataa	agcttttctta	caaattacat	60
tttttttcca	gtgaattact	tttgagtaa	aaatagctgc	tacataaatc	cctcctgacT	120
tctgaaaagg	agttgcatat	ttccaaaaat	aatattctta	ttttaatcac	acagaagaac	180

gtggagcaca	ggaaggaaat	ggctgggtgg	tcagagagag	gtgagctgtc	ggagaaacac	240
agttaaacta	aaaaataaaa	tccattttgt	gtataaaactg	acttaaacgc	atgcaaagaa	300
gtggaaaaca	tatgccattt	gtcaagaaaa	atactgcttt	atagctttta	ctttacaatt	360
aaaggagaaa	gcagaggcca	gatataagcc	cagataataa	catttaagtt	tctcataaaa	420
ctcccaaagt	t					431

<210> 439

<211> 170

<212> DNA

<213> Homo sapien

<400> 439

actgtcataa	aaaacagtgg	agctctgtat	tagaaagccc	ctcagaactg	ggaaggccag	60
gtaactctag	ttacacagaa	actgtgacta	aagtctatga	aactgattac	aacagactgt	120
aagaatcaaa	gtcaactgac	atctatgcta	catattatta	tatagtttgt		170

<210> 440

<211> 400

<212> DNA

<213> Homo sapien

<400> 440

acgtaaaaag	aacatccttc	ccatcttcaa	ggtcaagatt	gaacgctgac	tcctgcagga	60
agtcttccag	gattcccagg	caggaatgat	ggctccctgt	ccctgtagct	ccaggagtgc	120
ttgcttcacg	cacgcctcac	ataccagact	gaatgttygc	aggaggagtg	accaggctcg	180
tcctctgtgt	ccctaccacc	tacaacaggc	cagcaatcta	cccggtgtgtg	tttgttggac	240
agaattaacc	atgatgggcg	gccgagygcg	cctggagcta	tttgggggct	tygagagaa	300
ctcttaggag	agtgtcaggc	tctaggccag	tgtcaccaga	ggaggtcagt	ctcagtcctt	360
ggagtgggtg	gatggaaacc	agacgggact	ggcatggtcc			400

<210> 441

<211> 204

<212> DNA

<213> Homo sapien

<400> 441

acctagttag	ttcttaagat	caggtgtata	aaactgtgga	gtggagcggt	atggtatgga	60
atgacttgga	atgtaagctg	tcaggagagaa	aatgttggtta	cacttttgct	aagatctggg	120
ggtttcttca	tattctctgt	gttggaagca	gttgaccaga	aatgcttgcc	agtactgcca	180
aagcactgct	gtgaaatgtg	aagt				204

<210> 442

<211> 649

<212> DNA

<213> Homo sapien

<400> 442

acatttaatt	ttttacaaca	ttttctccct	agagatatata	tttagatatt	cctatcttca	60
aagtaaaaaat	caaaatagga	aataagcata	gaaacagcct	attggcagtg	gttacacctg	120
catggatatt	atgagtctcc	aaactattgg	aaattttatt	caaccaaggt	tcctctaagt	180
cttcattact	tggtgtgtaac	tcgagagaaa	actaatttat	atcaatttac	agtttagtgg	240
tcattgatcag	gggaaagtga	tactcttcca	ctgactacaa	gtcattgcag	aggcagttta	300
gaacttttcc	tttattccta	atatacagga	caaacccttg	cgacatctca	ctacctcaaa	360
aatcaaattt	aaatgaagta	tccaggagta	gcctaaagaa	tgagtgtaat	ctggatggat	420
tttagtctaa	atztatgcct	tgctcttcag	taaagtatat	taactccaga	tatatgttcc	480

acagatgcaa taatttctgt tccttggtcg gtgcagaata taatttatac ttcttgaaat	540
caactttgtc tattcatgaa aatagctgct ttttatttgc ctttgtctca ctttgaatat	600
atatgatcca caggttacag acttttccaa taactacatt tcaacttgt	649

