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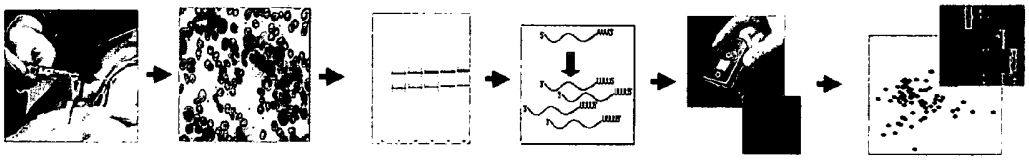
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(54) **Title:** METHODS FOR ASSESSING PATIENTS WITH ACUTE MYELOID LEUKEMIA



(57) **Abstract:** Methods for treating cancer, and preferably hematological malignancy, patients include analyzing gene expression profiles and/or molecular markers of a patient to determine status and/or prognosis of the patient. The invention also provides methods of analyzing whether a non-relapsed or non-refractory patient is likely to respond to treatment with farnesyl transferase inhibitors (FTIs) and, optionally, other therapeutics. The methods are also useful for monitoring patient therapy and for selecting a course of therapy. Genes modulated in response to FTI treatment are provided and are used in formulating the profiles.

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TITLE OF THE INVENTION

METHODS FOR ASSESSING PATIENTS WITH ACUTE MYELOID LEUKEMIA

A "Sequence Listing" listing appendix is hereby incorporated by reference herein.

BACKGROUND OF THE INVENTION

This invention relates to diagnostics, prognostics, and treatments for acute myeloid leukemia (AML) based on the detection of molecular markers and/or gene expression analysis.

Karyotyping is currently effective in providing prognostic value while it also serves to identify biologically distinct subtypes of AML. In addition, mutations in genes such as FLT3, c-KIT, AML1, GATA1, CEBPA and N-RAS are implicated in the pathogenesis of the disease. It is clear that screening for FLT3 and CEBPA mutations can stratify groups that have different risks of relapse. Effective risk stratification can allow for the appropriate use of allogeneic stem cell transplantation or other adjuvant therapies. Two papers published recently describe gene expression profiling of newly diagnosed adult AML patients and its use in predicting clinical outcome. Bullinger et al. (2004); and Valk et al. (2004). These studies show how gene-expression profiling can further refine clinical outcome prediction.

Valk et al. (2004) evaluated 285 patients (bone marrow or peripheral blood) on the Affymetrix U133A chip. The patient samples encompassed a wide range of cytogenetic and molecular abnormalities. Only 16 clusters were identified indicating AML may not be as heterogeneous as previously thought. Several of the clusters corresponded well with the cytogenetically and molecularly defined sub-types of AML thus supporting their use in the WHO classification system. These clusters were also seen by Bullinger et al. (2004) and other previously published smaller studies. Schoch et al. (2002); Debernardi et al. (2003); and Kohlmann et al. (2003). These clusters, not surprisingly, correlated with prognosis since they were associated with well known prognostic karyotypes.

Bullinger et al. (2004) investigated expression profiles from 116 adult patients (65 peripheral blood and 54 bone marrow) using cDNA arrays. In addition to the work done by Valk et al. (2004) they also developed a133 gene classifier for predicting clinical outcome across all cytogenetic risk groups. Using a training set of 59 samples and a testing set of 57 samples they showed that the 133 genes

clustered patients into poor and good outcome groups (p = 0.006 log rank; odds ratio, 10, 95% CI, 2.6-29.3).

Notably, the genes identified in both these studies overlap, only in part, to predictor genes previously identified in childhood leukemia. Yagi et al. (2003). Also, there is no overlap between the prognostic gene set identified by Bullinger et al. (2004) and the 3 genes recently identified that predict response to tipifarnib. US patent application serial no. 10/883,436.

The farnesyl transferase (FTase) enzyme mediates the covalent attachment of a carbon farnesyl moiety to the C-terminal CAAX (C, cysteine; A, aliphatic residue; X, any amino acid) recognition motif. Reiss et al. (1990). This farnesylation is further processed by cleavage of the 3 terminal amino acids (AAX) and methylation of the C-terminal isoprenyl-cysteine. The inhibition of protein farnesylation abrogates the correct subcellular localization required for protein function. Originally, the oncogenic Ras protein was thought to be the target for the antiproliferative effects of FTIs in cancer biology. Reuter et al. (2000). However, it has since been shown that inhibition of Ras farnesylation does not account for all of actions of tipifarnib. For example, FTIs do not always require the presence of mutant Ras protein to produce antitumor effects. Karp et al. (2001). Indeed, while early clinical studies were designed around populations with a high frequency of *ras* mutations, such as advanced colorectal and pancreatic cancer, no significant difference in response rates were seen when compared to placebo. Van Cutsem et al. (2004); and Rao et al. (2004).

Several other farnesylated proteins have been implicated as candidate targets that may mediate the antitumorigenic effects of FTIs including the small GTPase proteins Rho B, the centromere proteins CENP-E and CENP-F, the protein tyrosine phosphatase PTP-CAAX, and the nuclear membrane structural lamins A and B. The inhibition of farnesylation of these proteins may lead to the antiproliferative effect of FTIs and also indirectly modulate several important signaling molecules including TGFβRII, MAPK/ERK, PI3K/AKT2, Fas (CD95), NF-κB, and VEGF. Adnane et al. (2000); Morgan et al. (2001); Jiang et al. (2000); Na et al. (2004); Takada et al. (2004); and Zhang et al. (2002). Regulation of these signaling pathways leads to the modulation of cell growth, proliferation, and apoptosis. Thus, FTIs may have complex inhibitory effects on several cellular events and pathways.

There are currently no methods for determining status or predicting overall survival of these patients.

BRIEF SUMMARY OF THE INVENTION

The invention is a method of using one or more gene signatures for predicting prognosis in patients with acute myeloid leukemia (AML). These signatures can be used alone or in combination depending upon the type of drug treatment.

The present invention provides a method of assessing acute myeloid leukemia (AML) status by obtaining a biological sample from an AML patient; and measuring Biomarkers associated with Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9 where the expression levels of the Marker genes above or below pre-determined cut-off levels are indicative of AML status.

The present invention provides a method of staging acute myeloid leukemia (AML) patients by obtaining a biological sample from an AML patient; and measuring Biomarkers associated with Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9 where the expression levels of the Marker genes above or below pre-determined cut-off levels are indicative of AML survival.

The present invention provides a method of determining acute myeloid leukemia (AML) patient treatment protocol by obtaining a biological sample from an AML patient; and measuring Biomarkers associated with Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9 where the expression levels of the Marker genes above or below pre-determined cut-off levels are sufficiently indicative of response to therapy to enable a physician to determine the degree and type of therapy recommended to provide appropriate therapy.

The present invention provides a method of treating a acute myeloid leukemia (AML) patient by obtaining a biological sample from an AML patient; and measuring Biomarkers associated with Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9 where the expression levels of the Marker genes above or below pre-determined cut-off levels are indicate a response to therapy and; treating the patient with adjuvant therapy if they have a responder profile.

The present invention provides a method of determining whether a acute myeloid leukemia (AML) patient is high or low risk of mortality by obtaining a

biological sample from an AML patient; and measuring Biomarkers associated with Marker genes corresponding to those selected from Table 3 where the expression levels of the Marker genes above or below pre-determined cut-off levels are sufficiently indicative of risk of mortality to enable a physician to determine the degree and type of therapy recommended.

The present invention provides a method of generating an acute myeloid leukemia (AML) prognostic patient report by determining the results of any one of the above-described methods; and preparing a report displaying the results and reports generated thereby.

The present invention provides a kit for conducting an assay to determine acute myeloid leukemia (AML) prognosis in a biological sample comprising: materials for detecting isolated nucleic acid sequences, their complements, or portions thereof of a combination of genes selected from the group consisting of Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9.

The present invention provides articles for assessing acute myeloid leukemia (AML) status comprising: materials for detecting isolated nucleic acid sequences, their complements, or portions thereof of a combination of genes selected from the group consisting of Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9.

The present invention provides a microarray or gene chip for performing the above-described methods.

The present invention provides a diagnostic/prognostic portfolio comprising isolated nucleic acid sequences, their complements, or portions thereof of a combination of genes selected from the group consisting of Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9.

BRIEF DESCRIPTON OF DRAWINGS

Figure 1. Unsupervised clustering of relapsed and refractory AML patients. The dendogram shows the unsupervised k-means clustering of 58 relapsed or refractory AML patients, where each column represents a patient and each row represents a gene. The expression ratio for each gene was calculated by dividing the expression level of that gene in a patient by the mean of all other patients. The color bar

indicates the fold-change (log_2). Red is upregulated, blue is down-regulated. White indicates no change. The presence of 6 main clusters is shown.

Figure 2. Real-time RT-PCR of 2 genes. AHR and AKAP13 were measured by real-time RT-PCR. The HPRT or PBGD control genes were used to normalize gene expression values. Error bars are standard deviations. The resulting values were plotted against the corresponding microarray data and linear regression analysis was performed.

Figure 3 depicts the predictive value of the AKAP13 gene. Panel A shows a 2x2 table generated from a LOOCV performed using AKAP13 expression as a classifier on the responders (R) and non-responders (NR). Panel B shows the AKAP13 expression values for the same 58 patients. The *P* value indicates a significant difference in the gene expression between the mean values of each response group. Panel C shows the Kaplan-Meier curves generated from patients classified by the AKAP13 gene as being responders and non-responders.

Figure 4 provides identification of a minimal set of predictive markers. In Panel A, a LOOCV was performed using a sensitivity of 100%. Independent classifiers were tested that contained from 1 to 19 genes. The resulting error rate is plotted. Panel B shows a 2x2 table generated from a LOOCV performed using the 3-gene signature as a classifier on the responders (R) and non-responders (NR). Panel C shows the scores generated from the 3-gene classifier. The *P* value indicates a significant difference in the gene expression between the response groups. Panel D is the Kaplan-Meier curves generated from patients classified by the 3-gene signature as being responders and non-responders. Median survival times are also indicated.

Figure 5. A Kaplan-Meier analysis was performed on patients classified by the 3-gene signature as being predicted responders and non-responders. The survival curve of patients who were clinically defined as non-responders but classified as responders using the 3-gene signature is shown. Median survival times are also indicated.

Figure 6 depicts over-expression of AKAP13 in an AML cell line. Cell counts were normalized to cultures with no drug (indicated at –12 log units) to give a percentage of control. Error bars indicate standard errors of the mean. Open data points indicate results from a second experiment exploring higher concentrations of drug.

Figure 7 provides a model of FTI action in relapsed or refractory AML. A. In responders the IL3RA and AKAP13 genes are lowly expressed allowing for down-regulation of the ras, and RhoA, and lamin B pathways, respectively. Up-regulation of RhoH leads to increased inhibition of cellular transformation pathways. Together this allows for greater efficacy in FTI antitumorigenicity. B. The opposite expression profile is seen in non-responders allowing for the expression of compensatory pathways.

Figure 8. The Zarnestra predictive gene signature has superior utility to an independent prognostic gene signature. In panel A columns represent AML samples from relapsed or refractory patients and rows represent 167 probe sets that correspond to 103 of the 133 prognostic genes identified by Bullinger et al. [1], ordered according to hierarchical clustering. Panel B shows Kaplan-Meier survival estimates of the cluster-defined groups of patients. In panel C the 3-gene classifier has been used to identify responders of tipifarnib in the good and poor prognostic groups defined by the Bullinger signature. Kaplan-Meier survival curves are shown for patients identified as being responders to tipifarnib in the good (Zn+.cluster1) and poor (Zn+.cluster2) prognostic groups. The median survival times for each group are indicated.

Figure 9 is a flow chart depicting how the genes from Bullinger et al. (2004) were matched to 167 probe sets (103 unique genes) on the Affymetrix U133A chip.

Figure 10 shows the utility of the 167 probe set signature in relapsed or refractory AML patients. In panel A columns represent AML samples from relapsed or refractory patients and rows represent 167 probe sets that correspond to 103 of the 133 prognostic genes identified by Bullinger et al. (2004), ordered according to hierarchical clustering. Panel B shows Kaplan-Meier survival estimates of the cluster-defined groups of patients.

Figure 11 provides comparisons of prognostic and Zarnestra predictive gene signatures. Panel A shows the Kaplan-Meier survival curves for the good and poor prognostic clusters as defined by the subset of 103 Bullinger et al. (2004) genes. Panel B shows the Kaplan-Meier survival curves for the good and poor prognostic clusters as defined by the 3-gene signature that predicts response to Zarnestra. Panel C shows the Kaplan-Meier survival curves for the good and poor prognostic clusters from Panel A further stratified by the 3-gene Zarnestra signature. Panel D shows the

Kaplan-Meier survival curves for patients who are predicted to have a poor prognosis and not respond to Zarnestra versus the remainder of patients.

Figure 12 Identification of a minimal set of predictive markers. a) A LOOCV was performed selecting for genes with a sensitivity of 100%, specificity of 40% and fold-change > 2. Independent classifiers were tested that contained from 1 to 8 genes ranked by the AUC . The resulting error rate is plotted. b) A 2x2 table generated from a LOOCV performed using AKAP13 as a classifier on the responders (R) and non-responders (NR). c) The gene-expression values of AKAP13. The *P* value indicates a significant difference in the gene expression between the response groups. d) The Kaplan-Meier curves generated from patients classified by AKAP13 as being responders and non-responders. Median survival times are also indicated.

Figure 13 depicts an overview of gene expression analysis.

Figure 14 depicts AML samples maintain FTI-mediated global gene expression changes following termination of tipifarnib treatment.

Figure 15 depicts predictive expression profiles and testing of predictive classifiers in newly diagnosed AML.

Figure 16 depicts the 6-gene classifier stratifies newly diagnosed AML.

DETAILED DESCRIPTION OF THE INVENTION

A subset of genes previously described to have prognostic value in newly diagnosed AML is shown here to have utility in relapsed and refractory AML patients treated with a molecularly targeted therapy (Zarnestra). Currently there is no method for predicting response to farnesyl transferase inhibitors (such as Zarnestra). Also, current methods for understanding the prognosis of patients with AML is limited to histological subtype and karyotyping, both of which are not ideal markers for determining clinical outcome. The current signatures expand upon these traditional technologies by providing better stratification of prognostic high risk and low risk patients.

US Patent Application Serial No. 10/883,436 demonstrates that a 3-gene classifier (including AHR, AKAP13 and MINA53) predicts relapsed, refractory AML patient response to tipifarnib (Zarnestra®, R115777) with the lowest error rate. This was also seen when a leave-five-out cross validation was performed. When more genes were added the error rate increased indicating that additional genes

introduced noise to the classifier. For the 3-gene classifier the LOOCV demonstrated a sensitivity of 86% and specificity of 70% with an overall diagnostic accuracy of 74%. Kaplan-Meier analysis again showed a significant difference in survival between the predicted responder group and the non-responder group. Moreover, comparing the incorrectly classified non-responders to the correctly classified non-responders, the misclassified non-responders showed a better overall survival.

Zarnestra® is an orally available non-peptidomimetic competitive farnesyl transferase inhibitor (FTI) that has been shown to inhibit the proliferation of a variety of human tumor cell lines both in vitro and in vivo. End et al. (2001); and Cox et al. (2002). A phase I clinical trial of tipifarnib demonstrated a 32% response rate in patients with refractory or relapsed acute myeloid leukemia. Karp et al. (2001). Activity has also been seen in early clinical trials for myelodysplastic syndrome (MDS) (Kurzrock et al. (2004)), multiple myeloma (MM) (Alsina et al. (2003)) and chronic myeloid leukemia (CML). Cortes et al. (2003). Complete remission was defined as less than 5% bone marrow blasts with a neutrophil count greater than 1000/μL, a platelet count less than 100,000/μL, and no extramedullary disease. While it is clear that FTIs function by inhibiting protein farnesylation, it is still not known what genes are implicated in the antitumor effects of tipifarnib in hematopoietic malignancies. Microarray technology allows for the measurement of the steady-state mRNA level of thousands of genes simultaneously, thereby representing a powerful tool for identifying genes and gene pathways that correlate with FTI action. Global gene expression monitoring was therefore employed in a phase 2 clinical study of tipifarnib in relapsed and refractory AML to identify genes that predict response to this FTI in hematologic malignancies.

The mere presence of nucleic acid sequences having the potential to express proteins or peptides ("genes") within the genome is not determinative of whether a protein or peptide is expressed in a given cell. Whether or not a given gene capable of expressing proteins or peptides or transcribing RNA does so and to what extent such expression or transcription occurs, if at all, is determined by a variety of complex factors. Nevertheless, assaying gene expression can provide useful information about the cellular response to a given stimulus such as the introduction of a drug or other therapeutic agent. Relative indications of the degree to which

genes are active or inactive can be found in such gene expression profiles. In some instances, the presence of a molecular marker can, by itself or with the use of gene expression information, provide useful information about treatment efficacy too. The gene expression profiles and molecular markers of this invention are used to identify and treat AML patients.

Cancers, including hematological malignancies, typically arise from mutations in a variety of genes. The same type of cancer may arise as a result of, or coincident with, one or more mutations that differ from those of another patient having the same type of cancer. The fact that there are often multiple molecular bases underlying the same cancers is consistent with the observation that some therapies that affect one patient do not necessarily equally affect another patient with the same type of cancer. Further, from a diagnostic point of view, the presence of particular mutations such as translocations, deletions, or SNPs can have powerful implications. In some instances, such molecular markers are themselves useful indicators for diagnosis, prognosis, or treatment response determinations. This is particularly true where the molecular mutations can be associated with response to particular treatments.

A Biomarker is any indicia of the level of expression of an indicated Marker gene. The indicia can be direct or indirect and measure over- or under-expression of the gene given the physiologic parameters and in comparison to an internal control, normal tissue or another carcinoma. Biomarkers include, without limitation, nucleic acids (both over and under-expression and direct and indirect). Using nucleic acids as Biomarkers can include any method known in the art including, without limitation, measuring DNA amplification, RNA, micro RNA, loss of heterozygosity (LOH), single nucleotide polymorphisms (SNPs, Brookes (1999)), microsatellite DNA, DNA hypo- or hyper-methylation. Using proteins as Biomarkers can include any method known in the art including, without limitation, measuring amount, activity, modifications such as glycosylation, phosphorylation, ADP-ribosylation, ubiquitination, etc., imunohistochemistry (IHC). Other Biomarkers include imaging, cell count and apoptosis markers.

The indicated genes provided herein are those associated with a particular tumor or tissue type. A Marker gene may be associated with numerous cancer types but provided that the expression of the gene is sufficiently associated with one tumor or tissue type to be identified using the algorithm described herein to be specific for a

lung cancer cell, the gene can be used in the claimed invention to determine cancer status and prognosis. Numerous genes associated with one or more cancers are known in the art. The present invention provides preferred Marker genes and even more preferred Marker gene combinations. These are described herein in detail.

A Marker gene corresponds to the sequence designated by a SEQ ID NO when it contains that sequence. A gene segment or fragment corresponds to the sequence of such gene when it contains a portion of the referenced sequence or its complement sufficient to distinguish it as being the sequence of the gene. A gene expression product corresponds to such sequence when its RNA, mRNA, or cDNA hybridizes to the composition having such sequence (e.g. a probe) or, in the case of a peptide or protein, it is encoded by such mRNA. A segment or fragment of a gene expression product corresponds to the sequence of such gene or gene expression product when it contains a portion of the referenced gene expression product or its complement sufficient to distinguish it as being the sequence of the gene or gene expression product.

The inventive methods, compositions, articles, and kits of described and claimed in this specification include one or more Marker genes. "Marker" or "Marker gene" is used throughout this specification to refer to genes and gene expression products that correspond with any gene the over- or under-expression of which is associated with a tumor or tissue type. The preferred Marker genes are described in more detail in Table 8.

The present invention provides a method of assessing acute myeloid leukemia (AML) status by obtaining a biological sample from an AML patient; and measuring Biomarkers associated with Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9 where the expression levels of the Marker genes above or below pre-determined cut-off levels are indicative of AML status.

The present invention provides a method of staging acute myeloid leukemia (AML) patients by obtaining a biological sample from an AML patient; and measuring Biomarkers associated with Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9 where the expression levels of the Marker genes above or below pre-determined cut-off levels are indicative of AML survival.

The present invention provides a method of determining acute myeloid leukemia (AML) patient treatment protocol by obtaining a biological sample from an AML patient; and measuring Biomarkers associated with Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9 where the expression levels of the Marker genes above or below pre-determined cut-off levels are sufficiently indicative of response to therapy to enable a physician to determine the degree and type of therapy recommended to provide appropriate therapy.

The present invention provides a method of treating a acute myeloid leukemia (AML) patient by obtaining a biological sample from an AML patient; and measuring Biomarkers associated with Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9 where the expression levels of the Marker genes above or below pre-determined cut-off levels are indicate a response to therapy and; treating the patient with adjuvant therapy if they have a responder profile.

The present invention provides a method of determining whether a acute myeloid leukemia (AML) patient is high or low risk of mortality by obtaining a biological sample from an AML patient; and measuring Biomarkers associated with Marker genes corresponding to those selected from Table 3 where the expression levels of the Marker genes above or below pre-determined cut-off levels are sufficiently indicative of risk of mortality to enable a physician to determine the degree and type of therapy recommended.

The method provided herein may further include, contain or utilize measuring the expression level of at least one gene constitutively expressed in the sample. Preferably, the method provided herein results in a specificity of at least about 40%. Preferably, the method provided herein results in a sensitivity of at least at least about 80%. Preferably, the method provided herein results in a p-value of less than 0.05.

The method provided herein may be performed by measuring gene expression on a microarray or gene chip. The microarray can be a cDNA array or an oligonucleotide array and may further contain one or more internal control reagents.

The method provided herein may be performed by determining gene expression by nucleic acid amplification conducted by polymerase chain reaction (PCR) of RNA extracted from the sample. The PCR can be reverse transcription polymerase

chain reaction (RT-PCR) and can further contain one or more internal control reagent.

The method provided herein may be performed by measuring or detecting a protein encoded by the gene. Te protein can be detected by an antibody specific to the protein.

The method provided herein may be performed by measuring a characteristic of the gene. Characteristics include, without limitation, DNA amplification, methylation, mutation and allelic variation.

The present invention provides a method of generating an acute myeloid leukemia (AML) prognostic patient report by determining the results of any one of the above-described methods; and preparing a report displaying the results and reports generated thereby. The report may contain an assessment of patient outcome and/or probability of risk relative to the patient population and/or likelihood or response to chemotherapy.

The present invention provides a kit for conducting an assay to determine acute myeloid leukemia (AML) prognosis in a biological sample comprising: materials for detecting isolated nucleic acid sequences, their complements, or portions thereof of a combination of genes selected from the group consisting of Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9. The kit can further contain reagents for conducting a microarray analysis and/or a medium through which said nucleic acid sequences, their complements, or portions thereof are assayed.

The present invention provides articles for assessing acute myeloid leukemia (AML) status containing materials for detecting isolated nucleic acid sequences, their complements, or portions thereof of a combination of genes selected from the group consisting of Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9. The articles can further contain reagents for conducting a microarray analysis and/or a medium through which said nucleic acid sequences, their complements, or portions thereof are assayed.

The present invention provides a microarray or gene chip for performing the above-described methods. The microarray may contain isolated nucleic acid sequences, their complements, or portions thereof of a combination of genes selected from the group consisting of Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9. Preferably, the microarray

provides a measurement or characterization at least 1.5-fold over- or under-expression. Preferably, the microarray provides a measurement with a statistically significant p-value over- or under-expression. More preferably, the p-value is less than 0.05. The microarray can be any known in the art including, without limitation, cDNA array or an oligonucleotide array and can further contain internal control reagents.

The present invention provides a diagnostic/prognostic portfolio comprising isolated nucleic acid sequences, their complements, or portions thereof of a combination of genes selected from the group consisting of Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9. Preferably, the measurement or characterization is at least 1.5-fold over- or under-expression. Preferably, the measurement provides a statistically significant p-value over- or under-expression. More preferably, the p-value is less than 0.05.

Preferred methods for establishing gene expression profiles include determining the amount of RNA that is produced by a gene that can code for a protein or peptide. This is accomplished by reverse transcriptase PCR (RT-PCR), competitive RT-PCR, real time RT-PCR, differential display RT-PCR, Northern Blot analysis and other related tests. While it is possible to conduct these techniques using individual PCR reactions, it is best to amplify complementary DNA (cDNA) or complementary RNA (cRNA) produced from mRNA and analyze it via microarray. A number of different array configurations and methods for their production are known to those of skill in the art and are described in U.S. Patents such as: 5,445,934; 5,532,128; 5,556,752; 5,242,974; 5,384,261; 5,405,783; 5,412,087; 5,424,186; 5,429,807; 5,436,327; 5,472,672; 5,527,681; 5,529,756; 5,545,531; 5,554,501; 5,561,071; 5,571,639; 5,593,839; 5,599,695; 5,624,711; 5,658,734; and 5,700,637.

Microarray technology allows for the measurement of the steady-state mRNA level of thousands of genes simultaneously thereby presenting a powerful tool for identifying effects such as the onset, arrest, or modulation of uncontrolled cell proliferation. Two microarray technologies are currently in wide use. The first are cDNA arrays and the second are oligonucleotide arrays. Although differences exist in the construction of these chips, essentially all downstream data analysis and output are the same. The product of these analyses are typically measurements of the intensity of the signal received from a labeled probe used to detect a cDNA sequence from the sample that hybridizes to a nucleic acid sequence at a known

location on the microarray. Typically, the intensity of the signal is proportional to the quantity of cDNA, and thus mRNA, expressed in the sample cells. A large number of such techniques are available and useful. Preferred methods for determining gene expression can be found in US Patents 6,271,002; 6,218,122; 6,218,114; and 6,004,755.

Analysis of the expression levels is conducted by comparing such signal intensities. This is best done by generating a ratio matrix of the expression intensities of genes in a test sample versus those in a control sample. For instance, the gene expression intensities from a diseased tissue can be compared with the expression intensities generated from benign or normal tissue of the same type. A ratio of these expression intensities indicates the fold-change in gene expression between the test and control samples.

Gene expression profiles can also be displayed in a number of ways. The most common method is to arrange raw fluorescence intensities or ratio matrix into a graphical dendogram where columns indicate test samples and rows indicate genes. The data are arranged so genes that have similar expression profiles are proximal to each other. The expression ratio for each gene is visualized as a color. For example, a ratio less than one (down-regulation) may appear in the blue portion of the spectrum while a ratio greater than one (indicating up-regulation) may appear as a color in the red portion of the spectrum. Commercially available computer software programs are available to display such data including "GENESPRING" from Silicon Genetics, Inc. and "DISCOVERY" and "INFER" software from Partek, Inc.

In the case of measuring protein levels to determine gene expression, any method known in the art is suitable provided it results in adequate specificity and sensitivity. For example, protein levels can be measured by binding to an antibody or antibody fragment specific for the protein and measuring the amount of antibody-bound protein. Antibodies can be labeled by radioactive, fluorescent or other detectable reagents to facilitate detection. Methods of detection include, without limitation, enzyme-linked immunosorbent assay (ELISA) and immunoblot techniques.

Modulated Markers used in the methods of the invention are described in the Examples. The genes that are differentially expressed are either up regulated or down regulated in patients with various lung cancer prognostics. Up regulation and down regulation are relative terms meaning that a detectable difference (beyond the

contribution of noise in the system used to measure it) is found in the amount of expression of the genes relative to some baseline. In this case, the baseline is determined based on the algorithm. The genes of interest in the diseased cells are then either up- or down-regulated relative to the baseline level using the same measurement method.

Assays for the gene expression status of a cell also can determine normal/abnormal tissue distribution for diagnostic purposes using techniques such as immunohistochemical analysis (IHC). Any method known in the art can be used, for example in the case of the LBC oncogene, the antibodies to LBC protein may be used in conjunction with both fresh-frozen and formalin-fixed, paraffin-embedded tissue blocks prepared for study by IHC. Each tissue block may consist of 50 mg of residual "pulverized" tumor.

Briefly, frozen-sections may be prepared by rehydrating 50 ng of frozen pulverized tumor at room temperature in phosphate buffered saline (PBS) in small plastic capsules; pelleting the particles by centrifugation; resuspending them in a viscous embedding medium (OCT); inverting the capsule and pelleting again by centrifugation; snap-freezing in –70°C isopentane; cutting the plastic capsule and removing the frozen cylinder of tissue; securing the tissue cylinder on a cryostat microtome chuck; and cutting 25-50 serial sections containing intact tumor cells.

Permanent-sections may be prepared by a similar method involving rehydration of the 50 mg sample in a plastic microfuge tube; pelleting; resuspending in 10% formalin for 4 hr fixation; washing/pelleting; resuspending in warm 2.5% agar; pelleting; cooling in ice water to harden the agar; removing the tissue/agar block from the tube; infiltrating and embedding the block in paraffin; and cutting up to 50 serial permanent sections.

For the IHC assay, the sections are overlaid with a blocking solution containing: 3% bovine serum albumin (BSA) in PBS or other blocking reagents. The blocking reagents include non-specific serum or dry milk. Blocking is allowed to proceed for 1 hr at room temperature. Anti-LBC protein antibody is diluted with PBS buffer containing 3% BSA, 0.1% TritonX™-100 and t-octylphenoxypolyethoxyethanol, at a ratio of 1:100. The sample sections are generally overlaid with the antibody solution for 16 hr at 4°C. The duration and temperature conditions may be varied according to the antibody selected and the material tested. The optimal conditions are determined empirically. The antibody treated sections are then washed three times in PBS for 15

min. each to remove unbound antibody and then overlaid with PBS containing 3% BSA and a secondary antibody at a dilution of 1:2000. The secondary antibodies may be coupled to a chromogenic enzyme such as: horseradish peroxidase, alkaline phosphatase, fluorescein isothiocyanate, or other suitable enzymes. Alternatively, the secondary antibody may be conjugated to biotin and used in conjunction with chromophore-labeled avidin.

Another exemplary method for detecting the presence of a gene is via in situ hybridization. Generally, in situ hybridization comprises the following major steps: (1) fixation of tissue or biological structure to be analyzed; (2) prehybridization treatment of the biological structure to increase accessibility of target DNA, and to reduce nonspecific binding; (3) hybridization of the mixture of nucleic acids to the nucleic acid in the biological structure or tissue; (4) post-hybridization washes to remove nucleic acid fragments not bound in the hybridization and (5) detection of the hybridized nucleic acid fragments. The reagent used in each of these steps and the conditions for use vary depending on the particular application.

In this case, a hybridization solution comprising at least one detectable nucleic acid probe capable of hybridizing to a gene (at its chromosomal locus) is contacted with the cell under hybridization conditions. Any hybridization is then detected and compared to a predetermined hybridization pattern from normal or control cells. Preferably, the probes are alpha-centromeric probes. Such probes can be made commercially available from a number of sources (e.g., from Visys Inc., Downers Grove, IL). In a preferred embodiment, the hybridization solution contains a multiplicity of probes, specific for an area on the chromosome that corresponds to the translocation of the sequences that make up the chimera (e.g., 15q24-25).

Hybridization protocols suitable for use with the methods of the invention are described, e.g., in Albertson (1984); Pinkel (1988); EP No. 430,402; and Methods in Molecular Biology, Vol. 33: In Situ Hybridization Protocols, Choo, ed., Humana Press, Totowa, NJ (1994), etc. In one particularly preferred embodiment, the hybridization protocol of Pinkel et al. (1998) or of Kallioniemi (1992) is used. Methods of optimizing hybridization conditions are well known (see, e.g., Tijssen (1993) Laboratory Techniques in Biochemistry and Molecular Biology, Vol. 24: Hybridization With Nucleic Acid Probes, Elsevier, NY).

In a preferred embodiment, background signal is reduced by the use of a detergent (e.g., C-TAB) or a blocking reagent (e.g., sperm DNA, cot-1 DNA, etc.) during the

hybridization to reduce non-specific binding. Preferably, the hybridization is performed in the presence of about 0.1 to about 0.5 mg/ml DNA (e.g., cot-1 DNA).

The probes may be prepared by any method known in the art, including synthetically or grown in a biological host. Synthetic methods include but are not limited to oligonucleotide synthesis, riboprobes, and PCR.

The probe may be labeled with a detectable marker by any method known in the art. Methods for labeling probes include random priming, end labeling, PCR and nick translation. Enzymatic labeling is conducted in the presence of nucleic acid polymerase, three unlabeled nucleotides, and a fourth nucleotide which is either directly labeled, contains a linker arm for attaching a label, or is attached to a hapten or other molecule to which a labeled binding molecule may bind. Suitable direct labels include radioactive labels such as ^{32}P, ^{3}H, and ^{35}S and non-radioactive labels such as fluorescent markers, such as fluorescein, Texas Red, AMCA blue, lucifer yellow, rhodamine, and the like; cyanin dyes which are detectable with visible light; enzymes and the like. Labels may also be incorporated chemically into DNA probes by bisulfite-mediated transamination or directly during oligonucleotide synthesis.

Fluorescent markers can readily be attached to nucleotides with activated linker arms incorporated into the probe. Probes may be indirectly labeled by the methods disclosed above, by incorporating a nucleotide covalently linked to a hapten or other molecule such as biotin or digoxygenin, and performing a sandwich hybridization with a labeled antibody directed to that hapten or other molecule, or in the case of biotin, with avidin conjugated to a detectable label. Antibodies and avidin may be conjugated with a fluorescent marker, or with an enzymatic marker such as alkaline phosphatase or horseradish peroxidase to render them detectable. Conjugated avidin and antibodies are commercially available from companies such as Vector Laboratories (Burlingame, CA) and Boehringer Mannheim (Indianapolis, IN).

The enzyme can be detected through a colorimetric reaction by providing a substrate for the enzyme. In the presence of various substrates, different colors are produced by the reaction, and these colors can be visualized to separately detect multiple probes. Any substrate known in the art may be used. Preferred substrates for alkaline phosphatase include 5-bromo-4-chloro-3-indolylphosphate (BCIP) and nitro blue tetrazolium (NBT). The preferred substrate for horseradish peroxidase is diaminobenzoate (DAB).

Fluorescently labeled probes suitable for use in the in situ hybridization methods of the invention are preferably in the range of 150-500 nucleotides long. Probes may be DNA or RNA, preferably DNA.

Hybridization of the detectable probes to the cells is conducted with a probe concentration of 0.1-500 ng/μL, preferably 5-250 ng/μL. The hybridization mixture will preferably contain a denaturing agent such as formamide. In general, hybridization is carried out at 25°C-45°C, more preferably at 32°C-40°C, and most preferably at 37°C-38°C. The time required for hybridization is about 0.25-96 hours, more preferably 1-72 hours, and most preferably for 4-24 hours. Hybridization time will vary based on probe concentration and hybridization solution content which may contain accelerators such as hnRNP binding protein, trialkyl ammonium salts, lactams, and the like. Slides are then washed with solutions containing a denaturing agent, such as formamide, and decreasing concentrations of sodium chloride or in any solution that removes unbound and mismatched probe.

The temperature and concentration of salt will vary depending on the stringency of hybridization desired. For example, high stringency washes may be carried out at 42°C-68°C, while intermediate stringency may be in the range of 37°C-55°C, and low stringency may be in the range of 30°C-37°C. Salt concentration for a high stringency wash may be 0.5-1 times SSC (0.15M NaCl, 0.015M Na citrate), while medium stringency may be 1-4 times, and low stringency may be 2-6 times SSC.

The detection incubation steps, if required, should preferably be carried out in a moist chamber at 23°C-42°C, more preferably at 25°C-38°C and most preferably at 37-38°C. Labeled reagents should preferably be diluted in a solution containing a blocking reagent, such as BSA, non-fat dry milk, or the like. Dilutions may range from 1:10-1:10,000, more preferably 1:50-1:5,000, and most preferably at 1:100-1:1,000. The slides or other solid support should be washed between each incubation step to remove excess reagent.

Slides may then be mounted and analyzed by microscopy in the case of a visible detectable marker, or by exposure to autoradiographic film in the case of a radioactive marker. In the case of a fluorescent marker, slides are preferably mounted in a solution that contains an antifade reagent, and analyzed using a fluorescence microscope. Multiple nuclei may be examined for increased accuracy of detection.

Additionally, assays for the expression product of the LBC oncogene can also be used to determine whether the LBC oncogene mutation has occurred. Most

preferably, such assays are immunoassays. Immunoassays, in their most simple and direct sense, are binding assays. Certain preferred immunoassays are the various types of enzyme linked immunosorbent assays (ELISAs) and radioimmunoassays (RIA) known in the art. IHC detection using tissue sections is also particularly useful as are in situ hybridization and enzyme immunoassay.

In one exemplary ELISA, protein-specific antibodies are immobilized onto a selected surface exhibiting protein affinity, such as a well in a polystyrene microtiter plate. Then, a test composition containing the desired antigen, such as a clinical sample, is added to the wells. After binding and washing to remove non-specifically bound immune complexes, the bound antigen may be detected. Detection is generally achieved by the addition of another antibody, specific for the desired antigen, that is linked to a detectable label. This type of ELISA is a simple "sandwich ELISA." Detection may also be achieved by the addition of a second antibody specific for the desired antigen, followed by the addition of a third antibody that has binding affinity for the second antibody, with the third antibody being linked to a detectable label.

Variations of ELISA techniques are well known. In one such variation, the samples containing the desired antigen are immobilized onto the well surface and then contacted with the antibodies of the invention. After binding and appropriate washing, the bound immune complexes are detected. Where the initial antigen specific antibodies are linked to a detectable label, the immune complexes may be detected directly. Again, the immune complexes may be detected using a second antibody that has binding affinity for the first antigen specific antibody, with the second antibody being linked to a detectable label.

In embodiments of the invention in which gene expression is detected for determining AML prognosis or status, the use of gene expression portfolios is most preferred. A portfolio of genes is a set of genes grouped so that expression information obtained about them provides the basis for making a clinically relevant judgment such as a diagnosis, prognosis, or treatment choice. In this case, gene expression portfolios can be fashioned to help make therapeutic decisions regarding AML patients.

Diseased, in this context, refers to an alteration of the state of a body that interrupts or disturbs, or has the potential to disturb, proper performance of bodily functions as occurs with the uncontrolled proliferation of cells. Someone is diagnosed with a disease when some aspect of that person's genotype or phenotype

is consistent with the presence of the disease. However, the act of conducting a diagnosis or prognosis may include the determination of disease/status issues such as determining the likelihood of relapse, type of therapy and therapy monitoring. In therapy monitoring, clinical judgments are made regarding the effect of a given course of therapy by comparing the expression of genes over time to determine whether the gene expression profiles have changed or are changing to patterns more consistent with normal tissue.

Genes can be grouped so that information obtained about the set of genes in the group provides a sound basis for making a clinically relevant judgment such as a diagnosis, prognosis, or treatment choice. These sets of genes make up the portfolios of the invention. As with most diagnostic markers, it is often desirable to use the fewest number of markers sufficient to make a correct medical judgment. This prevents a delay in treatment pending further analysis as well unproductive use of time and resources.

One method of establishing gene expression portfolios is through the use of optimization algorithms such as the mean variance algorithm widely used in establishing stock portfolios. This method is described in detail in US patent publication number 20030194734. Essentially, the method calls for the establishment of a set of inputs (stocks in financial applications, expression as measured by intensity here) that will optimize the return (e.g., signal that is generated) one receives for using it while minimizing the variability of the return. Many commercial software programs are available to conduct such operations. "Wagner Associates Mean-Variance Optimization Application," referred to as "Wagner Software" throughout this specification, is preferred. This software uses functions from the "Wagner Associates Mean-Variance Optimization Library" to determine an efficient frontier and optimal portfolios in the Markowitz sense is one option. Use of this type of software requires that microarray data be transformed so that it can be treated as an input in the way stock return and risk measurements are used when the software is used for its intended financial analysis purposes.

The process of selecting a portfolio can also include the application of heuristic rules. Preferably, such rules are formulated based on biology and an understanding of the technology used to produce clinical results. More preferably, they are applied to output from the optimization method. For example, the mean variance method of portfolio selection can be applied to microarray data for a number of genes

differentially expressed in subjects with cancer. Output from the method would be an optimized set of genes that could include some genes that are expressed in peripheral blood as well as in diseased tissue. If samples used in the testing method are obtained from peripheral blood and certain genes differentially expressed in instances of cancer could also be differentially expressed in peripheral blood, then a heuristic rule can be applied in which a portfolio is selected from the efficient frontier excluding those that are differentially expressed in peripheral blood. Of course, the rule can be applied prior to the formation of the efficient frontier by, for example, applying the rule during data pre-selection.

Other heuristic rules can be applied that are not necessarily related to the biology in question. For example, one can apply a rule that only a prescribed percentage of the portfolio can be represented by a particular gene or group of genes. Commercially available software such as the Wagner Software readily accommodates these types of heuristics. This can be useful, for example, when factors other than accuracy and precision (e.g., anticipated licensing fees) have an impact on the desirability of including one or more genes.

The gene expression profiles of this invention can also be used in conjunction with other non-genetic diagnostic methods useful in cancer diagnosis, prognosis, or treatment monitoring. For example, in some circumstances it is beneficial to combine the diagnostic power of the gene expression based methods described above with data from conventional markers such as serum protein markers (e.g., Cancer Antigen 27.29 ("CA 27.29")). A range of such markers exists including such analytes as CA 27.29. In one such method, blood is periodically taken from a treated patient and then subjected to an enzyme immunoassay for one of the serum markers described above. When the concentration of the marker suggests the return of tumors or failure of therapy, a sample source amenable to gene expression analysis is taken. Where a suspicious mass exists, a fine needle aspirate (FNA) is taken and gene expression profiles of cells taken from the mass are then analyzed as described above. Alternatively, tissue samples may be taken from areas adjacent to the tissue from which a tumor was previously removed. This approach can be particularly useful when other testing produces ambiguous results.

Kits made according to the invention include formatted assays for determining the gene expression profiles. These can include all or some of the materials needed

to conduct the assays such as reagents and instructions and a medium through which Biomarkers are assayed.

Preferred methods for establishing gene expression profiles (including those used to arrive at the explication of the relevant biological pathways) include determining the amount of RNA that is produced by a gene that can code for a protein or peptide or transcribe RNA. This is best accomplished by reverse transcription PCR (RT-PCR), competitive RT-PCR, real time RT-PCR, differential display RT-PCR, Northern Blot analysis and other related tests. While it is possible to conduct these techniques using individual PCR reactions, it is often desirable to amplify copy DNA (cDNA) or copy RNA (cRNA) produced from mRNA and analyze it via microarray. A number of different array configurations and production methods are known to those of skill in the art and are described in US Patents such as: 5,445,934; 5,532,128; 5,556,752; 5,242,974; 5,384,261; 5,405,783; 5,412,087; 5,424,186; 5,429,807; 5,436,327; 5,472,672; 5,527,681; 5,529,756; 5,545,531; 5,554,501; 5,561,071; 5,571,639; 5,593,839; 5,599,695; 5,624,711; 5,658,734; and 5,700,637.

Microarray technology measures steady-state mRNA levels of thousands of genes simultaneously thereby presenting a powerful tool for identifying AML patient gene expression profiles. Two microarray technologies are currently in wide use. The first are cDNA arrays and the second are oligonucleotide arrays. Although differences exist in the construction of these chips, essentially all downstream data analysis and output are the same. The products of these analyses are typically measurements of the intensity of the signal received from a labeled probe used to detect a cDNA sequence from the sample that hybridizes to a nucleic acid sequence at a known location on the microarray. Typically, the signal intensity is proportional to the cDNA quantity, and thus mRNA, expressed in the sample cells. A large number of such techniques are available and useful. Preferred methods can be found in US Patents 6,271,002; 6,218,122; 6,218,114; and 6,004,755.

Analysis of the expression levels is conducted by comparing such intensities. This is best done by generating a ratio matrix of the expression intensities of genes in a test sample versus those in a control sample. For instance, the gene expression intensities from a tissue that has been treated with a drug can be compared with the expression intensities generated from the same tissue that has not been treated with the drug. A ratio of these expression intensities indicates the fold-change in gene expression between the test and control samples.

Gene expression profiles can be displayed in a number of ways. A common method is to arrange a ratio matrix into a graphical dendogram where columns indicate test samples and rows indicate genes. The data are arranged so genes that have similar expression profiles are proximal to each other. The expression ratio for each gene is visualized as a color. For example, a ratio less than one (indicating down-regulation) may appear in the blue portion of the spectrum while a ratio greater than one (indicating up-regulation) may appear as a color in the red portion of the spectrum. Commercially available computer software programs are available to display such data including "GENESPRINT" from Silicon Genetics, Inc. and "DISCOVERY" and "INFER" software from Partek, Inc.

The differentially expressed genes are either up regulated or down regulated in diseased cells, as deduced by an assessment of gene expression as described above. Up regulation and down regulation are relative terms meaning that a detectable difference (beyond the contribution of noise in the system used to measure it) is found in the amount of expression of the genes relative to some baseline. In this case, the baseline is the measured gene expression of a normal cell. The genes of interest in the diseased cells are then either up regulated or down regulated relative to the baseline level using the same measurement method. Preferably, levels of up and down regulation are distinguished based on fold changes of the intensity measurements of hybridized microarray probes. A 1.5 fold difference is preferred for making such distinctions. That is, before a gene is said to be differentially expressed in treated versus untreated diseased cells, the treated cell is found to yield at least 1.5 times more, or 1.5 times less intensity than the untreated cells. A 1.7 fold difference is more preferred and a 2 or more fold difference in gene expression measurement is most preferred.

One method of the invention involves comparing gene expression profiles for various genes to determine whether a person is likely to respond to the use of a therapeutic agent. Having established the gene expression profiles that distinguish responder from non-responder, the gene expression profiles of each are fixed in a medium such as a computer readable medium as described below. A patient sample is obtained that contains diseased cells (such as hematopoietic blast cells in the case of AML) is then obtained. Most preferably, the samples are of bone marrow and are extracted from the patient's sternum or iliac crest according to routine methods. Preferably the bone marrow aspirate is processed to enrich for leukemic blast cells

using routine methods. Sample RNA is then obtained and amplified from the diseased patient cells and a gene expression profile is obtained, preferably (in the case of a large gene portfolio) via micro-array, for genes in the appropriate portfolios. The expression profiles of the samples are then compared to those previously analyzed for prognostic outcome. When a small number of genes are used in the portfolio such as when the three gene profile is used, a simple nucleic acid amplification and detection scheme is the most preferred method of measuring gene modulation. In such a case, PCR, NASBA, rolling circle, LCR, and other amplification schemes known to skilled artisans can be used with PCR being most preferred. Where the portfolios include a large number of genes or it is desirable to measure the expression of numerous other genes then it is preferred to assess the expression patterns based on intensity measurements of microarrays as described above.

In similar fashion, gene expression profile analysis can be conducted to monitor treatment response. In one aspect of this method, gene expression analysis as described above is conducted on a patient treated with any suitable treatment at various periods throughout the course of treatment. If the gene expression patterns are consistent with a positive outcome the patient's therapy is continued. If it is not, the patient's therapy is altered as with additional therapeutics, changes to the dosage, or elimination of the current treatment. Such analysis permits intervention and therapy adjustment prior to detectable clinical indicia or in the face of otherwise ambiguous clinical indicia.

With respect to the molecular markers of the invention, a number of other formats and approaches are available for diagnostic use. Methylation of genomic regions can affect gene expression levels. For example, hypermethylation of gene promoter regions can constitutively down-regulate gene expression whereas hypomethylation can lead to an increase in steady-state mRNA levels. As such, detection of methylated regions associated with genes predictive of drug response, prognosis or status can be used as an alternative method for diagnosing gene expression levels. Such methods are known to those skilled in the art. Alternatively, single nucleotide polymorphisms (SNPs) that are present in promoter regions can also affect transcriptional activity of a gene. Therefore, detection of these SNPs by methods known to those skilled in the art can also be used as a diagnostic for detecting genes that are differentially expressed in different prognostic outcomes.

Articles of this invention are representations of the gene expression profiles useful for treating, diagnosing, prognosticating, staging, and otherwise assessing diseases. Preferably they are reduced to a medium that can be automatically read such as computer readable media (magnetic, optical, and the like). The articles can also include instructions for assessing the gene expression profiles in such media. For example, the articles may comprise a CD ROM having computer instructions for comparing gene expression profiles of the portfolios of genes described above. The articles may also have gene expression profiles digitally recorded therein so that they may be compared with gene expression data from patient samples. Alternatively, the profiles can be recorded in different representational format. Clustering algorithms such as those incorporated in "DISCOVERY" and "INFER" software from Partek, Inc. mentioned above can best assist in the visualization of such data.

Additional articles according to the invention are kits for conducting the assays described above. Each such kit would preferably include instructions in human or machine readable form as well as the reagents typical for the type of assay described. These can include, for example, nucleic acid arrays (e.g. cDNA or oligonucleotide arrays), as described above, configured to discern the gene expression profiles of the invention. They can also contain reagents used to conduct nucleic acid amplification and detection including, for example, reverse transcriptase, reverse transcriptase primer, a corresponding PCR primer set, a thermostable DNA polymerase, such as Taq polymerase, and a suitable detection reagent(s), such as, without limitation, a scorpion probe, a probe for a fluorescent probe assay, a molecular beacon probe, a single dye primer or a fluorescent dye specific to double-stranded DNA, such as ethidium bromide. Kits for detecting surface antigens contain staining materials or are antibody based including components such as buffer, anti-antigenic antibody, detection enzyme and substrate such as Horse Radish Peroxidase or biotin-avidin based reagents. Kit components for detecting blast cells generally include reagents for conducting flow cytometry, blast cell adhesion assays, and other common blast cell assays.

Conventional anti-cancer agents include, without limitation, tyrosine kinase inhibitors, MEK kinase inhibitors, P13K kinase inhibitors, MAP kinase inhibitors, apoptosis modulators and combinations thereof. Exemplary drugs that are most preferred among these are the "GLEEVEC" tyrosine kinase inhibitor of Novartis, U-0126 MAP kinase inhibitor, PD-098059 MAP kinase inhibitor, SB-203580 MAP

kinase inhibitor, and antisense, ribozyme, and DNAzyme, Bcl-XL, and anti-apoptotics. Examples of other useful drugs include, without limitation, the calanolides of US Patent 6,306,897; the substituted bicyclics of US Patent 6,284,764; the indolines of US Patent 6,133,305; and the antisense oligonucleotides of US Patent 6,271,210; platinum coordination compounds for example cisplatin or carboplatin, taxane compounds for example paclitaxel or docetaxel, camptothecin compounds for example irinotecan or topotecan, anti-tumor vinca alkaloids for example vinblastine, vincristine or vinorelbine, anti-tumor nucleoside derivatives for example 5-fluorouracil, gemcitabine or capecitabine, nitrogen mustard or nitrosourea alkylating agents for example cyclophosphamide, chlorambucil, carmustine or lomustine, anti-tumor anthracycline derivatives for example daunorubicin, doxorubicin or idarubicin; HER2 antibodies for example trastzumab; and anti-tumor podophyllotoxin derivatives for example etoposide or teniposide; and antiestrogen agents including estrogen receptor antagonists or selective estrogen receptor modulators preferably tamoxifen, or alternatively toremifene, droloxifene, faslodex and raloxifene, or aromatase inhibitors such as exemestane, anastrozole, letrazole and vorozole.

Anti-cancer agents can also include therapeutics directed to gene therapy or antisense therapy or RNA interference. These include, without limitation, oligonucleotides with sequences complementary to an mRNA sequence can be introduced into cells to block the translation of the mRNA, thus blocking the function of the gene encoding the mRNA. The use of oligonucleotides to block gene expression is described, for example, in, Strachan and Read, Human Molecular Genetics, 1996. These antisense molecules may be DNA, stable derivatives of DNA such as phosphorothioates or methylphosphonates, RNA, stable derivatives of RNA such as 2'-*O*-alkylRNA, or other antisense oligonucleotide mimetics. Antisense molecules may be introduced into cells by microinjection, liposome encapsulation or by expression from vectors harboring the antisense sequence.

In gene therapy, the gene of interest can be ligated into viral vectors that mediate transfer of the therapeutic DNA by infection of recipient host cells. Suitable viral vectors include retrovirus, adenovirus, adeno-associated virus, herpes virus, vaccinia virus, polio virus and the like. Alternatively, therapeutic DNA can be transferred into cells for gene therapy by non-viral techniques including receptor-mediated targeted DNA transfer using ligand-DNA conjugates or adenovirus-ligand-DNA

conjugates, lipofection membrane fusion or direct microinjection. These procedures and variations thereof are suitable for *ex vivo* as well as *in vivo* gene therapy. Protocols for molecular methodology of gene therapy suitable for use with the gene is described in Gene Therapy Protocols, edited by Paul D. Robbins, Human press, Totowa NJ, 1996.

Compounds identified according to the methods disclosed herein may be used alone at appropriate dosages defined by routine testing in order to obtain optimal inhibition or activity while minimizing any potential toxicity. In addition, co-administration or sequential administration of other agents may be desirable.

The invention is further illustrated by the following nonlimiting examples. All references cited herein are hereby incorporated herein by reference.

Example 1

Clinical Evaluation and Response Definitions

The current study was part of an open label, multicenter, non-comparative phase 2 clinical study in which patients with relapsed or refractory AML (Harousseau et al. (2003)) were treated with tipifarnib at a starting oral dose of 600 mg bid for the first 21 consecutive days of each 28-day cycle. Patients were enrolled into 2 cohorts, those with relapsed AML and those with refractory AML. A total of 252 patients (135 relapsed and 117 refractory) were treated. Eighty patients chose to provide bone marrow samples for RNA microarray analysis, for which a separate informed consent was required. The overall response rate was relatively low in this study.

Therefore, for the purposes of the gene expression profiling, response to tipifarnib was defined as patients who had an objective response (complete remission [CR], complete remission with incomplete platelet recovery [CRp] or partial remission [PR]), a hematological response (decrease of >50% of leukemic blast cells in bone marrow) as determined by either central review or by the clinical site, or stable disease (no hematological response but no progression of the disease) as determined by both central review and the clinical site. Complete remission with incomplete platelet recovery was defined similarly, except for a platelet count less than 100,000/μL sufficient to ensure transfusion independence. Partial remission was defined as at least a 50% decrease in bone marrow blasts with partial neutrophil (>500/μL) and platelet count (>50,000/μL) recovery. Response had to be confirmed at least 4 weeks after first documentation.

Sample Collection and Microarray Processing

Bone marrow samples were collected from patients before treatment with tipifarnib, diluted with phosphate buffered saline (PBS) and centrifuged with Ficoll-diatrizoate (1.077 g/mL). White blood cells were washed twice with PBS, resuspended in fetal bovine serum (FBS) with 10% dimethyl sulfoxide (DMSO) and immediately stored at -80°C. Cells were thawed and total RNA was extracted from cell samples using the RNeasy Kit (Qiagen, Valencia, CA). RNA quality was checked using the Agilent Bioanalyzer. Synthesis of cDNA and cRNA was performed according to Affymetrix (Santa Clara, CA) protocols.

Microarray Processing

Two rounds of linear amplification were performed because the RNA yield for several samples was too low to obtain enough labeled cRNA for chip hybridization using one round of amplification. For hybridization, 11 μg of cRNA were fragmented randomly by incubation at 94°C for 35 minutes in 40 mM Tris-acetate, pH 8.1, 100 mM potassium acetate, and 30 mM magnesium acetate. Fragmented cRNA was hybridized to U133A arrays at 45°C for 16 hours in a rotisserie oven set at 60 rpm. Following hybridization, arrays were washed (with 6x SSPE and 0.5x SSPE containing Triton X-100 [0.005%]), and stained with streptavidin-phycoerythrin (SAPE; Molecular Probes, Eugene, OR). Quantification of bound labeled probe was conducted using the Agilent G2500A GeneArray scanner (Agilent Technologies, Palo Alto, CA).

The total fluorescence intensity for each array was scaled to the uniform value of 600. Chip performance was quantitated by calculating a signal to noise ratio (raw average signal/noise). Chips were removed from further analysis if their signal-to-noise ratio was less than 5. Genes were only included in further analysis if they were called "present" in at least 10% of the chips. Eleven thousand seven hundred twenty three Affymetrix probe sets remained following this cut-off. The quality of the gene expression data were further controlled by identifying outliers based on principal components analysis and by analyzing the normal distributions of the gene intensities (Partek Pro V5.1).

Statistical Analysis

To identify genes that predict response with high sensitivity, a percentile analysis was employed. Genes that were up- or down-regulated in 100% of responders compared to at least 40% of non-responders were identified. The chi-

squared test and Student's t-test were then used to test the significance of the correlations between patient response and patient co-variates, including ras mutation status, and gene expression. Unsupervised k-means and hierarchical clustering were performed in Omniviz. The predictive value of the selected genes was then analyzed by leave-one-out and leave-five-out cross validation methods. Here, one (or five) sample(s) was (were) removed from the data set and the marker was reselected from 11,723 genes. The predictive value of this gene was then tested on the left-out sample(s) using a linear discriminant analysis. Sensitivity was calculated as the number of true positives detected by the test divided by the sum of true positives plus false negatives. Specificity was calculated as the number of true negatives detected by the test divided by the sum of true negatives and false positives. Positive predictive value was calculated as the number of true positives divided by the number of true positives and false positives. Negative predictive value was calculated as the number of true negatives divided by the number of true negatives and false negatives. The positive likelihood ratio of a patient responding to treatment is sensitivity divided by 1 minus specificity. Receiver operator curves (ROC) were used to choose appropriate thresholds for each classifier, requiring a sensitivity of 100%. The ROC diagnostic calculates the sensitivity and specificity for each parameter.

Real-Time RT-PCR Validation

TaqMan® real-time RT-PCR was employed to verify the microarray results of the AHR and AKAP13 genes. For each 1 μg sample of amplified RNA, cDNA was produced using T7 oligo(dT) primer and Superscript II reverse transcriptase according to the manufacturer's instructions (Invitrogen). Primers and MGB-probes for AKAP13 gene and control gene PBGD were designed using Primer Express (Applied Biosystems), while those for AHR gene and control gene HPRT were available as Assays-on-Demand from ABI. Primer/probe sequences for AKAP13 were as follows: AKAP13 forward, 5'ggtcagatgtttgccaaggaa3' (SEQ ID NO: 1); AKAP13 reverse, 5'tcttcagaaacacactcccatc-3' (SEQ ID NO: 2); AKAP13 probe, 6FAM-tgaaacggaagaagcttgtA-3' (SEQ ID NO: 3).

All primers and probes were tested for optimal amplification efficiency above 90%. The relative standard curve was composed of 5 dilutions (10-fold each) of HeLa cDNA (in most cases, ranging from 25 ng to 2.5 pg). RT-PCR amplification

mixtures (25 μL) contained 100 ng template cDNA, 2x TaqMan® universal PCR master mix (12.5 μL; Applied Biosystems), 500 nM forward and reverse primers, and 250 nM probe. Reactions were run on an ABI PRISM 7900HT Sequence Detector (Applied Biosystems). The cycling conditions were: 2 min of AmpErase UNG activation at 50°C, 10 min of polymerase activation at 95°C and 50 cycles at 95°C for 15 sec and annealing temperature (59°C or 60°C) for 60 sec. In each assay, a standard curve and a no-template control along with template cDNA were included in triplicates for the gene of interest and control gene. The relative quantity of each gene was calculated based on the standard curve, and was normalized with the quantity of the control gene. The median coefficient of variation (based on calculated quantities) of triplicate samples was 8%. The correlation between repeated runs using independently diluted templates from the stock was above 0.95. Samples were only compared with microarray data if duplicate TaqMan® experiments showed reproducible results.

Cell Line Culture and AKAP13 Over-expression Assay

The AKAP13 vectors, oncoLBC and protoLBC, and vector control (pSRalpha-neo) were obtained from Dr. Deniz Toksoz. Zheng et al. (1995). The HL60 cell line was obtained from the American Tissue Culture Collection and grown in RPMI 1640 with 10% FBS. Cells were transiently transfected with each vector using the Effectene reagent (Qiagen) according to the manufacturer's instructions and kept under G418 (600 μg/mL) for 7 days. Tipifarnib was then added in various concentrations (0, 1.5, 3.1, 6.3, 13, 25, 50, 100, 200, 1000, and 10,000 nM) to duplicate cultures ($1.5x10^5$ cells/mL). Cells were counted at Day 6. Cell counts were normalized to cultures with no drug to give a percent of viable control cells.

Results

Expression Profiling of Relapsed and Refractory AML

FTIs were originally designed to specifically inhibit FTase activity, thereby blocking the oncogenic ras pathways. Therefore, we initially analyzed DNA from the bone marrow of 80 patients with relapsed or refractory AML for activating ras mutations and investigated the possible correlation between ras mutation and the response to tipifarnib. While 26% of the AML samples harbored N-ras mutations, mutation status did not correlate with objective response or overall survival. Harousseau et al. (2003). We therefore performed gene expression profiling to

identify novel signatures that could be used to predict response to the FTI tipifarnib. Bone marrow samples were obtained for gene expression analysis from 80 patients prior to treatment with tipifarnib. Table 1 shows the patient information.

Table 1. Patient Information

Patient ID	AML CLASS	SEX	AGE	Best Response*	Survival Time	Response
A30009	REFRACTORY	MALE	70	CR	358	yes
A30011	RELAPSED	MALE	70	PR	154	yes
A30059	REFRACTORY	FEMALE	62	SD	119	yes
A30095	REFRACTORY	MALE	61	CR	380	yes
A30177	RELAPSED	FEMALE	63	SD	75	yes
A30192	RELAPSED	MALE	67	SD	266	yes
A30235	RELAPSED	FEMALE	58	CR	276	yes
A30246	REFRACTORY	MALE	74	HI	213	yes
A30353	RELAPSED	FEMALE	36	HI	192	yes
A30355	RELAPSED	FEMALE	44	HI	87	yes
A30360	REFRACTORY	MALE	80	HI	35	yes
A30364	RELAPSED	FEMALE	54	HI	67	yes
A30379	RELAPSED	FEMALE	63	SD	282	yes
A30380	REFRACTORY	FEMALE	71	HI	71	yes
A30007	REFRACTORY	FEMALE	54	NR	106	no
A30008	REFRACTORY	MALE	52	NR	27	no
A30053	RELAPSED	MALE	51	NR	48	no
A30057	REFRACTORY	MALE	74	NR	102	no
A30060	REFRACTORY	FEMALE	33	NR	175	no
A30096	REFRACTORY	MALE	69	NR	182	no
A30179	REFRACTORY	FEMALE	70	NR	148	no
A30182	REFRACTORY	MALE	70	NR	92	no
A30190	RELAPSED	FEMALE	54	NR	51	no
A30191	RELAPSED	FEMALE	67	NR	78	no
A30245	RELAPSED	MALE	63	NR	366	no
A30300	RELAPSED	MALE	47	NR	414	no
A30302	RELAPSED	MALE	62	NR	234	no
A30308	RELAPSED	MALE	66	NR	71	no
A30311	RELAPSED	FEMALE	61	NR	115	no
A30377	RELAPSED	MALE	68	NR	364	no
A30047	RELAPSED	FEMALE	63	NR	94	no
A30055	RELAPSED	FEMALE	71	NR	56	no
A30063	RELAPSED	MALE	46	NR	220	no
A30090	REFRACTORY	FEMALE	85	NR	56	no
A30091	REFRACTORY	FEMALE	67	NR	56	no
A30092	REFRACTORY	FEMALE	54	NR	40	no
A30111	REFRACTORY	FEMALE	71	NR	38	no
A30112	RELAPSED	FEMALE	61	NR	12	no
A30113	REFRACTORY	MALE	75	NR	177	no
A30119	REFRACTORY	MALE	19	NR	36	no
A30153	RELAPSED	FEMALE	68	NR	105	no
A30176	REFRACTORY	MALE	75	NR	54	no
A30178	RELAPSED	FEMALE	70	NR	39	no
A30180	REFRACTORY	MALE	62	NR	72	no

A30183	REFRACTORY	MALE	63	NR	64	no
A30244	RELAPSED	FEMALE	34	NR	35	no
A30247	REFRACTORY	FEMALE	72	NR	35	no
A30248	RELAPSED	MALE	46	NR	61	no
A30304	RELAPSED	MALE	65	NR	44	no
A30306	RELAPSED	FEMALE	28	NR	74	no
A30349	REFRACTORY	MALE	58	NR	22	no
A30354	REFRACTORY	FEMALE	31	NR	103	no
A30359	RELAPSED	MALE	65	NR	8	no
A30363	RELAPSED	MALE	64	NR	37	no
A30376	RELAPSED	FEMALE	24	NR	383	no
A30378	RELAPSED	FEMALE	76	NR	184	no
A30381	REFRACTORY	FEMALE	70	NR	128	no
A30395	REFRACTORY	MALE	61	NR	83	no

* Stable disease (SD) only included if confirmed by independent investigators
HI = hematological improvement
CR = complete response
PR = partial response
NR = no response

Fifty-eight of the 80 samples passed quality control measures including RNA quality and chip performance. There were no significant differences in age, sex, AML class (relapsed or refractory), cytogenic risk factors, baseline blast counts, response, and overall survival between these 58 patients and the remainder of the clinical study population (N = 194; Table 2).

Table 2

co-variate	58 subset	194 remainder	p-value
response	14	28	0.1237
male	28	119	0.1055
average age	60	56	0.1046
relapsed	31	104	0.8977
cytogenetic risk	34	5	0.1503
average blasts	55%	50%	0.1629

The gene expression data were integrated with the clinical information and retrospective analyses were performed to identify genes that could separate responders from non-responders with a high level of sensitivity. The data went through several filtering steps before identification of differentially expressed genes. First, genes that were not expressed in at least 10% of the samples were removed. This reduced the number of genes from approximately 22,000 to 11,723 genes. For unsupervised analyses genes that showed little variation in expression across the dataset (coefficient of variance of <45% across all the samples) were also excluded and quantile normalization was applied to the remaining 5,728 genes. At this stage

an unsupervised k-means clustering analysis was performed to identify any differences between patients based on their global gene expression profiles. Six main clusters of patients were identified using this technique. No separation between responders and non-responders was observed (Figure 1). Only a handful of genes may be associated with the anti-tumor effect of FTIs, for example, it is possible that the differential expression of a single gene that is involved in FTI biology impacts clinical response and this would be masked by the noise introduced from the other 11,722 genes.

Example 2

Identification of Genes that Are Differentially Expressed Between Responders and Non-responders

We next performed supervised analysis using the gene expression data to identify genes that were differentially expressed between all responders and at least 40% of non-responders. These criteria were chosen to identify genes that could predict response to tipifarnib with the highest level of sensitivity possible. From 11,723 genes, a total of 19 genes were identified that could stratify responders and non-responders (Table 3 and Table 10 for more detail) and that gave significant P values in a t-test (P <0.05). The genes included those involved in signal transduction, apoptosis, cell proliferation, oncogenesis, and potentially, FTI biology (ARHH, AKAP13, IL3RA).

Table 3 Top 19 Genes that Predict Response to tipifarnib and Results of Analysis

SEQ ID NO	Symbol	Specificity	P value	Functional description
151	AHR	0.52	0.00000255	Apoptosis, cell cycle, signal transduction
309	AKAP13	0.63	0.00006133	Small GTPase mediated signal transduction, oncogenesis
488	MINA53	0.50	0.00006934	Cell proliferation
411	IDS	0.50	0.00023964	Glycosaminoglycan degradation
632	OPN3	0.40	0.00064297	G-protein coupled receptor protein signaling
280	GPR105	0.43	0.00087608	G-protein coupled receptor protein signaling
582	TENC1	0.43	0.0010309	Signal transduction
376	TNFSF13	0.40	0.00104219	Cell proliferation
134	SVIL	0.45	0.00145723	Cytoskeletal anchoring
272	IL3RA	0.40	0.00198392	Receptor signaling
209	C6orf56	0.40	0.00261553	-
697	FRAG1	0.45	0.00298989	Tumor suppressor
476	GOSR1	0.45	0.01201057	Intra-Golgi transport
204	KIAA1036	0.43	0.01262079	-

483	BTG3	0.47	0.01659402	Regulation of cell cycle
487	MAPK8IP3	0.40	0.01817428	Regulation of JNK cascade
419	LILRB3	0.41	0.02374898	Immune response
242	ARHH	0.40	0.02721922	Small GTPase mediated signal transduction
496	NPTX2	0.45	0.03346833	Heterophilic cell adhesion

Real Time RT-PCR Validation of Gene Markers

To verify the microarray gene expression data, TaqMan® real time RT-PCR was performed on cDNA that was used for generating the labeled target cRNA for microarray hybridization. Two genes were selected to verify the gene expression data. The AHR and AKAP13 genes were chosen because the use of these genes resulted in the highest level of specificity for responders. The correlation coefficient was 0.74 for AHR and 0.94 for AKAP13 indicating that the microarray gene expression data could be validated by PCR (Figure 2).

Identification of the AKAP13 Gene as a Marker of Resistance

AKAP13 was over-expressed in patients who were resistant to tipifarnib. The predictive value of this gene was calculated for the 58 samples using a leave-one-out cross validation (LOOCV; Figure 3A). AKAP13 gene expression predicted non-response with a negative predictive value (NPV) of 96%, and low expression levels mediated response with a positive predictive value (PPV) of 43% ($\chi^2 = 13.7$; $P = 0.0022$). The overall diagnostic accuracy was 69% and positive likelihood ratio of responding was 2.4. Therefore, stratification of this patient population based on AKAP13 gene expression increased the response rate from 24% (14/58) in the entire group to 43% (13/30) among those patients with low expression of the gene. Expression values for the AKAP13 gene in each patient are shown in Figure 3B. When survival was analyzed by Kaplan-Meier analysis, the median survival of patients with low expression of this gene was 90 days longer than those patients who had high expression levels ($P = 0.008$; Figure 3C).

Identification of a Minimal Set of 3 Gene Markers

LOOCV was used to identify a candidate set of gene markers that could predict response to tipifarnib with an improved accuracy compared to AKAP13 alone. Classifiers were built with an increasing number of genes based on t-test P values, and the error rate of these classifiers was calculated using LOOCV while keeping the sensitivity of predicting response at 100% (Figure 4A).

The 3-gene classifier could predict response with the lowest error rate (Figure 4A). This was also observed when a leave-five-out cross validation was performed. When more genes were added the error rate increased, indicating that additional genes were introducing noise to the classifier. For the 3-gene classifier, the LOOCV demonstrated a NPV of 94% and a PPV of 48%, with an overall diagnostic accuracy of 74% and positive likelihood ratio of 2.9 (Figure 4B). The combined expression values for the 3 genes in each patient are shown in Figure 4C. Therefore, for the group of patients with this gene signature, the response rate to tipifarnib was 48% (12/25) compared to 24% (14/58) in this patient population.

Using the 3-gene signature (AHR, AKAP13 and MINA53), Kaplan-Meier analysis again showed a significant difference in survival between the predicted responder group and the non-responder group (Figure 4D). The 13 patients who were incorrectly classified as responders had a better overall survival compared to the 31 patients correctly classified as non-responders (Figure 5). Interestingly, the 2 patients that were misclassified as non-responders only demonstrated hematological improvements with relatively short overall survival times (71, 87 days).

Over-expression of AKAP13 Increases Resistance to tipifarnib in AML

The AKAP13 gene was the most robust marker of resistance to tipifarnib. We therefore investigated its involvement in FTI biology by over-expressing the oncoLBC and protoLBC variants of this gene in the HL60 cell line. Transient transfectants were then tested for sensitivity to tipifarnib. Over-expression of both AKAP13 variants in this AML cell line model led to an approximate 20-fold increase in resistance to tipifarnib compared to control cells (Figure 3). Both the LBC oncogene and proto-oncogene increased the resistance to tipifarnib to the same extent, as seen by a parallel rightward shift of the kill curves by more than one log-unit compared to control.

Discussion

Two groups recently identified gene expression profiles of newly diagnosed adult AML patients that are useful for predicting clinical outcome. Bullinger et al. (2004); and Valk et al. (2004). These profiles seem to be more powerful than currently used prognostic markers such as karyotyping. Moreover, expression profiles have been found that predict response to anticancer compounds including standard chemotherapeutics (Chang et al. (2003); Okutsu et al. (2002); and Cheok et al. (2003)) and novel selective anticancer agents. Hofmann et al. (2002); and

McLean et al. (2004). Similarly, pharmacogenetic profiles have recently been found that correlate with patient response to the tyrosine kinase inhibitor gefitinib. Paez et al. (2004) and Lynch et al. (2004). In that study, a subgroup of non-small cell lung cancer patients had activating mutations within the target epidermal growth factor receptor that correlated with clinical response to the targeted therapy.

In a phase 2 study of relapsed and refractory AML patients, we have identified gene expression profiles that predict response to tipifarnib, a novel farnesyl transferase inhibitor. This class of compounds is showing promise in the treatment of hematological malignancies (Karp et al. (2001); Kurzrock et al. (2004); Alsina et al. (2003); Cortes et al. (2003); and Thomas et al. (2001)) and solid tumors such as breast cancer (Johnston et al. (2003)) and recurrent glioma. Brunner et al. (2003). However, while clinical responses are being demonstrated, there is a growing need to tailor therapy by identifying patients who are most likely to respond to the drug and are, therefore, the best candidates for treatment. Furthermore, while ras was considered to be a primary target of this class of drugs, several clinical studies have shown that they are not necessarily effective in populations with a high frequency of ras mutations. Van Cutsem et al. (2004); and Rao et al. (2004).

