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(71) Applicant: **MEMORIAL SLOAN KETTERING CANCER CENTER** [US/US]; 1275 York Avenue, New York, New York 10065 (US).

(72) Inventors: **CHAN, Timothy A.**; 178 Watch Hill Road, Cortlandt Manor, New York 10567 (US). **RIZVI, Naiyer A.**; 108 East 82nd St, Apt. 4A, New York, New York 10028 (US). **HELLMAN, Matthew D.**; 253 West 72nd Street, New York, New York 10023 (US).

(74) Agents: **JARRELL, Brenda Herschbach** et al.; Choate, Hall & Stewart LLP, Two International Place, Boston, Massachusetts 02110 (US).

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(54) Title: DETERMINANTS OF CANCER RESPONSE TO IMMUNOTHERAPY BY PD-1 BLOCKADE

(57) Abstract: Molecular determinants of cancer response to immunotherapy are described, as are systems and tools for identifying and/or characterizing cancers likely to respond to immunotherapy.

DETERMINANTS OF CANCER RESPONSE TO IMMUNOTHERAPY BY PD-1 BLOCKADE

BACKGROUND

[1] Cancer immunotherapy involves the attack of cancer cells by a patient's immune system. Regulation and activation of T lymphocytes depends on signaling by the T cell receptor and also cosignaling receptors that deliver positive or negative signals for activation. Immune responses by T cells are controlled by a balance of costimulatory and inhibitory signals, called immune checkpoints.

[2] Immunotherapy with immune checkpoint inhibitors is revolutionizing cancer therapy. For example, in certain melanoma patients, anti-CTLA4 and anti-PD1 antibodies have offered a remarkable opportunity for long-term disease control in the metastatic setting.

SUMMARY

[3] The present invention encompasses the discovery that the likelihood of a favorable response to cancer immunotherapy can be predicted. The present invention particularly comprises the discovery that, for certain cancers, mutation burden can correlate with responsiveness to particular therapy. Still further, the present invention provides the finding that certain cancer cells may harbor somatic mutations that result in neoepitopes that are recognizable by a patient's immune system as non-self, and that presence and/or identity of such neoepitopes may correlate with responsiveness to particular therapy. The identification of multiple mutations in a cancer sample as described herein is useful for determining which cancer patients are likely to respond favorably to immunotherapy, in particular, treatment with an immune checkpoint modulator.

[4] The present disclosure defines certain characteristics of particular tumor cells that can be detected to predict responsiveness to immunotherapy, and particularly to therapy with immune checkpoint modulators. Among other things, the present disclosure provides tools and technologies that can be practically applied to define, characterize, and/or detect "signatures" of tumor responsiveness.

[5] For example, the present disclosure provides tools and technologies that provide effective prediction or assessment of the likelihood that a particular tumor will respond to a particular therapy. Among other things, the present disclosure provides tools for defining or detecting particular features of cancer cells that may act as a proxy for underlying aspects of biology that support the natural correlation. The present disclosure demonstrates, for example, that particular, limited, signatures can be defined that are useful to define or detect such features, and provides detection formats that utilize these signatures. Moreover, the present disclosure demonstrates that provided formats are more effective and/or informative, in at least some contexts, than are other methodologies for applying the biological correlation.

[6] In some embodiments, the invention provides methods for identifying a subject as likely to respond to treatment with an immune checkpoint modulator.

[7] In some embodiments, the methods comprise steps of detecting a marker of high mutations in a cancer sample from a subject; and identifying the subject as a candidate for treatment with an immune checkpoint modulator. In some embodiments, the step of detecting comprises sequencing one or more exomes from the cancer sample.

[8] In some embodiments, the number of mutations identifies the subject as a candidate for treatment with an immune checkpoint modulator. In some embodiments, a high number of mutations identifies the subject as a candidate for treatment with an immune checkpoint modulator. In some embodiments, a high number of nonsynonymous mutations identifies the subject as a candidate for treatment with an immune checkpoint modulator.

[9] In some embodiments, the ratio of transition mutations to transversion mutations identifies the subject as a candidate for treatment with an immune checkpoint modulator. In some embodiments, the ratio comprises the molecular smoking signature.

[10] In some embodiments, the somatic mutation comprises a neoepitope recognized by a T cell. In some embodiments, the number of neoepitopes identifies the subject as a candidate for treatment with an immune checkpoint modulator. In some embodiments, neoepitopes identify the subject as a candidate for treatment with an immune checkpoint modulator.

[11] In some embodiments, the neoepitopes are associated with high mutation rate. In some embodiments, high mutations are present in genes encoding proteins involved in DNA repair. In some embodiments, high mutations are present in genes encoding proteins involved in cell signal transduction.

[12] In some embodiments, the neoepitope has greater binding affinity to a major histocompatibility complex (MHC) molecule compared to a corresponding epitope that does not have a mutation.

[13] In some embodiments, the somatic mutation comprises a neoepitope comprising a nonamer that is not expressed in the same cell type that does not have a somatic mutation.

[14] In some embodiments, the neoepitope shares a consensus sequence with an infectious agent.

[15] In some embodiments, the cancer is or comprises a cancer selected from the group comprising: carcinoma, sarcoma, myeloma, leukemia, or lymphoma. In some embodiments, the cancer is selected from a group comprising: lung carcinoma, melanoma, renal carcinoma, bladder carcinoma, small cell carcinoma, and head and neck cancer.

[16] In some embodiments, the immune checkpoint modulator interacts with cytotoxic T-lymphocyte antigen 4 (CTLA4), programmed death 1 (PD-1) or its ligands, lymphocyte activation gene-3 (LAG3), B7 homolog 3 (B7-H3), B7 homolog 4 (B7-H4), indoleamine (2,3)-dioxygenase (IDO), adenosine A2a receptor, neuritin, B- and T-lymphocyte attenuator (BTLA), killer immunoglobulin-like receptors (KIR), T cell immunoglobulin and mucin domain-containing protein 3 (TIM-3), inducible T cell costimulator (ICOS), CD27, CD28, CD40, CD137, or combinations thereof.

[17] In some embodiments, the immune checkpoint modulator is an antibody agent. In some embodiments, the antibody agent is or comprises a monoclonal antibody or antigen binding fragment thereof. In some embodiments, the antibody is pembrolizumab.

[18] In some embodiments, the subject has not previously been treated with a cancer therapeutic. In some embodiments, the subject has not previously been treated with a cancer immunotherapeutic.

[19] In some embodiments, the method of identifying a subject for treatment with an immune checkpoint modulator further comprises a step of administering pembrolizumab to the subject.

[20] In some embodiments, the invention provides methods for detecting a low number of mutations in a cancer sample from a subject; and identifying the subject as a poor candidate for treatment with an immune checkpoint modulator.

[21] In some embodiments, the invention provides methods for determining a subject has a cancer comprising a marker of high mutations, wherein the mutations comprises a neoepitope comprising a nonamer, and selecting for the subject a cancer treatment comprising an immune checkpoint modulator. In some embodiments, the cancer comprises lung carcinoma.

[22] In some embodiments, the invention provides methods for improving efficacy of cancer therapy with an immune checkpoint modulator, the method comprising a step of: selecting for receipt of the therapy a subject identified as having a cancer with markers of high mutation comprising a neoepitope recognized by a T cell.

[23] In some embodiments, the invention provides methods for treating cancer by administering immune checkpoint modulator therapy, the improvement that comprises: administering the therapy to a subject identified as having a cancer with one or more markers of high mutation comprising a neoepitope recognized by a T cell.

[24] In some embodiments, the invention provides methods for treating a cancer selected from the group consisting of carcinoma, sarcoma, myeloma, leukemia, or lymphoma, the method comprising a step of: administering immune checkpoint modulator therapy to a subject identified as having a cancer with a marker of high mutations comprising a neoepitope recognized by a T cell. In some embodiments, the cancer is or comprises lung carcinoma.

[25] In some embodiments, the invention provides methods for defining a mutation signature that correlates with responsiveness to therapy with an immune checkpoint modulator, the method comprising: determining one or more mutation characteristics in a plurality of samples of tumors sharing a response characteristic to immune checkpoint modulator therapy; comparing the determined one or more mutation characteristics with those in a plurality of samples of tumors that do not share the response characteristic; and identifying a set of mutation characteristics whose presence correlates with the response characteristic.

[26] In some embodiments, the one or more mutation characteristics include a mutation characteristic selected from the group consisting of mutation burden, nonsynonymous mutation burden, neoantigen burden, transversion burden, transition burden, relative transversion vs transition burden, mutation burden in genes associated with DNA repair, presence of mutation in one or more particular genes associated with DNA repair, identity of mutation in one or more particular genes associated with DNA repair, and combinations thereof. In some embodiments, the determined burden is or comprises rate or number. In some embodiments, the genes associated with DNA repair are or include a genes selected from the group consisting of POLD1, PRKDC, DNA-PK, RAD17, POLE, and MSH2. In some embodiments, genes not associated with DNA repair that harbor mutation characteristics include genes selected from the group consisting of POLR2A, KEAP1, PAPPA2, PXDNL, RYR1, SCN8A, SLIT3 and KRAS.

[27] In some embodiments, the response characteristic is or comprises a characteristic selected from the group consisting of partial or stable response lasting longer than 6 months ("durable clinical benefit"; "DCB"), a reduction in tumor size for more than 4 weeks ("objective response rate"; "ORR"); no disease progression for more than 9 weeks ("progression-free survival"; "PFS"), and combinations thereof.

[28] In some embodiments, the invention provides methods for characterizing a tumor sample by determining presence of a set of mutation characteristics that correlates with a response characteristic to immune checkpoint modulator therapy.

[29] In some embodiments, the step of determining comprises detecting at least one of the mutation characteristics by nucleic acid sequencing. In some embodiments, the nucleic acid sequencing is or comprises whole exome sequencing.

BRIEF DESCRIPTION OF THE DRAWING

[30] The following figures are presented for the purpose of illustration only, and are not intended to be limiting.