<210> 443

<211> 346

<212> DNA

<213> Homo sapien

<400> 443

acgtgggatt gaaatgcaca tacatgtttt tgctaagagc acatacattt cattctcctc	60
actttgttca taacctcagc attgtcagat aacctcagtg agttaactca aagcctttta	120
ttatggaaag aactggcaca gttacatttg ccagtggcaa catccttaaa aattaataac	180
tgatgggtca cggacagatt ttgacctag ttcttttttc ttttagagca aaaagaactt	240
ttacctcggc atccagccca acccctaaag actgacaata tccttcaagc tcctttgaaa	300
gcaccctaaa cagccatttc cattttaata gttggatgcg gattgt	346

<210> 444

<211> 425

<212> DNA

<213> Homo sapien

<400> 444

accaattttcc ttttacagta aaggggcttt tctgtttgct tgttgaaccg gttcccagct	60
gcccattacc accaagccca aaagagtaaa ttctgtctga tgaaggaaca aaagcagaag	120
tgtgtgcgcg tccacaagca atctcagtga caatgcttcc cataagttca aaaactttcc	180
ttgggtttat ttcctgactg gtagaattat ggcccaactg accataccct ccagctccaa	240
aagtaaacac tccaccttcc ttgggttagag cagcagtatg atcttctcca caacaaatat	300
aaactatttt ctgagatctt agtgacttta gttaaattagg aacataccta tcattttcat	360
cattaagacc tagctgacca aacttgttgc gtcccatcc aaagatagct ccagaaaagg	420
tgagt	425

<210> 445

<211> 210

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(210)

<223> n = A,T,C or G

<400> 445

nactgtccca atataaaaca gtaattattt gacctttgca ctgtttgtct ggctcttttc	60
agtttgattg catataaatg tggaacttga tagatctcta tatttttaaat gcacttgtga	120
taaactggca gcagggttag acattacttt caaagcttga ggtagaccga gtcagcatgc	180
tagacagget tctctctcta accaaaactg	210

<210> 446

<211> 326

<212> DNA

<213> Homo sapien

<400> 446

tcgaaagacc cctgtaaaag agcccaacag tgaaaatgta gatatcagca gtggaggagg	60
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cgtgacaggc tggaaagagca aatgctgctg agcattctcc tgttccatca gttgccatcc      120
actaccccggt tttctcttct tgctgcaaaa taaaccactc tgcccatttt taactctaaa      180
cagatatttt tgtttctcat cttaactatc caagccacct attttatttg ttctttcatc      240
tgtgactgct tgctgacttt atcataattt tcttcaaaca aaaaaatgta tagaaaaatc      300
atgtctgtga gttcattttt aaatgt                                     326

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<210> 447

<211> 304

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(304)

<223> n = A,T,C or G

<400> 447

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ncntcnaggt acatgctaga agtctgatgt ngtnngtaac acagaaacat acacagtctt      60
catattcaaa gtcttcacng ggatgtcggt ctgtaatttc ctgcgtttgg gtctcttcca      120
gaaacagctt tagcttcctg ctccgaaggc caaacacctt ggctgcttca tacagaagac      180
cttggtgggt gagtccattc tgcccaagtg ggttttcaag caggagagtg cccactgtcc      240
ccattaaaca ctcttgtagc tttgcattca ggagctgtag gttgatatac tgacaaggaa      300
gagt                                     304

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<210> 448

<211> 203

<212> DNA

<213> Homo sapien

<400> 448

```

acatgaaagc ggcaatgcgg taaaaagcga attcttacct aaggtcagaa ttttttatta      60
agcgcathtt cattagttgg acaacaaccc ttataaaccc ttatgtcaaa ccatataatg      120
tgaagaatct ccatgggaga gatttttttt cacccttcag aattatcttt ttcccctaag      180
accttcatat gaatcttcct tgt                                     203

```

<210> 449

<211> 481

<212> DNA

<213> Homo sapien

<220>

<221> misc_feature

<222> (1)...(481)