Several gene markers were identified that have the potential to predict response to tipifarnib. A subset of these markers was both predictive of drug response and also thought to have the potential to be involved in FTI biology. One of the top candidates discovered from the microarray studies was the lymphoid blast crisis oncogene (oncoLBC or AKAP13). This gene functions as a guanine nucleotide exchange factor for the Rho proteins (Zheng et al. (1995)) and as a protein kinase A anchoring protein. Carr et al. (1991). AKAP13 contains a region that is homologous to an α-helical domain that is known to interact with lamin B. Foisner et al. (1991). This association could lead to lamin B activation via protein kinase A, consequently increasing mitotic activity. Both RhoB and lamin B are farnesylated and are candidate targets of FTIs. AKAP13 is also a proto-oncogene, because loss of its 3-prime end causes cellular transformation. Sterpetti et al. (1999). While it was originally identified from a patient with chronic myeloid leukemia, its expression has not been documented in AML.

The identification of several genes that are potentially involved in FTI biology (ARHH, AKAP13, IL3RA) support the idea that the interaction of multiple

pathways can affect how FTIs function in this population of AML patients (Figure 7). These genes interact with several farnesylated proteins including ras, rho, and potentially lamin B. Rho proteins are potentially important antitumorigenic targets for FTIs. Sahai et al. (2002); and Lancet et al. (2003). RhoB, RhoA, and RhoC have been found to be over-expressed in multiple cancer types. Sahai et al. (2002). In addition, RhoH (ARHH) is frequently re-arranged in tumors of myeloid origin, and this may lead to its over-expression. Pasqualucci et al. (2001). While most of these Rho proteins are geranygeranylated, they interact closely with each other and the farnesylated ras, RhoE, and RhoB small GTPases. Sahai et al. (2002); and Li et al. (2002). Furthermore, it has been shown that RhoH, RhoB, and RhoE can act in an antagonistic fashion to the transforming abilities of RhoA and RhoG. Li et al. (2002). The activity of RhoA, and possibly other related small GTPases, is increased by the guanine nucleotide exchange factor lymphoid blast crisis oncogene (AKAP13). Sterpetti et al. (1999); and Toksoz et al. (1994). In addition, AKAP13 may increase mitotic activity by activating lamin B via protein kinase A. Foisner et al. (1991). It is also well known that the IL3 receptor activates ras pathways. Testa et al. (2004). Therefore, as indicated in Figure 7, the increased activity of IL3RA and AKAP13, and the decrease in RhoH expression could lead to an increased cellular profile of transformation. This might allow for the leukemic blast cell to overcome the anti-tumorigenic effects of FTIs through compensatory pathways. In contrast, when IL3RA and AKAP13 are under-expressed and there is an increase in RhoH activity, FTIs may be more effective in blocking these pathways.

Finally, we demonstrated that over-expression of AKAP13 (both oncoLBC and protoLBC variants) increased the IC_{50} of the HL60 AML cell line by approximately 20-fold. This indicates that over-expression of AKAP13 is a relevant marker of resistance and that it may also be a useful alternative drug target for patients who are resistant to tipifarnib.

Overall, our findings allow development of a gene expression based diagnostic assay to identify patients likely respond to tipifarnib. This information could be used to better direct treatment to the appropriate patient population. Using survival as the gold standard, the gene signature predicts a level of response to therapy that cannot be predicted by using conventional clinical response criteria. Alternatively, this raises the question of whether the gene signature for predicting response to FTI treatment also has prognostic value irrespective of FTI therapy. We thus evaluated a

prognostic signature previously identified in newly diagnosed AML patients who were treated with conventional chemotherapy. Bullinger et al. (2004). While this signature showed utility in the current patient population our 3-gene signature further stratified these poor and good prognostic groups showing that it is a predictor of response to FTIs.

Example 3

Analysis of an AML prognostic gene signature

The 3-gene signature can predict prognosis irrespective of the type of drug treatment. To determine this, we first evaluated a gene-expression signature recently identified in newly diagnosed AML patients who were treated with conventional chemotherapy. Bullinger et al. (2004). This signature was defined using a cDNA array and therefore we first matched these genes with the probes present on the Affymetrix gene chip. Of the 133 predictive genes identified by Bullinger et al., 167 probe sets (corresponding to 103 unique genes) were matched to the Affymetrix U133A chip. The 3 genes identified in our present analysis are not present in the Bullinger et al. 133 gene list. SEQ ID NOs: shown in Table 4. Two main groups of patients were defined by hierarchical clustering using these 167 probe sets (Fig 8A). Kaplan-Meier analysis showed a clear stratification of these clusters into patients with good and poor prognosis (Fig 8B, $p = 0.000003$). Our data therefore show that a subset of the 133-gene prognostic signature identified by Bullinger et al. (2004) can also be used in a relapsed and refractory cohort of patients. Consequently, this indicates that the prognostic gene profile is surprisingly robust across different microarray platforms, and different classes of AML.

Neither of the clusters defined by the prognostic gene signature had significantly more responders. However, when the tipifarnib 3-gene signature was applied to the good and poor prognostic groups, patients who responded to tipifarnib were further stratified from both prognostic groups (Fig 8C). Therefore, the 3-gene signature has independent utility to the prognostic signature and that it is specific for FTI treatment in this population of patients.

Example 4

Clinical Evaluation and Response Definitions

The current study was an open label, multicenter, non-comparative Phase 2 study investigating the efficacy and safety of farnesyl transferase inhibition with tipifarnib administered as a single agent, at a starting oral dose of 600 mg b.i.d. for the first 21 days of each 28 day cycle in AML. Subjects were enrolled into two cohorts, those with relapsed AML and those with refractory AML. A total of 252 patients (135 relapsed and 117 refractory) were treated. For the purposes of the gene expression profiling response to tipifarnib was defined as patients who had an objective response (CR, CRp, or PR) (as described above), or patients who demonstrated confirmed stable disease, or a hematological response (decrease of >50% of leukemic blast cells) as determined by either central review or by the clinical site at any time during follow up.

Sample Collection and Microarray Processing

All samples were obtained from patients who had consented to the described processing and analyses. Bone marrow samples were collected from patients before treatment with tipifarnib, diluted with PBS and centrifuged with Ficoll-diatrizoate (1.077g/ml). White blood cells were washed twice with PBS, resuspended in FBS with 10% DMSO and immediately stored at -80°C. Cells were thawed and total RNA was extracted from cell samples using the RNeasy Kit (Qiagen, Valencia, CA). RNA quality was checked using the Agilent Bioanalyzer. Synthesis of cDNA and cRNA were performed according to Affymetrix (Santa Clara, CA) protocols. Two rounds of linear amplification were performed because the RNA yield for several samples was too low to obtain enough labeled cRNA for chip hybridization using one round of amplification.

For hybridization, 11 μg of cRNA were fragmented randomly by incubation at 94°C for 35 min in 40 mM Tris-acetate, pH 8.1, 100 mM potassium acetate, and 30 mM magnesium acetate. Fragmented cRNA was hybridized to U133A arrays at 45°C for 16 h in a rotisserie oven set at 60 rpm. Following hybridization, arrays were washed (with 6x SSPE and 0.5x SSPE containing Triton X-100 (0.005%)), and stained with streptavidin-phycoerythrin (SAPE; Molecular Probes, Eugene, OR). Quantification of bound labeled probe was conducted using the Agilent G2500A GeneArray scanner (Agilent Technologies, Palo Alto, CA).

The total fluorescence intensity for each array was scaled to the uniform value of 600. Chip performance was quantitated by calculating a signal to noise ratio (raw average signal/noise). Chips were removed from further analysis if their signal-to-noise ratio was less than 5. Genes were only included in further analysis if they were called "present" in at least 10% of the chips. Approximately 12,000 Affymetrix probe sets remained following this cut-off. Gene expression data quality was further controlled by identifying outliers based on principal components analysis and by analyzing the normal distributions of the gene intensities (Partek Pro V5.1).

Statistical Analysis

Unsupervised hierarchical clustering and clustering was performed in Omniviz. Kaplan-Meier analysis was performed using S-Plus.

Example 5

A prognostic signature identified in de novo AML has utility in relapsed and refractory patients

Two papers were recently published describing gene-expression profiling of newly diagnosed adult AML patients and its use in predicting clinical outcome. Bullinger et al. (2004); and Valk et al. (2004). We have profiled 58 patients with relapsed and refractory AML using the Affymetrix U133A gene chip. Of the 133 predictive genes identified by Bullinger et al. 167 probe sets (corresponding to 103 unique genes) were identified on the U133A chip (Fig 9). Bullinger et al. (2004). The 167 probe sets are listed in the Sequence Listing Table and designated the SEQ ID NOs: shown in Table 4.

Two main groups of patients were defined by hierarchical clustering using these 167 probe sets (Fig 10A). Kaplan-Meier analysis showed a clear stratification of these clusters into patients with good and poor prognosis (Fig. 10B, $p = 0.0000219$). Our data therefore shows that a 103 gene subset of the 133-gene prognostic signature identified by Bullinger et al. (2004) can also be used in a relapsed and refractory cohort of patients. Table 4. Consequently, this indicates that the prognostic gene profile is surprisingly robust across different microarray platforms, different classes of AML, and for different treatment algorithms.

Table 4

SEQ ID NO	cluster1 mean	cluster2 mean	ratio	good prognostic group
44	2.101613636	0.980102944	2.144278466	up
51	1.574545244	0.899302214	1.750852182	up

52	2.459568465	1.161727897	2.117163987	up
55	1.752902097	0.968494897	1.809923937	up
56	2.395730325	0.72630844	3.298502667	up
68	1.319861385	1.36567127	0.96645614	down
76	1.269874887	1.430330507	0.8878192	down
90	0.986377684	1.432950683	0.688354244	down
91	1.177005842	1.428309412	0.824055231	down
93	1.095239589	0.99028255	1.105986962	up
104	1.798024918	0.806182842	2.230294202	up
108	5.041411016	0.60238936	8.369024013	up
111	1.159807609	1.639962342	0.707216001	down
114	1.300310388	1.324114868	0.982022345	down
115	1.342190037	2.306688065	0.581868896	down
116	1.320735142	1.367135334	0.966060279	down
118	3.891659096	1.14773151	3.390739962	up
119	1.519690498	1.219697115	1.245957278	up
120	1.328167684	1.250925424	1.061748094	up
124	4.052024058	0.844109372	4.800354307	up
128	2.091653255	0.964077201	2.169591038	up
129	1.991638259	1.045332875	1.905267027	up
130	2.231280889	0.889145566	2.509466362	up
131	1.815199475	0.992602441	1.828727596	up
142	1.3198052	1.283492456	1.028292136	up
143	2.222738653	0.801693589	2.772553857	up
144	1.591280353	1.037860182	1.533231913	up
147	1.050088807	1.267434876	0.828515	down
148	1.07046517	1.621321185	0.660242511	down
150	1.768390061	0.83169323	2.126252803	up
153	1.253048826	1.17309932	1.068152376	up
157	1.24240959	1.057597528	1.174747063	up
158	1.039468561	1.565715718	0.663893546	down
159	0.897290104	2.462204436	0.364425509	down
160	2.042794407	1.039120916	1.965887103	up
161	2.935364557	1.109613717	2.645393178	up
167	0.771931017	1.585630652	0.486829021	down
174	1.206470925	1.279664724	0.942802363	down
200	1.099482264	1.491611294	0.737110445	down
207	4.901329448	0.871582063	5.623485909	up
208	2.346190152	0.930016604	2.522740069	up
211	0.774893647	2.117870914	0.365883323	down
212	8.626480573	0.518118436	16.64963061	up
220	2.002466652	2.360710711	0.84824737	down
221	1.031573096	1.410790966	0.731201943	down
222	1.236611762	1.579356606	0.782984512	down
224	4.252841813	1.038446727	4.095387566	up
227	2.330630017	0.740455045	3.147564506	up
229	1.271065192	1.275443314	0.996567372	down
230	4.079291876	0.770236845	5.296152606	up

231	1.613398862	1.053542946	1.531403032	up
234	2.462533188	0.694618451	3.54515948	up
235	1.736866874	1.312450625	1.323376926	up
236	0.973964566	1.442647881	0.675122862	down
237	2.146894817	1.117648799	1.920902898	up
238	1.121767102	1.496868758	0.749409122	down
241	1.09122088	1.120796083	0.973612325	down
243	1.563910635	1.102945516	1.417940063	up
244	1.473673649	1.474149259	0.999677367	down
245	1.148794849	1.399237842	0.821014709	down
246	1.350310245	1.327639719	1.017075812	up□
249	1.44906906	1.424150806	1.017496921	up
256	1.790625889	1.255091645	1.426689354	up
260	1.423005429	1.45961841	0.97491606	down
262	1.09603256	1.181485007	0.927673693	down
263	1.125580943	1.178287994	0.955268108	down
264	0.891946685	1.753005455	0.508809988	down
265	1.2942793	2.776461422	0.466161456	down
277	1.102290438	1.391074208	0.792402326	down
278	1.186998217	2.302906551	0.515434817	down
281	0.79821098	1.919103099	0.415929181	down
288	1.236023874	1.187331666	1.041009778	up
301	1.087313678	1.212772631	0.896551959	down
303	1.820970134	1.219911387	1.492706891	up
306	0.893432913	1.529980396	0.583950563	down
310	1.076214323	1.702252048	0.632229713	down
314	1.407137316	1.229815501	1.144185705	up
315	2.943883289	0.906317573	3.248180746	up
316	1.666394606	0.87032571	1.914679281	up
340	1.499937462	0.921725287	1.627315083	up
346	1.035229803	1.508152041	0.686422705	down
347	1.317050838	1.350558887	0.975189495	down
348	1.481608791	1.161107338	1.276030856	up
351	1.177285398	1.293627618	0.910065139	down
352	1.328716012	1.354505535	0.980960194	down
353	1.245636653	1.388354047	0.897203891	down
354	1.057630522	1.407147783	0.751612968	down
355	1.394737541	1.22633541	1.137321429	up
356	1.194410314	1.007530697	1.185482803	up
359	1.653993358	1.201194991	1.37695659	up
361	1.318561503	1.233384342	1.069059707	up
364	1.045812959	1.463795973	0.714452682	down
365	1.721871636	1.213128563	1.419364517	up
366	1.437978693	1.211203408	1.18723138	up
369	1.480402866	1.289306967	1.148215983	up
373	1.750186104	1.199777316	1.458759122	up
379	1.987020453	2.331667877	0.852188458	down
383	1.419274906	1.587359923	0.894110331	down

385	1.412275401	1.410313065	1.001391419	up
387	1.339345508	1.331753924	1.005700441	up
395	1.747595879	1.473302004	1.186176272	up
401	1.237925661	1.240617377	0.997830341	down
404	1.176676928	1.14697739	1.025893743	up
407	1.256304659	1.357899094	0.925182633	down
415	2.013680769	0.801461983	2.512509405	up
418	1.405740421	1.158990553	1.212900673	up
423	1.346444485	1.136343796	1.184891835	up
426	9.592759013	1.560596128	6.146855576	up
430	1.768393033	1.23257422	1.434715252	up
437	1.40453464	1.860231401	0.755032218	down
438	1.673447728	3.930927905	0.425713157	down
445	1.283792446	1.501667999	0.85491097	down
446	1.214492279	1.091382628	1.11280155	up
448	1.561740275	1.228333636	1.271430033	up
450	1.734251715	1.844252606	0.940354759	down
452	1.408580649	1.582858413	0.889896807	down
453	1.1383915	1.741970797	0.653507798	down
454	1.079716972	1.450127515	0.744566917	down
457	1.783529874	1.314108612	1.357216487	up
460	1.136773942	1.003606776	1.132688588	up
462	1.220645614	1.113413039	1.096309789	up
466	1.183017496	1.211183566	0.976745003	down
467	1.113306085	1.067417158	1.042990621	up
469	1.211346488	1.1871952	1.020343148	up
484	0.998901987	1.654269584	0.60383265	down
485	1.133736575	1.914231031	0.592267368	down
489	1.412382921	1.384849519	1.019881873	up
493	3.988440713	0.965026485	4.132985753	up
495	1.187128423	1.462785203	0.81155348	down
498	3.691405839	0.765303503	4.823453473	up
499	2.216130138	0.848821568	2.610831558	up
507	2.199861346	0.773086467	2.845556663	up
520	1.67633492	1.194585675	1.403277265	up
524	7.743976211	0.841225224	9.205592025	up
529	2.591731743	1.08342825	2.392158173	up
530	1.273363236	1.097292728	1.160459013	up
535	1.095879149	1.302490014	0.8413724	down
546	0.987046127	2.124625445	0.464574181	down
550	2.103990301	0.929475745	2.263631205	up
555	1.439273076	1.211738853	1.187774967	up
557	1.121983318	1.251788385	0.896304305	down
559	1.197910138	1.34693432	0.889360468	down
560	1.144102989	1.261720239	0.906780246	down
565	1.078544278	1.162115183	0.928087244	down
568	1.46401688	0.960152377	1.524775561	up
569	1.262437604	1.105379077	1.142085669	up

585	1.349621283	1.10729713	1.218842935	up
590	1.203037349	1.068047506	1.126389361	up
609	1.395352279	1.172354292	1.190213819	up
624	1.131210862	1.399636303	0.80821772	down
630	0.859929427	1.37477642	0.625504929	down
637	0.72293765	2.343345902	0.308506588	down
641	1.340847351	1.601484153	0.837252962	down
656	1.259818484	1.213892186	1.037833918	up
658	0.60640428	2.092078796	0.289857285	down
659	1.099549227	1.166865002	0.942310572	down
665	1.615399946	1.733324276	0.931966378	down
684	0.734401434	2.496195783	0.294208267	down
685	2.158835355	0.765517273	2.82010012	up
686	0.957971846	1.386779118	0.690789061	down
687	0.982131268	1.162818279	0.844612856	down
690	2.421692274	0.791473723	3.059725425	up
691	1.268020946	0.973474927	1.302571757	up
692	1.054213523	1.147045848	0.91906834	down
693	1.251020003	1.271391137	0.983977288	down
694	1.122443987	1.153661375	0.972940597	down
696	1.301034813	1.029185966	1.264139675	up

The prognostic signature is independent of a 3-gene signature that predicts response to tipifarnib.

We identified a 3-gene signature (AHR, AKAP13, MINA53) that predicts response to tipifarnib in relapsed and refractory AML patients. These genes can stratify patients into good and poor prognostic outcome groups (Fig 11B, $p = 0.002$). The question arises as to whether this gene signature is predicting response to FTI treatment or merely identifying patients who have a generally good prognosis. When the 3-gene signature was applied to the good and poor prognostic groups, responders were further stratified from the prognostic groups (Fig 11C, $p = 0.000003$). Following the application of both gene signatures there is clear stratification of a group of patients that do not respond to tipifarnib and have a poor prognosis irrespective of treatment type (Fig 11D, $p = 0.0000005$). Therefore, the 3-gene signature seems to be independent of the prognostic signature that has been identified and it is specific for FTI treatment in this population of patients. As a result we suggest that the prognostic signature maybe used in conjunction with drug-specific signatures (such as the tipifarnib predictive profile) to better manage patient therapy.

Example 6

Identification of genes that are differentially expressed between responders and non-responders (not including stable disease patients)

Four patients were removed from the analysis since they were classified as having stable disease and these patients cannot be clearly defined as either responders or non-responders. Inclusion of stable disease patients may bias the analysis for selecting genes associated with prognosis irrespective of drug treatment. This resulted in comparing 10 responders with 44 non-responders. Selected genes were required to show a specificity of 40% and a minimum mean fold-change of 2.0. These criteria were chosen to identify genes that could predict response to tipifarnib with the highest level of sensitivity possible. From 11,723 genes, a total of 8 genes were identified that could stratify responders and non-responders (Table 5) and that gave significant P values in a t-test (P <0.05). The genes included those involved in signal transduction, apoptosis, cell proliferation, oncogenesis, and potentially, FTI biology. AKAP13 is the most robust marker

We next aimed at identifying a minimal set of genes that would provide the best diagnostic accuracy from the 8 selected genes. Classifiers were built with an increasing number of genes based on the AUC values from receiver operator characteristic analysis, and the error rate of these classifiers was calculated using LOOCV while keeping the sensitivity of predicting response at 100% (Fig. 12a). The AKAP13 gene could predict response with the lowest error rate of less than 40% (Fig. 12a). The error rate increased to more than 50% when more than 2 genes were used in the classifier. For the AKAP13 the LOOCV demonstrated a NPV of 93% and a PPV of 31%, with an overall diagnostic accuracy of 63% and positive likelihood ratio of 2.0 (Fig. 12b). The expression value for AKAP13 in each patient is shown in Fig. 12c. Therefore, for the group of patients with low expression of AKAP13, the response rate to tipifarnib was 31% (8/26) compared to 18% (10/54) in the current patient population. Using the AKAP13 gene, Kaplan-Meier analysis showed a significant difference in survival between the predicted responder group and the non-responder group (Fig. 12d).

Table 5. List of Top 8 Genes that Predict Response to Tipifarnib

SEQ ID NO:	Symbol	AUC	fold change	P value	Functional Description
309	AKAP13	0.830	0.491	0.00007	intracellular signaling, oncogenesis
151	AHR	0.807	0.446	0.00019	signal transduction, apoptosis
222	SCAP2	0.777	0.431	0.00007	signal transduction

496	NPTX2	0.738	0.115	0.02934	cell adhesion
451	BAT1	0.725	0.458	0.00097	cellular biosynthesis
272	IL3RA	0.705	0.375	0.00226	receptor signalling
411	IDS	0.645	0.395	0.00069	metabolism
280	P2RY14	0.627	0.369	0.00145	signal transduction

AUC = area under the curve from receiver operator characteristic analysis. This is an indication of the overall diagnostic accuracy.

Example 7

Gene Expression Profiling Predictive of Tipifarnib (ZARNESTRA®, R115777) Response in Patients With Newly Diagnosed Acute Myeloid Leukemia

Tipifarnib (ZARNESTRA®, R115777), has demonstrated clinical response in patients with hematological disease. While the inhibition of protein farnesylation is the primary mechanism of action (MOA), the level of farnesyl inhibition is not a reliable pharmacodynamic marker of response, nor is it clear what genetic markers can be employed to predict response. This prospectively designed study was conducted to identify potential genetic markers and expression signatures that may be surrogate predictors of response for tipifarnib in patients with acute myeloid leukemia (AML). Bone marrow samples were collected and gene expression profiles analyzed from a single arm phase 2 clinical study of tipifarnib in poor-risk patients with newly diagnosed AML. Lancet et al. (2004). In total, 79 samples were profiled before (n = 25), during (n = 30), and after (n = 24) tipifarnib treatment.

Bone marrow samples were analyzed using the Affymetrix U133A GeneChip® array. Global gene expression signatures revealed that tipifarnib treatment resulted in gene expression changes that were maintained for up to 120 days following treatment termination. Pretreatment vs post-treatment samples identified approximately 500 genes that had significant changes (False Discovery Rate [FDR] <0.005) in gene expression following farnesyl transferase inhibition, including several genes associated with farnesylation (eg K-ras, FNTA). Many of the modulated genes were identified as those significantly involved in protein biosynthesis, DNA replication, intracellular signaling, and cell cycle pathways, thus, reflective of inhibition of cellular proliferation. A subset of 27 genes (including genes associated with signal transduction and cell cycle) was also identified as being differentially modulated between responders and non-responders ($P < 0.01$). Gene expression signatures previously identified from a phase 2 clinical trial in relapsed and refractory AML were also tested in pretreatment samples to examine their ability to predict response. Raponi et al. (2004). A combination of 6 genes was

found to have significant predictive accuracy in this independent set of samples (P = 0.05). The genes identified from these studies might be used as surrogate biomarkers of tipifarnib activity.

Patient Samples

In a phase 2 study, patients with newly diagnosed AML received ZARNESTRA®, 600 mg bid21dQ4wks. Bone marrow samples were obtained before, during, and after treatment with ZARNESTRA ®. Mononuclear cells isolated by Ficoll-Hypaque density centrifugation and viably frozen.

Microarray Analysis

Message RNA was amplified from patient blast cells and hybridized to the Affymetrix U133A chip, which can probe for approximately 22,000 genes (Fig. 13). Chip data were pre-filtered to remove poor quality data and genes that were not expressed in at least 10% of the patient samples. In addition genes that did not vary across the dataset were removed (CV < 40%). Approximately, 8000 genes remained for further analysis. A total of 79 chips passed quality control measures and also had associated clinical response data.

Statistical Analysis

Analysis of variance (ANOVA) and t-tests were used to investigate the effect of drug treatment and time and their interactions for each gene. Multiple hypotheses testing was controlled by applying the false discovery rate (FDR) algorithm. All statistical analyses were performed in S-Plus 6.1 (Insightful Corporation). Principal components analysis was performed in Partek Pro. Hierarchical clustering was performed using a correlation metric and complete linkage (OmniViz Pro™, OmniViz, Maynard, MA). Pathway analysis was performed using Gene Ontology functional classifications. Table 6 shows the results of the analysis.

Table 6. Functional Gene Classes significantly modulated by tipifarnib

GO.ID	GO.Class	p.value
6886	Intracellular protein transport	5.75E-05
6951	Heatshock response	8.32E-05
6913	Nucleocytoplasmic transport	1.18E-04
6207	De novo pyrimidine base biosynthesis	1.58E-04
6809	Nitric oxide biosynthesis	1.58E-04
6376	mRNA splice site selection	2.05E-04
245	Spliceosome assembly	2.05E-04
6259	DNA metabolism	4.86E-04
6371	mRNA splicing	4.86E-04
6607	NLS-bearing substrate-nucleus import	5.64E-04
15031	Protein transport	6.05E-04

6338	Chromatin remodeling	9.87E-04
6397	mRNA processing	0.003201
7050	Cell cycle arrest	0.003685
8380	RNA splicing	0.003992
6512	Ubiquitin cycle	0.004639
6396	RNA processing	0.005096
398	Nuclear mRNA splicing, via spliceosome	0.007120
6916	Anti-apoptosis	0.007395
6118	Electron transport	0.010004
7049	Cell cycle	0.019631
6457	Protein folding	0.021817
7264	Small GTPase mediated signal transduction	0.025281
8285	Negative regulation of cell proliferation	0.026482
6366	Transcription from PolI promoter	0.048613

Approximately 8000 genes were used for global unsupervised clustering. Pretreatment samples clustered distally from during- and after-treatment samples. After-treatment samples included those that were from patients up to 120 days following treatment termination. Figure 14 shows that AML samples maintain FTI-mediated global gene expression changes following termination of tipifarnib treatment.

502 genes were found to be differentially expressed after treatment with tipifarnib ($p<0.005$). These genes are listed in Tables 7A-7C and in more detail in Table 9.

Table 7A

SEQ ID NO	psid	SEQ ID NO	psid	SEQ ID NO	psid	SEQ ID NO	psid	SEQ ID NO	psid
4	200002	47	201104	97	202029	165	203133	215	204158
5	200008	48	201118	98	202077	166	203138	216	204168
6	200010	49	201134	99	202078	168	203140	217	204170
7	200013	50	201163	100	202090	169	203142	219	204294
8	200017	53	201227	101	202110	170	203211	220	204351
9	200018	54	201244	102	202114	171	203213	223	204411
10	200025	57	201273	103	202141	172	203255	225	204528
11	200026	58	201277	105	202163	173	203262	226	204640
12	200041	59	201300	106	202187	175	203316	228	204652
14	200056	60	201305	107	202197	176	203332	232	204766
15	200061	61	201317	109	202231	177	203362	233	204767
16	200073	62	201324	110	202233	178	203371	239	204905
17	200086	63	201352	112	202275	179	203385	240	204923
18	200087	64	201381	113	202279	180	203396	247	205033
19	200091	65	201393	117	202298	181	203437	248	205087
20	200634	66	201403	121	202324	182	203460	250	205133
21	200640	67	201429	122	202325	183	203484	251	205176
22	200643	69	201455	123	202349	184	203514	252	205213
24	200718	70	201472	125	202423	185	203528	253	205270

25	200772	71	201483	126	202432	186	203531	254	205323
26	200780	72	201568	127	202442	187	203581	255	205335
27	200801	73	201588	132	202503	188	203610	257	205339
28	200834	74	201597	133	202544	189	203613	258	205361
29	200846	75	201620	135	202582	190	203621	259	205403
30	200853	77	201635	136	202591	191	203666	261	205467
31	200857	78	201665	137	202622	192	203667	266	205644
32	200858	79	201675	138	202642	193	203674	267	205671
33	200902	80	201699	139	202649	194	203743	268	205807
34	200925	81	201715	140	202673	195	203748	269	205849
35	200934	82	201716	141	202692	196	203761	270	205967
36	200949	83	201738	145	202735	197	203827	271	206066
37	200964	84	201754	146	202754	199	203882	273	206150
38	200971	86	201805	149	202761	201	203893	274	206177
39	200981	87	201812	152	202824	202	203922	275	206219
40	200991	88	201818	154	202841	203	203936	276	206245
41	200999	89	201890	155	202848	205	203960	279	206618
42	201019	92	201921	156	202854	206	203965	282	206723
43	201027	94	201938	162	202957	210	204067	283	206790
45	201049	95	201987	163	203044	213	204145	284	206868
46	201094	96	202001	164	203053	214	204146	285	206874

Table 7B

SEQ ID NO	psid	SEQ ID NO	psid	SEQ ID NO	psid	SEQ ID NO	psid	SEQ ID NO	psid
286	206958	335	208919	398	210235	461	212571	518	214264
287	207072	337	208956	399	210283	463	212578	519	214288
289	207127	338	208966	400	210284	464	212583	522	214352
290	207163	339	208975	402	210448	465	212630	523	214377
291	207165	341	208981	403	210453	468	212757	525	214494
292	207266	342	209022	405	210563	470	212833	526	214499
293	207287	343	209063	406	210598	471	212860	527	214617
294	207335	344	209066	408	210633	472	212878	528	214661
295	207540	345	209089	409	210639	473	212907	531	214800
296	207551	349	209138	410	210649	474	212927	532	214820
297	207568	350	209172	412	210785	475	212964	534	215038
298	207571	357	209257	413	210786	477	213028	536	215096
299	207573	358	209258	414	210840	478	213047	537	215121
300	207777	360	209282	416	210859	479	213061	538	215127
302	207845	362	209295	417	210982	480	213062	539	215136
304	207974	363	209303	420	211430	481	213074	540	215147
305	208091	367	209362	421	211445	482	213129	541	215171
307	208270	368	209369	422	211487	486	213159	542	215227
308	208310	370	209377	424	211645	490	213253	543	215379
311	208420	371	209385	425	211730	491	213287	544	215380
312	208549	372	209411	427	211747	492	213311	545	215399
313	208598	374	209471	429	211858	494	213414	547	215493
317	208629	375	209492	431	211921	497	213502	548	215691
318	208633	377	209507	432	211932	500	213567	552	216207
319	208643	378	209520	433	211938	501	213599	553	216348
320	208656	380	209585	434	211976	502	213687	554	216384
321	208667	381	209628	435	211985	503	213700	556	216833
322	208672	382	209662	436	212007	504	213727	558	216977
323	208679	383	209679	439	212027	505	213754	561	217022

324	208695	384	209687	440	212181	506	213811	562	217106
325	208745	386	209734	441	212201	508	213867	563	217122
326	208746	388	209827	442	212248	509	213911	564	217249
327	208754	389	209838	443	212269	510	213941	566	217329
328	208808	390	209868	444	212277	511	214003	567	217336
329	208819	391	209907	447	212287	512	214051	570	217491
330	208831	392	210093	449	212311	513	214097	571	217749
331	208894	393	210097	455	212426	514	214124	572	217750
332	208900	394	210137	456	212451	515	214129	573	217754
333	208904	396	210180	458	212549	516	214143	574	217769
334	208905	397	210233	459	212561	517	214224	575	217773

Table 7C

SEQ ID NO:	psid	SEQ ID NO:	psid	SEQ ID NO:	psid
576	217801	621	218643	671	221509
577	217812	622	218660	672	221528
578	217825	623	218671	673	221577
579	217833	625	218830	674	221593
580	217838	626	218873	675	221599
581	217843	627	218936	676	221620
583	217860	628	218937	677	221669
584	217866	629	218946	688	222203
586	217877	631	219030	689	222280
587	218003	633	219056	695	37201
588	218039	634	219105	700	55692
589	218058	635	219110	701	59644
591	218103	636	219163	702	AFFX-HSAC07/X00351_3
592	218116	638	219286	703	AFFX-HSAC07/X00351_M
593	218117	639	219293	704	AFFX-HUMISGF3A/M97935_MB
594	218175	640	219347	705	AFFX-r2-Ec-bioB-3
595	218188	642	219506		
596	218213	643	219507		
597	218241	644	219546		
598	218256	645	219759		
599	218259	646	219765		
600	218274	647	219816		
601	218276	648	219819		
602	218280	649	219906		
603	218283	650	220001		
604	218288	651	220023		
605	218334	652	220052		
606	218339	653	220060		
607	218350	654	220155		
608	218367	655	220199		
610	218373	657	220404		
611	218395	661	220741		
612	218397	662	220755		
613	218447	663	220864		
614	218467	664	220942		
615	218482	666	221143		
616	218543	667	221253		
617	218563	668	221432		
618	218576	669	221434		

620	218605	670	221505		

Included in this list were many genes involved in FTI biology including AKT1, CENPF, KRAS, RAF1, STATs and farnesyltransferase. Several gene functional categories were found to be significantly enriched in this gene list (Table 8).

Table 8.
Genes differentially expressed between responders and non-responders after treatment with tipifarnib

SEQ ID NO:	Probe set ID	Gene function (GO)	RE pre v RE post	PD pre v PD post
13	200044	RNA splicing	Up	No difference
23	200661	Protein	Up	No difference
85	201804	Protein folding	Up	No difference
123	202349	Protein folding	Up	No difference
137	202622	Nuclear	Up	No difference
149	202761	Cytoskeleton	Up	No difference
198	203845	transcription	Down	No difference
210	204067	Electron transport	Up	No difference
218	204215	Membrane	Down	No difference
257	205339	Cell proliferation	Down	No difference
266	205644	RNA splicing	Down	No difference
268	205807	Bone mineralization	Down	No difference
290	207163	Signal transduction	Up	No difference
329	208819	Signal transduction	Up	No difference
336	208927	RNA	Up	No difference
362	209295	Signal transduction	Down	No difference
428	211762	Cell cycle	Down	No difference
470	212833	Transport	Down	Down (more in PD)
521	214298	Cell cycle	Up	Up (more in PC)
549	215764	Transport	Up	Up (more in PD)
551	215905	RNA splicing	Up	No difference
598	218256	Transport	Down	No difference
610	218373	Apoptosis	Up	No difference
619	218603	Cell cycle	Down	No difference
660	220671	transcription	No difference	down
698	44696	Signal transduction	No difference	Up
699	49485	Transcription	Up	No difference

We have previously identified 8 genes that were predictive of resistance to tipifarnib in relapsed and refractory AML. The most predictive gene in that dataset was AKAP-13 (AUC = 0.83).

The predictive value of these genes was tested in the current set of newly diagnosed AML samples (CTEP20). Samples from patients with complete response or progressive disease were used. The results are shown in Figure 15.

A predictive classifier was built from the top 6 genes since these gave less than a 50% error rate in the training set. This 6 gene classifier is shown in Table 9 and its ability to stratify newly diagnosed AML is shown in Figure 16.

Table 9

SEQ ID NO:	PSID	Symbol	INT17AUC	CTEP20AUC
309	208325	AKAP13	0.830	0.464
151	202820	AHR	0.807	0.750
222	204362	SCAP2	0.777	0.893
496	213479	NPTX2	0.738	0.766
451	212384	BAT1	0.725	0.288
272	206148	IL3RA	0.705	0.714
411	210666	IDS	0.645	0.446
280	206637	P2RY14	0.627	0.589

Conclusions

- 27% of the clinical bone marrow samples could be used indicating optimization of sample collection is required.
- Global gene expression signatures of AML cells indicated FTI-treatment resulted in stable gene expression changes following treatment termination.
- Approximately 500 genes ($p < 0.005$) were affected by tipifarnib reflecting the multiple pathways that are targeted by FTIs. These included many pathways previously associated with FTI biology.
- Differential expression of 27 genes was found between responders and non-responders following treatment with tipifarnib (Table 8). These are candidate PD markers.
- A 6-gene classifier identified in relapsed and refractory AML was found to have predictive value in newly diagnosed AML

Example 8

Antibodies (Prophetic)

An LBC oncogene-derived peptide is synthesized, coupled to keyhole limpet hemocyanin, and used to immunize rabbits for production of polyclonal antibodies. The sera are tested for reactivity against the corresponding peptide with ELISA, and the positive batches are affinity-purified. The purified antibody specifically detects the peptide that has the epitope in tissue sections. This is verified by complete abolishment of the signal if the corresponding peptide is added simultaneously with the antibody. In addition to this polyclonal antibody, which works well in IHC, monoclonal antibodies able to detect the protein in its natural fold are produced. To produce monoclonal antibodies, a purified antigen, produced in mammalian cells to ensure natural fold and posttranslational modifications, is generated. The antigen, LBC onco protein-IgG constant part fusion protein, is expressed in mouse myeloma cells, and the protein is purified using the Fc part as bait. This purified antigen is recognized in Western blot by the C-terminal polyclonal antibody. The antigen is used to generate mouse monoclonal antibodies against LBC peptides by selecting out of the positive clones those that produce antibodies that react against LBC peptide instead of the IgG constant part. Kits for the clinical identification of LBC oncogene can be readily fashioned employing these and similar antibodies. Such kits would include antibodies directed to LBC peptide identification (and hence, LBC oncogene), appropriate indicator reagents (e.g., enzymes, labels, and the like), and (optionally) other reagents useful in the clinical application of such a kit such as dilution buffers, stabilizers, and other materials typically used in such assays.

Example 9

Immunohistochemistry (Prophetic)

An affinity-purified polyclonal antibody against the C-terminal peptide of LBC oncogene is used for the IHC detection and localization of LBC oncogene. Four μm sections from formalin-fixed and paraffin embedded normal and tumor tissue is mounted on 3-aminopropyl-triethoxy-silane (APES, Sigma, St. Louis, MO) coated slides. The sections are deparaffinized and rehydrated in graded concentrations of ethanol and treated with methanolic peroxide (0.5% hydrogen peroxide in absolute methanol) for 30 minutes at room temperature to block the endogenous peroxidase activity. Antigen retrieval is done in a microwave oven twice for 5 minutes (650W). An Elite ABC Kit (Vectastain, Vector Laboratories, Burlingame, CA) is used for

immunoperoxidase staining. The LBC peptide antibody is used at an optimal dilution of 1:2000. Both the biotinylated second antibody and the peroxidase-labeled avidin-biotin complex are incubated on the sections for 30 minutes. The dilutions are made in PBS (pH 7.2), and all incubations are carried out in a moist chamber at room temperature. Between the different staining steps the slides are rinsed three times with PBS. The peroxidase staining is visualized with a 3-amino-9-ethylcarbazole (Sigma) solution (0.2 mg/ml in 0.05 M acetate buffer containing 0.03% hydrogen peroxide, pH 5.0) at room temperature for 15 minutes. Finally, the sections are lightly counterstained with Mayer's haematoxylin and mounted with aqueous mounting media (Aquamount, BDH). In control experiments the primary antibodies are replaced with the IgG fraction of normal rabbit serum or the primary antibody was preabsorbed with the LBC peptide. These stainings indicate the presence of the LBC oncogene in a subset of cells.

Although the foregoing invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, the descriptions and examples should not be construed as limiting the scope of the invention.

Table 10

Sequence Listing Description

SEQ ID NO	psid	Description	Name	Accession
1		AKAP13 forward primer		NM_007209
2		AKAP13 reverse primer		NM_001494
3		AKAP13 probe		NM_000975
4	200002	ribosomal protein L35	RPL35	NM_007209
5	200008	GDP dissociation inhibitor 2		NM_001494
6	200010	ribosomal protein L11		NM_000975
7	200013	ribosomal protein L24	RPL24	NM_000986
8	200017	ribosomal protein S27a	RPS27A	NM_002954
9	200018	ribosomal protein S13	RPS13	NM_001017
10	200025	ribosomal protein L27	RPL27	NM_000988
11	200026	ribosomal protein L34	RPL34	NM_000995
12	200041	HLA-B associated transcript-1	D6S81E	NM_004640
13	200044	splicing factor, arginineserine-rich 9	SFRS9	NM_003769
14	200056	highly similar to integrin alpha-7	FLJ12486	AK022548
15	200061	Similar to ribosomal protein S24		BC000523
16	200073	hnRNP-C like protein		M94630
17	200086	cytochrome c oxidase subunit IV		AA854966
18	200087	FLJ21323	FLJ21323	AK024976
19	200091	ribosomal protein S25		AA888388
20	200634	profilin 1	PFN1	NM_005022
21	200640	tyrosine 3-monooxygenasetryptophan 5-monooxygenase activation protein, zeta polypeptide	YWHAZ	NM_003406
22	200643	high density lipoprotein binding protein	HDLBP	NM_005336
23	200661	protective protein for beta-galactosidase	PPGB	NM_000308
24	200718	transcription elongation factor B (SIII), polypep 1-like		NM_003197
25	200772	prothymosin, alpha (gene sequence 28)		NM_002823
26	200780	guanine nucleotide binding protein (G protein), alpha stimulating activity polypeptide 1	GNAS1	NM_000516
27	200801	actin, beta	ACTB	NM_001101
28	200834	ribosomal protein S21	RPS21	NM_001024
29	200846	protein phosphatase 1, catalytic subunit, α isoform	PPP1CA	NM_002708
30	200853	H2A histone family, member Z	H2AFZ	NM_002106
31	200857	nuclear receptor co-repressor 1	NCOR1	NM_006311
32	200858	ribosomal protein S8	RPS8	NM_001012
33	200902	15 kDa selenoprotein	SEP15	NM_004261
34	200925	cytochrome c oxidase subunit VIa polypeptide 1	COX6A1	NM_004373
35	200934	DEK oncogene (DNA binding)	DEK	NM_003472
36	200949	ribosomal protein S20	RPS20	NM_001023
37	200964	ubiquitin-activating enzyme E1	UBE1	NM_003334
38	200971	stress-associated endoplasmic reticulum protein 1	SERP1	NM_014445
39	200981	neuroendocrine secretory protein 55	NESP55	NM_016592
40	200991	KIAA0064 gene product	KIAA0064	NM_014748
41	200999	transmembrane protein (63kD), endoplasmic reticulum Golgi intermediate compartment	P63	NM_006825
42	201019	eukaryotic translation initiation factor 1A	EIF1A	NM_001412
43	201027	KIAA0741 gene product	IF2	NM_015904
44	201042	transglutaminase 2		AL031651

45	201049	ribosomal protein S18	RPS18	NM_022551
46	201094	ribosomal protein S29	RPS29	NM_001032
47	201104	DJ328E19.C1.1		NM_015383
48	201118	phosphogluconate dehydrogenase	PGD	NM_002631
49	201134	cytochrome c oxidase subunit VIIc	COX7C	NM_001867
50	201163	insulin-like growth factor binding protein 7	IGFBP7	NM_001553
51	201195	L-type amino acid transporter 1		NM_003486
52	201212	protease, cysteine, 1	legumain	NM_005606
53	201227	NADH dehydrogenase 1 beta subcomplex, 8	NDUFB8	NM_005004
54	201244	v-raf-1 murine leukemia viral oncogene hom 1	RAF1	NM_002880
55	201249	solute carrier family 2 member 1	SLC2A1	NM_006516
56	201250	solute carrier family 2 member 1	SLC2A1	NM_006516
57	201273	signal recognition particle 9kD	SRP9	NM_003133
58	201277	heterogeneous nuclear ribonucleoprotein AB	HNRPAB	NM_004499
59	201300	prion protein (p27-30)	PRNP	NM_000311
60	201305	acidic protein rich in leucines		NM_006401
61	201317	proteasome (prosome, macropain) sub α type 2	PSMA2	NM_002787
62	201324	epithelial membrane protein 1	EMP1	NM_001423
63	201352	YME1 (S. cerevisiae)-like 1	YME1L1	NM_014263
64	201381	calcyclin binding protein		NM_014412
65	201393	insulin-like growth factor 2 receptor	IGF2R	NM_000876
66	201403	microsomal glutathione S-transferase 3	MGST3	NM_004528
67	201429	ribosomal protein L37a	RPL37A	NM_000998
68	201445	calponin 3, acidic	CNN3	NM_001839
69	201455	puromycin sensitive aminopeptidase		NM_006310
70	201472	von Hippel-Lindau binding protein 1	VBP1	NM_003372
71	201483	suppressor of Ty (S. cerevisiae) 4 homolog 1		NM_003168
72	201568	low molecular mass ubiquinone-binding protein	QP-C	NM_014402
73	201588	thioredoxin-like, 32kD	TXNL	NM_004786
74	201597	cytochrome c oxidase subunit VIIa polypep 2	COX7A2	NM_001865
75	201620	membrane-bound transcription factor protease, site 1	MBTPS1	NM_003791
76	201621	neuroblastoma, suppression of tumorigenicity 1	NBL1	NM_005380
77	201635	fragile X mental retardation, autosomal hom 1		U25165
78	201665	ribosomal protein S17	RPS17	NM_001021
79	201675	A kinase (PRKA) anchor protein 1	AKAP1	NM_003488
80	201699	proteasome 26S sub ATPase 6	PSMC6	NM_002806
81	201715	KIAA0670	KIAA0670	NM_014977
82	201716	sorting nexin 1	SNX1	NM_003099
83	201738	translation factor sui1 homolog	GC20	NM_005875
84	201754	cytochrome c oxidase subunit VIc	COX6C	NM_004374
85	201804	cytoskeleton-associated protein 1	CKAP1	NM_001281
86	201805	protein kinase, AMP-activated, γ 1 non-catalytic sub	PRKAG1	NM_002733
87	201812	6.2 kd protein	LOC54543	NM_019059
88	201818	hypothetical protein FLJ12443	FLJ12443	NM_024830
89	201890	ribonucleotide reductase M2 polypeptide		NM_001034
90	201910	RhoGEF (ARHGEF) and pleckstrin domain protein 1	FARP1	NM_005766
91	201911	RhoGEF (ARHGEF) and pleckstrin domain protein 1	FARP1	NM_005766
92	201921	guanine nucleotide binding protein 10	GNG10	NM_004125
93	201934	hypothetical protein PRO2730		NM_025222
94	201938	deleted in oral cancer 1	DOC1	NM_004642
95	201987	thyroid hormone receptor-assoc protein, 240 kD sub		NM_005121
96	202001	NADH dehydrogenase 1 α subcomplex, 6	NDUFA6	NM_002490
97	202029	ribosomal protein L38	RPL38	NM_000999

98	202077	NADH dehydrogenase 1, alphabeta subcomplex, 1	NDUFAB1	NM_005003
99	202078	COP9 subunit 3	COPS3	NM_003653
100	202090	ubiquinol-cytochrome c reductase (6.4kD) sub	UQCR	NM_006830
101	202110	cytochrome c oxidase subunit VIIb	COX7B	NM_001866
102	202114	sorting nexin 2	SNX2	NM_003100
103	202141	COP9 homolog		NM_006710
104	202154	tubulin, beta, 4	TUBB4	NM_006086
105	202163	CCR4-NOT transcription complex, subunit 8	CNOT8	NM_004779
106	202187	protein phosphatase 2 regulatory subunit B α isoform	PPP2R5A	NM_006243
107	202197	myotubularin related protein 3	MTMR3	NM_021090
108	202219	solute carrier family 6, member 8	SLC6A8	NM_005629
109	202231	dendritic cell protein	GA17	NM_006360
110	202233	ubiquinol-cytochrome c reductase hinge protein	UQCRH	NM_006004
111	202242	transmembrane 4 superfamily member 2	TM4SF2	NM_004615
112	202275	glucose-6-phosphate dehydrogenase	G6PD	NM_000402
113	202279	chromosome 14 open reading frame 2	C14ORF2	NM_004894
114	202285	tumor-associated calcium signal transducer 2		NM_002353
115	202286	tumor-associated calcium signal transducer 2		NM_002353
116	202287	tumor-associated calcium signal transducer 2		NM_002353
117	202298	NADH dehydrogenase 1 alpha subcomplex, 1	NDUFA1	NM_004541
118	202310	proalpha 1 (I) chain of type I procollagen		NM_000088
119	202311	proalpha 1 (I) chain of type I procollagen		NM_000088
120	202312	collagen, type I, alpha 1	COL1A1	NM_000088
121	202324	golgi resident protein GCP60	GCP60	NM_022735
122	202325	ATP synthase, H+ transporting, mitochondrial F0 complex, subunit F6	ATP5J	NM_001685
123	202349	dystonia 1, torsion	DYT1	NM_000113
124	202411	interferon, alpha-inducible protein 27	IFI27	NM_005532
125	202423	zinc finger protein 220	ZNF220	NM_006766
126	202432	protein phosphatase 3 catalytic subunit, beta isoform	PPP3CB	NM_021132
127	202442	adaptor-related protein complex 3, sigma 1 sub	AP3S1	NM_001284
128	202458	protease, serine, 23	SPUVE	NM_007173
129	202468	catenin α-like 1	CTNNAL1	NM_003798
130	202478	GS3955 protein	GS3955	NM_021643
131	202481	short-chain dehydrogenasereductase 1	SDR1	NM_004753
132	202503	KIAA0101	KIAA0101	NM_014736
133	202544	glia maturation factor, beta	GMFB	NM_004124
134	202565	supervillin, transcript variant 1	SVIL	NM_003174
135	202582	RAN binding protein 9	RANBPM	NM_005493
136	202591	single-stranded DNA-binding protein	SSBP	NM_003143
137	202622	spinocerebellar ataxia 2	SCA2	NM_002973
138	202642	transformationtranscription domain-assoc protein	TRRAP	NM_003496
139	202649	ribosomal protein S19	RPS19	NM_001022
140	202673	dolichyl-phosphate mannosyltransferase polypeptide 1, catalytic subunit	DPM1	NM_003859
141	202692	upstream binding transcription factor, RNA polymerase I	UBTF	NM_014233
142	202712	creatine kinase, mitochondrial 1	CKMT1	NM_020990
143	202723	forkhead box O1A	FOXO1A	NM_002015
144	202724	forkhead box O1A	FOXO1A	NM_002015
145	202735	emopamil-binding protein	EBP	NM_006579
146	202754	KIAA0029 protein	KIAA0029	NM_015361
147	202759	A kinase (PRKA) anchor protein 2	AKAP2	NM_007203

148	202760	A kinase (PRKA) anchor protein 2	AKAP2	NM_007203
149	202761	synaptic nuclei expressed gene 2	KIAA1011	NM_015180
150	202789	phospholipase C, γ 1		NM_002660
151	202820	aryl hydrocarbon receptor	AHR	NM_001621
152	202824	transcription elongation factor B (SIII), polypeptide 1	TCEB1	NM_005648
153	202834	serine (or cysteine) proteinase inhibitor, clade A member 8	SERPINA8	NM_000029
154	202841	7-60 protein	7-60	NM_007346
155	202848	G protein-coupled receptor kinase 6		NM_002082
156	202854	hypoxanthine phosphoribosyltransferase 1	HPRT1	NM_000194
157	202860	KIAA0476 gene product	KIAA0476	NM_014856.
158	202889	microtubule-associated protein 7		NM_003980
159	202890	microtubule-associated protein 7		NM_003980
160	202947	glycophorin C, transcript variant 1	GYPC	NM_002101
161	202949	four and a half LIM domains 2	FHL2	NM_001450
162	202957	hematopoietic cell-specific Lyn substrate 1	HCLS1	NM_005335
163	203044	KIAA0990 protein	KIAA0990	NM_014918
164	203053	breast carcinoma amplified sequence 2	BCAS2	NM_005872
165	203133	protein translocation complex beta	SEC61B	NM_006808
166	203138	histone acetyltransferase 1	HAT1	NM_003642
167	203139	death-associated protein kinase 1	DAPK1	NM_004938
168	203140	B-cell CLLlymphoma 6	BCL6	NM_001706
169	203142	adaptor-related protein complex 3, β 1 subunit	AP3B1	NM_003664
170	203211	KIAA1073 protein	KIAA1073	NM_016156
171	203213	cell division cycle 2, G1 to S and G2 to M		NM_001786
172	203255	vitiligo-associated protein VIT-1	VIT1	NM_018693
173	203262	chromosome X (unique) 9928 expressed sequence	DXS9928E	NM_004699
174	203287	ladinin 1	LAD1	NM_005558
175	203316	small nuclear ribonucleoprotein polypeptide E	SNRPE	NM_003094
176	203332	inositol polyphosphate-5-phosphatase, 145kD	INPP5D	NM_005541
177	203362	MAD2 (mitotic arrest deficient, yeast, homolog)-like 1	MAD2L1	NM_002358
178	203371	NADH dehydrogenase 1 beta subcomplex, 3	NDUFB3	NM_002491
179	203385	diacylglycerol kinase, alpha	DGKA	NM_001345
180	203396	proteasome (prosome, macropain) subunit, α type, 4	PSMA4	NM_002789
181	203437	putative receptor protein	PMI	NM_003876
182	203460	presenilin 1, transcript variant I-463	PSEN1	NM_007318
183	203484	Sec61 gamma	SEC61G	NM_014302
184	203514	mitogen-activated protein kinase kinase kinase 3		NM_002401
185	203528	sema domain, Ig domain, TM domain and short cytoplasmic domain, 4D	SEMA4D	NM_006378
186	203531	cullin 5		NM_003478
187	203581	RAB4, member RAS oncogene family		NM_004578
188	203610	ring finger protein 15		NM_006355
189	203613	NADH dehydrogenase 1 beta subcomplex, 6	NDUFB6	NM_002493
190	203621	NADH dehydrogenase 1 beta subcomplex, 5	NDUFB5	NM_002492
191	203666	stromal cell-derived factor 1	SDF1	NM_000609
192	203667	tubulin-specific chaperone a	TBCA	NM_004607
193	203674	KIAA0054 gene product; Helicase	KIAA0054	NM_014877
194	203743	thymine-DNA glycosylase	TDG	NM_003211
195	203748	RNA binding motif, single stranded interacting protein 1, transcript variant MSSP-2	RBMS1	NM_016839
196	203761	Src-like-adapter	SLA	NM_006748
197	203827	hypothetical protein FLJ10055	FLJ10055	NM_017983

198	203845	p300CBP-associated factor		NM_003884
199	203882	interferon-stimulated transcription factor 3, γ	ISGF3G	NM_006084
200	203886	fibulin 2	FBLN2	NM_001998
201	203893	adrenal gland protein AD-004	LOC51578	NM_016283
202	203922	cytochrome b-245, beta polypeptide		NM_000397
203	203936	matrix metalloproteinase 9	MMP9	NM_004994
204	203940	KIAA1036 protein	KIAA1036	NM_014909
205	203960	HSPCO34 protein	LOC51668	NM_016126
206	203965	ubiquitin specific protease 20	USP20	NM_006676
207	204014	dual specificity phosphatase 4	DUSP4	NM_001394
208	204015	dual specificity phosphatase 4	DUSP4	NM_001394
209	204049	KIAA0680 gene product	KIAA0680	NM_014721
210	204067	sulfite oxidase		NM_000456
211	204082	pre-B-cell leukemia transcription factor 3	PBX3	NM_006195
212	204141	tubulin, beta polypeptide	TUBB	NM_001069
213	204145	FSHD region gene 1	FRG1	NM_004477
214	204146	RAD51-interacting protein		NM_006479
215	204158	T-cell, immune regulator 1	TCIRG1	NM_006019
216	204168	microsomal glutathione S-transferase 2	MGST2	NM_002413
217	204170	CDC28 protein kinase 2	CKS2	NM_001827
218	204215	hypothetical protein MGC4175		NM_024315
219	204294	aminomethyltransferase	AMT	NM_000481
220	204351	S100 calcium-binding protein P	S100P	NM_005980
221	204361	SKAP55 homologue	SKAP-Hom	NM_003930
222	204362	SKAP55 homologue	SKAP-Hom	NM_003930
223	204411	KIAA0449 protein	KIAA0449	NM_017596
224	204416	apolipoprotein C-I	APOC1	NM_001645
225	204528	nucleosome assembly protein 1-like 1	NAP1L1	NM_004537
226	204640	speckle-type POZ protein	SPOP	NM_003563
227	204642	endothelial differentiation, sphingolipid G-protein-coupled receptor, 1	EDG1	NM_001400
228	204652	nuclear respiratory factor 1	NRF1	NM_005011
229	204694	alpha-fetoprotein	AFP	NM_001134
230	204698	interferon stimulated gene	ISG20	NM_002201
231	204729	syntaxin 1A	STX1A	NM_004603
232	204766	nudix -type motif 1	NUDT1	NM_002452
233	204767	flap structure-specific endonuclease 1		NM_004111
234	204777	T-cell differentiation protein, transcript variant a	MAL	NM_002371
235	204863	interleukin 6 signal transducer		NM_002184
236	204864	interleukin 6 signal transducer	IL6ST	NM_002184
237	204881	UDP-glucose ceramide glucosyltransferase	UGCG	NM_003358
238	204885	mesothelin, transcript variant 1	MSLN	NM_005823
239	204905	eukaryotic translation elongation factor 1 epsilon 1	EEF1E1	NM_004280
240	204923	753P9 on chromosome Xq25-26.1		NM_018990
241	204950	KIAA0955 protein	KIAA0955	NM_014959
242	204951	ras homolog gene family, member H	ARHH	NM_004310
243	204955	sushi-repeat-containing protein, X chrom	SRPX	NM_006307
244	204966	brain-specific angiogenesis inhibitor 2	BAI2	NM_001703
245	204989	integrin, beta 4	ITGB4	NM_000213
246	204990	integrin, beta 4	ITGB4	NM_000213
247	205033	defensin, alpha 1, myeloid-related sequence	DEFA1	NM_004084
248	205087	DKFZP566K023 protein		NM_015485
249	205108	apolipoprotein B	APOB	NM_000384

250	205133	heat shock 10kD protein 1	HSPE1	NM_002157
251	205176	integrin beta 3 binding protein	ITGB3BP	NM_014288
252	205213	KIAA0050 gene product	ACAP1	NM_014716
253	205270	lymphocyte cytosolic protein 2	LCP2	NM_005565
254	205323	metal-regulatory transcription factor 1	MTF1	NM_005955
255	205335	signal recognition particle 19kD	SRP19	NM_003135
256	205336	parvalbumin	PVALB	NM_002854
257	205339	TAL1 (SCL) interrupting locus	SIL	NM_003035
258	205361	prefoldin 4		U41816
259	205403	interleukin 1 receptor, type II	IL1R2	NM_004633
260	205453	homeo box B2	HOXB2	NM_002145
261	205467	caspase 10	CASP10	NM_001230
262	205600	homeo box B5	HOXB5	NM_002147
263	205601	homeo box B5	HOXB5	NM_002147
264	205608	angiopoietin 1		NM_001146
265	205609	angiopoietin 1	ANGPT1	NM_001146
266	205644	small nuclear ribonucleoprotein polypeptide G	SNRPG	NM_003096
267	205671	MHC, class II DO β	HLA-DOB	NM_002120
268	205807	tuftelin 1	TUFT1	NM_020127
269	205849	gamma-aminobutyric acid A receptor β 3, trans var 1	GABRB3	NM_006294
270	205967	H4 histone family, member G	H4FG	NM_003542
271	206066	RAD51 (S. cerevisiae) homolog C	RAD51C	NM_002876
272	206148	interleukin 3 receptor, alpha	IL3RA	NM_002183
273	206150	tumor necrosis factor receptor superfamily, mem 7	TNFRSF7	NM_001242
274	206177	arginase, liver	ARG1	NM_000045
275	206219	vav 1 oncogene	VAV1	NM_005428
276	206245	NS1-binding protein	NS1-BP	NM_006469
277	206289	homeo box A4	HOXA4	NM_002141
278	206298	hypothetical protein from s 23549 and 23762	LOC58504	NM_021226
279	206618	interleukin 18 receptor 1	IL18R1	NM_003855
280	206637	KIAA0001	KIAA0001	NM_014879
281	206674	fms-related tyrosine kinase 3	FLT3	NM_004119
282	206723	G protein-coupled receptor Edg-4		AF233092
283	206790	NADH dehydrogenase 1 beta subcomplex, 1	NDUFB1	NM_004545
284	206868	KIAA0189 gene product	KIAA0189	NM_014725
285	206874	Ste20-related serinethreonine kinase		NM_014720
286	206958	UPF3	UPF3	NM_023011
287	207072	interleukin 18 receptor accessory protein	IL18RAP	NM_003853
288	207111	egf-like module containing, mucin-like, hormone receptor-like sequence 1	EMR1	NM_001974
289	207127	heterogeneous nuclear ribonucleoprotein H3	HNRPH3	NM_021644
290	207163	v-akt murine thymoma viral oncogene hom 1	AKT1	NM_005163
291	207165	hyaluronan-mediated motility receptor trans var 2	HMMR	NM_012485
292	207266	RNA binding motif, single stranded interacting protein 1, transcript variant MSSP-3	RBMS1	NM_016837
293	207287	hypothetical protein FLJ14107	FLJ14107	NM_025026
294	207335	solute carrier family 1 member 7	SLC1A7	NM_006671
295	207540	spleen tyrosine kinase	SYK	NM_003177
296	207551	male-specific lethal-3 (Drosophila)-like 1	MSL3L1	NM_006800
297	207568	cholinergic receptor, nicotinic, α polypeptide 6	CHRNA6	NM_004198
298	207571	basement membrane-induced gene	ICB-1	NM_004848
299	207573	ATP synthase, H+ transporting, mitochondrial F1F0, subunit g	ATP5JG	NM_006476

300	207777	nuclear body protein Sp140	SP140	NM_007237
301	207826	inhibitor of DNA binding 3, dominant negative helix-loop-helix protein	ID3	NM_002167
302	207845	anaphase-promoting complex 10	APC10	NM_014885
303	207935	keratin 13	KRT13	NM_002274
304	207974	S-phase kinase-associated protein 1A (p19A)	SKP1A	NM_006930
305	208091	hypothetical protein DKFZp564K0822		NM_030796
306	208130	thromboxane A synthase 1	TBXAS1	NM_030984
307	208270	arginyl aminopeptidase	RNPEP	NM_020216
308	208310	follistatin-like 1	FSTL1	NM_007085
309	208325	lymphoid blast crisis oncogene	LBC	NM_006738
310	208414	homeo box B3	HOXB3	NM_002146
311	208420	suppressor of Ty (S.cerevisiae) 6 homolog	SUPT6H	NM_003170
312	208549	prothymosin a14	LOC51685	NM_016171
313	208598	upstream regulatory element binding protein 1	UREB1	NM_005703
314	208621	villin 2	ezrin	NM_003379
315	208622	villin 2	ezrin	NM_003379
316	208623	cytovillin 2	VIL2	NM_003379
317	208629	hydroxyacyl-Coenzyme A dehydrogenase3-ketoacyl-Coenzyme A thiolaseenoyl-Coenzyme A hydratase alpha subunit		U04627
318	208633	actin binding protein; macrophin		AB029290
319	208643	Ku autoimmune antigen gene		J04977
320	208656	cyclin I	CYC1	AF135162
321	208667	putative tumor suppressor ST13	ST13	U17714
322	208672	splicing factor, arginineserine-rich 3		BC000914
323	208679	PNAS-139		AF279893
324	208695	ribosomal protein L39	RPL39	BC001019
325	208745	ATP synthase, H+ transporting, mitochondrial F1F0, subunit g		AA917672
326	208746	F1F0-type ATP synthase subunit g		AF070655
327	208754	DKFZp762G106		AL162068
328	208808	high-mobility group protein 2		BC000903
329	208819	mel transforming oncogene - RAB8 homolog		BC002977
330	208831	KIAA0162		D79984
331	208894	MHC class II HLA-DR-alpha		M60334
332	208900	topoisomerase I		W025108
333	208904	ribosomal protein S28	RPS28	BC000354
334	208905	cytochrome c		BC005299
335	208919	Similar to hypothetical protein FLJ13052		BC001709
336	208927	speckle-type POZ protein		BC001269
337	208956	deoxyuridine triphosphatase	DUT	U62891
338	208966	interferon, gamma-inducible protein 16		AF208043
339	208975	importin beta subunit		L38951
340	208977	tubulin, beta, 2		BC004188
341	208981	plateletendothelial cell adhesion molecule		NM_000442
342	209022	highly similar to autonomously replicating sequence	ARS	AK026678
343	209063	polyadenylate binding protein-interacting protein 1		BF248165
344	209066	mitochondrial ubiquinone-binding protein		M26700
345	209089	RAB5A, member RAS oncogene family		BC001267
346	209119	nuclear receptor subfamily 2, group F, mem 2		AV703465
347	209120	nuclear receptor subfamily 2, group F, mem 2		AV703465
348	209122	adipose differentiation-related protein		NM_001122

349	209138	immunoglobulin lambda locus		FLM87790
350	209172	centromere protein F		U30872
351	209191	Similar to tubulin, beta, 4		BC002654
352	209209	mitogen inducible gene	mig-2	AW469573
353	209210	mitogen inducible gene	mig-2	Z24725
354	209227	Putative prostate cancer tumor suppressor		NM_006765
355	209228	Putative prostate cancer tumor suppressor		NM_006765
356	209239	nuclear factor of kappa light polypeptide gene enhancer in B-cells 1	p105	M55643
357	209257	chondroitin sulfate proteoglycan 6	bamacan	NM_005445
358	209258	chondroitin sulfate proteoglycan 6	bamacan	NM_005445
359	209270	laminin S B3 chain	LAMB3	NM_000228
360	209282	protein kinase D2		NM_016457
361	209289	nuclear factor IB		NM_005596
362	209295	TRAIL receptor 2		AF016266
363	209303	NADH dehydrogenase Fe-S protein 4		NM_002495
364	209309	zinc-alpha2-glycoprotein		D90427
365	209324	retinally abundant regulator of G-protein signalling 16	hRGS-r	NM_002928
366	209325	retinally abundant regulator of G-protein signaling	hRGS-r	NM_002928
367	209362	suppressor of RNA polymerase B, yeast homolog	SRB7	NM_004264
368	209369	1,2-cyclic-inositol-phosphate phosphodiesterase	ANX3	NM_005139
369	209372	tubulin, beta polypeptide		BC001352
370	209377	thyroid hormone receptor interactor 7		AF274949
371	209385	proline synthetase co-transcribed		AL136616
372	209411	ADP-ribosylation factor binding protein GGA3		AF219139
373	209443	proteinase inhibitor, clade A member 5		NM_000624
374	209471	farnesyl-protein transferase alpha-subunit		NM_002027
375	209492	ATP synthase, H+ transporting, mitochondrial F0 complex, subunit e		BC003679
376	209500	tumor necrosis factor superfamily, member 13	TNSF13	NM_003808
377	209507	replication protein A3		NM_002947
378	209520	nuclear cap binding protein subunit 1		NM_002486
379	209560	delta-like homolog		NM_003836
380	209585	multiple inositol polyphosphate phosphatase		NM_004897
381	209628	hypothetical protein P15-2		NM_018698
382	209662	centrin, EF-hand protein, 3		NM_004365
383	209679	hypothetical protein from 643		NM_020467
384	209687	stromal cell-derived factor 1		U19495
385	209730	sema domain, Ig, short basic domain, secreted, 3F		U38276
386	209734	hematopoietic protein 1		NM_005337
387	209810	pulmonary surfactant-associated protein B	SP-B	NM_000542
388	209827	interleukin 16	IL16	NM_004513
389	209838	thyroid receptor interacting protein 15		AF212227
390	209868	RNA binding motif, single stranded interacting prot 1	SCR2	NM_002897
391	209907	intersectin 2 long isoform	ITSN2	AF182198
392	210093	mago-nashi homolog, proliferation-associated		NM_002370
393	210097	retinoic acid repressible protein		AF130102
394	210137	dCMP deaminase		BC001286
395	210139	peripheral myelin protein 22	GAS3	L03203
396	210180	splicing factor, arginineserine-rich 10		U87836
397	210233	interleukin 1 receptor accessory protein	IL1RAP	AF167343
398	210235	LAR-interacting protein 1a		U22815
399	210283	Sim to polyadenylate binding protein-interacting 1		BC005295

400	210284	TAK1-binding protein 2		AF241230
401	210347	C2H2-type zinc-finger protein		AF080216
402	210448	ionotropic ATP receptor P2X5b		U49396
403	210453	DKFZp566G013		AL050277
404	210510	soluble neuropilin-1		AF145712
405	210563	FLICE-like inhibitory protein short form		U97075
406	210598			AF130051
407	210615	neuropilin-1 soluble isoform 11	NRP1	AF280547
408	210633	acidic keratin-10	KRT10	M19156
409	210639	apoptosis-related protein	APG5L	AF293841
410	210649	BRG1-Associated Factor 250a	BAF250a	AF231056
411	210666	iduronate-2-sulfatase	IDS	NM_000202
412	210785	basement membrane-induced gene	ICB-1beta	AB035482
413	210786	Friend leukemia virus integration 1	FLI-1	M93255
414	210840	IQ motif cont'g GTPase activating protein 1		D29640
415	210854	GABAnoradrenaline transporter		U17986
416	210859	CLN3 protein	CLN3	AF077973
417	210982	MHC class II HLA-DRA	HLA-DRA	M60333
418	211000	gp130 of the rheumatoid arthritis antigenic peptide-bearing soluble form	gp130-RAPS	AB015706
419	211133	leukocyte Ig-like receptor subfamily B member 3	LILRB3	NM_00864
420	211430	anti-hepatitis A IgG		M87789
421	211445	FKSG17	FKSG17	AF315951
422	211487	ribosomal protein S17		BC004886
423	211535	fibroblast growth factor receptor	FGFR	M60485
424	211645	immunoglobulin kappa-chain VK-1	IgK	M85256
425	211730	polymerase (RNA) II (DNA directed) polypeptide L		BC005903
426	211743	proteoglycan 2, bone marrow		BC005929
427	211747	U6 snRNA-associated Sm-like protein		BC005938
428	211762	karyopherin alpha 2		BC005978
429	211858	guanine nucleotide-binding protein Gs α sub iso L2		AF088184
430	211915	beta-tubulin	TUB4q	U83110
431	211921	fetal thymus prothymosin alpha		AF348514
432	211932	heterogeneous nuclear protein similar to rat helix destabilizing protein		BE867771
433	211938	hypothetical protein PRO1843		BF247371
434	211976	FLJ21862 fis		AK026168
435	211985	matrix Gla protein		AI653730
436	212007	UBX domain-containing 1		D87684
437	212012	KIAA0230		AF200348
438	212013	KIAA0230		AF200348
439	212027	S164 protein		BE466128
440	212181	diphosphoinositol polyphosphate phosphohydrolase2	NUDT4	AF191654
441	212201	KIAA0692 protein		AB014592
442	212248	FLJ20738 fis		AI972475
443	212269	minichromosome maintenance deficient 3-assoc	GANP	AJ010089
444	212277	KIAA0647 protein		AB014547
445	212283	est:tg49b04.x1		AF016903
446	212285	est:tg49b04.x1		AF016903
447	212287	KIAA0160 protein		BF382924
448	212298	neuropilin 1		NM_003873
449	212311	KIAA0746 protein		AB018289
450	212382	FLJ11918 fis		AK021980

451	212384	HLA-B associated transcript-1		BG341380
452	212385	FLJ11918 fis		AK021980
453	212386	FLJ11918 fis		AK021980
454	212387	FLJ11918 fis		AK021980
455	212426	tyrosine 3-monooxygenasetryptophan 5-monooxygenase activation protein, theta polypeptide		BF033313
456	212451	KIAA0256		D87445
457	212531	lipocalin 2	LCN2	NM_005564
458	212549	DKFZp586N1323		AI149535
459	212561	KIAA1091		AA349595
460	212570	KIAA0830		AL573201
461	212571	KIAA1564		U00955
462	212573	KIAA0830		AL573201
463	212578	ribosomal protein S17		BF026595
464	212583	KIAA0560 gene product		AB011132
465	212630	sec6 homolog		AF055006
466	212664	tubulin, beta, 5		NM_006087
467	212740	phosphoinositide-3-kinase, regulatory sub 4	p150	BF740111
468	212757	FLJ22656 fis		BF111268
469	212771	DKFZp564A026		AU150943
470	212833	TB1 gene		M74089
471	212860	DKFZp667O2416		BG168720
472	212878	kinesin 2		AA284075
473	212907	hbc647		AI972416
474	212927	KIAA0594		AB011166
475	212964	DKFZp434D1023		AB028943
476	213020	DKFZp566B213	GOSR1	NM_004871
477	213028	nuclear factor related to kappa B binding protein		AI887378
478	213047	SET translocation		AI278616
479	213061	KIAA0251		AA643304
480	213062	KIAA0251		AA643304
481	213074	DKFZp564D156		BG545769
482	213129	glycine cleavage system protein H		BE908931
483	213134	BTG family, member 3	BTG3	NM_-006806
484	213147	homeo box A10		NM_018951
485	213150	homeo box A10		NM_018951
486	213159	KIAA0805		AB018348
487	213178		MAPK8IP3	NM_015133
488	213188	Weakly similar to T15138 hyp protein T28F2.4		NM_032778
489	213231	dystrophia myotonica-containing WD repeat motif		L19267
490	213253	structural maint of chromosomes 2 yeast-like 1	SMC2L1	AU154486
491	213287	gene for acidic (type I) cytokeratin 10		X14487
492	213311	KIAA1049 protein		BF000251
493	213338	DKFZP586E1621		BF062629
494	213414	ribosomal protein S19		BE259729
495	213423	Putative prostate cancer tumor suppressor		AI884858
496	213479	neuronal pentraxin II	NPTX2	NM_002523
497	213502	immunoglobulin lambda-like polypeptide 3		X03529
498	213539	CD3D antigen, delta polypeptide (TiT3 complex)	CD3D	NM_000732
499	213553	apolipoprotein C-I		W79394
500	213567	23728 sequence		BF431965
501	213599	Opa-interacting protein 5		BE045993
502	213687	uncharacterized hypothalamus protein HSMNP1		BE968801

503	213700	hypothetical protein FLJ10803		AA554945
504	213727	hypothetical protein FLJ11585		AI743654
505	213754	polyadenylate binding protein-interacting protein 1		AW613203
506	213811	transcription factor 3		BG393795
507	213843	accessory proteins BAP31BAP29		AW276522
508	213867	actin, β		AA809056
509	213911	H2A histone family, member Z		BF718636
510	213941	ribosomal protein S7		AI970731
511	214003	ribosomal protein S20		BF184532
512	214051	thymosin, beta		BF677486
513	214097	ribosomal protein S21		AW024383
514	214124	DKFZp434B2027		AL043487
515	214129	KIAA0477		AI821791
516	214143	ribosomal protein L24		AI560573
517	214224	protein NIMA-interacting, 4	parvulin	BE674061
518	214264	est:tt46h03		AI656610
519	214288	proteasome (prosome, macropain) subunit, β type, 1		W86293
520	214292	integrin, beta 4		AA808063
521	214298	septin 2		AL568374
522	214352	v-Ki-ras2 Kirsten rat sarcoma 2 viral oncogene hom		BF673699
523	214377	est:UI-H-BI4-aop-e-12-0-UI.s1		BF508685
524	214433	selenium binding protein 1	SELENBP1	NM_003944
525	214494	cell matrix adhesion regulator	CMAR	NM_005200
526	214499	Bcl-2-associated transcription factor short form		AF249273
527	214617	perforin 1		AI445650
528	214661	near HD on 4p16.3 with hom to hyp S. pombe gene		R06783
529	214696	24659 sequence		AF070569
530	214721	DKFZp762L106		AL162074
531	214800	basic transcription factor 3		R83000
532	214820	transcriptional unit N143		AJ002572
533	214905	EUROIMAGE 46866		AL109674
534	215038	Huntingtin interacting protein		AF049103
535	215073	nuclear receptor subfamily 2, group F, mem 2		AL554245
536	215096	esterase Dformylglutathione hydrolase		AU145746
537	215121	immunoglobulin lambda locus		AA680302
538	215127	RNA binding motif, single stranded interacting prot 1		AL517946
539	215136	DKFZp564C0482		AL050353
540	215147	23712 sequence		AF007147
541	215171	NT2RP3000341		AK023063
542	215227	acid phosphatase 1, soluble		BG035989
543	215379	immunoglobulin lambda joining 3		AV698647
544	215380	FLJ11717 fis		AK021779
545	215399	amplified in osteosarcoma		AI683900
546	215446	lysyl oxidase	LOX	L16895
547	215493	3 end of the BTN2A1 gene encoding butyrophilin 2A		AL121936
548	215691	HSPCO34 protein		AV702994
549	215764	adaptor-related protein complex 2, alpha 2 subunit		AA877641
550	215812	creatine transporter	SLC6A10	U41163
551	215905	U5 snRNP-specific 40 kDa protein		AL157420
552	216207	immunoglobulin kappa variable 1-13		AW408194
553	216348	transcription factor AP-2 beta		AL049693
554	216384	prothymosin alpha	PTMA	AF257099
555	216641	ladinin	LAD	U58994

556	216833	glycophorin HeP2		U05255
557	216899	PAC RP5-1139P1 from 7p15-p21		AC003999
558	216977	U2 snRNP-specific A protein, alternative transcript 3		AJ130972
559	217013	PAC RP4-604G5 from 7q22-q31.1		AC004522
560	217014	PAC RP4-604G5 from 7q22-q31.1		AC004522
561	217022	Ig A1-A2 lambda hybrid GAU heavy chain		S55735
562	217106	putative dimethyladenosine transferase		AF091078
563	217122	Matrix Metalloproteinase Female Rep tract MIFR1 2	MMP2122A	AL031282
564	217249	BAC CTB-162B4 from 4		AC004544
565	217293	angiopoietin 1		AF209975
566	217329	cytochrome c oxidase subunit VIIb pseudogene	COX7BP1	AF042164
567	217336	RP5-858M22 on chromosome 20		AL118510
568	217410	FLJ11524 fis		AK021586
569	217419	FLJ11524 fis		AK021586
570	217491	cytochrome c oxidase subunit VIIc pseudogene	COX7CP1	AF042165
571	217749	coat protein gamma-cop	LOC51137	NM_016128
572	217750	hypothetical protein FLJ13855		NM_023079
573	217754	putative nucleolar RNA helicase	NOH61	NM_019082
574	217769	hypothetical protein	HSPC014	NM_015932
575	217773	NADH dehydrogenase 1 alpha subcomplex, 4	NDUFA4	NM_002489
576	217801	ATP synthase, H+ transporting, mitochondrial F1 complex, epsilon subunit	ATP5E	NM_006886
577	217812	high-glucose-regulated protein 8	HGRG8	NM_016258
578	217825	CGI-76 protein		AF151039
579	217833	NS1-associated protein 1		NM_006372
580	217838	RNB6	RNB6	NM_016337
581	217843	HSPC126 protein	HSPC126	NM_014166
582	217853	hypothetical protein FLJ13732 similar to tensin	TENC1	NM_022748
583	217860	NADH dehydrogenase 1 alpha subcomplex, 10	NDUFA10	NM_004544
584	217866	hypothetical protein FLJ12529	FLJ12529	NM_024811
585	217875	transmembrane, prostate androgen induced RNA	TMEPAI	NM_020182
586	217877	hypothetical protein SP192	SP192	NM_021639
587	218003	FK506-binding protein 3	FKBP3	NM_002013
588	218039	HQ0310 PRO0310p1	LOC51203	NM_016359
589	218058	CpG binding protein	CGBP	NM_014593
590	218062	Cdc42 effector protein 4; binder of Rho GTPases 4	CEP4	NM_012121
591	218103	hypothetical protein FLJ20062	FLJ20062	NM_017647
592	218116	hepatocellular carcinoma-associated antigen 59	LOC51759	NM_016520
593	218117	ring-box 1	RBX1	NM_014248
594	218175	hypothetical protein FLJ22471	FLJ22471	NM_025140
595	218188	translocase of inner mitochondrial membrane 13 (yeast) homolog B	TIMM13B	NM_012458
596	218213	chromosome 11 open reading frame 10	C11orf10	NM_014206
597	218241	golgi autoantigen, golgin subfamily a, 5	GOLGA5	NM_005113
598	218256	nucleoporin p54	NUP54	NM_017426
599	218259	KIAA1243 protein	KIAA1243	NM_014048
600	218274	hypothetical protein FLJ10415	FLJ10415	NM_018089
601	218276	WW Domain-Containing Gene	WW45	NM_021818
602	218280	H2A histone family, member O	H2AFO	NM_003516
603	218283	kiaa-iso protein	LOC51188	NM_016305
604	218288	hypothetical protein MDS025	MDS025	NM_021825
605	218334	hypothetical protein FLJ23445	FLJ23445	NM_025075
606	218339	HSPC158 protein	HSPC158	NM_014180

607	218350	geminin	LOC51053	NM_015895
608	218367	ubiquitin specific protease 21	USP21	NM_012475
609	218368	type I transmembrane protein Fn14	FN14	NM_016639
610	218373	hyp protein FLJ13258 similar to fused toes	FLJ13258	NM_022476
611	218395	hypothetical protein FLJ13433	FLJ13433	NM_022496
612	218397	hypothetical protein FLJ10335	FLJ10335	NM_018062
613	218447	DC13 protein	DC13	NM_020188
614	218467	x 003 protein	MDS003	NM_020232
615	218482	DC6 protein	DC6	NM_020189
616	218543	hypothetical protein FLJ22693	FLJ22693	NM_022750
617	218563	NADH dehydrogenase 1 alpha subcomplex, 3	NDUFA3	NM_004542
618	218576	dual specificity phosphatase 12	DUSP12	NM_007240
619	218603	homolog of Drosophila headcase	hHDC	NM_016217
620	218605	hypothetical protein FLJ23182	FLJ23182	NM_022366
621	218643	postsynaptic protein CRIPT	CRIPT	NM_014171
622	218660	dysferlin, limb girdle muscular dystrophy 2B	DYSF	NM_003494
623	218671	ATPase inhibitor precursor	LOC51189	NM_016311
624	218801	UDP-glucose:glycoprotein glucosyltransferase 2	FLJ10873	NM_020121
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705	AFFX-r2-Ec-bioB-3	E coli bioB gene biotin synthetase		J04423

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CLAIMS

1. A method of assessing acute myeloid leukemia (AML) status comprising the steps of

a. obtaining a biological sample from an AML patient; and

b. measuring Biomarkers associated with Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9 wherein the expression levels of the Marker genes above or below pre-determined cut-off levels are indicative of AML status.