[31] Figures 1A-1G shows Nonsynonymous mutation burden predicts clinical benefit with anti-PD-1 therapy. According to Figure 1A, in the discovery cohort, nonsynonymous mutation burden is greater in tumors with DCB (n=7) compared to those with NDB (n=9) (median 302 vs 148, p=0.02). In Figure 1B, higher nonsynonymous mutation burden (above median of discovery cohort (n=8)) correlated with improved PFS compared to tumors with lower nonsynonymous mutation burden (n=8) (HR 0.19, 95% CI 0.05-0.70, p=0.01). IN Fig. 1C, in validation cohort, median nonsynonymous mutation burden is also greater in tumors from patients with DCB (n=7) compared to those with NDB (n=7) (median 244 vs 125, p=0.04). In Fig. 1D, higher nonsynonymous mutation burden (above median of validation cohort, n=9) again correlated with improved PFS compared to those with lower nonsynonymous mutation burden (n=9) (HR 0.15, 95% CI 0.04-0.59, p=0.006). In Fig. 1E the ROC curve for nonsynonymous mutation burden prediction of DCB in discovery cohort. AUC is 0.86 (95% CI 0.66-1.05, p=0.02). Cut-off of ≥178 nonsynonymous mutations is designated by triangle. According to Fig. 1F nonsynonymous mutation burden in those with DCB (n=14) compared to those with NCB (n=17) for the entire set of sequenced tumors (median 299 vs 127, p=0.0008). According to Fig. 1G PFS is improved in those with higher nonsynonymous mutation burden (n=17) compared to those with lower nonsynonymous mutation burden (n=17) in the entire set of sequenced tumors (HR 0.19, 95% CI 0.08-0.47, p=0.0004). In figures 1A, 1C, and 1F, median and interquartile ranges of total nonsynonymous mutations are shown, with individual values for each tumor shown with dots.

[32] Figures 2A-2B show smoking and response to pembrolizumab in NSCLC. Figure 2A shows the molecular smoking signature significantly associates with improved PFS. Tumors characterized as TH as by molecular smoking signature classifier (n=16) have improved progression-free survival compared to those with TL signature (n=18) (HR 0.15, 95% 0.06-0.39, p=0.0001). Figure 2B shows there is no significant difference in PFS between ever (n=28) and never smokers (n=6) (HR 0.52, 95% CI 0.15-1.8, p=0.29).

[33] Figure 3 shows mutation burden, clinical response, and factors contributing to mutation burden. Total exonic mutation burden for each sequenced tumor with nonsynonymous (dark shading), synonymous (medium shading), and indels/frameshift mutations (light shading) displayed in the histogram. Columns are shaded to indicate durable response (DCB, green; NDB, red; not reached 6 months follow-up (NR), blue). The cohort identification (D, discovery; V, validation), best objective response (PR, partial response; SD, stable disease; POD, progression of disease), and progression-free survival (censored at the time of data lock) are reported in the table. Those with ongoing progression-free survival are labeled with ++. The presence of the molecular smoking signature is displayed with TH cases (purple) and TL cases (orange). The presence of deleterious mutations in specific DNA repair/replication genes is noted by the arrows.

[34] Figures 4A-4E show candidate neoantigens, neoantigen-specific T-cell response, and response to pembrolizumab. Figure 4A illustrates that across the overall set of sequenced tumors, neoantigen burden is greater tumors from patients with DCB (n=14) compared to NDB (n=17) (median 203 vs 83, p=0.001). Figure 4B shows higher neoantigen burden (above median of overall set, n=17)) correlates with improved PFS compared to tumors with lower neoantigen burden (n=17) (HR 0.23, 95% CI 0.09-0.58, p=0.002). In Figure 4C the top panel shows representative computed tomography (CT) images of a liver metastasis prior to and at days after initiating treatment, as indicated. Middle panel of Figure 4C shows decline of tumor burden. While the bottom panel of Figure 4C shows the anti-HERC1 P>S CD8+ T-cell response measured in peripheral blood. Figure 4D shows a CD8+ T-cell population in serially-collected autologous PBLs recognizing the HERC1 P>S neoantigen (ASNASSAAK) was detected after beginning pembrolizumab, represented by the events in the double positive position indicated in

black. Percentages indicate the number of CD8+ MHC multimer+ cells out of total CD8 cells. Figure 4E shows autologous T-cell response to WT HERC1 peptide (black) vs. mutant HERC1 P>S neoantigen (red) vs. no stimulation (blue), as detected by intracellular cytokine staining. T-cell co-stains for IFNγ and CD8, TNFα, CD107a, and MIP1β, respectively, are displayed for the Day 63 and Day 297 time points.

[35] Figure 5 coverage and depth of target exome sequence. Coverage and depth of sequenced exomes is similar in discovery compared to validation cohorts and is similar in those with durable clinical benefit (DCB) compared to those with no durable benefit (NDB).

[36] Figure 6 shows an exome analysis pipeline.

[37] Figures 7A-7B show median and interquartile range of mutations in the current study and in published series of NSCLC (13, 14). Figure 7A shows somatic nonsynonymous mutation burden. Figure 7B shows total exonic mutations.

[38] Figure 8 shows a pattern of nucleotide changes in tumors sequenced. The spectrum and frequency of nucleotide changes in the pembrolizumab-treated NSCLCs is typical of non-small cell lung cancers.

[39] Figure 9 shows a distribution of nucleotide alterations in nonsynonymous mutations. Across the overall set of sequenced NSCLCs treated with pembrolizumab, C>A transversions are more frequent in those with DCB, while C>T transitions are more frequent in those with NDB (* denotes p=0.01).

[40] Figure 10 shows a neoantigen analysis pipeline. ^All steps are executed for predicted wild type and mutant. *MHC Class I prediction by NetMHCv3.4.

[41] Figure 11 shows HLA type and benefit to pembrolizumab. There was no evident association between the presence of any specific HLA allele and benefit from pembrolizumab.

[42] Figure 12 depicts neoantigens and best objective response. The absolute quantity of predicted neoantigens correlates with best overall response (Spearman ρ -0.43, 95% CI -0.68--0.10, p=0.01), but the frequency of neoantigens/nonsynonymous mutation does not (Spearman ρ -0.04, 95% CI -0.39-0.30, p=0.78).

[43] Figures 13A-13D demonstrate that following expansion, stimulation of peripheral blood mononuclear cells with wild type or mutant peptide versus no stimulation control shows a polyfunctional CD8+ T cell response to the mutant peptide only. Figure 13A shows neoantigen-induced IFNγ production by CD3+CD8+ T-cells at day 63 and day 297 after initiation of therapy. Figure 13B shows co-staining of CD107a in CD3+CD8+IFNγ+ cells when stimulated with mutant peptide versus no stimulation or wild type. Figure 13C shows co-staining of MIP-1β in CD3+CD8+IFNγ+ cells when stimulated with mutant peptide versus no stimulation or wild type. Figure 13D shows co-staining of TNF-α in CD3+CD8+IFNγ+ cells when stimulated with mutant peptide versus no stimulation or wild type.

[44] Figures 14A-14Q, show the DNA quality metrics.

[45] Figure 15 depicts a table summarizing clinical and genomic charateristics.

[46] Figure 16 depicts a table demonstrating nonsynonymous, total exonic mutation burden, and association with clinical efficacy to pembrolizumab. Analyzed independently, nonsynonymous mutation burden significantly correlates with improved confirmed ORR, DCB, and PFS (with the exception of ORR for the validation cohort, p=0.33). Clinical efficacy strongly correlates with nonsynonymous mutation burden in the overall set of sequenced NSCLCs. High total exonic mutation burden less strongly correlates with improved clinical efficacy. ^Denotes that three patients are currently undergoing therapy and have not yet reached 6 months of follow-up; as such, these patients are not included in the DCB/NDB calculations and are removed from the numerator and denominator.

[47] Figure 17 depicts a table of detailed clinical and genomic characteristics of individual patients.

[48] Figure 18 depicts a table of quality metrics for all samples.

[49] Figure 19A -19B depict the correlation of molecular smoking signature, nonsynonymous mutation burden, and neoantigen burden. Figure 19A shows a hive plot that displays the relationship between molecular smoking signature, mutation and neoantigen burden for each tumor. Red lines depict transversion low tumors; blue lines depict transversion high tumors. Transversion low tumors have significantly lower mutation and neoantigen burden

compared to transversion high tumors (Mann Whitney $p<0.0001$ for both). Nonsynonymous mutation burden correlates with neoantigen burden (Spearman ρ 0.91, 95% CI 0.83-0.96, $p<0.0001$). In Figure 19B, this hive plot displays the relationship between pack-years of tobacco consumption, mutation and neoantigen burden for each tumor. Red lines depict those who are light/never smokers (≤median pack-years of the cohort, 25); blue lines heavy smokers (>25 pack-years). Modest correlation is seen between pack-years and non-synonymous mutation burden (Spearman ρ 0.31, 95% CI -0.05-0.59, $p=0.08$) as well as between pack-years and neoantigen burden (Spearman ρ 0.35, 95% CI 0-0.62, $p=0.04$).

[50] Figure 20 depicts the immunophenotype of neoantigen-specific T-cells. In the left panel, peripheral blood lymphocytes (PBLs) from day 44 were used to identify HERC1 P3278S neoantigen (ASNASSAAK) reactive T-cells using two-color MHC multimer staining, as described. Neoantigen-specific T-cells are represented by the events in the double positive position. Flow cytometry dot plots of staining of HERC1 P3278S neoantigen-specific T-cells (Top panels) and bulk CD8+ T-cells (Bottom panels) show expression of indicated phenotypic markers.

[51] Figure 21 depicts neoepitope sequences. Figure 21 includes, among other things, a listing of immunogenic mutations, HLA typesm neoantigens and predicted MHC binding.

DEFINITIONS

[52] In order for the present invention to be more readily understood, certain terms are defined below. Those skilled in the art will appreciate that definitions for certain terms may be provided elsewhere in the specification, and/or will be clear from context.

[53] *Administration*: As used herein, the term "administration" refers to the administration of a composition to a subject. Administration may be by any appropriate route. For example, in some embodiments, administration may be bronchial (including by bronchial instillation), buccal, enteral, interdermal, intra-arterial, intradermal, intragastric, intramedullary, intramuscular, intranasal, intraperitoneal, intrathecal, intravenous, intraventricular, mucosal,

nasal, oral, rectal, subcutaneous, sublingual, topical, tracheal (including by intratracheal instillation), transdermal, vaginal and vitreal.

[54] *Affinity*: As is known in the art, "affinity" is a measure of the tightness with a particular ligand binds to its partner. Affinities can be measured in different ways. In some embodiments, affinity is measured by a quantitative assay. In some such embodiments, binding partner concentration may be fixed to be in excess of ligand concentration so as to mimic physiological conditions. Alternatively or additionally, in some embodiments, binding partner concentration and/or ligand concentration may be varied. In some such embodiments, affinity may be compared to a reference under comparable conditions (e.g., concentrations).