<223> n = A,T,C or G

<400> 449

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acttgttcta taatactctg atgtttcctt aaattcctga acaacattct gtttactaaa      60
tttcttttct tcctttattc acaccaaatt ccaccctata atagaagcta attatttcag      120
aaagcttttt agtgatcatt tattactttg tgtttactag atattaattc taagatgaat      180
tccttttagaa ttttagaaaa aattattcta gacaacaatc aaagtaaagg atacatccag      240
cattgaaacc ataagccggc aagtctccag gttaaaagggt ttgtatcctc cagcaatgcc      300
agactgtgtc agacatctct gcaattcatc agcatctatc tgcccatcct gtccagctac      360
agcagcaaag taaccatata gcggatcctg agtttgctcg ggaaacgcag gccctccggg      420
agccctcca tactgcatct tgagttgaag tcttatangt agaagctggg gatccttaga      480
g                                     481

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<210> 450
 <211> 296
 <212> DNA
 <213> Homo sapien

<400> 450
 acatgggttta atacaacaac aaaaaaattt aatcaagtga aacgtaataa actgaacaat 60
 aaacactcaa aacattttcc attggaaaca tgtaaagaca atatgagggt ttgttaccat 120
 cttactgcaa ttttcttatg tgttactagt ctacataccc catgttttct gtaatcatgc 180
 agatgtgaat ggaagtttga atgattaaat aaatgaaaag tccgtttact gcaggggaatc 240
 atttcacaag gcagccaaac cgggttttaga gaacaaaact attcaagaaa ttctcc 296

<210> 451
 <211> 294
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(294)
 <223> n = A,T,C or G

<400> 451
 acatgntcca aggcacgcgn ctgtgaactt cctctgagtg aaggcatccc ctccagcacc 60
 tttcagcctg ctagttagga cgacccgcgc ccacctcca ggacctccag cctgtcactg 120
 cctttctctt cttttaaata attcttcatt gagttctaat atgtaaaaaa aaagtttact 180
 gttaaagttt caaataanga aatttttttt aaaagtcctc agtaatctta ccagtaacaa 240
 ttgttatggg cacatttgct tttggaagat ttctttttgta tgcattggat aagt 294

<210> 452
 <211> 129
 <212> DNA
 <213> Homo sapien

<400> 452
 acttttagat cacaaatttg cctttaagta acacataata cacttaaggc agatttgcct 60
 tacaggtggc ctgagcttct aaacaccact acactgcttt atataaaaaa caaaaatcac 120
 atagaagag 129

<210> 453
 <211> 151
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(151)
 <223> n = A,T,C or G

<400> 453
 actctcaann tgtatttagg tgccaacaca tttaggatca ttgnngnttc tcagtgaatt 60
 gaccttttta tgagaataaa atgtctatct ctgaaatgtc cctatttctg gaaatgttcc 120
 ttatactaaa gtccaacttg tgtggattan t 151

<210> 454
 <211> 119
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(119)
 <223> n = A,T,C or G

<400> 454
 tgctgatgna gcatgctttt taaatccttt aaaaacactc accatataaa cttgcatttg 60
 agcttgtgtg tttctttgtt aatgtgtaga gttctccttt ctgaaattg ccagtgtgt 119

<210> 455
 <211> 515
 <212> DNA
 <213> Homo sapien

<400> 455
 accttataaa gttccttttc atcctttctct gtcttcaact gacattcaag ttgttctctt 60
 tcatgttgtg ccttcttgag tttggccttt aaactgtcta attcggtttc tttttcaatt 120
 gctttatgtg ttactgacac aatatcttcc tcaagctgat gggctttgga tgtagcatca 180
 ctgaacctct tcttaaactc ttcattttcc atttttaagc tttgtgttac ttcagtaaga 240
 cccttttgtt ctgcttgacg ttgggtcacat ctttctttct catgggttaag ttctctttcc 300
 attctcccaa cttgttctcg aagttgtgct gtttcttttt ccagaacggc aattaacttt 360
 aacagttctt cttttctctt catgggtttc tcaattttca actcaagaag gctgctttt 420
 gtgggtacca ctaacatgtc agaatttctt tcctcttcca tagtaagcag ctcttcaact 480
 ggagaagaag ctgaaactg gaaaggtgta cctgc 515