2. A method of staging acute myeloid leukemia (AML) patients comprising the steps of

a. obtaining a biological sample from an AML patient; and

b. measuring Biomarkers associated with Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9 wherein the expression levels of the Marker genes above or below pre-determined cut-off levels are indicative of AML survival.

3. A method of determining acute myeloid leukemia (AML) patient treatment protocol comprising the steps of

a. obtaining a biological sample from an AML patient; and

b. measuring Biomarkers associated with Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9 wherein the expression levels of the Marker genes above or below pre-determined cut-off levels are sufficiently indicative of response to therapy to enable a physician to determine the degree and type of therapy recommended to provide appropriate therapy.

4. A method of treating a acute myeloid leukemia (AML) patient comprising the steps of:

a. obtaining a biological sample from an AML patient; and

b. measuring Biomarkers associated with Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9 wherein the expression levels of the Marker genes above or below pre-determined cut-off levels are indicate a response to therapy and;

c. treating the patient with adjuvant therapy if they have a responder profile.

5. A method of determining whether a acute myeloid leukemia (AML) patient is high or low risk of mortality comprising the steps of

a. obtaining a biological sample from an AML patient; and

b. measuring Biomarkers associated with Marker genes corresponding to those selected from Table 3

wherein the expression levels of the Marker genes above or below pre-determined cut-off levels are sufficiently indicative of risk of mortality to enable a physician to determine the degree and type of therapy recommended.

6. The method of one of claims 1-5 further comprising measuring the expression level of at least one gene constitutively expressed in the sample.

7. The method of one of claims 1-5 wherein the specificity is at least about 40%.

8. The method of one of claims 1-5 wherein the sensitivity is at least at least about 80%.

9. The method of claim 28 wherein the p-value is less than 0.05.

10. The method of one of claims 1-5 wherein gene expression is measured on a microarray or gene chip.

11. The method of claim 10 wherein the microarray is a cDNA array or an oligonucleotide array.

12. The method of claim 10 wherein the microarray or gene chip further comprises one or more internal control reagents.

13. The method of one of claims 1-5 wherein gene expression is determined by nucleic acid amplification conducted by polymerase chain reaction (PCR) of RNA extracted from the sample.

14. The method of claim 13 wherein said PCR is reverse transcription polymerase chain reaction (RT-PCR).

15. The method of claim 14, wherein the RT-PCR further comprises one or more internal control reagents.

16. The method of one of claims 1-5 wherein gene expression is detected by measuring or detecting a protein encoded by the gene.

17. The method of claim 16 wherein the protein is detected by an antibody specific to the protein.

18. The method of one of claims 1-5 wherein gene expression is detected by measuring a characteristic of the gene.

19. The method of claim 18 wherein the characteristic measured is selected from the group consisting of DNA amplification, methylation, mutation and allelic variation.

20. A method of generating an acute myeloid leukemia (AML) prognostic patient report comprising the steps of:

determining the results of any one of claims 1-5; and

preparing a report displaying the results.

21. The method of claim 20 wherein the report contains an assessment of patient outcome and/or probability of risk relative to the patient population and/or likelihood or response to chemotherapy.

22. A patient report generated by the method according to claim 21.

23. A kit for conducting an assay to determine acute myeloid leukemia (AML) prognosis in a biological sample comprising: materials for detecting isolated nucleic acid sequences, their complements, or portions thereof of a combination of genes selected from the group consisting of Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9.

24. The kit of claim 24 further comprising reagents for conducting a microarray analysis.

25. The kit of claim 24 further comprising a medium through which said nucleic acid sequences, their complements, or portions thereof are assayed.

26. Articles for assessing acute myeloid leukemia (AML) status comprising: materials for detecting isolated nucleic acid sequences, their complements, or portions thereof of a combination of genes selected from the group consisting of Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9.

27. The articles of claim 26 further comprising reagents for conducting a microarray analysis.

28. The articles of claim 27 further comprising a medium through which said nucleic acid sequences, their complements, or portions thereof are assayed.

29. A microarray or gene chip for performing the method of one of claims 1-5.

30. The microarray of claim 29 comprising isolated nucleic acid sequences, their complements, or portions thereof of a combination of genes selected from the group consisting of Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9.

31. The microarray of claim 30 wherein the measurement or characterization is at least 1.5-fold over- or under-expression.

32. The microarray of claim 30 wherein the measurement provides a statistically significant p-value over- or under-expression.

33. The microarray of claim 32 wherein the p-value is less than 0.05.

34. The microarray of claim 30 comprising a cDNA array or an oligonucleotide array.

35. The microarray of claim 30 further comprising or more internal control reagents.

36. A diagnostic/prognostic portfolio comprising isolated nucleic acid sequences, their complements, or portions thereof of a combination of genes selected from the group consisting of Marker genes corresponding to those selected from Table 3, Table 4, Table 5, Table 7, Table 8 or Table 9.

37. The portfolio of claim 36 wherein the measurement or characterization is at least 1.5-fold over- or under-expression.

38. The portfolio of claim 37 wherein the measurement provides a statistically significant p-value over- or under-expression.

39. The portfolio of claim 37 wherein the p-value is less than 0.05.

Figure 1.

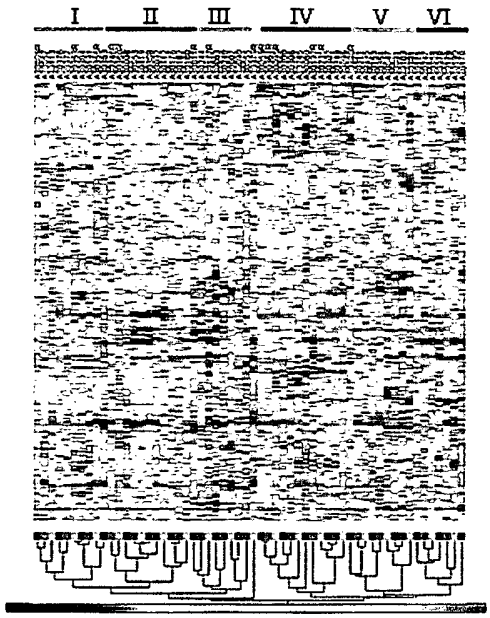


Figure 2.

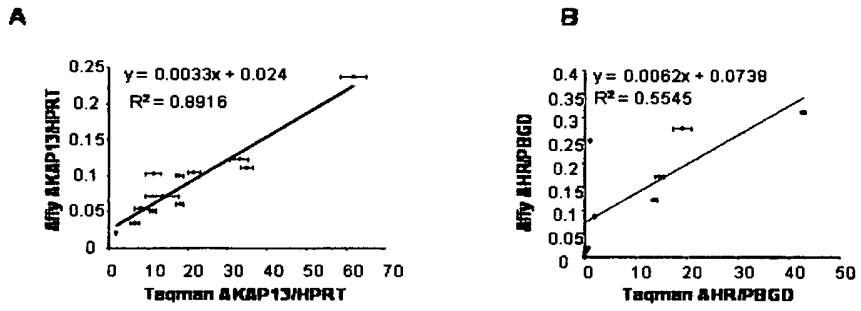
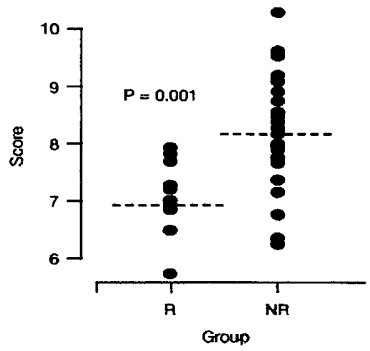


Figure 3.

A

Test for Response	Gold response: R	Gold response: NR
Low LBC	13	17
High LBC	1	27
Total	14	44

B



C

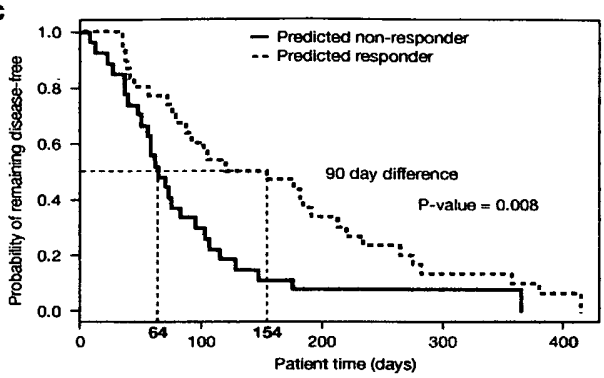
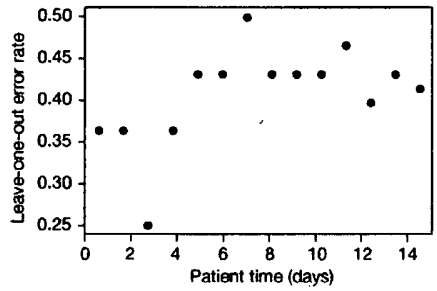
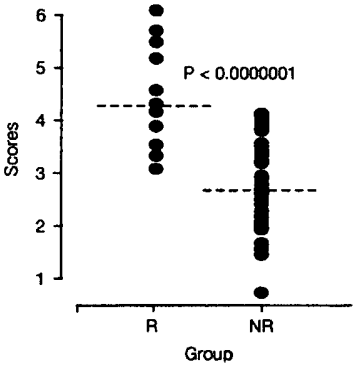


Figure 4.

A



B



C

Test for Response	Gold response: R	Gold response: NR
Low LBC	12	13
High LBC	2	31
Total	14	44

D

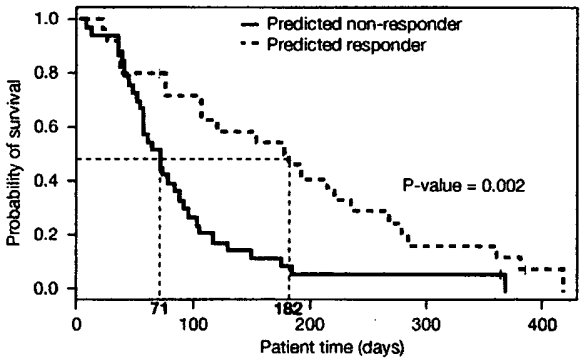


Figure 5.

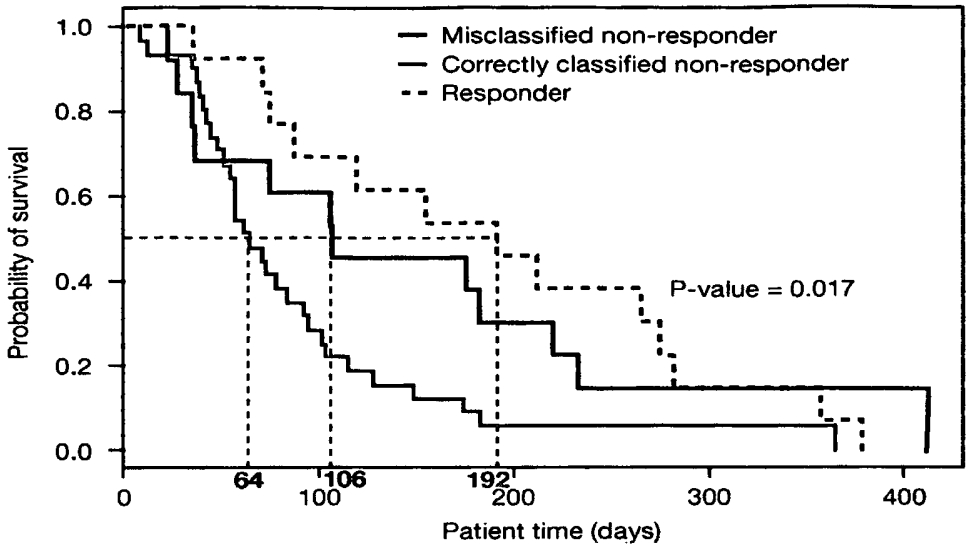
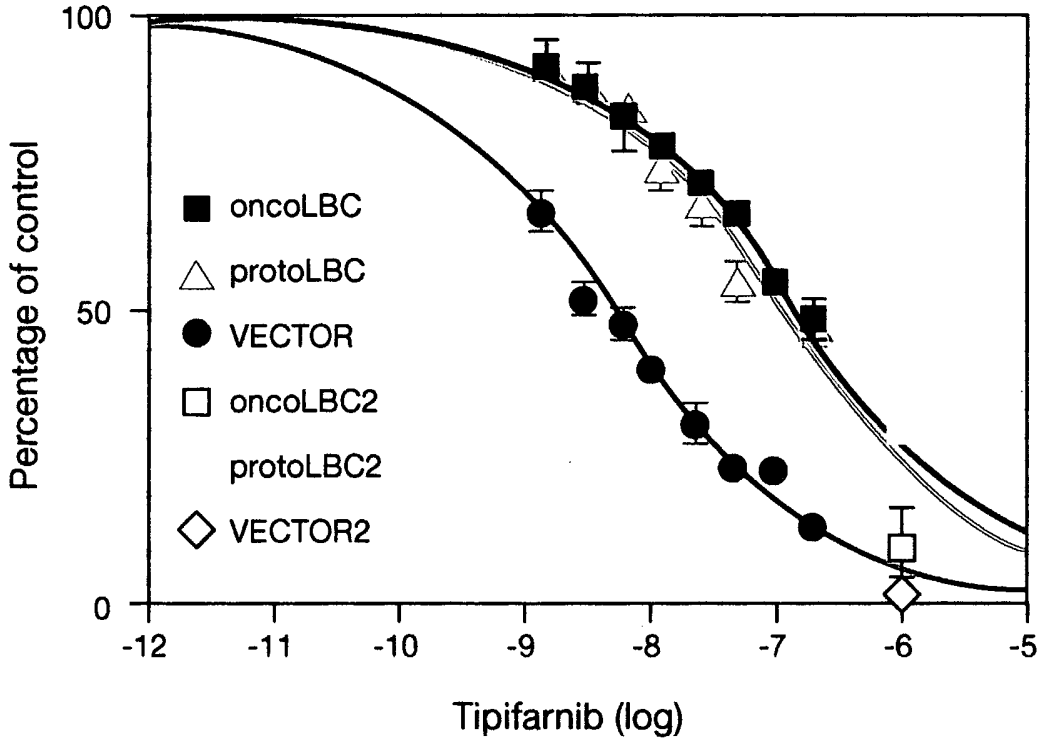


Figure 6.



	oncoLBC (nM)	protoLBC (nM)	VECTOR (nM)
EC50	158	115	5.27
95% CI	127–196	91–147	4.50–6.16

Figure 7.

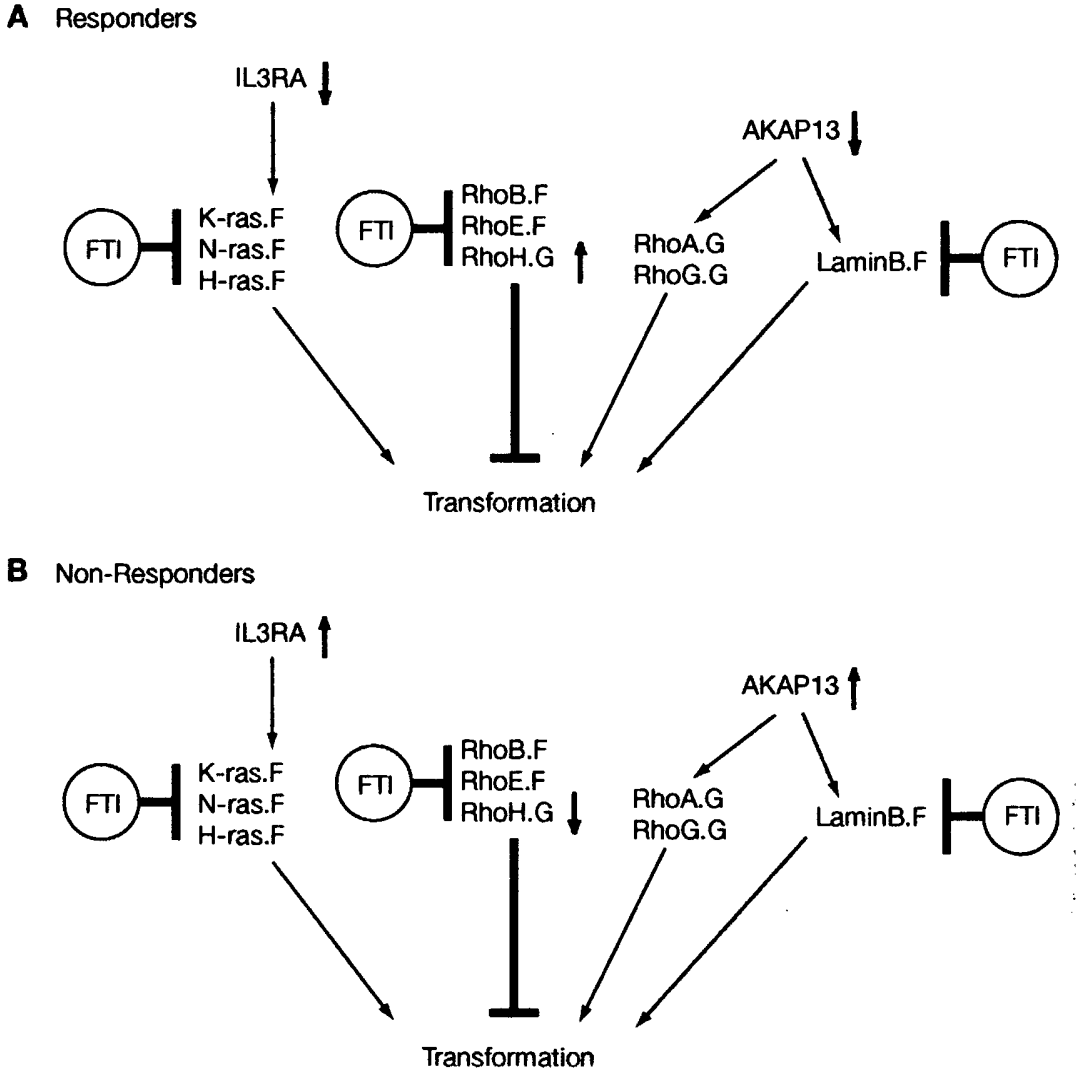

A Responders
IL3RA
AKAP13
FTI
K-ras.F
N-ras.F
H-ras.F
FTI
RhoB.F
RhoE.F
RhoH.G
RhoA.G
RhoG.G
LaminB.F
FTI
Transformation
B Non-Responders
IL3RA
AKAP13
FTI
K-ras.F
N-ras.F
H-ras.F
FTI
RhoB.F
RhoE.F
RhoH.G
RhoA.G
RhoG.G
LaminB.F
FTI
Transformation

Figure 8

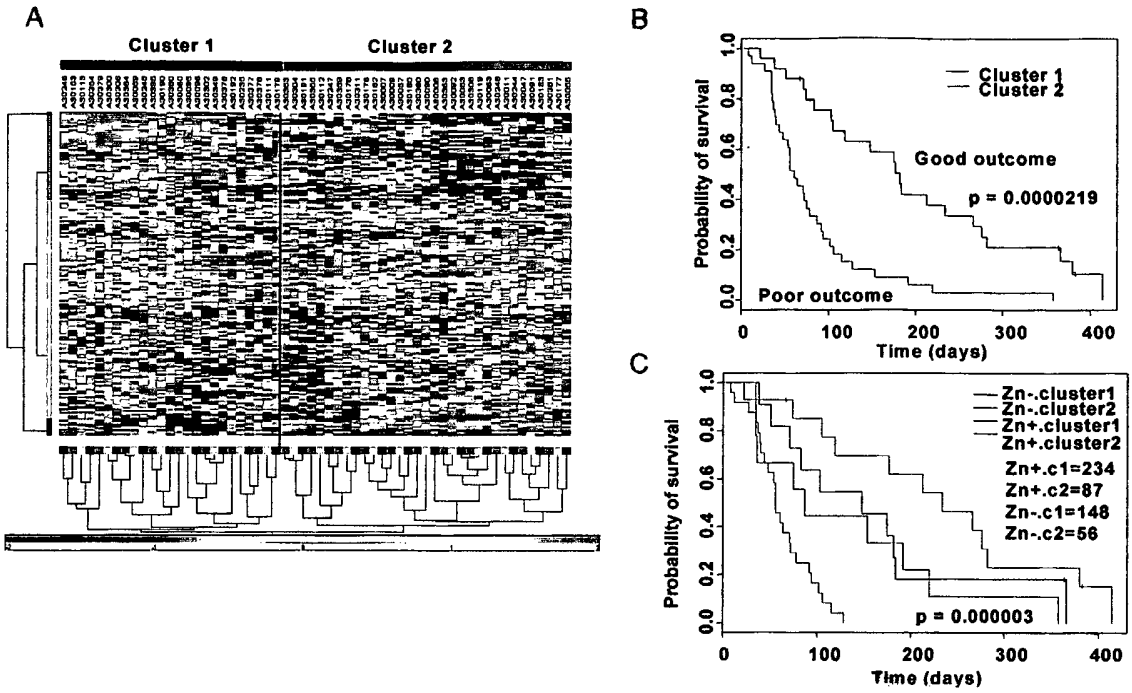


Figure 9

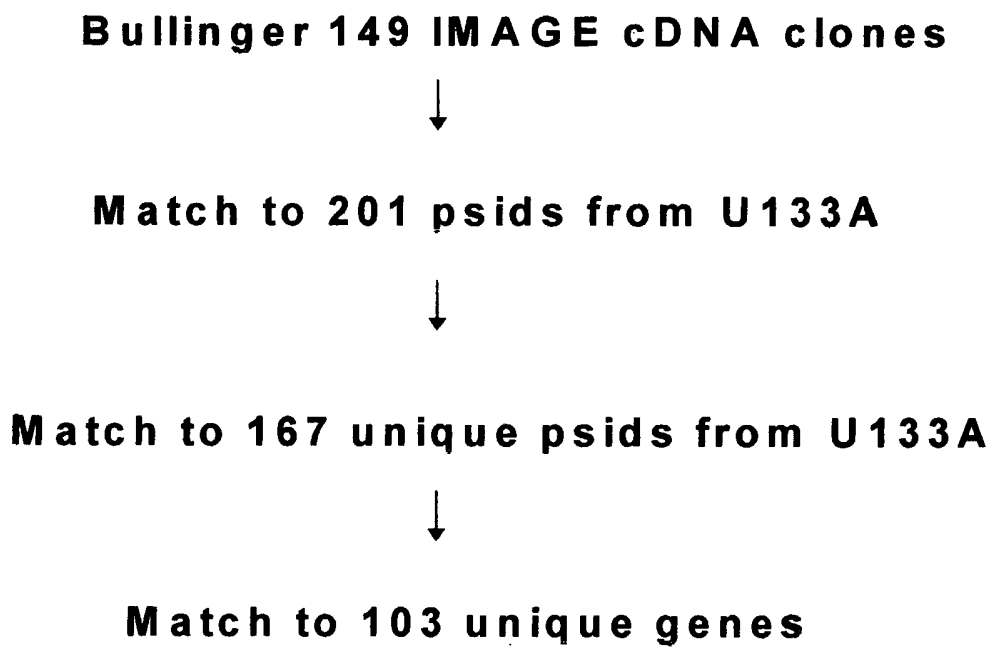


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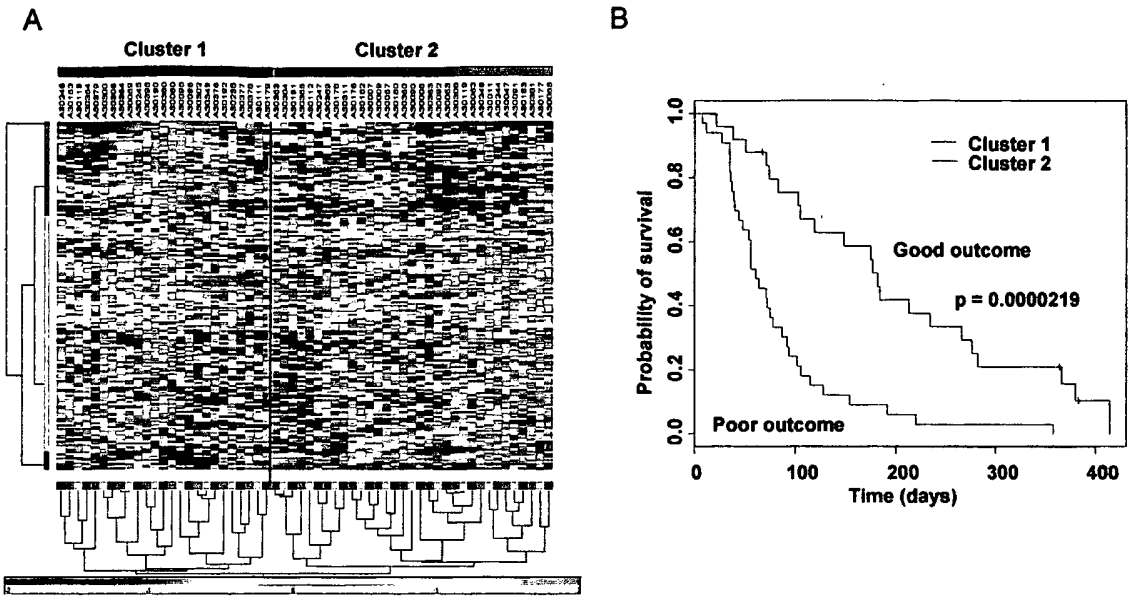


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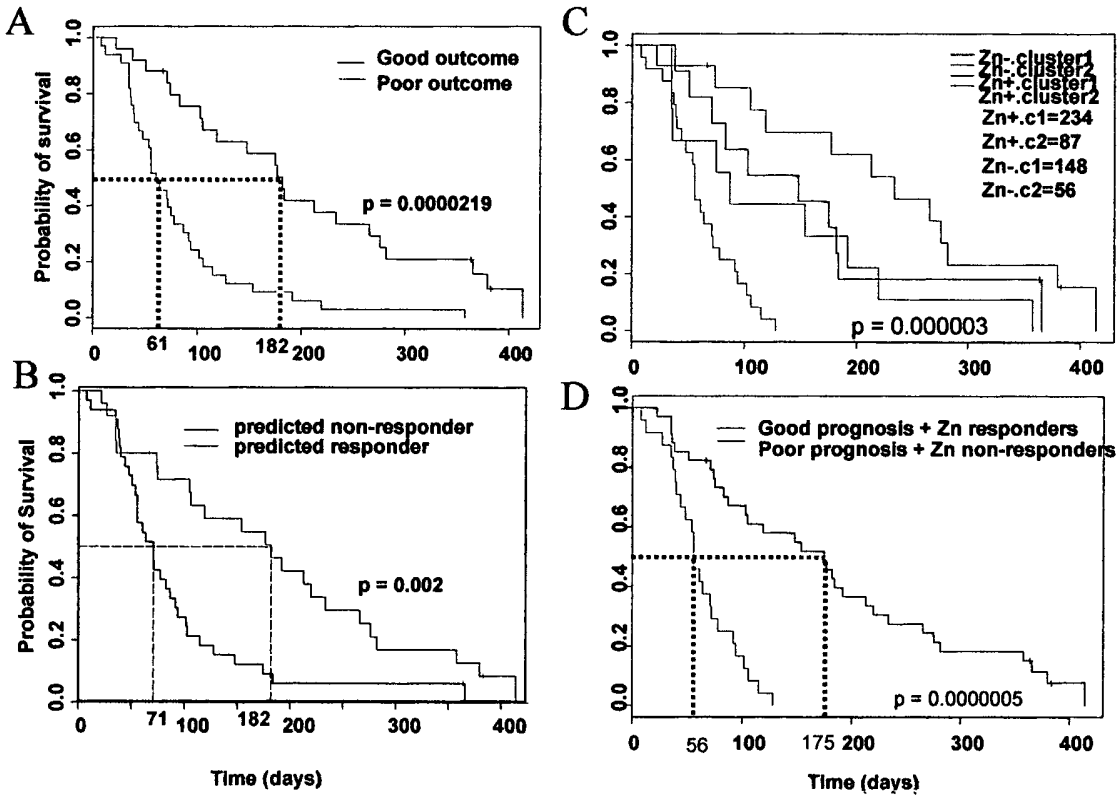


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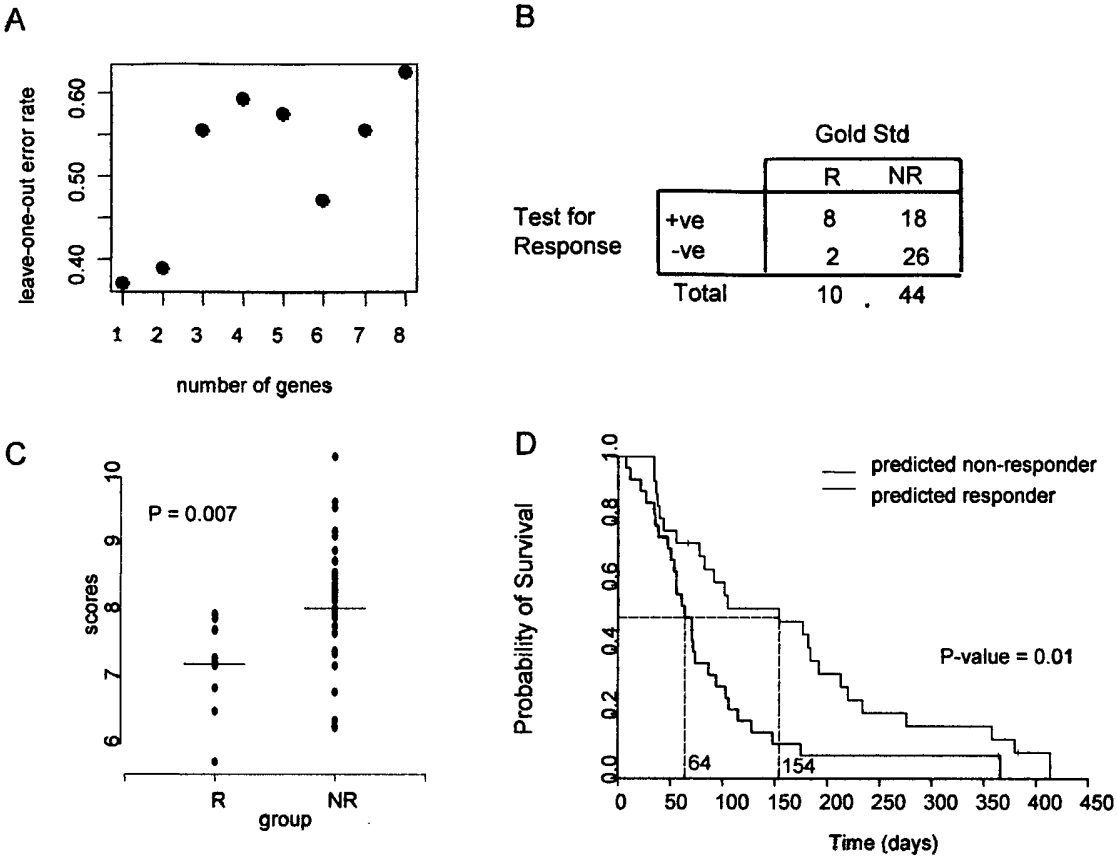


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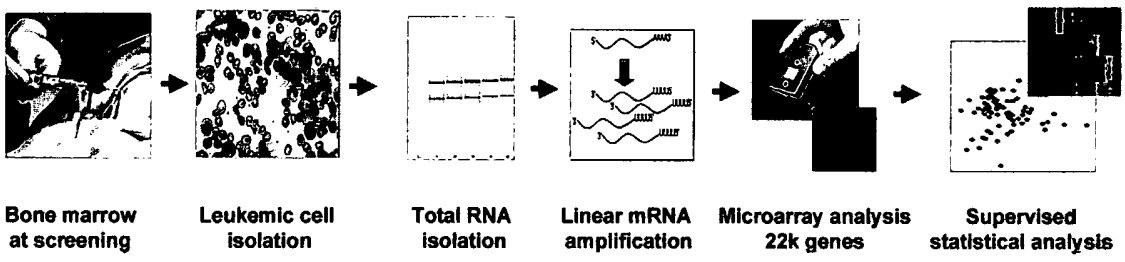


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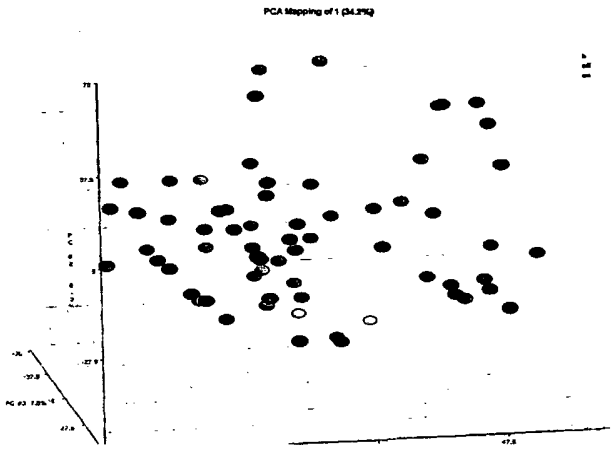


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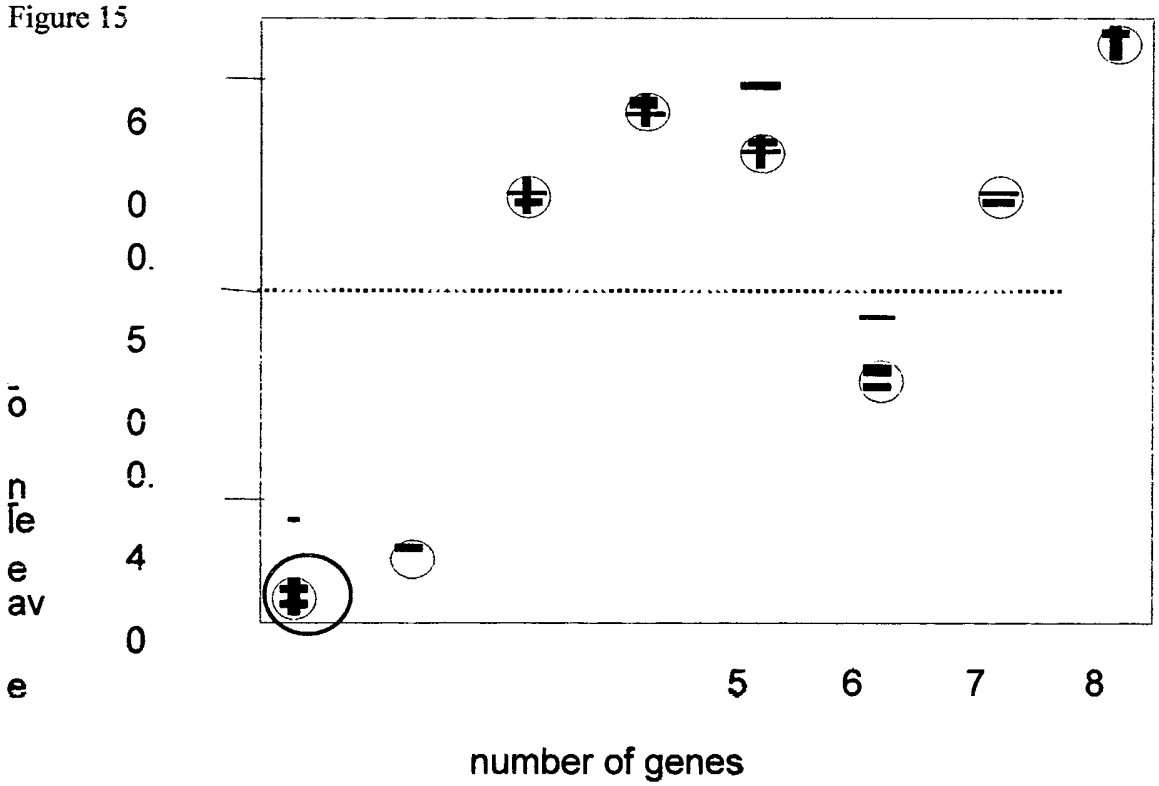
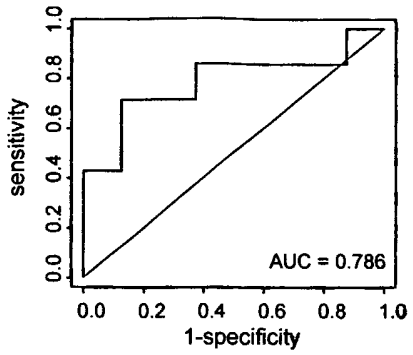
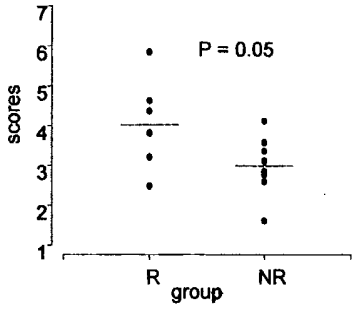


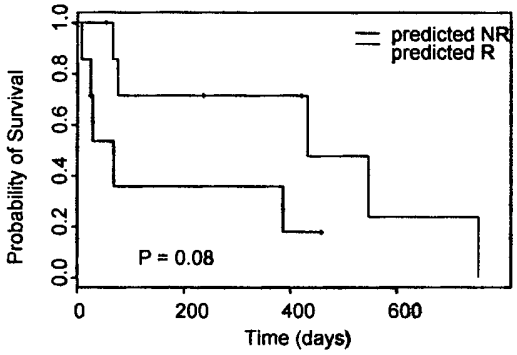
Figure 16



	Responder	Non-Responder
Positive	5	3
Negative	2	5
Sensitivity:	71%	
Specificity:	63%	
PPV:	63%	
NPV:	71%	

Overall Response: 63% vs. 47%





SEQUENCE LISTING

<110> VERIDEX LLC
Raponi, Mitch

<120> METHODS OF ASSESSING PATIENTS WITH ACUTE MYELOID LEUKEMIA

<130> VDX5008WOPCT

<150> 60/637,265
<151> 2004-12-17

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<221> misc_feature
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<223> n is a, c, g, or t

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<221> misc_feature
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<223> n is a, c, g, or t

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<221> misc_feature
<222> (477)..(477)
<223> n is a, c, g, or t

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<221> misc_feature
<222> (507)..(507)
<223> n is a, c, g, or t

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ctcgctttct ttttaatccc cntgcatcgg atcaccggcg tgccccacca tgtcagacgc 180

agccgtagac accagctccg aaatcaccac caaggactta aaggagaaga aggaagttgt 240

ggaagaggca gaaanatgga agaganncgc ccctgctnaa cgggnaatgc tnnananant 300

gaggaanaat ggggnagcag gaggctngac aatngaggta gacgaangaa ganggaagan 360

anggtgggga nggaangagg anggaggana gaangaaggt gantggtgan ggaangagga 420

ntggangant gaangatgag gaagctgagt cagctacggg caagcgggca gctgaangat 480

gatgaggatg acgatgtcga taccaangaa gcagaagacc gacgaggatg actagacagc 540

<210> 26
<211> 488
<212> DNA
<213> human

<400> 26
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gtcactactg ctaccctcat ttcacctgcg ctgtggacac tgagaacatc cgccgtgtgt 180

tcaacgactg ccgtgacatc attcagcgca tgcaccttcg tcagtacgag ctgctctaag 240

aagggaaccc ccaaatttaa ttaaagcctt aagcacaatt aattaaaagt gaaacgtaat 300

tgtacaagca gttaatcacc caccataggg catgattaac aaagcaacct ttcccttccc 360

ccgagtgatt ttgcgaaacc ccctttttccc ttcagcttgc ttagatgttc caaatttaga 420

aagcttaagg cggcctacag aaaaaggaaa aaaggccaca aaagttccct ctcactttca 480

gtaaaaat 488

<210> 27
<211> 555
<212> DNA
<213> human

<400> 27
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cttgactcag gatttaaaaa ctggaacggt gaaggtgaca gcagtcggtt ggagcgagca 180

tcccccaaag ttcacaatgt ggccgaggac tttgattgca cattgttgtt tttttaatag 240

tcattccaaa tatgagatgc attgttacag gaagtccctt gccatcctaa aagccacccc 300

acttctctct aaggagaatg gcccagtcct ctcccaagtc cacacagggg aggtgatagc 360

attgctttcg tgtaaattat gtaatgcaaa atttttttaa tcttcgcctt aatacttttt 420

tattttgttt tattttgaat gatgagcctt cgtgcccccc cttccccctt tttgtccccc 480

aacttgagat gtatgaaggc ttttggtctc cctgggagtg ggtggaggca gccagggctt 540

acctgtacac tgact 555

<210> 28
<211> 223
<212> DNA
<213> human

<400> 28
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tccgctagca atcgcatcat cggtgccaag gaccacgcat ccatccagat gaacgtggcc 120

gaggttgaca aggtcacagg caggtttaat ggccagttta aaacttatgc tatctgcggg 180

gccattcgta ggatgggtga gtcagatgat tccattctcc gat 223

<210> 29
<211> 411
<212> DNA
<213> human

<400> 29
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cctcatgtgc tctttccaga tcctcaagcc cgccgacaag aacaagggga agtacgggca 120

gttcagtggc ctgaaccctg gaggccgacc catcacccca ccccgcaatt ccgccaaagc 180

caagaaatag cccccgcaca ccaccctgtg ccccagatga tggattgatt gtacagaaat 240

catgctgcca tgctgggggg gggtcacccc gacccctaag gcccacctgt cacggggaac 300

atggagcctt ggtgtatttt tcttttcttt ttttaatgaa tcaatagcag cgtccagtcc 360

cccagggctg cttcctgcct gcacctgcgg tactgtgagc aggatcctgg g 411

<210> 30
<211> 545
<212> DNA
<213> human

<400> 30
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tcaaggctac aattgctggt ggtggtgtca ttccacacat ccacaaatct ctgattggga 180

agaaaggaca acagaagact gtctaaagga tgcctggatt ccttgttatc tcaggactct 240

aaatactcta acagctgtcc agtgttggtg attccagtgg actgtatctc tgtgaaaaac 300

acaattttgc ctttttgtaa ttctatttga gcaagttgga agtttaatta gctttccaac 360

caaccaaatt tctgcattcg agtcttaacc atatttaagt gttactgtgg cttcaaagaa 420

gctattgatt ctgaagtagt gggttttgat tgagttgact gtttttaaaa aactgtttgg 480

attttaattg tgatgcagaa gttatagtaa caaacatttg gttttgttca gaccttattt 540

ccact 545

<210> 31
<211> 508
<212> DNA
<213> human

<400> 31
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atgcggatgc tcagcagtac tccaccaaca ccgattgcat gtgctccctc tgcggtgaac 120

caagcagctc ctcaccaaca gaacaggatc tgggagcgag agcctgcccc actgctctca 180

gcacagtacg agaccctgtc ggatagtgat gactgaactg cacaaagtga ggggaacagg 240

gtgcaggaga gggatctcta gtttttgtgg tttaattttt agtagcaggt caaaaacctg 300

ccctcctgtg acttattccc tgagactttt caggagagcc agcccacaga tgatgaagaa 360

atgatggaag ttcatttgga gagtcaaatg ggaaaaaaac aaacaaaaaa ctgcctttga 420

tacaggcaat tcagtggact ataataatag tggagggttg agatgtagag tttttaaaaa 480

gtgaacagtt gctgttctta catctgta 508

<210> 32
<211> 259
<212> DNA
<213> human

<400> 32
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atttctcctg gggctcagag tgttgtactc gtaaaacaag gatcatcgat gttgtctaca 120

atgcatctaa taacgagctg gttcgtacca agaccctggt gaagaattgc atcgtgctca 180

tcgacagcac accgtaccga cagtggtacg agtcccacta tgcgctgccc ctgggccgca 240

agaagggagc caagctgac 259

<210> 33
<211> 538
<212> DNA
<213> human

<400> 33
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tgcatttgtt gataccacta acaaaatgct ttgtaacaga cttgcggtta attatgcaaa 120

tgatagtttg tgataattgg tccagtttta cgaacaacag atttctaaat tagagaggtt 180

aacaagacag atgattacta tgcctcatgt gctgtgtgct ctttgaaagg aatgacagca 240

gactacaaag caaataagat atactgagcc tcaacagatt gcctgctcct cagagtctct 300

cctatttttg tattacccag ctttcttttt aatacaaatg ttatttatag tttacaatga 360

atgcactgca taaaaacttt gtagcttcat tattgtaaaa catattcaag atcctacagt 420

aagagtgaaa cattcacaaa gatttgcgtt aatgaagact acacagaaaa cctttctagg 480

gatttgtgtg gatcagatac atacttggca aatttttgag ttttacattc ttacagaa 538

<210> 34
<211> 476
<212> DNA
<213> human

<400> 34
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ggcggcctat gtcgagtggc gcccatggcg aagagggctc agctcgcatg tggaagactc 120

tcaccttctt cgtcgcgctc cccggggtgg cagtcagcat gctgaatgtg tacctgaagt 180

cgcaccacgg agagcacgag agacccgagt tcatcgccta cccccatctc cgcatcagga 240

ccaagccgtt tccctgggga gatggtaacc atactctatt ccataaccct catgtgaatc 300

cacttccaac tggctacgaa gatgaataaa gagaatctgg accactaccc gggcaccagg 360

gaccacagca ctggtttgga ccgttactct gcacatggac cagaaaaagt atatgggacc 420

ttaagctaac cttctttact tgtatcaaat gatgactggt atactggtct cccatc 476

<210> 35
<211> 548
<212> DNA
<213> human

<400> 35
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cttcacgatt atgactaaag taccagatta taatgccaga atataatgtg caggcaatcg 120

tggatgtctc tgacaaagtg tgtctcaaaa ataatatact tttacattaa agaaatttaa 180

tgtttctctg gagttggggc tcttggcttt cagagtttgg ttaatcagtg ttgattctag 240

atgatcaaca taatggacca ctcctgaatg agacttaatt ttgtctttca aatttactgt 300

cttaaatcag tttattaaat ctgaatttta aaacatgctg tttatgacac aatgacacat 360

ttgttgcacc aattaagtgt tgaaaaatat ctttgcatca tagaacagaa atatataaaa 420

atatatgttg aatgttaaca ggtattttca caggtttgtt tcttgatagt tactcagaca 480

ctagggaaag gtaaatacaa gtgaacaaaa taagcaacta aatgagacct aataattggc 540

cttcgatt 548

<210> 36
<211> 469
<212> DNA
<213> human

<400> 36
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gttcgctctc gccgaggaac aagtcggtca ggaagcccgc gcgcaacagc catggctttt 120

aaggataccg gaaaaacacc cgtggagccg gaggtggcaa ttcaccgaat tcgaatcacc 180

ctaacaagcc gcaacgtaaa atccttggaa aaggtgtgtg ctgacttgat aagaggcgca 240

aaagaaaaga atctcaaagt gaaaggacca gttcgaatgc ctaccaagac tttgagaatc 300

actacaagaa aaactccttg tggtgaaggt tctaagacgt gggatcgttt ccagatgaga 360

attcacaagc gactcattga cttgcacagt ccttctgaga ttgttaagca gattacttcc 420

atcagtattg agccaggagt tgaggtggaa gtcaccattg cagatgctt 469

<210> 37
<211> 438
<212> DNA
<213> human

<400> 37
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tcaaacagtt cctcgactat tttaagacag agcacaaatt agagatcacc atgctgtccc 120

agggcgtgtc catgctctat tccttcttca tgccagctgc caagctcaag gaacggttgg 180

atcagccgat gacagagatt gtgagccgtg tgtcgaagcg aaagctgggc cgccacgtgc 240

gggcgctggt gcttgagctg tgctgtaacg acgagagcgg cgaggatgtc gaggttccct 300

atgtccgata caccatccgc tgaccccgtc tgctcctcta ggctggcccc ttgtccaccc 360

ctctccacac cccttccagc ccagggttcc catttggctt ctggcagtgg cccaactagc 420

caagtctggt gttccctc 438

<210> 38
<211> 443
<212> DNA
<213> human

<400> 38
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gatggtcgcc aagcaaagga tccgtatggc caacgagaag cacagcaaga acatcaccca 120

gcgcggcaac gtcgccaaga cctcgagaaa tgcccccgaa gagaaggcgt ctgtaggacc 180

ctggttattg gctctcttca tttttgttgt ctgtggttct gcaattttcc agattattca 240

aagtatcagg atgggcatgt gaagtgactg accttaagat gtttccattc tcctgtgaat 300

ttttaacttg aactcattcc tgatgtttga taccctggtt gaaaacaatt cagtaaagca 360

tcctgcctca gaatgacttt cctatcatgc ttcatgtgtc attccaaggt ttcttcatga 420

gtcattccaa gttttctagt cca 443

<210> 39
<211> 430
<212> DNA
<213> human

<400> 39
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gcgtcactac tgctaccctc atttcacctg cgctgtggac actgagaaca tccgccgtgt 120

gttcaacgac tgccgtgaca tcattcagcg catgcacctt cgtcagtacg agctgctcta 180

agaagggaac ccccaaattt aattaaagcc ttaagcacaa ttaattaaaa gtgaaacgta 240

attgtacaag cagttaatca cccaccatag ggcatgatta acaaagcaac ctttcccttc 300

ccccgagtga ttttgcgaaa ccccctttc ccttcagctt gcttagatgt tccaaattta 360

gaaagcttaa ggcggcctac agaaaaagga aaaaaggcca caaaagttcc ctctcacttt 420

cagtaaaaat 430

<210> 40
<211> 375
<212> DNA
<213> human

<400> 40
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aattggcagt cccagcacag atgccagtgc cagtgatgtc cacggcaatt tcgccttcga 120

gggcattgga gatgaggatc tgtaatctcc actgcttgga tgtctgccct ctaccccaga 180

ggaatttaca gaaacttgcc ctgtgcctgt gtcccccatg ctaggggcgg aggggtcttt 240

tccttcttct ttcctaccta ccccttttct cttggccagg ggcctcgtat cctacctttc 300

cttgtcccct gggctggctg cacagaggat tgcccccttct cttttcagag ctggccctcg 360

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<210> 41
<211> 438
<212> DNA
<213> human

<400> 41
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gacgcatctg tgatatcaga ggtaactatg caaagcatcc aggcggttct gaatgtgaag 120

cactacaccc agcagagtcc cggtgccctc tgtccccact gccggcccat gtcctctctc 180

cggaggtcac caaggaatgc acaggtttcg actaccagaa aggggagtcc ttgggttctt 240

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ggccaagtcc ttttatttta acatgatgtc catgaagagg tttgccgtct gggcagccct 360

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<211> 414
<212> DNA
<213> human

<400> 42
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agaagattaa aatttcatta gcatgaatgc aatttgttaa agcagactga tttgtttcta 120

agatattttt ggtttttta aaactgataa taatgctgaa ttatcttaag tgagatgtta 180

agcccacttt gttcttttaa tgtaatggag cttatgggta gaagaccatg tctactaatt 240

acaaaaaaaa aaaaaaacca tgattgctgc ttttcctacc acttccagta agaaaatggg 300

tgttttgaag aaatcatttg ccttgtctca cggaatctga ttaagccctg gcctcttgat 360

gtatagagtc atggatattc cagttaccta gatattccct tgagattttg atac 414

<210> 43
<211> 467
<212> DNA
<213> human

<400> 43
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gagatccgat agtgatgggg gtgacggtgg aagcaggtca ggtgaaacag gggacaccca 120

tgtgtgtccc aagcaaaaat tttgttgaca tcggaatagt aacaagtatt gaaataaacc 180

ataaacaagt ggatgttgca aaaaaaggac aagaagtttg tgtaaaaata gaacctatcc 240

ctggtgagtc acccaaaatg tttggaagac attttgaagc tacagatatt cttgttagta 300

agatcagccg gcagtccatt gatgcactca aagactggtt cagagatgaa atgcagaaga 360

gtgactggca gcttattgtg gagctgaaga aagtatttga aatcatctaa ttttttcaca 420

tggagcagga actggagtaa atgcaatact gtgttgtaat atcccaa 467

<210> 44
<211> 457
<212> DNA
<213> human

<220>
<221> misc_feature
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<223> n is a, c, g, or t

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acaaggttgg ncaccccagc taccccttct ttgcagggct aaggccccca aacatagccc 180

ctgccccgga ggaagcttgg ggaacccatg agttgtcagc tttgacttta tctcctgctc 240

tttctacatg actgggcctc ccttgggctg gaagaattgg ggattctcta ttggaggtga 300

gatcacagcc tccagggccc cccaaatccc agggaaggac ttggagagaa tcatgctgtt 360

gcatttagaa ctttctgctt tgcacaggaa agagtcacac aattaatcaa catgtatatt 420

ttctctatac atagagctct atttctctac ggtttta 457

<210> 45
<211> 377
<212> DNA
<213> human

<400> 45
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atgctcatgt ggtgttgagg aaagcagaca ttgacctcac caagagggcg ggagaactca 180

ctgaggatga ggtggaacgt gtgatcacca ttatgcagaa tccacgccag tacaagatcc 240

cagactggtt cttgaacaga cagaaggatg taaaggatgg aaaatacagc caggtcctag 300

ccaatggtct ggacaacaag ctccgtgaag acctggagcg actgaagaag attcgggccc 360

atagagggct gcgtcac 377

<210> 46
<211> 236
<212> DNA
<213> human

<400> 46
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gcgaaaattc ggccagggtt ctcgctcttg tcgtgtctgt tcaaaccggc acggtctgat 120

ccggaaatat ggcctcaata tgtgccgcca gtgtttccgt cagtacgcga aggatatcgg 180

tttcattaag ttggactaaa tgctcttcct tcagaggatt atccggggca tctact 236

<210> 47
<211> 539
<212> DNA
<213> human

<400> 47
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ccaaaggtgt taccctggtt tcaatgaacc taacctcatt ctttgtgtct tcagtgttgg 120

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gccatgttct tgcagaaaac gcttaacctg agtttcatag gaggtaatca ccagacaact 480

gcagaatgta gaacactgag caggacaact gacctgtctc cttcacatag tccatatca 539

<210> 48
<211> 532
<212> DNA
<213> human

<400> 48
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cctgatgggc tcctgtcacc ctccacgtct ccacagacca ggacattcca tg 532

<210> 49
<211> 301
<212> DNA
<213> human

<400> 49
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aggagccact atgaggaggg ccctgggaag aatttgccat tttcagtgga aaacaagtgg 120

tcgttactag ctaagatgtg tttgtacttt ggatctgcat ttgctacacc cttccttgta 180

gtaagacacc aactgcttaa aacataagga tgtttcagtt cctccattta acagatatga 240

agagcatttt aagaggtgca gcctctggaa gtggatcaaa ctagaactca tatgccatac 300

t 301

<210> 50
<211> 192
<212> DNA
<213> human

<400> 50
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tcatggataa ctacattacc tgttcttgcc taataagttt cttttaatcc aatccactaa 120

cactttagtt atattcactg gttttacaca gagaaataca aaataaagat cacacatcaa 180

gactatctac aa 192

<210> 51
<211> 522
<212> DNA
<213> human

<400> 51
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tgctgtgctg gaattccaca gggaccaggg ccaccgcagg ggactgtctc agaagacttg 120

atttttccgt ccctttttct ccacactcca ctgacaaacg tccccagcgg tttccacttg 180

tgggcttcag gtgttttcaa gcacaaccca ccacaacaag caagtgcatt ttcagtcgtt 240

gtgctttttt gttttgtgct aacgtcttac taatttaaag atgctgtcgg caccatgttt 300

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ctccctgtct gtgtcccagc cacgcagggc catccactgt gacgtcggcc gaccaggctg 420

gacaccctct gccgagtaat gacgtgtgtg gctgggacct tctttattct gtgttaatgg 480

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<400> 52
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caggaccttc ttcacaagat gacttgctcg ctgttacctg cttccccagt cttttctgaa 180

aaactacaaa ttagggtggg aaaagctctg tattgagaag ggtcatattt gctttctagg 240

aggtttgttg ttttccctgt tagttttgag gagcaggaag ctcatggggg cttctgtagc 300

ccctctcaaa aggagtcttt attctgagaa tttgaagctg aaacctcttt aaatcttcag 360

aatgatttta ttgaagaggg gcgcaagccc caaatggaaa actg 404

<210> 53
<211> 140
<212> DNA
<213> human

<400> 53
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ggtggttcac tatgagatct gaggaggctt cgtgggcttt tgggtcctct aactaggact 120

ccctcattcc tagaaattta 140

<210> 54
<211> 465
<212> DNA
<213> human

<400> 54
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gatgtggaga cacatgggat tttggaaatc agcttctgga ggaatgcatg tcacaggcgg 120

gactttcttc agagagtggt gcagcgccag acattttgca cataaggcac caaacagccc 180

aggactgccg agactctggc cgcccgaagg agcctgcttt ggtactatgg aacttttctt 240

aggggacacg tcctcctttc acagcttcta aggtgtccag tgcattggga tggttttcca 300

ggcaaggcac tcggccaatc cgcatctcag ccctctcagg agcagtcttc catcatgctg 360

aattttgtct tccaggagct gcccctatgg ggcgggccgc agggccagcc tgtttctcta 420

acaaacaaac aaacaaacag ccttgtttct ctagtcacat catgt 465

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<211> 278
<212> DNA
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<400> 55
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tcctccttca cccctgaatt tccagagcac ttcatctgct ccttcatcac aagtccagtt 180

ttctgccact agtctgaatt tcatgagaag atgccgattt ggttcctgtg ggtcctcagc 240

actattcagt acagtgcttg atgcacagca ggcactca 278

<210> 56
<211> 476
<212> DNA
<213> human

<400> 56
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caagatattt atatatattt ttggttgtca atattaaata cagacactaa gttatagtat 120

atctggacaa gccaacttgt aaatacacca cctcactcct gttacttacc taaacagata 180

taaatggctg gtttttagaa acatggtttt gaaatgcttg tggattgagg gtaggaggtt 240

tggatgggag tgagacagaa gtaagtgggg ttgcaaccac tgcaacggct tagacttcga 300

ctcaggatcc agtcccttac acgtacctct catcagtgtc ctcttgctca aaaatctgtt 360

tgatccctgt tacccagaga atatatacat tctttatctt gacattcaag gcatttctat 420

cacatatttg atagttggtg ttcaaaaaaa cactagtttt gtgccagccg tgatgc 476

<210> 57
<211> 524
<212> DNA
<213> human

<400> 57
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atttccacat ttaaactacc tgttaatata agggatttgt agtatcagct tgttgagcaa 120

tgactttgaa tctagttttc agtgatcaga agcagcagtt atttgagtgt atgaatggaa 180

tgatgatcac tgtgctataa tgtactgaaa ccaccatatt acagaaatat ttactacata 240

ttttccatct gtagtttctc agaagggcta tggattagtt tgaactgtca aatccttgca 300

tacttctgtg acacccctgc ccattttctg tctttaatta accaaggtgt taggtgtgac 360

tgtcacaact gttatgtttt ccagtaaact agaagcacga tatttgataa ttatatttgt 420

atttcaccac ctaaatgtaa tgttgattcc tcaagaatga aatgaaggca ctacattgaa 480

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<210> 58
<211> 545
<212> DNA
<213> human

<400> 58
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ccaaatttaa cttggcaaac tttctattgc ctgtcccatg tgcatcttat ttaaaatttc 180

ccccatggaa atcactctcc tgttgactat ttccagagct ctaggtgttt aggcagcgtg 240

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gcaggtgaga ggctctgctt ctgctgccgc tctgcagcct ggacctgtgg accctggttg 360

taaagagtaa attgtatctt aggaaaccag tgtcaccttt ttttcacctt ttaattttat 420

attatttgcg tcatacattt cctgtaacgg aagtgttaat tttactgtac tttttggtac 480

ccctttttggg aatctaatgt attgtaaggt attttacacg tgtcctgatt ttgccacaac 540

ctgga 545

<210> 59
<211> 511
<212> DNA
<213> human

<400> 59
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tctgttaatg ttaattaaag taaaattatt ccctgaattg tttgatattg tcacctagca 180

gatatgtatt acttttctgc aatgttatta ttggcttgca ctttgtgagt atctatgtaa 240

aaatatatat gtatataaaa tatatattgc ataggacaga cttaggagtt ttgtttagag 300

cagttaacat ctgaagtgtc taatgcatta acttttgtaa ggtactgaat acttaatatg 360

tgggaaaccc ttttgcgtgg tccttaggct tacaatgtgc actgaatcgt ttcatgtaag 420

aatccaaagt ggacaccatt aacaggtctt tgaaatatgc atgtacttta tattttctat 480

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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ctacttggat nggctatgan ccgagangga ccaggnaagc acctgancnt cangnatgcc 120

gaggtggant nggtgntgga ntgnananga ggaggangga ncgaagaagg agaagatgag 180

gnaagancga nggacgnatn gaggatggtg aagaagagga gtttgatgaa ngaagantga 240

ntgaagatga ngaagatgta gaaggggatg aggacgacga tgaagtcagt gaggaggaag 300

aagaatttgg acttgatgaa gaagatgaag atgaggatga ggatgaagag gaggaagaag 360

gtgggaaagg tgaaaagagg aagagagaaa cagatgatga aggagaagat gattaagacc 420

ccagatgacc tgcagaaaca gaactgttca gtattggttg gactgctcat ggattttgta 480

gctgt 485

<210> 61
<211> 534
<212> DNA
<213> human

<400> 61
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cagagagtag cttctgtgat gcaagaatat actcagtcag gtggtgttcg tccatttgga 120

gtttctttac ttatttgtgg ttggaatgag ggacgaccat atttatttca gtcagatcca 180

tctggagctt actttgcctg gaaagctaca gcaatgggaa agaactatgt gaatgggaag 240

actttccttg agaaaagata taatgaagat ctggaacttg aagatgccat tcatacagcc 300

atcttaaccc taaaggaaag ctttgaaggg caaatgacag aggataacat agaagttgga 360

atctgcaatg aagctggatt taggaggctt actccaactg aagttaagga ttacttggct 420

gccatagcat aacaatgaag tgactgaaaa atccagaatt tcagataatc tatctactta 480

aacatgttta aagtatgttt tgttttgcag acttttgca tacttatttc taca 534

<210> 62
<211> 299
<212> DNA
<213> human

<400> 62
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tacttacatt tcagacatat ccaaagggaa tactcacatt ttgttaagaa gttgaactat 180

gactggagta aaccatgtat tcccttatct tttacttttt ttctgtgaca tttatgtctc 240

atgtaatttg cattactctg gtggattgtt ctagtactgt attgggcttc ttcgttaat 299

<210> 63
<211> 376
<212> DNA
<213> human

<400> 63
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aatgtacttc agagaagcag tattttgtta aataaataca taacctcatt ctgaataatg 120

tccctcattt tgactataac tgtgcttggt ttcaaaagca aaattaaaca aaaatctcag 180

tcccctccga agtgaacttt gtgttaccct gcgtcagaaa tgccaagttg tgtttacttt 240

tcattcagat tttgtgaata tgaacatgct gttataggat ctacagatga atatttaact 300

caatagaaaa attattttag aacacattgt attggtatta caaccagatt atattcttga 360

cgttgacttc attaaa 376

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<211> 555
<212> DNA
<213> human

<400> 64
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aggagtgcaa agaaaaagag aagccctcct atgacactga aacagatcct agtgagggat 180

tgatgaatgt tctaaagaaa atttatgaag atggagacga tgatatgaag cgaaccatta 240

ataaagcctg ggtggaatca agagagaagc aagccaaagg agacacggaa ttttgagact 300

ttaaagtcgt tttgggaact gtgatgtgat gtggaaatac tgatgtttcc agtaagggaa 360

tattggtgag ctgcatatat aaatttgaca gatagctatt tacatagcct tctaagtaaa 420

ggcaatgaat tctccatttc ctactggagg atttatttaa ataaaatatg cttattaaac 480

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<211> 453
<212> DNA
<213> human

<400> 65
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gtgacttaca gaaactgcat gaaaaatcat gggccagagc ctcggcccta gcattgcact 180

tggcctcatg ctggagggag gctgggcggg tacagcgcgg aggaggaggg aggccaggcg 240

ggcatggcgt ggaggaggag ggaggccggg cggtcacagc atggaggagg agggaggcgc 300

tgctggtgtt cttattctgg cggcagcgcc tttcctgcca tgtttagtga atgacttttc 360

tcgcattgta gaattgtata tagactctgg tgttctattg ctgagaagca aaccgccctg 420

cagcatccct cagcctgtac cggtttggct ggc 453

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<211> 541
<212> DNA
<213> human

<400> 66
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tccaaggccc gcaagaagta caaagtggag tatcctatca tgtacagcac ggaccctgaa 120