[55] *Amino acid*: As used herein, term "amino acid," in its broadest sense, refers to any compound and/or substance that can be incorporated into a polypeptide chain. In some embodiments, an amino acid has the general structure H2N–C(H)(R)–COOH. In some embodiments, an amino acid is a naturally occurring amino acid. In some embodiments, an amino acid is a synthetic amino acid; in some embodiments, an amino acid is a d-amino acid; in some embodiments, an amino acid is an l-amino acid. "Standard amino acid" refers to any of the twenty standard l-amino acids commonly found in naturally occurring peptides. "Nonstandard amino acid" refers to any amino acid, other than the standard amino acids, regardless of whether it is prepared synthetically or obtained from a natural source. As used herein, "synthetic amino acid" encompasses chemically modified amino acids, including but not limited to salts, amino acid derivatives (such as amides), and/or substitutions. Amino acids, including carboxy- and/or amino-terminal amino acids in peptides, can be modified by methylation, amidation, acetylation, protecting groups, and/or substitution with other chemical groups that can change the peptide's circulating half-life without adversely affecting their activity. Amino acids may participate in a disulfide bond. Amino acids may comprise one or posttranslational modifications, such as association with one or more chemical entities (e.g., methyl groups, acetate groups, acetyl groups, phosphate groups, formyl moieties, isoprenoid groups, sulfate groups, polyethylene glycol moieties, lipid moieties, carbohydrate moieties, biotin moieties, etc.). The term "amino acid" is used interchangeably with "amino acid residue," and may refer to a free amino acid

and/or to an amino acid residue of a peptide. It will be apparent from the context in which the term is used whether it refers to a free amino acid or a residue of a peptide.

[56] *Antibody agent*: As used herein, the term "antibody agent" refers to an agent that specifically binds to a particular antigen. In some embodiments, the term encompasses any polypeptide with immunoglobulin structural elements sufficient to confer specific binding. Suitable antibody agents include, but are not limited to, human antibodies, primatized antibodies, chimeric antibodies, bi-specific antibodies, humanized antibodies, conjugated antibodies (*i.e.*, antibodies conjugated or fused to other proteins, radiolabels, cytotoxins), Small Modular ImmunoPharmaceuticals ("SMIPs™"), single chain antibodies, cameloid antibodies, and antibody fragments. As used herein, the term "antibody agent" also includes intact monoclonal antibodies, polyclonal antibodies, single domain antibodies (e.g., shark single domain antibodies (e.g., IgNAR or fragments thereof)), multispecific antibodies (*e.g.* bi-specific antibodies) formed from at least two intact antibodies, and antibody fragments so long as they exhibit the desired biological activity. In some embodiments, the term encompasses stapled peptides. In some embodiments, the term encompasses one or more antibody-like binding peptidomimetics. In some embodiments, the term encompasses one or more antibody-like binding scaffold proteins. In come embodiments, the term encompasses monobodies or adnectins. In many embodiments, an antibody agent is or comprises a polypeptide whose amino acid sequence includes one or more structural elements recognized by those skilled in the art as a complementarity determining region (CDR); in some embodiments an antibody agent is or comprises a polypeptide whose amino acid sequence includes at least one CDR (e.g., at least one heavy chain CDR and/or at least one light chain CDR) that is substantially identical to one found in a reference antibody. In some embodiments an included CDR is substantially identical to a reference CDR in that it is either identical in sequence or contains between 1-5 amino acid substitutions as compared with the reference CDR. In some embodiments an included CDR is substantially identical to a reference CDR in that it shows at least 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or 100% sequence identity with the reference CDR. In some embodiments an included CDR is substantially identical to a reference CDR in that it shows at least 96%, 96%, 97%, 98%, 99%, or 100% sequence identity with the reference CDR. In some

embodiments an included CDR is substantially identical to a reference CDR in that at least one amino acid within the included CDR is deleted, added, or substituted as compared with the reference CDR but the included CDR has an amino acid sequence that is otherwise identical with that of the reference CDR. In some embodiments an included CDR is substantially identical to a reference CDR in that 1-5 amino acids within the included CDR are deleted, added, or substituted as compared with the reference CDR but the included CDR has an amino acid sequence that is otherwise identical to the reference CDR. In some embodiments an included CDR is substantially identical to a reference CDR in that at least one amino acid within the included CDR is substituted as compared with the reference CDR but the included CDR has an amino acid sequence that is otherwise identical with that of the reference CDR. In some embodiments an included CDR is substantially identical to a reference CDR in that 1-5 amino acids within the included CDR are deleted, added, or substituted as compared with the reference CDR but the included CDR has an amino acid sequence that is otherwise identical to the reference CDR. In some embodiments, an antibody agent is or comprises a polypeptide whose amino acid sequence includes structural elements recognized by those skilled in the art as an immunoglobulin variable domain. In some embodiments, an antibody agent is a polypeptide protein having a binding domain which is homologous or largely homologous to an immunoglobulin-binding domain.

[57] *Antibody polypeptide:* As used herein, the terms "antibody polypeptide" or "antibody", or "antigen-binding fragment thereof", which may be used interchangeably, refer to polypeptide(s) capable of binding to an epitope. In some embodiments, an antibody polypeptide is a full-length antibody, and in some embodiments, is less than full length but includes at least one binding site (comprising at least one, and preferably at least two sequences with structure of antibody "variable regions"). In some embodiments, the term "antibody polypeptide" encompasses any protein having a binding domain which is homologous or largely homologous to an immunoglobulin-binding domain. In particular embodiments, "antibody polypeptides" encompasses polypeptides having a binding domain that shows at least 99% identity with an immunoglobulin binding domain. In some embodiments, "antibody polypeptide" is any protein having a binding domain that shows at least 70%, 80%, 85%, 90%, or 95% identity with an

immuglobulin binding domain, for example a reference immunoglobulin binding domain. An included "antibody polypeptide" may have an amino acid sequence identical to that of an antibody that is found in a natural source. Antibody polypeptides in accordance with the present invention may be prepared by any available means including, for example, isolation from a natural source or antibody library, recombinant production in or with a host system, chemical synthesis, etc., or combinations thereof. An antibody polypeptide may be monoclonal or polyclonal. An antibody polypeptide may be a member of any immunoglobulin class, including any of the human classes: IgG, IgM, IgA, IgD, and IgE. In certain embodiments, an antibody may be a member of the IgG immunoglobulin class. As used herein, the terms "antibody polypeptide" or "characteristic portion of an antibody" are used interchangeably and refer to any derivative of an antibody that possesses the ability to bind to an epitope of interest. In certain embodiments, the "antibody polypeptide" is an antibody fragment that retains at least a significant portion of the full-length antibody's specific binding ability. Examples of antibody fragments include, but are not limited to, Fab, Fab', $F(ab')_2$, scFv, Fv, dsFv diabody, and Fd fragments. Alternatively or additionally, an antibody fragment may comprise multiple chains that are linked together, for example, by disulfide linkages. In some embodiments, an antibody polypeptide may be a human antibody. In some embodiments, the antibody polypeptides may be a humanized. Humanized antibody polypeptides include may be chimeric immunoglobulins, immunoglobulin chains or antibody polypeptides (such as Fv, Fab, Fab', F(ab')2 or other antigen-binding subsequences of antibodies) that contain minimal sequence derived from non-human immunoglobulin. In general, humanized antibodies are human immunoglobulins (recipient antibody) in which residues from a complementary-determining region (CDR) of the recipient are replaced by residues from a CDR of a non-human species (donor antibody) such as mouse, rat or rabbit having the desired specificity, affinity, and capacity. In particular embodiments, antibody polyeptides for use in accordance with the present invention bind to particular epitopes of on immune checkpoint molecules.

[58] *Antigen*: An "antigen" is a molecule or entity to which an antibody binds. In some embodiments, an antigen is or comprises a polypeptide or portion thereof. In some embodiments, an antigen is a portion of an infectious agent that is recognized by antibodies. In

some embodiments, an antigen is an agent that elicits an immune response; and/or (ii) an agent that is bound by a T cell receptor (e.g., when presented by an MHC molecule) or to an antibody (e.g., produced by a B cell) when exposed or administered to an organism. In some embodiments, an antigen elicits a humoral response (e.g., including production of antigen-specific antibodies) in an organism; alternatively or additionally, in some embodiments, an antigen elicits a cellular response (e.g., involving T-cells whose receptors specifically interact with the antigen) in an organism. It will be appreciated by those skilled in the art that a particular antigen may elicit an immune response in one or several members of a target organism (e.g., mice, rabbits, primates, humans), but not in all members of the target organism species. In some embodiments, an antigen elicits an immune response in at least about 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 65%, 70%, 75%, 80%, 85%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99% of the members of a target organism species. In some embodiments, an antigen binds to an antibody and/or T cell receptor, and may or may not induce a particular physiological response in an organism. In some embodiments, for example, an antigen may bind to an antibody and/or to a T cell receptor *in vitro*, whether or not such an interaction occurs *in vivo*. In general, an antigen may be or include any chemical entity such as, for example, a small molecule, a nucleic acid, a polypeptide, a carbohydrate, a lipid, a polymer [in some embodiments other than a biologic polymer (e.g., other than a nucleic acid or amino acid polymer)] etc. In some embodiments, an antigen is or comprises a polypeptide. In some embodiments, an antigen is or comprises a glycan. Those of ordinary skill in the art will appreciate that, in general, an antigen may be provided in isolated or pure form, or alternatively may be provided in crude form (e.g., together with other materials, for example in an extract such as a cellular extract or other relatively crude preparation of an antigen-containing source). In some embodiments, antigens utilized in accordance with the present invention are provided in a crude form. In some embodiments, an antigen is or comprises a recombinant antigen.

[59] *Approximately*: As used herein, the term "approximately" or "about," as applied to one or more values of interest, refers to a value that is similar to a stated reference value. In certain embodiments, the term "approximately" or "about" refers to a range of values that fall within 25%, 20%, 19%, 18%, 17%, 16%, 15%, 14%, 13%, 12%, 11%, 10%, 9%, 8%, 7%, 6%,

5%, 4%, 3%, 2%, 1%, or less in either direction (greater than or less than) of the stated reference value unless otherwise stated or otherwise evident from the context (except where such number would exceed 100% of a possible value).

[60] *Burden*: The term "burden" as used herein, for example in reference to mutation burden or neoantigen burden, refers to the number or rate (e.g., of mutations or neoantigens) in a sample or cohort, in some embodiments relative to that observed in an appropriate reference sample or cohort.

[61] *Combination therapy*: The term "combination therapy", as used herein, refers to those situations in which two or more different pharmaceutical agents are administered in overlapping regimens so that the subject is simultaneously exposed to both agents. When used in combination therapy, two or more different agents may be administered simultaneously or separately. This administration in combination can include simultaneous administration of the two or more agents in the same dosage form, simultaneous administration in separate dosage forms, and separate administration. That is, two or more agents can be formulated together in the same dosage form and administered simultaneously. Alternatively, two or more agents can be simultaneously administered, wherein the agents are present in separate formulations. In another alternative, a first agent can be administered just followed by one or more additional agents. In the separate administration protocol, two or more agents may be administered a few minutes apart, or a few hours apart, or a few days apart.