<210> 456
 <211> 350
 <212> DNA
 <213> Homo sapien

<220>
 <221> misc_feature
 <222> (1)...(350)
 <223> n = A,T,C or G

<400> 456
 actccccctc ccaaataaga acctcaaaga ctgatccatt tcccctaggg cctggggccag 60
 gagtagctca ctgctcactg ctgaggagaa aggcacaaga tataatgtca taagagcagg 120
 acagtggctc agcctacaga gttccctata ggggaaagaa ggcaggaaat aggcgcaggg 180
 tctggtcctg tccctgcacc accctgagca gctagtcttg ggaagggatt acaggccctg 240
 ggccataggg tgctcgccat tctgctttcc tatcctgttt ctctccctgt gctgctcct 300
 tttagccagn gctgagaaat gttcancacc tgaggcaaaa ctgccatagt 350

<210> 457
 <211> 293
 <212> DNA
 <213> Homo sapien

<400> 457
 gcagggccaa cagtcacagc agccctgacc agagcattcc tggagctcaa gctcctctac 60

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aaagaggtgg acagagaaga cagcagagac catgggaccc cctcagccc ctccctgcag      120
attgcatgtc ccctggaagg aggtcctgct cacagcctca cttctaacct tctggaaccc      180
accaccact gccaaagctca ctattgaatc cagccattc aatgtcgcag aggggaagga      240
ggttcttcta ctgcccaca acctgcccc gaatcgtatt ggttacagct ggt              293

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<210> 458
<211> 500
<212> DNA
<213> Homo sapien

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<400> 458
actagactcc agattaccct ttcttaataa atatctcagg gtaaggaaag aaagaaactg      60
tatagatata tttaaaatag agaatacttt ccaagcaata catgatgcct ttcctaaaag      120
actctaaaag aaaaagattc tctaactctc ttttagcacc aaattattgt ttatcttgct      180
ggatatttta tatgaacagt gttaatttag atgcactaaa gcaaaggtag gcaaactaca      240
accatgagtc aaacatggcc acaccattc atttgctatt gtctaagctg gttttgcact      300
acaactgcag agttgaatag atgcagcaga tcttttacag aaaaagtttt ctgacctcaa      360
ttctaaagta attgtagtag ggagctggag gactttcttt ccctttatgg taattttttg      420
agctacaaaa agagccttgc agaaatgggt gaagggatta atctttttaa aataaatgct      480
atatatttag aaaataaaaa

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<210> 459
<211> 394
<212> DNA
<213> Homo sapien

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<400> 459
ggtgaaaaga cttgatTTTT tgaaaggatt gtttatcaaa cacaattcta atctcttctc      60
ttatgtatTT ttgtgcaact ggcgcagttg tgtagcagtt gagtaatgct ggtagctgt      120
taagggtggc tggtgcagtg cagagtgcct ggctgtttcc tgttttctcc cgattgctcc      180
tgtgtaaaga tgccttgctg tgcagaaaca aatggctgtc cagtittatta aaatgcctga      240
caactgcaact tccagtcacc cgggccttgc atataaataa cggagcatac agtgagcaca      300
tctagctgat gataaatata cctttttttc cctcttcccc ctaaaaatgg taaatctgat      360
catatctaca tgtatgaact taacatggaa aatg

```

```

<210> 460
<211> 279
<212> DNA
<213> Homo sapien

```

```

<220>
<221> misc_feature
<222> (1)...(279)
<223> n = A,T,C or G

```

```

<400> 460
actnccgatt gaagccccca ttcgtataat aattacatca caagacgtct tgcactcatg      60
agctgtcccc acattaggct taaaaacaga tgcaattccc ggacgtctaa accaaaccac      120
tttcaccgct acacgaccgg gggatatacta cggtaatgc tctgaaatct gtggagcaaa      180
ccacagtttc atgcccacgc tcctagaatt aattccccta aaaatctttg aaatagggcc      240
cgtatttacc ctatagcacc ccctctagag caaaaaaa

```