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agcaagcgta gtcgaggagc cctggggtcc atcgccctcc tgggcttggt gggcacaact 360

gtgtgctctg ctttccagca tcttggttgg gttaaaagtg gcttgggcag tggacccaaa 420

tgctgccatt aaagaattat aggggtttaa aaactctcat tcattttaaa tgacttacct 480

ttatttccat ttacattttt tttctaaata taataaaaac ttacctggca tcagcctcat 540

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<210> 67
<211> 264
<212> DNA
<213> human

<400> 67
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tgctctttct gtggcaaaac caagatgaag agacgagctg tggggatctg gcactgtggt 180

tcctgcatga agacagtggc tggcggtgcc tggacgtaca ataccacttc cgctgtcacg 240

gtaaagtccg ccatcagaag actg 264

<210> 68
<211> 383
<212> DNA
<213> human

<400> 68
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caagctagcc ttgagtaatt tttatcttgt cttcctaaaa cactattaag cttattgtac 180

ttttaagaaa aattgcctta cgtacattcc tttttccttt ttctgcctct tccctcaata 240

gttgcctttt agtgctgtaa taggttaaat cctacagcat aatcaataac tcgcatatga 300

agtaaaaagg aatactgtga aaggggagta ctcttgtaca gccagttctt ttatgcaaaa 360

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<210> 69
<211> 266
<212> DNA
<213> human

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<222> (236)..(238)
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atgcgtgcga gaagtcagtg gtaactgctg cagggcttaa tacattagtg gtaactggtt 180

taaaaaacaa agactgtaag cctgtgtgtg ccactgtttg cttcaacagt atatcnnnct 240

aataagcctc acctatttaa tccaat 266

<210> 70
<211> 462
<212> DNA
<213> human

<400> 70
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actactatga tattctggac attttaggaa atggtaattt gccttgctac acattaagag 120

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aatctgcaat ggctgaaaag agttgtgagc ttttttattc atgataaaac cttataggaa 360

tagtataaaa aatccctgtg gaaagctact agtacattga ccagcgctgg gtgatacaga 420

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<210> 71
<211> 460
<212> DNA
<213> human

<400> 71
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gaattgagga gagagtagga tgctgatttt cctacccgtg 460

<210> 72
<211> 345
<212> DNA
<213> human

<400> 72
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ctttctttcg cgtggtgccg cagtttgtag tgttttatct tatctacaca tgggggactg 240

aagagttcga gagatccaag aggaggatcc agctgcctat gaaaatgaca aatgagcaac 300

gcatccggat gacggttccc tgtctctgaa agacctttct ctgga 345

<210> 73
<211> 548
<212> DNA
<213> human

<400> 73
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atggattttg aagaggcaga aagaagtgaa ccaactcaag ctctggaact gacagaggat 180

gatattaaag aagatggcat tgttccactt cgttatgtta agtttcagaa tgttaacagt 240

gtaactatat ttgttcagtc gaatcaaggt gaagaggaaa caacaagaat ttcatatttt 300

acttttattg gtactccagt ccaggcaaca aatatgaatg acttcaaacg agtagttggc 360

aaaaaaggag aaagccacta aggtacaaaa gacactggac aaccatattg caatcagatc 420

tacagctcct ggataattgc ttgattctcg ccagagactg tcaatgtttc attcattgcc 480

attaccaata aatcattgct tttgttcaga tggtatcact agtgtttcca ttgtaatctt 540

gacacatg 548

<210> 74
<211> 360
<212> DNA
<213> human

<400> 74
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atgatgaaat tccactgtat ctaaagggtg gggtagctga tgccctcctg tatagagcca 180

ccatgattct tacagttggt ggaacagcat atgccatata tgagctggct gtggcttcat 240

ttcccaagaa gcaggagtga cttcagtcat cccagcaatc gcttggttca gtttcattca 300

gctctctatg gaccagtaat ctgataaata accgagctct tctttgggga tcaatattta 360

<210> 75
<211> 516
<212> DNA
<213> human

<400> 75
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gacttagtgg ctctgccgcc agtgagactt cccgccggca gctgtgcgca ccaaagactc 180

gggagaactg gaaaggctgt ctggggtctt ctgactgcag gggaaggatg tactttccaa 240

acaaatgata caaccctgac caagctaaaa gacgcttgtt aaaggctatt ttctatattt 300

attgttggga aaagtcactt taaagacttg tgctatttgg aagcaaagct attttttttg 360

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ttttaatgac agtacagact gagatttgaa ggaaacatgc acaaatctgt aaaacataga 480

ccttcgcttt atttttgtaa gtatcacctg ccacca 516

<210> 76
<211> 517
<212> DNA
<213> human

<400> 76
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gatgggtgtg ggagtgaggg gttacctccc tcgccccaag gttccagagg ccctaggcgg 180

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ctgcacttta accctagaag gtggggacct gggggggaggg acagggcagg cgggcccatg 360

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<210> 77
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<212> DNA
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<400> 77
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taaagttcgg atgatgaaag gagaatttta tgtcattgaa tatgctgctt gtgacgctac 240

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<211> 411
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<213> human

<400> 78
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agaggcccag taagaggtat ctccatcaag ctgcaggagg aggagagaga aaggagagac 240

aattatgttc ctgaggtctc agccttggat caggagatta ttgaagtaga tcctgacact 300

aaggaaatgc tgaagctttt ggacttcggc agtctgtcca accttcaggt cactcagcct 360

acagttggga tgaatttcaa aacgcctcgg ggacctgttt gatttttct g 411

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<212> DNA
<213> human

<400> 79
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gcaactgtaa atatgaaatg gtcatcacat ctgaccttgg tcagtgggga ggggaactgg 240

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atgtgtttaa acaaatgtaa tattttgtac aagatacact ggagaacaaa gggaactcaa 360

gattcttcca gccacatgtc acctgtaggt agaagtaaac tctgcagtgc agcttctgct 420

cttggcccct ctgccagggc ccctgtggct tcctgcacac tggacaggtg actgtatggt 480

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<210> 80
<211> 509
<212> DNA
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<400> 80
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tgatcatgat tttgtagtac aggaagactt catgaaagca gtcagaaaag tggctgattc 180

taagaagctg gagtctaaat tggactacaa acctgtgtaa tttactgtaa gatttttgat 240

ggctgcatga cagatgttgg cttattgtaa aaataaagtt aaagaaaata atgtatgtat 300

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aattcaactt ttaagataca gaagaaattt gtatgtttgt taaagttgca tttattgcag 420

caagttacaa agggaaagtg ttgaagcttt tcatatttgc tgcgtgagca ttttgtaaaa 480

tattgaaagt ggtttgagat agtggtata 509

<210> 81
<211> 497
<212> DNA
<213> human

<400> 81
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cctatcccta catacatacc aaatggaaaa gtggccatcc ttttcccccc aaacacaccc 180

ccttaaccta tctcttggga cttagcccga ccctccctct catttcccat taagtctgag 240

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cttgggaaca gccggggcca ggactgggtc acctatgagc tgaatcagca tctcctcctg 420

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caggttccac tttatat 497

<210> 82
<211> 113
<212> DNA
<213> human

<400> 82
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acactgtcct cctccacctt gatggacccc tagtgatgca tcctgcctag gct 113

<210> 83
<211> 387
<212> DNA
<213> human

<400> 83

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cttgtgaaat gattccctgc agtaaacgga cttttcattt atttaatcat tcaaacttcc 180

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ttgcagtaag atggtaacaa aacctcatat tgtctttaca tgtttccaat ggaaaatgtt 300

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ttaaaccatg tacgttgcag cttaaca 387

<210> 84
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<212> DNA
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<400> 84
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ctgtagcatt cgtgctatcc ctgggggttg cagctttgta taagtttcgt gtggctgatc 180

aaagaaagaa ggcatacgca gatttctaca gaaactacga tgtcatgaaa gattttgagg 240

agatgaggaa ggctggtatc tttcagagtg taaagtaatc ttggaatata aagaatttct 300

tcaggttgaa ttacctagaa gtttgtcact gacttgtgtt cctgaactat gccacatgaa 360

<210> 85
<211> 483
<212> DNA
<213> human

<400> 85
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tgtgaggtgc gggcggcggg acaatcccct cgccggggca ccgtcatgta tgtaggtctc 180

acagatttca agcctggcta ctggattggt gtccgctatg atgagccact ggggaaaaat 240

gatggcagtg tgaatgggaa acgctacttc gaatgccagg ccaagtatgg cgcctttgtc 300

aagccagcag tcgtgacggt gggggacttc ccggaggagg actacgggtt ggacgagata 360

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gtgtgcccat ggccctttc tcctgacccc attttaattt tattcatttt ttcctttgcc 480

att 483

<210> 86
<211> 486
<212> DNA
<213> human

<400> 86
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ctgtgggaat cagatgaaac ttgagggaat tgtgactctg ttccctgttc agggtcccct 180

gcccttctat ctgggagcta gggaaggtat gggggaggaa agagaatgga tttatagcta 240

cccttaccct cacacataca cttgaaaaaa ctttcagcct agccagttct agcccctgtc 300

ctcttagata tatccccctt tctgggtgaa ctataggctc tgtgcctctc agacaaattc 360

tgatctctaa gagatcccca gacctcactt gcctctgcct ccatcttggc cctgattcaa 420

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ctatat 486

<210> 87
<211> 310
<212> DNA
<213> human

<400> 87
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ggggtgcaga tcccggaatg cctgaaccaa ctgttttgag cctactttgg ggataaagga 180

ttatttggtc ttctggattt ggaggcaatc agcggacagc atggaagatg tgtgctctgg 240

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acgcatctgt 310

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<211> 445
<212> DNA
<213> human

<400> 88
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ccacctccct tccgcaggtc tgcagatgaa gggtttttg aatgaaatgc cactgcgcat 240

tttcagaaaa aaaaatctct gataaacaga ctttgaatgg atgtttgttc ctcctgattc 300

tcttttctct tcgtggcgac ttagagttgg cggatattcg gaactgtgaa tgtacatagc 360

gttgagttaa acccccttgtg tgtgagacag gacgcagcgg gcccctggtg gcctgggggc 420

cagacccgtg ggcaggtggg gcatg 445

<210> 89
<211> 378
<212> DNA
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<400> 89
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acgtcgtcct gtttattgtt agttttcttc atcatttatt gtatagacaa tttttaaatc 180

tctgtaatat gatacatttt cctatctttt aagttattgt tacctaaagt taatccagat 240

tatatggtcc ttatatgtgt acaacattaa aatgaaaggc tttgtcttgc attgtgaggt 300

acaggcggaa gttggaatca ggttttagga ttctgtctct cattagctga ataatgtgag 360

gattaacttc tgccagct 378

<210> 90
<211> 403
<212> DNA
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<223> n is a, c, g, or t

<220>
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<223> n is a, c, g, or t

<220>
<221> misc_feature
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<223> n is a, c, g, or t

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cagtggcttt ggcccctact cgggaaacgt ctgcctgttc tcgatggtga tggggtggct 180

gccattccct tggttttcct aagccctttc taacgagagt ctcaaacaag cggaggcgag 240

ggccaattca accccattct ttccagcgcc ccgcaccata gcacctgccc acctgagaac 300

caggaacgca ccctctctgt ggagctctga ctggtgtanc tggaaacaaa cagcaacttg 360

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<211> 441
<212> DNA
<213> human

<400> 91
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cagcctgcct ctgctcggct actcgctcac catcccctct gagtccgaga acatccagaa 180

agactacgtg ttcaagctgc acttcaagtc ccacgtctac tacttcaggg cggaaagcga 240

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<210> 92
<211> 534
<212> DNA
<213> human

<400> 92
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ggctttatta atcaactgat gtcttgattt ttctaaatgg gaagattgct ttatttttaa 180

cactaattat gggagcagat tcttaccaaa cttctttgga aaagttaatg ttatgatgtg 240

cattaggctg ccccatcgtg tatataaatg aaggcagatt tgatttttgt attcttacgt 300

ttactctgct ttgtagttgt ggctgtactt aaagcaatac agaatttcat atatttaaaa 360

atgtttaaaa tgtgacccac agaacattgt aaatgattaa aaactaacat gaaaatatta 420

caacctaaaa gaattcttaa cttcacaagt gttttacttc gacgatgtgc ctttgattta 480

atttgggaca ctttttaga aggatacatt attcgtgttt gcaacggtct ttga 534

<210> 93
<211> 358
<212> DNA
<213> human

<400> 93
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acagtgacac tgcactgggt acttaaagaa attatttccc gttgtaatta taattactgc 180

ttattaagga aaatatggga attttagaaa gaatcaagtt tgccacccaa atgctaccac 240

tgttaatctt ttggtgttaa atgttccccc tagacatttc tgtgcataga tttttggtgt 300

gtttacatag tcgttattct gtatatacaa ttttatgtcc cttttgtact taacgtat 358

<210> 94
<211> 423
<212> DNA
<213> human

<400> 94
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ttgttaccca tggtgttctt tgttcctttt cataagctaa taccactgta gggattttgt 120

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aaagtcaatt tttaaaaatg cacaagttat aaatacagaa gaaagagcaa cccaccaaac 300

ctaacaagga cccccgaaca ctttcatact aagactgtaa gtagatctca gttctgcgtt 360

tattgtaagt tgataaaaac atctggaaga aaatgactaa aactgtttgc atctttgtat 420

gta 423

<210> 95
<211> 438
<212> DNA
<213> human

<220>
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<222> (36)..(36)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (49)..(49)
<223> n is a, c, g, or t

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tttaaaacat ctttagtttt caaagtaaac tggatatgtg gaccttaaag ttattgagtt 240

taagctacaa attgtaacgt cattactgga catgtcagca tcaaccctct caaaatagct 300

tggtcacttt atgaaggggc gttttaaagt tgttgtttag cagtgacatt taatatggtc 360

caattgcttt tctttttaac gtgacaaaaa gagaataagg aacaaacact attgctgccg 420

aatgccataa cactgagt 438

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<211> 373
<212> DNA
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<400> 96
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atgggacggg ataaagtccg agaaatgttt atgaagaatg cccatgtcac agaccccagg 180

gtggttgatc ttctggtcat taagggaaag atcgaactgg aagaaacaat taaagtatgg 240

aagcagcgga cacatgttat gcggttcttc catgaaacag aagcgccaag gccaaaggat 300

ttcctatcca agttctatgt tggccacgat ccatgaagtc attcagtgga aagatgcacg 360

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<210> 97
<211> 288
<212> DNA
<213> human

<400> 97

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gaagtttaaa gttcgatgca gcagatacct ttacaccctg gtcatcactg acaaagagaa 240

ggcagagaaa ctgaagcagt ccctgccccc cggtttggca gtgaagga 288

<210> 98
<211> 448
<212> DNA
<213> human

<400> 98
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cacagttgtg ccgccagtat agcgacatgc ctcctttgac gttagagggc atccaggacc 120

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aagaaattgt agattacatt gcagataaga aagatgtata tgaataaagt atcagaccct 360

ttggctttgc tgagagagga ctcagatgat agtgacgaat gtctggcagt gaggacacat 420

tttggcattc ttgctgactc tgacagag 448

<210> 99
<211> 483
<212> DNA
<213> human

<400> 99
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gcttcataac attgatcagg agatgctgaa gtgcattgag ctggatgagc ggctgaaagc 240

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agatgattca ggaaacaaac catccagtta ttcttgaaac taacatccat cctgagctaa 360

acaagagaaa ctaccatctt ggccagtgac aagtgttcgg agggcagcag agaggaccaa 420

gcctgtgtca cctggagact aaaaaattaa gttttgtttt gacatcttca gtcctgtgtg 480

ctt 483

<210> 100
<211> 283
<212> DNA
<213> human

<400> 100
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gaaacccaca gctcagcttc aggcttctta tgtttctgaa aac 283

<210> 101
<211> 409
<212> DNA
<213> human

<400> 101
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acatatgtag caacacaagt cggaatagaa tggaacctgt cccctgttgg cagagttacc 300

ccaaaggaat ggaggaatca gtaatcatcc cagctggtgt aataatgaat tgtttaaaaa 360

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<210> 102
<211> 410
<212> DNA
<213> human

<400> 102
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atacacacac acacacacac acacacacac acacactctg acattttatt acaagctgca 180

tgtcctgacc ctctttgaat taagtggact gtggcatgac attctgcaat actttgctga 240

attgaacact attgtgtctt aaatacttgc actaaatagt gcactgcaag accagaaaat 300

tttacaatat ttttctttac aatatgttct gtagtatgtt taccctcttt atgaagtgaa 360

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<210> 103
<211> 540
<212> DNA
<213> human

<400> 103
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gaaacatagc tgaggaacaa atagaccatt tccatactaa accagtttgt taactttaga 180

ttttttccaa tagtgtgagt atatccattg ctggcagtgg agggcttgcc atgaaaatgc 240

aacttattta agacatttat gagacatatt aacttgtgct gtcgcctttt agaaggagaa 300

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<211> 393
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<213> human

<400> 104
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aggccgagag caacatgaac gacctggtgt ccgagtacca gcagtaccag gacgccacgg 180

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gtctaaaccc ccggagccat cttgctgccg acaccctgct ttccccatcg ccctagggct 360

cccttgccgc cctcctgcag tatttatggc ctc 393

<210> 105
<211> 390
<212> DNA
<213> human

<400> 105
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gcaaaccttg aaacgtgagg gagatggatt aatgtgagta acaggaatgt gtctttaaaa 120

agctagagtg gttacattta atcaggcagt aagataattt gggttcttga gttgttttgg 180

agtaatatcc cacaactggg gtaggaagct caggactttt ttctttaaag ctagtcattt 240

caaaagcata ttgtattttt ttgaatgact acagtatgga caatttcaaa aaccaaaacc 300

cactttggat tggtggaagt aaaaactggt aactcactca agtgaatgaa tggtcttgca 360

ttttaaaagc ttatgggaaa ctcaatttga 390

<210> 106
<211> 463
<212> DNA
<213> human

<400> 106
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gagtggtaac agatgggtag aggcagctca ggtgaattac ccagcttgcc tctcaattca 180

ttcctcctct tcctctcaaa ggctgaaggc agggcctttc cagtcctcac aacctgtcct 240

tcacctagtc cctcctgacc cagggatgga ggctttgagt cccacagtgt ggtgatacag 300

agcactagtt gtcactgcct ggctttattt aaaggaactg cagtaggctt cctctgtaga 360

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acatcttttg ttatcagagt accattccaa tctcttaact tgc 463

<210> 107
<211> 437
<212> DNA
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<400> 107
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ggtgtggtta aggcgtggcc cagaaggctt ccctggtgct ctcagtccag gcaaagccca 120

gagcatctga gcacgtctct gacttccagt ggcaacacag tttgaacgtg gtgaaacagg 180

gtgtagttct tttccacatt ctgtgtcatc tagtcgtgca ggtagggaaa aagttggtct 240

aattgaagat tgtgcatttc ctagtgacag gtgccaagag gttatgatac gggtttcttg 300

ggtctgatgt acagtgtgaa taaatgcttg cagctcttag ctctttttttg atcgatgaag 360

cacttttta ttaatatttt cctttgttaa aggaggaacc gtaactctcc atagctgtac 420

atataaccct tttctcc 437

<210> 108
<211> 448
<212> DNA
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<400> 108
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cccagactgg attggaaaag tgcatggtgg gggcctcggg gctgtcccca cgctgtccct 120

ttgccacaag tctgtggggc aagaggctgc aatattccgt cctgggtgtc tgggctgcta 180

acctggcctg ctcaggcttc ccaccctgtg cggggcacac ccccaggaag ggaccctgga 240

cacggctccc acgtccaggc ttaaggtgga tgcacttccc gcacctccag tcttctgtgt 300

agcagcttta acccacgttt gtctgtcacg tccagtcccg agacggctga gtgaccccaa 360

gaaaggcttc cccgacaccc agacagaggc tgcagggctg gggctgggtg agggtggcgg 420

gcctgcgggg acattctact gtgctaaa 448

<210> 109
<211> 535
<212> DNA
<213> human

<400> 109
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atttttgtga gtgctaaatt ggcatcatat gtcaagtttt atcagaataa taaagacttc 180

attgattcac ttggcctgtt acatgaacag aatatggcaa aaatgagact acttactttt 240

atgggaatgg caatagaaaa taaggaaatt tcttttgaca caatgcagca agaacttcag 300

attggagctg atgatgttga agcatttgtt attgacgccg taagaactaa aatggtctac 360

tgcaaaattg atcagaccca gagaaaagta gttgtcagtc atagcacaca tcggacattt 420

ggaaaacagc ggtggcaaca actgtatgac acacttaatg cctggaaaca aaatctgaac 480

aaagtgaaaa acagcctttt gagtctttcc gatacctgag tttttatgct tataa 535

<210> 110
<211> 480
<212> DNA
<213> human

<400> 110
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aacaacagtg agagagcaat gcgagcagtt ggagaaatgt gtaaaggccc gggagcggct 180

agagctctgt gatgagcgtg attcctctcg atcacataca gaagaggatt gcacggagga 240

gctctttgac ttcttgcatg cgagggacca ttgcgtggcc cacaaactct ttaacaactt 300

gaaataaatg tgtggactta agttgcaccc cagtcttcat catctgggca tcagaatatt 360

tccttatggt tttggatgta ccatttgttt cttatttgtg taactgtaag ttcacatcaa 420

cctcatgggt ttggcttgag gctggtagct tctatgtaat tcgcaatgat tccatctaaa 480

<210> 111
<211> 531
<212> DNA
<213> human

<400> 111
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tatctgttct tttgacttaa tctcatttgg tttgattttc cctctactaa ggctttccta 120

ccttcttcag gctgcctaag acatgtaagc gaaacacttc aataattgtc catgaggaga 180

aaaaaagcat tgtcatgcat gaaggaaact gaacttgagg tggcctcctt gcttgttaca 240

tacctgggta tgtgtaggca gtttagtgca tctttgcctc tcagttgaaa cctgtataac 300

cctgttacaa agctgtgttg ttgcttcttg tgaaggccat gatattttgt tttttcccca 360

attaattgct attgtgttat tttactaact tctctctgta ttttttcttg cattgacatt 420

atagacattg aggacctcat ccaaacaatt taaaaatgag tgtgaagggg gaacaagtca 480

aaatattttt aaaagatctt caaaaataat gcctctgtct agcatgccaa c 531

<210> 112
<211> 371
<212> DNA
<213> human

<400> 112
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cccagagctt attggccact gggtctcgct ccgagtgggg ccagggtggg agggagggtc 180

aggggggagga aaggggcgag cacccacgtg agagaatctg cctgtggcct tgcccgccag 240

cctcagtgcc acttgacatt ccttgtcacc agcaacatct cgagcccccc agatgtcccc 300

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ataagaaaag c 371

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<213> human

<400> 113
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ggcgtgtcag gcatactctg agtagataat ttgtcatgca gcgcatgcaa tcagaatctc 120

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tccaggcact cacttgtatt ctactgctca ataaac 216

<210> 114
<211> 366
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (28)..(28)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (121)..(123)
<223> n is a, c, g, or t

<400> 114
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ctctttagac tttctgccgg gagagcggcc cagacgcgcc aggtctgtag caggaggccg 120

nnncgagggc gggtccccag aagcctacag gtgagtatcg gttctccccc tcccggcttt 180

cggtccggag gaggcgggag cagcttccct gttctgatcc tatcgcgggc ggcgcagggc 240

cggcttggcc ttccgtggga cggggagggg ggcgggatgt gtcacccaaa taccagtggg 300

gacggtcggt ggtggaacca gccgggcagg tcgggtagag tataagagcc ggagggagcg 360

gccggg 366

<210> 115
<211> 324
<212> DNA
<213> human

<400> 115
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aatgagttta gatgggaaat agcgttgtta tcgccttggg tttaaattat ttgatgagtt 120

ccacttgtat catggcctac ccgaggagaa gaggagtttg ttaactgggc ctatgtagta 180

gcctcattta ccatcgtttg tattactgac cacatatgct tgtcactggg aaagaagcct 240

gtttcagctg cctgaacgca gtttggatgt ctttgaggac agacattgcc cggaaactca 300

gtctatttat tcttcagctt gccc 324

<210> 116
<211> 322
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<400> 116
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tcccccagaa gtgggtgttt catgttgcta ctctggtgtg tcccaagata tcctaactgg 120

ccagtgtaaa tgctattctt tctaaataag attatttgga aacttccttc aaactgcagg 180

agggcgagct ctgagggcac gagaagctaa aactagctgc ttttgatgaa aaagagtgcc 240

agtctttggt catctctaaa caaggcttat caccaatgga gacagaaaac tctagttcaa 300

gagctgtacc tcctttgaat cc 322

<210> 117
<211> 257
<212> DNA
<213> human

<400> 117
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gggcagagat gtggttcgag attctccccg gactctccgt catgggcgtg tgcttgttga 120

ttccaggact ggctactgcg tacatccaca ggttcactaa cgggggcaag gaaaaaaggg 180

ttgctcattt tgggtatcac tggagtctga tggaaagaga taggcgcatc tctggagttg 240

atcgttacta tgtgtca 257

<210> 118
<211> 473
<212> DNA
<213> human

<400> 118
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acgagatcga gatccgcgcc gagggcaaca gccgcttcac ctacagcgtc actgtcgatg 120

gctgcacgag tcacaccgga gcctggggca agacagtgat tgaatacaaa accaccaaga 180

cctcccgcct gcccatcatc gatgtggccc ccttggacgt tggtgcccca gaccaggaat 240

tcggcttcga cgttggccct gtctgcttcc tgtaaactcc ctccatccca acctggctcc 300

ctcccaccca accaactttc cccccaaccc ggaaacagac aagcaaccca aactgaaccc 360

cctcaaaagc caaaaaatgg gagacaattt cacatggact ttggaaaata ttttttcct 420

ttgcattcat ctctcaaact tagtttttat ctttgaccaa ccgaacatga cca 473

<210> 119
<211> 472
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (149)..(149)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (153)..(153)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (428)..(428)
<223> n is a, c, g, or t

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cactggtgct atagaaattg agatgccccc ccaggccagc aaatgttcct ttttgttcaa 120

agtctatttt tattccttga tatttttttnt ttnttttttt ttttttttgt ggatggggac 180

ttgtgaattt ttctaaaggt gctatttaac atgggaggag agcgtgtgcg gctccagccc 240

agcccgctgc tcactttcca ccctctctcc acctgcctct ggcttctcag gcctctgctc 300

tccgacctct ctcctctgaa accctcctcc acagctgcag cccatcctcc cggctccctc 360

ctagtctgtc ctgcgtcctc tgtccccggg tttcagagac aacttcccaa agcacaaagc 420

agtttttncc cctaggggtg ggaggaagca aaagactctg tacctatttt gt 472

<210> 120
<211> 424
<212> DNA
<213> human

<400> 120
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ctggatgccc tgcacttggt ggcggtggga tgctcatgga tactgggagg gtgaggggag 180

tggaacccgt gaggaggacc tgggggcctc tccttgaact gacatgaagg gtcatctggc 240

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gtctgctgag cctggcgagg gtctgggagg gaccaggagg aaggcgtgct ccctgctcgc 360

tgtcctggcc ctgggggagt gagggagaca gacacctggg agagctgtgg ggaaggcact 420

cgca 424

<210> 121

<211> 419
<212> DNA
<213> human

<400> 121
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tcataactgt tacatccaga acatttgtca ggctctctgt cagcttttca tgtacatatg 180

gtatagaaac catggagtta ggcacttccc tggaattttt ttttttatga gaaaaatact 240

gtatttaaaa tgtaaaataa acttttaaaa agcaggcact aatatatatt tcttccagcc 300

tttgattaca aatttgtcct tgcacatgtt aagatgaatt atctcctaaa aatatcattg 360

ttcttgggag cagtgtatgt tactttacat agcagcggtt cctgtcatgt gttcatgtt 419

<210> 122
<211> 374
<212> DNA
<213> human

<400> 122
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ttgatcctat acagaaactc tttgtggaca agattagaga atacaaatct aagcgacaga 120

catctggagg acctgttgat gctagttcag agtatcacca agagctggag agggagcttt 180

ttaagctcaa gcaaatgttt ggtaatgcag acatgaatac atttcccacc ttcaaatttg 240

aagatcccaa atttgaagtc atcgaaaaac cccaggcctg aagaataaag taaaattaat 300

ctggtaattt gtcacggatt agttgtacaa ctacttagaa gtttcagaat aaacatgcat 360

ttcataactg tcaa 374

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<211> 490
<212> DNA
<213> human

<400> 123
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cacacgtgct ctctgctgga ttctaaatta tgtgaatttt gccatattaa atcttcctca 420

tttatactat tatttgttac gttcaatcag aatccccgaa acctcctata aagcttagct 480

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<210> 124

<211> 515
<212> DNA
<213> human

<400> 124
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ccgtagtttt gcccctggcc aggattgcta cagttgtgat tggaggagtt gtggccatgg 180

cggctgtgcc catggtgctc agtgccatgg gcttcactgc ggcgggaatc gcctcgtcct 240

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tcatcctggg ctccattggg tctgccattg cggctgtcat tgcgaggttc tactagctcc 420

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acccagcgag gagccaacta tcccaaatat acctg 515

<210> 125
<211> 475
<212> DNA
<213> human

<400> 125
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aatgctaact gagggtcttg atgcttgagc ctttgactga taaaactcaa atagcagtcc 120

ccagtgattt gcctcttagg ttctttctta aattgttggt ggatgactgt acattttagt 180

gatttgaaaa ataactgaca aaccattgaa acagtttatt ttatgttgga agagatggcg 240

cagatgtgtg tcagaaggga gatcacggtg tgagtttcgt agctatttaa gtgatacata 300

cctctagttt ttgtatgtct tttgagatcc tgagttcatc ccctgtgaat cagagtgcac 360

aagcacctct cctgtgagtg gctaatgaga agagggacag accgaccacc agcacagtag 420

ggcagatctg gacagcagaa tgttataacg caagttcatg tgttgctccc aactc 475

<210> 126
<211> 419
<212> DNA
<213> human

<400> 126
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aagcaatggt tctgttcaat cattcagatg ttagtggaag cataaaagtc aagactgcat 180

gttgaaacct ttcttttgat agttactgaa ctgcttggtt aaactaaatg gaaccatgtg 240

ctaatttttc acaattattg acctgtattg attgccactg tagtttggta tttcccttta 300

ctttggtggc ctgcttccct catgccctgg aatacaactc agagctccag gcagcggaac 360

catctattgt tttgtttgcc agaaagtgca ccctgtatgg tctcctgtct aagttggaa 419

<210> 127
<211> 549
<212> DNA
<213> human

<400> 127
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ccaaaaatag aggaggagag tcttaacttt tgctcttgga tttaagtcaa ggtactgtat 120

agaagttgtg taaaatcagt atgaaagttc aatgttgctg ttcttgctca gtgattttaa 180

agaaattgag tagttcctat gtgatttttt ttttctttt ctaaactgca ttcctgtgcc 240

cacctacggc atgcctctat gtattggcta ctacagtgtt ttaaaaagtg tttcagatat 300

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actcaacaa 549

<210> 128
<211> 519
<212> DNA
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<400> 128
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gaaactacct ggattgtagg gaggggtgac acagtgttcc ctcctggcag caattaaggg 240

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agcagtttga aggcatactt ttgcatagaa ataaaaaaaa tactgatttg gggcaatgag 480

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<210> 129
<211> 544
<212> DNA
<213> human

<400> 129
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caagcttttt caaaacagct gaaagacgat gacaagctta tgcttctcct ggaaataaac 180

aagctaattc ctctatgcca ccagctccag acagtaacta agacttcttt gcagaataaa 240

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tctctggaac atcatgtgat gaagctgaca tttttaaaaa tcaaatgatc ctttatcttt 480

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<210> 130
<211> 529
<212> DNA
<213> human

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<210> 131
<211> 438
<212> DNA
<213> human

<400> 131
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agacaggatg aagacatgct tgaggagcca cggagtttgg gggccacagc acctgggcac 180

acacccgagc acctgtccat tggcatgctt ctgctgggtg agcaggacag ctcctgtccc 240

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gtaactgacc cccacaggga ggcaggaaaa cagccagaag ccaccttgac acttttgaac 360

atttccagtt ctgtagagtt tattgtcaat tgcttctcaa gtctaaccag cctcagcagt 420

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<210> 132
<211> 524
<212> DNA
<213> human

<400> 132

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cacaaatgat gaaaaagaat agaactttct cattcatctt tgaataacgt ctccttgttt 180

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ttgagaattt gtaagactaa ttatggtaac ttagcttagt attcaatata atgcattgtt 360

tggtttcttt taccaaatta agtgtctagt tcttgctaaa atcaagtcat tgcattgtgt 420

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<210> 133
<211> 518
<212> DNA
<213> human

<400> 133
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tattttgtat ttctggaaga atgtagtaat cttctagacc gcttaaaacc aatgctccca 180

agctgaatat tcttgagcaa atttgttttt tattatgcca tttgacattt caaatcagtg 240

ctcatataca gtaaacttgt gatagaaatt gtattttatt gctttttgga ttataattca 300

tataaatata attacttgaa tattgtttga gatcattaac atgccagggc agttcccact 360

gatttagatg gtccaagata atctcattca ggaggcttga aacattaatg gtttagtctt 420

gtgaatttta acagttctct gtcatcgttt aacaaaacca acaactgaca caactcctta 480

agctgtggtt tcagtctctg ctagttcata ttgcatgt 518

<210> 134
<211> 325
<212> DNA
<213> human

<400> 134
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ggagttgctt ctgttgaatt agctctgcca ccaatatgta tcttcataca cgtttggaaa 120

tgtttcctgc agcattaggt atgacttgtt ctgagtactg cttccggtgc taaaatgaac 180

aaagaatttg tacttaatgg catggactct ggagaatcta tgcgaatcaa cctttctacc 240

ttaatatctc cccaaaaatg tatagtgcct tgtttttatg tacagtttat atacagaaaa 300

gtttgctctg catttttgat gatgg 325

<210> 135
<211> 315
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (202)..(202)
<223> n is a, c, g, or t

<400> 135
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ttgttttaac atggtctttt tcaactttgt ttcctgttta actacagatg acttctgttg 120

tagactcaca agtttaactg ttgtattata acagtattac atgtcaacgg tgtggttatg 180

acctttattt atataaaaac cnaatattta gtcaatttac cgtgtcttaa tttaatcttt 240

gtacaccttc catttttaag tgcttaaatg agtactatat tgcaataaaa tgtagtgata 300

taattaacca gccat 315

<210> 136
<211> 401
<212> DNA
<213> human

<400> 136
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aaacaactac cagtttggtt cttgaaagat ccctgaatcg tgtgcactta cttgggcgag 120

tgggtcagga ccctgtcttg agacaggtgg aaggaaaaaa tccagtcaca atattttctc 180

tagcaactaa tgagatgtgg cgatcagggg atagtgaagt ttaccaactg ggtgatgtca 240

gtcaaaagac aacatggcac agaatatcag tattccggcc aggcctcaga gacgtggcat 300

atcaatatgt gaaaaagggg tctcgaattt atttggaagg gaaaatagac tatggtgaat 360

acatggataa aaataatgtg aggcgacaag caacaacaat c 401

<210> 137
<211> 532
<212> DNA
<213> human

<400> 137
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gccaatgatg ctaatgacga cacagccacc cggcggtccc caggccgccc tcgctcaaag 120

tgcactacag cccattccag tctcgacaac agcgcatttc ccctatatga cgcacccttc 180

agtacaagcc caccaccaac agcagttgta aggctgccct ggaggaaccg aaaggccaaa 240

ttccctcctc ccttctactg cttctaccaa ctggaagcac agaaaactag aatttcattt 300

attttgtttt taaaatatat atgttgattt cttgtaacat ccaataggaa tgctaacagt 360

tcacttgcag tggaagatac ttggaccgag tagaggcatt taggaacttg ggggctattc 420

cataattcca tatgctgttt cagagtcccg caggtacccc agctctgctt gccgaaactg 480

gaagttattt atttttaat aacccttgaa agtcatgaac acatcagcta gc 532

<210> 138
<211> 520
<212> DNA
<213> human

<400> 138
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ggaaataaca cctcacagca gcttcgtgct tttgtacaga cctttgtaac aagtgtacag 180

aaaactcatt ttgtttgaga aacaggagtt gatgaaccca tcatgctggt ttttctctga 240

gcacaaagtt ttaggctgta cacagccagc cttgggaatc tcgttgagcg ttcggcgtgg 300

atccacgggg ccaggccacc ctgcgggagg ccacacgcat ccacttcgga ttcagtgggt 360

gaagacagaa ctctgagagt ctgcaggcgg ctcctgtgct ttttatttct ggctcttcgg 420

atgtcttcta gacatttact atcactgcac ctgaagaaaa aatcactttt accttcctaa 480

tttaaaaaga caaaacagaa atgtacgttc cttcgctagc 520

<210> 139
<211> 428
<212> DNA
<213> human

<400> 139
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gctggccaag cacaaagagc ttgctcccta cgatgagaac tggttctaca cgcgagctgc 180

ttccacagcg cggcacctgt acctccgggg tggcgctggg gttggctcca tgaccaagat 240

ctatggggga cgtcagagaa acggcgtcat gcccagccac ttcagccgag gctccaagag 300

tgtggcccgc cgggtcctcc aagccctgga ggggctgaaa atggtggaaa aggaccaaga 360

tggcggccgc aaactgacac ctcagggaca aagagatctg gacagaatcg ccggacaggt 420

ggcagctg 428

<210> 140
<211> 511
<212> DNA
<213> human

<400> 140
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atttaacagg aagtttcaga ttataccgaa aagaagttct agagaaatta atagaaaaat 120

gtgtttctaa aggctacgtc ttccagatgg agatgattgt tcgggcaaga cagttgaatt 180

atactattgg cgaggttcca atatcatttg tggatcgtgt ttatggtgaa tccaagttgg 240

gaggaaatga aatagtatct ttcttgaaag gattattgac tctttttgct actacataaa 300

agaaagatac tcatttatag ttacgttcat ttcaggttaa acatgaaaga agcctggtta 360

ctgatttgta taaaatgtac tcttaaagta taaaatataa ggtaaggtaa atttcatgca 420

tctttttatg aagaccacct attttatatt tcaaattaaa taattttaaa gttgctggcc 480

taatgagcaa tgttctcaat tttcgttttc a 511

<210> 141
<211> 198
<212> DNA
<213> human

<400> 141
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accggaccag cctggcccac cccacccact tctgcacttg cggttccggc atggacaatg 120

gaccggagag tgggggtggg gggtcccaaa gagtttgatg aggccctcca cacctgcggc 180

ccaatccaag gtggggtg 198

<210> 142
<211> 563
<212> DNA
<213> human

<400> 142
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gtggtaacat gaagagagtg tttgaaagat tctgccgagg cctcaaagag gtggagagac 120

ttatccaaga acgtggctgg gagttcatgt ggaatgagcg tttgggatac atcttgacct 180

gtccatctaa cctgggcact ggacttcggg caggagtgca catcaaactg cccctgctaa 240

gcaaagatag ccgcttccca aagatcctgg agaacctaag actccaaaaa cgtggtactg 300

gaggagtgga cactgctgct acaggcggtg tctttgatat ttctaatttg gaccgactag 360

gcaaatcaga ggtggagctg gtgcaactgg tcatcgatgg agtaaactat ttgattgatt 420

gtgaacggcg tctggagaga ggccaggata tccgcatccc cacacctgtc atccacacca 480

agcattaact ccccatcgcc agctgatgac tcaagattcc caggagtttt gctcattcta 540

atgatggccc attctacttg ctc 563

<210> 143
<211> 578
<212> DNA
<213> human

<400> 143
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aaatgatgaa tcccagctcc catacccacc ctggacatgc tcagcagaca tctgcagtta 120

acgggcgtcc cctgccccac acggtaagca ccatgcccca cacctcgggt atgaaccgcc 180

tgacccaagt gaagacacct gtacaagtgc ctctgcccca ccccatgcag atgagtgccc 240

tgggggggcta ctcctccgtg agcagctgca atggctatgg cagaatgggc cttctccacc 300

aggagaagct cccaagtgac ttggatggca tgttcattga gcgcttagac tgtgacatgg 360

aatccatcat tcggaatgac ctcatggatg gagatacatt ggattttaac tttgacaatg 420

tgttgcccaa ccaaagcttc ccacacagtg tcaagacaac gacacatagc tgggtgtcag 480

gctgagggtt agtgagcagg ttacacttaa aagtacttca gattgtctga cagcaggaac 540

tgagagaagc agtccaaaga tgtctttcac caactccc 578

<210> 144
<211> 476
<212> DNA
<213> human

<400> 144
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tctccaacga tatacaaatt ggacttgttc aactgctgga tatatgctac caataacccc 120

agccccaact taaaattctt acattcaagc tcctaagagt tcttaattta taactaattt 180

taaaagagaa gtttcttttc tggttttagt ttgggaataa tcattcatta aaaaaaatgt 240

attgtggttt atgcgaacag accaacctgg cattacagtt ggcctctcct tgaggtgggc 300

acagcctggc agtgtggcca ggggtggcca tgtaagtccc atcaggacgt agtcatgcct 360

cctgcatttc gctacccgag tttagtaaca gtgcagattc cacgttcttg ttccgatact 420

ctgagaagtg cctgatgttg atgtacttac agacacaaga acaatctttg ctataa 476

<210> 145
<211> 262
<212> DNA
<213> human

<400> 145
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acactggccg aggaggagct ctctgcctgc cagaagagtc tagtcctgct cccacagttt 120

ggagggacaa agctaattga tctgtcacac tcaggctcat gggcaggcac aagaagggga 180

ataaaggggc tgtgtgaagg cactgctggg agccattaga acacagatac aagagaagcc 240

aggaggtcta tgatggtgac ga 262

<210> 146
<211> 571
<212> DNA
<213> human

<400> 146
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aaccaagtca aaaccatgta ctatctcctt gggggttagg gatgctaaga agagcccaca 120

aatagaggat tactcttccc ctgaatctct aaactcagaa acaattacca aaaaatacat 180

aactcttcct tgtagggccc tttccttatt catttaggta gtgtgaacat taagtataaa 240

ataaattatg ttcttaatgc ctcttaaacc acttacattc aaaggggaac agaaatcatt 300

ctaagcagga aaatacttcc actttttttt tttcaagtat ctctctaata actaaatgcc 360

acttatttgc attctccttg tggatttttt gtcacctaag gaaatgcatt tgatgagtgc 420

tggaaacttc ttaagtgctt tacagtttgt tttcattgtt tgcagcggat cactggacat 480

caaagattca ttgcacttat gaacaaggaa ccttcttttc aatttctgtg taatttgcaa 540

ggctgtacaa tgtgtgctga tgcaagcctt t 571

<210> 147
<211> 311
<212> DNA
<213> human

<220>
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<222> (185)..(185)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (251)..(251)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (273)..(273)
<223> n is a, c, g, or t

<400> 147
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gacatgactt ggctttctca tccagaaatt atggaaacag ggtctgtcag tggcaggagg 120

ccgtgctgtg ttttacttgg atgacacaat gcagtttact tgcctcttca tacccatgca 180

tgctngctca ccctagacaa tgacatataa gccgtatata gatcaatgtc cacatatata 240

tacacacaca natatatata tataaagtgt aancaaggaa cactaaaaca gtgttgattc 300

ttgtctctga a 311

<210> 148
<211> 489
<212> DNA
<213> human

<400> 148
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atagaaataa gtgcaggctt ggaatcagct acaaatccta aagatggggt gtgtgtggat 120

gtgtgtgtgt gtgtgtgtac accattgtgt gtttgtaaaa tgtgtatgtt catgagtaag 180

ggtgtgtgtg tgtgtgtatt aaaattccag agtgaccgtg gcacttgggt gtacaggtaa 240

ttcctccaga gctgtttgct ggcttcagga gtggagtgag aatttctttt ttatgaaaag 300

ggatataaag gcaccgagct gatgcagtat ttgtaatatt aagttgacct aacaaggtat 360

ttgcatgagt cacaattaca aagttttgag cggttttgta atttgacatt taggaaagtc 420

tcctatttat tctcatactt tacattcatg cttagtatac tatagaggat gccagcttta 480

atctttctg 489

<210> 149
<211> 544
<212> DNA
<213> human

<400> 149
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tggttcagaa actcataggc acccttagct gatggaaaca atcaatcata tttaatacgc 120

ttagaatcag ttttactcca atcagctggc aattttgagc tgccggttat acaccaaaat 180

gttctgttca gtacctagct ctgctctttt atattgcttt aaatttttaa agaaattata 240

ttgcatggat gtggttattt gtgcatattt tttaacaatg cccaatctgt atgaataatg 300

taaacttcga ttttttttta aaaaaattag attttagctg gagcttttga ctaatgtaaa 360

gtaaatgcca aactaccgac ttgataggga tgtttttgta agttaatttt ctaagacttt 420

ttcacatcca aagtgatgct ttgctttggg ttttaactgt ttggccacgg cgggggtggg 480

ggcggggggt tggtacagaa acttgaagct gtttgtgata tgtacaactc agatgtttct 540

catt 544

<210> 150
<211> 492
<212> DNA
<213> human

<400> 150
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ggcaggtggg ctgcctgctg tgttaagagg acttagtttg tgatgtaagg cactgtcagg 120

aatgggggggc gggccagggt gggaagagaa gaaatagcag agcctatttt ggtgaggttt 180

tttgttttta agtcaaagaa gactcagtat gctttccctg aggaatgaaa aagggattga 240

ggagttgcct gactcctggg tgggtggggt acaggcagtt aggtgctgaa tgaagctgcc 300

atccttgctg cagcttctaa ctggtaaaaa gatccaggga tggagatggg aaggttagaa 360

aggcagccct cacctctgag gacagaggcc ggggtccagg cccgtgggcg caaaggtgcc 420

tcatagcata gccagcattc agcacacaca aacctactgc ccacatttgg gctcagggtt 480

ggccatttgc ta 492

<210> 151
<211> 450
<212> DNA
<213> human

<400> 151
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cctggcaata gaccgagctc cgtctccaaa aaaaaaaata caatttttat ttcttttact 120

ttttttagta agttaatgta tataaaaatg gcttcggaca aaatatctct gagttctgtg 180

tattttcagt caaaacttta aacctgtaga atcaatttaa gtgttgaaaa aaatttgtct 240

gaaacatttc ataatttgtt tccagcatga ggtatctaag gatttagacc agaggtctag 300

attaatactc tatttttaca tttaaacctt ttattataag tcttacataa accatttttg 360

ttactctctt ccacatgtta ctggataaat tgtttagtgg aaaataggct ttttaatcat 420

gaatatgatg acaatcagtt atacagttat 450

<210> 152
<211> 262
<212> DNA
<213> human

<400> 152
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ttgtaaaaag agaacatgca ttaacatcag gcacgataaa agccatgttg agtggcccag 120

gtcagtttgc tgagaacgaa accaatgagg tcaattttag agagatacct tcacatgtgc 180

tatcgaaagt atgcatgtat tttacgtaca aggttcgcta cactaacagc tccaccgaga 240

ttcctgaatt cccaattgca cc 262

<210> 153
<211> 371
<212> DNA
<213> human

<400> 153
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ccttttcttc taatgagtcg actttgagct ggaaagcagc cgtttctcct tggtctaagt 120

gtgctgcatg gagtgagcag tagaagcctg cagcggcaca aatgcacctc ccagtttgct 180

gggtttattt tagagaatgg gggtggggag gcaagaacca gtgtttagcg cgggactact 240

gttccaaaaa gaattccaac cgaccagctt gtttgtgaaa caaaaaagtg ttccctttc 300

aagttgagaa caaaaattgg gttttaaaat taaagtatac atttttgcat tgccttcggt 360

ttgtatttag t 371

<210> 154
<211> 534
<212> DNA
<213> human

<400> 154
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gcccggcagg acctgcaggg gacgagccag ccgagagccc atcggagacc ccaggcccca 120

gcccggcagg acctacaagg gatgagccag ccaaggcggg ggaggcagca gagttgcagg 180

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cctcaggctc tgcttcgtga cccgtgaccc atgacccaca gtgctggcct cctgtggggc 360

cactatagca gccaccagaa gccgcgaggc cctcagggaa gcccaaggcc tgcagaagcc 420

tcctggcctg gctgtgtctt ccccacccag ctctcccctg cgcccctgtc tttgtaaatt 480

gacccttctg gagtgggggg cggcgggcag ggctgctttt cttagtctga tgcc 534

<210> 155
<211> 305
<212> DNA
<213> human

<400> 155
ctgtggaaac tgcagcgaca gcgaggaaga gctccccacc cgcctctagc ccccagcccg 60

aggcccccac cagcagttgg cggtagcagc tactccgagc gccgtttaca gttttgcaca 120

gtgatcttcc ccattgtcca ctcaagtcgt ggcctgggga acacagacgg agctgtcccc 180

agtgtcctcc gtccctcagc ccctggcctg gctgagtttg gcagggcctg ggccatccct 240

gggacaaagg tgcgtccctt cagctcttct ccgtggagct cggggctttc tgtatttatg 300

tattt 305

<210> 156
<211> 519
<212> DNA
<213> human

<400> 156
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tagtagagct ttttgcatgt atcttctaag aattttatct gttttgtact ttagaaatgt 120

cagttgctgc attcctaaac tgtttatttg cactatgagc ctatagacta tcagttccct 180

ttgggcggat tgttgtttaa cttgtaaatg aaaaaattct cttaaaccac agcactattg 240

agtgaaacat tgaactcata tctgtaagaa ataaagagaa gatatattag ttttttaatt 300

ggtattttaa tttttatata tgcaggaaag aatagaagtg attgaatatt gttaattata 360

ccaccgtgtg ttagaaaagt aagaagcagt caattttcac atcaaagaca gcatctaaga 420

agttttgttc tgtcctggaa ttattttagt agtgtttcag taatgttgac tgtattttcc 480

aacttgttca aattattacc agtgaatctt tgtcagcag 519

<210> 157
<211> 408
<212> DNA
<213> human

<400> 157
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aatggtccct cttccctgac gttgctgaag gagcccaagg ctctccatgc ctttctacct 120

aagtgtttgt attttatttt aaattattta ttctggagcc acagcccccc tgcttatgag 180

gttcttatgg agagtgagaa agggaaggga aatagggcac catggtccgg tggtttgtag 240

ttccttcaaa gtcaggcact gggagctaga ggagtctcaa gctcccctta ggaagaactg 300

gtgccccctc cagtcctaat ttttcttgcc tgccccgcct tggggaatgc ctcacccacc 360

caggtcctga cctgtgcaat aaggattgtt ccctgcgaag ttttgttg 408

<210> 158
<211> 479
<212> DNA
<213> human

<400> 158
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tccgggaaat ggaaagccag ttggcagccc acatgtggtt acctcacacc agtcaaaagt 120

gacagtggag agcactcccg atttggaaaa acaaccaaat gaaaatggtg tatctgttca 180

gaatgaaaat tttgaagaaa ttataaactt acccattgga tctaaaccat ccagattaga 240

tgtcaccaac agtgagagcc cagaaattcc tttgaatcca attttggcct ttgatgatga 300

agggacactt gggcccctgc ctcaggtaga tggtgttcag acacagcaga ctgcagaagt 360

tatatgagtg tttcttctga agaaccaaag ctgaaattta atgagaattt ctacaattaa 420

tggaattcct ttcctgctat aaaggagcat cccctccacc cgttttctag agttcttga 479

<210> 159
<211> 516
<212> DNA
<213> human

<400> 159
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tctgcgtggc atctgtcagc ttttcacctt tcattcttat tcttcacttt tgctgctgag 120

cctagctgta caaacttgca ctttcatttg ctaatataaa ttcagtttta ttttaccatt 180

ttagagacta ctaatgatta aatgtagaag gagagggtgc acatgttttt atgtggagtg 240

tttaaaagat aaatttatac cactgtaatg tgcagctttt attaaaagag aaattggttg 300

aactgctagg ttgaatgaga gacttcatct attggactat ttttttaat ccaggcatat 360

ggtctttagt aatggcttgt aatttgtgaa aacattaatt tgggggtttt ccctgttttc 420

agttgtccat gtacacatag tcattatatt agaaaagaaa gctgttcaac aaacttgttt 480

aatttgttta aatcaacata gcatgaaaca ccaaat 516

<210> 160
<211> 512
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (476)..(476)
<223> n is a, c, g, or t

<400> 160
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acttcacttc cctgaatgcc tcccccatct ccatcaggaa aaatacaccc catcgcccag 120

caccctgct gataccacca gacagagaga gagagcactt gattcttccc gagatagcca 180

cctggaaaca ctaggtgcct gcccagggag gaacggagga ggactcgcgc tacaagaggc 240

cactcccagg gacccaggga ggcgatggcc accccagagg ccacctttg ctccaccgga 300

ggtgggagaa aatctgggca cgatcgggcc ccctgggcag tgcaggacaa catcagctca 360

ctggcaggaa agtccttgtt gagggtgagg gggtgctggg gtacccgggg gctggggaag 420

caaggaaata agtcatctgt atgctgactg gggataatgg catcaaatgt cagtcnttga 480

catttggggg gaacagcagg tgccagagct aa 512

<210> 161
<211> 532
<212> DNA
<213> human

<400> 161
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cctcacagag agggacgaca tcctgtgccc cgactgtggg aaagacatct gaattcaaca 120

cagagaagtt gctgcttgtg atctcacaca cagattttta tgttttcttt ctcacccagg 180

caatcttgcc ttctggtttc ttccagccac attgagactt tcttctagtg cttttcagtg 240

atactcacgt ttgcttaaac cctttagtgc tttgtgatag ttcagtccca gggaaagaga 300

aaactcgccc taggccctag gtgggaagat ggtttgaaat ttttgtaatc gagtaaggca 360

cacccaaatg taaaaatcct tttgaatgat gcctttataa atctttctct cactgtctat 420

ttaagtgcaa ttaacatatg tcacgaactt gaaagttttc taaactcaat aaggtaatga 480

ccagttgtta tttacagctc tgtaacctcc cgttgcgtca agtctaaacc aa 532

<210> 162
<211> 542
<212> DNA
<213> human

<400> 162
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ctggtggcgg ggacgttgcc atggccactt tggactcttc cctgcaaatt atgtcaagct 120

tctggagtga ctagagctca ctgtctactg caactgtgat ttcccatgtc caaagtggct 180

ctgctccacc ccctccctat tcctgatgca aatgtctaac cagatgagtt tctggacaga 240

cttccctctc ctgcttcatt aagggcttgg ggcagagaca gcatggggaa ggaggtcccc 300

ttccccaaga gtcctctcta tcctggatga gctcatgaac atttctcttg tgttcctgac 360

tccttcccaa tgaacacctc tctgccaccc caagctctgc tctcctcctc tgtgagctct 420

gggcttccca gtttgtttac ccgggaaagt acgtctagat tgtgtggttt gcctcattgt 480

gctatttgcc cactttcctt ccctgaagaa atatctgtga accttctttc tgttcagtcc 540

ta 542

<210> 163
<211> 547
<212> DNA
<213> human

<400> 163
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atttcttgag tacctgttag ttagtattat ttatgtgtat cgggagtgtg tttagtctgt 180

tttatttgca gtaaaccgat ctccaaagat ttccttttgg aaacgctttt tcccctcctt 240

aatttttata ttccttactg ttttactaaa tattaagtgt tctttgacaa ttttggtgct 300

catgtgtttt ggggacaaaa gtgaaatgaa tctgtcatta taccagaaag ttaaattctc 360

agatcaaatg tgccttaata aatttgtttt catttagatt tcaaacagtg atagacttgc 420

cattttaata cacgtcattg gagggctgcg tatttgtaaa tagcctgatg ctcatttgga 480

aaaataaacc agtgaacaat atttttctat tgtacttttc agaaccattt tgtctcatta 540

ttcctgt 547

<210> 164
<211> 431
<212> DNA
<213> human

<400> 164
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tcacaaaagg catctgaact tttaatgaac tgtgaaggac aacagcatct tcccaaaacc 120

attgatgttt aagtgtttag aaatcataga aggtgtaggc tgctgtggta attctatttg 180

tatatctcaa cagaattaaa atgtctagct tggtggtatt tttatagcca taaaagaaaa 240

tctttaggct ttcaaaataa ggatgacttt agaataatat tgtgtcatag aattaatttt 300

cagccatgtg gaccatattt tgtatccaag gatccttatt taaagctttc aacatgtaca 360

ggaagttgga aatttttggt ttatgacttt gtctaataaa gagatagttc taaacacatt 420

cttgatcacc a 431

<210> 165
<211> 188
<212> DNA
<213> human

<400> 165
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acacagaaga ttcacctggg ctcaaagttg gccctgttcc agtattggtt atgagtcttc 120

tgttcatcgc ttctgtattt atgttgcaca tttggggcaa gtacactcgt tcgtagattc 180

agttacat 188

<210> 166
<211> 563

<212> DNA
<213> human

<400> 166
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aattcttcga ctactggtaa ctgacatgag tgatgccgaa caatacagaa gctacagact 120

ggatattaaa agaagactaa ttagcccata taagaaaaag cagagagatc ttgctaagat 180

gagaaaatgt ctcagaccag aagaactgac aaaccagatg aaccaaatag aaataagcat 240

gcaacatgaa cagctggaag agagttttca ggaactagtg gaagattacc ggcgtgttat 300

tgaacgactt gctcaagagt aaagattata ctgctctgta caggaagctt gcaaattttc 360

tgtacaatgt gctgtgaaaa atctgatgac tttaatttta aaatcttgtg acattttgct 420

tatactaaaa gttatctatc tttagttgaa tattttcttt tggagagatt gtatatttta 480

aaatactgtt tagagtttat gagcatatat tgcatttaaa gaaagataaa gcttctgaaa 540

tactactgca attgcttccc ttc 563

<210> 167
<211> 395
<212> DNA
<213> human

<400> 167
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cttttgttcc aatgtcaatg tgaacgtcca catgaaacct acacactgtc atgcttcatc 120

attccctctc atctcaggta gaaggttgac acagttgtag ggttacagag acctatgtaa 180

gaattcagaa gacccctgac tcatcatttg tggcagtccc ttataattgg tgcatagcag 240

atggtttcca catttagatc ctggtttcat aacttcctgt acttgaagtc taaaagcaga 300

aaataaagga agcaagtttt cttccatgat tttaaattgt gatcgagttt taaattgata 360

ggagggaaca tgtcctaatt cttctgtcct gagaa 395

<210> 168
<211> 484
<212> DNA
<213> human

<400> 168
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tgagaaagag cacttaagag aatattttaa gtattgcatc tgtataagta agaaaatatt 120

ttgtctaaaa tgcctcagtg tatttgtatt tttttgcaag tgaaggttta caatttacaa 180

agtgtgtatt aaaaaaaacc caaagaaccc aaaaatctgc agaaggaaaa atgtgtaatt 240

ttgttctagt tttcagtttg tatatacccg tacaacgtgt cctcacggtg ccttttttca 300

cggaagtttt caatgatggg cgagcgtgca ccatcccttt ttgaagtgta ggcagacaca 360

gggacttgaa gttgttacta actaaactct ctttgggaat gtttgtctca tcccattctg 420

cgtcatgctt gtgtgataac tactccggag acagggtttg gctgtgtcta aactgcatta 480

ccgc 484

<210> 169
<211> 534
<212> DNA
<213> human

<400> 169
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gctaacagga atgaatgaaa cttctgctgt aatcattgct gcaccacaga atttcactcc 120

ctctgtgatc tttcagaagg ttgtaaatgt agccaatgta ggtgcagtcc cttctggcca 180

ggataatata cacaggtttg cagctaaaac tgtgcacagt gggtcattga tgctagtcac 240

agtggaactg aaggaaggct ctacagccca gcttatcata aacactgaga aaactgtgat 300

tggctctgtt ctgctgcggg aactgaagcc tgtcctgtct caggggtaac ctgcttacat 360

ctggacttta gaatctggca cacaacaaaa gtgcctggca tccactactg ctgcctttca 420

tttataataa tagcccttcc atctggcagt gggggaagaa tacactcttg acattcttgt 480

ctcctgcttt agaatgctag tgtgtatcta tcatgtatgc aatactttcc ccct 534

<210> 170
<211> 444
<212> DNA
<213> human

<400> 170
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tcaaagaatt ccatgccctt cagattagcc caattaccag aaacatcatg aaagatattt 120

taaaaactaa ttatttacta cagtgtattt cacttgtctt gtgtgtctga acacacagaa 180

gctaattagc aagtttttaa gaagtattta aaaatcttac taggattgac attttttctg 240

aattctgtat aaatagctta tagtgagaag tactgtgctc aaattttaca tttttttcct 300

ttgcaaattc tgtaatttca ctcaacgatt aagtctacca aagaacacac tgcatgtaaa 360

agatgtatta caatctcaaa gccagtaaaa gaaatcttgc ttcactgttc acctgctaca 420

agtaagagtt tggtgctggt agaa 444

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<212> DNA
<213> human

<220>
<221> misc_feature
<222> (399)..(399)
<223> n is a, c, g, or t

<400> 171
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actggtattt taatttttga cctaaatgtt taagcattcg gaatgagaaa actatacaga 180

tttgagaaat gatgctaaat ttataggagt tttcagtaac ttaaaaagct aacatgagag 240

catgccaaaa tttgctaagt cttacaaaga tcaagggctg tccgcaacag ggaagaacag 300

ttttgaaaat ttatgaacta tcttattttt aggtaggttt tgaaagcttt ttgtctaagt 360

gaattcttat gccttggtca gagtaataac tgaaggagnt gcttatcttg gctttcgagt 420

ctgagtttaa aactacacat tttgacatag tgtttattag cagccatc 468

<210> 172
<211> 145
<212> DNA
<213> human

<400> 172
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gtctataatt ccttaatcaa agtcagcaat ttatggacag cttcagcatt tacagttgac 120

ctttcactag ccaggcaaac ttccc 145

<210> 173
<211> 460
<212> DNA
<213> human

<400> 173
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cgacttcatc gtcaccaagg cacgggggaa gagtggacca ctcttcaact ttgatgttca 180

tgacgatgtg cggttgctca gtgacgccac tgtggagaag gatgagtccc atgcaggcaa 240

ggtggtgctg aggagctggt acgagaagaa caagcacatc tttcccgcca gccgctggga 300

accctacgac cctgaaaaga agtgggacaa gtacacgatc cgctgagcat ccaggaggct 360

gcgcggcccc ggctcctcag ctccctcagt gtgccccgtg gtgtcaccgg gactccaggc 420

acccgctccc ctgcgaccat gccaggcacg ctgggaggag 460

<210> 174
<211> 505
<212> DNA
<213> human

<400> 174
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tccttcccag cccagcctct tggggctggg actttctcac cctgcggcag gcacaacaga 120

tgctgggacc cagtctctgc ccaggtcaca gcacaagtgc acatcagcac tatggggcct 180

atgtcctgcc cagagacctc tgctccttcc tgctcacatc cacagtcagg gcacggcgcc 240

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atgtcccccc tctctgaggc ctggacccac ccatctttgt ccctgggggc tgctcccagc 360

cactgaggcc cgctctggcc aggggagaag gagctgccgt gcgtcttccc tgtgccccgt 420

ctccctgctt ggttctcccc tcccttccct ggccggctgc catggccagg agctaagtgc 480

ctttttgtgt gcaaccactt accct 505

<210> 175
<211> 282
<212> DNA
<213> human

<400> 175
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agaaggctgt atcattggtt ttgatgagta tatgaacctt gtattagatg atgcagaaga 180

gattcattct aaaacaaagt caagaaaaca actgggtcgg atcatgctaa aaggagataa 240

tattactctg ctacaaagtg tctccaacta gaaatgatca at 282

<210> 176
<211> 462
<212> DNA
<213> human

<400> 176
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gttccggcat ggctaggctg agagcaggga tctacctggc ttctcagttc tttggttgga 120

aggagcagga aatcagctcc tattctccag tggagagatc tggcctcagc ttgggctaga 180

gatgccaagg cctgtgccag gttccctgtg ccctcctcga ggtgggcagc catcaccagc 240

cacagttaag ccaagccccc caacatgtat tccatcgtgc tggtagaaga gtctttgctg 300

ttgctcccga aagccgtgct ctccagcctg gctgccaggg agggtgggcc tcttggttcc 360

aggctcttga aatagtgcag ccttttcttc ctatctctgt ggctttcagc tctgcttcct 420

tggttattag gagaatagat gggtgatgtc tttccttatg tt 462

<210> 177
<211> 479
<212> DNA
<213> human

<400> 177
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tttgtcaaca ttgtgatgta tattcctttg aagatagtaa ctgtagatgg aaaaacttgt 180

gctataaagc tagatgcttt cctaaatcag atgttttggt caagtagttt gactcagtat 240

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tttgaccttc atttcatgta tagttttccc tattgaatca gtttccaatt atttgacttt 420

aatttatgta acttgaacct atgaagcaat ggatatttgt actgtttaat gttctgtga 479

<210> 178
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<212> DNA
<213> human

<400> 178
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gcatggacat cataaaatgg aacttccaga ttatagacaa tggaagatag aagggacacc 180

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taaaggattc aaatggggat ttgctgcatt tgtggtagct gtaggagctg aatattacct 360

ggagtccctg aataaagata agaagcatca ctgaagataa tacctggaag catcatagtg 420

gtttcttaac tctccaaaat aagatttctt ctctgtagcc tacttgtctg gtttatcc 478

<210> 179
<211> 485
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gccctgtaca atcaagatca cccacaagaa ccagatgccc atgctcatgg gcccaccccc 300

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gccttgaacc cacctccctg tccctggact ctactcccga ggctctgtac attgctgcca 420

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cacct 485

<210> 180
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<213> human

<400> 180
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atgaccttga agtcagcact tgctttagct atcaaagtac taaataagac catggatgtt 180

agtaaactct ctgctgaaaa agtggaaatt gcaacactaa caagagagaa tggaaagaca 240

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gaagccaaag ctgagcgtga gaagaaagaa aaagaacaga aagaaaagga taaatagaat 360

cagagatttt attactcatt tggggcacca tttcagtgta aaagcagtcc tactcttcca 420

cactaggaag gctttacttt ttttaactgg tgcagtggga aaataggaca ttacatactg 480

aattgggtcc ttgtcatttc tgtccaattg aatactttat tgtaacgatg atggttaccc 540

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<211> 548
<212> DNA
<213> human

<400> 181
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gagcccac 548

<210> 182
<211> 434
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<213> human

<400> 182
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cgctcacttg ccccagatgc ctcctctgtc ctcattcttc tctcccacac aagcagtctt 360

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<210> 183
<211> 245
<212> DNA
<213> human

<400> 183
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<210> 184
<211> 539
<212> DNA
<213> human

<220>
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<222> (180)..(180)
<223> n is a, c, g, or t

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<210> 185
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<400> 185
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gaactgggcc tcggtggccg gggccgcgag ctgtgaccac agcaccctca agcatacggc 240

gctgttcctg ccactgtcct gaagatgtga atgggtggta cgatttcaac actggttaat 300

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gaagagcaat aaactctgga tgtttgtgcg cgtgtg 396

<210> 186
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<213> human

<400> 186
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gtaagtgact gggatgctgt cttatgaatt cttccaaggt catgtttgtg aaataaacat 180

tacatgagag ctttcctgtc atctacacta tatgttgtct ggagtgttga acaaatttat 240

tttagtttct aagttgtaat ctatcctcat atggtctata cgattttgaa tgtgtgccac 300

tacatactga gatgataatg ctgtacaatt ttaagtggta gcagtttctg tatgcagta 359

<210> 187
<211> 519
<212> DNA
<213> human

<400> 187
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acagcaaatc atataaatcg aattaaatgg acaacaccgt tagatgtgta tgtaaaaatt 180

ttctgtttca tatttttcct ttcactttcg gtttaaaaca tgctatatgt actgtatgtc 240

ctgtagccca gtgcggctcc acagcatgga atctgatgta tgatatgata gaatgtggca 300

ctaaatgcag tttcagattt tatttttttt aatcatatga actaaaattg tcaattgtga 360

ggtgtgcttt tctcatcatg ttggttatat tgcacaattg gttatattta tgacctgata 420

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ctacatggtg tttacgtgat ccacacttga aatactaga 519

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ggaaccggat gggatttagg agtttgtatg gaaaatgtgc agaggggcac tggcatgaag 240

caagagcctc agtctggatt ctggaccctc aggctgtgca aaaagaaagg ctatgtagca 300

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ctggactatg aggccggagt tgtatccttt tataacggga atactggctg ccacatcttt 420

actttcccga aggcttcctt ctctgatact ctccggccct atttccaggt ttatcaatat 480

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accagc 546

<210> 189
<211> 495
<212> DNA
<213> human

<400> 189
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tggctgaagg accaggagct gagccctcgg gagccggtgc tgcccccaca gaagatgggg 180

cctatggaga aattctggaa taaatttttg gagaataaat ccccttggag gaaaatggtc 240

catggggtat acaaaaagag tatctttgtt ttcactcatg tacttgtacc tgtctggatt 300

attcattatt acatgaagta tcatgtttct gaaaaaccat atggcatagt tgaaaagaag 360

tccagaatat tccctggtga tacaattctg gagactggag aagtaattcc accaatgaaa 420

gaatttcctg atcaacatca ttaaagatta tgtaaaaagt taaaaggctt atgagcctaa 480

gtttgttcct atatt 495

<210> 190
<211> 435
<212> DNA
<213> human

<400> 190
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aaagcaactc ctgacaatta agccttttt tctccaaata caaagtatat tctctttatt 120

ggaaaataaa ttaataaata tattctgtat ttttgctctc cgtgaaaaac aaaagagcct 180

ctgacattac tgtctctcag tgttggttca gattgaggct tttgtttgag gagtttggct 240

tccagtcccc aaagaaggtt taaaatgtac taataaaaac tggagaaata ggaatttgtg 300

aacccctaaa attgtagcaa ctttgaaagg ttagtgtttt atttacctga caaatggaag 360

ttatagaagt ctaataatgt taagcaccag taattatagt attttgtaca aatgcctgta 420

ctgtagatgt ctgta 435

<210> 191
<211> 388
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (291)..(291)
<223> n is a, c, g, or t

<400> 191
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gtgatcgtct gactggtgtt atcaccgtgg gctccctgac tgggagttga tcgcctttcc 120

caggtgctac acccttttcc agctggatga gaatttgagt gctctgatcc ctctacagag 180

cttccctgac tcattctgaa ggagccccat tcctgggaaa tattccctag aaacttccaa 240

atcccctaag cagaccactg ataaaaccat gtagaaaatt tgttattttg naacctcgct 300

ggactctcag tctctgagca gtgaatgatt cagtgttaaa tgtgatgaat actgtatttt 360

gtattgtttc aattgcatct cccagata 388

<210> 192
<211> 415
<212> DNA
<213> human

<400> 192
gccgatcctc gcgtgagaca gatcaagatc aagaccggcg tggtgaagcg gttggtcaaa 60

gaaaaagtga tgtatgaaaa agaggcaaaa caacaagaag aaaagattga aaaaatgaga 120

gctgaagacg gtgaaaatta tgacattaaa aagcaggcag agatcctaca agaatccagg 180

atgatgatcc cagattgcca gcgcaggttg gaagccgcat atttggatct tcaacggata 240

ctagaaaatg aaaaagactt ggaagaagct gaggaatata aagaagcacg tttagtactg 300

gattcagtga agttagaagc ctgaaacttt tctcgtatgg ggtggttttt gcattaaatc 360

ctggggtcca ttttacaatc cattattttt gaccactgct atgtgttcaa gtagt 415

<210> 193
<211> 443
<212> DNA
<213> human

<400> 193
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tccacccctt atgcctaaca agcagatcgc ggagtcggcc aatagcagta gcccccagag 120

ctctgcgggg ggcaagcccg ccatgtccta tgccagcgct ctgcgggccc ctccaaagcc 180

caggcccccc cctgagcagg ccaagaagag tagcgaccct ctgtctctct tccaggaact 240

gagcctaggg agctcatctg gcagcaatgg cttttactca tattttaaat aatcactttt 300

ttttccctca agggagaatg ttttaatttc tgtttgtatc agtagaatta aggtagttgg 360

acttcatcta tagatgcaca gttccctttg ttttaatatt aaatatgttc tcacttaatt 420

gctttgctgc tagacttgca act 443

<210> 194
<211> 510
<212> DNA
<213> human

<400> 194
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ggttatatga ttgctcttct ctttataata agagaaacaa attcttattg tgaatcttaa 120

catgcttttt agctgtggct atgatggatt ttatttttc ctaggtcaag ctgtgtaaaa 180

gtcatttatg ttatttaaat gatgtactgt actgctgttt acatggacgt tttgtgcggg 240

tgctttgaag tgccttgcat cagggattag gagcaattaa attatttttt cacgggactg 300

tgtaaagcat gtaactaggt attgctttgg tatataacta ttgtagcttt acaagagatt 360

gttttatttg aatggggaaa atacccttta aattatgacg gacatccact agagatgggt 420

ttgaggattt tccaagcgtg taataatgat gtttttcctа acatgacaga tgagtagtaa 480

atgttgatat atcctataca tgacagtgtg 510

<210> 195
<211> 560
<212> DNA
<213> human

<400> 195
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tattctacag caccctggtg ccgtgttaac tccctcaatg gagcacacca tgtcactaca 120

gcccgcatca atgatcagcc ctctggccca gcagatgagt catctgtcac taggcagcac 180

cggaacatac atgcctgcaa cgtcagctat gcaaggagcc tacttgccac agtatgcaca 240

tatgcagacg acagcggttc ctgttgagga ggcaagtggt caacagcagg tggctgtcga 300

gacgtctaat gaccattctc catatacctt tcaacctaat aagtaactgt gagatgtaca 360

gaaaggtgtt cttacatgaa gaagggtgtg aaggctgaac aatcatggat ttttctgatc 420

aattgtgctt taggaaatta ttgacagttt tgcacaggtt cttgaaaacg ttatttataa 480

tgaaatcaac taaaactatt tttgctataa gttctataag gtgcataaaa cccttaaatt 540

catctagtag ctgttccccc 560

<210> 196
<211> 394
<212> DNA
<213> human

<400> 196
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tccctgtttc aaagggatcc tggggaagga ggggaacatg cttgcagtat ctctccctgt 120

ctgtctgctc acataagcat tccgtccatc taagctcatc gtgctactgg tatgtgtatg 180

tgcagttaca cagtttcctg tatcataaat cctagtgtgt ttatacaagg agacatctgt 240

ggtttcccca accgttccaa aaggctattt caaaggaacc agcccacgta tgagaaatga 300

atgtaacact gtggacattg acttcccgca taaggcaggg tgacccccctg aactccagat 360

gtttgcacag tatcttatgt gttgttttcc gttg 394

<210> 197
<211> 145
<212> DNA
<213> human

<400> 197
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ctataatctt gtgccgtgga aatcagaagg gcaaaacgaa gcagtcatga tgagaagcac 120

acctcagaaa tcaggacatc ccccc 145

<210> 198
<211> 442
<212> DNA
<213> human

<220>
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<222> (27)..(27)
<223> n is a, c, g, or t