[62] *Comparable*: The term "comparable" is used herein to describe two (or more) sets of conditions, circumstances, individuals, or populations that are sufficiently similar to one another to permit comparison of results obtained or phenomena observed. In some embodiments, comparable sets of conditions, circumstances, individuals, or populations are characterized by a plurality of substantially identical features and one or a small number of varied features. Those of ordinary skill in the art will appreciate that sets of circumstances, individuals, or populations are comparable to one another when characterized by a sufficient number and type of substantially identical features to warrant a reasonable conclusion that differences in results obtained or phenomena observed under or with different sets of circumstances, individuals, or populations are caused by or indicative of the variation in those

features that are varied. Those skilled in the art will appreciate that relative language used herein (e.g., enhanced, activated, reduced, inhibited, etc) will typically refer to comparisons made under comparable conditions.

[63] *Consensus sequence:* As used herein, the term "consensus sequence" refers to a core sequence that elicits or drives a physiological phenomenon (e.g., an immune response). It is to be understood by those of skill in the art that a a cancer cell that shares a "consensus sequence" with an antigen of an infectious agent shares a portion of amino acid sequence that affects the binding affinity of the antigen to an MHC molecule (either directly or allosterically), and/or facilitates recognition by T cell receptors. In some embodiments, a consensus sequence is a tetrapeptide. In some embodiments, a consensus sequence is a nonapeptide. In some embodiments, a consensus sequence is betwene four and nine amino acids in length. In some embodiments, a consesnsus sequence is greater than nine amino acids in length.

[64] *Diagnostic information*: As used herein, diagnostic information or information for use in diagnosis is any information that is useful in determining whether a patient has a disease or condition and/or in classifying the disease or condition into a phenotypic category or any category having significance with regard to prognosis of the disease or condition, or likely response to treatment (either treatment in general or any particular treatment) of the disease or condition. Similarly, diagnosis refers to providing any type of diagnostic information, including, but not limited to, whether a subject is likely to have a disease or condition (such as cancer), state, staging or characteristic of the disease or condition as manifested in the subject, information related to the nature or classification of a tumor, information related to prognosis and/or information useful in selecting an appropriate treatment. Selection of treatment may include the choice of a particular therapeutic (e.g., chemotherapeutic) agent or other treatment modality such as surgery, radiation, etc., a choice about whether to withhold or deliver therapy, a choice relating to dosing regimen (e.g., frequency or level of one or more doses of a particular therapeutic agent or combination of therapeutic agents), etc.

[65] *Dosing regimen:* A "dosing regimen" (or "therapeutic regimen"), as that term is used herein, is a set of unit doses (typically more than one) that are administered individually to a subject, typically separated by periods of time. In some embodiments, a given therapeutic agent

has a recommended dosing regimen, which may involve one or more doses. In some embodiments, a dosing regimen comprises a plurality of doses each of which are separated from one another by a time period of the same length; in some embodiments, a dosing regimen comprises a plurality of doses and at least two different time periods separating individual doses. In some embodiments, a dosing regimen is or has been correlated with a desired therapeutic outcome, when administered across a population of patients.

[66] *Durable clinical benefit:* As used herein, the term "durable clinical benefit" (DCB), has its art-understood meaning, referring to a clinical benefit that lasts for a relevant period of time. In some embodiments, such a clinical benefit is or comprises reduction in tumor size, increase in progession free survival, increase in overall survival, decrease in overall tumor burden, decrease in the symptoms caused by tumor growth such as pain, organ failure, bleeding, damage to the skeletal system, and other related sequelae of metastatic cancer and combinations thereof. In some embodiments, the relevant period of time is at least 1 month, 2 months, 3 months, 4 months, 5 months, 6 months, 7 months, 8 months, 9 months, 10 months, 11 months, 1 year, 2 years, 3 years, 4 years, 5 years, or longer. In some particular emodiments, the relevant period of time is 6 months.

[67] *Favorable response*: As used herein, the term "favorable response" refers to a reduction in frequency and/or intensity of one or more symptoms, reduction in tumor burden, full or partial remission, or other improvement in disease pathophysiology. Symptoms are reduced when one or more symptoms of a particular disease, disorder or condition is reduced in magnitude (e.g., intensity, severity, etc.) and/or frequency. For purposes of clarity, a delay in the onset of a particular symptom is considered one form of reducing the frequency of that symptom. Many cancer patients with smaller tumors have no symptoms. It is not intended that the present invention be limited only to cases where the symptoms are eliminated. The present invention specifically contemplates treatment such that one or more symptoms is/are reduced (and the condition of the subject is thereby "improved"), albeit not completely eliminated. In some embodiments, a favorable response is established when a particular therapeutic regimen shows a statistically significant effect when administered across a relevant population; demonstration of a particular result in a specific individual may not be required. Thus, in some embodiments, a

particular therapeutic regimen is determined to have a favorable response when its administration is correlated with a relevant desired effect.

[68] *Homology*: As used herein, the term "homology" refers to the overall relatedness between polymeric molecules, e.g., between nucleic acid molecules (e.g., DNA molecules and/or RNA molecules) and/or between polypeptide molecules. In some embodiments, polymeric molecules are considered to be "homologous" to one another if their sequences are at least 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 65%, 70%, 75%, 80%, 85%, 90%, 95%, or 99% identical. In some embodiments, polymeric molecules are considered to be "homologous" to one another if their sequences are at least 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 65%, 70%, 75%, 80%, 85%, 90%, 95%, or 99% similar.

[69] *Identity*: As used herein, the term "identity" refers to the overall relatedness between polymeric molecules, e.g., between nucleic acid molecules (e.g., DNA molecules and/or RNA molecules) and/or between polypeptide molecules. Calculation of the percent identity of two nucleic acid sequences, for example, can be performed by aligning the two sequences for optimal comparison purposes (e.g., gaps can be introduced in one or both of a first and a second nucleic acid sequences for optimal alignment and non-identical sequences can be disregarded for comparison purposes). In certain embodiments, the length of a sequence aligned for comparison purposes is at least 30%, at least 40%, at least 50%, at least 60%, at least 70%, at least 80%, at least 90%, at least 95%, or substantially 100% of the length of the reference sequence. The nucleotides at corresponding nucleotide positions are then compared. When a position in the first sequence is occupied by the same nucleotide as the corresponding position in the second sequence, then the molecules are identical at that position. The percent identity between the two sequences is a function of the number of identical positions shared by the sequences, taking into account the number of gaps, and the length of each gap, which needs to be introduced for optimal alignment of the two sequences. The comparison of sequences and determination of percent identity between two sequences can be accomplished using a mathematical algorithm. For example, the percent identity between two nucleotide sequences can be determined using the algorithm of Meyers and Miller (CABIOS, 1989, 4: 11-17), which has been incorporated into the ALIGN program (version 2.0) using a PAM120 weight residue table, a gap length penalty of 12

and a gap penalty of 4. The percent identity between two nucleotide sequences can, alternatively, be determined using the GAP program in the GCG software package using an NWSgapdna.CMP matrix.

[70] *Immune checkpoint modulator*: As used herein, the term "immune checkpoint modulator" refers to an agent that interacts directly or indirectly with an immune checkpoint. In some embodiments, an immune checkpoint modulator increases an immune effector response (e.g., cytotoxic T cell response), for example by stimulating a positive signal for T cell activation. In some embodiments, an immune checkpoint modulator increases an immune effector response (e.g., cytotoxic T cell response), for example by inhibiting a negative signal for T cell activation (e.g. disinhibition). In some embodiments, an immune checkpoint modulator interferes with a signal for T cell anergy. In some embodiments, an immune checkpoint modulator reduces, removes, or prevents immune tolerance to one or more antigens.

[71] *Long Term Benefit*: In general, the term "long term benefit" refers to a desirable clinical outcome, e.g., observed after administration of a particular treatment or therapy of interest, that is maintained for a clinically relevant period of time. To give but one example, in some embodiments, a long term benefit of cancer therapy is or comprises (1) no evidence of disease ("NED", for example upon radiographic assessment) and/or (2) stable or decreased volume of diseases. In some embodiments, a clinically relevant period of time is at least 1 month, at least 2 months, at least 3 months, at least 4 months, at least 5 months or more. In some embodiments, a clinically relevant period of time is at least six months. In some embodiments, a clinically relevant period of time is at least 1 year.

[72] *Marker*: A marker, as used herein, refers to an agent whose presence or level is a characteristic of a particular tumor or metastatic disease thereof. For example, in some embodiments, the term refers to a gene expression product that is characteristic of a particular tumor, tumor subclass, stage of tumor, etc. Alternatively or additionally, in some embodiments, a presence or level of a particular marker correlates with activity (or activity level) of a particular signaling pathway, for example that may be characteristic of a particular class of tumors. The statistical significance of the presence or absence of a marker may vary depending upon the particular marker. In some embodiments, detection of a marker is highly specific in that it

reflects a high probability that the tumor is of a particular subclass. Such specificity may come at the cost of sensitivity (i.e., a negative result may occur even if the tumor is a tumor that would be expected to express the marker). Conversely, markers with a high degree of sensitivity may be less specific that those with lower sensitivity. According to the present invention a useful marker need not distinguish tumors of a particular subclass with 100% accuracy.

[73] *Modulator*: The term "modulator" is used to refer to an entity whose presence in a system in which an activity of interest is observed correlates with a change in level and/or nature of that activity as compared with that observed under otherwise comparable conditions when the modulator is absent. In some embodiments, a modulator is an activator, in that activity is increased in its presence as compared with that observed under otherwise comparable conditions when the modulator is absent. In some embodiments, a modulator is an inhibitor, in that activity is reduced in its presence as compared with otherwise comparable conditions when the modulator is absent. In some embodiments, a modulator interacts directly with a target entity whose activity is of interest. In some embodiments, a modulator interacts indirectly (i.e., directly with an intermediate agent that interacts with the target entity) with a target entity whose activity is of interest. In some embodiments, a modulator affects level of a target entity of interest; alternatively or additionally, in some embodiments, a modulator affects activity of a target entity of interest without affecting level of the target entity. In some embodiments, a modulator affects both level and activity of a target entity of interest, so that an observed difference in activity is not entirely explained by or commensurate with an observed difference in level.

[74] *Mutation:* As used herein, the term "mutation" refers to permanent change in the DNA sequence that makes up a gene. In some embodiments, mutations range in size from a single DNA building block (DNA base) to a large segment of a chromosome. In some embodiments, mutations can include missense mutations, frameshift mutations, duplications, insertions, nonsense mutation, deletions and repeat expansions. In some embodiments, a missense mutation is a change in one DNA base pair that results in the substitution of one amino acid for another in the protein made by a gene. In some embodiments, a nonsense mutation is also a change in one DNA base pair. Instead of substituting one amino acid for another, however, the altered DNA sequence prematurely signals the cell to stop building a protein. In some

embodiments, an insertion changes the number of DNA bases in a gene by adding a piece of DNA. In some embodiments, a deletion changes the number of DNA bases by removing a piece of DNA. In some embodiments, small deletions may remove one or a few base pairs within a gene, while larger deletions can remove an entire gene or several neighboring genes. In some embodiments, a duplication consists of a piece of DNA that is abnormally copied one or more times. In some embodiments, frameshift mutations occur when the addition or loss of DNA bases changes a gene's reading frame. A reading frame consists of groups of 3 bases that each code for one amino acid. In some embodiments, a frameshift mutation shifts the grouping of these bases and changes the code for amino acids. In some embodiments, insertions, deletions, and duplications can all be frameshift mutations. In some embodiments, a repeat expansion is another type of mutation. In some embodiments, nucleotide repeats are short DNA sequences that are repeated a number of times in a row. For example, a trinucleotide repeat is made up of 3-base-pair sequences, and a tetranucleotide repeat is made up of 4-base-pair sequences. In some embodiments, a repeat expansion is a mutation that increases the number of times that the short DNA sequence is repeated.