```

<210> 461
<211> 278
<212> DNA

```

<213> Homo sapien

<400> 461

```

tttggacact aggaaaaaaac cttgtagaga gagtaaaaaa ttttaacaccc atagtaggcc      60
taaaagcagc caccaattaa gaaagcggtc aagctcaaca ccactacct aaaaaatccc      120
aaacatataa ctgaactcct cacacccaat tggaccaatc tatcaccta tagaagaact      180
aatgttagta taaagtaaca tgaaaacatt ctctccgca taagcctgcg tcagattaaa      240
acactggact gacaattaac agccaatatc tacaatca      278

```

<210> 462

<211> 556

<212> DNA

<213> Homo sapiens

<400> 462

```

aacgtccaag gggggccacat cgatgatggg caggcgggag gtcttggtgg ttttgtattc 60
aatcaactgtc ttgccccagg ctccgggtgtg actcgtgcag ccatcgacag tgacgctgta 120
ggtgaagcgg ctggtgccct cggcgcggtat ctcgatctcg ttggagccct ggaggagcag 180
ggccttcttg aggttgccag tctgctgggt catgtaggcc acgctgttct tgcagtggta 240
ggtgatgttc tgggaggcct cgggtggacat caggcgcagg aaggtcagct ggatggccac 300
atcggcaggg tcggagccct ggccgccata ctcgaaactgg aatccatcgg tcatgctctc 360
gccgaacccg acatgcctct tgccttggg gttcttgctg atgtaccagt tcttctgggc 420
cacactgggc tgagtggggg acacgcaggt ctaccagtc tccatgttgc agaagacttt 480
gatggcatcc aggttgccag cttggttggg gtcaatccag tactctccac tcttccagtc 540
agagtggcac atcttg      556

```

<210> 463

<211> 659

<212> DNA

<213> Homo sapiens

<400> 463

```

cacactgtgc ccttccagtt gctggcccgg tacaaaggcc tgaacctcac cgaggatacc 60
tacaagcccc ggatttacac ctgcccacc tggagtgcct ttgtgacaga cagttcctgg 120
agtgcacgga agtcacaact ggtctatcag tccagacggg ggcttttgt caaatattct 180
tctgattact tccaagcccc ctctgactac agatactacc cctaccagtc cttccagact 240
ccacaacacc ccagcttctt cttccaggac aagagggtgt cctgggtccct ggtctacctc 300
cccaccatcc agagctgctg gaactacggc ttctcctgct cctcgagcga gctccctgtc 360
ctgggcctca ccaagtctgg cggctcagat cgcaccattg cctacgaaa caaagccctg 420
atgctctgcg aagggtctct cgtggcagac gtcaccgatt tcgagggctg gaaggctgcg 480
attcccagtg ccttgagacac caacagctcg aagagcacct cctccttccc ctgcccggca 540
gggcacttca acggcttccg cacggtcac cgcctcttct acctgaccaa ctctcaggt 600
gtggactaga cggcgtggcc caagggtggt gagaaccgga gaacccagg acgccttca 659

```

<210> 464

<211> 695

<212> DNA

<213> Homo sapiens

<400> 464

```

accttcattt gaccccatca gcttcagggc cttctttaca tttccactgg cctgatccat 60
gtatgcaatg ctatTTTTTgc agtgatatgt gatgttctgg gaagctcggc tggagagaag 120
tcgaaggaat gccagctgca catcaaggac atcttcagga agttcaggat tgccgtagct 180
aaactgaaaa ccaccatcca tggactctcc aaaccaaacg tgtttcttct cagcactaga 240
atctgtccac cagtgtttcc gtggaacatt caaaggattg gcacttatgc atgtttcccc 300

```

```

agtttccata ttacagaata ccttgatagc atccaatttg catccttggt tagggccaac 360
ccagtattct ccactcttga gttcaggatg gcagaatttc aggtctctgc agtttctagc 420
gggggttttta cgagaaccat caggactaat gaggcctttc atttgtccat taacagactt 480
gagtgaagtc ataatctcat cgggtgttgat tttgaaatcc attgggttcat ctccataata 540
cggggcaaaa cgcagcgtt tttcacctcc aatcccagca atggcagcgg ctccaacacc 600
accacagcaa ggaccagggg caccaggagg tccaggaggg cctgggttgc ctgggtggcc 660
tggggagccc tcagatcctc tttcacctct gttac 695

```

<210> 465

<211> 73

<212> DNA

<213> Homo sapiens

<400> 465