<220>
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<222> (32)..(32)
<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

<220>
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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

<220>
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<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (78)..(78)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (80)..(80)
<223> n is a, c, g, or t

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gnagttggan gtnantgntn ttgatatgta agagatattc agaatgctca cactgaaaat 120

gcctcaactt tttaaagtgt aagaaaccac catgagtggt gtctagattt ctaatgaaga 180

atcatgatac agtttggatt aagtatcttg gactggtttt aaacagtgct ttgtaccgga 240

tctgctgaag catctgtcca gctggtatcc tgtgaaagtt tgttattttc tgagtagaca 300

ttcttataga gtattgtctt taaaatcaga ttgtctcttc tatattgaaa gcatttttat 360

gttttctaat ttaaaaatta atattttctt atagatattg tgcaataaag ctgaagtaga 420

atgtgtggtt tttgcaaatg ct 442

<210> 199
<211> 506
<212> DNA
<213> human

<400> 199
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aatttctggg aagagagcca tggctccagc catactccac agaatcttat cacagtgaag 120

atggagcagg cctttgcccg atacttgctg gagcagactc cagagcagca ggcagccatt 180

ctgtccctgg tgtagagcct gggggaccca tcttccacct cacctctttg ttcttcctgt 240

ctcctttgaa gtagactcat tcttcacacg attgacctgt cctctttgtg ataattctca 300

gtagttgtcc gtgataatcg tgtcctgaaa atcctcgcac acactggctg gtggagaact 360

caaggctaat tttttatcct ttttttttt ttatttttga gatatacgcc ctctttcatc 420

tgtaagggac taggaaattc caaatggtgt gaacccaggg ggcctttccc tcttccctga 480

cctcccaact ctaaagccaa gcactt 506

<210> 200
<211> 444
<212> DNA
<213> human

<400> 200
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accacctttg ccctgtgagg tgccagcacg ggccacctgc gggtgtggcg cagccagggc 120

tcacactgcg tgggagggac tgggtcacta ttgtggtttt tactataact ttgtaaatta 180

acttaatttt gctgacttga ctcctgtggc ttctggaccc ctcctctgcc ccgcaggagg 240

aagttccacg gcaggtggtg cgttcccatg taggcaccaa gtggaagctt gcacggtggg 300

ccacggccgt ggcgggtgcc ctgtgggtga ggctgggtga tgacctgagg accagagaca 360

cgcgaccatg ttggggctct tggactcctc tggatgaccc gtccccaaac gttgacattc 420

catttcatgt tccactgtga ttaa 444

<210> 201
<211> 276
<212> DNA
<213> human

<400> 201
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agagctagaa aataatgtag atcagatctt gaaatggatt gagcagtgga tcaaagatca 120

taactcttga cttataaggc tagctactta ataatcactc ttgttgatat ctctgccgac 180

atcatagaaa ttggtcaagt gtcagtaaca ctttattaaa atcatgttgc agaaccagca 240

ggtggatagt atataggttt atgcctgggg ttcttt 276

<210> 202
<211> 371
<212> DNA
<213> human

<400> 202
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caataacgcc accaatctga agctcaaaaa gatctacttc tactggctgt gccgggacac 120

acatgccttt gagtggtttg cagatctgct gcaactgctg gagagccaga tgcaggaaag 180

gaacaatgcc ggcttcctca gctacaacat ctacctcact ggctgggatg agtctcaggc 240

caatcacttt gctgtgcacc atgatgagga gaaagatgtg atcacaggcc tgaaacaaaa 300

gactttgtat ggacggccca actgggataa tgaattcaag acaattgcaa gtcaacaccc 360

taataccaga a 371

<210> 203
<211> 341
<212> DNA
<213> human

<400> 203
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tggatccccg gagcgccagc gaggtggacc ggatgttccc cggggtgcct ttggacacgc 120

acgacgtctt ccagtaccga gagaaagcct atttctgcca ggaccgcttc tactggcgcg 180

tgagttcccg gagtgagttg aaccaggtgg accaagtggg ctacgtgacc tatgacatcc 240

tgcagtgccc tgaggactag ggctcccgtc ctgctttgca gtgccatgta aatccccact 300

gggaccaacc ctggggaagg agccagtttg ccggatacaa a 341

<210> 204
<211> 402
<212> DNA
<213> human

<400> 204
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agggcaggaa acagtcctct gaaggagtgg ggaggtgggc agtctgcccc cgccaggtac 180

catcgcctcc tgccagcttc cttagaccag gcagggctgc catggtgcta gctgcaagtc 240

catcagtatt gaccgtctcg ctccatcttg gtcctccgga gtcccaagtt tccttttcat 300

caaatctgac aagagagaag aaacatgggt gtgcttggcc cacagggcct ggtggtgatg 360

gacctccccg ctccctcaag ctctggatgg ctgcagtgtt gt 402

<210> 205

<211> 292
<212> DNA
<213> human

<400> 205
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acacccacct gaaaatatca ttgatgggaa tccagaaacg ttttggacca ccacaggaat 120

gtttccccag gaattcatta tttgtttcca caaacatgta aggattgaaa ggcttgtaat 180

ccaaagttac tttgtacaga ccttgaagat tgaaaaaaca cgtctaaaga gccagttgat 240

tttgagcaat ggattgaaaa agatttggta cacacagagg ggcagcttca aa 292

<210> 206
<211> 556
<212> DNA
<213> human

<400> 206
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cagtgcagag cccgcctgga gggatgtggg ggctgtgcag ggtgcagcgc tcaggtggat 120

cctgggaagc agcctctgga tgctgagtgg agggagccac tgagcacagc aaggcaccaa 180

agcccctgga gaaaccgcca gggcgaggtg cgaccatcat caggatcaaa gcagacgggg 240

cgtgggtggg gaaggggctc tgggaccaga ccccccacac tactgcgtct ttgtttctat 300

cagtctttgt agaagcaggt ggtggtggaa attccagcag gtgggtcccg cagaggccct 360

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ttcccctggc attggcccca gccttctgaa agccggcgct gcagccagag gccgcacgct 480

gcactgtcgc gacgcagaga ggcttctgtg caggctggga tcgggcccca tgtctgtgct 540

gtctagtttg tgttca 556

<210> 207
<211> 390
<212> DNA
<213> human

<400> 207
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tatttattaa gactttcttc agagtatgaa agtacaaaaa gtctagttac agtggattta 120

gaatatattt atgttgatgt caaacagctg agcaccgtag catgcagatg tcaaggcagt 180

taggaagtaa atggtgtctt gtagatatgt gcaaggtagc atgatgagca acttgagttt 240

gttgccactg agaagcaggc gggttgggtg ggaggaggaa gaaagggaag aattaggttt 300

gaattgcttt ttaaaaaaaa aagaaaagaa aaagacagca tctcactatg ttgccaaggc 360

tcatcttgag aagcaggcgg gttgggtggg 390

<210> 208
<211> 398
<212> DNA

<213> human

<400> 208
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gagcaggcga ccgagctcct tccccatcat ttctccttgg ccaacgacga ggccagccag 120

aatggcaata aggactccga atacataata aaagcaaaca gaacactcca acttagagca 180

ataacggctg ccgcagcagc cagggaagac cttggtttgg tttatgtgtc agtttcactt 240

ttccgataga aatttcttac ctcatttttt taagcagtaa ggcttgaagt gatgaaaccc 300

acagatccta gcaaatgtgc ccaaccagct ttactaaagg gggaggaagg gagggcaaag 360

ggatgagaag acaagtttcc cagaagtgcc tggttctg 398

<210> 209
<211> 541
<212> DNA
<213> human

<400> 209
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tttttctgca tgcccaggtg tctgtctctg gctgaggttt tgtctatttt acagtgtttc 120

aatccagcca taaaaattaa cttgtgattt ttttttttccc aaagtcatgc ttttccttaa 180

ttatattttt attttattat tttagtgtct tgagaaaaat accaagagat ataatgtttc 240

ttttaattgt ctatgcttaa tcatctttaa acacttttta aatttctaac cacaagacct 300

ctctataatg gtaaatgtaa gacatcacca ttttatcact caaagtatgt tattgaaagt 360

ttctatttgg ttgataaaag gaacaatttt ttcccacttt tgatgcctgt gatgcaattt 420

tttattgcct acaatgagat acacttagta caaaaaatga aaatctggta tttcaaaatt 480

gcatttcttg tataataggt cagatttatt aactactcat actttttctt tacactaatc 540

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<210> 210
<211> 407
<212> DNA
<213> human

<400> 210
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atatagcaca tttcacccaa ggaccttccc tctttggaca ctatgttaca tacccctctt 120

ggcctttgaa cctgtgccag gaagtgtgag ctgttacagc aaggggctag aagtgaaaaa 180

agtaattctg gagacaagca ctattttctc ttcctacccc acctccattt ctaatgccta 240

ctgccatcaa ggccttgttt tgcttttctt tttggattgt tcagagaaat gtgtgtggca 300

tgtgtaagaa aagtgtatat actatcttat actacctctc caggttgcca gagagttgcg 360

aggagagcaa ggggcacaac cgtctccctt tatagttcta cttttct 407

<210> 211

<211> 380
<212> DNA
<213> human

<400> 211
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ccagattgtt ctgagagacg aagatacttg ctgctgatag aggtgaaaac gagattgatc 120

cgtctggggt tttacggtgt gcactgggtg ctgcacagac ttgtcaaggt ttgctacgtc 180

ctctgggcat ctgcaaaagg ccctgctctc tggagtgttg tatatagtgt agcaaaagag 240

tatttataca tcccaccaat caaaacacag ctttattacc tcatgcgaac tcatacaaac 300

caatagaatt tcaacatgtt ctgtagctta gagtgctcac ttactacctc tgaacaatac 360

tcacgctgta gtttgtctct 380

<210> 212
<211> 167
<212> DNA
<213> human

<400> 212
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tcctcaagca tggtctttct acttgtaaac tatggtgctc agttttgcct ctgttagaaa 120

ttcacactgt tgatgtaatg atgtggaact cctctaaaaa ttacagt 167

<210> 213
<211> 455
<212> DNA
<213> human

<400> 213
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tggacttgtt gttgggcgtt cagatgcaat tggaccaaga gaacaatggg aaccagtctt 120

tcaaaatggg aaaatggctt tgttggcctc aaatagctgc tttattagat gcaatgaagc 180

aggggacata gaagcaaaaa gtaaaacagc aggagaagaa gaaatgatca agattagatc 240

ctgtgctgaa agagaaacca agaaaaaaga tgacattcca gaagaagaca aaggaaatgt 300

aaaacaatgt gaaatcaatt atgtaaagaa atttcagagc ttccaagacc acaaacttaa 360

aataagtaaa gaagacagta aaattcttaa aaaggctcgg aaagatggat ttttgcatga 420

gacgcttctg gacaggagag ccaaattgaa agccg 455

<210> 214
<211> 438
<212> DNA
<213> human

<400> 214
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attttatgaa atcttcattg tcaaaacctt taataaaagt ggaaatattt tgaaatgccc 120

tttttcttga taccactcat ccacgtgttc ctgattgtcc acatttcatg ataaaatgag 180

agctctgcag agaatgttag cctttctgtt gtaaatgtaa tcttcaagta gtcacttttt 240

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gtacagcttt tcaggaagct tagatctgaa tttactttga aaaacaattg taatgaatat 360

tttatattta cattgagaat ttcaactagc ttctgatcaa tttttaataa aaaattttca 420

aatcatgtta gctgttaa 438

<210> 215
<211> 521
<212> DNA
<213> human

<400> 215
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gaggaggccg agctcgtccc ctccgaggtg ctcatgcacc aggccatcca caccatcgag 120

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ctgcactggg tggaattcca gaacaagttc tactcaggca cgggctacaa gctgagtccc 420

ttcaccttcg ctgccacaga tgactagggc ccactgcagg tcctgccaga cctccttcct 480

gacctctgag gcaggagagg aataaagacg gtccgccctg g 521

<210> 216
<211> 501
<212> DNA
<213> human

<400> 216
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cagtcactgg gtcaccagag tttgagagag tatttcgggc acaacaaaac tgtgtggagt 180

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ctacttgtct gggtctggtg tacatatatg gccgtcacct atacttctgg ggatattcag 300

aagctgctaa aaaacggatc accggtttcc gactgagtct ggggattttg gccttgttga 360

ccctcctagg tgccctggga attgcaaaca gctttctgga tgaatatctg gacctcaata 420

ttgccaagaa actgaggcgg caattctaac tttttctctt ccctttaatg cttgcagaag 480

ctgttcccac catgaaggta a 501

<210> 217
<211> 496
<212> DNA
<213> human

<400> 217
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cggacaagta cttcgacgaa cactacgagt accggcatgt tatgttaccc agagaacttt 120

ccaaacaagt acctaaaact catctgatgt ctgaagagga gtggaggaga cttggtgtcc 180

aacagagtct aggctgggtt cattacatga ttcatgagcc agaaccacat attcttctct 240

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acaaatcttt catccatacc tgtgcatgag ctgtattctt cacagcaaca gagctcagtt 420

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<212> DNA
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<400> 218
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agtgagtaat ttttggataa ggtatgctga agaatctcct gcagaagtct gatacatgat 180

tttcatgtta attgtaaatg ttaattccct cttgcaaggg agacatatcc tagatcactt 240

tgctttttct ttaaggagct gatgttgcac ctaaacattc caacccttaa agctaaaaca 300

gcacaaaaaa atttcacttt tgaaatgaaa tttttataat tgtatggcaa aaggctatgt 360

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<210> 219
<211> 526
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (173)..(173)
<223> n is a, c, g, or t

<400> 219
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cctactcttg cctgctggag ggtaatgaga agctttggtt ctgccatctc tcccactctg 120

ccaggtgctg gctgtggagc aaaggctcac ctttgtggag aggataaaac ctncccaacc 180

tacctcacca tggtttttca cattgcaaag ggtaataaca tgggcagtgc ggacttaggc 240

taccccctcc agtttgcttt ccgtaaatgc aaattgtcct tactgcaagt caggaatgat 300

tgctgactca cagtagggct gctatgcctg tgtgtaaact tggggatggc tgagggaaca 360

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gacttgcctt accctgggct gatctttgcc cctggtatgc attaat 526

<210> 220
<211> 406
<212> DNA
<213> human

<400> 220
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gtgctgatgg agaaggagct accaggcttc ctgcagagtg gaaaagacaa ggatgccgtg 180

gataaattgc tcaaggacct ggacgccaat ggagatgccc aggtggactt cagtgagttc 240

atcgtgttcg tggctgcaat cacgtctgcc tgtcacaagt actttgagaa ggcaggactc 300

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<210> 221
<211> 431
<212> DNA
<213> human

<400> 221
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gattgtactg gagctttttc tgatgagttg tcatttaagc gtggtgatgt gatttacatt 180

cttagcaagg aatacaatag atatggctgg tgggtaggag aaatgaaggg agccattggc 240

ttggtgccta aagcctacat aatggagatg tatgatattt gagagtcctg gaaaaggaaa 300

attcttctgc ttgtctgcaa atgctttgga tttagaagcg tcatgaaagc acgagtgaca 360

gctcctaacc tctccttgtt ttattaaaca ttacttatct ttgactgtta ttttatgcag 420

tcgctcatta a 431

<210> 222
<211> 441
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (405)..(405)
<223> n is a, c, g, or t

<400> 222
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ttaattccta ttaagtacag ccgcaagaaa gaaaaaatga tgaagttgca aatggcagtg 180

tgctgtcacc tgcaacagaa gtgcgtacca gaagtatgac tcatgcaaag cattttaccg 240

tacaaatatc ctggtgcgat gatgggcctg gcaacatttt ctactgtact tttgtttaaa 300

tttaatgaaa caaaaaattc ctaagaaata ccaccctacc actaacaaaa tggtataaag 360

aatctcccag ccaggccaac atggtgaaac cctgtctcta ctaanaatta gccaagtgtg 420

gtaatgttca cctgcagtcc c 441

<210> 223
<211> 340
<212> DNA
<213> human

<400> 223
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gagggccttg cagggaagta ggaaatagaa actcctccac aaagagccga ggatcagaga 180

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ggtgtatata tgttttgtac ctctgccgat ggctgtacat 340

<210> 224
<211> 341
<212> DNA
<213> human

<400> 224
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gggaccccag acgtctccag tgccttggat aagctgaagg agtttggaaa cacactggag 180

gacaaggctc gggaactcat cagccgcatc aaacagagtg aactttctgc caagatgcgg 240

gagtggtttt cagagacatt tcagaaagtg aaggagaaac tcaagattga ctcatgagga 300

cctgaagggt gacatccagg aggggcctct gaaatttccc a 341

<210> 225
<211> 284
<212> DNA
<213> human

<400> 225
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ttgtaccaat tcaggtagaa gtagaggcct accttgaatt aagg 284

<210> 226
<211> 454
<212> DNA
<213> human

<400> 226
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ctctgggtgg aagtcaatgg tggtgtcaca tccccacttg gtggctgagg cataccgctc 180

tctggcttca gcacagtgcc cttttctggg acccccacgc aaacgcctga agcaatccta 240

agatcctgct tgttgtaaga ctccgtttaa tttccagaag cagcagccac tgttgctgcc 300

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actgcattgt ggccccagac ttttaaaaca gcactaaata acttggggga aacgggggga 420

gggaaaatga aatgaaaacc ctgttgctgc gtca 454

<210> 227
<211> 570
<212> DNA
<213> human

<400> 227
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ttcttagcaa atgagtctaa caaatatgac atccgtcttt cccacttttg ttgatgttta 180

tttcagaatc ttgtgtgatt catttcaagc aacaacatgt tgtattttgt tgtgttaaaa 240

gtacttttct tgatttttga atgtatttgt ttcaggaaga agtcatttta tggatttttc 300

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gtagggaacg ccagaacttt taagtccagc tattcattag atagtaattg aagatatgta 420

taaatattac aaagaataaa aatatattac tgtctcttta gtatggtttt cagtgcaatt 480

aaaccgagag atgtcttgtt tttttaaaaa gaatagtatt taataggttt ctgacttttg 540

tggatcattt tgcacatagc tttatcaact 570

<210> 228
<211> 562
<212> DNA
<213> human

<400> 228
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catatatata tatatatgta tgaaacccgc atggaattat ctgtatgaaa tcaaggtgcg 180

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gaccatgccc ttcaccaaag ctgcctccca gtggccacac agaactctcc ctgctggact 360

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actgcgtggt ctgccagctg agatgctcct cgggctggcc caggtgctga ccttgccaca 480

ggcagatgaa tgtcttgaaa gctcccgggc ctcagcctcc catctcctct ccttcccagg 540

aatccttgat ctcatgacta tt 562

<210> 229
<211> 485
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<400> 229
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aatgactcca gtaaaccctg gtgttggcca gtgctgcact tcttcatatg ccaacaggag 120

gccatgcttc agcagcttgg tggtggatga aacatatgtc cctcctgcat tctctgatga 180

caagttcatt ttccataagg atctgtgcca agctcagggt gtagcgctgc aaacgatgaa 240

gcaagagttt ctcattaacc ttgtgaagca aaagccacaa ataacagagg aacaacttga 300

ggctgtcatt gcagatttct caggcctgtt ggagaaatgc tgccaaggcc aggaacagga 360

agtctgcttt gctgaagagg gacaaaaact gatttcaaaa actcgtgctg ctttgggagt 420

ttaaattact tcaggggaag agaagacaaa acgagtcttt cattcggtgt gaacttttct 480

cttta 485

<210> 230
<211> 480
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<213> human

<400> 230
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ccctcagcac atggtggggg ccacaccatt tgccgtggcc aggctagaga tcctgcagct 120

cctgaaaggc aagctggtgg tgggtcatga cctgaagcac gacttccagg cactgaaaga 180

ggacatgagc ggctacacaa tctacgacac gtccactgac aggctgttgt ggcgtgaggc 240

caagctggac cactgcaggc gtgtctccct gcgggtgctg agtgagcgcc tcctgcacaa 300

gagcatccag aacagcctgc ttggacacag ctcggtggaa gatgcgaggg caacgatgga 360

gctctatcaa atctcccaga gaatccgagc ccgccgaggg ctgccccgcc tggctgtgtc 420

agactgaagc cccatccagc ccgttccgca gggactagag gctttcggct ttttgggaca 480

<210> 231
<211> 498
<212> DNA
<213> human

<400> 231
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tcccttgtgg acaggcaggg agatgcatgc gagtgcatgc agcaggggat ggggccgtgt 360

ccgtgtgccc caccctccct cggctttact cctgcccagt gactgtgacc actgtccgtg 420

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<210> 232
<211> 432
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<213> human

<400> 232
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ctgcttcaga agaagaaatt ccacgggtac ttcaagttcc agggtcagga caccatcctg 300

gactacacac tccgcgaggt ggacacggtc tagcgggagc ccagggcagc ccctgggcag 360

gagacgtggc tgctgaacag ctgcaaacca tcttcacctg ggggcattga gtggcgcaga 420

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<210> 233
<211> 445
<212> DNA
<213> human

<400> 233
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tggccagtgg gaggtgatgg tggacctaga ctgtgctttt ctgtcttgtt cagccttgac 180

ccaccttgag agagagccac caggaaggcg catcttagca gatgggagga actgctgaga 240

gaagatgggc agaaagctgg agcccctgga gttggctgtg tctgtgtttg tgactgatta 300

ctggctgtgt cttgggtggg cagaaactcg aacttgctat gtaatttgtg tctagttatt 360

cagaggagta agatggtgat gttcacctgg caatcagctg agttgagact ttggaataag 420

acactggttt tcatgcgctg ttttt 445

<210> 234
<211> 504
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<213> human

<400> 234
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aaaacaacca ccccccccact gcccaaaaaa aaaagccctg ccctgttgct cgtgggtgct 180

gtgtttactc tcccgtgtgc cttcgcgtcc gggttgggag cttgctgtgt ctaacctcca 240

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cagctctcga gaactacctg ttggtattgt ccacaagctc tcccgagcgc cccatcttgt 420

gccatgtttt aagtcttcat ggatgttctg catgtcatgg ggactaaaac tcacccaaca 480

gatctttcca gaggtccatg gtgg 504

<210> 235
<211> 285
<212> DNA
<213> human

<400> 235
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tctgctttaa taagcgagac ctaattaaaa aacacatctg gcctaatgtt ccagatcctt 120

caaagagtca tattgcccag tggtcacctc acactcctcc aaggcacaat tttaattcaa 180

aagatcaaat gtattcagat ggcaatttca ctgatgtaag tgttgtggaa atagaagcaa 240

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<210> 236
<211> 534
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<213> human

<400> 236
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cggccagaag atctacaatt agtagatcat gtagatggcg gtgatggtat tttgcccagg 180

caacagtact tcaaacagaa ctgcagtcag catgaatcca gtccagatat ttcacatttt 240

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<210> 237
<211> 400
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<400> 237
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ccagaatgat caggtggacc aaactacgaa ttaacatgct tcctgctaca ataatttgtg 120

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tcgcctggtt catccgcgaa tccatgacaa tatacatttt tttgtctgca ttatgggacc 360

caactataag ctggagaact ggtcgctaca gattacgctg 400

<210> 238
<211> 168
<212> DNA
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ccccacggag gatttgaagg cgctcagtca gcagaatgtg agcatggact tggccacgtt 120

catgaagctg cggacggatg cggtgctgcc gttgactgtg gctgaggt 168

<210> 239
<211> 324
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<400> 239
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cattagcaga tatactattg tactatggac ttcatcgctt tatagttgac ctgacagttc 180

aagaaaagga gaaatatctt aatgtgtctc gctggttttg tcacattcag cattatccag 240

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actagaagct gtccatgcca taca 324

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<212> DNA
<213> human

<400> 240
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aaggagagta tctgtgagtg ggggcctccc ttgaccccag tacgaagtct atgccctgaa 360

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<210> 241
<211> 406
<212> DNA
<213> human

<400> 241
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ggatctatcc tgtgtgtgcc tatgagattg ggtgcagtgt atcctgttag ctccattctc 360

agggcgtttg aatgtgaatt aggaccagcg caatgaatgc tcaagt 406

<210> 242
<211> 474
<212> DNA
<213> human

<400> 242
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gatgtcagag ccaagggcta cctggagtgc tcagccctta gcaatcgggg agtacagcag 180

gtgtttgagt gcgccgtccg aactgccgtc aaccaggcca ggagacgaaa cagaaggagg 240

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ttttctctgg gtacacccca agcagcgtct ccgttttgga tacagttatt gatgaggctt 420

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<210> 243
<211> 441
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<213> human

<400> 243
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<210> 244
<211> 377
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gaactaccca ggagcca 377

<210> 245
<211> 407
<212> DNA
<213> human

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<210> 246
<211> 480
<212> DNA
<213> human

<400> 246
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gcaggcggct ccctcacccg gcatgtgacc caggagtttg tgagccggac actgaccacc 240

agcggaaccc ttagcaccca catggaccaa cagttcttcc aaacttgacc gcaccctgcc 300

ccacccccgc catgtcccac taggcgtcct cccgactcct ctcccggagc ctcctcagct 360

actccatcct tgcacccctg ggggcccagc ccacccgcat gcacagagca ggggctaggt 420

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<210> 247
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<212> DNA
<213> human

<400> 247
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cagccccgga gcagattgca gcggacatcc cagaagtggt tgtttccctt gcatgggacg 180

aaagcttggc tccaaagcat c 201

<210> 248
<211> 452
<212> DNA
<213> human

<400> 248
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atttgaagtc aaagagtatt cagcgttgga tgaattacaa aaggaatttg aaactgcagg 180

acttaagaag cttttctccg aatttgtact tgctctggta aaatgaaatg gaagacagga 240

atcttttagt aaaatagcag tgtttttttgt tgtttttgca ttggatttgg ggagtggtta 300

attgaaatag tcaattttaa agtttctctg aagcaaaatg ataggcatca ttctaacttc 360

aggaacaaaa gccagttctg ttttatgaaa tattaaacat gaagaaaact tgtatattct 420

aatgtttgcc aggaaaggct aggttcagta ga 452

<210> 249
<211> 459
<212> DNA
<213> human

<400> 249
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aagattgatt gacctgtcca ttcaaaacta ccacacattt ctgatataca tcacggagtt 180

actgaaaaag ctgcaatcaa ccacagtcat gaacccctac atgaagcttg ctccaggaga 240

acttactatc atcctctaat tttttaaaag aaatcttcat ttattcttct tttccaattg 300

aactttcaca tagcacagaa aaaattcaaa ctgcctatat tgataaaacc atacagtgag 360

ccagccttgc agtaggcagt agactataag cagaagcaca tatgaactgg acctgcacca 420

aagctggcac cagggctcgg aaggtctctg aactcagaa 459

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<211> 431
<212> DNA

<213> human

<400> 250
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ccaaaggagg cattatgctt ccagaaaaat ctcaaggaaa agtattgcaa gcaacagtag 180

tcgctgttgg atcgggttct aaaggaaagg gtggagagat tcaaccagtt agcgtgaaag 240

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attatttcct atttagagat ggtgacattc ttggaaagta cgtagactga aataagtcac 360

tattgaaatg gcatcaacat gatgctgccc attccactga agttctgaaa tctttcgtca 420

tgtaaataat t 431

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<211> 464
<212> DNA
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<400> 251
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tcacgtcatc ttgacagcta tgaattcctt aaagccattt taaactgagg cattaagaag 180

aaatgcactc accatgagca ccaacttctg catctgcctg atcatattta aaggaacaga 240

gaaatatttg taattaatct gcccagtaaa taccagctcg tagcagttgg caggtgcatg 300

tctagataaa atttcttgca gctaatttaa actttctaca cgcaccagta gataatctca 360

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tgacttatat tctgtaccac atacacttct gtggactttt agca 464

<210> 252
<211> 377
<212> DNA
<213> human

<400> 252
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caggccacag ctgctaattc tcttctggcc tgtgagtttc tcctccagaa cggggcgaac 180

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acggggctcg cctgcctgtt cctgaaacgg ggagctgatc tgggggctcg agactctgaa 300

ggcagggacc ctctgaccat cgccatggaa acagccaacg ctgacatcgt caccctgcta 360

cgactggcaa agatgag 377

<210> 253
<211> 529
<212> DNA

<213> human

<400> 253
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agctgctctt agaaagataa accaggatgg cacatttctg gtcagagaca gctctaaaaa 180

aacaacaacc aatccatatg tcctcatggt gttgtacaaa gataaagttt acaacatcca 240

gatccgttat cagaaggaaa gtcaagttta cttgttggga actggactcc gagggaaaga 300

ggactttctg tctgtgtcag atattattga ctacttcagg aaaatgccac ttctgctcat 360

tgatgggaaa aaccgaggtt ccagatacca gtgcacatta acgcatgctg cagggtaccc 420

atagcaagtt atagccgagc aaatgaaccg tcctcctgcc tctgttgcca acacgagatc 480

aatcagcctt ggtcaatgga caaacactta ggactgaact gaacccctc 529

<210> 254
<211> 515
<212> DNA
<213> human

<400> 254
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ggccagtgag gcagctgtga gttggacagg gttcaggtga gatggtgttg tcatttgtgc 180

ttagtgttgg tggtgctcag ggtggataac acgggtcgtt ctgcagcccg cttcagcaca 240

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tgatcactgt ccttgccttc ctggttcttt ctctcggttg gttgccaggg cttgcagatc 420

gcagtgaatt ttccttgggg aacatcgctg ttttgtccta gagtgaactt gtggcttatg 480

gccagtgctg tttggtggtc tgccttcttt ttaat 515

<210> 255
<211> 449
<212> DNA
<213> human

<400> 255
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cctctgcctt gtacagttcc catcacgtaa gtcagtaatg ttgtatgcag cagaaatgat 120

acctaaacta aaaacaagga cacaaaaaac aggaggtgct gaccaaagtc ttcaacaagg 180

agagggaagt aaaaaaggga aaggaaagaa aaagaagtaa cctagtatca gcatcaagta 240

tgtggtacta ctgtaagaga catgaatgga gacttctaat ttgtatcgga gggaaacaga 300

agctttttgt ttgcatcatt taactgaact gtgaaccctt gtgcctctca tctttatcat 360

cggagttgac agtgaaacaa atttacatca gaagtttgca tctcgcgtat atgccgtata 420

aaagaatttt tttgtctttc aatgcagtt 449

<210> 256
<211> 344
<212> DNA
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<400> 256
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cggtgggagc ctttagcgct accgactcct tcgaccacaa aaagttcttc caaatggtcg 120

gcctgaagaa aaagagtgcg gatgatgtga agaaggtgtt tcacatgctg gacaaggaca 180

aaagtggctt catcgaggag gatgagctgg gattcatcct aaaaggcttc tccccagatg 240

ccagagacct gtctgctaaa gaaaccaaga tgctgatggc tgctggagac aaagatgggg 300

acggcaaaat tggggttgac gaattctcca ctctggtggc tgaa 344

<210> 257
<211> 275
<212> DNA
<213> human

<400> 257
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ttaaaaacaa cttaataaaa acttacactc ttatacaaga gtgtatttcc ccttaattag 180

gatgcatgtt gattaaactc gagatacagc tttttgcagt atggtgggtt ggttttggtg 240

taacatcttc aacatgtcac actggctatc aaaga 275

<210> 258
<211> 376
<212> DNA
<213> human

<400> 258
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ctccaaaacc tagaagatgc ttgtgatgac atcatgcttg cagatgatga ttgcttaatg 180

ataccttatc aaattggtga tgtcttcatt agccattctc aagaagaaac gcaagaaatg 240

ttagaagaag caaagaaaaa tttgcaagaa gaaattgacg ccttagaatc cagagtggaa 300

tcaattcagc gagtgttagc agatttgaaa gttcagttgt atgcaaaatt cgggagcaac 360

ataaaccttg aagctg 376

<210> 259
<211> 317
<212> DNA
<213> human

<400> 259
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gatcctgtca caagagagga tttgcacatg gattttaaat gtgttgtcca taataccctg 120

agttttcaga cactacgcac cacagtcaag gaagcctcct ccacgttctc ctggggcatt 180

gtgctggccc cactttcact ggccttcttg gttttggggg gaatatggat gcacagacgg 240

tgcaaacaca gaactggaaa agcagatggt ctgactgtgc tatggcctca tcatcaagac 300

tttcaatcct atcccaa 317

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cagggttctc tcgacagccc ggtccctttt tccgaggaag agctggattt tttcaccagt 180

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gacttatgtg ttttgctaaa attcaggtat tactgaatta gcgtttaatc cacttccttt 360

cttcttcttc taaaatattg ggcactcggt tatcttttaa aattcacaca gaaaaattcc 420

gtttggtaga ctccttccaa tgaaatctc 449

<210> 261
<211> 452
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<213> human

<400> 261
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tgagccctca tagggagatc caaagtcctg tggttaacgc cttcatttat agatgaggca 360

gctgaggcct ggggatgtga acaacctgct cacagtcctc atttactgga tttgacttca 420

gccaggtgaa ctggaatgcc ttggggcgtg ga 452

<210> 262
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<212> DNA
<213> human

<220>
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<222> (412)..(412)

<223> n is a, c, g, or t

<400> 262
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gtatacccgc taccagaccc tggagctgga aaaggagttc cacttcaacc gctacctgac 120

ccggcgacgg cgcatcgaga tcgcccacgc actctgcctg tccgagcgcc agatcaagat 180

ctggttccag aaccggcgca tgaagtggaa gaaggacaac aaattgaaaa gtatgagcct 240

ggctacagct ggcagcgcct tccagccctg agcccgccca gaggagccca gcggcccaag 300

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cttcctgtgg ctccctctct cctggactgg ttatcttgtt attattgtta ataataataa 480

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<211> 548
<212> DNA
<213> human

<400> 263
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ctggcttcgg agatggagtc ccttttcatt ctcctcctcc tccctcctca ctccctaggc 180

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acaaggcctg gtctgggagt atacggaaac aaaaatgatc ctcagtgcaa aatgtcttgt 360

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agtctgggtc agacccatct ctcccttacc catcttgctt ccaagaccat ttgtagtgag 480

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ttttggta 548

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<213> human

<400> 264
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ccaatctaaa tggaatgttc tatactgcgg gacaaaacca tggaaaactg aatgggataa 180

agtggcacta cttcaaaggg cccagttact ccttacgttc cacaactatg atgattcgac 240

ctttagattt ttgaaagcgc aatgtcagaa gcgattatga aagcaacaaa gaaatccgga 300

gaagctgcca ggtgagaaac tgtttgaaaa cttcagaagc aaacaatatt gtctcccttc 360

cagcaataag tggtagttat gtgaagtcac caaggttctt gaccgtgaat ctggagccgt 420

ttgagttcac aagagtctct acttggggtg acagtgctca cgtggctcga ctatagaaaa 480

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tactact 547

<210> 265
<211> 528
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<213> human

<400> 265
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tgtccttttg tgttcctaca gacactttct taaaccagtt tttggataaa gaatactatt 240

tccaaactca tattacaaaa acaaaataaa ataataaaaa aagaaagcat gatatttact 300

gttttgttgt ctgggtttga gaaatgaaat attgtttcca attatttata ataaatcagt 360

ataaaatgtt ttatgattgt tatgtgtatt atgtaatacg tacatgttta tggcaattta 420

acatgtgtat tcttttcatt taattgtttc agaataggat aattaggtat tcgaattttg 480

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<211> 203
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<213> human

<400> 266
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acgaggaaat agtatcatca tgttagaagc cttggaacga gtataaataa tggctgttca 180

gcagagaaac ccatgtcctc tct 203

<210> 267
<211> 536
<212> DNA
<213> human

<400> 267
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tccctcagtc atgctaaggt cctcactaag cttgctctct ctggagcctg aagtagtgat 180

gagtagtctg ggccctgggt gaggtaaagg acattcatga ggtcaatgtt ctgggaataa 240

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caagggcatt gtccagaaac tcccctgaga ccttactcct tccagcccca aatcatttac 420

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<210> 268
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<400> 268
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agccagaatc cttaagtctg tgtgtttctg tgtctcaaga ctgggctcac attctggctt 180

tgtccataac aatgctctgg gatttcaggg agttccctca tttgtaaaat gaggggtca 240

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<211> 316
<212> DNA
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<400> 269
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ggttaatgcg agatgataca atatacgagg atgaagatgt aaaagaagcc ataagaagac 180

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ttgaaccgta tctgaa 316

<210> 270
<211> 553
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<213> human

<400> 270
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acagcctgca taa 553

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<211> 321
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<400> 271
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aatcaccttc tgttcagcac t 321

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<400> 272
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gactctttcc ccgcatccct cacatgaaag accccatcgg tgacagcttc caaaacgaca 300

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ggagagtggg aagcaggagc ccagccagct gcgcctgcgc tgcaggaggg cgggggctct 480

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<211> 470
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<213> human

<400> 274
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tggcattaaa aataagcaca cttacataag cccccataca tagagtggga ctcttggaat 420

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<211> 508
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<213> human

<400> 275
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caggccagca gtgggaagca caaagtattt tggcacagcc aaagcccgct atgacttctg 180

cgcccgagac cgatcagagc tgtcgctcaa ggagggtgac atcatcaaga tccttaacaa 240

gaagggacag caaggctggt ggcgagggga gatctatggc cgggttggct ggttccctgc 300

caactacgtg gaggaagatt attctgaata ctgctgagcc ctggtgcctt ggcagagaga 360

cgagaaactc caggctctga gcccggcgtg ggcaggcagc ggagccaggg gctgtgacag 420

ctcccggcgg gtggagactt tgggatggac tggaggagcg cagcgtccag ctggcggtgc 480

tcccgggatg tgccctgaca tggttaat 508

<210> 276
<211> 469
<212> DNA
<213> human

<400> 276
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actagaaatg aatggaagat gatgggacat atgacttcac caaggagcaa tgctgggatt 180

gcaactgtag ggaacaccat ttatgcagtg gaggattcga tggcaatgaa tttctgaata 240

cggcggaagt ctataacctt gagtcaaatg aatggagccc ctatacaaag attttccagt 300

tttaacgggt ttaagaccct ctcaaactaa caggcttagt gatgtaatta tggttagcag 360

aggtacactt gtgaataaag agggtgggtg gggatagatg ttgctaacag caacacaaag 420

cttttgcata ttgcatacta ttaaacatgc tgtacatact ttttgggtt 469

<210> 277
<211> 494
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (102)..(103)
<223> n is a, c, g, or t

<400> 277
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aagaagacat tatccggtta agagtctgtg ctggttgcca cnnaagagag aacagttgtc 120

caggatgctg gctggtggaa caacctgctg gcccgaaaca aggctgccag gtgtggaaca 180

gcccatgctg actggggaca tacacttgca tctttgttga aagcagaaga agacagaccc 240

tttccccacc ttccttacct cctcttcccc cattaaggca gctcatccaa gcttgtattt 300

aactgaataa atgagtagac attgtggacc tcacaagatt atttaattct taagatgtgt 360

agaccttgat ggtaggtgtg acatgttagt ttttcttact tgcatttatt taagacacac 420

tgttacagag atactgttgt caccttctgg ggcacggtct ttggggagag gggagtgcat 480

ttagacttat gtgg 494

<210> 278
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<400> 278
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agggccccaa agtaaaagga atggcagagc tcacttctgt accacgtctg ctggtctcca 180

gccttgtatg gagttagaag cgtctgtatc tctggagcag ccaggcgctc tggagccagc 240

tggagagaga gagatcctga tacctctgtg gggactgtgg ggacttttgg gaccccacac 300

actccaggtg ggatcagatg ctgctccaac catgcagttc ctggtgaggg tcagaagggg 360

acggtaccaa gagcagcgct tagcccttac ccaggaaata tccttcatgg ccacagaaat 420

ggagggcgcc caggatccag gcagccaccg ggaacagtca gctttcttta 470

<210> 279
<211> 454

<212> DNA
<213> human

<400> 279
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aaaaataata gctattcaag aaaatcacca agtgactgtg aaaccgtcag ttcggaaggc 180

tggttagaac atgtgggagc aacatgaatg ttctacaaaa gtttaaagca gagattgttt 240

caaatgggtg tagtagatat tactgaaaac caaaaaagag tgagattgtc agtgtaagaa 300

tgtgatttaa tgtttgtagt gcttacaatt ttgtgtacca actggatgac taaaaagagt 360

aaaataactt aattaatagc tcatatttta tgtgtgaaaa catgttagtg aacatatata 420

atcaaaatag atttcattgc tattgcatag tctc 454

<210> 280
<211> 459
<212> DNA
<213> human

<400> 280
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ggaaaaagac acacccacac cgtagaacat atattaatct actggcgaat gggaaaggag 180

accattttct tagaaagcaa ataaacttga ttttttaaa tctaaaattt acattaatga 240

gtgcaaaata acacataaaa tgaaaattca cacatcacat ttttctggaa aacagacgga 300

ttttacttct ggagacatgg catacggtta ctgacttatg agctaccaaa actaaattct 360

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tttttataag taatgtttgt atctatttca tgctttact 459

<210> 281
<211> 389
<212> DNA
<213> human

<400> 281
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atggatttgg ggctactctc tccgcaggct caggtcgaag attcgtagag gaacaattta 120

gttttaagga cttcatccct ccacctatcc ctaacaggct gtagattacc aaaacaagat 180

taatttcatc actaaaagaa aatctattat caactgctgc ttcaccagac ttttctctag 240

aagccgtctg cgtttactct tgttttcaaa gggacttttg taaaatcaaa tcatcctgtc 300

acaaggcagg aggagctgat aatgaacttt attggagcat tgatctgcat ccaaggcctt 360

ctcaggccgg cttgagtgaa ttgtgtacc 389

<210> 282
<211> 404

<212> DNA
<213> human

<400> 282
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aggaatctgg ctcttcagcc atctcaggtt tagggggttt gtaacagaca ttattctgtt 180

ttcactgcgt atccttggta agccctgtgg actggttcct gctgtgtgat gctgagggtt 240

ttaaggtggg gagagataag ggctctctcg ggccatgcta cccggtatga ctgggtaatg 300

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ggtgcagagt gtgagctggg aaaggtttgt ggctccttgc agcc 404

<210> 283
<211> 218
<212> DNA
<213> human

<400> 283
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cattggatgt tatttagaca gaaagagtga tgaacggcta actgccttcc ggaacaagag 120

tatgttattt aaaagggaat tgcaacccag tgaagaagtt acctggaagt aaagactggc 180

tagattatcg aatgttcaca ttttaaagtt ctgagaga 218

<210> 284
<211> 543
<212> DNA
<213> human

<400> 284
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aggccactgg tgctttattt ttctatctgc tgagtaaact gaaatgagat gggtcccaac 240

caccactgta attttcaagc ctattttatt tgtacctgta aatactgtac agctaatata 300

tatatatata tatatatata tatgtgtgtg tgtgtgtgtg tgtatgtgtg tttatagaga 360

tacacacaca tatatatgtg tgtatatata tacacataca tatatataca cacacgcatt 420

tgcacagaca cacacatata tcaattctca tgagtgtatt ataatctctg gtgggggcaa 480

gtgtctggaa ggcctgaggg gcacttcaga tgagaatgga gaggtaggga gccaggtgca 540

gca 543

<210> 285
<211> 545
<212> DNA
<213> human

<400> 285

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aatctagaac tgaagtgaaa gaagagagtt ccagttctaa tagtcttttg attaacaatt 240

cttttctgag aaatgatttt tataagaaat ggggtgattc tttaaatgct tttcttaagt 300

tgaaggcaca acagttaatg gctgtattgt tgctattccg ttgctgacat gtttttgata 360

aagctttaac attcctgcta ctaattttgg cggagagtgt ttgccaggtt tcaatgtggg 420

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cagaaagaat tttgtttaag attatgcctc ttatctactt gagagcaaca tgtcttttca 540

atcat 545

<210> 286
<211> 195
<212> DNA
<213> human

<400> 286
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gtcgagtgaa gagtagttct tgtttgttac aacctttgtg agtcagccat gcccgcaaag 180

cgtgctgtgt tttag 195

<210> 287
<211> 495
<212> DNA
<213> human

<400> 287
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tctcagggat tcacgtggaa ccagctcaga attacctcta ggatttttca gtggaaagga 120

ctcagtagaa cagaaaccac tgggaggagc tcccagccta aggaatggtg aaatgagccc 180

tggagccccc tccagtccag tccctgggat agagatgttg ctggacagaa ctcacagctc 240

tgtgtgtgtg tgttcaggct gataggaaat tcaaagagtc tcctgccagc accaagcaag 300

cttgatggac aatggaatgg gattgagact gtggtttaga gcctttgatt tcctggactg 360

gacagacggc gagtgaattc tctagacctt gggtactttc agtacacaac acccctaaga 420

tttcccagtg gtccgagcag aatcagaaaa tacagctact tctgccttat ggctagggaa 480

ctgtcatgtc tacca 495

<210> 288
<211> 540
<212> DNA
<213> human

<400> 288

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cagctcccag tcccagacct caaggatctt gctgtcctcc atgccatccg cttccaagac 120

gggttaaagc ctttcttgct ttcaaatatg ctatggagcc acagttgagg acagtagttt 180

cctgcaggag cctaccctga aatctcttct cagcttaaca tggaaatgag gatcccacca 240

gccccagaac cctctgggga agaatgttgg gggccgtctt cctgtggttg tatgcactga 300

tgagaaatca gacgtttctg ctccaaacga ccattttatc ttcgtgctct gcaacttctt 360

caattccaga gtttctgaga acagacccaa attcaatggc atgaccaaga acacctggct 420

accattttgt tttctcctgc ccttgttggt gcatggttct aagcgtgccc ctccagcgcc 480

tatcatacgc ctgacacaga gaacctctca ataaatgatt tgtcgcctgt ctgactgatt 540

<210> 289
<211> 370
<212> DNA
<213> human

<400> 289
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gaagagatgg aatggataat cagggaggct atggatcagt tggaagaatg ggaatgggga 180

acaattacag tggaggatat ggtactcctg atggtttggg tggttatggc cgtggtggtg 240

gaggcagtgg aggttactat gggcaaggcg gcatgagtgg aggtggatgg cgtgggatgt 300

actgaaagca aaaacaccaa catacaagtc ttgacaacag catctggtct actagacttt 360

cttacagatt 370

<210> 290
<211> 480
<212> DNA
<213> human

<400> 290
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ggtttaaatt tgttattgtg tattatgttg ttcaaatgca ttttgggggt ttttaatctt 240

tgtgacagga aagccctccc ccttcccctt ctgtgtcaca gttcttggtg actgtcccac 300

cggagcctcc ccctcagatg atctctccac ggtagcactt gacctttcg acgcttaacc 360

tttccgctgt cgccccaggc cctccctgac tccctgtggg ggtggccatc cctgggcccc 420

tccacgcctc ctggccagac gctgccgctg ccgctgcacc acggcgtttt tttacaacat 480

<210> 291
<211> 206
<212> DNA
<213> human

<400> 291
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taagcctgca ttcttaacaa actcttcagt taattcttag atacactaaa aatctgagaa 120

actctacatg taactatttc ttcagagttt gtcatatact gcttgtcatc tgcatgtcta 180

ctcagcattt gattaacatt tgtgta 206

<210> 292
<211> 334
<212> DNA
<213> human

<400> 292
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tattctacag caccctggtg ccgtgttaac tccctcaatg gagcacacca tgtcactaca 120

gcccgcatca atgatcagcc ctctggccca gcagatgagt catctgtcac taggcagcac 180

cggaacatac atgcctgcaa cgtcagctat gcaaggagcc tacttgccac agtatgcaca 240

tatgcagacg acagcggttc ctgttgagga ggcaagtggt caacagcagg tggctgtcga 300

gacgtctaat gaccattctc catatacctt tcaa 334

<210> 293
<211> 448
<212> DNA
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<400> 293
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cctcagcttc attgtgagac ctcaagttcc tcagcttcca ggatgatcaa cctagctgaa 120

aacctgaagt ccctcccggt acaagtccaa gcagtcccca gccagggaga ccaggtgttg 180

tctgacatcc cacacacatc ggcacacttg ggggattgca aaagggagga agggagccaa 240

aggctagggc cccggggttc agctaacact cagcacccct cccaaagagc gccccctgtg 300

tgttctggat ctctagaggg gtttggtttg ggccaagtag tgcttagttt taattttctc 360

tttctggaaa taaatacttt taataagtaa agatgctgct cagctgtcat atcctgcaag 420

gttagaggaa agatgtgggc cgtgcgcg 448

<210> 294
<211> 516
<212> DNA
<213> human

<400> 294
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tcgtgctcac ctccgtggga ctgcccaccg atgacatcac cctcatcatt ggcgttgact 120

gggctctgga ccgtttccgc accatgatta acgtgctggg tgatgcgctg gcagcgggga 180

tcatggccca tatatgtcgg aaggattttg cccgggacac aggcaccgag aaactgctgc 240

cctgcgagac caagccagtg agcctccagg agatcgtggc agcccagcag aatggctgtg 300

tgaagagtgt agccgaggcc tccgagctca ccctgggccc cacctgcccc caccacgtcc 360

ccgttcaagt ggagcgggat gaggagctgc ccgctgcgag tctgaaccac tgcaccatcc 420

agatcagcga gctggagacc aatgtctgag cctgcggagc tgcaggggca ggcgaggcct 480

ccaggggcag ggtcctgagg caggaactcg actctc 516

<210> 295
<211> 512
<212> DNA
<213> human

<400> 295
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cctttgatca caggagcaat cacaggaaaa tgtatccaga ggaattgatt gtcagccacc 120

tccctctgcc agtcgggaga gccaggcttg gatggaacat gcccacaact tgtcacccaa 180

agcctgtccc aggactcacc ctccacaaag caaaggcagt cccgggagaa aagacggatg 240

gcaggatcca aggggctagc tggatttgtt tgttttcttg tctgtgtgat tttcatacag 300

gttattttta cgatctgttt ccaaatccct ttcatgtctt tccacttctc tgggtcccgg 360

ggtgcatttg ttactcatcg ggcccaggga cattgcagag tggcctagag cactctcacc 420

ccaagcggcc ttttccaaat gcccaaggat gccttagcat gtgactcctg aagggaaggc 480

aaaggcagag gaatttggct gcttctacgg cc 512

<210> 296
<211> 552
<212> DNA
<213> human

<400> 296
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gttgcccaca tactgcagtt attctgttag gaatgattcc ctgggtgcct gaaagtgctc 120

tgacacgaca cttgttactt tgcaggccat ctgtgatggc aaggaaaaag caactatgtt 180

cacagtgaaa tattcgtgga ataggttagg ccattcagta gacattgcag ttagttagca 240

agaaccacat tgtctcttta tttgttagca ttaaacaaat tttttttgc aaattggttt 300

tatttttttg atgaagccga gcaactctgt ccaaaaaggt ttagtttgta ctcggaaacc 360

acaaagtagt ctcaaagtat tttagaggga atcgatattg atggcaaaag aaaatttgca 420

gctatgcatt tgcttctaac ggttccctct ctgtgaaaca ttatttttgg tgatctaaag 480

aaagcattgc ctttcttatt tgagatttta cagctatact ttgttgtgta atgttatggt 540

tccctttctg ta 552

<210> 297
<211> 537
<212> DNA
<213> human

<400> 297
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aagacaaggg gcacaggctc tgatgcagtg cccagaggcc ttgccaggag gcctgccaaa 120

ggcaagcttg caagccatgg ggaacccaga catcttaaag aatgcttcca ttgtcacaaa 180

tcaaatgagc ttgccacaag caagagaaga ttaagtcatc agccattaca gtgggtggtg 240

gaaaattcgg agcactcgcc tgaagttgaa gatgtgatta acagtgttca gttcatagca 300

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atggtggtgg acagagtatt tctttgggta tttataattg tctgtgtatt tggaactgca 420

gggctatttc tacagccact acttgggaac acaggaaaat cttaaaatgt attttctttt 480

atgttcagaa atttacagac accatatttg ttctgcattc cctgccacaa ggaaagg 537

<210> 298
<211> 485
<212> DNA
<213> human

<400> 298
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aatcctgcaa ccccagctgt cccaccggtg gatgcagagg ggaatccgag gccatcaacc 180

ttggtgacag cagcgcagtg ccaatgctga tcacactgca tgggagattt tgttaacgtc 240

tgccaccccc actctcaccc ccaagctcta agcccccggg aggcctggac tgtcttcctc 300

atctctgtag caccaagcct gatagatctg tatatggtaa acaggggttt aaccacatgt 360

ggttaacatg gattaatgtg ggaatttggc ttcaagaaca caaccttagg accttgggcc 420

ccaaaagctg gtggtgaaat gagaggagcc aatttaagaa gacccttatg gagacctgag 480

gctgc 485

<210> 299
<211> 358
<212> DNA
<213> human

<400> 299
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tcgaagcctc gattggccac attttggtac tacgccaagg ttgagctggt tcctcccacc 180

cctgctgaga tccctaaagc tattcagagc ctgaaaaaaa tagtcaatag tgctcaaact 240

ggtagcttca aacagctcac agttaaggaa gctgtgctga atggtttggt ggccactgag 300

gtgttgatgt ggttttatgt cggagagatt ataggcaagc ggggcatcat tggctatg 358

<210> 300
<211> 470

<212> DNA
<213> human

<400> 300
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caaagacaaa tcctcaaaag gaaattcaat catcatgaat cacaacccca agtatctcat 180

cagccaggga agagtaagtg ggatcacagg gaaggatgtt ggcagcgaca ccatcccata 240

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tttgtctgaa aaccagccaa gctttattca ggacacactt cttgccttca ctttcccact 360

tccgtggcca cctccatgca gaagccctaa gcccacattc tttcaatagc tcacggtggt 420

gcatgagtgt ccatcatctg actcttctcg gagtctcata ttttgtggga 470

<210> 301
<211> 417
<212> DNA
<213> human

<400> 301
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cctccagaac gcaggtgctg gcgcccgttc tgcctgggac cccgggaacc tctcctgccg 120

gaagccggac ggcagggatg ggccccaact tcgccctgcc cacttgactt caccaaatcc 180

cttcctggag actgaacctg gtgctcagga gcgaaggact gtgaacttgt ggcctgaaga 240

gccagagcta gctctggcca ccagctgggc gacgtcaccc tgctcccacc ccaccccaag 300

ttctaaggtc ttttcagagc gtggaggtgt ggaaggagtg gctgctctcc aaactatgcc 360

aaggcggcgg cagagctggt cttctggtct ccttggagaa aggttctgtt gccctga 417

<210> 302
<211> 412
<212> DNA
<213> human

<400> 302
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taactgacaa tcataagaag ccaactcgtt cattcatgat acagattgct gttctagcca 180

atcacctgaa tggaagagac acccatatga gacaaattaa aatatacaca ccagtagaag 240

agagctccat tggtaaattt cctagatgta caactataga tttcatgatg tatcgttcaa 300

taaggtgact ttaaaatgag acgaaaatca ttaaacgtat ctttgtttta tcctgtattc 360

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<210> 303
<211> 537
<212> DNA
<213> human

<400> 303
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ctcatcagca gcatcgaggc ccagctgagc gagctccgca gtgagatgga gtgccagaac 120

caagagtaca agatgctgct ggacatcaag acacgtctgg agcaggagat cgccacctac 180

cgcagcctgc tcgagggcca ggacgccaag aagcgtcagc ccccgtagca cctctgttac 240

cacgacttct agtgcctctg ttaccaccac ctctaatgcc tctggtcgcc gcacttctga 300

tgtccgtagg ccttaaatct gcctggcgtc ccctccctct gtcttcagca cccagaggag 360

gagagagccg gcagttccct gcaggagaga ggaggggctg ctggacccaa ggctcagtcc 420

ctctgctctc aggacccccc gtcctgactc tctcctgatg gtgggccctc tgtgctcttc 480

tcttccggtc ggatctctct cctctctgac ctggatacgc tttggtttct caacttc 537

<210> 304
<211> 478
<212> DNA
<213> human

<400> 304
accgaacacc atgccttcaa ttaagttgca gagttctgat ggagagatat ttgaagttga 60

tgtggaaatt gccaaacaat ctgtaactat taagaccatg ttggaagatt tgggaatgga 120

tgatgaagga gatgatgacc cagttcctct accaaatgtg aatgcagcaa tattaaaaaa 180

ggtcattcag tggtgcaccc accacaagga tgaccctcct cctcctgaag atgatgagaa 240

caaagaaaag cggacagatg atatccctgt ttgggaccaa gaattcctga aagttgacca 300

aggaacactt tttgaactca ttctggctgc aaactactta gacatcaaag gtttgcttga 360

tgttacatgc aagactgttg ccaatatgat caaggggaaa actcctgagg agattcgcaa 420

gaccttcaat atcaaaaatg actttactga agaggaggaa gcccaggtac gcaaagag 478

<210> 305
<211> 430
<212> DNA
<213> human

<400> 305
gacaactgcg tgggtccaaa cactcctctt cctccaggtc atttgttttg catttttaat 60

gtctttattt tttgtaatga aaaagcacac taagctgccc ctggaatcgg gtgcagctga 120

ataggcaccc aaaagtccgt gactaaattc cgtttgtctt tttgatagca aattatgtta 180

agagacagtg atggctaggg ctcaacaatt ttgtattccc atgtttgtgt gagacagagt 240

ttgttttccc ttgaacttgg ttagaattgt gctactgtga acgctgatcc tgcatatgga 300

agtcccactt tggtgacatt tcctggccat tcttgtttcc attgtgtgga tggtgggttg 360

tgcccacttc ctggagtgag acagctcctg gtgtgtagaa ttcccggagc gtccgtggtt 420

cagagtaaac 430

<210> 306
<211> 493
<212> DNA
<213> human

<400> 306
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tggctatgaa atcatcacca acacactttc ttttgccacc tacctactgg ccaccaaccc 120

tgactgccaa gagaagcttc tgagagaggt agacgttttt aaggagaaac acatggcccc 180

tgagttctgc agcctcgagg aaggcctgcc ctatctggac atggtgattg cagagacgct 240

gaggatgtac ccgccagctt tcagattcac acgggaggca gctcaggact gcgaggtgct 300

ggggcagcgc atccccgcag gcgctgtgct agagatggcc gtgggtgccc tgcaccatga 360

ccctgagcac tggccaagcc cggagacctt caaccctgaa aggtaccgct gcagctagaa 420

tccaaatctg ccctaggtcc aaaaaatggt gtctatatca agatcgtatc ccgctgacac 480

agaaggctgc cgg 493

<210> 307
<211> 465
<212> DNA
<213> human

<400> 307
gaagtataca cttccgctgt accacgcaat gatgggtggc agtgaggtgg cccagaccct 60

cgccaaggag acttttgcat ccaccgcctc ccagctccac agcaatgttg tcaactatgt 120

ccagcagatc gtggcaccca agggcagtta gaggctcgtg tgcatggccc ctgcctcttc 180

aggctctcca ggctttcaga ataattgttt gttcccaaat tcctgttccc tgatcaactt 240

cctggagttt atatcccctc aggataatct attctctagc ttaggtatct gtgactcttg 300

ggcctctgct ctggtgggaa cttacttctc tatagcccac tgagccccga gacagagaac 360

ctgcccacag ctctccccgc tacaggctgc aggcacgcag ggcagcgggt attctcctcc 420

cacctaagtc tctgggaaga agtggagagg actgatgctc ttctt 465

<210> 308
<211> 369
<212> DNA
<213> human

<400> 308
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aatcctcaac actatggaag atttcttacc ggacccttga acctcaatga tccagatgca 120

aaatgcagat tccccaaaat ttttgtaaat acagatgaca cttatgaaga gctccattta 180

atcgtttata aggccatgag tgcggctgtg tgctttatga tcgacgcctc tgtccaccca 240

acgttggatt tttgccgaag actggacagc atcgttggcc cccagctcac agtgctgccc 300

tctgacatct gtgaacagtt taacatcaac aagaggatgt ccgggtctga gaaagaaccc 360

cagtttaag 369

<210> 309
<211> 314
<212> DNA
<213> human

<400> 309
aagagtggtc agatgtttgc caaggaagat ttgaaacgga agaagcttgt acgtgatggg 60

agtgtgtttc tgaagaatgc agcaggaagg ttgaaagagg ttcaagcagt tcttctcact 120

gacattttag ttttccttca agaaaaagac cagaagtaca tctttgcatc attggaccag 180

aagtcaacag tgatctcttt aaagaagctg attgtgagag aagtggcaca tgaggagaaa 240

ggtttattcc tgatcagcat ggggatgaca gatccagaga tggtagaagt ccatgccagc 300

tccaaagagg aacg 314

<210> 310
<211> 250
<212> DNA
<213> human

<400> 310
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tgtggagctc tgggggcaa cctggaggtc tgaaaagagg agccagagaa ggtggtaccc 120

aggcttcctg gtcagaaccg gcctggagct ccttcccttc cccctggcct gagaggttgc 180

ttttaagtct tccacccctt gttccatctg cctgccaacc catcggaaag gaatccacat 240

catattggag 250

<210> 311
<211> 486
<212> DNA
<213> human

<400> 311
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tgagctcagt gtatgctagg caacaattct cccgctccag accctcaccg accacctgtc 120

ctgggaccag gctgggaggg gagtgtggca gggaggagga agaggaaggt gagaatgagt 180

agaacagttt tgtattctac tccctacaag ccattttgaa cttctgccct caccggactc 240

tgggctgtga ctggggcacc aaactcagca catgagtctc ccctagctct cgtggggaga 300

gggatgctat ttattcagtt tggggcagga gggagaggag ggaaagtatt tctgaccctg 360

atgccaacag ccgggtggct gtccaagcag gattgcaggg gacacaggga agcactgccc 420

agcccctgcc tggctgccct ttccccccctg ctgctgccac cgcttcctgc ctgtcatttg 480

aataaa 486

<210> 312
<211> 306
<212> DNA
<213> human

<400> 312
atgtcagacg cagccgtaga caccagctcc gaaatcacca ccgaggactt aaaggagaag 60

aaggaagttg tggaagaggc ggaaaatgga agagacgccc ctgctgacga ggaaaatggg 120

gagcaagagg ctgacaatga agtagatgaa gaacaggaag aaggtgggga ggaagaaggt 180

gatggtgagg aagaggatgg agatgaagat gagggagctg agtcagctac ggacaagcgg 240

gcagctgaag atgatgagga taacgatgtc gataccaaga agcagaagac cgacgaggat 300

gactag 306

<210> 313
<211> 569
<212> DNA
<213> human

<400> 313
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ttccaaagcg cctcatttcc atcttcactg agcaggagtt agagctgctt atatcaggac 120

tgcccaccat tgacatcgat gatctgaaat ccaacactga ataccacaag taccagtcca 180

actctattca gatccagtgg ttctggagag cattgcgttc tttcgatcaa gctgaccgtg 240

ccaagttcct ccagtttgtc acgggtactt ccaaggtacc cctgcaaggc tttgctgccc 300

tcgaaggcat gaatggcatt cagaagtttc agatccatcg agatgacagg accctaccca 360

agattgggaa cacaaatgtg gctgagtcct ggaccttggg taactcacaa tttggtgttt 420

ctatggaggt gatgtttgag atgagatgtg ctagacacag tgggggctgg ggagacactg 480

tcagttttaa tcagctggat ctgcctgcct atgagagctt tgagaagctc cgccacatgc 540

tactgttggc tatccaggag tgctctgaa 569

<210> 314
<211> 449
<212> DNA
<213> human

<400> 314
taaagactat cggcctccgg gaagtgtggt actttggcct ccactatgtg gataataaag 60

gatttcctac ctggctgaag ctggataaga aggtgtctgc ccaggaggtc aggaaggaga 120

atcccctcca gttcaagttc cgggccaagt tctaccctga agatgtggct gaggagctca 180

tccaggacat cacccagaaa cttttcttcc tccaagtgaa ggaaggaatc cttagcgatg 240

agatctactg ccccccctgag actgccgtgc tcttggggtc ctacgctgtg caggccaagt 300

ttggggacta caacaaagaa gtgcacaagt ctgggtacct cagctctgag cggctgatcc 360

ctcaaagagt gatggaccag cacaaactta ccagggacca gtgggaggac cggatccagg 420

tgtggcatgc ggaacaccgt gggatgctc 449

<210> 315
<211> 443

<212> DNA
<213> human

<220>
<221> misc_feature
<222> (192)..(193)
<223> n is a, c, g, or t

<400> 315
agaggaccca caatgacatc atccacaacg agaacatgag gcaaggccgg gacaagtaca 60

agacgctgcg gcagatccgg cagggcaaca ccaagcagcg catcgacgag ttcgaggccc 120

tgtaacagcc aggccaggac caagggcaga ggggtgctca tagcgggcgc tgccagcccc 180

gccacgcttg tnnctttagt gctccaagtc taggaactcc ctcagatccc agttccttta 240

gaaagcagtt acccaacaga aacattctgg gctgggaacc agggaggcgc cctggtttgt 300

tttccccagt tgtaatagtg ccaagcaggc ctgattctcg cgattattct cgaatcacct 360

cctgtgttgt gctgggagca ggactgattg aattacggaa aatgcctgta aagtctgagt 420

aagaaacttc atgctggcct gtg 443

<210> 316
<211> 428
<212> DNA
<213> human

<400> 316
ggcagagagc acagtgatca ccagcgtgag tggtggagga ggacacttgg atttttttt 60

ttgttttttt ttttttgctt aacagtttta gaatacattg tacttataca ccttattaat 120

gatcagctat atactattta tatacaagtg ataatacaga tttgtaacat tagttttaaa 180

aagggaaagt tttgttctgt atattttgtt acctttaca gaataaaaga attacatatg 240

aaaaaccctc taaaccatgg cacttgatgt gatgtggcag gagggcagtg gtggagctgg 300

acctgcctgc tgcagtcacg tgtaaacagg attattatta gtgttttatg catgtaatgg 360

actatgcaca cttttaattt tgtcagattc acacatgcca ctatgagctt tcagactcca 420

gctgtgaa 428

<210> 317
<211> 577
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (401)..(401)
<223> n is a, c, g, or t

<400> 317
ccgtccttat ctcatcaaag ccaggctgct ttattgcagg tgctgatatc aacatgttag 60

ccgcttgcaa gacccttcaa gaagtaacac agctatcaca agaagcacag agaatagttg 120

agaaacttga aaagtccaca aagcctattg tggctgccat caatggatcc tgcctgggag 180

gaggacttga ggttgccatt tcatgccaat acagaatagc aacaaaagac agaaaaacag 240

tattaggtac ccctgaagtt ttgctggggg ccttaccagg agcaggaggc acacaaaggc 300

tgcccaaaat ggtgggtgtg cctgctgctt tggacatgat gctgactggt agaagcattc 360

gtgcagacag ggcaaagaaa atgggactgg ttgaccaact nggtggaacc cctgggacca 420

ggactaaaac ctccagagga acggacaata gaatacctag aagaagttgc aattactttt 480

gccaaaggac tagctgataa gaagatctct ccaaagagag acaagggatt ggtggaaaaa 540

ttgacagcgt atgccatgac tattccattt gtcaggc 577

<210> 318
<211> 478
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (102)..(102)
<223> n is a, c, g, or t

<400> 318
tccagctcca gtgctagtca gagtaaccac agctgtacat ccatgccatc ttctccagcc 60

accccagcca gtggaaccaa ggttatccca tcatcaggta gncaagttga aacgaccaac 120

accaactttt cattctagtc ggacatccct tgctggtgat accagcaata gttcttcccc 180

ggcctccaca ggtgccaaaa ctaatcgggc agaccctaaa aagtctgcca gtcgccctgg 240

gagtcgggct gggagtcgag ccgggagtcg agccagcagc cggcgaggaa gtgacgcttc 300

tgactttgac ctcttagaga cgcagtctgc ttgttccgac acttcagaaa gcagcgctgc 360

aggggccaa ggcaactcca ggagagggct aaacaaacct tccaaaatcc caaccatgtc 420

taagaagacc accactgcct cccccaggac tccaggtccc aagcgataac actgtcta 478

<210> 319
<211> 541
<212> DNA
<213> human

<400> 319
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agatcttttc ttgacctagt atatcagtga cagttgcagc ccttgtgatg tgattagtgt 120

ctcatgtgga accatggcat ggttattgat gagtttctta acccttttcca gagtcctcct 180

ttgcctgatc ctccaacagc tgtcacagct tgtgttgagc aagcagtagc atttgcttcc 240

tcccaacaag cagctgggtt aggaaaacca tgggtaagga cggactcact tctcttttta 300

gttgaggcct tctagttacc acattactct gcctctgtat ataggtggtt ttctttaagt 360

ggggtgggaa ggggagcaca atttcccttc atactccttt taagcagtga gttatggtgg 420

tggtctcatg aagaaaagac cttttggccc aatctctgcc atatcagtga acctttagaa 480

actcaaaaac tgagaaattt actacagtag ttagaattat atcacttcac tgttctctac 540

t 541

<210> 320
<211> 543
<212> DNA
<213> human

<400> 320
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ttggctttct cttacaattg aactgcttca gaaagcacag atggatagct cccagttgat 120

ccattgtcgg gagcttgtgg cacatcacct ttctactctg cagtcttccc tgcctctgaa 180

ttccgtttat gtctaccgtc ccctcaagca caccctggtg acctgtgaca aaggagtgtt 240

cagattacat ccctcctctg tcccaggccc agacttctcc aaggacaaca gcaagccaga 300

agtgccagtc agaggtacag cagcctttta ccatcatctc ccagctgcca gtgggtgcaa 360

gcagacctct actaaacgca aagtagagga aatggaagtg gatgacttct atgatggaat 420

caaacggctc tataatgaag ataatgtctc agaaaatgtg ggttctgtgt gtggcactga 480

tttatcaaga caagagggac atgcttcccc ttgtccacct ttgcagcctg tttctgtcat 540

gta 543

<210> 321
<211> 476
<212> DNA
<213> human

<400> 321
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ttaaataaga ctaagtatag gcattgtacc tgacattgct acgtttctac cagtgtttca 120

atttaaagtg ctagtgttta aaaacatttt caagggataa ggccttctgt actttgctta 180

tttgaagaat cagtggtagg agcagtgaag taaattctat ggagtacatt tctaaaatac 240

cacatttctg aaatcataaa taagtttatt caggttctaa ccctttgctg tacacaagca 300

gacagaaatg catctgttac ataaatgaga aaaagctatt atgctgatgg agcatgcttt 360

ttaaatcctt taaaaacact caccatataa acttgcattt gagcttgtgt gttcttttgt 420

taatgtgtag agttctcctt tctcgaaatt gccagtgtgt acttggctta actcaa 476

<210> 322
<211> 496
<212> DNA
<213> human

<400> 322
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actgataata aacctctaaa cctgcccagc ggaagtgtgt tttttttaa atttaaatac 120

agaaacaact ggcaaaaatt gaactaagat ttacttttt ttccatagct gggatatagg 180

ctgcagctat agttgaacaa gcagtcttta aaaactgctg tgaaacacag gccatcaggg 240

aaaacgaaat gctgcactat taaattagag gtttttgaaa aatccaactc tcatcctggg 300

cagaggttgc ctagttggta tagaatgtta agtttcaaga aagtttacct ttgctttagg 360

tcataagttc cttatttgat tgctgtatat ggatacatgg ctgttcgtga cattctttat 420

gtgcaaattt gtgatttcaa aaatgtcctg ccagtttaag ggtacattgt agagccgaac 480

tttgagttac tgtgca 496

<210> 323
<211> 524
<212> DNA
<213> human

<400> 323
gtctctttgc tatatgacct tgaaaatctt ccggcatcca aggattccat tgtgcatcaa 60

gctggcatgt tgaagcgaaa ttgttttgcc tctgtctttg aaaaatactt ccaattccaa 120

gaagagggca aggaaggaga gaacagggca gttatccatt atagggatga tgagaccatg 180

tatgttgagt ctaaaaagga cagagtcaca gtagtcttca gcacagtgtt taaggatgac 240

gacgatgtgg tcattggaaa ggtgttcatg caggagttca aagaaggacg cagagccagc 300

cacacagccc cacaggtcct ctttagccac agggaacctc ctctggagct gaaagacaca 360

gacgccgctg tgggtgacaa cattggctac attacctttt gtgctgttcc cttcgtacac 420

caatgccagt gctcgagaca caccattaac cttgttccac acgttccggg actacctccc 480

ctaccacatt aagggccttt aaggcctata ttcacacacg tatg 524

<210> 324
<211> 242
<212> DNA
<213> human

<400> 324
ccattcccca gtggattcgg atgaaaactg gaaataaaat caggtacaac tccaaaagga 60

gacattggag aagaaccaag ctgggtctat aaggaattgc acatgagatg gcacacatat 120

ttatgctgtc tgaaggtcac gatcatgtta ccatatcaag ctgaaaatgt caccactatc 180

tggagatttc gacgtgtttt cctctctgaa tctgttatga acacgttggt tggctggatt 240

ca 242

<210> 325
<211> 407
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (26)..(26)
<223> n is a, c, g, or t