[75] *Neoepitope*: A "neoepitope" is understood in the art to refer to an epitope that emerges or develops in a subject after exposure to or occurrence of a particular event (e.g., development or progression of a particular disease, disorder or condition, e.g., infection, cancer, stage of cancer, etc). As used herein, a neoepitope is one whose presence and/or level is correlated with exposure to or occurrence of the event. In some embodiments, a neoepitope is one that triggers an immune response against cells that express it (e.g., at a relevant level). In some embodiments, a neopepitope is one that triggers an immune response that kills or otherwise destroys cells that express it (e.g., at a relevant level). In some embodiments, a relevant event that triggers a neoepitope is or comprises somatic mutation in a cell. In some embodiments, a neoepitope is not expressed in non-cancer cells to a level and/or in a manner that triggers and/or supports an immune response (e.g., an immune response sufficient to target cancer cells expressing the neoepitope). In some embodiments, a neoepitope is a neoantigen.

[76] *No Benefit*: As used herein, the phrase "no benefit" is used to refer to absence of detectable clinical benefit (e.g., in response to administration of a particular therapy or treatment

of interest). In some embodiments, absence of clinical benefit refers to absence of statistically significant change in any particular symptom or characteristic of a particular disease, disorder, or condition. In some embodiments, absence of clinical benefit refers to a change in one or more symptoms or characteristics of a disease, disorder, or condition, that lasts for only a short period of time such as, for example, less than about 6 months, less than about 5 months, less than about 4 months, less than about 3 months, less than about 2 months, less than about 1 month, or less. In some embodiments, no benefit refers to no durable benefit.

[77] *Objective Response:* As used herein, the phrase "objective response" refers to size reduction of a cancerous mass by a defined amount. In some embodiments, the cancerous mass is a tumor. In some embodiments, confirmed objective response is response confirmed at least four (4) weeks after treatment.

[78] *Objective Response Rate*: As used herein, the term "objective response rate" ("ORR") has its art-understood meaning referring to the proportion of patients with tumor size reduction of a predefined amount and for a minimum time period. In some embodiments, response duration usually measured from the time of initial response until documented tumor progression. In some embodiments, ORR involves the sum of partial responses plus complete responses.

[79] *Patient*: As used herein, the term "patient" or "subject" refers to any organism to which a provided composition is or may be administered, e.g., for experimental, diagnostic, prophylactic, cosmetic, and/or therapeutic purposes. Typical patients include animals (e.g., mammals such as mice, rats, rabbits, non-human primates, and/or humans). In some embodiments, a patient is a human. In some embodiments, a patient is suffering from or susceptible to one or more disorders or conditions. In some embodiments, a patient displays one or more symptoms of a disorder or condition. In some embodiments, a patient has been diagnosed with one or more disorders or conditions. In some embodiments, the disorder or condition is or includes cancer, or presence of one or more tumors. In some embodiments, the disorder or condition is metastatic cancer.

[80] *Polypeptide*: As used herein, a "polypeptide", generally speaking, is a string of at least two amino acids attached to one another by a peptide bond. In some embodiments, a polypeptide may include at least 3-5 amino acids, each of which is attached to others by way of at least one peptide bond. Those of ordinary skill in the art will appreciate that polypeptides sometimes include "non-natural" amino acids or other entities that nonetheless are capable of integrating into a polypeptide chain, optionally.

[81] *Prognostic and predictive information*: As used herein, the terms prognostic and predictive information are used interchangeably to refer to any information that may be used to indicate any aspect of the course of a disease or condition either in the absence or presence of treatment. Such information may include, but is not limited to, the average life expectancy of a patient, the likelihood that a patient will survive for a given amount of time (e.g., 6 months, 1 year, 5 years, etc.), the likelihood that a patient will be cured of a disease, the likelihood that a patient's disease will respond to a particular therapy (wherein response may be defined in any of a variety of ways). Prognostic and predictive information are included within the broad category of diagnostic information.

[82] *Progression Free Survival*: As used herein, the term "progression free survival" (PFS) has its art-understood meaning relating to the length of time during and after the treatment of a disease, such as cancer, that a patient lives with the disease but it does not get worse. In some embodiments, measuring the progression-free survival is utilized as an assessment of how well a new treatment works. In some embodiments, PFS is determined in a randomized clinical trial; in some such embodiments, PFS refers to time from randomization until objective tumor progression and/or death.

[83] *Protein*: As used herein, the term "protein" refers to a polypeptide (i.e., a string of at least two amino acids linked to one another by peptide bonds). Proteins may include moieties other than amino acids (e.g., may be glycoproteins, proteoglycans, etc.) and/or may be otherwise processed or modified. Those of ordinary skill in the art will appreciate that a "protein" can be a complete polypeptide chain as produced by a cell (with or without a signal sequence), or can be a characteristic portion thereof. Those of ordinary skill will appreciate that a protein can sometimes include more than one polypeptide chain, for example linked by one or

more disulfide bonds or associated by other means. Polypeptides may contain L-amino acids, D-amino acids, or both and may contain any of a variety of amino acid modifications or analogs known in the art. Useful modifications include, e.g., terminal acetylation, amidation, methylation, etc. In some embodiments, proteins may comprise natural amino acids, non-natural amino acids, synthetic amino acids, and combinations thereof. The term "peptide" is generally used to refer to a polypeptide having a length of less than about 100 amino acids, less than about 50 amino acids, less than 20 amino acids, or less than 10 amino acids.

[84] *Reference*: Those of skill in the art will appreciate that, in many embodiments described herein, a determined value or characteristic of interest is compared with an appropriate reference. In some embodiments, a reference value or characteristic is one determined for a comparable cohort, individual, population, or sample. In some embodiments, a reference value or characteristic is tested and/or determined substantially simultaneously with the testing or determination of the characteristic or value of interest. In some embodiments, a reference characteristic or value is or comprises a historical reference, optionally embodied in a tangible medium. Typically, as would be understood by those skilled in the art, a reference value or characteristic is determined under conditions comparable to those utilized to determine or analyze the characteristic or value of interest.

[85] *Response*: As used herein, the term "response" may refer to an alteration in a subject's condition that occurs as a result of or correlates with treatment. In some embodiments, a response is or comprises a beneficial response. In some embodiments, a beneficial response may include stabilization of the condition (e.g., prevention or delay of deterioration expected or typically observed to occur absent the treatment), amelioration (e.g., reduction in frequency and/or intensity) of one or more symptoms of the condition, and/or improvement in the prospects for cure of the condition, etc. In some embodiments, "response" may refer to response of an organism, an organ, a tissue, a cell, or a cell component or in vitro system. In some embodiments, a response is or comprises a clinical response. In some embodiments, presence, extent, and/or nature of response may be measured and/or characterized according to particular criteria; in some embodiments, such criteria may include clinical criteria and/or objective criteria. In some embodiments, techniques for assessing response may include, but are not

limited to, clinical examination, positron emission tomography, chest X-ray CT scan, MRI, ultrasound, endoscopy, laparoscopy, presence or level of a particular marker in a sample, , cytology, and/or histology. Where a response of interest is or comprises response of a tumor to therapy, those of ordinary skill will be aware of a variety of established techniques for assessing such response, including, for example, for determining tumor burden, tumor size, tumor stage, etc. For example, certain technologies for assessing response of solid tumors to treatment are discussed in Therasse et. al., "New guidelines to evaluate the response to treatment in solid tumors", European Organization for Research and Treatment of Cancer, National Cancer Institute of the United States, National Cancer Institute of Canada, *J. Natl. Cancer Inst.*, 2000, 92(3):205-216. Those of ordinary skill in the art will be aware of, and/or will appreciate in light of the present disclosure, strategies for determining particular response criteria for individual tumors, tumor types, patient populations or cohorts, etc, as well as for determining appropriate references therefor..

[86] *Sample:* As used herein, the term "sample" typically refers to a biological sample obtained or derived from a source of interest, as described herein. In some embodiments, a source of interest comprises an organism, such as an animal or human. In some embodiments, a biological sample is or comprises biological tissue or fluid. In some embodiments, a biological sample may be or comprise bone marrow; blood; blood cells; ascites; tissue or fine needle biopsy samples; cell-containing body fluids; free floating nucleic acids; sputum; saliva; urine; cerebrospinal fluid, peritoneal fluid; pleural fluid; feces; lymph; gynecological fluids; skin swabs; vaginal swabs; oral swabs; nasal swabs; washings or lavages such as a ductal lavages or broncheoalveolar lavages; aspirates; scrapings; bone marrow specimens; tissue biopsy specimens; surgical specimens; feces, other body fluids, secretions, and/or excretions; and/or cells therefrom, *etc*. In some embodiments, a biological sample is or comprises cells obtained from an individual. In some embodiments, obtained cells are or include cells from an individual from whom the sample is obtained. In some embodiments, a sample is a "primary sample" obtained directly from a source of interest by any appropriate means. For example, in some embodiments, a primary biological sample is obtained by methods selected from the group consisting of biopsy (*e.g.*, fine needle aspiration or tissue biopsy), surgery, collection of body

fluid (*e.g.,* blood, lymph, feces *etc.*), *etc.* In some embodiments, as will be clear from context, the term "sample" refers to a preparation that is obtained by processing (e.g., by removing one or more components of and/or by adding one or more agents to) a primary sample. For example, filtering using a semi-permeable membrane. Such a "processed sample" may comprise, for example nucleic acids or proteins extracted from a sample or obtained by subjecting a primary sample to techniques such as amplification or reverse transcription of mRNA, isolation and/or purification of certain components, *etc.*

[87] *Specific binding*: As used herein, the terms "specific binding" or "specific for" or "specific to" refer to an interaction (typically non-covalent) between a target entity (e.g., a target protein or polypeptide) and a binding agent (e.g., an antibody, such as a provided antibody). As will be understood by those of ordinary skill, an interaction is considered to be "specific" if it is favored in the presence of alternative interactions. In many embodiments, an interaction is typically dependent upon the presence of a particular structural feature of the target molecule such as an antigenic determinant or epitope recognized by the binding molecule. For example, if an antibody is specific for epitope A, the presence of a polypeptide containing epitope A or the presence of free unlabeled A in a reaction containing both free labeled A and the antibody thereto, will reduce the amount of labeled A that binds to the antibody. It is to be understood that specificity need not be absolute. For example, it is well known in the art that numerous antibodies cross-react with other epitopes in addition to those present in the target molecule. Such cross-reactivity may be acceptable depending upon the application for which the antibody is to be used. In particular embodiments, an antibody specific for receptor tyrosine kinases has less than 10% cross-reactivity with receptor tyrosine kinase bound to protease inhibitors (e.g., ACT). One of ordinary skill in the art will be able to select antibodies having a sufficient degree of specificity to perform appropriately in any given application (e.g., for detection of a target molecule, for therapeutic purposes, etc.). Specificity may be evaluated in the context of additional factors such as the affinity of the binding molecule for the target molecule versus the affinity of the binding molecule for other targets (e.g., competitors). If a binding molecule exhibits a high affinity for a target molecule that it is desired to detect and low affinity for non-

[88] *Stage of cancer*: As used herein, the term "stage of cancer" refers to a qualitative or quantitative assessment of the level of advancement of a cancer. Criteria used to determine the stage of a cancer include, but are not limited to, the size of the tumor and the extent of metastases (e.g., localized or distant).