```

caggtccaga gctcccaggt ttccagggtt cagtcctctc agtcccagag ctcccagggt 60
ttcggtttcc agt 73

```

<210> 466

<211> 507

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> (1)...(507)

<223> n = A,T,C or G

<400> 466

```

agcactggca gaggnagcca aatatagtga tgtgcgccag agataagtat tctcctctcc 60
aagcatattg ctatacaaga ctttaaagac ttcataaaag ccaaacttgc agagtccttg 120
catggagtag ccaaggaaaag tcggagccca tccttttagcc aaaccacgaa caccatcctc 180
tttaagtgtg actgagaatc cgttaaatat gcccttgtag ttttgggggt ccacctgcat 240
acggcatttc actaaatcca ggggaaccac agcagtgtgt gtcagaccac aacttaagac 300
cccaccaaag ccacacagtg cataatactt cgcggagcca aattcacaac tgtactcttc 360
cacgycgycg gctgccaggt tgcgagggcg gcggygctgg cccgtgggcc ctggggagct 420
gctgcggagg tccccgagac catcgtgcac canctgcaga tgtggcgtgt tgaaggggtt 480
cgcccgcgcc aggtgcgcca cggacga 507

```

<210> 467

<211> 183

<212> DNA

<213> Homo sapiens

<400> 467