<400> 325

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gtaccatatg ccaaagtgat agagatgaat catgtcagta gttagaataa catttcaact 120

gttttctttg ctaaaatcac agaaagaccc tattgacaac atctatgtct gtaaaaatgt 180

tagagtactt gtcatcttga atatagcctc cccaagagag aacagggtgg tattctaagt 240

atgtttcttt gtaacatctt tagcagtagg acagagccat acatgtgaaa tctgattttt 300

atgtgtgtta ttcgtttgtc tggttttact acctttgcaa aaacaaaata ccccaaagat 360

atttaaacaa ggttataatt tagcatcttc cctggatcta aatagta 407

<210> 326
<211> 448
<212> DNA
<213> human

<400> 326
ccttccggcg ggtgacattc agccggcggt tcggggcgac ggactctcca ttccagaacc 60

atggcccaat ttgtccgtaa ccttgtggag aagaccccgg cgctggtgaa cgctgctgtg 120

acttactcga agcctcgatt ggccacattt tggtactacg ccaaggttga gctggttcct 180

cccacccctg ctgagatccc tagagctatt cagagcctga aaaaaatagt caatagtgct 240

cagactggta gcttcaaaca gctcacagtt aaggaagctg tgctgaatgg tttggtggcc 300

actgaggtgt tgatgtggtt ttatgtcgga gagattatag gcaagcgggg catcattggc 360

tatgatgttt gaagaccaat ctttaacatc tgattatatt tgatttatta tttgagtgtt 420

gttggaccat gtgtgatcag actgctat 448

<210> 327
<211> 544
<212> DNA
<213> human

<400> 327
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atgaaaactt cctttctgag aagttagtgt taaggtcttg gaatgtgaac acattgtttg 120

tagtgctatc cattcctctc ctgagatttt aacttactac tggaaatcct taaccaatta 180

taatagcttt ttttctttat tttcaaaatg atttcctttg ctttgattag acactatgtg 240

ctttttttt ttaaccatag ttcatcgaaa tgcagctttt tctgaacttc aaagatagaa 300

tcccattttt aatgaactga agtagcaaaa tcatcttttt cattctttag gaaatagcta 360

ttgccaaagt gaaggtgtag ataataccta gtcttgttac ataaagggga tgtggtttgc 420

agaagaattt tctttataaa attgaagttt taagggacgt cagtgtttat gccatttttc 480

cagttccaaa atgattccat tccattctag aaatttgaag tatgtaacct gaaatcctta 540

ataa 544

<210> 328
<211> 494

<212> DNA
<213> human

<400> 328
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acaggctcaa agaagaagaa cgaaccagaa gatgaggagg aggaggagga agaagaagat 120

gaagatgagg aggaagagga tgaagatgaa gaataaatgg ctatccttta atgatgcgtg 180

tggaatgtgt gtgtgtgctc aggcaattat tttgctaaga atgtgaattc aagtgcagct 240

caatactagc ttcagtataa aaactgtaca gatttttgta tagctgataa gattctctgt 300

agagaaaata cttttaaaaa atgcaggttg tagctttttg atgggctact catacagtta 360

gattttacag cttctgatgt tgaatgttcc taaatattta atggtttttt taatttcttg 420

tgtatggtag cacagcaaac ttgtaggaat tagtatcaat agtaaatttt gggtttttta 480

ggatgttgca tttc 494

<210> 329
<211> 421
<212> DNA
<213> human

<400> 329
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tagtgccatg aagcgattct gtctttgact tccaatggca aacctgggtg atcgggaaca 120

agcacgttgt acccttggct ggacatggcc aagacacaag gcattccacg gcggcaagct 180

gaccgcacag cagtctggct tgattttcag ccgtcatcat tgggttctgt tttgacagct 240

ctgctgtccc atagggactg cgactgggac caggtcaacc acgccagggg ggtgtcacca 300

gccttttctt tttttctttc ttttttttt tttcctcctt aagctgctgt caatccaaac 360

cattggcatc atcgtttctt ttcaattaaa accaacatat cagcaatagt ctgctctccc 420

c 421

<210> 330
<211> 470
<212> DNA
<213> human

<400> 330
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tgcccctcct tttatgtcca taaagtggcg tgaagtgaga cgttctcttt ggtggtcaac 120

ccggatgggt gacaggctgg atggccttgt gaacttgagc tcagtgtatg ctaggcaaca 180

attctcccgc tccagaccct caccgaccac ctgtcctggg accaggctgg gaggggagtg 240

tggcagggag gaggaagagg aaggtgagaa tgagtagaac agttttgtat tctactccct 300

acaagccatt ttgaacttct gccctcaccg gactctgggc tgtgactggg gcaccaaact 360

cagcacatga gtctccccta gctctcgtgg ggagagggat gctatttatt cagtttgggg 420

caggagggag aggagggaaa gtatttctaa ccctgatgcc aacagccggg 470

<210> 331
<211> 101
<212> DNA
<213> human

<400> 331
cgatcaccaa tgtacctcca gaggtaactg tgctcacgaa cagccctgtg gaactgagag 60

agcccaacgt cctcatctgt ttcatagaca agttcacccc a 101

<210> 332
<211> 434
<212> DNA
<213> human

<400> 332
ctccgggccg acatgagtgg ggaccacctc cacaacgatt cccagatcga agcggatttc 60

cgattgaatg attctcataa acacaaagat aaacacaaag atcgagaaca ccggcacaaa 120

gaacacaaga aggagaagga ccgggaaaag tccaagcata gcaacagtga acataaagat 180

tctgaaaaga aacacaaaga gaaggagaag accaaacaca aagatggaag ctcagaaaag 240

cataaagaca aacataaaga cagagacaag gaaaaacgaa aagaggaaaa ggttcgagcc 300

tctggggatg caaaaataaa gaaggagaag gaaaatggct tctctagtcc accacaaatt 360

aaagatgaac ctgaagatga tggctatttt gttcctccta aagaggatat aaagccatta 420

aagagacctc gaga 434

<210> 333
<211> 240
<212> DNA
<213> human

<400> 333
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cgtgcgcgag ggcgacgtgc tcacccttt ggagtcagag cgagaagccc ggaggttgcg 120

ctgagcttgg ctgctcgctg ggtcttggat gtcgggttcg accacttggc cgatgggaat 180

ggtctgtcac aatctgctcc tttttttgt ccgccacacg taactgagat gctcctttaa 240

<210> 334
<211> 419
<212> DNA
<213> human

<400> 334
ctggggaaat tgcttcactg tcttagaacc aagcaagatt cacctgtgtt ttgtgttcat 60

gttcatttgc ctcttaaagg caagggttga agataaataa ggtagcaatg tctatagttt 120

tggccttaac tatgccaatc taattataat tccctgtatt taaaatggtt tcttttactt 180

attgaaaggc attttagtgt ggtttatgtg taatattaaa gattattcaa cacctctcac 240

atcttacaga tctataaggt cacatgcttt taaaatagta gcaagttaaa cttcactctt 300

gaattcttta caatctaagt caaactaagt tataatttag gattgtcttt aaacagccat 360

tcagaaacaa aactgtagaa ctgtgtattt gattgggaat ggtgcttttg ccaacttaa 419

<210> 335
<211> 512
<212> DNA
<213> human

<400> 335
gagtaactgc tctctgagtt ttgcacacga agttgccctc atctgctgga gatcgataag 60

gaaggcacaa gacgttctcc tctgcccgtg aggagcttcc cgcagccgcc tggcccagcc 120

tgggcacgtt ctccgaggca tgtgtctccc tgctcaccct cgtctgggca cctcagcatc 180

tgtggacttg agcgtccaaa aaccctgagt gtgattctgg gcagccggcc tggcttgaag 240

tccgccatga ccctgggcac aggggaagcc cagccgtggg cttaggagag agggaccagc 300

gcccagcgtt agggctggaa gacggcagtg ttcagaattc cagccgctca tctgaacaca 360

gaaggtgtga actgacctct aaagcagcgt gagatgggaa tgatctagaa aactttggat 420

ttttgaagta aattttaatg tttcatatta atttcttgaa aatgtattaa atgtcattga 480

aagccttatt acgcttttca gatcctttca at 512

<210> 336
<211> 307
<212> DNA
<213> human

<400> 336
tgtggattcc agtagtattt atattgagag aaacaaattt tagtccttct aactgtgcta 60

aaacttggat atttgtgaaa actccttacc accatacaag catcagaaga gctctcttgt 120

tgttagcact tattgtttgc aagaacagaa tacatccttt tatcctttta tgaaaaatga 180

caagtgaagg caaaagggga aggttatttg atctggaaga tgagtgttct gatgtggtgg 240

cttttgcaaa aatctttatt ggtgttgaaa actggaaaaa ataactcatc cagaattcat 300

attgtct 307

<210> 337
<211> 531
<212> DNA
<213> human

<400> 337
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atagaggaaa tgttggtgtt gtactgttta attttggcaa agaaaagttt gaagtcaaaa 120

aaggtgatcg aattgcacag ctcatttgcg aacggatttt ttatccagaa atagaagaag 180

ttcaagcctt ggatgacacc gaaaggggtt caggaggttt tggttccact ggaaagaatt 240

aaaatttatg ccaagaacag aaaacaagaa gtcatacctt tttcttaaaa aaaaaaaaaa 300

aagtttttgc ttcaagtgtt ttggtgtttt gcacttctgt aaacttacta gctttacctt 360

ctaaaagtac tgcatttttt actttttttt atgatcaagg aaaagatcat taaaaaaaaa 420

cacaaagaag tttttctttg tgtttggatc aaaaagaaac tttgtttttc cgcaattgaa 480

ggttgtatgt aaatctgctt tgtggtgacc tgatgtaaac agtgtcttct t 531

<210> 338
<211> 427
<212> DNA
<213> human

<400> 338
ggaagtggtg gtgcatggac gactgaccac aatcaactgt gaggaaggag ataaactgaa 60

actcacctgc tttgaattgg caccgaaaag tgggaatacc ggggagttga gatctgtaat 120

tcatagtcac atcaaggtca tcaagaccag gaaaaacaag aaagacatac tcaatcctga 180

ttccaagtat ggaaacttca ccagactttt tcttctaaaa tctggatgtc attgacgata 240

atgtttatgg agataaggtc taagtgccta aaaaaatgta catatacctg gttgaaatac 300

aacactatac atacacacca ccatatatac tagctgttaa tcctatggaa tggggtattg 360

ggagtgcttt tttaattttt catagttttt ttttaataaa atggcatatt ttgcatctac 420

aacttct 427

<210> 339
<211> 460
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (173)..(174)
<223> n is a, c, g, or t

<400> 339
gaggaaagac gctctttagg ttttgttttg ttttttttt tttggttttg ttttttgttt 60

ttttttttac tctagggaaa acactgacga atggtcagag ctcctatcct gatcttttca 120

tcaaggcgcc tttcctaata atatggttca actgtgaatg tagaagtggg ggnnaggggg 180

gagaaaaaga aaactctggc gttagaggat ataaaaaaat ataagtacaa ttgttacaaa 240

taacgcagac ttcaaaaaca aaaaaatcac aacccaaaca aaccaaaatt taaatgatca 300

gaattggcag cacaaagaaa acgccctctc ctgacttgta ttgtggcagt ctgaacgccc 360

ccagaaaatt gtgccaaaga gtttagaaaa ataaatatac aataaaagta aacacataca 420

cacaaaacag caaacttcag gtaactattt tggattgcaa 460

<210> 340
<211> 523
<212> DNA
<213> human

<400> 340
ttcaggggcc gcatgtccat gaaggaggtg gatgagcaaa tgcttaatgt ccaaaacaaa 60

aacagcagct attttgttga gtggatcccc aacaatgtga aaacggctgt ctgtgacatc 120

ccacctcggg ggctaaaaat gtccgccacc ttcattggca acagcacggc catccaggag 180

ctgttcaagc gcatctccga gcagttcacg gccatgttcc ggcgcaaggc cttcctgcac 240

tggtacacgg gcgagggcat ggacgagatg gagttcaccg aggccgagag caacatgaat 300

gacctggtgt ccgagtacca gcagtaccag gatgccacag ccgaggagga gggcgagttc 360

gaggaggagg ctgaggagga ggtggcctag agccttcagt cactggggaa agcagggaag 420

cagtgtgaac tctttattca ctcccagcct gtcctgtggc ctgtcccact gtgtgcactt 480

gctgttttcc ctgtccacat ccatgctgta cagacaccac cat 523

<210> 341
<211> 493
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (273)..(273)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (408)..(408)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (410)..(410)
<223> n is a, c, g, or t

<400> 341
gaggggctgt tgaatttccc acataccctc cttccaccaa gttggaacat ccttggaaat 60

tggaagagca caagaggaga tccagggcaa ggccattggg atattctgaa acttgaatat 120

tttgttttgt gcagagataa agacctttc catgcaccct catacacaga aaccaatttt 180

ctttttata ctcaatcatt tctagcgcat ggcctggtta gaggctggtt ttttctcttt 240

tcctttggtc cttcaaaggc ttgtagtttt ggntagtcct tgttctttgg aaatacacag 300

tgctgaccag acagcctccc cctgtcccct ctatgacctc gccctccaca aatgggaaaa 360

ccagactact tgggagcacc gcctgtgaaa taccaacctg aagacacngn ttcattcagg 420

caacgcacaa aacagaaaat gaaggtggaa caagcacaga tgttcttcaa ctgtttttgt 480

ctacactctt tct 493

<210> 342
<211> 499
<212> DNA
<213> human

<400> 342
atctatctat tgtcagtcgt ctctcagttc ttgaggtata ttattttaat cattccatgc 60

cttaatatgc ttgcaataca agaatatctt cagatgggtg aataccaaaa ggctttcagt 120

ttttagtcag aaatcaagca ttgggctgtg gtagccaaaa accataggtt agctaaaaag 180

atcatgatac aattatttta ttaagtcatg gttaataaca aatgaatcca gacttgtcta 240

acagattttc catcaacaaa tattgttatg tgcaaaagta ttgcctatgt tgttttacac 300

accactgcat taactagaac tgctgagagg actgtatata tgattttaaa cctaagttga 360

ttttttttct cactcttgaa aggagtactt ctttgtgaaa gcagttctta cagctttgtt 420

ttcaaccagc taaaaatgtt ttatatatta ctctaacctg ttgtcctcca cattctattg 480

tcctaattgt actgttttc 499

<210> 343
<211> 557
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (410)..(410)
<223> n is a, c, g, or t

<400> 343
ggggcagagt ccatgcaact tcaacatata gagaagcaac accagaaaat gatcctaact 60

actttatgaa tgaaccaaca ttttatacat ctgatggtgt tcctttcact gcagctgatc 120

cagattacca agagaaatac caagaattac ttgaaagaga ggacttttt ccagattatg 180

aagaaaatgg aacagattta tccggggctg gtgatccata cttggatgat attgatgatg 240

agatggaccc agagatagaa gaagcttatg aaaagttttg tttggaatca gagcgtaagc 300

gaaaacagta aagttaaatt tcagcatatc agttttataa agcagtttag gtatggtgat 360

ttagcagaac acaagagagc aagaaaatgt gtcacatcta taccaaattn aggatgttga 420

gttatgttac taatgtatgc aactttaatt ttgtttaaca ctatctgcca aaataaactt 480

tattccctat aacttaaaat gtgtatatat atataatagt ttattatgta cagttaattc 540

tactgttttg gctgcaa 557

<210> 344
<211> 334
<212> DNA
<213> human

<400> 344
gtcctctatg acttacccag aaggcaacgc ttctctttct ggtcaaaatg gctggtaagc 60

agggcgtttc agcatcaggc aagtggctgg atggtattcg aaaatggtat tacaatgctg 120

caggattcaa taaactgggg ttaatgcgag atgatacaat atacgaggat gaagatgtaa 180

aagaagccat aagaagactt cctgagaacc tttataatga caggatgttt cgcattaaga 240

gggcactgga cctgaacttg aagcatcaga tcttgcctaa agagcagtgg accaaatatg 300

aagaggaaaa tttctacctt gaaccgtatc tgaa 334

<210> 345
<211> 477
<212> DNA
<213> human

<400> 345
ttttaaattc gatcttcagc tgtactgtaa atagggtact gcattgtagt ctccatatct 60

gtattacttt tctgtaatat ttaagagttg cttaaaagca tacaaaatgt actgttacta 120

aaacagctaa ttatttctct ctcccccttt gacaggaagg ggcttcagtt gttcctccat 180

ggctagaacc ataataaaca atgtacccgt aatttgtaac ataaagtatt gcaatatgtt 240

agtaacaatc ttgcagcctt cctttccaaa gttcatttta ttttgatcag ttcagtatat 300

tgcactaatt attttaggta ttttcattat atgaaagcta ccatgtgtca gagatgattt 360

aatctattta agtgttggac tgctaggaga acttgtacat ttatgataat gcagaattag 420

gaaaacggtt caccagtgtt tagttttata ttgaggtgct caggttggaa taaagtg 477

<210> 346
<211> 296
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (92)..(92)
<223> n is a, c, g, or t

<400> 346
cggctgcaca ccagctctaa gagcgagagt gaacgagaga gggagggaga gagtgagagc 60

gagcgagatc tttggagaga ttttttttnt tngcctccta cttctgtctt gaagccagac 120

aatcgacttc agctctccct cccctccctc tttctccacg ttctgctccc actcgctctc 180

ctgtcccctt cccctccccc cccggcggaa agcccccccga aaccaacaaa gctgagccga 240

gagaaacaaa caaaacaaac acaccgggcc agacaagcca tcgacaaaac tttgca 296

<210> 347
<211> 435
<212> DNA
<213> human

<400> 347
aaagaaacca tgacaaacct agcttttaaa aaatatttta agaaagagaa tgaactgtgg 60

aatttattgg cagccaagga atgtgtccaa gacacatgct gaggttttga ataaaaagtg 120

aacttttgta atttgaattg ggtcccgctt agttcttgaa ttgttatgaa aatcctatat 180

ctgtttgtat atttgcaaac cctttgtatt ataattgttg atattttccc tttttaaaaa 240

ataccattga aatcagcatg acaaaaataa cactgttggc acttataggt aacgtgattg 300

attcagtatc ttagagttta cagtttgtgt tttaaaaaaa ctgaaggttt ttttttaag 360

tgcaacattt ctgtatactg taaaagttat aataactgaa ctgtttggtc gagtctttgt 420

gtgttatatt ccaag 435

<210> 348
<211> 488
<212> DNA
<213> human

<400> 348
gagtctcaga atgctcagga ccaaggtgca gagatggaca agagcagcca ggagacccag 60

cgatctgagc ataaaactca ttaaacctgc ccctatcact agtgcatgct gtggccagac 120

agatgacacc ttttgttatg ttgaaattaa cttgctaggc aaccctaaat tgggaagcaa 180

gtagctagta taaaggccct caattgtagt tgtttccagc tgaattaaga gctttaaagt 240

ttctggcatt agcagatgat ttctgttcac ctggtaagaa aagaatgata ggcttgtcag 300

agcctatagc cagaactcag aaaaaattca aatgcactta tgttctcatt ctatggccat 360

tgtgttgcct ctgttactgt ttgtattgaa taaaaacatc ttcatgtggg ctggggtaga 420

aactggtgtc tgctctggtg tgatctgaaa aggcgtcttc actgctttat ctcatgatgc 480

ttgcttgt 488

<210> 349
<211> 417
<212> DNA
<213> human

<400> 349
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acactgtggt tttcggcgga gggaccaaac tgaccgtcct aggtcagccc aaggctgccc 120

cctcggtcac tctgttcccg ccctcctctg aggagcttca agccaacaag gccacactgg 180

tgtgtctcat aagtgacttc tacccgggag ccgtgacagt ggcctggaag gcagatagca 240

gccccgtcaa ggcgggagtg gagaccacca caccctccaa acaaagcaac aacaagtacg 300

cggccagcag ctatctgagc ctgacgcctg agcagtggaa gtcccacaga agctacagct 360

gccaggtcac gcatgaaggg agcaccgtgg agaagacagt ggcccctaca gaatgtt 417

<210> 350
<211> 403
<212> DNA
<213> human

<400> 350
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tgtagtatga ggcatggaat agttttgtat cgggaatttc tcagagctga gtaaaatgaa 120

ggaaaagcat gttatgtgtt tttaaggaaa atgtgcacac atatacatgt aggagtgttt 180

atctttctct tacaatctgt tttagacatc tttgcttatg aaacctgtac atatgtgtgt 240

gtgggtatgt gtttatttcc agtgagggct gcaggcttcc tagaggtgtg ctataccatg 300

cgtctgtcgt tgtgcttttt tctgttttta gaccaatttt ttacagttct ttggtaagca 360

ttgtcgtatc tggtgatgga ttaacatata gcctttgttt tct 403

<210> 351
<211> 389
<212> DNA
<213> human

<400> 351
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cctggtgcct cctaccctat ggccctgaat ggtgcactgg tttaattgtg ttggtgtcgg 120

cccctcacaa atgcagccaa gtcatgtaat tagtcatctg gaacaaagac taaaaacagc 180

agagaattgc gggttctacc cagtcagaag atcacaccat ggagactttc tactagagga 240

cttgaaagag aactgagggg ccacaaaata aacttcacct tccattaagt gttcaagcat 300

gtctgcaaat taggagggag ttagaaacag tctttttcat cctttgtgat gaagcctgaa 360

attgtgccgt gttgccttat atgaatatg 389

<210> 352
<211> 515
<212> DNA
<213> human

<400> 352
tgtctccccg ctatctaaaa aagtataaga acaagcagat aacagcgaga atcttggagg 60

cccatcagaa tgtagctcag atgagtctaa ttgaagccaa gatgagattt attcaagctt 120

ggcagtcact acctgaattt ggcatcactc acttcattgc aaggttccaa gggggcaaaa 180

aagaagaact tattggaatt gcatacaaca gactgattcg gatggatgcc agcactggag 240

atgcaattaa aacatggcgt ttcagcaaca tgaaacagtg gaatgtcaac tgggaaatca 300

aaatggtcac cgtagagttt gcagatgaag tacgattgtc cttcatttgt actgaagtag 360

attgcaaagt ggttcatgaa ttcattggtg gctacatatt tctctcaaca cgtgcaaaag 420

accaaaacga gagtttagat gaagagatgt tctacaaact taccagtggt tgggtgtgaa 480

tagaaatact gtttaatgaa actccacggc cataa 515

<210> 353
<211> 536
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (26)..(26)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (64)..(64)
<223> n is a, c, g, or t

<220>
<221> misc_feature

<222> (124)..(124)
<223> n is a, c, g, or t

<400> 353
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tatngtctcg tgtttttatt tttacaccat attgtattac acttttagta ttcaccagca 120

taancactgt ctgcctaaaa tatgcaactc tttgcattac aatatgaagt aaagttctat 180

gaagtatgca ttttgtgtaa ctaatgtaaa aacacaaatt ttataaaatt gtacagtttt 240

ttaaaaacta ctcacaacta gcagatggct taaatgtagc aatctctgcg ttaattaaat 300

gcctttaaga gatataatta acgtgcagtt ttaatatcta ctaaattaag aatgacttca 360

ttatgatcat gatttgccac aatgtcctta actctaatgc ctggactggc catgttctag 420

tctgttgcgc tgttacaatc tgtattggtg ctagtcagaa aattcctagc tcacatagcc 480

caaaagggtg cgagggagag gtggattacc agtattgttc aataatccat ggttca 536

<210> 354
<211> 407
<212> DNA
<213> human

<400> 354
gatgcctaac caaggactag agctccttct tgagatctaa atctaaagta aatgtgcatt 60

aaagcagtgt gcttcaaagg catcagacga tgaaagcaac ataccacaac taggagttat 120

ttctcaaact taaatgtcct ctgggaatcc agacttaaaa ataagagcaa acttaacaca 180

ctatccattt tcgagcaaac ttaacccact atatccattt tgctcatgtg ttttatgcaa 240

ccagctttcc atcaaatcct caatccttga atccaggtaa aaggttaatt atcctaggat 300

tagtgaatga ttcaatgaag ctttcttgaa aacaaacata ggagtgtaat gtactattat 360

gtttgtatcc tgttttagtt tataaagcac tttcacatac attatgg 407

<210> 355
<211> 518
<212> DNA
<213> human

<400> 355
acccaactac tctggtacca ttgctttggc cctgttagtg tcgcttgttg gaggtttgct 60

ttatttgaga aggaacaact tggagttcat ctataacaag actggttggg ccatggtgtc 120

tctgtgtata gtctttgcta tgacttctgg ccagatgtgg aaccatatcc gtggacctcc 180

atatgctcat aagaacccac acaatggaca agtgagctac attcatggga gcagccaggc 240

tcagtttgtg gcagaatcac acattattct ggtactgaat gccgctatca ccatggggat 300

ggttcttcta aatgaagcag caacttcgaa aggcgatgtt ggaaaaagac ggataatttg 360

cctagtggga ttgggcctgg tggtcttctt cttcagtttt ctactttcaa tatttcgttc 420

caagtaccac ggctatcctt atagtgatct ggactttgag tgagaagatg tgatttggac 480

catggcactt aaaaactcta taacctcagc cttttaat 518

<210> 356
<211> 474
<212> DNA
<213> human

<400> 356
actgggctac tctggcgcag aaattaggtc tggggatact taataatgcc ttccggctga 60

gtcctgctcc ttccaaaaca cttatggaca actatgaggt ctctgggggt acagtcagag 120

agctggtgga ggccctgaga caaatgggct acaccgaagc aattgaagtg atccaggcag 180

cctccagccc agtgaagacc acctctcagg cccactcgct gcctctctcg cctgcctcca 240

caaggcagca aatagacgag ctccgagaca gtgacagtgt ctgcgacacg ggcgtggaga 300

catccttccg caaactcagc tttaccgagt ctctgaccag tggtgcctca ctgctaactc 360

tcaacaaaat gccccatgat tatgggcagg aaggacctct agaaggcaaa atttagcctg 420

ctgacaattt cccacaccgt gtaaaccaaa gccctaaaat tcactgcgtt gtcc 474

<210> 357
<211> 409
<212> DNA
<213> human

<400> 357
gtagatccct tcagttcaaa acataatgtg attgtgggca gaaatggatc tggaaaaagt 60

aacttttttt atgcaattca gtttgttctc agtgatgagt ttagtcatct tcgtccagaa 120

cagcggttgg ctttattgca tgaaggtact ggtcctcgtg ttatttctgc ttttgtggag 180

attatttttg ataattcaga caaccggtta ccaatcgata aagaggaagt ttcacttcga 240

agagttattg gtgccaaaaa ggatcagtat ttcttagaca agaagatggt cacgaaaaat 300

gatgtgatga acctccttga aagcgctggt ttttctcgaa gcaatcctta ttatattgtt 360

aaacaaggaa agatcaacca gatggcaaca gcaccagatt ctcagagat 409

<210> 358
<211> 458
<212> DNA
<213> human

<400> 358
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taaagccaag gatttacaag atgaactagc aggcaatagt gaacaaagga aacgtttatt 180

aaaagagagg cagaagctgc ttgaaaaaat agaagaaaag cagaaagaac tggcagaaac 240

agaacccaaa ttcaacagtg tgaaagagaa agaagaacga ggaattgcta gattggctca 300

agctacccag gaaagaacgg atctttatgc aaagcagggt cgaggaagcc agtttacatc 360

aaaagaagaa agggataagt ggattaaaaa ggaactcaag tctttagatc aggctattaa 420

tgacaagaaa agacagattg ctgctataca taaggatt 458

<210> 359
<211> 422
<212> DNA
<213> human

<400> 359
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gagttggagc tgctgcgggg cagccaggcc atcatgctgc gctcagcgga cctgacagga 180

ctggagaagc gtgtggagca gatccgtgac cacatcaatg ggcgcgtgct ctactatgcc 240

acctgcaagt gatgctacac gttccagccc gttgccccac tcatctgcgc gctttgcttt 300

tggttggggg gcagattggg ttggaatgct ttccatctcc aggagacttt catgtagccc 360

aaagtacagc ctggaccacc cctggtgtgt gtagctagta agattaccct gagctgcagc 420

tg 422

<210> 360
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<212> DNA
<213> human

<400> 360
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cacatctcag ctggagccat tgacctcatc aacaacctgc tgcaggtgaa gatgcgcaaa 120

cgctacagcg tggacaaatc tctcagccac ccctggttac aggagtacca gacgtggctg 180

gacctccgag agctggaggg gaagatggga gagcgataca tcacgcatga gagtgacgac 240

gcgcgctggg agcagtttgc agcagagcat ccgctgcctg ggtctgggct gcccacggac 300

agggatctcg gtggggcctg tccaccacag gaccacgaca tgcaggggct ggcggagcgc 360

atcagtgttc tctgaggtcc tgtgccctcg tccagctgct gccctccaca gcggttcttc 420

acaggatccc agcaatgaac tgttctaggg aaagtggctt cctgcccaaa ctggatggga 480

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<210> 361
<211> 505
<212> DNA
<213> human

<400> 361
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cagcctcctt ggaggtagaa tttatttatt taaaattact ggttgcatca agaacccata 180

gggtgtacaa aaggttctat aaaatctgca ttatagagac aaagaggcag gcaaatccat 240

gtcacaaggg taaagcttac agtttacaaa ctgggaacgc cagggtgtag gatataaaaa 300

cgcactcttg agaaaacaaa tgtaatcagg gtgctgaaaa cttgcatggt gctttcagac 360

attagccttg ttcaacaaat ttcttgtatt gacagatcca tagtgtgcat gggcagacac 420

attttgcctc tatgtctctt aaaatttaa ttaaaaatac tctttccagt aatcctaatt 480

tgcacgaaga tataatgtcc acatt 505

<210> 362
<211> 172
<212> DNA
<213> human

<400> 362
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atatccccag gccaaatagc atgtgacaca ggacagccat agtatagtgt gtcactcgtg 120

gttggtgtcc tttcatgctt ctgccctgtc aaaggtccct atttgaaatg tg 172

<210> 363
<211> 527
<212> DNA
<213> human

<400> 363
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cgaccaggtc gttgaggact tcctcatgga gattggcaca ggaccagact caagacacac 120

aactcataac agttgatgaa aaattggata tcactacttt aactggcgtt ccagaagagc 180

atataaaaac tagaaaagtc aggatctttg ttcctgctcg caataacatg cagtctggag 240

taaacaacac aaagaaatgg aagatggagt ttgataccag ggagcgatgg gaaaatcctt 300

tgatgggttg ggcatcaacg gctgatccct tatccaacat ggttctaacc ttcagtacta 360

aagaagatgc agtttccttt gcagaaaaaa atggatggag ctatgacatt gaagagagga 420

aggttccaaa acccaagtcc aagtcttatg gtgcaaactt ttcttggaac aaaagaacaa 480

gagtatccac aaaataggtt ggcactgact atatctctgc ttgactg 527

<210> 364
<211> 541
<212> DNA
<213> human

<400> 364
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acggggagat gttcttcaca atggaaatgg cacttaccag tcctgggtgg tggtggcagt 240

gcccccgcag gacacagccc cctactcctg ccacgtgcag cacagcagcc tggcccagcc 300

cctcgtggtg ccctgggagg ccagctagga agcaagggtt ggaggcaatg tgggatctca 360

gacccagtag ctgcccttcc tgcctgatgt gggagctgaa ccacagaaat cacagtcaat 420

ggatccacaa ggcctgagga gcagtgtggg gggacagaca ggaggtggat ttggagaccg 480

aagactggga tgcctgtctt gagtagactt ggacccaaaa aatcatctca ccttgagccc 540

a 541

<210> 365
<211> 480
<212> DNA
<213> human

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<222> (32)..(32)
<223> n is a, c, g, or t

<400> 365
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aagaagatcc gatcagctac caagctggcc tccagggcac accagatctt tgaggagttc 180

atttgcagtg aggcccctaa agaggtcaac attgaccatg agacccgcga gctgacgagg 240

atgaacctgc agactgccac agccacatgc tttgatgcgg ctcaggggaa gacacgtacc 300

ctgatggaga aggactccta cccacgcttc ctgaagtcgc ctgcttaccg ggacctggct 360

gcccaagcct cagccgcctc tgccactctg tccagctgca gcctggacga gccctcacac 420

acctgagtct ccacggcagt gaggaagcca gccgggaaga gaggttgagt cacccatccc 480

<210> 366
<211> 535
<212> DNA
<213> human

<400> 366
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ggtatgagaa caggcaaaaa gagatgcccc gagatagaag gggagccttg tgtttctttc 120

ctgcagacgt gagatgaaca ctggagtggg cagaggtggc ccaggaccat ggcaccctta 180

gagtgcagaa gctgggggga gaggctgctt cgaagggcag gactggggat aatcagaacc 240

tgcctgtcac ctcagggcat cactgaacaa acatttcctg atgggaactc ctgcggcaga 300

gcccaggctg gggaagtgaa ctacccaggg cagccccttt gtggcccagg ataatcaaca 360

ctgttctctc tgtaccatga gctcctccag gagattattt aagtgtattg tatcattggt 420

tttctgtgat tgtcataaca ttgtttttgt tattgttggt gctgttgtta tttattattg 480

taatttcagt ttgcctctac tggagaatct cagcaggggt ttcagcctga ctgtc 535

<210> 367
<211> 328
<212> DNA
<213> human

<400> 367
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tcaactttta ttgctgtatt ctagtcagac cagaacatac ttccactaca tcagttactt 120

ggcatcattt cacctcagtt tattattgcc aaataataat ttgtgtcagc attttcaact 180

atggttattc atccaaccct tggatctctt tgagtctact gataatctcc actggaaagg 240

tggaattgaa atgtggtcca cattttaact agctatttcc tggggctgta tttttcagaa 300

tatgctgagc tacatttgct gcaatctg 328

<210> 368
<211> 382
<212> DNA
<213> human

<400> 368
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agactgcatc gagccttgaa gggtattgga actgatgagt ttactctgaa ccgaataatg 120

gtgtccagat cagaaattga ccttttggac attcgaacag agttcaagaa gcattatggc 180

tattccctat attcagcaat taaatcggat acttctggag actatgaaat cacactctta 240

aaaatctgtg gtggagatga ctgaaccaag aagataatct ccaaaggtcc acgatgggct 300

tttccaacag ctccacctta cttcttctca tactatttaa gagaacaagc aaatataaac 360

agcaacttgt gttcctaaca gg 382

<210> 369
<211> 474
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (281)..(281)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (319)..(319)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (326)..(326)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (428)..(429)
<223> n is a, c, g, or t

<400> 369
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tgacccactc tctgggggggc ggcacggggt ccgggatggg caccctgctc atcagcaaga 180

tccgggaaga gtacccagac cgcatcatga acaccttcag cgtcatgccc tcacccaagg 240

tgtcagacac ggtggtggag ccctacaacg ccaccctctc ngtccaccag ctggtggaaa 300

acacagatga aacctactnc attganaacg aggccctgta tgacatctgc ttccgcaccc 360

tgaagctgac cacccccacc tacggggacc tcaaccacct ggtgtcggcc accatgagcg 420

gggtcacnnc acctgcctgc gcttcccggg ccagctgaac gcagacctgc gcaa 474

<210> 370
<211> 373
<212> DNA
<213> human

<400> 370
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tttttaggac tctactagtt ggcatacgaa aatatataag gatggacatt ttatcgtctc 120

atagtcatgc tttttggaaa tttacatcat cctcaagtaa aataaatatc agttaaatat 180

tggaagctgt gtgtaagatt gattcagcat tccatgcact tgctttaaaa tttagtcctg 240

tgcatactgt ggtgttttta ctgtgcatat ttgaattttt catgcagttt ttctagagca 300

ataatcagtg gtgcttttgt acctaggttt tatgtgattt taatgaaaca tggatagttg 360

tggccacctg ctg 373

<210> 371
<211> 273
<212> DNA
<213> human

<400> 371
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tgcctataat cgtggaagtc agagggattc ccctttttca tctcatttta ataggaaaat 120

tccttatggt taacatctcc ctacaaactc ctactacgtc gtctaaattg ctgctctgga 180

ataaggtgat ttctgccccc agattcttcc ctagccggta gatacgtgaa gatattccca 240

actgtggaat ggcagtgtag gtagcttcag gaa 273

<210> 372
<211> 579
<212> DNA
<213> human

<400> 372
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aggacatgga atttggcctc atgacaggcc caactaggga taggaaggaa aatgaagaga 120

gccagtattt ccccttctcc agaagcaggt actcagcttt ctgggaaaag cgtgcctcca 180

gccgtgggga caggccatcc tactgactac ctcttgcttg gcatgaaata aactgctatc 240

ctccccttgg aatctaccgc cactctacat cctactgctt tggcctccct ctcctctcac 300

cagatggcat gtggtgtggc acctgtggct ggacacagga ggcctcagga tcacaaatgt 360

tacactagac atatgtccta atgtgctgcc cagaaacctc aactgttccc cagctactga 420

ggggcactgt cagcgagatg ttgggtctgg aggtgatgag atcgggccac acttgagctg 480

agtcaccaga ccctattgct tcaacagtgc ttggcccccg ccagcttgtc ccagccactc 540

tagctgctgg atgtgatcct gggacatgta ctccaagcc 579

<210> 373
<211> 421
<212> DNA
<213> human

<400> 373
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cctggccctt gatgccgagc tcatgccaca aagctcagta ggagggatgt tccagtggat 120

gagggccagc caggaagcac aggtccaagg ctggtcccac acttatcagc agcaacaact 180

gtcagttcat cctgcatggg aaaaatgttg gaatgggagt ctgaaatggg gctactgttt 240

cagtcctaac gtgctgtgtg acattgggac aacactttcc ctctctggac ctcagtttcc 300

ctctgtatac aaggatcaga ttcttgctgt gacccaagaa ctcctgaaat catatagaaa 360

ggctggggtg ggccctgtca ttcgtggttg atttcaatac actcaagtgc cattcatcct 420

t 421

<210> 374
<211> 526
<212> DNA
<213> human

<400> 374
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aatgattaaa ctagtaccac ataatgaaag tgcatggaac tatttgaaag ggattttgca 120

ggatcgtggt ctttccaaat atcctaatct gttaaatcaa ttacttgatt tacaaccaag 180

tcatagttcc ccctacctaa ttgcctttct tgtggatatc tatgaagaca tgctagaaaa 240

tcagtgtgac aataaggaag acattcttaa taaagcatta gagttatgtg aaatcctagc 300

taaagaaaag gacactataa gaaaggaata ttggagatac attggaagat cccttcaaag 360

caaacacagc acagaaaatg actcaccaac aaatgtacag caataacacc atccagaaga 420

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ccttcccttt tgtggtgtaa aagtgcatca cacaggtatt gctttt 526

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<213> human

<400> 375
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tacctaaaac ctcgggcaga agaggagagg aggatagcag cagaagagaa gaagaagcag 180

gatgaactga aacggattgc cagagaattg gcagaagatg acagcatatt aaagtgagtg 240

accctgcgac ccactctttg gaccagcagc ggatgaataa agcttcctgt gttgtgtgac 300

<210> 376
<211> 535
<212> DNA
<213> human

<400> 376
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tgttcagacc tggtcggggc ccactggaag catccagaac agcaccacca tctagcggcc 120

gctcgaggga agcacccgcc ggttggccga agtccacgaa gccgccctct gctagggaaa 180

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caggccattc caagcccttc cgggctggaa ctggtgtcgg aggagcctcg ggtgtatcgt 480

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<210> 377
<211> 358
<212> DNA
<213> human

<400> 377
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aacgccggca tgctagctca attcatcgac aagcctgtct gcttcgtagg gaggctggaa 120

aagattcatc ccaccggaaa aatgtttatt ctttcagatg gagaaggaaa aaatggaacc 180

atcgagttga tggaacccct tgatgaagaa atctctggaa ttgtggaagt ggttggaaga 240

gtaaccgcca aggccaccat cttgtgtaca tcttatgtcc agtttaaaga agatagccat 300

ccttttgatc ttggacttta caatgaagct gtgaaaatta tccatgactt ccctcagt 358

<210> 378
<211> 522
<212> DNA
<213> human

<400> 378
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gtaagatgaa caaacatgtc ctgaagatcc agaaagagct ggaagaagct aaagagaaac 120

ttgctaggca acacaaacgg cgaagtgatg atgacgacag aagcagtgac aggaaagacg 180

gggttcttga ggaacaaata gaacgacttc aggaaaaagt ggaatctgct cagagtgaac 240

aaaagaatct tttcctcgtt atatttcagc ggtttatcat gatcttgacc gagcacctag 300

tacgatgcga aactgatggg accagtgtat taacaccatg gtataagaac tgtatagaga 360

ggctgcagca gatcttccta cagcatcacc aaataatcca gcagtacatg gtgaccctgg 420

agaaccttct cttcactgct gaattagacc ctcatatctt ggccgtgttc cagcagttct 480

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<211> 365
<212> DNA
<213> human

<400> 379
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tcttccccga gaagatcgac atgaccacct tcagcaagga ggccggcgac gaggagatct 180

aagcagcgtt cccacagccc cctctagatt cttggagttc cgcagagctt actatacgcg 240

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tctct 365

<210> 380
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<400> 380
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tgtggtaagc tgggagtatc actctggaag aaagtaacat ctccagatga gaatttgaaa 180

caagaaacag agtgttgtaa aaggacacct tcactgaagc aagtcggaaa gtacaatgaa 240

aataaatatt tttggtattt atttatgaaa tatttgaaca ttttttcaat aattcctttt 300

tacttctagg aagtctcaaa agaccatctt aaattattat atgtttggac aattagcaac 360

aagtcagata gttagaatcg aagtttttca aatccattgc ttagctaact ttttcattct 420

gtcacttggc ttcgattttt atattttcct attatatgaa atgtatcttt tggttgtttg 480

atttttcttt ctttctttgt aaatagttct gagttctgtc aaatgccgtg 530

<210> 381
<211> 424
<212> DNA
<213> human

<400> 381
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tttattctac tcatagtgag cttattctta ttttggattg attttccaaa accacagctt 180

cagcagcaac aatcagaatg tccaaatgct gtcctttccc ttacagagaa gaacaatggt 240

aactaaaagc tgcatataac tagcaataac tacattgaac ggtgtgcatt gttcatgatt 300

gttgtgtttt aagacttgta tataaactgc tttttccaaa ctctgtataa cttttaaatg 360

gctggaacta ctcgtataag gactagactg tatttttgac atgctcctat ttttgtaact 420

tgaa 424

<210> 382
<211> 522
<212> DNA
<213> human

<400> 382
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aaataagctt gaggaatttg cgacgtgttg ctagagaatt gggtgaaaac atgagtgatg 120

aagaacttcg agctatgata gaagaatttg acaaagatgg tgatggagaa ataaaccaag 180

aggagttcat tgctattatg actggtgaca tttaaagaat tacaaggata aacactaaga 240

atgttgcagt taccatctta tattctattt ttgtgcctgg agccatgtga aaaaaaccaa 300

cttagttctt ttatcctaaa ggaccaaaaa taagcatctt atatatctgt attttactac 360

tgttaagttt ctttgtatga actgtgttgt tagtactcag atagtttagc tttgtattta 420

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<210> 383
<211> 477
<212> DNA
<213> human

<400> 383
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gtcccaaatg ccgacatcac tgactccagg gaccagggac atggagaaag ctgtttatga 180

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tatgccaggg gacatctgag tatgtgccca gtcatctttt ttcacaggtt gaagggagag 300

aaaagatttt gagttaaggt cattggctgc tctactctgt cccctacctg gtcacctagt 360

gatagcccca gtggagatac tgtccataca aggtcttccc agaggctgga taccacagta 420

aaaggccagg ccaggagggg taggagacta tggagatctt acctcctgat aaatgtg 477

<210> 384
<211> 475
<212> DNA
<213> human

<400> 384
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aggcactaac aaactctgag gtttccgaaa tcagaagcga aaaaatcagt gaataaacca 120

tcatcttgcc actaccccct cctgaagcca cagcagggtt tcaggttcca atcagaactg 180

ttggcaaggt gacatttcca tgcataaatg cgatccacag aaggtcctgg tggtatttgt 240

aacttttgc aaggcatttt tttatatata tttttgtgca catttttttt tacgtttctt 300

tagaaaacaa atgtatttca aaatatattt atagtcgaac aattcatata tttgaagtgg 360

agccatatga atgtcagtag tttatacttc tctattatct caaactactg gcaatttgta 420

aagaaatata tatgatatat aaatgtgatt gcagcttttc aatgttagcc acagt 475

<210> 385
<211> 562
<212> DNA
<213> human

<400> 385
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gccttgggtt gggggcactc tgccacgacc agcccccttcc tgggtattta ttctctattt 180

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cctccccgcc tggccaggga gggccacccc actctacctc cttagctttc cctgtgccac 300

tttgactcag aggctgggag catagcagag gccaggccca ggcagagctg acgggaggcc 360

ccagctctga ggggaggggg tccgtggtag agcctggggc aggtagaggc tccccagggc 420

tcccttatgt ccaccacttc aggggatggg tgtggatgta attagctctg gggggcagtt 480

gggtagatgg gtgggggctc ctggtggcct tctgctgccc aggccacagc cgcctttggg 540

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<211> 493
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<213> human

<400> 386
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ctgacaagct taaaaccaga aatcgagaat ccatttctct gctcatgcgc ttggtggtgg 180

aggagtcatc cttcctgacc ctggacatgc tggagtcctg tttcccttat gtcctgcttc 240

gaaatgccta tcgggaggtg tctcgggcct tccacctaaa ctgaatgcct gccagtaccc 300

actgaagagc cctttggacc ttcctaaacc cttgccatag tggaagctgt ggtcactttc 360

gcaggggtg ggaatggggt ggggtcacta aggagagagg gtcaggagcc agagttgatg 420

agcagatctg tggaagaaca atccagggct gagaaatcgt agagcagtga ggcaggctgg 480

gagcatggag gac 493

<210> 387
<211> 476
<212> DNA
<213> human

<400> 387
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aaaaatggga acatacagaa ctctaaaaga tagacatcag aaattgttaa gttaagcttt 180

ttcaaaaaat cagcaattcc ccagcgtagt caagggtgga cactgcacgc tctggcatga 240

tgggatggcg accgggcaag ctttcttcct cgagatgctc tgctgcttga gagctattgc 300

tttgttaaga tataaaaagg ggtttctttt tgtctttctg taaggtggac ttccagattt 360

tgattgaaag tcctagggtg attctatttc tgctgtgatt tatctgctga aagctcagct 420

ggggttgtgc aagctaggga cccattcctg tgtaatacaa tgtctgcacc aatgct 476

<210> 388
<211> 463
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (435)..(435)
<223> n is a, c, g, or t

<400> 388
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caagcctctc accattaaca ggattttcaa aggagcagcc tcagaacaaa gtgagacagt 120

ccagcctgga gatgaaatct tgcagctggg tggcactgcc atgcagggcc tcacacggtt 180

tgaagcctgg aacatcatca aggcactgcc tgatggacct gtcacgattg tcatcaggag 240

aaaaagcctc cagtccaagg aaaccacagc tgctggagac tcctaggcag gacatgctga 300

agccaaagcc aataacacac agctaacaca cagctcccat aaccgctgat tctcagggtc 360

tctgctgccg ccccacccag atgggggaaa gcacaggtgg gcttcccagt ggctgctgcc 420

caggcccaga ccttntagga cgccacccag caaaaggttg ttc 463

<210> 389
<211> 537
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (427)..(427)
<223> n is a, c, g, or t

<400> 389
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acatagcttt gtttacccag atataggtgc gttctttttt ttctgttagt catctgtgac 180

ttttgttctg gaatacaggt ttttaaatat atcttaacag tctgactaac ttaaaataat 240

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tgtagcattt attcactgat taaatctttt ccacttttgt gaaaaccata ccagtggttt 420

acatcanatt gtaatgtgtt catctcattc ttctttttat ccctaaacct agctaaaagt 480

tactgcaaag aaatctttgg ctgccacaag tagatgctct ctactaccag agctgga 537

<210> 390
<211> 352
<212> DNA
<213> human

<400> 390
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tctcctgtat ctgcctacca ggtgcaaagt ccttcgtgga tgcaacctca accatatatt 180

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gcatcaatga tcagccctct ggcccagcag atgagtcatc tgtcactagg cagcaccgga 300

acatacatgc ctgcaacgtc agctatgcaa ggagcctact tgccacagta tg 352

<210> 391
<211> 568
<212> DNA
<213> human

<400> 391
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cctgatactg aaatagcgtc tactcgtgca ctgaataaaa acagaaactt gatcatttta 360

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agcttgattt aaatactgtg aactctaata atgtggaaaa tatttttcaa ctttaatttt 480

ctgaagtata aattatttat gtaaattcat tgtttttgca tatttcttag gacatgcatc 540

tttaagcttt atcattgccc atatgtac 568

<210> 392
<211> 327
<212> DNA
<213> human

<400> 392
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ccggcaggag cttgaaatcg tcattggaga tgaacacatt tcttttacaa catcaaaaat 120

tggttccctt attgatgtca atcaatccaa ggatccagaa ggcttacgag tattttatta 180

tcttgtccag gacctgaagt gtttggtctt cagtcttatt ggattacact tcaagattaa 240

accaatctag actgaatatt ggtgtggaca tgggggtgg gtgggagtag aaaattttgt 300

gtatatcagg gcagtatttt tttatga 327

<210> 393
<211> 336
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (106)..(106)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (256)..(256)
<223> n is a, c, g, or t

<400> 393
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aaaaagtaca gtctgtcagc cagaataaaa gctacttggc cgtaaggcta aaagaccaag 180

atctgagaga ttcaaggcaa caagcagcac aagccttcat acataattca ttatatgggc 240

caggaaccaa caggantact gtaaataagt tcctgtctct tgccaacaag aggttaccag 300

tgaaaagagc tgctgtccag tttttgaata atgctt 336

<210> 394
<211> 501
<212> DNA
<213> human

<400> 394
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agaggagaca gcctgtctct ccttgttgcc cccaaagccc atgccctgcc gtggtggcag 180

ctggggctgt ggatgggagg ggtccccaac atggatgtgt tgcccctcct ccgcatgcca 240

acgcagttca tgtacaaggc ccctctgcaa ctggagagaa aattaattcc tatcccgtga 300

gtggattgtg agaaattcca cccacgtgga gacagcttac tgcagcactg ttggtgttcg 360

gagctcttct gtgccctggc tccatgcttt cacctacaca agcatcacct tcctaatcac 420

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acatgctcag tacctgtgtt g 501

<210> 395
<211> 534
<212> DNA
<213> human

<400> 395
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cttgtggcat tggcatactt gcccttacag gtggagtatc ttcgtcacac atctaaatga 120

gaaatcagtg acaacaagtc tttgaaatgg tgctatggat ttaccattcc ttattatcac 180

taatcatcta aacaactcac tggaaatcca attaacaatt ttacaacata agatagaatg 240

gagacctgaa taattctgtg taatataaat ggtttataac tgcttttgta cctagctagg 300

ctgctattat tactataatg agtaaatcat aaagccttca tcactcccac atttttctta 360

cggtcggagc atcagaacaa gcgtctagac tccttgggac cgtgagttcc tagagcttgg 420

ctgggtctag gctgttctgt gcctccaagg actgtctggc aatgacttgt attggccacc 480

aactgtagat gtatatatgg tgcccttctg atgctaagac tccagacctt ttgt 534

<210> 396
<211> 115
<212> DNA
<213> human

<400> 396
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accggcgaca gcagccagga gtcatgagcg acagcggcga gcagaactac ggcga 115

<210> 397
<211> 538
<212> DNA
<213> human

<400> 397
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tctgtacaat tatgaaaaat taaaaacaaa gaaaatattc aaagctacca aagatagaaa 120

aaactggtag agccacatat tgttggtgaa ttattaagac ccttttaaaa atcattcatg 180

gtagagttta agagtcataa aaaagattgc atcatctgac ctaagacttt cggaattttt 240

cctgaacaaa taacagaaag ggaattatat acctttttaat attattagaa gcattatctg 300

tagttgtaaa acattattaa tagcagccat ccaattgtat gcaactaatt aaggtattga 360

atgtttattt tccaaaaatg cataattata atattatttt aaacactatg tatcaatatt 420

taagcaggtt tataatatac cagcagccac aattgctaaa atgaaaatca tttaaattat 480

gattttaaat ggtatacaca tgatttctat gttgatagta ctatattatt ctacaata 538

<210> 398
<211> 342
<212> DNA

<213> human

<400> 398
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gagtggtgtt cacggagcac ttctggcctt agatgaaacc ttcgacttca gtgcactggc 120

actgctgtta cagatcccga cgcagaacac acaggctcgt gctgtcttgg aaagagaatt 180

taacaacctt ttggtcatgg ggactgatag aaggtttgat gaagatgatg ataaaagctt 240

taggagagca ccttcatgga gaaaaaagtt tagaccaaag gacattcgtg gcttagctgc 300

tgggtcagca gagactctcc ctgcaaactt ccgggtgact tc 342

<210> 399
<211> 525
<212> DNA
<213> human

<400> 399
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gatggtgttc ctttcactgc agctgatcca gattaccaag agaaatacca agaattactt 120

gaaagagagg actttttcc agattatgaa gaaaatggaa cagatttatc cggggctggt 180

gatccatact tggatgatat tgatgatgag atggacccag agatagaaga agcttatgaa 240

aagttttgtt tggaatcaga gcgtaagcga aaacagtaaa gttaaatttc agcatatcag 300

ttttataaag cagtttaggt atggtgattt agcagaacac aagagagcaa gaaaatgtgt 360

cacatctata ccaaattaag gatgttgagt tatgttacta atgtatgcaa ctttaatttt 420

gtttaacact atctgccaaa ataaacttta ttccctataa cttaaaatgt gtatatatat 480

ataatagttt attatgtaca gttaattcta ctgttttggc tgcaa 525

<210> 400
<211> 467
<212> DNA
<213> human

<400> 400
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gtgtgacaag atggtgttct gctaatgtta aatgtcagcc cacagagcta ataatacctc 120

agtataatgt catgagcagt tgaaattcat cacatgaaaa gtaatctgct gaaagacttg 180

gttgcccact gcctaactgt gtacagtgtt accagtgtcc cattatggat aattctcaat 240

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aggaggaagg aatagaatga tagcttgttt tatttgtaaa gctttcagtg aaacactaca 360

tacacgaaga aaaggaacaa ggtttaacta tttaagaacc atttgctgcc gcatagtgcc 420

attggatagg gaagaacttc agaaatctgt ggtactcttg gccttgt 467

<210> 401
<211> 440
<212> DNA

<213> human

<400> 401
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agagccctta agttctgaga aaatttgaag cccccagggg tggggtggac gcgtgccgcc 120

cagtcgacgt cagcgtggtc tgtcatcctg ctagtttgtg atgttttctg acagtagcct 180

ccaagaagcc gttgtgcgaa gacagagtcc tgcagagtcc ttccagccta ggcctgcagc 240

gccatttttat ttatattttt taataaaaag taaaaacaaa aaaacagacc cacattggaa 300

cagtgaatca gtcccataga gagggcccgt ggaccatcgc tgtcatgagt gatgccctgg 360

cccttctgaa accagccaac ctaattacct gtattgtgga aatgcgcatg agtccccaac 420

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<210> 402
<211> 543
<212> DNA
<213> human

<400> 402
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ggt 543

<210> 403
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<212> DNA
<213> human

<400> 403
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cccaatttgt ccgtaacctt gtggagaaga ccccggcgct ggtgaacgct gctgtgactt 120

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aggtgttgat gtggttttat gtcggagaga ttataggcaa gcggggcatc attggctatg 360

atgtttgaag accaatcttt aacatctgat tatatttgat ttattatttg agtgttgttg 420

gaccatgtgt gatcagactg ctat 444

<210> 404
<211> 462
<212> DNA
<213> human

<400> 404
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atcaatgagt ggctccaaat agacctgggg gaggagaaga tcgtgagggg catcatcatt 120

cagggtggga agcaccgaga gaacaaggtg ttcatgagga agttcaagat cgggtacagc 180

aacaacggct cggactggaa gatgatcatg gatgacagca aacgcaaggc gaagtctttt 240

gagggcaaca acaactatga tacacctgag ctgcggactt ttccagctct ctccacgcga 300

ttcatcagga tctaccccga gagagccact catggcggac tggggctcag aatggagctg 360

ctgggctgtg aagtggaagc ccctacagct ggaccgacca ctcccaacgg gaacttggtg 420

gatgaatgtg atgacgacca ggccaactgc cacagtggaa ca 462

<210> 405
<211> 517
<212> DNA
<213> human

<400> 405
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cccacctgct caggaaccct caccttgttt cggactatag agtgctgatg gcagagattg 120

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gttacaggaa tgttctccaa gcagcaatcc aaaagagtct caaggatcct tcaaataact 420

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<210> 406
<211> 494
<212> DNA
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<400> 406
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gtttacttgt tagatatcta aagggaaaag aaactgccat ctccatatga aagtaagaaa 240

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cagtttgaga tggggttttg cagaaaccac atctctgaaa aaaaaacaaa agaaaagcca 420

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acgtgagtcc tgga 494

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<211> 456
<212> DNA
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<400> 407
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aaggaatgat tgcaggatcc cagtgtgccc tttcaattgc cctcttgtgg aaggggttct 180

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gaaactgaag gctttgaatg aaatagggcg agtatgttag cctggagcaa attgtgtatg 360

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aaaactataa ggttttgctt tacctacagt gtttca 456

<210> 408
<211> 555
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<400> 408
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gcggcactcc ggcggcggca gcagctccgg cggcggatac ggcggcggca gctccagcgg 120

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<211> 539
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<213> human

<400> 409
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aatgaaatgc agaaaaaaga tcacaagcaa ctctggatgg gattgcaaaa tgacagattt 240

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<210> 410
<211> 400
<212> DNA
<213> human

<400> 410
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<210> 411
<211> 340
<212> DNA
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<400> 411
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<210> 412
<211> 458
<212> DNA
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acatctcgca cgtgactccc tcagcctcag agccttggga tgcagagcag ctggcagggt 240

tcctctcaat cctgcaaccc cagctgtccc accggtggat gcagagggga atccgaggcc 300

atcaaccttg gtgacagcag cgcagtgcca atgctgatca cactgcatgg gagattttgt 360

taacgtctgc caccccccact ctcaccccca agctctaagc ccccgggagg cctggactgt 420

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<210> 413
<211> 171
<212> DNA
<213> human

<400> 413
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gaagacaaaa ctggatgttc tttcttgttg gatagaacct ttgtatttgt ttctttaaaa 120

acatttttttt taatgttggt aacttttgct tcctctacct gaacaaagag a 171

<210> 414
<211> 527
<212> DNA
<213> human

<400> 414
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tgcctgtttt tgttggtgca cagagattga cttgattcag agagacaatt cactccatcc 120

ctatggcaga ggaatgggtt agccctaatg tagaatgtca ttgtttttaa aactgtttta 180

tatcttaaga gtgccttatt aaagtataga tgtatgtctt aaaatgtggg tgataggaat 240

tttaaagatt tatataatgc atcaaaagcc ttagaataag aaaagctttt tttaaattgc 300

tttatctgta tatctgaact cttgaaactt atagctaaaa cactaggatt tatctgcagt 360

gttcagggag ataattctgc ctttaattgt ctaaaacaaa aacaaaacca gccaacctat 420

gttacacgtg agattaaaac caatttttc cccatttttt ctccttttt ctcttgctgc 480

ccacattgtg cctttatttt atgagcccca gttttctggg cttagtt 527

<210> 415
<211> 503
<212> DNA
<213> human

<400> 415
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ttcaccccgc tggtctgcat gggcatcttc atcttcaacg ttgtgtacta cgagccgctg 120

gtctacaaca acacctacgt gtacccgtgg tggggtgagg ccatgggctg ggccttcgcc 180

ctgtcctcca tgctgtgcgt gccgctgcac ctcctgggct gcctcctcag ggcaaagggc 240

accatggctg agcgctggca gcacctgacc cagcccatct ggggcctcca ccacttggag 300

taccgagctc aggacgcaga tgtcaggggc ctgaccaccc tgaccccagt gtccgagagc 360

agcaaggtcg tcgtggtgga gagtgtcatg tgacaactca gctcacatca ccagctcacc 420

tctggtagcc atagcagccc ctgcttcagc cccaccgcac ccctccaggg ggcctgcctt 480

tccctgacac ttttggggtc tgc 503

<210> 416
<211> 540
<212> DNA
<213> human

<400> 416
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gaactcctct ttttctggaa cacttccctg agtcacgctc agcaataccg ctggtaagag 120

gagcgagggc agtgggctgg gagggcgccg tggtgatgca gctgccctgc ccagtaggca 180

ccgggggggag cgggatggtc cctggaggag cctcctctcc tccccccaac cctaacctca 240

ggtaccagat gctgtaccag gctggcgtct ttgcctcccg ctcttctctc cgctgctgtc 300

gcatccgttt cacctgggcc ctggccctgc tgcagtgcct caacctggtg ttcctgctgg 360

cagacgtgtg gttcggcttt ctgccaagca tctacctcgt cttcctgatc attctgtatg 420

aggggctcct gggaggcgca gcctacgtga acaccttcca caacatcgcc ctggagacca 480

gtgatgagca ccgggagttt gcaatggcgg ccacctgcat ctctgacaca ctggggatct 540

<210> 417
<211> 445
<212> DNA
<213> human

<400> 417
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tgcattggcc aacatagctg tggacaaagc caacttggaa atcatgacaa agcgctccaa 120

ctatactccg atcaccaatg acaagttcac cccaccagtg gtcaatgtca cgtggcttcg 180

aaatggaaaa cctgtcacca caggagtgtc agagacagtc ttcctgccca gggaagacca 240

ccttttccgc aagttccact atctcccctt cctgccctca actgaggacg tttacgactg 300

cagggtggag cactggggct tggatgagcc tcttctcaag cactgggagt ttgatgctcc 360

aagccctctc ccagagacta cagagaacgt ggtgtgtgcc ctgggcctga ctgtgggtct 420

ggtgggcatc attattggga ccatc 445

<210> 418
<211> 404
<212> DNA
<213> human

<400> 418
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gagggaactt agcagagagc aaatgctatt tgataacagt tactccagta tatgctgatg 120

gaccaggaag ccctgaatcc ataaaggcat accttaaaca agctccacct tccaaaggac 180

ctactgttcg gacaaaaaaa gtagggaaaa acgaagctgt cttagagtgg gaccaacttc 240

ctgttgatgt tcagaatgga tttatcagaa attatactat attttataga accatcattg 300

gaaatgaaac tgctgtgaat gtggattctt cccacacaga atatacattg tcctctttga 360

ctagtgacac attgtacatg gtacgaatgg cagcatacac agat 404

<210> 419
<211> 538
<212> DNA
<213> human

<400> 419
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ctgctgagga ggtccagccc agctgctgac gtccaggaag aaaacctcta gcccacacga 120

tgaagacccc caggcagtga cgtatgcccc ggtgaaacac tccagtccta ggagagaaat 180

ggcctctcct ccctcctcac tgtctgggga attcctggac acaaaggaca gacaggtgga 240

agaggacagg cagatggaca ctgaggctgc tgcatctgaa gcctcccagg atgtgaccta 300

cgcccagctg cacagcttga cccttagacg gaaggcaact gagcctcctc catcccagga 360

aggggaacct ccagctgagc ccagcatcta cgccactctg gccatccact agcccggggg 420

gtacgcagac cccacactca gcagaaggag actcaggact gctgaaggca cgggagctgc 480

ccccagtgga caccagtgaa ccccagtcag cctggacccc taacacagac catgagga 538

<210> 420
<211> 429
<212> DNA
<213> human

<400> 420
cagcacgtac cgtgtggtca gcgtcctcac cgtcctgcac caggactggc tgaatggcaa 60

ggagtacaag tgcaaggtct ccaacaaagc cctcccagcc cccatcgaga aaaccatctc 120

caaagccaaa gggcagcccc gagaaccaca ggtgtacacc ctgccccccat cccgggatga 180

gctgaccaag aaccaggtca gcctgacctg cctggtcaaa ggcttctatc ccagcgacat 240

cgccgtggag tgggagagca atgggcagcc ggagaacaac tacaagacca cgcctcccgt 300

gctggactcc gacggctcct tcttcctcta cagcaagctc accgtggaca agagcaggtg 360

gcagcagggg aacgtcttct catgctccgt gatgcatgag gctctgcaca accactacac 420

gcagaagag 429

<210> 421
<211> 552
<212> DNA
<213> human

<400> 421
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gaattaacaa tgtaaccatc tgaaagcaac ttttttggtg tctcagatga gtaactgcag 120

cttggtttga aatttgtact gtttctatca taaataaagt tatggcttct tgttggatga 180

aaaaaaaaag acagtatttt gccaaattaa acagaaaaga gagttcagtg gaagatggct 240

ctgatttcag ggtaataata atggtaggta acaattaaat ggcatttaaa aatttgctga 300

atgcttgcta cgagcggtgg ctcatgcctg aatctcagca ctttgggagg ccaaggcagg 360

cagatcatct gaggtcatga gttcgagacc agcctggcca acatgatgaa accctgtctc 420

tactaaaaat acaaaaatta gctgggcatg gtggtgcaca cctgtaatcc cagttactca 480

ggaggctgag gcaggagaat cacttgaatc cagaaggcgg aggttgcagt gagctgagat 540

tgcaccacgg ca 552

<210> 422
<211> 456
<212> DNA
<213> human

<400> 422
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ggccgcgttc gcaccaaaac cgtgaagaag gcggcccggg tcatcataga aaagtactac 120

acgcgcctgg gcaacgactt ccacacgaac aagcgcgtgt gcgaggagat cgccattatc 180

cccagcaaaa agctccgcaa caagatagca ggttatgtca cgcatctgat gaagcgaatt 240

cagagaggcc cagtaagagg tatctccatc aagctgcagg aggaggagag agaaaggaga 300

gacaattatg ttcctgaggt ctcagccttg gatcaggaga ttattgaagt agatcctgac 360

actaaggaaa tgctgaagct tttggacttc ggcagtctgt ccaaccttca ggtcactcag 420

cctacagttg ggatgaattt caaaacgcct cgggga 456

<210> 423
<211> 529
<212> DNA
<213> human

<400> 423
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tcccctccca gatgttggac caacacccct ccctgccacc aggcactgcc tgagggcagg 120

gagtgggagc caatgaacag gcatgcaagt gagagcttcc tgagctttct cctgtcggtt 180

tggtctgttt tgccttcacc cataagcccc tcgcactctg gtggcaggtg cttgtcctca 240

gggctacagc agtagggagg tcagtgcttc gagccacgat tgaaggtgac ctctgcccca 300

gataggtggt gccagtggct tattaattcc gatactagtt tgctttgctg accaaatgcc 360

tggtaccaga ggatggtgag gcgaaggcag gttgggggca gtgttgtggc ctggggccag 420

ccaacactgg ggctctgtat atagctatga agaaaacaca aagttgataa atctgagtat 480

atatttacat gtctttttaa aagggtcgtt accagagatt tacccatcg 529

<210> 424
<211> 263
<212> DNA
<213> human

<400> 424
tcctccctgt ctgcatctgt aggagacaga gtcaccatca cttgccgggc aagtcagggc 60

attagaaatg atttagcctg gtatcagcag aaaccaggga aagcccctaa gcgcctgatc 120

tatgctgcat ccagtttgca aagtggggtc ccatcaaggt tcagcggcag tggatctggg 180

acagaattca ctctcacaat cagcagcctg cagcctgaag attttgcaac ttattactgt 240

ctacagcata atagttaccc ttg 263

<210> 425
<211> 349
<212> DNA
<213> human

<400> 425
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ggccgagtac accgaggggg atgcgctgga tgccctgggc ctgaagcgct actgctgccg 120

ccggatgctg ctggcccacg tggacctgat cgagaagctg ctcaattatg caccctgga 180

gaagtgacca cgctggaacc cacccacccg ctgtgctgac catgggccct gagcgtcctg 240

ccccgaattc acgaggctga ggcatccggg agctggcgta atgcctggcc gcagtgtgtg 300

tgtatcccat accccactct ggaaggaacc atccagtaaa ggtctttca 349

<210> 426
<211> 552
<212> DNA
<213> human

<400> 426
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agaggacaca gtaaaagtgg tgggcatccc tgggtgccag acctgccgct acctcctggt 120

gagaagtctt cagacgttta gtcaagcttg gtttacttgc cggaggtgct acaggggcaa 180

cctggtttcc atccacaact tcaatattaa ttatcgaatc cagtgttctg tcagcgcgct 240

caaccagggt caagtctgga ttggaggcag gatcacaggc tcgggtcgct gcagacgctt 300

tcagtgggtt gacggcagcc gctggaactt tgcgtactgg gctgctcacc agccctggtc 360

ccgcggtggt cactgcgtgg ccctgtgtac ccgaggaggc tactggcgtc gagcccactg 420

cctcagaaga cttcctttca tctgttccta ctgagctggt cccagccagc agttcagagc 480

tgccctctcc tgggcagctg cctcccctcc tctgcttgcc atccctccct ccacctccct 540

gcaataaaat gg 552

<210> 427
<211> 363
<212> DNA
<213> human

<400> 427
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ggatttgatg actttgtcaa tatggtactg gaagatgtca ctgagtttga aatcacacca 120

gaaggaagaa ggattactaa attagatcag attttgctaa atggaaataa tataacaatg 180

ctggttcctg gaggagaagg acctgaagtg tgaatgagtt tccttgactt acactagatt 240

ttgttttggc ttataatgac aagaaaatgg aatttttttt cccactttct aatgtttaaa 300

tcccataaag ctaagtttcc cgttaaaggg aagtgctttg aagatgtgta cccatttttg 360

taa 363

<210> 428
<211> 500
<212> DNA
<213> human

<400> 428
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ttagtcccat tccttgtcag cgttctctct aaggcagatt ttaagacaca aaaggaagct 120

gtgtgggccg tgaccaacta taccagtggt ggaacagttg aacagattgt gtaccttgtt 180

cactgtggca taatagaacc gttgatgaac ctcttaactg caaaagatac caagattatt 240

ctggttatcc tggatgccat ttcaaatatc tttcaggctg ctgagaacct aggtgaaact 300

gagaaactta gtataatgat tgaagaatgt ggaggcttag acaaaattga agctctacaa 360

aaccatgaaa atgagtctgt gtataaggct tcgttaagct taattgagaa gtatttctct 420

gtagaggaag aggaagatca aaacgttgta ccagaaacta cctctgaagg ctacactttc 480

caagttcagg atggggctcc 500

<210> 429
<211> 267
<212> DNA
<213> human

<400> 429
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ggccaacaaa aagatcgaga agcagctgca gaaggacaag tacttcattc gagatgagtt 120

tctgaggatc agcactgcca gtggagatgg gcgtcactac tgctaccctc atttcacctg 180

cgctgtggac actgagaaca tccgccgtgt gttcaacgac tgccgtgaca tcattcagcg 240

catgcacctt cgtcagtacg agctgct 267

<210> 430
<211> 373
<212> DNA
<213> human

<400> 430
tacctaacgg cggctgccat tttcaggggt cgcatgccca tgagggaggt ggatgaacag 60

atgttcaaca ttcaagataa gaacagcagc tactttgctg actggctccc caacaacata 120

aaaacagccg tctgtgacat cccaccctgg gggctaaaaa tgtcagtcac cttcactggg 180

aacaacacag ccgtccagga actcaagcgg gtctcagagc agtttacagc aacgttcagg 240

cgcaaggcct tcctccactg gtacacgggc gagggcatgg atgagatgga attcactgag 300

gccgagagca acatgaacga cttggtgtct gaatatcagc aatatcagga tgccacggcc 360

gagggagaag gag 373

<210> 431
<211> 333
<212> DNA
<213> human

<400> 431
atgtcagacg cagccgtaga caccagctcc gaaatcacca ccaaggactt aaaggagaag 60

aaggaagttg tggaagaggc agaaaatgga agagacgccc ctgctaacgg gaatgctaat 120

gaggaaaatg gggagcagga ggctgacaat gaggtagacg aagaagagga agaaggtggg 180

gaggaagagg aggaggaaga agaaggtgat ggtgaggaag aggatggaga tgaagatgag 240

gaagctgagt cagctacggg caagcgggca gctgaagatg atgaggatga cgatgtcgat 300

accaagaagc agaagaccga cgaggatgac tag 333

<210> 432
<211> 451
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (244)..(244)
<223> n is a, c, g, or t