[89] *Subject*: As used herein, the term "subject" or "patient" refers to any organism upon which embodiments of the invention may be used or administered, e.g., for experimental, diagnostic, prophylactic, and/or therapeutic purposes. Typical subjects include animals (e.g., mammals such as mice, rats, rabbits, non-human primates, and humans; insects; worms; etc.).

[90] *Substantially*: As used herein, the term "substantially" refers to the qualitative condition of exhibiting total or near-total extent or degree of a characteristic or property of interest. One of ordinary skill in the biological arts will understand that biological and chemical phenomena rarely, if ever, go to completion and/or proceed to completeness or achieve or avoid an absolute result. The term "substantially" is therefore used herein to capture the potential lack of completeness inherent in many biological and chemical phenomena.

[91] *Suffering from*: An individual who is "suffering from" a disease, disorder, or condition (e.g., a cancer) has been diagnosed with and/or exhibits one or more symptoms of the disease, disorder, or condition. In some embodiments, an individual who is suffering from cancer has cancer, but does not display any symptoms of cancer and/or has not been diagnosed with a cancer.

[92] *Susceptible to*: An individual who is "susceptible to" a disease, disorder, or condition (e.g., cancer) is at risk for developing the disease, disorder, or condition. In some embodiments, an individual who is susceptible to a disease, disorder, or condition does not display any symptoms of the disease, disorder, or condition. In some embodiments, an individual who is susceptible to a disease, disorder, or condition has not been diagnosed with the disease, disorder, and/or condition. In some embodiments, an individual who is susceptible to a disease, disorder, or condition is an individual who displays conditions associated with development of the disease, disorder, or condition. In some embodiments, a risk of developing a disease, disorder, and/or condition is a population-based risk.

[93] *Target cell or target tissue*: As used herein, the terms "target cell" or "target tissue" refer to any cell, tissue, or organism that is affected by a condition described herein and to be treated, or any cell, tissue, or organism in which a protein involved in a condition described herein is expressed. In some embodiments, target cells, target tissues, or target organisms include those cells, tissues, or organisms in which there is a detectable amount of immune checkpoint signaling and/or activity. In some embodiments, target cells, target tissues, or target organisms include those cells, tissues or organisms that display a disease-associated pathology, symptom, or feature.

[94] *Therapeutic regimen*: As used herein, the term "therapeutic regimen" refers to any method used to partially or completely alleviate, ameliorate, relieve, inhibit, prevent, delay onset of, reduce severity of and/or reduce incidence of one or more symptoms or features of a particular disease, disorder, and/or condition. It may include a treatment or series of treatments designed to achieve a particular effect, e.g., reduction or elimination of a detrimental condition or disease such as cancer. The treatment may include administration of one or more compounds either simultaneously, sequentially or at different times, for the same or different amounts of time. Alternatively, or additionally, the treatment may include exposure to radiation, chemotherapeutic agents, hormone therapy, or surgery. In addition, a "treatment regimen" may include genetic methods such as gene therapy, gene ablation or other methods known to reduce expression of a particular gene or translation of a gene-derived mRNA.

[95] *Therapeutic agent*: As used herein, the phrase "therapeutic agent" refers to any agent that, when administered to a subject, has a therapeutic effect and/or elicits a desired biological and/or pharmacological effect.

[96] *Therapeutically effective amount*: As used herein, the term "therapeutically effective amount" refers to an amount of an agent (e.g., an immune checkpoint modulator) that confers a therapeutic effect on the treated subject, at a reasonable benefit/risk ratio applicable to any medical treatment. The therapeutic effect may be objective (i.e., measurable by some test or marker) or subjective (i.e., subject gives an indication of or feels an effect). In particular, the "therapeutically effective amount" refers to an amount of a therapeutic agent or composition effective to treat, ameliorate, or prevent a desired disease or condition, or to exhibit a detectable

therapeutic or preventative effect, such as by ameliorating symptoms associated with the disease, preventing or delaying the onset of the disease, and/or also lessening the severity or frequency of symptoms of the disease. A therapeutically effective amount is commonly administered in a dosing regimen that may comprise multiple unit doses. For any particular therapeutic agent, a therapeutically effective amount (and/or an appropriate unit dose within an effective dosing regimen) may vary, for example, depending on route of administration, on combination with other pharmaceutical agents. Also, the specific therapeutically effective amount (and/or unit dose) for any particular patient may depend upon a variety of factors including the disorder being treated and the severity of the disorder; the activity of the specific pharmaceutical agent employed; the specific composition employed; the age, body weight, general health, sex and diet of the subject; the time of administration, route of administration, and/or rate of excretion or metabolism of the specific fusion protein employed; the duration of the treatment; and like factors as is well known in the medical arts.

[97] *Treatment*: As used herein, the term "treatment" (also "treat" or "treating") refers to any administration of a substance (e.g., provided compositions) that partially or completely alleviates, ameliorates, relieves, inhibits, delays onset of, reduces severity of, and/or reduces incidence of one or more symptoms, features, and/or causes of a particular disease, disorder, and/or condition (e.g., cancer). Such treatment may be of a subject who does not exhibit signs of the relevant disease, disorder and/or condition and/or of a subject who exhibits only early signs of the disease, disorder, and/or condition. Alternatively or additionally, such treatment may be of a subject who exhibits one or more established signs of the relevant disease, disorder and/or condition. In some embodiments, treatment may be of a subject who has been diagnosed as suffering from the relevant disease, disorder, and/or condition. In some embodiments, treatment may be of a subject known to have one or more susceptibility factors that are statistically correlated with increased risk of development of the relevant disease, disorder, and/or condition.

[98] *Wild-type*: As used herein, the term "wild-type" has its art-understood meaning that refers to an entity having a structure and/or activity as found in nature in a "normal" (as contrasted with mutant, diseased, altered, etc.) state or context. Those of ordinary skill in the art

will appreciate that wild-type genes and polypeptides often exist in multiple different forms (e.g., alleles).

DETAILED DESCRIPTION OF CERTAIN EMBODIMENTS

[99] The present invention encompasses the discovery of particular signatures and/or characteristics that can be detected in certain tumors or tumor samples and that predict or correlate with responsiveness to immune checkpoint modulator therapy. For example, among other things, the present disclosure demonstrates that a high mutational load can correlate with such responsiveness. The present disclosure also particularly demonstrates that presence (e.g., number and/or rate) and/or identity of somatic neoepitopes (e.g., which may result from tumor mutations) can contribute to, and therefore may correlate with, such responsiveness. Among other things, the present disclosure defines certain mutation and/or neoepitope characteristics of relevant tumors that correlate with and/or can be used to predict responsiveness to immune checkpoint modulator therapy. The present disclosure also provides technologies for defining and/or detecting certain mutation "signatures" useful in predicting and/or characterizing such responsiveness.

[100] Furthermore, the overall number and/or rate of mutation and/or of neoepitopes in cancer cells can be predictive of clinical response to immunotherapy, and particularly to immune checkpoint modulator therapy. Thus, in accordance with the present invention, those individuals whose tumors show high mutation burden and/or high neoepitope burden are predisposed to benefit from immunotherapy as described herein compared to those individuals with reltaively lower such burdens.

[101] Without wishing to be bound by any particular theory, we note that the present disclosure demonstrates, among other things, that neoepitopes in cancer cells can be associated with increased binding affinity to MHC class I molecules and/or with improved recognition by cytotoxic T cells. In some embodiments, neoepitopes useful in predicting responsiveness to therapy as described herein (e.g., useful for inclusion in a "signature" that can be detected or analyzed in assessing likelihood of response) are those that in fact show increased binding

affinity to MHC class I molecules and/or improved recognition by cytotoxic T cells, for example relative to a parent protein that is otherwise identical but lacks the neoepitope.

[102] In general, the present disclosure relates to characterizing tumor responsiveness to immunotherapy, and particularly to immune checkpoint modulator therapy. In some embodiments, such therapy involves blockade of programmed cell death 1 (PD-1). In some particular embodiments, such therapy involves treatement with an agent that interferes with an interaction involving PD-1 (e.g., with PD-L1). In some embodiments, such therapy involves administration of an antibody agent that specifically interacts with PD-1 or with PD-L1. In some embodiments, such therapy involves administration of one or more of nivolumab (BMS-936558, MDX-1106, ONO-4538, a fully human Immunoglobulin G4 (IgG4) monoclonal PD-1 antibody), pembrolizumab (MK-3475, a humanized monoclonal IgG4 anti-PD-1 antibody), BMS-936559 (a fully human IgG4 PD-L1 antibody), MPDL3280A (a humanized engineered IgG1 monoclonal PD-L1 antibody) and/or MEDI4736 (a humanized engineered IgG1 monoclonal PD-L1 antibody).

[103] The present invention provides, among other things, technologies for defining, characterizing, and/or detecting burden (e.g., number, level, and/or rate) of somatic mutations and/or neoepitopes present in cancer cells and/or for defining, characterizing, and/or detecting particular mutation and/or neoepitope "signatures" that predict responsiveness to immunotherapy, and particularly to immune checkpoint modulator therapy. In some emodiments, the present invention provides methods and/or reagents for identifying cancer patients that are likely to respond favorably to treatment with immunotherapy (e.g., with an immune checkpoint modulator) and/or for selecting patients to receive such immunotherapy. Alternatively or additionally, the present invention provides methods and/or reagents for treating patients with an immune checkpoint modulator that have been identified to have cancer harboring a particular mutation burden, neoepitope burden, and/or mutation or neoepitope signature as described herein.