```

cctcatgagc taccggggcca gctctgtact gaggtcacc gtctttgtag gggcctacac 60
cttctgagga gcaggagggg gccaccctcc ctgcagctac cctagctgag gagcctgttg 120
tgaggggagc aatgagaaaag gcaataaagg gagaaagaaa aaaaaaaaaa aaaaggcgcg 180
ccg

```

<210> 468

<211> 129

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature
 <222> (1)...(129)
 <223> n = A,T,C or G

<400> 468
 gcggccgcgt cgaccggcgc cgtcggggcnc cgggcccgggc catggagctg tggacgtgtc 60
 tggccgcggc gctgctgttg ntgntgctgn tgggtgcagtt gagccgcncn gccgagttct 120
 acnccaang 129

<210> 469
 <211> 243
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> (1)...(243)
 <223> n = A,T,C or G

<400> 469
 gcggccgcgt cgacnnggcca tggagactgt ggcacagtag actgtagtgt gaggctcgcg 60
 ggggcagtggt ccatggaggc cgtgctgaac gagctggtgt ctgtggagga cctgctgaag 120
 tttgaaaaga aatttcagtc tgagaaggca gcaggctcgg tgtccaagag caccgagttt 180
 gagtacgcct ggtgcctggt gcggagcaag tacaatgatg acatccgtaa aggcatcgtg 240
 ctg 243

<210> 470
 <211> 452
 <212> DNA
 <213> Homo sapiens

<400> 470
 cctcaagtac gtccggcctg gtggtgggtt cgagcccaac ttcattgctct tcgagaagtg 60
 cgaggtgaac ggtgcggggg cgcacctctt ctgcgccttc ctgcgggagg ccctgccagc 120
 tcccagcgac gacgccaccg cgcttatgac cgaccccaag ctcattacct ggtctccggt 180
 gtgtcgcaac gatgttgctt ggaactttga gaagtctctg gtgggccttg acggtgtgcc 240
 cctacgcagg tacagccgcc gcttccagac cattgacatc gagcctgaca tcgaagccct 300
 gctgtctcaa gggctcagct gtgcctaggg cgccccctct accccggctg cttggcagtt 360
 gcagtgcgtc tgtctcgggg gggttttcat ctatgagggt gtttcctcta aacctacgag 420
 ggaggaacac ctgatcttac agaaaatacc ac 452

<210> 471
 <211> 168
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> (1)...(168)
 <223> n = A,T,C or G

<400> 471
 cttctccgct ctttctanga tctccgcttg gttcggncgg cctgcctcca ctctgcctc 60
 taccatgtcc atcaggtga cccagaagtc ctacaagggt tccacctctg gccccgggc 120
 cttcagcagc cgctcctaca cgagtggggc cggttccgc atcagctc 168

<210> 472
 <211> 479
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> (1)...(479)
 <223> n = A,T,C or G

<400> 472
 gccaggcgtc cctctgtctg ccactcagt ggcaacaccc gggagctggg ttgtcctttg 60
 tggagcctca ncagttccct ctttcanaac tcaactgccaa gagccctgaa caggagccac 120
 catgcagtgc ttcagcttca ttaagaccat gatgatcctc ttcaatttgc tcatctttct 180
 gngtggcgca gccctgttgg cagcgggcat ctgggtgnca atcgatgggg catcctttct 240
 gaagatcttc gggccactgt cgtccactgc catgcagttt gtcaacgngg gctacttctc 300
 catcgcagcc ggcgttgtgg tntttgctct tggtttctct ggctgctatg gtgctaanac 360
 tgagagcaag tgtgccctcg tgacgntctt cttcactctc ctctctntct tcattgctga 420
 ggntgcagnt gctgagggtc gccttgggtg acaccacaat ggctgagccc ttntctgacn 479

<210> 473
 <211> 69
 <212> DNA
 <213> Homo sapiens

<400> 473
 gagcgatgga gcgtgggtag ggaggggtcca cagtgtccac tcgccgtgtg cgaagggtga 60
 ctcggtagt 69

<210> 474
 <211> 155
 <212> DNA
 <213> Homo sapiens

<400> 474
 gccgccactg ccgggagagc tcgatgggct tctcctgcgc gccgcccggg gtctggccga 60
 gtccagagag ccgcggcgcc tcgttccgag gagccatcgc cgaagcccga ggccgggtcc 120
 cgggttgggg actgcagggg aaggcagcgg tggcg 155

<210> 475
 <211> 282
 <212> DNA
 <213> Homo sapiens

<400> 475
 ggcttcgacg ttggccctgt ctgcttctctg taaactccct ccatcccaac ctgggtccct 60
 cccacccaac caactttccc cccaaccggg aaacagacaa gcaacccaaa ctgaaccccc 120
 tcaaaagcca aaaaatggga gacaatttca catggacttt ggaaaatatt tttttccttt 180
 gcattcatct ctcaaaactta gtttttatct ttgaccaacc gaacatgacc aaaaacccaa 240
 agtgcattca accttaccaa aaaaaaaaaa aaagggcggc cg 282

<210> 476
 <211> 434
 <212> DNA

<213> Homo sapiens

<400> 476

```
ctccaggaca gcgctccagct tgggtgctggt gaagacgaag tggagcggat ggttgtagaa 60
acgagtgatg gtgctgagcg gcgtgcagtc ttccgggatcc acgaaggcca agtccttgag 120
gtagagcatg tccacgatgt tggagcgctc ctccctcgta accgggatgc gcgtgtggcc 180
gctctgcatg atgctggcca ggacgccgaa gtccagcacg gtgctggcgt ccagcatgaa 240
gcagtcttcg agggggcgtga gcacgtcctc cacgggtccgg cagcgcagca cgcccttgct 300
gagatcgctg taggggtcgc cgccgccgcg cgccagctcc agcaccgcgt cccgcagccg 360
ccccggccgc gccgccagct ccagcagctg cccacgggc agcgcgacgg gcagagtgag 420
caggacggcc aggc 434
```

<210> 477

<211> 314

<212> DNA

<213> Homo sapiens

<400> 477

```
ggcgggcgct agctggctcc gggcagctcg gccttggggg cttcggggcc ccgagacgcg 60
gggcgtatga gtggggcgtg cgctccacgc ggaagtcgga gcctcctccc ctggataggg 120
tgtacgagat ccctggactg gagcccatca cttttgcggg gaagatgcac ttctgtccct 180
ggctggcgcg gccgatcttt ccgccttggg accgcggcta caaggacca aggttctacc 240
gctcgcccc tcttcacgag catccgctgt acaaagacca ggctgctat atctttcacg 300
accgttgcgg cctt 314
```

<210> 478

<211> 317

<212> DNA

<213> Homo sapiens

<400> 478