<400> 432
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tctctttggt agttgaacgt tgaattcaag tcttttgttt taagaagtac taagcaaaca 120

agcaataaaa aggggaatgg ggtgtgctag tgtttgaata tgctctcttg ttgctctaat 180

tctgtgcctc tgtgcattaa tatttggatg catgcaatgc cagcatggaa attggtcttc 240

acanatactg cagttttcca gaaacattca caaaccaata aatgtaacag acattccatt 300

tgttaatggg catatatgtg aaaagcagtg tagaaaatag gctaatatta gaaaatggtt 360

aagtcctaaa taacttcaag tgtggttata taatggacac tgtcaatgtt cataacttaa 420

acctgggtac ctggtcaaaa taatgcttgg g 451

<210> 433
<211> 405
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (165)..(165)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (180)..(182)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (212)..(212)
<223> n is a, c, g, or t

<400> 433
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caggggtgtt ggtttatgcg tgctgcagca gtgggcataa tgaatataat ttacccagtg 120

gacaaaggtg tgtaccaagt gaatttaaat aattggtgtg gattnggcca gtagctaagn 180

nntgggcttt taaagagtat tgaagattga anagggtttt tctttctttt ttaaaaaaga 240

aaaacaaact attgattgta gataatgaaa agctagggtt tgccctcttc atgtctactc 300

tccttccaaa tagttatatc caaaactgtt tttccctctc ccctaccttg tccccctat 360

taaaatagaa acagggattg attaatgtcc cgctcctgaa tacat 405

<210> 434
<211> 509
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (157)..(157)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (161)..(161)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (222)..(222)
<223> n is a, c, g, or t

<400> 434
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aatttggtcc agagaaggcg gaaggaaata gttttcctgt ttccttttct cgaggtggat 120

gtcctcaggc ttccttcaca cctccttctc atgggtncgg ntggcagtac agtcaggctg 180

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ctttccctac tttactaatg tatcccttat gtggtaccag caatggagga caggcagact 360

taccccctgc catctagaga gaatgttgtt attacccgta aaacttgacc acccccatat 420

cccactcctt tttgtaaaaa caaatgctta aacctgtgag cctgccgttc ctttctatgt 480

gttaatcagt ttccttccat ttgagctgt 509

<210> 435
<211> 135
<212> DNA
<213> human

<400> 435
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ttttctgatt ttttgacaaa tgaatttttg cacactttca ttggtgtctt tcggcaactt 120

acacacattg aaaat 135

<210> 436
<211> 553
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (259)..(259)
<223> n is a, c, g, or t

<400> 436
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gatggctgca agttgggaag atgataaagt tacagaagca tcttcaaaca gttttgttgc 120

tattaaaatc gataccaaaa gtgaagcctg cctacagttt tcacaaatct atcctgtagt 180

gtgtgttcca tccagtttct ttattggaga cagtggaatt cccttggaag taatagcagg 240

aagtgtttct gcagatganc ttgttacaag aattcacaag gtccgacaga tgcatttgct 300

aaaaagtgaa acatcagtag caaatggcag tcagtcagaa agttcagtgt ctactccatc 360

tgcgtcattt gaacctaaca acacttgtga aaactctcag tccagaaatg cagagctttg 420

tgagatacca cccacttctg atacaaagtc agatactgca acaggaggag aaagtgcagg 480

ccatgccact tcctctcagg agcctagtgg atgctcagat cagagacctg cagaggacct 540

caacatccga gtg 553

<210> 437
<211> 372
<212> DNA
<213> human

<400> 437
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gccctggagg cctcatggtc tcagtgctga ggcggcacac ctgtagcaca cctgcgtaat 120

gtgcggtctg ggccagtcac aaggaattgt gttgtctaag ccaaaggggg aagctgactg 180

tgatttacca aaaaaaattc tgtaattcaa accaaaatgt ctgcggaatc accagtttga 240

tactctctgt aatcagaaca gtgggcagtg cctgggtgaa cgtgtctagc agccactgtg 300

cgggatcgct gtaacaggag tggaatgtac atatttattt acttttctaa ctgctccaac 360

agccaaatgc ct 372

<210> 438
<211> 527
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (307)..(307)
<223> n is a, c, g, or t

<400> 438
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agaacctttg atgagagcgt tcacagggac actgtctggg ggtgcagtgc aagcccccgg 120

cctcttccct gggaacctct gaactcctcc ttcctctggg ctctctgtaa catttcacca 180

cacgtcagca tctaatccca agacaaacat tcccgctgct cgaagcagct gtatagcctg 240

tgactctccg tgtgtcagct ccttccacac ctgattagaa cattcataag ccacatttag 300

aaacagnttt gctttcagct gtcacttgca cacatactgc ctagttgtga accaaatgtg 360

aaaaaacctc cttcatccca ttgtgtatct gatacctgcc gagggccaag ggtgtgtgtt 420

gacaacgccg ctcccagccg gccctggttg cgtccacgtc ctgaacaaga gccgcttccg 480

gatggctctt cccaagggag gaggagctca agtgtcggga actgtct 527

<210> 439
<211> 388
<212> DNA
<213> human

<400> 439
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gaccgagatc gggatcgaga gagagatcgt gaccgggata gagaaaggag ctcagatcgt 120

aataaggatc gcagtcgatc aagagaaaaa agcagagatc gtgaaaggga acgagagcgg 180

gaaagagaga gagagagaga acgagagcga gaacgagaac gggagcgaga gagagagcga 240

gagagggaac gggagcgaga aagagaaaaa gacaaaaaac gggaccgaga agaagatgaa 300

gaagatgcat acgaacgaag aaaacttgaa agaaaactcc gagagaaaga agctgcttat 360

caagagcgcc ttaagaattg ggaaatca 388

<210> 440
<211> 490
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (171)..(171)
<223> n is a, c, g, or t

<400> 440
ttacatgagg ggttcttcac gattctcctg gaacccagtc tagcaaaatg agaggaaagg 60

ccctagggag atttatttct gttaaatagt taactctgct gagtatgaca aatagtgtct 120

actatctcaa ccctccaaaa tttgcagagt gttgggactg tcatttgtga nttttttttt 180

ttttttttgg tggggtagtt gaataaaatt gggcagctaa atttttcagt tccatgtgcc 240

tcccaaataa aaaacagaaa ataagtagtt tttgtgaatt gacttgcaga caaagtagaa 300

actgtgctgc atgatgttat tttgtaaaca gatgacattt tctgaccagg cacatgccat 360

ccaatttttct gtcaatcaca ctgttgtata aagcagcaga actgaagggg aaaaatgatt 420

gttgtataca ctgaattgct ttgcatggtc tcatttgaga taattgatgt aagaatcctg 480

actttttttat 490

<210> 441
<211> 321
<212> DNA
<213> human

<400> 441
gatcgctaaa atgtccttga gtcccagcag ccccaggcac gaggatcagc tcgaggtcac 60

cagggaaccg gccaggcggc tcttcctttt tggagaggag ccatcaaaac tcgatcagga 120

tgttttggcc gctcttgaat gtgcagacgt cgacccccat cagttcccgg ccgtgcacag 180

atggaagagt gctgtcctgt gctactcacc ctcggacaga cagagttggc ccagtcccgc 240

ggtgaaagga aggttcaagt ctcagctgcc agatctcagt ggccctcaca gctacagtcc 300

ggggagaaac agcgtggctg g 321

<210> 442
<211> 372
<212> DNA
<213> human

<400> 442
actgtgccca gtctatatat aatagatttt agaagaaatt tctgccactc agtgactgct 60

ttaaattcta gagacagagg ctgagagaaa cttagtagcc tgcctgcgca tactgcaagt 120

acagactata taacaagttg aaagagaatc accctggtat ataatatttt aaaacatgaa 180

aaaggcatta ctattgttct ggtctaagta ctctaacagg acgatgattt ctaaccctag 240

catcatgaca tgtatatagt gtgttgtaag acatttgcca gctaatagtt acagtactga 300

agcttgtgaa tacgttaatt gagaaaactt taagcaggtt caaagttatc ccatgatagt 360

ggcattctta tt 372

<210> 443
<211> 467
<212> DNA
<213> human

<400> 443

gaggggagga ttcccagcac agaggatctg atgcgaggag cttctgctga ggagctcttg 60

gcgcagtgtt tgtcgagcag tctgctgctg gagaaagaag agaacaagag gtttgaagat 120

cagcttcagc aatggttgtc tgaagactca ggagcattta cggatttaac ttcccttccc 180

ctctatcttc ctcagactct agtgtctctt tctcacacta ttgaacctgt gatgaaaaca 240

tctgtaacta ctagcccaca gagtgacatg atgagggagc aactgcagct gtcagaggcg 300

acaggaacgt gtctaggcga acgactaaag cacctggaaa ggctgatccg gagttcaagg 360

gaagaggaag ttgcctctga gctccatctc tctgcgctgc tagacatggt ggacatttga 420

gcagcctgac ctgtggggag ggggtctctc ccgaagagtt tctgttt 467

<210> 444
<211> 355
<212> DNA
<213> human

<400> 444
ttatttgtcc tgacctttc agtcctacag agacgcatct gtggttcttt tgtacttgcc 60

atagatgtaa cctaaaaagt tttggcatat ttaggtcagc ctagcggaac ttttttttc 120

atttaaatgg agctgaataa tggagatttt gtgtctgcaa aattcctgag atcattgaaa 180

aagtaacaag ctgttccttg tttctgatac ataaaattat tttaagcatt ttatcaatca 240

ttaaaattta ctgccagttg tgagtggctt tttaattaac ttgtctttca ttgcacttca 300

ctctgcctgt tttcaagggg agtaagattg gtaacatttg gggagactgt atctg 355

<210> 445
<211> 473
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (127)..(127)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (398)..(398)
<223> n is a, c, g, or t

<400> 445
cgtccgcctt tggtgaatct ggcagcactg atggaagcag cgatgaggaa ctgagcgggg 60

accaggaggc cagtgggggt ggctctgggg ggctcgagcc cttggagggc agcagcgtgg 120

ccacccntgg gccacctgtc gagagggctt cctgctacaa ctccgcgttg ggctgctgct 180

ctgatgggaa gacgccctcg ctggacgcag agggctccaa ctgccccgcc accaaggtgt 240

tccagggcgt cctggagctg gagggcgtcg agggccagga gctgttctac acgcccgaga 300

tggctgaccc caagtcagaa ctgttcgggg agacagccag gagcattgag agcaccctgg 360

acgacctctt ccggaattca gacgtcaaga aggatttncg gagtgtccgc ttgcgggacc 420

tggggcccgg caaatccgtc cgcgccattg tggatgtgca ctttgacccc acc 473

<210> 446
<211> 438
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (300)..(300)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (303)..(303)
<223> n is a, c, g, or t

<400> 446
gagctcactg tgggatgggg ttgacctctg ccgcctgcct gggtatctgg gcctggccat 60

ggctgtgttc ttcatgtgtt gattttattt gacccctgga gtggtgggtc tcatctttcc 120

catctcgcct gagagcggct gagggctgcc tcactgcaaa tcctccccac agcgtcagtg 180

aaagtcgtcc ttgtctcaga atgaccaggg gccagccagt gtctgaccaa ggtcaagggg 240

caggtgcaga ggtggcaggg atggctccga agccagaaat gccttaaact gcaacgtccn 300

gtnccttccc cacccccatc ccatccccac ccccagcccc agcccagtcc tcctaggagc 360

aggacccgat gaagcgggcg gcggtggggc tgggtgccgt gttactaact ctagtatgtt 420

tctgtgtcaa tcgctgtg 438

<210> 447
<211> 528
<212> DNA
<213> human

<400> 447
tggattcact actggcacat taacaagcac caataggttt ttattccaac tccgagcact 60

gtggttgagt aacatcacct caatttttta ttatccttaa agatattgca ttttcatatt 120

ctttatttat aaaggatcaa tgctgctgta aatacaggta tttttaattt taaaatttca 180

ttccaccacc atcagatgca gttccctatt ttgtttaatg aagggatata taagctttct 240

aatggtgtct tcagaaattt ataaaatgta aatactgatt tgactggtct ttaagatgtg 300

tttaactgtg aggctattta acgaatagtg tggatgtgat ttgtcatcca gtattaagtt 360

cttagtcatt gatttttgtg tttaaaaaaa aataggaaag agggaaactg cagctttcat 420

tacagattcc ttgattggta agctctccaa atgatgagtt ctagtaaact ctgatttttg 480

cctctggata gtagatctcg agcgtttatc tcgggcttta atttgcta 528

<210> 448
<211> 370
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (168)..(168)
<223> n is a, c, g, or t

<400> 448
gcaaatatct taccaggcag cctatgaatt aacccaaaga agctttggtt ggttttggtg 60

gatttttatc atgccatgtt ggacatgaga ttttttagat cttccttccc acattgctag 120

acgtctcact caaagacatt tgttgggagt cacatttgca tcataganga gacagtccat 180

tcatcttagt taaattggat tgagaatgcc ttttgtttcc aggaaaatat tgatcaccat 240

gaaagaagaa tagtttttg tccccagaga cattcattta gttgatataa tcctaccaga 300

aggaaagcac taagaaacac tcgtttgttg tttttaaagg caacagactt aaagttgtcc 360

tcagccaagg 370

<210> 449
<211> 429
<212> DNA
<213> human

<400> 449
ggaaggtacg ataatcccac accatatctt ggatttcttg gaaattgact caactctcca 60

ttctaataac atctccattc tccaggaact gtacgaaagg tgctggagcc acagtaacga 120

ggagtccttc agcccctgct ccttggcctg gctttacctg cacttgcggc ttctctgggg 180

tgctatcctg cactcagccc tgatctactt tctgggaacc tttctgctat ccatattgat 240

cgcctggact gtgcagtatt tccagtctgt ctcagcaagc gatccccctc caagaccatc 300

ccaggcctcc ccagacactg ccacgtccac tgcaagtcca gctgtgactc cagctgcaga 360

tgcctctgac caagaccagc ccacagtaac taataacccg gagccacgtg ggtgaactgt 420

gcactccag 429

<210> 450
<211> 453
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (178)..(178)
<223> n is a, c, g, or t

<400> 450
gttacctacc tgtgtagccg aagtagtgtg cagtgaggcg tttctgaata catggtcaga 60

tttttggaaa aaaacaaaaa caaaaaaaac aagtaaagtt caaaaaccgt caaatgagaa 120

aattgcaagt agtgtgacag agctgattga ttttgttgct ttcttgattt tttttttnca 180

aaatgggttt actaaaatgt agatgactta actgcctcct ccttcgtctg aaaaatgcca 240

atattcaatc atcatgcagc attataacaa gccttataag tcctaaagca ttaagttgca 300

ctttttgag gaggggtagt gcagtatttc tctggccagt atgaatgaag tttatactta 360

ccatatttga tagaaacata gatcaagcta tggcacagcg actcatcaga tagctagctt 420

tgacgtctgg gcacaattga accaacttcc atc 453

<210> 451
<211> 476
<212> DNA
<213> human

<400> 451
ggcacgggta tgtcctcaat aacctcaagg aaaataaact tcaaaaatta agatccttgg 60

ccaggcacgg tggcttatgt gtgtaatccc agcacttggg gaggctgagg gaggtggatc 120

acttgagtcc aggagtttga gaccagtctg ggcaacatgg cgaaacttca tcactaccaa 180

agaagaaaaa aaattagcca ggtgtggtgg tgtatgcctg tagtcccaga tactctggtg 240

gctgaggtga gaggatagct tgagcccagg aaattgaggc tgcagtgaac tatgattgca 300

ctactgtgct ccagcttggg caacagagtg agatcttgtc tccaaaagtc cttgaaggat 360

tttaggaagt tgttaaaagt cttgaaacga tgtttggggg catgttaggg ttcttgaatg 420

tttaattcct ctaataactg cttattcaag agaagcattt ctgactgggt gcaggg 476

<210> 452
<211> 493
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (77)..(77)
<223> n is a, c, g, or t

<400> 452
ttaccacgtg gtcatctttt acaaacccat aaacattttg attagctgtg tgtgtgttga 60

aaaactgtaa atatgtncag tagcgataaa actaaaataa ctttgatttg ttgataagtt 120

cctaaaatgt ggaggtggat taaaacctta ggagaatagc agaaatcaaa cttcatgaaa 180

agttattttg gggctttcct gtgaaatgta tgaacaaaga ggctcagaga aggacatgga 240

agacaataat gtatactctc tcctcctccc tgaataatga aaaccatgtg tatttgttcc 300

ctccgtatgt taaagatttc cttttagtgg tacattctgc actcattttg tatagtctac 360

caaggcgggt atccctagga acaatattat ataggaagca ggtatactct gatcacattc 420

aggataagtg tacagaagaa aatacggtgt ttactcttta gggaactgga aacactccct 480

gcattgatgt aca 493

<210> 453
<211> 179
<212> DNA
<213> human

<400> 453

gagatttacc atgtatcagt gcctggcttt ttgttataaa gctttgtttg tctagtgctc 60

ttttgctata aaatagactg tagtacaccc tagtaggaaa aaaaaaaaac taaatttaaa 120

aataaaaaat atatttggct tatttttcgc aggagcaatc cttttatacc atgaatatt 179

<210> 454
<211> 540
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (59)..(59)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (103)..(103)
<223> n is a, c, g, or t

<400> 454
gtttatacaa ctgtcagtcc acccagtggt gcaactggtt ctgattcagt cttccgatnc 60

ctttttattt ttcacttttt cctatttctg aatttttttt ttnatttgtg atcttgattt 120

tgatgagggg ttggggagtg gggagggagt cgaaccaaga cttggagtta agaggatttt 180

catcttttgc atccaacagg cagaatatga tctgtgtcca aaagtgaact tgagtcagga 240

atgaatcaat ttcagcataa acaagcacaa aaatttagtc tgctggctga ctggaagcaa 300

aaaagtcaag atggaatatg atgaattcca acacaatggg gcaccaaggc ctttaggcct 360

ctcttttat tttgctttgg ttttgtttgt ttttctttag agacatgctc tttctcatgg 420

gacttgaagt ggactcatct ttgtgcagtg ctggttttgc catactcatt tcaagtatta 480

tagacatatg taatggtgaa aatatatgaa ctgtggcctt tttcattctt gttacttgtg 540

<210> 455
<211> 222
<212> DNA
<213> human

<400> 455
catacccata ttttaaggga caggtgaatt tactactttc taaagtttat tgatacttcc 60

cttttatgta aaatgtagta gtgataccta tatttccaca ttgtgcattg tgacacactt 120

gtctagggat gcctggaagt gtataaaatt ggactgcatt tcttagagtg ttttactata 180

gatcagtctc atgggccatc tcttcctcag atgtaaatga ta 222

<210> 456
<211> 533
<212> DNA
<213> human

<400> 456
gaagcgatcc aaattctgag tctttatatt ttgaggatga agatgggttt caagaactaa 60

atgagaatgg aaatgctaag gatgagaata ttcaacaaaa actttcttct aaagtattgg 120

atgatttacc tgaaaactca ccaatcaata tagttcagac tccaattcct attaccacct 180

cagttcccaa acgtgcaaaa agtcagaaga agaaagcttt agcagcagcc cttgccacag 240

ctcaagagta ttcagaaata agtatggagc aaaaaaaatt acaggaagct ttatcaaaag 300

cagctggaaa aaagaataaa acacctgtgc agctagattt aggggacatg ttagctgctc 360

tggaaaaaca acagcaagca atgaaagcac ggcaaattac taacaccaga cctctgtcat 420

atacagtggt tactgcagct tcttttcaca ctaaagactc tactaataga aaacctttaa 480

ccaaaagtca gccctgtttg acatccttta attctgtgga cattgcttct tct 533

<210> 457
<211> 404
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (374)..(374)
<223> n is a, c, g, or t

<400> 457
caagagctac aatgtcacct ccgtcctgtt taggaaaaag aagtgtgact actggatcag 60

gacttttgtt ccaggttgcc agcccggcga gttcacgctg ggcaacatta agagttaccc 120

tggattaacg agttacctcg tccgagtggt gagcaccaac tacaaccagc atgctatggt 180

gttcttcaag aaagtttctc aaaacaggga gtacttcaag atcaccctct acgggagaac 240

caaggagctg acttcggaac taaaggagaa cttcatccgc ttctccaaat ctctgggcct 300

ccctgaaaac cacatcgtct tccctgtccc aatcgaccag tgtatcgacg gctgagtgca 360

caggtgccgc cagntgccgc accagcccga acaccattga ggga 404

<210> 458
<211> 577
<212> DNA
<213> human

<400> 458
ctggctcact ttgcagttgg cactgggttg gggaggaaga gagctgatga gtgtggcttc 60

cctgagctgg ggtttccctg cttgtccagt tgtgagctgt cctcggtgtt accgaggctg 120

tgcctagaga gtggagattt ttgatgaaag gtgtgctcgc tctctgcgtt ctatcttctc 180

tctcctcctt gttcctgcaa accacaagat aaaggtagtg gtgtgtctcg accccatcag 240

cctctcaccc actcccagac acacacaagt cctcaaaagt ttcagctccg tgtgtgagat 300

gtgcaggttt tttctagggg gtaggggggag actaaaatcg aatataactt aaaatgaaag 360

tatacttttt ataatttttc tttttaaaac ttggtgaaat tatttcagat acatatttta 420

gtgtcaaggc agattagtta tttagccacc aaaaaaaagt attgtgtaca atttggggcc 480

tcaaatttga ctctgcctca aaaaaaagaa atatatcctа tgcagagtta cagtcacaaa 540

gttgtgtatt ttatgttaca ataaagcctt cctctga 577

<210> 459
<211> 497
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (61)..(61)
<223> n is a, c, g, or t

<400> 459
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ngttatgttt ccttgccccg tcgcattaat gaggcccttc cacatcattt ttaaactaat 120

gtttttctat attaacatta ttatggatat ttggctttca taggccacac acaggtgtgc 180

tgcgcgggaa gccccatgct ccaatcaaag ggatttttag tagtgcctct aagcaagcac 240

cgatgagtca gtcccacgta ttttcttttt tgtcagtatt gtttgggaag gagacatgcc 300

gggatgtgtc atcgtgccaa ataccacatt tcctgttggc acagtttcac agaagtaaac 360

ataagcatgt tttaacaggt ttttcttttc ttttttcttt tttaaaatgt tttatttatt 420

taacccgcca ttgtgtgttt ttaagtattt tctttttta aggaaaggaa aagcttgtca 480

caatctaact ggctatg 497

<210> 460
<211> 515
<212> DNA
<213> human

<400> 460
ctgctctttg acactgcttt tggtaccctg ggtggcctat ttcaggtggt ttttagtgtc 60

tgcaagcgga ttggctacaa ggttactttt gacaattctg gggagttata aactcaaaaa 120

actaatagta tccagtcaca gtgaatttga aagctggaat agtttgtctt tacaatgggt 180

ttctgttcac tgtcagttat cattatattt tggcctttgg tggggatgtc tgcttgtttt 240

tgcaaaagaa gatggcagaa tttagacttg acagaggaga aatgctcagg gtgagattag 300

gtgtagtaat ctgctgttta cctccagtta tatgtgcaaa ctcccaagcc actaataact 360

tcagttatgc actctaacac agacgaccac ctgaaatgca ctggtattta tttctgataa 420

ttaaaaatta caggggaggg aagaactaga aaaagaacaa ctttagacca aaggtgtctg 480

agaaaaggag aaagggagct tgttcttccc attgc 515

<210> 461
<211> 540
<212> DNA
<213> human

<220>
<221> misc_feature

<222> (90)..(90)
<223> n is a, c, g, or t

<400> 461
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gggtcacagc agtgccactt ctgcatcttn gccttttatg ccatttgtga tgggtggtgc 120

accatcatcc cctcatgtag actccagcac catgcttcat caccaccacc accacccccа 180

cccccaccat caccaccatc accatccagg cttgagagcc cctggctacc cctcttcacc 240

agtgactacc gcctctggta ctaccttgcg gttgccacca ctgcaacctg aggaggatga 300

cgatgaggat gaagaagatg atgatgactt atctcagggc tatgatagct cagaaaggga 360

cttctcactc attgatgatc ctatgatgcc agctaactca gactccagtg aagatgctga 420

tgactgaagc cccagcatgg gccccattgc ttgggcggct gctgtatttt catttactct 480

ggcccttgga ctatggaaac gtgggagggg caggggagat gtggggaagt ccaggactcc 540

<210> 462
<211> 460
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (62)..(62)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (182)..(182)
<223> n is a, c, g, or t

<400> 462
taaagatctt gctgtggctc tgttatgttc tgaggccttg ggattagcct cttcctcatt 60

anggagctga ttttctagtc tgtggatcag ctatgccttt ggacacttct cttttccatt 120

gtgccttttg aatgttgtct tctcactcag catcagcact tcgatctaaa tgcagactag 180

gnagttggga ggaggaacca aagtgaacca tccttcattt attcagtcat tcgttcatct 240

gtcaaacacg tatttggaca tcaaggttgc agagatgaac aatgcatgga tttcatcttt 300

gaggagttca aaacctagtg gagagaacac atggtacaat cgtaacacat gaaggacaag 360

taagtgctgc agtaaaggta ctaataacat gttccttgga acagaggaag aaaaaccacg 420

aaaccatgga aattagggaa gcctttacag agggtgtgac 460

<210> 463
<211> 502
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (41)..(45)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (47)..(72)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (74)..(80)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (83)..(85)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (87)..(88)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (93)..(93)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (169)..(169)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (189)..(189)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (194)..(194)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (199)..(199)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (217)..(217)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (328)..(328)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (334)..(334)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (351)..(351)
<223> n is a, c, g, or t

<400> 463

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nnnnnnnnnn nngnnnnnnn gannnanncg ccnacatggg ccgcgttcgc accaaaaccg 120

tgaagaaggc ggcccgggtc atcatagaaa agtactacac gcgcctggng caacgacttc 180

cacacgaanc aagncgcgnt gtgcgaggag atcgccnatt atccccagca aaaagctccg 240

caacaagata gcaggttatg tcacgcatct gatgaagcga attcagagag gcccagtaag 300

aggtatctcc atcaagctgc aggaggangg agangagaaa ggagagacaa nttatgttcc 360

tgaggtctca gccttggatc aggagattat tgaagtagat cctgacacta aggaaatgct 420

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gaatttcaaa acgcctcggg ga 502

<210> 464
<211> 557
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (45)..(45)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (214)..(214)
<223> n is a, c, g, or t

<400> 464
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ggaggactct gccaaatcaa tctgggcaag aagcaggatc ctgagtctgg gcaatgagag 120

tcagagaact taactcctgt gtgcagggta gaattttccc atggcagaaa ttctgagttt 180

tctgccttat ttttcttggg ataaccagcc acanggagac cttcaggtaa aatgtggttc 240

aaatatggga aggcagaggt acctgggacc ttgctactca agtatgattt gtgaaccaac 300

agcatcaaca tcgtattgaa gtttgttatt tatagaaatg cagaagtttg ggctctgctc 360

caaacctatt aaatctaaat ctacattgca acaaagtccc caggtgattc acaggcactt 420

tgtagtttga gaagcactgt actaagatta ctgtgttgtc ttcacatgaa tgaggctata 480

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<210> 465
<211> 484
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (347)..(347)
<223> n is a, c, g, or t

<400> 465
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agccccagct acgtgccccc cttcaaggac attgtggtgc ccagcctgaa cgtggccaag 120

ctgctcaagt agcctccgcc ggcctgccct gctcgccccc ccacagcctc ggtccctgcc 180

tttagaaacg cgggacagct gattgctctc cttggccaca cgtgctcctt ttagctgcac 240

ggcctgtctt taggtgccag tgtgatgcac cgggtgtgcg tcgagtgagc gtcccgaggc 300

cacgtgcgga ggcccctcac tgtgctgtca aaggcctgtg ggtgcanggc tctgccgcac 360

agcctctctt gggtgcttgt ttgttgcagt ggttgaaagt gtgtggggca cagaggacgt 420

gcacctccct gccctcctcc tccctgggcc ttcaccgcac cccatctgct taagtgctcg 480

gaac 484

<210> 466
<211> 501
<212> DNA
<213> human

<220>
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<222> (124)..(124)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (127)..(127)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (131)..(132)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (134)..(134)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (136)..(136)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (138)..(138)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (309)..(309)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (338)..(338)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (355)..(355)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (372)..(377)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (379)..(379)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (381)..(383)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (414)..(414)
<223> n is a, c, g, or t

<400> 466
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acctctgccc cccatgaatc ccattttacc tctagaccta taagttctgg tttatgtttg 120

accnccnccc nncngngntg cacttcaccg ctgaccttgc ctcaccttta acccccccacc 180

tgagccccag ctcctacctc tgaccccaac ttctctttga tctctgaatc ccctctgact 240

ccaacttctc tttcaccctc tatgagtccc attttacttc tacacctgca agtcctggtt 300

tatattggna ccccctccctc cgagctgcag ttcacctntt gaccttgcct caccntttca 360

ccccccaccc cnnnnnngng nnngctccta cctctgaccc cagcttctct ctgnttccca 420

caggccccat gcatcctccc tgcctcactc ccctcagccc ctgccgacct tagcttatct 480

gggagagaaa caaggcctgg t 501

<210> 467
<211> 361
<212> DNA
<213> human

<400> 467
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gacatcatca ctgatgtcgc cacattccag accacacagg gcttcatcgt aactgcttct 120

agagatggga ttgtgaaggt gtggaaataa aacctactga tttgtataaa ttttaatagt 180

tataaatata atactataac tcgagaaaag gcatttctag agaacagatt catttgctta 240

attttcaaaa ttatgtctcc atattactgt ttcatgactg actgactaaa tgacacccaa 300

aatggttaag atgtacttga ctagtttact tatgcatctc tttgcaagaa tcagccagcc 360

a 361

<210> 468

<211> 533
<212> DNA
<213> human

<400> 468
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ctaccttcag gaggcacgag agctgggaga agaggcaaag ctacaggttt acttgggagc 120

cagctgagaa gagagcagac tcacaggtgc tggtgcttgg atttagccag gctcctccga 180

gcacctcatg catgtcccag cccctgggcc ctagcccttt cctgccctgc agtctgcagt 240

gccagcacgc aaatcccttc accacagggt ttcgttttgc tggcttgaag acaaatggtc 300

ttagaattca ttgagaccca tagcttcata tggctgctcc agccccactt cttagcattc 360

ttactcctct tctggggcta atgtcagcat ctatagacaa tagactatta aaaaatcacc 420

ttttaaacaa gaaacggaag gcatttgatg cagaattttt gcatgacaac atagaaataa 480

tttaaaaata gtgtttgttc tgaatgttgg tagacccttc atagctttgt tac 533

<210> 469
<211> 466
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (73)..(73)
<223> n is a, c, g, or t

<400> 469
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ctccaatcct ggntcccatt aactccaagt gccttttga cagtgacaac agacagtccc 120

tcgctttttg ttgttgttgg ttttcttaac ccctttaatg gaactgcctg gattttatac 180

agttattaaa ggatgtctct tttgctttaa actgcatgct gccaagtgcc atttggggtc 240

agcatcctcg tttcaacaca gtgtgctctc tagttatcat gtgtaacgtg ggttctgttt 300

agcgaagata gactagagga cacgttagag atgcccttcc ctgctccatc cctgtggcac 360

cattatggtt ttttggctgt ttgtatatac ggttacgtat taactctgga atcctatggg 420

ctcatcttgc tcacccaatg tgggagtctg gtttgagcaa gcgagc 466

<210> 470
<211> 437
<212> DNA
<213> human

<400> 470
gcattgtccc tatgtaacta tcttaatggc tatatatatg tattttataa agccatttat 60

gtatacacat gtaacttgga atttccttca tccctacaca ttttctacac ttacatcacc 120

ttattgcata aaacaaagtc acgcgctttc tgcttgaaca tcaaaatatc aaaaaccaag 180

gtacccaaaa gatacaagtc agagacaaca tccttgtcca tatccaaacc cagtgtttca 240

gtgctagcaa cttaatttct catacattta tagagtttgg tttgctttgc tagttgtgtg 300

aatcattggg ctgtttttag agccactgtt aagagagaat ataaaataat catgacaatt 360

actactgttt ccacatttac aaattgtgta cttaaatgaa cctcatttcc cttttatttc 420

tgaatggctt gtctgag 437

<210> 471
<211> 466
<212> DNA
<213> human

<400> 471
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atccagagaa aaggaagaag gtgcagggtg ggccaagagg caagtgaagg ttggcctgag 120

tctgggccgg aaactcagag gatgtttctc ctctgctggg agctgtagtt tcttatcaaa 180

atagatattg ttccaccatc cccctccttg gcccttcaag tgggctgaag cccttggaaa 240

gtgacatagg aagtccccag atcttgccct tctcactcca gaggctagtg gtcacagaca 300

gctgggaatg gcagccacag agggtcccct ctgggagaaa cagcttcacc ccagcctcag 360

ggccctgggc catcactgca gtggccctgg gaggtgagga agaagctggc tagaggaggg 420

ggctcccacc tacctttttat ttaagccagt attctttgtt cctgct 466

<210> 472
<211> 261
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (131)..(133)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (136)..(139)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (143)..(145)
<223> n is a, c, g, or t

<400> 472
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ctaaaaaacc ttggggcact ttacagacgt caaggcaaat ttgaagctgc agaaacgtta 120

gaagaagctg nnntgnnnnc tcnnnaacag agggtggcag aagtgctcaa tgaccctgag 180

aacatggaga agcgcaggag ccgtgagagc ctcaacgtgg acgtggtcaa gtacgagagt 240

ggccctgacg gaggggagga a 261

<210> 473
<211> 541

<212> DNA
<213> human

<400> 473
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ctaccgatac tatgtggtaa tgctattttg ttttactaac aagctctgga atatttagca 120

gtcattttca ctggcacaag agccttttgt atgttattca atttaaactt ttaaaccaaa 180

aattttatgg tccagtgtct ttggcaaaaa gatgctggag ggaatgtaac atacaattaa 240

tatgtggtta tatatatata taaaaagaca caaattgcca tgttatggtt ctgccttgaa 300

acagcacaat gaagtgtatc agtatattct gtgattatga aacttatatg ttgtgttgtt 360

ttgtgtcttc tgttgcctgt cctttgggcc agatgtgggc cagttaaatg cagttatcat 420

ctcattaaat acagatgcag ataaaatatc tttagtgctg caacatttta cctaactttt 480

tgtatgtttt catgactgtg tgttattttc caaagctgtt cctacctcac catgaggctt 540

t 541

<210> 474
<211> 285
<212> DNA
<213> human

<400> 474
cttgatttgg tgaatacagt tatattttaa aaccttaagg tgacaagcat tttctatgcc 60

taaatcttca ttggtttgcc tggaaagagt ctctgttaaa agattttcca tattcaaagt 120

aaaaggaaag atttcttgct ttctaattgt cttttggaca catgcctatt ttctttgagg 180

tataaacctt tagatgtgaa aaatgtaatt tcattctgct attgtgtgtg cttgtgtgtg 240

tgtaattgaa aaaactggga aatcctgctt tgttggtaat aaatc 285

<210> 475
<211> 520
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (147)..(147)
<223> n is a, c, g, or t

<400> 475
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acctcactgg ggcagggagg atccccaggg ctcccaccct ccacttggcg ggccccgtgg 120

ggccaggtgc tgaggggagc ctctctnccc cacccatcac tagcttccct ctgccctctc 180

ccaccccggg ggggacccag gttgggcact ggctcatttc tcgcaaatac ctcgaagggg 240

agggggggagg gatggggtta tagctgtttt gtttaattgg aactggaaga gggatcatgt 300

tttgttttat gcccttccca gaaggggggga gggacaccgg gatcgcactc ctgtactggc 360

caccgccgct gtcacttgtc acattgagtt catgtccctt gagagtttgt ataaattcag 420

gtcagagctg cagctacaca gctgcccagt gtcatagaaa agcaattcac caacgactga 480

tctctccatt cagaagtgtg cagtcttaaa tgtacagcga 520

<210> 476
<211> 562
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (283)..(283)
<223> n is a, c, g, or t

<400> 476
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ccttttttggt ccttttaagt aaccactcaa aacttttcat ttcactgaaa aaatatgaaa 120

aaccatgaca atagggctgg gtgcagtggc tcacgcctgt aatcttagca ctttgggaga 180

ccaaggcagg cggatcgttt gaggccagga gtttgagacc agcctgggca atgtagcaag 240

actctgtctc tgcaaaaaaa attaaaagat acctgagagc tcnctttaat atcaaggtat 300

ttgcatccat tcccaccctg ttagctctta agggaggagg gaaatcaatt ccaaccatac 360

tttcctgtga tggaagatgt ttcctcttga aaaaatgcca atacagattt ttaaaaccta 420

ttgttttcca aatgcacttt gtaagttttt gcttttaaaa tagcttcttg gaaccaattt 480

tattgtattt gtacttaatt tttgttctca tctaaatgtg cattttctga ctgtatagaa 540

gaagctttgg tatgtaattt aa 562

<210> 477
<211> 546
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (76)..(76)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (99)..(99)
<223> n is a, c, g, or t

<400> 477
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atttatttttt ttaaangaac ctgttgtaca tctttctcna atacaaactt gggctttagc 120

tgccccctcc actaaaccga tgacttactt ttttgactag aatgagaaaa tggcaagaat 180

cttagtaagg tggtagccag cttggtaact gcatagtaat cgagaggctg taagatggga 240

attcatcgta ggcagcgagg tagagtgggt cccctgaaat gggattcgct tggcactgcc 300

tcttaaagat aggggtgttg ggatcttgat tgtggccgcc ccccccagct ttacctgccc 360

actttgtcct tcttggcaag cctgttcaca tggacgtcca gagccagtgg acagagagga 420

ggggacggac agcagaggtg ctgcttttgc agcagaaact ttgttgcagt tcagagtata 480

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tttgta 546

<210> 478
<211> 508
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (94)..(94)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (108)..(110)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (115)..(115)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (121)..(121)
<223> n is a, c, g, or t

<400> 478
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atttggaatt gacattctct attgtaattt tgtncctgtt tatttttnnn ttttnttttt 120

ntttcactgg aaaggaaaga tgatgctcag ttttaaacgt taaaagtgta caagttgctt 180

tgttacaata aaactaaatg tgtacacaaa ggatttgatg cttttctctc agcataggta 240

tgcttactat gaccttccaa gtttgacttg tataacatca ctgtcaaact ttgtcaccct 300

aacttcgtat tttttgatac gcactttgca ggatgacctc agggctatgt ggattgagta 360

atgggatttg aatcaatgta ttaatatctc catagctggg aaacgtgggt tcaatttgcc 420

attggtttct gaaagtattc acatcatttg ggataccaga tagctcaata ctctctgagt 480

acattgtgcc cttgattttt atctccaa 508

<210> 479
<211> 282
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (42)..(42)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (66)..(66)
<223> n is a, c, g, or t

<400> 479
ggcattgctg tcaacattaa gactgcagag atttacagag cntcctttca agatcggggt 60

ccggangagc agcttcgtgc tgcgcgaact ttagcaggag gaccaatgat tagcatttat 120

gatgcagaga cagaacaact tcgtatagga ccgtactcct ggacaccatt tccacatgtg 180

gatttctggt tgcaccaaga tgacaagcaa atactagaga atctttccac ttcgcctctg 240

gctgagccac cccactttgt tgaacatatt agatctacct tg 282

<210> 480
<211> 213
<212> DNA
<213> human

<400> 480
ctggaaataa agccctactc tacaaaaaaa atgaagatgg cttgtgggaa aagatctctt 60

ctccaggaag ttaaaaaaca tgaattacca aagaaagcac cttcttggcc tgacagacca 120

ttggtggggc tggcacgaat ccagatctgg atcctacatc tgttgggtct taggcctcct 180

tccctcctca gtgtctttca aatgactttc atc 213

<210> 481
<211> 438
<212> DNA
<213> human

<400> 481
tagaaaactt aaatcctgtc acaggatatt tagacatgtg tagaatgtag ctcaattttt 60

aaaaagtaac tgacctagag ggtgaaagtt gaaactgaca cattttcaaa ttaagattat 120

gcttattttg tacagaaaac aatgtttaaa cacaagcaga tctgttgtat gtaataagta 180

acacagagtt ttaaaacaaa ttaattattt agctttattg aagtttgttt ttttccttcc 240

gaacctggag tatcatatta taaacagcag tttcacacca gaatagcagt gccctttctt 300

tttgtacata ctgattggac ctttctttac tgttacgtgg acactttcta tgttagtttt 360

gatgcataat tctttgaatc cttttataca aactagaatg tatgtgtaag aatacctgtc 420

cctgcaatgt agtaacta 438

<210> 482
<211> 482
<212> DNA
<213> human

<400> 482
gcaagccagc agagttgtct taaattagtg gtggatagaa gacttagaat agaaactttt 60

agtattaccg atggggaaaa aaaaactact gttaacactg ctaatgaaag aaaatgccct 120

ttaactttct aatgattata gataaatata atatgcgtct ttttcacaat atcctatgat 180

ttttagacta ggctctagtg ttcagaattc atgaaattat ccatggtaaa aactagttat 240

aaaaattaca taattcaaag ataacattgt tattcttaag ccttatataa tattgtaact 300

tgcatgtatc catacctgga tttgggatga aatacttaat gatctttcca ttggaaataa 360

ctggaagtga agaggttttg ttgcttgtac agtgtcagat gaggaacacc actatcttaa 420

ttttgcgata cactgcattt gctggtgcta tttttataca gtgaagcaac agctttgcag 480

ca 482

<210> 483
<211> 435
<212> DNA
<213> human

<400> 483
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ccggaatcac tggattaatc ctcacatgtt agcacctcac taacttcgtt tttgattgtg 120

ttggtgtcat gttgagaaaa aggtagaata aaccttacta cacattaaaa gttaaaagtt 180

cttactaata gtagtgaagt tagatgggcc aaaccatcaa acttattttt atagaagtta 240

ttgagaataa tctttcttaa aaaatatatg cactttagat attgatatag tttgagaaat 300

tttattaaag ttagtcaagt gcctaagttt ttaatattgg acttgagtat ttatatattg 360

tgcatcaact ctgttggata cgagaacact gtagaagtgg acgatttgtt ctagcacctt 420

tgagaattta cttta 435

<210> 484
<211> 533
<212> DNA
<213> human

<400> 484
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gcttggtgct ggtttatttg ttgttttctg ggggaaaaag ccatatcatg ctaaaattct 120

atagagatag atattgtcct aagtgtcaag tcctgactgg gctgggtttg ctgtcttggg 180

gtcccactgc tcgaaatggc ccctgtcttc ggccgagctg gtttcctgcc cagcctgggg 240

caaacctagc cggaaggccg aggtcccatt gttggcgctg aggtgtctgg cctgaggtca 300

atggtgcaaa ggagccgcca ccgggcatgt ctgcctggag tgctgtgctg tgtttaatca 360

ggggatacag gcccctgggt ttctttttttc tttcttcctt tcttccttgg ccaagagaag 420

ggcttacagg catggacatg caggttggca aacgggcttg actttggctg atttaaaaag 480

tgagaaagaa agtaaaaaag gttaattttt ccttcctctg taagatatcc cag 533

<210> 485
<211> 535
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (212)..(212)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (375)..(375)
<223> n is a, c, g, or t

<400> 485
aaggtcttac attgcctgac taaaatgttt catttacctc taaatttcca tatccttctg 60

gctgtagata aataatgtag ttttgtttat gcatttggaa ttagtggatt tttttgtcat 120

taaaattgtt accactggta acatgtgaca agcacaccac aattctccct atcttgtgaa 180

gttgtttttt taaatcgcct tgaacaaaaa gnttttttttt ttgtttgttt ttgctttctg 240

aaattcacag aagcctagga ggactggggt aagcggaata aactagagaa gggagacatt 300

gtttggattt cctttatact gtgaagttac atgcataaaa gggtcaaacc tgtagatgca 360

gaaaaagaaa aaaanctata aatacaaatc tgtataaatg tctattatta tgaagaattg 420

ccaatcttgt tttaagcaaa tgcattctat cgttattata aatgttagtt ctagctctat 480

ttacttctaa tcttaaatca gaataaatta atattgtatt gctgctgtgc gtgga 535

<210> 486
<211> 470
<212> DNA
<213> human

<400> 486
gtgccactga tgcacagcca ggcaacacct taagtcctgc caacaattca cactccagaa 60

aggcagaagt gatttacaga gtccaaattg tggatcccag tcaaattctg gaagggatca 120

acctgtctaa aaggaaagag ctacagtggc ctgatgaagg aatccggtta aaagctggga 180

gaaatagctg gaaagactgg agtccgcagg agggcatgga aggccatgtg attcaccgat 240

gggtgccttg cagcagagat ccaggtacca gatcccacat cgacaaggca gtgcttctgg 300

tccagattga tgataaatat gtgactgtaa ttgaaactgg ggtactagaa cttggggctg 360

aagtgtgagc cagtgtttat tataaagaca tttctttttc cctctcaatt ccaaggcatt 420

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<210> 487
<211> 300
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (44)..(44)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (46)..(46)

<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (108)..(108)
<223> n is a, c, g, or t

<400> 487
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tcttggggag ctgccccaca agccccgctg gccaccgagg gctgcagncg ctgcgctgcc 120

ggcttctccc caccaccctg ccacctccac tgtgatgtat gtccgctccc tcgtctgttc 180

ccccaggatc tcgaagtgac tccgggctga gcagtggggc ggctggggga ggggtgacga 240

ttctcctcag gctttggccc tgcaagcaaa cccacatatc tgctctgtat gtaataaatg 300

<210> 488
<211> 478
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (395)..(395)
<223> n is a, c, g, or t

<400> 488
ctttgtgtat agacaagccc atgcccatta aaataaagtt atcctgtaac ataaatttta 60

ttaaataata cttccccaca gatgagaggc acgcaacacc tatggacaaa agggagttac 120

agaggctgct taaaagatgg agaaaagcct gagattgaag gaggaaaaaa acccagtatt 180

taaagtctat aaaaaatact caaaatagtg ggtcttcgag tttaaaatag tcattgttat 240

tttacattct aaagtgcatg taggttgata ttttttaaaa tatcattgga gaatttaatc 300

tttctttata aaaatagagc atttttctgc tttctggcaa aagttgggga taaaaggaaa 360

aaaagttgtc aaaatgtaat tttcagtcca attcnccagg aaaacatgct tgtgaattgt 420

gcagtaaaag gtggtaatga ctactggaag ctaagtcaaa ggtgatttcc tacctgat 478

<210> 489
<211> 466
<212> DNA
<213> human

<400> 489
agcccaggga gggaacggac ctgcgagtca cacaactggt gacccacacc agcggctgga 60

gcaggaccct cttggggaga agagcatcct gcccgcagcc agggcccctc atcaaagtcc 120

tcggtgtttt ttaaattatc agaactgccc aggaccacgt ttcccaggcc ctgcccagct 180

gggactcctc ggtccttgcc tcctagtttc tcaggcctgg ccctctcaag gcccaggcac 240

cccaggccgg ttggaggccc cgacttccac tctggagaac cgtccaccct ggaaagaaga 300

gctcagattc ctcttggctc tcggagccgc agggagtgtg tcttcccgcg ccaccctcca 360

ccccccgaaa tgtttctgtt tctaatccca gcctgggcag gaatgtggct ccccggccag 420

gggccaagga gctattttgg ggtctcgttt gcccagggag ggcttg 466

<210> 490
<211> 507
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (170)..(170)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (174)..(175)
<223> n is a, c, g, or t

<400> 490
ggaattagtt ctgtccactg tggaggggag aggaaataat gctgtaaatg ttgagttaca 60

gaaagtccaa tgtcaaatat agtttttttg tttcctttca aatgtattac agactgtgcc 120

aaaacagtta ccaattcaca ctgtcaatat taaagtatac catagtatan aaannagtca 180

gtacttgctg ttaattttaa tatttctgat ttaacagtta gttattaagt ggtacttcat 240

tgctgtttta gccaacgttt taaaaataat ttgggagttt gactattttg gcttacgtac 300

tcatttcctt ttctctgcta aaaatgtttt gcttgtgtgc gttcctgatt tttgtcttgt 360

ataatcttga tctttgaaaa ccctcaaaca tgtattaaat tgttgtaact ttttttcatt 420

agagggaaga cattaagggg attggggaca tttgtttcac acatctgcag taatatgagt 480

taactaatat ttaacaagct ctttctt 507

<210> 491
<211> 444
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (33)..(34)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (36)..(47)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (49)..(49)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (51)..(53)
<223> n is a, c, g, or t

<220>

<221> misc_feature
<222> (55)..(56)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (58)..(58)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (60)..(61)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (63)..(63)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (66)..(74)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (76)..(80)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (85)..(85)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (208)..(208)
<223> n is a, c, g, or t

<400> 491
tccagcggag gccacaagtc ctcctcttcc ggnncnnnnn nnnnnnntnc nnntnngngn 60

ncnagnnnnn nnnnannnnn ccaanatact aacaaaacca gagtaatcaa gacaattatt 120

gaagaggtgg cgcccgacgg tagagttctt tcatctatgg ttgaatcaga aaccaagaaa 180

cactactatt aaactgcatc aagagganag agtctccctt cacacagacc attatttaca 240

gatgcatgga aaacaaagtc tccaagaaaa cacttctgtc ttgatggtct atggaaatag 300

accttgaaaa taaggtgtct acaaggtgtt ttgtggtttc tgtatttctt cttttcactt 360

taccagaaag tgttctttaa tggaaagaaa aacaactttc tgttctcatt tactaatgaa 420

tttcaataaa ctttcttact gatg 444

<210> 492
<211> 318
<212> DNA
<213> human

<400> 492
aggctgaggg gggaacagcg cggccaggag cccctcgggc ccggcgcctt gcatttcgat 60

ctccgtgatg acgatgacgc ggaagaagaa gggcccaagc gggagcttgg tgtccggcgt 120

cccgggggcg cagggaagga gggcgtccga gtcaacaacc gcttcgagct gataaacatt 180

gacgatcttg aggatgaccc tgtggtgaac ggggagaggt ctggctgtgc gctcacagac 240

gctgtggcac cagggaacaa aggaaggggt cagcgtggaa acacagagag caagacggat 300

ggagatgaca ccgagaca 318

<210> 493
<211> 559
<212> DNA
<213> human

<400> 493
ggtgtgcttc gtgctgtagt tatcgttagt tcctcttccc gagatggggc cgccgagaga 60

ccccagcgcc tttgaaaagc aaggtttgtg ctgcgcttcc agttccgaaa agcagatgtt 120

taagcccttg gactgagggt gggatcgcag ctccgaagac ggagaggagg gaaatggggc 180

cctttccccc ctattgcatc cccctgcccg actccttccc cgcacccacg tgccctagat 240

tcatggcaga aaatgaccaa atcctgtgta tttgttttat atatttaata actgttttaa 300

atgaaagttt tagtaaaaaa aatacaaaac aaaaagatta aattgctatt gctgtagtaa 360

gagaagctct ttgtatctga acatagttgt atttgaaatt tgtggttttt taatttattt 420

aaaattgggg ggagggcatg ggaaggattt aacaccgata tattgttacc gctgaaaatg 480

aactttatga acctttcca agttgatcta tccagtgacg tggcctggtg ggcgtttctt 540

cttgtactta tgtggtttt 559

<210> 494
<211> 432
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (251)..(251)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (261)..(261)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (285)..(285)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (296)..(296)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (306)..(306)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (311)..(311)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (314)..(315)
<223> n is a, c, g, or t

<400> 494
ccgcacgatg cctggagtta ctgtaaaaga cgtgaaccag caggagttcg tcagagctct 60

ggcagccttc ctcaaaaagt ccgggaagct gaaagtcccc gaatgggtgg ataccgtcaa 120

gctggccaag cacaaagagc ttgctcccta cgatgagaac tggttctaca cgcgagctgc 180

ttccacagcg cggcacctgt acctccgggg tggcgctggg gttggctcca tgaccaagat 240

ctatggggga ngtcagagaa ncggcgtcat gcccagccac ttcanccgag gctccnaaga 300

gtgtgngccc nccnngggtc ctccaagccc tggaggggct gaaaatggtg gaaaaggacc 360

aagatggcgg ccgcaaactg acacctcagg gacaaagaga tctggacaga atcgccggac 420

aggtggcagc tg 432

<210> 495
<211> 443
<212> DNA
<213> human

<400> 495
ctttgctatg acttctggcc agatgtggaa ccatatccgt ggacctccat atgctcataa 60

gaacccacac aatggacaag tgagctacat tcatgggagc agccaggctc agtttgtggc 120

agaatcacac attattctgg tactgaatgc cgctatcacc atggggatgg ttcttctaaa 180

tgaagcagca acttcgaaag gcgatgttgg aaaaagacgg ataatttgcc tagtgggatt 240

gggcctggtg gtcttcttct tcagttttct actttcaata tttcgttcca agtaccacgg 300

ctatccttat agctttttaa ttaaatgaag ccaagtggga tttgcataaa gtgaatgttt 360

accatgaaga taaactgttc ctgactttat actattttga attcattcat ttcattgtga 420

tcagctagct tattcttgtg tac 443

<210> 496
<211> 529
<212> DNA
<213> human

<400> 496
atcatccttc cttagactga tgctttgact gaatcatcac tagctatggc attaaaaggc 60

ctctcttctc atctggtgcc aaaggttccg ttgcagcttt ttacaaccat ccggtgtggt 120

ttggaggatt tgtttttttt ttttcccaac agaaaagaac agccattaga agaaggctcc 180

cattttctga tgttccgccc cactgtgaag agtgtgctcg ttttaaattc atgttgattc 240

ttgtaagcac tggactgtct tcatcaagta tttccctaca gaactcctca agaaaacaga 300

gatcatttgg ctagagattg tctgagtgac tccaagctac tcactgtatt ggacgggagt 360

agtaatttat tttaaagata aagtgactaa gtggggaaat ttataaagct aaatattata 420

tattttattt ttcatacatg tttgaagtgc aaatctgtgg atattccatt tgtaggacca 480

agtcgacatg cccatcctga cattgtatgc tacgagaact cttctgatg 529

<210> 497
<211> 474
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (91)..(91)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (103)..(103)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (105)..(105)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (111)..(111)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (119)..(119)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (137)..(137)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (146)..(146)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (253)..(253)
<223> n is a, c, g, or t

<400> 497
gagcagtacc atctgggtct ggatcaaaaa ctcagaaaat acgtggttgg agagctcatc 60

tggaattttg ccgatttcat gactaaccag ngtcagccca agncnacccc ntcggtcant 120

ctgttcctgc cgtcctntga ggagcnccaa gccaacaagg ccacactggt gtgtctcatg 180

aataacttta tccgggaatc ttgatggtga cctggaaggc agatggtacc ctcatcaccc 240

agagcgtgga gangaccacg ccctccaaac agagcaacaa caagtacgtg gccagcagct 300

acctgagcct gacgcccgag cagtggaggt cccgcagaag ctacagctgc caggttatgc 360

aagaagggag caccgtggag aagtcagtgg cccctgcaga atgttcatag gttccagccc 420

ccaccccacc cacaggggcc tggagctgca ggatcccagg ggaggggtct ctct 474

<210> 498
<211> 419
<212> DNA
<213> human

<400> 498
gggaacactg ctctcagaca ttacaagact ggacctggga aaacgcatcc tggacccacg 60

aggaatatat aggtgtaatg ggacagatat atacaaggac aaagaatcta ccgtgcaagt 120

tcattatcga atgtgccaga gctgtgtgga gctggatcca gccaccgtgg ctggcatcat 180

tgtcactgat gtcattgcca ctctgctcct tgctttggga gtcttctgct ttgctggaca 240

tgagactgga aggctgtctg gggctgccga cacacaagct ctgttgagga atgaccaggt 300

ctatcagccc ctccgagatc gagatgatgc tcagtacagc caccttggag gaaactgggc 360

tcggaacaag tgaacctgag actggtggct tctagaagca gccattacca actgtacct 419

<210> 499
<211> 442
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (140)..(140)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (148)..(148)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (155)..(155)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (165)..(165)
<223> n is a, c, g, or t

<400> 499
gagaactgct tgaacctagg aggcggaggt tgcagtaagc cgagatcgca ccatttgaca 60

cagcaagtct ccgtctcaaa actacaacaa caacaacaac aacaaccaaa ttttgcaccc 120

ctgcctcatc ttcctggcan ggcccagncc ccagncccag gggancccca gacgtctcca 180

gtgccttgga taagctgaag gagtttggaa acacactgga ggacaaggct cgggaactca 240

tcagccgcat caaacagagt gaactttctg ccaagatgcg ggagtggttt tcagagacat 300

ttcagaaagt gaaggagaaa ctcaagattg actcatgagg acctgaaggg tgacatccca 360

ggaggggcct ctgaaatttc ccacacccca gcgcctgtgc tgaggactcc ctccatgtgg 420

ccccaggtgc caccaataaa aa 442

<210> 500
<211> 451
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (174)..(174)
<223> n is a, c, g, or t

<400> 500
ttacctacat ggtgactgtt cggtctaatt cagaaacaga agtactaaaa gaatactaaa 60

aagtttttac ccattatctc tatccctgtt ttctttttgc aattctcagc tgcagggagc 120

aagaaaatac acagcagata ggaaatgttt gtttgcatcc tggctttctc aacngcactt 180

tacgtccttg aatattctag atatttactc cttcaagaag tcaggagtat atccaggcct 240

acctatcatc cttgccatcc ccattaaccc tcatttttca gtatgtgttt tacatttatg 300

gttatttttc agtctatagt atctgttcac tcattgctct atcacatctg agtttctccg 360

tctttctttc cactagattg taagctcctt aagggcaagg tcggcatata agcaaagttc 420

tgtaaacacc gtgaaggtac catgagttct a 451

<210> 501
<211> 461
<212> DNA
<213> human

<400> 501
agtgctaacg cacaatcgct taaaatcact aatgaagatt ctgagtgaag tgactcctga 60

ccagtccaag ccagaaaact gatcctgtac caaagcttga gtgtcaggtt caggctttat 120

tgctgtcttc aacaacaggt gctgcttagt catttcttga aaaagattgg cttcaagaat 180

ggaggggaaa tgcagtttct atttaccttt aggctgattt tccaaattat ttgtgaagct 240

gtttttagaa gatgagagac taaggattct tctcttttat agctatttgc cttaagaact 300

tactttagat tcttattgaa ttcataatac ttatctctga aaatgtcttt gactgtaaat 360

ttaggaatta agatgcagag tcccatgtgt cctctgatct aaagttgcat ggttggtctg 420

aaaatagagt tgggcttaat gttgacttct attactcctg c 461

<210> 502
<211> 153
<212> DNA
<213> human

<400> 502
ggaactatgt ctggaaggct gtggtccaag gccatttttg ctggctataa gcggggtctc 60

cggaaccaaa gggagcacac agctcttctt aaaattgaag gtgtttacgc ccgagatgaa 120

acagaattct atttgggcaa gagatgcgct tat 153

<210> 503
<211> 474
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (39)..(39)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (53)..(53)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (56)..(56)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (75)..(75)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (110)..(110)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (113)..(113)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (147)..(147)
<223> n is a, c, g, or t

<400> 503
gccttgcatg gtgcctgtag ggggatttgc tttgctgtnc cattggggta canctnctgc 60

tcttactcta gaccnaaaag tcgggttgag tgactggtgg cagggccacn ganagagaca 120

gcggggaggg tggctgaccc tggcggncct ggactgagcg tctggaggag tcgtggaggc 180

tctttccctt ctttctcctc tgagagctcg ttcttcaggc tcttccagct tgtcatgtcg 240

agtgcctggc cactgctcag ggttggaggc tcagtccctt tgccctgtct gttccagctc 300

tggagctaac tcagggatcc ctgatcaggg ttacataggt ttggtaaaat gagtgctgga 360

aattaacttt ctcccagtag tcttaggtca tgctcagtga acttaaactt tatccagata 420

tggttttcct tcagcctttc tattcccttt ctagccagtg aaagacccgc tgcc 474

<210> 504
<211> 583
<212> DNA
<213> human

<400> 504

ttgacagggt agcatcacgc ccacagacta caccctctcc aagtgctacc tcccacgtga 60

ggatgtggtt ttgatcatct actgtggagt ggtgggcttc cttgtggtcc tcacactcac 120

tcactttggg cttctagcct caccttttct ttctggtttg aacttgctcg gaaagcgtaa 180

gacaagatga agagcaggcg ccattataaa tatcaaagcc caagaaatgg aactttgggc 240

agagatcatg ttagaatcaa gtggatgatg agaccaatta caggccgtct ctctgcacag 300

cacagaaatt ctcaatcact gaaatgagta actgcaaaat aaatagttga ttgtactgtt 360

ctcatgctat aaaagtggac aggtactcta caacaaatct gttttctcat ttttatcaaa 420

tatatgtatc atcaaaggtt gcatctgtac agtatgtaaa tgctattaat gtcgtcactc 480

acatgcacga cagtccttgt tcccccagga agggcctggt ggccccagca cacacttggg 540

attatgtgta tacataaata aatattgggc tgtttccctc ttc 583

<210> 505
<211> 460
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (304)..(304)
<223> n is a, c, g, or t

<400> 505
cactgcagct gatccagatt accaagagaa ataccaagaa ttacttgaaa gagaggactt 60

ttttccagat tatgaagaaa atggaacaga tttatccggg gctggtgatc catacttgga 120

tgatattgat gatgagatgg acccagagat agaagaagct tatgaaaagt tttgtttgga 180

atcagagcgt aagcgaaaac agtaaagtta aatttcagca tatcagtttt ataaagcagt 240

ttaggtatgg tgatttagca gaacacaaga gagcaagaaa atgtgtcaca tctataccaa 300

attnaggatg ttgagttatg ttactaatgt atgcaacttt aattttgttt aacactatct 360

gccaaaataa actttattcc ctataactta aaatgtgtat atatatataa tagtttatta 420

tgtacagtta attctactgt tttggctgca ataaaatcga 460

<210> 506
<211> 568
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (375)..(376)
<223> n is a, c, g, or t

<400> 506
gtgatggggg cggccaaggt gacactgggt ccaggagctc cctggggccc tggcctacca 60

ctcactggcc tcgctccccc tgtccccgaa tctcagccac cgtgtcactc tgtgacctgt 120

cccatggatc ctgaaactgc atcttggccc tgttgcctgg gctgacagga gcatttttt 180

ttttccagt aaacaaaacc tgaaagcaag caacaaaaca tacactttgt cagagaagaa 240

aaaaatgcct taactataaa aagcggagaa atggaaacat atcactcaag ggggatgctg 300

tggaaacctg gcttattctt ctaaagccac cagcaaattg tgcctaagcg aaatattttt 360

tttaaggaaa ataannacat tagttacaag attttttttt tcttaatgta gatgaaaatt 420

agcaaggatg ctgcctttgg tctctggttt ttttaagctt tttttgcata tgttttgtaa 480

gcaacaaatt tttttgtata aaagtcccgt gtctctcgct atttctgctg ctgttcctag 540

actgagcatt gcatttcttg atcaacca 568

<210> 507
<211> 503
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (169)..(170)
<223> n is a, c, g, or t

<400> 507
gacattgcct gtatgatcgg gtaccgacct tgcccctgga tgaaatggtg ctggtccttc 60

ttcaccccgc tggtctgcat gggcatcttc atcttcaacg ttgtgtacta cgagccgctg 120

gtctacaaca acacctacgt gtacccgtgg tggggtgagg ccatgggcnn ggccttcgcc 180

ctgtcctcca tgctgtgcgt gccgctgcac ctcctgggct gcctcctcag ggccaagggc 240

accatggctg agcgctggca gcacctgacc cagcccatct ggggcctcca ccacttggag 300

taccgagctc aggacgcaga tgtcaggggc ctgaccaccc tgaccccagt gtccgagagc 360

agcaaggtcg tcgtggtgga gagtgtcatg tgacaactca gctcacatca ccagctcacc 420

tctggtagcc atagcagccc ctgcttcagc cccaccgcac ccctccaggg ggcctgcctt 480

tccctgacac ttttggggtc tgc 503

<210> 508
<211> 525
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (26)..(28)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (30)..(30)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (32)..(32)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (36)..(36)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (41)..(41)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (45)..(45)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (69)..(70)
<223> n is a, c, g, or t

<400> 508
acctaacttg cgccggaaac cagatnnnan tngcantggc nttanttgtt ttttttgttt 60

tgttttggnn ttttttttt ttggcttgac tcaggattta aaaactggaa cggtgaaggt 120

gacagcagtc ggttggagcg agcatccccc aaagttcaca atgtggccga ggactttgat 180

tgcacattgt tgtttttta atagtcattc caaatatgag atgcgttgtt acaggaagtc 240

ccttgccatc ctaaaagcca ccccacttct ctctaaggag aatggcccag tcctctccca 300

agtccacaca ggggaggtga tagcattgct ttcgtgtaaa ttatgtaatg caaaattttt 360

ttaatcttcg ccttaatact tttttatttt gttttatttt gaatgatgag ccttcgtgcc 420

ccccttccc cctttttgt cccccaactt gagatgtatg aaggcttttg gtctccctgg 480

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<223> n is a, c, g, or t

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agaaagngac aacnagaaga ctgntctaaa ggatgcctgg attccttgtt atctcaggac 180

tctaaatact ctaacagctg tccagtgttg gtgattccnn nnngnnnngt ntnctctnnn 240

ngtgaaaaac acaatntttg ccttttttgta attctatttg agcaagttgg aagtttaatt 300

agctttccaa ccaaccaaat ttctgcattc gagtcttaac catatttaag tgttactgtg 360

gcttcaaaga agctattgat tctgaagtag tgggttttga ttgagttgac tgtttttaaa 420

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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aataagcaaa agcgtnccca ggagnccgta ctctgacagc tgtgcacgat gnccatcctt 180

gaggacttgg tcttcccaag cgaaattgtg ggcaagagaa tccgcgtcaa actagatggc 240

agccggctca taaaggttca tttggacaaa gcacagcaga acaatgtgga acacaaggtt 300

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gagtttcaat tgtaaa 376

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<212> DNA
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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<222> (202)..(204)
<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<222> (210)..(210)
<223> n is a, c, g, or t

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<222> (231)..(231)
<223> n is a, c, g, or t

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tgtncgctct cgccgaggaa caagtcggtc aggaagcccg ngcgcaacag cncatggctt 120

ttaaggatac cggaaaaaca cccgtggagc cggaggtggc aattcaccga attcgaatca 180

ccctnnaaca agccgcnaan cnnntaanan tccttggaaa aggtgtgtgc ntgacttgat 240

aagaggcgca aaagaaaaga atctcaaagt gaaaggacca gttcgaatgc ctaccaagac 300

tttgagaatc actacaagaa aaactccttg tggtgaaggt tctaagacgt gggatcgttt 360

ccagatgaga attcacaagc gactcattga cttgcacagt ccttctgaga ttgttaagca 420

gattacttcc atcagtattg agccaggagt tgaggtggaa gtcaccattg cagatgctt 479

<210> 512
<211> 382
<212> DNA
<213> human

<400> 512
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tgtttttttg taaacctgtg tgtttgtaga gatttcagac atcttctgat ttcttctcac 120

ctatattccc tggttaagag gtcaggggta gtgaatgttt ccttaagttc ctttttaaac 180

ttcccattgg tatgtaaatt ccaaatggca gatgctgtca ataaccttgc catggatgac 240

ctttgtgtag gtagtccttg cacctcatgc aggataagcc aattttaact ttctacaatg 300

ggtgcctcaa tagtttcata atcttcatga agttgcatcc tttggcagct tcttacagtt 360

tattttcact tccaatgtag ca 382

<210> 513
<211> 107
<212> DNA
<213> human

<400> 513
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tggtcttaac gttgtccttt tcccctggtt ctaggaactt ttgactg 107

<210> 514
<211> 536
<212> DNA
<213> human

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<222> (148)..(148)
<223> n is a, c, g, or t

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<222> (302)..(302)
<223> n is a, c, g, or t

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tgcaacctcc gcctcctggg ttcaagcgat tctcctgctt cagcctcctg agtagctggg 120

attacaggtg cacaccacca cgcccggnta atttttgtat ttttagtaga gatggggttt 180

caccatgttg gtcaggctgg tcttgaactc ctgacctcgt tcctgcctta gcctcctaaa 240

gtgccgggat tacaggcgtg aaccaccgca cctggccagt actacatcca ttttattgaa 300

tnattttgaa tgacttaaag ttcaactatg aaaaagcttt cttttcacat gtacttttg 360

attaggtatt atcaacttat gaaacttgaa gatgtgaagt gacaggtttt gcatgtgatg 420

agtgttttct gttaaaaaat aaatattgaa atattaaccc attaaataca tttttatggt 480

aacctatgtt ttacagtgga gttttaaaaa tgctaggtct ttctttcatt ttattg 536

<210> 515
<211> 361
<212> DNA
<213> human

<400> 515
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actgcagccc aggatggaaa accttgtttg cactaaccag aaagatcctt gtctgatttt 120

ggcagaatta aacggtgact tactaatgat agaactggta caagtagcat caactacaaa 180

gtgaaactca ctttagccta catggatctc actgtacata catatcaatc cctaaattga 240

atggtggagg ttgcaaagtg tatttgcaca ttttaaatca ttctgtttta gtttttccac 300

ttttattcat tcttatccct agccccttct cgttccctca tcccttctgt gggccaataa 360

a 361

<210> 516
<211> 136
<212> DNA
<213> human

<220>
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<223> n is a, c, g, or t

<400> 516
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acctaagcna aagattgtga agcctgtgaa agtttcagct ccccgagttg gtggaaaacg 120

ctaaactggc agatta 136

<210> 517
<211> 149
<212> DNA
<213> human

<400> 517
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tgccttgcct gtaagtggga tggataagcc tgtgtttaca gacccaccgg ttaagacaaa 120

atttggatat catattatta tggtcgaag 149

<210> 518
<211> 420
<212> DNA

<213> human

<400> 518
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ccaaatactt ctggtatatt actcgagggg tttttaaata ttgtcaggaa aaagaaggaa 120

gctcaacgat atcggaacga agtaagacac atcttcacag cctttgacac ctactatcgt 180

ggatttttaa ctttggaaga tttcaaaaaa gcatttaggc aggtggctcc caaattaccg 240

gaaaggactg ttcttgaggt attcagggaa gtagatcgag attcagatgg tcacgtcagc 300

tttagagact ttgaatatgc cctgaactat ggacagaagg aagcctaact attgtgaact 360

acttttggta actctgggga gatcaataga ttgtaatgtc agcagactct actctactaa 420

<210> 519
<211> 237
<212> DNA
<213> human

<400> 519
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catttctgcg gctgagagag atgtgtacac tggggacgca ctccggatct gcatagtgac 120

caaagagggc atcagggagg aaactgtttc cttaaggaag gactgatctg tgtgctctta 180

tcaccaatca gttcagacct ggttgatttt gtactttgga actgtacctt ggatggt 237

<210> 520
<211> 141
<212> DNA
<213> human

<400> 520
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ggagtcgggc tcagatgaaa gggttccccc cttccagggg cccacgagac tctataatcc 120

tggctgggag gccagcagcg c 141

<210> 521
<211> 497
<212> DNA
<213> human

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<222> (65)..(65)
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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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gcttnccttt ggggtgccag gcagcgaggc ccccgncccc tancctgcca tgtacttcaa 120

gctcacttct tctttttgag ttccgcaact tgctcctgcc tcccagcccc actggcactg 180

accatgacca cctacttcta ttttttttt agagtttctt tttttgatca cttactttca 240

aagcacacag tcaaacaagg ttatgccaaa tttccaggcc tttttgaagt attgagaagg 300

ggaaggggat ttctcacttc aattatagat cataatagga agcaaaaaga aaaaaatgaa 360

aagcaaacat atgcacgcac ttttcttgtt gacaaagcaa gaatataggt ttgctgtgta 420

ggtttggtgc tctattgatt ggtgagtgac cagagcaagt atgaaggtga tgctgccaaa 480

gcacaagcca gtttctt 497

<210> 522
<211> 472
<212> DNA
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<222> (68)..(68)
<223> n is a, c, g, or t

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<222> (403)..(403)
<223> n is a, c, g, or t

<400> 522
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tttcctcnaa gtgccagtat tcccagagtt ttggtttttg aactagcaat gcctgtgaaa 120

aagaaactga atacctaaga tttctgtctt ggggtttttg gtgcatgcag ttgattactt 180

cttatttttc ttaccaattg tgaatgttgg tgtgaaacaa attaatgaag cttttgaatc 240

atccctattc tgtgttttat ctagtcacat aaatggatta attactaatt tcagttgaga 300

ccttctaatt ggtttttact gaaacattga gggaacacaa atttatgggc ttcctgatga 360

tgattcttct aggcatcatg tcctatagtt tgtcatccct gangaatgta aagttacact 420

gttcacaaag gttttgtctc ctttccactg ctattagtca tggtcactct cc 472

<210> 523
<211> 563
<212> DNA
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<222> (238)..(238)
<223> n is a, c, g, or t

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<222> (251)..(251)
<223> n is a, c, g, or t