[104] The present invention defines and provides tools and kits for detecting or determining whether a particular cancer patient does or does not have the relevant mutational landscape or signature for responding to immunotherapy (e.g., PD-1 blockade). The present

invention demonstrates that certain particular mutational landscapes or signatures are more useful and effective in predicting responsiveness.

[105] The present disclosure demonstrates that high mutational loads can predict responsiveness of cancers to immunotherapy. Furthermore, the disclosure also teaches that high neoepitope loads can predict responsiveness of cancers to immunotherapy. Moreover, the present disclosure demonstrates that particular mutational and/or neoepitope signatures can predict responsiveness of cancers to immunotherapy. Specifically, the present disclosure establishes that signatures including information from DNA repair genes and/or signal transduction genes can predict responsiveness of cancers to immunotherapy. The present disclosure further establishes that signatures that, alternatively or additionally, include characteristics of the established molecular smoking signature, can predict responsiveness of cancers to immunotherapy.

Cancer Cell Mutability

[106] Acquired (or somatic) mutations can occur in the DNA of cells at some time during an individual's life. These changes can be caused by environmental factors such as ultraviolet radiation from the sun, carcinogens in chemicals or cigarette smoke, or can occur if a mistake is made during DNA replication. Cancer cells from cancers such as lung cancer or melanoma, which are often the result of chronic exposure to environmental factor or mutagens, often possess multiple mutations of varying types.

[107] Within tumor types there is a large variability in mutation loads, ranging from tens to thousands of mutations with a cancer cell. In analyzing the tumors of non small cell lung carcinoma (NSCLC) patients, smokers have a much greater mutation burden compared to never-smokers. The present disclosure shows, that in those cancers that are responsive to immunotherapy (e.g., PD-1 blockade), higher mutation loads correlated with better response to immune checkpoint regulators. In some embodiments, highly mutable cancers are more susceptible to attack from the immune system.

[108] Mutations of certain genes correlate with higher (hyper) levels of mutations in cancer cells. The present disclosure demonstrates that mutations in genes associated with DNA repair correlated with cancer cells possessing higher numbers of mutations.

Mutational Load and Susceptibility to Immune System

[109] Among other things, the present disclosure demonstrates a that high mutation load can predict clinical efficacy of immunotherapy treatment for certain cancers. The present disclosure establishes that, in certain cases, individuals with higher somatic mutation loads are more likely to respond positively to immunotherapy than individuals with significantly lower mutation burdens. The present disclosure demonstrates that, for certain cancers, patients with high numbers of mutations are more likely to benefit from treatment with immune checkpoint modulators than those patients with lower mutation loads. In some embodiments, patients with higher numbers of somatic mutations respond better to PD-1 (programmed cell death 1) blockade than those patients with significantly lower overall mutations. In some embodiments, individuals with high numbers of mutations respond better to treatment with anti-PD-1 antibodies than those individuals with low numbers of mutations. In some embodiments, the overall number of mutations has a greater correlation with positive response to immunotherapy than the specific mutational signatures.

[110] In some embodiments, the type of somatic mutation correlates with response to treatment. For example, the present disclosure teaches that individuals with a lower transition to transversion ratio (Ti/Tv) also experienced greater likelihood of positive response to immunotherapy.

Defined Signatures

[111] The present disclosure encompasses the insight that meaningful limits can be imposed on mutational analysis of cancer cells and, moreover, that use of such limits surprisingly defines and/or provides signature formats that effectively predict responsiveness to treatment. In

some embodiments, the \ mutation signatures as described herein correlate with and/or predict response to immunotherapy (e.g., PD-1 blockade). In some embodiments, the genes that are mutated (for example, DNA repair) as well as the exact type of mutation (for example, transversions rather than transitions) correlate with and/or are predictive of positive response to immunotherapy. Moreover, the present disclosure demonstrates that such signatures can be detected and effectively utilized to predict tumor responsiveness.

[112] In some embodiments, as described herein, the present disclosure provides technologies for defining mutation signatures that predict responsiveness to immunotherapy, and particularly to immune checkpoint modulator therapy. In some embodiments, the present disclosure defines one or more characteristics or attributes of useful signatures. In some embodiments, the present disclosure describes and/or establishes effective use of such signatures in predicting therapeutic responsiveness.

Use of Signatures

[113] The present disclosure demonstrates that mutational landscape of particular tumors can predict the likelihood of clinical benefit from immunotherapy (e.g., PD-1 blockade). The disclosure also teaches that high mutation load can predict likelihood of positive response to immunotherapy. Furthermore, the nature of the somatic mutations present can predict response to immunotherapy. As demonstrated herein, in some embodiments, individuals with neoepitope signatures consistent with mutations of genes associated with DNA repair and signaling (e.g., KRAS signaling) also correlated with a positive outcome for immune checkpoint modulation.

[114] The present dislcosure particularly demonstrates, surprisingly, that the established "smoking signature" can be effectively utilized to predict responsiveness of certain tumors to immunotherapy, and particularly to immune checkpoint modulator therapy (e.g., PD-1 blockade). In some embodiments, individuals possessing (or whose tumor(s) possess) one or more features of the molecular smoking signature and suffering from a smoking-related cancer are more likely to repond to immunotherapy than are non-smoking individuals and/or individuals that do not posess (or whose tumor(s) do not possess) the one or more features..

Cancer Types

[115] The present disclosure demonstrates that in those cancers that respond to immunotherapy (e.g., immune checkpoint blockade), the tumor mutational landscape of the patient can predict with clinical efficacy. In some embodiments, cancer types to which the present disclosure applied include one or more of lung cancer (e.g., small cell or non-small-cell carcinoma ["NSCLC"), bladder cancer, renal carcinoma, head and neck cancers, and melanoma respond to immunotherapy. In some embodiments, lung cancer reponds to PD-1 blockade. In some embodiments, expression of PD-L1 is an indicator of positive response to therapy.

[116] In some embodiments, smoking related cancers are more likely to respond to immunotherapy treatment. The present disclosure demonstrates that those individuals possessing (or whose tumor(s) possess) one or more features or characteristics of the established molecular smoking signature are more likely to respond to immunotherapy treatment. In particular, among other things, the present disclosure establishes that, for those individuals suffering from NSCLC, those with the smoking signature experienced greater clinical benefit from treatment with PD-1 blockade than their non-smoker counterparts.

[117] In some embodiments, a cancer cell comprising a neoepitope is selected from a carcinoma, sarcoma, melanoma, myeloma, leukemia, or lymphoma. In some embodiments, a cancer cell comprising a neoepitope is a melanoma. In some embodiments, a cancer cell comprising a neoepitope is a non-small-cell lung carcinoma.

Relevant Therapeutic Modalities

[118] Teachings of the present disclosure predict responsiveness to immunomodulatory therapeutic modalities or regimens, and particularly to therapeutic modalities or regimens targeting immune checkpoint regulators. The present disclosure demonstrates the mutational landscape of tumors correlates with responsiveness to immune checkpoint regulators. In some embodiments, high somatic mutation load correlates with an increased likelihood of clinical

efficacy from immune checkpoint regultors for those cancers responsive to immunotherapy (e.g., PD-1 blockade). In some embodiments, such therapy involves blockade of programmed cell death 1 (PD-1). In some particular embodiments, such therapy involves treatement with an agent that interferes with an interaction involving PD-1 (e.g., with PD-L1). In some embodiments, such therapy involves administration of an antibody agent that specifically interacts with PD-1 or with PD-L1. In some embodiments, such therapy involves administration of one or more of nivolumab (BMS-936558, MDX-1106, ONO-4538, a fully human Immunoglobulin G4 (IgG4) monoclonal PD-1 antibody), pembrolizumab (MK-3475, a humanized monoclonal IgG4 anti-PD-1 antibody), BMS-936559 (a fully human IgG4 PD-L1 antibody), MPDL3280A (a humanized engineered IgG1 monoclonal PD-L1 antibody) and/or MEDI4736 (a humanized engineered IgG1 monoclonal PD-L1 antibody).

Somatic Mutations

[119] Somatic mutations comprise DNA alterations in non-germline cells and commonly occur in cancer cells. It has been discovered herein that certain somatic mutations in cancer cells result in the expression of neoepitopes, that in some embodiments transition a stretch of amino acids from being recognized as "self" to "non-self". According to the present invention, a cancer cell harboring a "non-self" antigen is likely to elicit an immune response against the cancer cell. Immune responses against cancer cells can be enhanced by an immune checkpoint modulator. The present invention teaches that cancers expressing neoepitopes may be more responsive to therapy with immune checkpoint modulator. Among other things, the present invention provides strategies for improving cancer therapy by permitting identification and/or selection of particular patients to receive (or avoid) therapy. The present invention also provides technologies for defining neoeptiopes, or sets thereof, whose presence is indicative of a particular clinical outcome of interest (e.g., responsiveness to therapy, for example with a particular immune checkpoint modulator and/or risk of developing a particular undesirable side effect of therapy). The present invention defines and/or permits definition of one or more neoepitope "signatures" associated with beneficial (or undesirable) response to immune checkpoint modulator therapy.

[120] In some embodiments, a somatic mutation results in a neoantigen or neoepitope. Among other things, the present disclosure demonstrates the existence of neoepitopes, arising from somatic mutation, whose presence is associated with a particular response to immune checkpoint modulator therapy. In some embodiments, high numbers of neoepitopes are associated with a positive response to immunotherapy. In some embodiments, a neoepitope is or comprises a tetrapeptide, for example that contributes to increased binding affinity to MHC Class I molecules and/or recognition by cells of the immune system (i.e. T cells) as "non-self". In some embodiments, a neoepitope shares a consensus sequence with an antigen from an infectious agent.

[121] In some embodiments, a neoepitope signature of interest in accordance with the present invention is or comprises a neoepitope or set thereof whose presence in a tumor sample correlates with a particular clinical outcome. In some embodiments, neoepitopes of genes associated with DNA repair correlate with a positive response to immune checkpoint modulation. In some embodiments, neoepitopes of genes associated with signal transduction correlate with a positive response to immune checkpoint therapy. In some embodiments, the present disclosure provides technologies for defining and/or detecting neoepitopes, and particulary those relevant to immune checkpoint modulator therapy.

[122] Among other things, the present disclosure demonstrates definition of neoepitopes and neoepitope signatures associated with a particular response or response feature (e.g., responsiveness to therapy or risk of side effect) of immune checkpoint modulator therapy. In the particular Examples presented herein, such definition is achieved by comparing genetic sequence information from a first plurality of tumor samples, which first plurality contains samples that share a common response feature to immune checkpoint modulator therapy, with that obtained from a second plurality of tumor samples, which second plurality contains samples that do not share the common response feature but are otherwise comparable to those of the first set, so that the comparison defines genetic sequence elements whose presence is associated or correlates with the common response feature. The present disclosure specifically demonstrates that increased mutational burden can correlate with a response feature (e.g., with responsiveness to therapy), but also demonstrates that such increased mutational burden alone may not be

sufficient to predict the response feature. The present disclosure demonstrates that, when such somatic mutation generates neoepitopes, a useful neoeptiope signature associated with the response feature can be defined. The present disclosure provides specific technologies for defining and utilizing such signatures.