```
aacagagtga tcattccagt taagcggggc gaagagaata cagactatgt gaacgcatcc 60
tttattgatg gctaccggca gaaggactcc tatatcgcca gccagggcc tcttctccac 120
acaattgagg acttctggcg aatgatctgg gagtggaaat cctgctctat cgtgatgcta 180
acagaactgg aggagagagg ccaggagaag tgtgcccagt actggccatc tgatggactg 240
gtgtcctatg gagatattac agtggaactg aagaaggagg aggaatgtga gagctacacc 300
gtccgagacc tcttgggt 317
```

<210> 479

<211> 171

<212> DNA

<213> Homo sapiens

<400> 479

```
aggtgctttg ctagatgctg tgacaggtat gccaccaaca ctgctcacag cttttctgag 60
gacaccagtg aaagaagcca cagctcttct tggcgtatct atactcactg agtcttaact 120
tttcaccagg ggtgctcacc tctgccccta ttgggagagg tcataaaatg t 171
```

<210> 480

<211> 65

<212> DNA

<213> Homo sapiens

<400> 480

```
ccccagtgga aaggctccca ccctggtaga tgaacagccc ctggagaact acctggatat 60
```

ggagt

65

<210> 481

<211> 207

<212> DNA

<213> Homo sapiens

<400> 481

```
cacagcgtgc tctgcggggt cactcccact ttgttagtga tgtgggtatc tcctcagatg 60
gccagtttgc cctctcaggc tcttgggatg gaacctgcg cctctgggat ctcacaacgg 120
gcaccaccac gaggcgattt gtggggccata ccaaggatgt gctgagtgtg gccttctcct 180
ctgacaaccg gcagattgtc tctggat 207
```

<210> 482

<211> 319

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> (1)...(319)

<223> n = A,T,C or G

<400> 482

```
cacactgtgc ccttcagtt gctggcccgg tacaaggcc tgaacctcac cgaggatacc 60
tacaagcccc ggatttacac ctgcgccacc tggagtgcct ttgtgacaga cagttcctgg 120
agtgcacgga agtcacaact ggtctatcag tccagacggg ggcctttggt caaatattct 180
tctgattact tccaagcccc ctctgactac agatactacc cctaccagtg cttccaaact 240
gcacaacacc cnagcttntc cttccagnac aagaggggtg cctggtcctt ggcctacctc 300
cccaccatcc agagctgct 319
```

<210> 483

<211> 233

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> (1)...(279)

<223> n = A,T,C or G

<400> 483

```
acaggcccag tggcgccctag ccttcagctg ctgggctctc ccgagcctgc cttagcccat 60
acaaccactt gatcacgcgg gcattgcgct ccaccaccga cacgccatag ggaacgcgct 120
cccgggcccg ctctcaaca gtcaccgagc tgcggcgggg gcagccccct tcagagctgc 180
ccggcccagc actgggccct gccagggaca cnatatccga gctggcccgt gcc 233
```

<210> 484

<211> 194

<212> DNA

<213> Homo sapiens

<400> 484

```
agagcccttg ctgggggggtg cctgggagat ggggtaagaa gagctttcat ttgtctggta 60
gatagatagc atgtaagggg gtggttgtcc caggaggcag ctgctgacag gtttgctaca 120
```

cacagccccg gactgtgttg cctgggtgct cattcagaga ggggctatca tctgggagcc 180
tgtgcccctg ggtc 194

<210> 485

<211> 67

<212> DNA

<213> Homo sapiens

<400> 485

tccatatcca ggtagttctc caggggctgt tcattctacca ggggtgggagc ctcccactgg 60
gggaagt 67

<210> 486

<211> 70

<212> DNA

<213> Homo sapiens

<400> 486

taccgagtca accttcgcac acggcgagtg gacactgtgg accctcccta cccacgctcc 60
atcgctcagt 70