<400> 523
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actctaccac catgaacaat gacgtgacgc tgctgaagct cgcctcgcca gcccagtaca 120

caacacgcat ctcgccagtt tgcctggcat cctcaaacga ggctctgact gaaggcctca 180

cgtgtgtcac caccggctgg ggtcgcctca gtggcgtggg caatgtgaca ccagcacntc 240

tgcagcaggt ngctttgccc ctggtcactg tgaatcagtg ccggcagtac tggggctcaa 300

gtatcactga ctccatgatc tgtgcaggtg gcgcaggtgc ctcctcgtgc cagggtgact 360

ccggaggccc tcttgtctgc cagaagggaa acacatgggt gcttattggt attgtctcct 420

ggggcaccaa aaactgcaat gtgcgcgcac ctgctgtgta tactcgagtt agcaagttca 480

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<211> 543
<212> DNA
<213> human

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<223> n is a, c, g, or t

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aaagtcccag ccagagcccc tagtggtcaa gggaaaacgg gtggctggag gccctcagat 120

gatccagctc agcctggatg ggaagcgcct ctacatcacc acgtcgctgt acagtgcctg 180

ggacaagcag ttttaccctg atctcatcag ggaaggctct gtgatgctgc aggttgatgt 240

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gccccttggc ccagcccttg cccnatgagc tccgctaccc tgggggcgat tgtagctctg 360

acatctggat ttgaaggctc caccctcatc acccacactc cctattttgg gccctcactt 420

ccttggggac ctggcttcat tctgctctct cttggcaccc gacccttggc agcatgtacc 480

acacagccaa gctgagactg tggcaatgtg ttgagtcata tacatttact gaccactgtt 540

gct 543

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<212> DNA
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<223> n is a, c, g, or t

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<222> (134)..(134)
<223> n is a, c, g, or t

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<222> (260)..(260)
<223> n is a, c, g, or t

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ctgttcatgc cgangcttgc acgaccgccc cagttcctgt ggctccctcg gaatgctaag 180

gggatcggac atgaaaggac cctgtgagcc gattgtccta tctccagcgg ccctgtcatc 240

cagctcactc atcaatgggn ccagtcaggc ccaggcactg ggctccggag gactcaccac 300

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<223> n is a, c, g, or t

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ggcagagggc gctttaactt caaaaaatca ggtagcagtc ctaaatggac tcatgacaaa 180

taccaagggg atgggattgt tgaagatgaa gaagagacca tggaaaataa tgaagaaaag 240

aaggacagac gcaaggaaga aaaggaataa taaatatgaa gtaagattac aacagagcag 300

aacttgcacc caccattttt tttacctgat ttttgttttc aaataagaat gtaagcattt 360

tacttaaatt ttactgtttg caagtagtct atagaaattt tgttttaagt cttcaaatat 420

cttgagaaat agtagactgt atgttgaaaa ttgtactgaa ataaagtaga aanttgttac 480

gtaccatatt tgtaactatc aacttttaaa acttttaacg tttttgttac atgcattgta 540

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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nnnnncnnnc aacgtggccc agagaagcca aaagattgga tacgcatcag acagatggaa 180

aagggagatt cagactgttt ttcagggagg tggctgggtt tacacgctaa tcccgattca 240

ccctgtccaa actgcctaag ccctccgcca ttntcaagcc ctgcagtcac agctacacag 300

atcacagctt cagccaggag ctgggcagaa ggccaanagg ctgttcccac caggctgctc 360

agggntggtc ttttaggacc cttcccttga gccctntatg gtgtggcaaa gccttcattg 420

ccttaactgg agccccatca gctccagctg ctctgtnttn tttgcccnca atgctttgcc 480

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<210> 528
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<212> DNA
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<223> n is a, c, g, or t

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aaagttcaaa aaataaatta cattttataa ataagnnaan naannnnana nnnnnnnnnn 120

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnaat 180

tncccnacct cnggtnntcc acntgcnttn gnccccnnaa ttataggtgt gagccacagc 240

acccagccaa aaaagtaatt ttttttagag taataatgct ataatgttgg tgtgattcca 300

acctccagct ccccccancc gctgcctgcg gttttgtttc tgttaaaacg tcacctgatg 360

aaatagaatg aatcctgaaa tgcacctctg ggatcgggaa tggtctgtgt gttatcagct 420

gcgactggtt cactgcgtct ggacaagcct catggggact ggggattctg gccagtgtaa 480

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aaagcctcca tgtcatttga cctacgaatt ctatctttgg gaatttatcc taagaaanta 120

cttanggatt tanttngtga taagatgttc atcccagcat tgcaatggag aaaaatggga 180

agcaatggtt tggttgggaa tttattcctt ttctgctgta acgaaagttt gcaatagggg 240

attgcttaag taaattattg tatctccatc cagatggtgg agtaccgcgc agacattaaa 300

agtcatgtaa aagaacatct gactgaaaga aaaatgctcc ttgaatatta aaaggttgta 360

aaaatagtgc atgttatgtg atttcaattt tgtttttaa aatatgggtg tatgcttgta 420

tacgtagagc agataaaaaa gacggaaggc atactaaaaa atgttgagtg gttatctttg 480

tatggtggaa caaagtcact gtaattttca tctttggtt 519

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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ccccacgcaa tatttggaac acttatgtga aaaatgattt gtttttctga aattnacgtt 120

tctctctnag tcctgtaact gtccccgagg ggattgagca gaagctcggg tatgagccct 180

gaggttnact gccggttatt tntctgtcct gggaacagcc tgacccacct ccctntctcc 240

atgtagccag tgnggggagg gggagacaca gaaccnacca cagccagggg cgtccccatg 300

gcnactgtgn cccggcccct cctctcttgc ctnactctcc tctcttgcnc tnactctaga 360

cactaactta gttccaggtt cggtgccctg ntggngctcc tgttnccaat agcttaggtc 420

ccatggtggg ggagga 436

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<211> 373
<212> DNA
<213> human

<400> 531
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ttttatatta tgactgcttt ttaagaaatt tttgtttatg gatctgataa aatctagatc 120

tctaatattt ttaagcccaa gccccttgga cactgcagct cttttcagtt tttgcttata 180

cacaattcat tctttgcagc taattaagcc gaagaagcct gggaatcaag tttgaaacaa 240

agattaataa agttctttgc ctagtataca gttttatttt tttatttcat tgacaccgat 300

ctgtacacag taaaaaaaat tgcttataga aagctaatca tggcatgtaa tatggctgat 360

aacctttgga att 373

<210> 532
<211> 347
<212> DNA
<213> human

<400> 532
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tggtcactga ctggccatcc aattaccatt ttttctttca gtccaaaata gttagaccct 120

tgcatacaga agtggtattt tggtttttaa tcagatttgg tttcatcaga agcagcaaga 180

atggacctga tgtctttaaa agcatagccg acaatggtag cttctcaagt tatgaaataa 240

aactgagaga taatggagaa aataattttt atgggttttt ttggttatgg tgctattcct 300

aaggttaact ttgaatatgt gacacacaca ctcctaagta cctttaa 347

<210> 533
<211> 492
<212> DNA
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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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gtccggaagc tgggttccaa gagcgactgt tccagcagcc tcaggcagaa gctacaaggc 120

tgcccagatg cgatcctgcc cagatgtgtc ctcactgtca cccaggaagg gaagccccgg 180

aacaccaccc tcagtcacag gcatggggcc cactgcaagg cacaacccac tccagagctc 240

ccaaggccgc ctcccctggg acctgcagcc agctggctcc ataactgctt ttccngtttc 300

cntccnaggc attttcatcc ntagccctac tttgtgcntg ggatctgagg gggatagcaa 360

gcggagaaag aagggatcta gagggagaag attctagatc cttcttttga ctgccagctg 420

attttgattg ccagctttac ctgcttcatg agctcagcca agtcacttaa cctctcagag 480

cttcactgtt ct 492

<210> 534
<211> 519
<212> DNA
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<222> (189)..(189)
<223> n is a, c, g, or t

<220>
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<222> (243)..(243)
<223> n is a, c, g, or t

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<222> (316)..(316)
<223> n is a, c, g, or t

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ctggctcgca agctgactca cggtgttatg aataaggagc tgaagtactg taagaatcct 120

gaggacctgg agtgcaatga gaatgtgaaa cacaaaacca aggagtacat taagaagtac 180

atgcagaant ttggggctgt ttacaaaccc aaagaggaca ctgaattaga gtgactgttg 240

ggncagggtg ggaggatggg tggtcaggta agacagactc tagggagagg aaatcctgtg 300

ggcctttctg tcccanccct gtcagcactg tgctactgat gatacatcac cctggggaat 360

tcaaccctgc agatgtcaac tgaaggccac aaaaatgaac tccatctaca agtgattacc 420

tagttgtgag ctgttggcat gtggttagaa gccatcagag gtgcaagggc ttagaaaaga 480

acctggccag acctgactcc actcttaaac ctgggtctt 519

<210> 535
<211> 321
<212> DNA
<213> human

<400> 535
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gttccaaacc agtttattct gtggttctat aataagtttt gatataatct tggcttctta 120

aaaactgtgt atcattaaaa tatatgttct gcaagaatta aaactgagtc catgaaaata 180

ccataggaag acataaaact ttaaaaggca actcaaagat gatggaaacg cacttacaag 240

tggtgaccaa aatttttagg tgaagtcgag cactctaatt agagaactgg aggaaccaca 300

tataacactt aacttcccct a 321

<210> 536
<211> 147
<212> DNA
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<400> 536
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atacctgaat gcatgaaaaa actccaaata agagaatctc ttcaggatta taaaagttgt 120

aaaatgcaac tgtattgctg agcaaaa 147

<210> 537
<211> 552
<212> DNA
<213> human

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<223> n is a, c, g, or t

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<222> (190)..(190)
<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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tggcctggaa ggcagatagc agccccgtca aggcgggagt ggagaccacc acaccctcca 120

aacaaagcaa caacaagtac gcggccagca gctanctgag cctgacgcct gagcagtgga 180

agtcccacan aagctacagc tgccaggtca cgcatgaagg gagcaccgtg gagaagacag 240

tggcccctac agaatgttca taggttctnn ancctcanc ccccnnccac gggagactag 300

agctgcagga tcccagggga ggggtctctc ctcccacccc aaggcatcaa gcccttctcc 360

ctgcactcna taaacccnca ataaatatnc tcattngntc aancagaaan nnnnnnnnan 420

nnnatttttt ttctcacata aattgctagc ctccccgggg ttctcagtgt ggggtacagg 480

gaattctgca cccagtgtga aaatcaccca agggagaggc tcacagcctc cctgagtcat 540

ctcaccagag gg 552

<210> 538
<211> 166
<212> DNA
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<223> n is a, c, g, or t

<400> 538
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aacgttattt ataatgaaat caactanaac tatttttgct ataagttcta taaggtgcat 120

aaaaccctta aattcatcta gtagctgttc ccccgaacag gtttat 166

<210> 539
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<212> DNA
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<220>
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<222> (26)..(26)
<223> n is a, c, g, or t

<400> 539
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tgcctcgact acgatggaaa cattttggat gcctgcacat ttgctttgct agcggcttta 120

aaaaatgtac agttgcctga agttactata aatgaagaaa ctgctttagc agaagttaat 180

ttaaagaaga aaagttattt gaatattaga actcatccag ttgcaacttc ctttgctgtg 240

tttgatgaca ctttgcttat agttgaccct actggagagg aggaacatct ggcaacagga 300

accttaacga tagtaatgga tgaggaaggc aaactctgtt gtcttcacaa accaggtgga 360

agtgggctaa ctggagctaa acttcaggac tgtatgagcc gagcagttac aagacacaaa 420

gaagttaaaa aactgatgga tgaagtaatt aagagtatga aacccaaata aacagccacc 480

acattttcaa aacagatttg taaaaattgt atttgttaac actgtgcaca aacgtttta 539

<210> 540
<211> 530
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<223> n is a, c, g, or t

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taaaagaaac agaaataaaa gccaattaaa taggaatgac aagatgatag tgcagattca 120

aaagaaatag gtatgcacaa gtgacttaaa gcagagtcct cctctagccc aggacactct 180

tcagtctggc tgcagctggc tagcttcttt ttttttttt ttaattctaa gaaatagatt 240

gaaatgaaac gatggaaaag aagcaggact tctccccgtg ggtgtctgtg atgtcctaaa 300

aaaaaaaaaa aaaaaaaagn nnannnttcc taggactcca aacgctgtcc tgagatcagt 360

tttaacctcg tctttcgggc cgaaagtagt tcacatttcc cgagcacaag catggagatt 420

ttgaggtgcc caggttagaa tttgcgtgtc gtcctcatga tcccctgcac ttttattccc 480

cgagaatctt gcctcccggt ggctagtaca gtattgtttc cttcttgatc 530

<210> 541
<211> 344
<212> DNA
<213> human

<400> 541
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tcacttgaag tgacttctga gaattatgca gagtcaacat ggatcatttc acagtgagat 120

gctttatgga ttgaaggata tggtaaaatg tttatagttt actttgaaag taaaatatac 180

tatgtcttgg ttttgaggat attggataca aaactctctt cctttagggc tactgagtct 240

tgattcctga tcatcagaaa tttcaccaga aacaacttgc ttccaatata cccaattcta 300

tatgaagaat tcatggagag tgtactggca ctggaagagt ttag 344

<210> 542
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<223> n is a, c, g, or t

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<222> (249)..(249)
<223> n is a, c, g, or t

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<222> (323)..(323)
<223> n is a, c, g, or t

<400> 542
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aatcatggca ttcacacagc ccataaagca agacagatta ccaaagaaga ttttgccaca 120

tttgattata tactatgtat ggatgaaagc aatctgagag atttgaatag aaaaagtaat 180

cnagttaaaa cctgcaaagc taaaattgaa ctactnggga gctatgatcc acaaaaacaa 240

cttattatng aagatcccta ttatgggaat gactctgact ttgagacggt gtaccagcag 300

tgtgtcaggt gctgcagagc gtncttggag aaggcccact gaggcaggtt cgtgccctgc 360

tgcggccagc ctgactagac cccaccctga ggtcctgcat ttctcagtcg gtgtgtaatc 420

acgttccagg gcccaaagcc cagctctttg ttcagttgac ttactgtttc ttaccttaaa 480

aagtaattgt agatggaaat cagtttgtgt tcggcaggag a 521

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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gagcttcaag ccaacaaggc cacactggtg tgtctcataa gtgacttnta ccngggagcn 120

gtgacagtgg cctggaaggn agatagcagc cccgtcaagg cgggagtgga gacnaccaca 180

ccctccaaac aaagcaacaa caagtacgcg gcnagcagct atctgagcct gacgcctgag 240

cagtggaagt cccacngaag ctacagctgc caggtcacgc atgaagggag caccgtggag 300

aagacagtgg cccctncaga atgttcntag nntnnnaacc ctcacccccc tccccgggat 360

actgtccggg ggcccaggcc gcagtgtggg tgggtcagct tgaatccagc cttcctacca 420

gttctctacc agcacttgcc ttcctggtgt caaagagtct ttgttattat ttggctgaa 479

<210> 544
<211> 485
<212> DNA
<213> human

<400> 544
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acaggaaagg tctcagaaga aattgaagac atcatcaaaa agggggaaac acaaactctt 120

tagaacataa cagaatatat ctaagggtat tctatgtgct aatataaaat atttttaaca 180

cttgagaaca gggatctggg ggatctccac gtttgatcca ttttcagcag tgctctgaag 240

gagtatctta cttgggtgat tccttgtttt tagactataa aaagaaactg ggataggagt 300

tagacaattt aaaaggggtg tatgagggcc tgaaatatgt gacaaatgaa tgtgagtacc 360

ccttctatga acactgaaag ctattctctt gaattgatct taagtgtctc cttgctctgg 420

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<210> 545
<211> 237
<212> DNA
<213> human

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ctgtggcttt tcctgttatt gtcccctaat gataggatat tccctgctgc ctacctggag 120

attcagtagg atcttttgag tggaggtggg tagagagagc aaggagggca ggacacttag 180

caggcactga gcaagcaggc ccccncctgc ccttagtgat gtttggagtc gttttac 237

<210> 546
<211> 466
<212> DNA
<213> human

<220>
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<222> (39)..(39)
<223> n is a, c, g, or t

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<222> (41)..(41)
<223> n is a, c, g, or t

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<222> (59)..(59)
<223> n is a, c, g, or t

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<222> (65)..(67)
<223> n is a, c, g, or t

<400> 546
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acaannntac agtagacaat acagacagag cttttgttga gctgtaactg agctatggaa 120

tagcttcttt gatgtacctc tttgccttaa attgcttttt agttctaaga ttgtagaatg 180

atcctttcaa attgtaatct tttctaacag agatatttta atatagttgc tttcttaaaa 240

aacaaaaaaa ctactgtcag tattaatact gagccagact ggcatctaca gatttcagat 300

ctatcatttt attgattctt aagcttgtat taaaaactag gcaatatcat catggataca 360

taggagaaga cacatttaca atcattcatt gggcctttta tctgtctatc catccatcat 420

catttgaagg cctaatatat tgccaagtac tcacatggta tgcatt 466

<210> 547
<211> 453
<212> DNA
<213> human

<400> 547
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gagaggagag ggaaccagat atgcagatca gagatagagg aagtggaacc agagagctgg 120

gagggaccaa ggttgtaagg gtggctaagt cccaccataa cagctaaggg gacctgggag 180

atgatggctc atttccaccc agccccagga tttccagagc gcacatccac aggcctggac 240

ctgggatgaa gatgaatgaa gaacatggat gcacgtggat gtagtttggc tcaggtgtcc 300

ctgcagttgg caaggagtca gtactcagtc cctgagtgtg gctgaaattt gaggtcctgg 360

ctgagccaag gagtaatgga ccagatctac ctcagtattc aagttcagtg gggacaccag 420

tggcttcaaa cttcctggtt tcatgatatc ttg 453

<210> 548
<211> 315
<212> DNA
<213> human

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<222> (205)..(209)
<223> n is a, c, g, or t

<220>
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<222> (213)..(214)
<223> n is a, c, g, or t

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<222> (217)..(218)
<223> n is a, c, g, or t

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<223> n is a, c, g, or t

<400> 548
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tttgagcaat ggattgaaaa agatttggta cacacagagg ggcagcttca aaatgaagaa 120

attgtggcac atgatggctc cgctacttac ttgagattca ttattgtatc agcctttgat 180

cattttgcat ctgtgcatag cgttnnnnna ganngannan tagtctcaaa tctttcctca 240

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<400> 549
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taaagggaaa ttagaagttg gcgtgaacgt ggcgtttgtg ggagtgtcac tgagatggcc 360

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<223> n is a, c, g, or t

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accccgctgg tttgcatggg catcttcatc ttcaacgttg tgtactacaa gccgctggtc 180

tacaanaaca ccnacgtgta cccgtggtgg ggtgaggcca tgggctgggc cttcgtgctg 240

tcctccatgc tgtgcatgcc actgcacctc ctgggctgcc tcctcagggc caagggnacc 300

atggctgagt gctggaagna cctgacccag cccatctggg gcctccacca cttggagtac 360

cgagctcagg atgcagatgt caggggcctg accaccctga ccccagtgtc cgagagcagc 420

aaggtcgtcg tggtggagag tgtcatg 447

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<212> DNA
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<400> 551
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catcaatgaa gtggctttcc accctgatga gcccatcatt atctcagcat cgagtgacaa 180

gagactgtat atgggagaga ttcagtgaag atatggactg gaagactcca aggccgcttg 240

tctttgagac ctcagactgc ataagtgatg ccaaatgttg gatgtccagg ctagcaccct 300

cccttcagat gaccattgct agcaagaaac aggaggcggt ggccatattc caaaaaccac 360

ttctgtccca tttcaccagg atgactaagg caagctccct gtggcctcta aaaaccacct 420

gccagatttc agggactgtt ttttttttttc tttttctttt ttcctgtttt ctaatgcagg 480

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<210> 552

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<212> DNA
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<223> n is a, c, g, or t

<220>
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<223> n is a, c, g, or t

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<222> (191)..(191)
<223> n is a, c, g, or t

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ttagcctgnt atcagcagaa accagggaaa gctcctaagc tcctgatcta tgatgcctcc 180

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<211> 416
<212> DNA
<213> human

<400> 553
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ccagcaagaa gctccacaac aagacagcag gttatgtcac ccatctgatg aagcagattc 180

agagaggccc agtaagaggt atctccatca agctgcagga ggaggtgaga gaaaggagag 240

acaattatgt tcctgagatc tcagccctgg atcaggagat cattgaagta gatcctgaca 300

ctaaagaaat gctgaagctt ttggactttg gtggtctgtc taacctgcag gtcactcagc 360

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<211> 285
<212> DNA
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<400> 554
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gaggaaaatg gggagccgga ggctgacaac gaggtagatg aagaagagga agaaggtggg 180

gaggaagaag gtgatggtga ggaagaggat ggagatgaag atgagggagc tgagtcagct 240

acgggcaagc gggcagctga agatgatgag gatgacgatg tcgat 285

<210> 555
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<212> DNA
<213> human

<400> 555
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aaactcggaa acaaccctaa ctcgcagtgc cagcatgaag ctcccagaca acacagtgaa 180

gttgggagag aagctggaga gataccacac ggccatacgg agatcagaat ctgtcaagtc 240

tcggggtctg ccttgcactg agttattcgt ggctcctgtg ggtgtagcca gcaagcgcca 300

cctctttgag aaggaactgg cgggccagag ccgagcagaa ccagcctcca gccggaagga 360

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ggaatctgga gatcaggacc cccaggaggc acagaaagca tcatctgcaa ccgagaggac 480

tcagtgggga cagaaatctg actcctcgct 510

<210> 556
<211> 224
<212> DNA
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<400> 556
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cactgtacca ggcatgagga tgtggcctgc atgctgcctg atcttgccta gaaccggctg 180

cacctgctgt tctcttgttt atgcaaactg gctgcacctg ctat 224

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<211> 559
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<213> human

<400> 557
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taagaaagga tggaaagaaa gattgctgtt ttgaaatctc tgctcctgat aaacgtatat 180

atcagtttac agcagcttct cccaaagatg ctgaagaatg ggtacagcag ctgaaatttg 240

tattgcaaga tatggaatct gatattattc ctgaggatta tgatgagaga ggagaattat 300

atgatgatgt tgatcatcct ctaccaataa gcaatccact aacaagcagt caaccaatag 360

atgatgaaat ttatgaagaa cttccagggg ataagagcac tgattatgct aatttttacc 420

agggattgtg ggattgtact ggagcttttt ctgatgagtt gtcatttaag cgtggtgatg 480

tgatttacat tcttagcaag gaatacaata gatatggctg gtgggtagga gaaatgaagg 540

gagccattgg cttggtgcc 559

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<400> 558
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gttccgcaag tcagagtact ggatttccag aaagtgaaac taaaatttta atccaggtgc 240

tggtttgcca actgacaaaa agaaaggtgg gccatctcca ggggatgtag aagcaatcaa 300

gaatgccata gcaaatgctt caactctggc tgaagtggag aggctgaagg ggttgctgca 360

gtctggtcag atccctggca gagaacgcag atcagggccc actgatga 408

<210> 559
<211> 425
<212> DNA
<213> human

<400> 559
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agacatgcgg aaggagtaga ggactgggag aagcagagcc aagttcagaa ggccagggag 180

gacatcttta tggagaccct gaacaacatc atggagtatt acaacgacgg taacgatcct 240

ccctctgtgg tggtcaccag ccaccaggcc ccaggagaaa agaagaaact gaagtgcctg 300

gcctacgact tctacccagg gaaaattgat gtgcactgga ctcgggccgg cgaggtgcag 360

gagcctgagt tacggggaga tgttcttcac ggtggaaacg gcacttacct gacctggttg 420

ttggt 425

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<211> 227
<212> DNA
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<400> 560
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agaaactgaa gtgcctggcc tacgacttct acccagggaa aattgatgtg cactggactc 180

gggccggcga ggtgcaggag cctgagttac ggggagatgt tcttcac 227

<210> 561
<211> 548
<212> DNA
<213> human

<400> 561
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gtgttccagt gtcctgccgg gctgtgccga gccatggaac catggggaga ccttcacttg 120

cactgctgcc caccccgagt tgaagacccc actaaccgcc aacatcacaa aatccggaaa 180

cacattccgg cccgaggtcc acctgctgcc gccgccgtcg gaggagctgg ccctgaacga 240

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cccagccagg gcaccaccac cttcgctgtg accagcatac tgcgcgtggc agccgaggac 420

tggaagaagg gggacacctt ctcctgcatg gtgggccacg aggccctgcc gctggccttc 480

acacagaaga ccatcgaccg cttggcgggt aaacccaccc atgtcaatgt gtctgttgtc 540

atggcgga 548

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aaatgaattt tgtatttttt gtatttgaga agataatgct tttgctttac tgagacatta 180

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acagtttatt gtataaagat gttactcttc tatttactgt tatatactgt aaggccttct 420

ttaggccttt agctctgttc ctccagtaat aaaaaagtta aaatatgctt cactagtcac 480

acattcccca taccatttcg tgttattcac attccccgta ccatttcttg ttattcaca 539

<210> 563
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<400> 563
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tgttttccat ctcatttccc ttccatctga aagtggcatt cagctgactt gctcatttag 180

actgttcacg gagtctgaat ctgccaacgt ggtgttggag gctccacctt gaaaagggcc 240

acagtcaggg caactttccc catacaggaa aacttgaaaa ttacatcaac agtctacgtc 300

acagccaaat tatatttcct ttataccaaa caaaactatg gagaactaaa agtacatcac 360

acaaaacgtt tatagtgttt tgcatgtgac ctatttcagt atttatataa ctagattagt 420

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gttgataccg tgtaactaat cccgtggat 509

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<400> 564
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aaagggtggg atagctgatg ccctccttca tagagccacc atgattctta cagttggtgg 180

aacagcatat gccatatatc agctggctgt ggcttcattt cccaataaag gagtgacttc 240

aatcatccca gcaatcactt ggttcacatt cattc 275

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gaacattttt gctgtgggga gtggagagag attgggttga tggtacctgc ctgaagtttc 180

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atagtacaga ccagaagctg tttgaggatg tgttgttgcc tgaccagaca ccttgaggcc 360

agaattctaa gtagtttcaa aactcctccc tttcataccc catctactga ctttctgctt 420

tcttcaaaat gctctgttgg ccaggtgcag tggttcacgc ctgcaatccc aacacttagg 480

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<400> 566
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tggcaaggca gagccaccag aaaggtacac ctgattttca tgacagatat ggtaatgctg 120

tattagctag tggagccact ttctgtactg ctgtatggac aagtgtagca acacaagtcg 180

gaatagaatg gaacccatcc cctgtt 206

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<211> 431
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ctactggtac cttcccaatg agggtatcca gtatctccgt gattaccttc atctgccccc 240

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cagacggagt gctgtgcccc ctggtgccga caagaaagcc gaggctggga ctgggtcagc 420

aactgaattc c 431

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<211> 389
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agggatggct ccgaagccag aaatgcctta aactgcaacg tcccgtccct tccccacccc 420

catcccatcc ccacccccag ccccagccca gtcctcctag gagcaggacc cgatgaagcg 480

ggcggcggtg gggctgggtg ccgtgttact aactctag 518

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<211> 148
<212> DNA
<213> human

<400> 570
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tactttggat ctgcatttgc tacaccct 148

<210> 571
<211> 505
<212> DNA
<213> human

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attgaaaaac aattaggaat cattgcagat ttttttttat tctgctccca cctcccaccc 360

gggactactt gctggtgact ttttttttttt ttttttttttt aaatagggga tgattttagc 420

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<213> human

<400> 573
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gcatc 545

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<211> 516
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<400> 574
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<210> 575
<211> 463
<212> DNA
<213> human

<400> 575
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gcatgaaatc atgttggaga tctctattgt aatctctatt gga 463

<210> 576
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<212> DNA
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<400> 576
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gtgaagatgt gtgggcacat gttatggcag attgaaaagg atctcattcc atgggaaaaa 240

aaaaaatcct gtcttgttca taaattgac 269

<210> 577
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<212> DNA
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<400> 577
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cccagaaagt gggaatttga ttttatcctt ccgaactgga agaacatttt tatgaagaat 240

ttttgtctag gagaatataa cagtgttacc caaggttgtg tctttaaggg tggttcattt 300

tctctgacct tttgttactc aaagtaaagt actaggagtc ctaagaaatg ttctgttctt 360

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actcgtttac agaaatgcat tttggaagag aaaaatactg taaaacgtgt cgtgaatgtt 480

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<210> 578
<211> 371
<212> DNA
<213> human

<400> 578
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catatgagaa gaaagaaatc cccaccacct caacctctgc tgagattgtg tgctaggaac 180

agccttccct ccgtttcccc tcagtcaaac ttgagccagc ctctggatcg atgtgatctt 240

attgcatgtt tccatggggt gtacctatac tttaagccaa tcctgctgca ttcactgcta 300

agttaaataa aaagccaaga agaaaaaaaa aattttgcac tgtgcagatc ctttgctatc 360

tgacttgcat c 371

<210> 579
<211> 456
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (81)..(81)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (89)..(89)
<223> n is a, c, g, or t

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aagattaggt ttttaatatt aacagtagtc tggtaaatat ttagaagtct ggcattgaga 180

aacaaaagct tgtacctgac tagtattttt atttaaaaaa attagttctg ttagcttatt 240

taaattgtgt tttatttatc cgtagaattt atatttattt cattcctttc atctcactga 300

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<210> 580
<211> 371
<212> DNA
<213> human

<400> 580
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ccagactcca gtgcaccaga gcacgcacag gagcctgggc gcgctgctgt gaaacgtcct 180

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ccaggttttc t 371

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<211> 482
<212> DNA
<213> human

<400> 581
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tttgactttc tttttaaagc caaagaccat agttttagtt ttaagccact aggtagatat 180

ttaggggaat agtcaaaatt tactgttgaa aaagcagttg ctatgtgctt tcttaccctg 240

ttctgttcca gttttgctgg atttgtacat agccattcta gaaatagagt tgagggaaat 300

tatccatata catatcacta ataggcttct tggaattatt tagaaaagca tttttaaact 360

ggcagtggat gactgaatag gcatcatatt tctttttgtg tgtcatttaa aagtaacaaa 420

aactgccatt tgacagtaaa ggctcttggc ttctgttgga ggcatgggaa attgtctcaa 480

tt 482

<210> 582
<211> 520
<212> DNA
<213> human

<400> 582
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aaccgtgaga gagcccccac cgtggacacc ggctctatgg ccacaggaaa aggaacgttt 180

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gcggagagtt cacgaactgt gcccaacgca tgttatagcc agggtcctac taactactca 300

gtaaaagaac gtattgttgt attcctccag tgttaagcta tagccatgtt aaaagtcact 360

gtgcatttat tctcagcatc aaataccttg taacgtcttc tctgccttgt tagtgcatat 420

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<211> 539
<212> DNA
<213> human

<400> 583
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gtcttacatc agttcagaga gctgccgggc cgcaagtaca gccctgggta caacaccgag 180

gtgggagaca agtggatctg gctgaagtga acgggccgcc ttctgctcca gctgcatcac 240

agtgatggcc aagctgcatc agccgcactc tcctggacgc catatagctt taagatcggg 300

ggagggtaaa taatgcaaaa attgcacagt ggaagaaggg gtctcacaaa aagcaatcca 360

tcctgtagta taggtaatgg agttggggga agcagcttcc attctggatg tttggaaccc 420

tttagctttg ttttggaatg gcccaccatt ctcactggaa aacagtggtc tgctgtgaaa 480

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<210> 584
<211> 509
<212> DNA

<213> human

<400> 584
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gctttttttc ccctgtcccc caaccccatc cccacctcca cttcagaaca tggcacccca 180

cccaactggc caagtgttaa gtgatgtgct tattgagagc aactccgggt gtcttttaaa 240

atgtagagaa aaggtgacag tttaaggaaa aatatatata gaataccaga aatgccgttt 300

acccggagaa ttttttttctc cccatttgtt ttgtttttac tcaatgacac cattttagt 360

tttatttcct gatagcaaaa ggaaaaaaaa cacccatccc tcaaaaaggc caaggtcccg 420

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tgatgacgct gtcaatcttt tatactgca 509

<210> 585
<211> 562
<212> DNA
<213> human

<400> 585
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aggggccgcc gcccacctac agcgaggtca tcggccacta cccggggtcc tccttccagc 180

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cgcgcttctt agaagaggag tgagaggaag gcgggggggcg cagcaacgca tcgtgtggcc 420

ctcccctccc acctccctgt gtataaatat ttacatgtga tgtctggtct gaatgcacaa 480

gctaagagag cttgcaaaaa aaaaaagaaa aaagaaaaaa aaaaaccacg tttctttgtt 540

gagctgtgtc ttgaaggcaa aa 562

<210> 586
<211> 467
<212> DNA
<213> human

<400> 586
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tgacaaagtg actattgaag ttataattgt attaaattaa tgctaataat ttggatattt 180

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atttggatat aggaaatgtt gtgttattct tgcagccttg atattcaggg tggattgtaa 360

aatataaatt tttgtgagat ttcaaagatt aagattattt tgataacatt atttacagat 420

ttaaaagatg tggttatcac aagtctcgag ggggaaacta ctgcata 467

<210> 587
<211> 512
<212> DNA
<213> human

<400> 587
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gagtaggcaa agttatcaga ggatgggatg aagctctctt gactatgagt aaaggagaaa 180

aggctcgact ggagattgaa ccagaatggg cttacggaaa gaaaggacag cctgatgcca 240

aaattccacc aaatgcaaaa ctcacttttg aagtggaatt agtggatatt gattgaaata 300

ggcagtgctt cagctctaag gatattagca acaatgataa aacttggcct tgaagaaatt 360

tacacaacta gttagaactt gttactattg taaaggaaga gtcaactgga aaattcaagg 420

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tggtctaaaa tactttccta cagctgtgta aa 512

<210> 588
<211> 517
<212> DNA
<213> human

<400> 588
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tattttacct aggtgaaatt gtttaggctt atgtaccttc gttcaaatat cctcatgtaa 240

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cttacttaaa agctacatag ccctatcgaa atgcgaggat taatgcttta atgcttttag 360

agacagggtc tcactgtgtt gcccaggctg gtctcaaact ccaccaaatg tacttcttat 420

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tggagcttct gagttttata ctgctcaaga tcgtcat 517

<210> 589
<211> 512
<212> DNA
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<400> 589
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ccgcctgccc aagcgccagt gcaatcgcca ttactgctgg gagaagctgc ggcgtgcgga 180

agtggacttg gagcgcgtgc gtgtgtggta caagctggac gagctgtttg agcaggagcg 240

caatgtgcgc acagccatga caaaccgcgc gggattgctg gccctgatgc tgcaccagac 300

gatccagcac gatcccctca ctaccgacct gcgctccagt gccgaccgct gagcctcctg 360

gcccggaccc cttaaaccct gcattccaga tgggggagcc gcccggtgcc cgtgtgtccg 420

ttcctccact catctgtttc tccggttctc cctgtgccca tccaccggtt gaccgcccat 480

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<210> 590
<211> 450
<212> DNA
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<400> 590
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gcccctgagg ttgactgccg gttatttttc tgtcctggga acagcctgac ccacctccct 180

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ctagacacta acttagttcc aggttcggtg ccctgttggt gctcctgttt ccaatagctt 360

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tcccgtccag gccagttcca gattctaaac 450

<210> 591
<211> 538
<212> DNA
<213> human

<400> 591
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tggggactag gaggaagggt gtggcatggc tcagtctggc ccccttgatt accggcctag 300

cccctgctca catcacagct gtctgaagaa cagtgaggtg gagtgcctag aactcccgtg 360

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ctgctgaact gtgttgacac tcatgaccct ttttttaaac cgttaaaggg aagttcggtg 480

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<210> 592
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<212> DNA
<213> human

<400> 592

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ggtgtgataa tactctttag attgtgcttt cattattata gatgcatcat gtcttctgct 300

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<212> DNA
<213> human

<400> 593
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ccaaaagtat gggcactagg aaaagacttc ttccatcaag cttaattgtt ttgttattca 360

tttaattgac tttccct 377

<210> 594
<211> 488
<212> DNA
<213> human

<400> 594
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caccgatcac cgagcagccg tgcgtgtatc tcaaggaact aaataagatg acgctactcc 480

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<211> 461
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<400> 595
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cagggaaact aattgtattt agtgacaaaa ataaaaagtt tttttttat aattcagtct 480

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<212> DNA
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<400> 598
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<400> 599
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<211> 558
<212> DNA
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<210> 602
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<212> DNA
<213> human

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<211> 571
<212> DNA
<213> human

<400> 603
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agatcttggt cattttatga caatggatct aaaatgtcag catcatgcaa agtgcaacgg 360

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tggc 424

<210> 636
<211> 488
<212> DNA
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<211> 446
<212> DNA
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aaccatatta ctctcatgat acttcattaa tctccatcat gtatgccaag cctgacacat 360

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<400> 640
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atgtaaagca gcagtactct tctcacta 508

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<211> 420
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<400> 642
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gactttagtg cagatttcac cattgattac tccatatttg agtcagagga caggctgaac 180

aggttggata aggacataac agaagcaata gagactacca ttagtcttga aacagcacgt 240

gcagaccatc cgaagcctgt aactgtgaaa ccagtaacaa cggaacctag tccagatctg 300

aacgatgccg tgtccagttt gcgaagtcct attcccctcc tcctgtcgcg tgcctttgtt 360

caggtgggga tgtatttcat gtagaaggtg gaagaaggct gctatgactc tttggatggg 420

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cgagggaaat cctatagagt tcagaggtct aggtcaaaaa gcagaacaag aaggtccagg 180

tcaagacctc gtctccgttc tcatagtcgt agcagtgaaa ggtccagtca cagaagaacg 240

cgtagtcggt ctcgggatag agaacgacgt aagggcagag ataaagagaa aagagaaaag 300

ggagaggata aagggaagga caaggaatac ataacatcaa acgtgggaat ctggaaacat 360

caaagctgga tttagaacat cttgccacca gctgaacagg ccaaagccag actacagctg 420

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<400> 644
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ttcttataca tatactatca aattatgttg tgtgcattag aaatcagttg cttgatagta 180

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ggagacattt tattattttg ccttactaat gattttgcag ctctgttttt ctgcacactc 360

aatagaaaat attgtgggtc tgagatgccc tttgaaaatg cctgaaagaa aacatgggct 420

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aatcttccga ctctgaggac ttggctaatg gttaatactt 220

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atgtgcacat atggatgtat gttgaaagtg gatgatg 457

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<400> 655
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ccctctcctg ccacctggct gcccacagag ctctccaggg cagaagtcgc ggtgggctca 240

gtgggtgccc tgagcggggt ctctcagact gacgtcaggc cttggtgggc tgcactctca 300

cctggaggct ccggggaagc atctgcctcc aggaccattc aggctgttga caagtcaact 360

cctcatggct gtaggactga ggttcccaag tccttgtccc tggtcctgtg gtccctccac 420

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<210> 660
<211> 267
<212> DNA
<213> human

<400> 660
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gcaggcacac cctggattac atctggtatt ctaaacatgc tctaaatgta aggtcagctc 180

tcgatctgct cactgaagaa cagattggac ccaacaggtt accttccttc aattatcctt 240

cagaccacct gtctctagtg tgtgact 267

<210> 661
<211> 484
<212> DNA
<213> human

<400> 661
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ccgggttacc tggaagctac tcttaattgg tttagattat ataaggtacc agatggaaaa 120

ccagaaaacc agtttgcttt taatggagaa ttcaaaaaca aggcttttgc tcttgaagtt 180

attaaatcca ctcatcaatg ttggaaagca ttgcttatga agaactgtaa tggaggagct 240

ataaattgca caaacgtgca gatatctgat agccctttcc gttgcactca agaggaagca 300

agatcattag ttgaatcggt atcatcttca ccaaataaag aaagtaatga agaagagcaa 360

gtgtggcact tccttggcaa gtgattgaaa catctgaaat tctgctgtca agattcccat 420

ctctaaggac tccaagactc tttttcccca agtgctagag acaaggggt ctatgagcat 480

ttac 484

<210> 662
<211> 436
<212> DNA
<213> human

<400> 662
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tggaactgac ctagctcgtg gcaggggaa ctcggctagc ggccccacag cccctgctga 120

ctcaaaacaa ctaatgaact ctggaagccc agccagggac aatgcacctt cacagagatt 180

ctgcactaat ctgagtgaag gtctaaggtt tggaatctcc ccctcatgga gagaagcttt 240

gtatggctgt catgcttaga cagtgattcc tgcaacttga ccttcaggct gggagaggtg 300

gagagccatg cctgttctcc ttccttgcta tggaatttgc tgacacaata tcttccgcct 360

ggtgctgggc atatcctaag aacttacaac tttcctgtat tatcctgtgt gagcagctgt 420

caccttattg ggggaa 436

<210> 663
<211> 381
<212> DNA
<213> human

<400> 663
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aaccctgatc tacgggcact ggagcataat gaagtggaac cgtgagcgca ggcgcctaca 120

aatcgaggac ttcgaggctc gcatcgcgct gttgccactg ttacaggcag aaaccgaccg 180

gaggaccttg cagatgcttc gggagaacct ggaggaggag gccatcatca tgaaggacgt 240

gcccgactgg aaggtggggg agtctgtgtt ccacacaacc cgctgggtgc ccccttgat 300

cggggagctg tacgggctgc gcaccacaga ggaggctctc catgccagcc acggcttcat 360

gtggtacacg taggccctgt g 381

<210> 664
<211> 542
<212> DNA
<213> human

<400> 664
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cctcatatgg tcaggtcgct tcaaaaagga agatgaaatc ccagagactg tctcgttgga 120

gatgcttgat gctgcaaaga acaagatgcg agtgaagatc agctatctaa tgattgccct 180

gacggtggta ggatgcatct tcatggttat tgagggcaag aaggctgccc aaagacacga 240

gactttaaca agcttgaact tagaaaagaa agctcgtctg aaagaggaac agctatgaag 300

gccaaaacag agtagcagag gtatccgtgt tggctggatt ttgaaaatcc aggaattatg 360

ttataacgtg cctgtattaa aaaggatgtg gtatgaggat ccatttcata aagtatgatt 420

tgcccaaacc tgtaccattt ccgtatttct gctgtagaag tagaaataaa ttttcttaaa 480

taatgactgt gttttattgt tttgatccaa gtcaagtgta gcctctcagc cttttggaga 540

aa 542

<210> 665
<211> 279
<212> DNA
<213> human

<400> 665
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ctagaggcgt ggaccaaggg gcatggagct tcactccttg ctggccaggg agttggggac 120

tcagagggac cacttggggc cagccagact ggcctcaatg gcggactcag tcacattgac 180

tgacggggac cagggcttgt gtgggtcgag agcgccctca tggtgctggt gctgttgtgt 240

gtaggtcccc tggggacaca agcaggcgcc aatggtatc 279

<210> 666
<211> 510
<212> DNA
<213> human

<400> 666
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aagggaagag catccatgag ctccgggctc agctctgcga ccttagcgtc aaggccatca 120

aggaagcgat tgattatctg accgttgagg gccacatcta tcccactgtg gatcgggagc 180

attttaagtc tgctgattga ggcagggaaa acatcctttc atttttcgaa gaccttgca 240

tccagctgtg agtaattttg acctgttgac tttttaggag taggactaaa aaaaaaaatc 300

tcaagtggca ttctttgtca actcgctgct tttctaactg ctttgaactt ttcggatttt 360

ctgtatttga agctcagaga gagacggtga tggataaatt gacaactctg taggatttac 420

tagcaagcta atggaaacat gattttcggg gaagaaaaac tacagaaaat gtagaaattt 480

attatttaat tgtgttggag cttctttttc 510

<210> 667
<211> 446
<212> DNA
<213> human

<400> 667
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taaacacctc tatctccctt gggaataagc acatacaggc ttaagctcta agatagatag 120

gtgtttgtcc ttttaccatc gagctacttc ccataataac cactttgcat ccaacactct 180

tcacccacct cccatacgca aggggatgtg gatacttggc ccaaagtaac tggtggtagg 240

aatcttagaa acaagaccac ttatactgtc tgtctgaggc agaagataac agcagcatct 300

cgaccagcct ctgccttaaa ggaaatcttt attaatcacg tatggttcac agataattct 360

ttttttaaaa aaacccaacc tcctagagaa gcacaactgt caagagtctt gtacacacaa 420

cttcagcttt gcatcacgag tcttgt 446

<210> 668
<211> 448
<212> DNA
<213> human

<400> 668
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tgaaggggcc ggggcctttt accgcagcta caccacccag ctgaccatga acgttccttt 120

ccaagccatt cacttcatga cctatgaatt cctgcaggag cactttaacc cccagagacg 180

gtacaaccca agctcccacg tcctctctgg agcttgcgca ggagctgtag ctgccgcagc 240

cacaacccca ctggacgttt gcaaaacact gctcaacacc caggagtcct tggctttgaa 300

ctcacacatt acaggacata tcacaggcat ggctagtgcc ttcaggacgg tatatcaagt 360

aggtggggtg accgcctatt tccgaggggt gcaggccaga gtaatttacc agatcccctc 420

cacagccatc gcatggtctg tgtatgag 448

<210> 669
<211> 230
<212> DNA
<213> human

<400> 669
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tgagaagaat tccttggact gcggcgtcga gtcagctgaa agaacacttt gcacagttcg 120

gccatgtcag aaggtgcatt ttacctttg acaaggagac tggctttcac agaggtttgg 180

gttgggttca gttttcttca gaagaaggac ttcggaatgc actacaacag 230

<210> 670
<211> 325
<212> DNA
<213> human

<400> 670
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acaaaatact tatttttaaa atgaaatcta tatattgact ttcttatcaa tcatcttact 120

gtgcaatcaa aattagagta ctttggtttg aaaacaacac ttagagcctc cagataactt 180

ttaagactta tttagctttg tgggtggtat tttcatgcaa ataagtaagg gtgggtttta 240

tattttgtag aagttttcgg tcctatttta atgctctttg tatggcagta tgtatatatt 300

gtgttaagtt cctcaagaat ctcct 325

<210> 671
<211> 220
<212> DNA
<213> human

<400> 671
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atcgagacta tctggtatgc gttatgtatg tagtctgttg ctgctgaaag atgtctgtgt 120

gcccgtatca acatgtgact tcatgtaaag tttctttgtg ttcacagttc ttagcaaatg 180

cagttacaat ccatagatag ccagcagtgg atgttactcc 220

<210> 672
<211> 408
<212> DNA
<213> human

<400> 672
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cttttccttc ctcagagaga aatctcccct aacctgaatt gcagcccccc ccagtttgct 120

ttcctttggc cttccagacc ccaggaagtt ggccttccct tcctagtgct atggtttctg 180

ccattggcca tgatttcagg gagctggctg aggccggctg aggccacacc tgtgccagtg 240

gggcttccct ggtgctgcag cacttgtaaa ccacacacac agcctctctc cctggacata 300

cgttagcaca ttggcattca gtattggtgg cctggcatgg taggtactac ccaatgaaga 360

gtgtactata tattttcatt actataggcc atacttatac agacgtgt 408

<210> 673
<211> 536
<212> DNA
<213> human

<400> 673
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accccaggcg cccgcgctgc acctgcgact gtcgccgccg ccgtcgcagt cggaccaact 120

gctggcagaa tcttcgtccg cacggcccca gctggagttg cacttgcggc cgcaagccgc 180

caggggcgc cgcagagcgc gtgcgcgcaa cggggaccac tgtccgctcg ggcccgggcg 240

ttgctgccgt ctgcacacgg tccgcgcgtc gctggaagac ctgggctggg ccgattgggt 300

gctgtcgcca cgggaggtgc aagtgaccat gtgcatcggc gcgtgcccga gccagttccg 360

ggcggcaaac atgcacgcgc agatcaagac gagcctgcac cgcctgaagc ccgacacggt 420

gccagcgccc tgctgcgtgc ccgccagcta caatcccatg gtgctcattc aaaagaccga 480

caccggggtg tcgctccaga cctatgatga cttgttagcc aaagactgcc actgca 536

<210> 674
<211> 297
<212> DNA
<213> human

<400> 674
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tcttaaaatg tgaattcatc tgttaagcta ggggtgacac acgtcattgt acccttttta 120

aattgttggt gtgggaagat gctaaagaat gcaaaactga tccatatctg ggatgtaaaa 180

aggttgtgga aaatagaatg tccagacccg tctacaaaag gtttttagag ttgaaatatg 240

aaatgtgatg tgggtatgga aattgactgt tacttccttt acagatctac agacagt 297

<210> 675
<211> 437
<212> DNA
<213> human

<400> 675
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tcatgggggc aaatgaaagt aaaaggctct aatacaacct ataaggactg caaagtatgg 120

ccaggggta gtcggacttg ggattggaga gaaacaggaa ctgagcattc tcctggtgtg 180

cagcctgcag atgtgaagga agttgttgag aagggtgtac agactcttgt gattggccga 240

gggatgagtg aggccttgaa ggtgccttca tcaactgtgg agtacctcaa gaaacatggc 300

attgatgtgc gggtcctcca gacagagcag gcagtgaagg agtataatgc cttggttgcc 360

caaggggtca gggtgggagg tgtcttccat tccacctgct gatggagcct taagaggaga 420

ataaatcact aagtgcc 437

<210> 676
<211> 528
<212> DNA
<213> human

<400> 676
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cttgaagaaa gcatctcaca gctccgacac tattgcgagc catacacaac ctggtgtcag 120

acagctatga ctatctccaa aatgcacctc ctggattttt ttccgagact tggtgttatt 180

ggttttgctg gccttattgg actccttttg gctagaggtt caaaaataaa gaagctagtg 240

tatccgcctg gtttcatggg attagctgcc tccctctatt atccacaaca agccatcgtg 300

tttgcccagg tcagtgggga gagattatat gactggggtt tacgaggata tatagtcata 360

gaagatttgt ggaaggagaa ctttcaaaag ccaggaaatg tgaagaattc acctggaact 420

aagtagaaaa cttcatgctc tgccatctta atcaggaaaa actagaccag acctctgtta 480

tcttctgtga aatcatccta caagcaaact aacctggaat cccttcac 528

<210> 677
<211> 419
<212> DNA
<213> human

<400> 677
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ccttgttttc ctaatgccag aagggtgacc agtgaagatt caccgtcaaa ccatgaaagt 120

cctttcttgg atccacttta tcttgattag tctgcatttt actagttcac tggatccctc 180

ctctaggggc ctggggactt tcactgatgc tcttcctgat tctagagcaa aggtgtggga 240

aggggaaatg gaggaatgcc ctcctgtctg tgtcgttctc tgtgccacag ctacagatgc 300

agaaggtttc tctggatagc acacctctga atgtaaatca tgataaaatg gatatttgga 360

aacttactcc taagctgtga tttagggtgt atttctactt ctggactgcc tcaatatca 419

<210> 678
<211> 422
<212> DNA
<213> human

<220>

<221> misc_feature
<222> (45)..(46)
<223> n is a, c, g, or t

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gcgttccagt tgaagttttt gactctgaag aagctgaaat attccagaag aaacttgatg 120

agaccaccag attgctcagg gaactccagg aagcccagaa tgaacgtttg agcaccagac 180

cccctccgaa catgatctgt ctcttgggtc cctcatacag agaaatgcat cttgctgaac 240

aagtgaccaa taatcttaaa gaacttgcac agcaagtaac tccaggtgat atcgtaagca 300

cgtatggagt tcgaaaagca atggggattt ccattccttc ccccgtcatg gaaaacaact 360

ttgtggattt gacagaagac actgaagaac ctaaaaagac ggatgttgct gagtgtggac 420

ct 422

<210> 679
<211> 316
<212> DNA
<213> human

<400> 679
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agatggacga ggaagataag gctttcaagc agaaacaaaa agaggagcag aagaaactcg 120

aggagctaaa agcgaaggcc gcggggaagg ggcccttggc cacaggtgga attaagaaat 180

ctggcaaaaa gtaagctgtt ccttgtgcct gaggagatgg tgacccttta tttcatctgt 240

atttaaacct ctctattccc tgccataaca tcttttgcca cgtatagctg gaattaagtg 300

ttgtcttgga gctgtt 316

<210> 680
<211> 368
<212> DNA
<213> human

<400> 680
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cagcctctga caatagcggc ccagaagatg caaagagaca agccaagaaa cagaagacaa 120

ggcggacgtg aggaggaagg ggacagttgc agtctcactt gggacaggcc acagccaggg 180

gtccggccac tacccgcccg tgggataaaa gccaaaagca tgcgtcagct aacttcagcc 240

tgtgctgctg ggcccgcacc ccatgtccct tgtcactgtg gcatcctgca cccatcctca 300

cccctccgta gagcccctcg tgcaatgcaa tgaatggacc ctcctgtcac tctgctgaac 360

agaattta 368

<210> 681
<211> 519
<212> DNA
<213> human

<400> 681
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tgcagcctcc accacgtccc cagaaacagc cgcagacttg agctcactac atcaagaaca 120

ccacaccgcg ctccaaggaa cagctacaag cacagagaca gaggcataca gagacaaaga 180

gagaaagaga cgcaacatgg cagcagacac tgctttttt attaaacatt aaaaaaaagg 240

tcaaaatcca agcaaacttg aacccgagaa tgtacacaga agtaggaaac acagagaaca 300

gagctgtccc agccagccag cgagcgatgc tcttttcgga gaacgtttca tagacggaag 360

tagattccat gggcctccaa gacaatagga tcctctctcc attcctcgcc atatgggttt 420

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ttttttctgc agtcaccggc tgccaacata atctgcacc 519

<210> 682
<211> 471
<212> DNA
<213> human

<400> 682
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tttcactatt gagaccgcaa ctgcttgcac tgatcatttg gttcgtgagc agttggtgat 120

tttagttggt ctggtgttcg ggctaagaat attttattgt ggacttaatt acaaccactg 180

cactgtaatg attcaatgct gtattatgat attgctgtaa acaaaattca ttcttatatt 240

gtcacttatt ctttgcctga ttcagaagtt aaataggagc tttggaatca ttattcatga 300

cccctctgca aatgtgtcag tctccaaaga gagtatctcc ccccaaattt tgtgtagctt 360

cttttgttat ggaaaatggt ggacaaaaaa agaaactgtg ataactgggg cgttgttttt 420

taaaataaac tccagcacag ggatgctgtg catgcctgag ttgattccga a 471

<210> 683
<211> 509
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (72)..(72)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (221)..(222)
<223> n is a, c, g, or t

<400> 683
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acatgttatg gnatttttaa gtggcaggta ttgtaactgt tttttgtgtg caaaatactg 120

agtaaccact gggaaaatat ttcagatgaa agggatgaca aaagcatgtt gcgctttgca 180

tcagcaaggc attgacttct gaaaaaatga tctgaaaaaa nngtttcacc gtttgtcttc 240

ttacctcatt ttaagaagca tgtgaaaatg ggatactata gactactgag aatttcagaa 300

attgagaaca atttcataat aaaacggcta tatttgaaga gagaatacat tttatataaa 360

caggaaaata catttgacac tttatggaat tttatgagac tttttgtggg aacagaaggt 420

cttcaaattg taaaatgtaa agattgctct ttttattaag tctttaacag ggatgtattt 480

cattgtatgt tttgggtatg gctttggaa 509

<210> 684
<211> 538
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (107)..(107)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (169)..(169)
<223> n is a, c, g, or t

<400> 684
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gtcactctgg ctaacaaatt tgagtcctgc agtgtaccac gaaaaatcna tgtcagccca 180

acaacttaca gattactcaa agactgtcct ggtttcgtgt ttacccctcg atcaagggag 240

gaacttccac caaacttccc tagtgaaatc cccggaatct gccattttct ggatgcttac 300

caacaaggaa caaactcaaa accatgcttc caaaagaaag atgtggaaga tggcaatgcc 360

aatttttag gcaaagcatc aggaatagat tagcaaccta tatacctatt tataagtctt 420

tggggtttga ctcattgaag atgtgtagag cctctgaaag cactttaggg attgtagatg 480

gctaacaagc agtattaaaa tttcaggagc caagtcacaa tctttctcct gtttaaca 538

<210> 685
<211> 534
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (423)..(423)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (477)..(485)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (489)..(496)

<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (498)..(498)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (502)..(503)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (505)..(505)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (509)..(509)
<223> n is a, c, g, or t

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cctgtctttt cattttgtac attcttccca ttctgtattc ttgtacaaaa gatctcattg 180

aaaatttaaa gtcatcataa tttgttgcca taaatatgta agtgtcaata ccaaaatgtc 240

tgagtaactt cttaaatccc tgttctagca aactaatatt ggttcatgtg cttgtgtata 300

tgtaaatctt aaattatgtg aactattaaa tagaccctac tgtactgtgc tttggacatt 360

tgaattaatg taaatatatg taatctgtga cttgatattt tgttttattt ggctatttaa 420

aancataaat ctaaaatgtc ttatgttatc agattatgct attttgtata aagcacnnnn 480

nnnnncaann nnnnnncnaa annanaaant cactggaccg acgttttaac aacg 534

<210> 686
<211> 113
<212> DNA
<213> human

<400> 686
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tcctaaagcc ccctgatgaa agatttggct ctgatttgct gccaacttat tgg 113

<210> 687
<211> 312
<212> DNA
<213> human

<400> 687
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aacttcctgc agagttaccg agtgctcagc gattgagctt tgaccacacc cgtgtttgtt 120

cctagtctgt tcccagccat aagcatctcc acaagccctc tgtggcttgt gtggcctgat 180

gtccatggcc accaagggcc tctcaccata cgcttctcca ctcaaccttt ggagagacac 240

ggaccaccaa aggcttgatt tttcttcatc ctacattata ttcaaaacaa acaggctggg 300

tgccgtagct ca 312

<210> 688
<211> 558
<212> DNA
<213> human

<400> 688
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atgaatctgt tgcaagaaaa ctctgggata tcagtgaagt gatggttggc ctgctaaaat 120

aggaacaagg agtaaaagag ctgtttataa aactgcatat cagttatatc tgtgatcagg 180

aatggtgtgg attgagaact tgttacttga agaaaaagaa ttttgatatt ggaatagcct 240

gctaagaggt acatgtgggt attttggagt tactgaaaaa ttatttttgg gataagagaa 300

tttcagcaaa gatgttttaa atatatatag taagtataat gaataataag tacaatgaaa 360

aatacaatta tattgtaaaa ttataactgg gcaagcatgg atgacatatt aatatttgtc 420

agaattaagt gactcaaagt gctatcgaga ggtttttcaa gtatctttga gtttcatggc 480

caaagtgtta actagtttta ctacaatgtt tggtgtttgt gtggaaatta tctgcctggt 540

gtgtgcacac aagtctta 558

<210> 689
<211> 340
<212> DNA
<213> human

<220>
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<222> (126)..(126)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (236)..(238)
<223> n is a, c, g, or t

<400> 689
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gatccccact tcagcctccc aaagtgctgg gatgacaggc atgagcctct gcacctggcc 120

tcgtgntttt ttttttagtt agccatttta tacgtgttta ctgaacacct gtcctgtgcc 180

catattctaa gtgccttacc tgcattaaac tcatgtaacc ttcacaaccc gaaaannnaa 240

aattatttag gatcaattaa ctggttaaaa aaaacttggg ggggggcccg gcacccaata 300

ccccttatag tgagtttatt acgggcccta ctggccgttg 340

<210> 690
<211> 498
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (41)..(41)
<223> n is a, c, g, or t

<220>
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<222> (85)..(85)
<223> n is a, c, g, or t

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<222> (89)..(89)
<223> n is a, c, g, or t

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<222> (96)..(96)
<223> n is a, c, g, or t

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<221> misc_feature
<222> (164)..(180)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (216)..(231)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (330)..(361)
<223> n is a, c, g, or t

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tcagcacatg gtgggggcca caccntttng ccgtgnccag gctagagatc ctgcagctcc 120

tgaaaggcaa gctggtggtg ggtcatgacc tgaagcacga cttnnnnnnn nnnnnnnnnn 180

acatgagcgg ctacacaatc tacgacacgt ccactnnnnn nnnnnnnnnn ngtgaggcca 240

agctggacca ctgcaggcgt gtctccctgc gggtgctgag tgagcgcctc ctgcacaaga 300

gcatccagaa cagcctgctt ggacacagcn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 360

nctatcaaat ctcccagaga atccgagccc gccgagggct gccccgcctg gctgtgtcag 420

actgaagccc catccagccc gttccgcagg gactagaggc tttcggcttt ttgggacagc 480

aactaccttg cttttgga 498

<210> 691
<211> 441
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (354)..(401)
<223> n is a, c, g, or t

<400> 691
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gggagaagag catcctgccc gcagccaggg cccctcatca aagtcctcgg tgtttttttaa 120

attatcagaa ctgcccagga ccacgtttcc caggccctgc ccagctggga ctcctcggtc 180

cttgcctcct agtttctcag gcctggccct ctcaaggccc aggcacccca ggccggttgg 240

aggccccgac ttccactctg gagaaccgtc caccctggaa agaagagctc agattcctct 300

tggctctcgg agccgcaggg agtgtgtctt cccgcgccac cctccacccc ccgnnnnnnn 360

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn ngccaggggc caaggagcta 420

ttttggggtc tcgtttgccc a 441

<210> 692
<211> 494
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (33)..(33)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (35)..(35)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (45)..(54)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (168)..(168)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (203)..(257)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (304)..(304)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (306)..(306)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (348)..(362)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (427)..(427)

<223> n is a, c, g, or t

<400> 692
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cagccccttc ctgggtattt attctctatt tattggggat aggagaagag gcatcctgcc 120

tgggtgggac agcccccttca gccccttctc ccctccccgc ctggccangg cagggccacc 180

ccactctacc tccttagctt tcnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 240

nnnnnnnnnn nnnnnnnaga gctgacggga ggccccagct ctgaggggag ggggtccgtg 300

gtanangcct ggggccggta gaggctcccc agggctccct tatgtccnnn nnnnnnnnnn 360

nngggtgtgg atgtaattag ctctgggggg cagttgggta gatgggtggg ggctcctggt 420

ggccttntgc tgcccaggcc acagccgcct ttgggttcca tcttgctaat aaacactggc 480

tctgggacta gaaa 494

<210> 693
<211> 383
<212> DNA
<213> human

<400> 693
ccactgcttt acaggacagg gggttgaagc tgagccccgc ctcacaccca cccccatgca 60

ctcaaagatt ggattttaca gctacttgca attcaaaatt cagaagaata aaaaatggga 120

acatacagaa ctctaaaaga tagacatcag aaattgttaa gttaagcttt ttcaaaaaat 180

cagcaattcc ccagcgtagt caagggtgga cactgcacgc tctggcatga tgggatggcg 240

accgggcaag ctttcttcct cgagatgctc tgctgcttga gagctattgc tttgttaaga 300

tataaaaagg ggtttctttt tgtctttctg taaggtggac ttccagcttt tgattgaaag 360

tcctagggtg attctatttc tgc 383

<210> 694
<211> 438
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (322)..(322)
<223> n is a, c, g, or t

<400> 694
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ccaaggttcc agaggcccta ggcgggatgg gctcgctgaa cctcgaggaa ctccaggacg 120

aggaggacat gggacttgcg tggacagtca gggttcactt gggctctctc tagctcccca 180

attctgcctg cctcctccct cccagctgca ctttaaccct agaaggtggg gacctggggg 240

gagggacagg gcaggcgggc ccatgaagaa agcccctcgt tgcccagcac tgtctgcgtc 300

tgctcttctg tgcccagggt gnctgccagc ccactgcctc ctgcctgggg tggcctggcc 360

ctcctggctg ttgcgacgcg ggcttctgga gcttgtcacc attggacagt ctccctgatg 420

gaccctcagt cttctcat 438

<210> 695
<211> 583
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (26)..(119)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (150)..(186)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (213)..(213)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (288)..(288)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (302)..(302)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (307)..(307)
<223> n is a, c, g, or t

<220>
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<222> (317)..(325)
<223> n is a, c, g, or t

<220>
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<222> (415)..(415)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (421)..(421)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (477)..(477)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (522)..(522)
<223> n is a, c, g, or t

<220>

<221> misc_feature
<222> (531)..(531)
<223> n is a, c, g, or t

<400> 695
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nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnc 120

caggaggggc ccccgggagt ggagatttcn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 180

nnnnnnctgt gcccaccctg tacacttggc ttnccccctgc aactgcaggg ccgcttctgg 240

ggcctggacc accatgggga ggaagagtcc cactcattac aaataaanaa aggtggtgtg 300

ancctgngaa aaaaaannnn nnnnntccat gtggccaaat cctagggcct caacctcgca 360

tcctgaacct tagcatcgtg gaacacagaa gcttccactg tcagctctca agagnccatg 420

nccaggaagg cccatgctga gctttcagtc cagcccccttc attttacaaa caagganact 480

gagctcgaac cacccatttg agatgtcact gtggccccca gntagaggcc nagggctggg 540

agcattctcc aggagcagag gttcagtctg cttcatggtc tct 583

<210> 696
<211> 241
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (73)..(73)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (120)..(120)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (136)..(151)
<223> n is a, c, g, or t

<400> 696
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tgcaggcctg ggnaaggcag caagccgggc cgtccgtgtt ccatcctcca cgcacccccn 120

cctatcgttg gttcgnnnnn nnnnnnnnnn ncttgtgcat gacgccctgc tctggggagc 180

gtctggcgcg atctctgcct gcttactcgg gaaatttgct tttgccaaac ccgcttttc 240

g 241

<210> 697
<211> 426
<212> DNA
<213> human

<220>
<221> misc_feature

<222> (26)..(26)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (28)..(28)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (137)..(159)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (180)..(180)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (317)..(317)
<223> n is a, c, g, or t

<400> 697
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tagtcctgac ttcacctttt tgatttggtg tgtgccctag ggtatgtacc cttccccatc 120

tgagcctcgg tgtgtcnnnn nnnnnnnnnn nnnnnnnnng gactgtatga tttccaaggn 180

ctctaccagt cagtggttct gatgtcatcg ggtggaggtg gtgttctata cctaaaggat 240

gacctgctcc agaaacagca ccagcacagc atgtattttc ttctcttctg aaagttctgg 300

cttgtagacc cctcccntcc tttgcaaagg tatgggatag aggggtcaga tgcagatctc 360

tactgtaaaa tgggctccct ggtatctcct gtcttcccta ctgctccaaa ccctaaattt 420

tggttg 426

<210> 698
<211> 531
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (168)..(168)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (185)..(185)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (223)..(223)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (229)..(229)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (452)..(466)
<223> n is a, c, g, or t

<400> 698
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cccttctcca acccccttcat aagcttgggc cactgcctgg gacccagcag acactgccca 120

ggactcttta gtgcactcac tcttgtctgc cccctacctt ccctcctngg aaccacacta 180

cttgnaatca ccattacttt gcctcgctgg cagagttggg tcnaagtgnc cctctccttg 240

accttgagat gaaggtcaag agcacaggga ccaggccttg gttaggctga gctcccagca 300

ggacaccgcc tgcagaaagg acctgccctg ataatgtccc ttccccagat tctcaagcag 360

atgcccaagg gaggtcccca cagagccaga gtgcctgagg cttcctgctt gagaacctgc 420

cccctggatc ttggacactt acagattgag cnnnnnnnnn nnnnnnggtc tcactccaga 480

gggtcagaac gtttgcttta gtttttcat ctgttttgtt ccttgagtca g 531

<210> 699
<211> 552
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (49)..(51)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (365)..(365)
<223> n is a, c, g, or t

<400> 699
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tggattgtct cctgatgagt acatgtggac tcacctgagg aagggaagga agggaataat 120

cttttatgtt tcatttacct tatgaaaagt gttaaaacat tgccaactca aaataacatt 180

atttaatgca tgtgcaaagt taggtcttcc cagttgtctc agtgctgagg aacctcatca 240

gagaagcatg gaagatgcca aaggattttt ggaaggtaaa gaaggctgaa tagtgaccac 300

atgggcctgt tttcagggtc ccagcttagt taagtcaccc atgcacctgg tcattgtgtc 360

tcccntgcac atccagcgtt tctcagaagc agacccaccc ttaagttgac aggattgatg 420

gaacatgctc tcctgctcaa ggcacaacct ctgggctgga gtagaggact ctggtgggaa 480

ggttttgctg ctaatgtatt tatggaatga atgtatttca ttcaaatctg tattcctcta 540

ggaaggatta aa 552

<210> 700
<211> 447
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (73)..(73)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (140)..(140)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (214)..(215)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (221)..(221)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (228)..(229)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (239)..(240)
<223> n is a, c, g, or t

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cagagagaaa tcntccccta acctgaattg cagccccctc cagtttgctt tcctttggcc 120

ttccagaccc caggaagttn ggccttccct tcctagtgct atggtttctg ccattggcca 180

tgatttcagg gagctggctg aggccggctg aggnnccaca ncctgtgnnc cagtggggnn 240

cttccctggt gctgcagcac ttgtaaacca cacacacagc ctctctccct ggacatacgt 300

tagcacattg gcattcagta ttggtggcct ggcatggtag gtactaccca atgaagagtg 360

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agatctacct atcttaggat ggaacct 447

<210> 701
<211> 574
<212> DNA
<213> human

<220>
<221> misc_feature
<222> (142)..(149)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (151)..(151)
<223> n is a, c, g, or t

<220>

<221> misc_feature
<222> (155)..(155)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (157)..(158)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (163)..(168)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (171)..(187)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (226)..(226)
<223> n is a, c, g, or t

<400> 701
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aagggacact tgaaggctta ttttgcttca cagtaaaata acagctctat tattattcag 120

caaggccaaa gacttttgag annnnnnnng naaantnntt ttnnnnnntt nnnnnnnnnn 180

nnnnnnncat cttcttatac atatactatc aaattatgtt gtgtgncatt agaaatcagt 240

tgcttgatag tagctattaa acccaatatt gctgatagta tgctaatatc ctaaaactta 300

aatattgcat atctatgaat gttaaattca gaatatctct aaaacatgga aaattgatgt 360

ttcaataaaa agggagacat tttattattt tgccttacta atgattttgc agctctgttt 420

ttctgcacac tcaatagaaa atattgtggg tctgagatgc cctttgaaaa tgcctgaaag 480

aaaacatggg ctactacatt atgttaatgt tttgtaatgt ccttttaatg agtggtgaca 540

taaaagggct gctttgttgt cctgatatgg caaa 574

<210> 702
<211> 538
<212> DNA
<213> human

<400> 702
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tttttgtttt gttttggttt ttttttttt tttggcttga ctcaggattt aaaaactgga 120

acggtgaagg tgacagcagt cggttggagc gagcatcccc caaagttcac aatgtggccg 180

aggactttga ttgcacattg ttgtttttt aatagtcatt ccaaatatga gatgcattgt 240

tacaggaagt cccttgccat cctaaaagcc accccacttc tctctaagga gaatggccca 300

gtcctctccc aagtccacac aggggaggtg atagcattgc tttcgtgtaa attatgtaat 360

gcaaaatttt tttaatcttc gccttaatac ttttttattt tgttttattt tgaatgatga 420

gccttcgtgc ccccccttcc ccctttttgt cccccaactt gagatgtatg aaggcttttg 480

gtctccctgg gagtgggtgg aggcagccag ggcttacctg tacactgact tgagacca 538

<210> 703
<211> 529
<212> DNA
<213> human

<400> 703
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gacttcgagc aagagatggc cacggctgct tccagctcct ccctggagaa gagctacgag 120

ctgcctgacg gccaggtcat caccattggc aatgagcggt tccgctgccc tgaggcactc 180

ttccagcctt ccttcctggg catggagtcc tgtggcatcc acgaaactac cttcaactcc 240

atcatgaagt gtgacgtgga catccgcaaa gacctgtacg ccaacacagt gctgtctggc 300

ggcaccacca tgtaccctgg cattgccgac aggatgcaga aggagatcac tgccctggca 360

cccagcacaa tgaagatcaa gatcattgct cctcctgagc gcaagtactc cgtgtggatc 420

ggcggctcca tcctggcctc gctgtccacc ttccagcaga tgtggatcag caagcaggag 480

tatgacgagt ccggcccctc catcgtccac cgcaaatgct tctaggcgg 529

<210> 704
<211> 589
<212> DNA
<213> human

<400> 704
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ccacagacaa cctgctcccc atgtctcctg aggagtttga cgaggtgtct cggatagtgg 120

gctctgtaga attcgacagt atgatgaaca cagtatagag catgaatttt tttcatcttc 180

tctggcgaca gttttccttc tcatctgtga ttccctcctg ctactctgtt ccttcacatc 240

ctgtgtttct agggaaatga aagaaaggcc agcaaattcg ctgcaacctg ttgatagcaa 300

gtgaattttt ctctaactca gaaacatcag ttactctgaa gggcatcatg catcttactg 360

aaggtaaaat tgaaaggcat tctctgaaga gtgggtttca caagtgaaaa acatccagat 420

acacccaaag tatcaggacg agaatgaggg tcctttggga aaggagaagt taagcaacat 480

ctagcaaatg ttatgcataa agtcagtgcc caactgttat aggttgttgg ataaatcagt 540

ggttatttag ggaactgctt gacgtaggaa cggtaaattt ctgtgggag 589

<210> 705
<211> 233
<212> DNA
<213> human

<400> 705
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cgatgtgctt tatggcaggc gcaaactcga ttttctacgg ttgcaaactg ctgaccacgc 120

cgaatccgga agaagataaa gacctgcaac tgttccgcaa actggggcta aatccgcagc 180

aaactgccgt gctggcaggg gataacgaac aacagcaacg tcttgaacag gcg 233