Immune Checkpoint Modulation

[123] Immune checkpoints refer to inhibitory pathways of the immune system that are responsible for maintaining self-tolerance and modulating the duration and amplitude of physiological immune responses.

[124] Certain cancer cells thrive by taking advantage of immune checkpoint pathways as a major mechanism of immune resistance, particularly with respect to T cells that are specific for tumor antigens. For example, certain cancer cells may overexpress one or more immune checkpoint proteins responsible for inhibiting a cytotoxic T cell response. Thus, immune checkpoint modulators may be administered to overcome the inhibitory signals and permit and/or augment an immune attack against cancer cells. Immune checkpoint modulators may facilitate immune cell responses against cancer cells by decreasing, inhibiting, or abrogating signaling by negative immune response regulators (e.g. CTLA4), or may stimulate or enhance signaling of positive regulators of immune response (e.g. CD28).

[125] Immunotherapy agents targeted to immune checkpoint modulators may be administered to encourage immune attack targeting cancer cells. Immunotherapy agents may be or include antibody agents that target (e.g., are specific specific for) immune checkpoint modulators. Examples of immunotherapy agents include antibody agents targeting one or more of CTLA-4, PD-1, PD-L1, GITR, OX40, LAG-3, KIR, TIM-3, CD28, CD40, ; and CD137.

[126] Specific examples of antibody agents may include monoclonal antibodies. Certain monoclonal antibodies targeting immune checkpoint modulators are available. For instance, ipilumimab targets CTLA-4; tremelimumab targets CTLA-4; pembrolizumab targets PD-1, etc..

Detection of Mutations and/or Neoepitopes

[127] Cancers may be screened to detect mutations and/or neoepitopes (e.g., to detect mutation load/burden and/or neoepitope load/burden, and/or to detect a particular signature) as described herein using any of a variety of known technologies. In some embodiments, particular mutations or neoepitopes, or expression thereof, is/are detected at the nucleic acid level (e.g., in DNA or RNA). In some embodiments, such mutations or neopeitopes, or expression thereof, is detected at the protein level (e.g., in a sample comprising polypeptides from cancer cells, which sample may be or comprise polypeptide complexes or other higher order structures including but not limited to cells, tissues, or organs).

[128] In some particular embodiments, detection involves nucleic acid sequencing. In some embodiments, detection involves whole exome sequencing. In some embodiments, detection involves immunoassay. In some embodiments, detection involves use of amicroarray. In some embodiments, detection involves massively parallel exome sequencing sequencing. In some embodiments, mutations and/or neoepitopes may be detected by genome sequencing. In some embodiments, detection involves RNA sequencing. In some embodiments, detection involves standard DNA or RNA sequencing. In some embodiments, detection involves mass spectrometry.

[129] In some embodiments, detection involves next generation sequencing (DNA and/or RNA). In some embodiments, detection involves genome sequencing, genome resequencing, targeted sequencing panels, transcriptome profiling (RNA-Seq), DNA-protein interactions (ChIP-sequencing), and/or epigenome characterization. In some embodiments, re-sequencing of a patient's genome may be utilized, for example to detect genomic variations.

[130] In some embodiments, detection involves using a technique such as ELISA, Western Tranfer, immunoassay, mass spectrometry, microarray analysis, etc.

[131] Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. Although methods and materials similar or equivalent to those described herein can be

used in the practice or testing of the present invention, suitable methods and materials are described herein.

Methods of Treatment

[132] In some embodiments, the invention provides methods for identifying cancer patients that are likely to respond favorably to treatment with an immune checkpoint modulator. In some embodiments, the invention provides methods for identifying a cancer patient that is likely to respond favorably to treatment with an immune checkpoint modulator and treating the patient with an immune checkpoint modulator. In some embodiments, the invention provides methods of treating a cancer patient with an immune checkpoint modulator who has previously been identified as likely to respond favorably to treatment with an immune checkpoint modulator. In some embodiments, the invention provides methods for identifying a cancer patient that is not likely to respond favorably to treatment with an immune checkpoint modulator and not treating the patient with an immune checkpoint modulator. In some embodiments, the invention provides methods for identifying a cancer patient who is likely to suffer one or more autoimmune complications if administered an immune checkpoint modulator. In some embodiments, the invention provides methods for treating a cancer patient with an immunosuppressant who has previously identified as likely to suffer one or more autoimmune complications if treated with an immune checkpoint modulator. In some embodiments, the immunosuppressant is administered to the patient prior to or concomitantly with an immune checkpoint modulator.

Administration of immune checkpoint modulators

[133] In accordance with certain methods of the invention, an immune checkpoint modulator is or has been administered to an individual. In some embodiments, treatment with an immune checkpoint modulator is utilized as a sole therapy. In some embodiments, treatement with an immune checkpoint modulator is used in combination with one or more other therapies.

[134] Those of ordinary skill in the art will appreciate that appropriate formulations, indications, and dosing regimens are typically analyzed and approved by government regulatory authorities such as the Food and Drug Administration in the United States. For example, Example 5 presents certain approved dosing information for ipilumimab, an anti-CTL-4 antibody. In many embodiments, an immune checkpoint modulator is administered in accordance with the present invention according to such an approved protocol. However, the present disclosure provides certain technologies for identifying, characterizing, and/or selecting particular patients to whom immune checkpoint modulators may desirably be administered. In some embodiments, insights provided by the present disclosure permit dosing of a given immune checkpoint modulator with greater frequency and/or greater individual doses (e.g., due to reduced susceptibiloity to and/or incidence or intensity of undesirable effects) relative to that recommended or approved based on population studies that include both individuals identified as described herein (e.g., expressing neoepitopes) and other individuals. In some embodiments, insights provided by the present disclosure permit dosing of a given immune checkpoint modulator with reduced frequency and/or reduced individual doses (e.g., due to increased responsiveness) relative to that recommended or approved based on population studies that include both individuals identified as described herein (e.g., expressing neoepitopes) and other individuals.

[135] In some embodiments, an immune system modulator is administered in a pharmaceutical composition that also comprises a physiologically acceptable carrier or excipient. In some embodiments, a pharmaceutical composition is sterile. In many embodiments, a pharmaceutical composition is formulated for a particular mode of administration.

[136] Suitable pharmaceutically acceptable carriers include but are not limited to water, salt solutions (e.g., NaCl), saline, buffered saline, alcohols, glycerol, ethanol, gum arabic, vegetable oils, benzyl alcohols, polyethylene glycols, gelatin, carbohydrates such as lactose, amylose or starch, sugars such as mannitol, sucrose, or others, dextrose, magnesium stearate, talc, silicic acid, viscous paraffin, perfume oil, fatty acid esters, hydroxymethylcellulose, polyvinyl pyrrolidone, etc., as well as combinations thereof. A pharmaceutical preparation can, if desired, comprise one or more auxiliary agents (e.g., lubricants, preservatives, stabilizers,

wetting agents, emulsifiers, salts for influencing osmotic pressure, buffers, coloring, flavoring and/or aromatic substances and the like) which do not deleteriously react with the active compounds or interference with their activity. In some embodiments, a water-soluble carrier suitable for intravenous administration is used.

[137] In some embodiments, a pharmaceutical composition or medicament, if desired, can contain an amount (typically a minor amount) of wetting or emulsifying agents, and/or of pH buffering agents. In some embodiments, a pharmaceutical composition can be a liquid solution, suspension, emulsion, tablet, pill, capsule, sustained release formulation, or powder. In some embodiments, a pharmaceutical composition canbe formulated as a suppository, with traditional binders and carriers such as triglycerides. Oral formulation can include standard carriers such as pharmaceutical grades of mannitol, lactose, starch, magnesium stearate, polyvinyl pyrrolidone, sodium saccharine, cellulose, magnesium carbonate, etc.

[138] In some embodiments, a pharmaceutical composition can be formulated in accordance with the routine procedures as a pharmaceutical composition adapted for administration to human beings. For example, in some embodiments, a composition for intravenous administration typically is a solution in sterile isotonic aqueous buffer. Where necessary, acomposition may also include a solubilizing agent and a local anesthetic to ease pain at the site of the injection. Generally, ingredients are supplied either separately or mixed together in unit dosage form, for example, as a dry lyophilized powder or water free concentrate in a hermetically sealed container such as an ampule or sachet indicating the quantity of active agent. Where a composition is to be administered by infusion, it can be dispensed with an infusion bottle containing sterile pharmaceutical grade water, saline or dextrose/water. Where a composition is administered by injection, an ampule of sterile water for injection or saline can be provided so that the ingredients may be mixed prior to administration.

[139] In some embodiments, an immune checkpoint modulator can be formulated in a neutral form; in some embodiments it may be formulated in a salt form. Pharmaceutically acceptable salts include those formed with free amino groups such as those derived from hydrochloric, phosphoric, acetic, oxalic, tartaric acids, etc., and those formed with free carboxyl

groups such as those derived from sodium, potassium, ammonium, calcium, ferric hydroxides, isopropylamine, triethylamine, 2-ethylamino ethanol, histidine, procaine, etc.

[140] Pharmaceutical compositions for use in accordance with the present invention may be administered by any appropriate route. In some embodiments, a pharmaceutical compostion is administered intravenously. In some embodiments, a pharmaceutical composition is administered subcutaneously. In some embodiments, a pharmaceutical composition is administered by direct administration to a target tissue, such as heart or muscle (e.g., intramuscular), or nervous system (e.g., direct injection into the brain; intraventricularly; intrathecally). Alternatively or additionally, in some embodiments, a pharmaceutical composition is administered parenterally, transdermally, or transmucosally (e.g., orally or nasally). More than one route can be used concurrently, if desired.

[141] Immune checkpoint modulators (or a composition or medicament containing an immune checkpoint modulator, can be administered alone, or in conjunction with other immune checkpoint modulators. The term, "in conjunction with," indicates that a first immune checkpoint modulator is administered prior to, at about the same time as, or following another immune checkpoint modulator. For example, a first immune checkpoint modulator can be mixed into a composition containing one or more different immune checkpoint modulators, and thereby administered contemporaneously; alternatively, the agent can be administered contemporaneously, without mixing (e.g., by "piggybacking" delivery of the agent on the intravenous line by which the immune checkpoint modulator is also administered, or vice versa). In another example, the immune checkpoint modulator can be administered separately (e.g., not admixed), but within a short time frame (e.g., within 24 hours) of administration of the immune checkpoint modulator.

[142] In some embodiments, subjects treated with immune checkpoint modulators are administered one or more immunosuppressants. In some embodiments, one or more immunosuppressants are administered to decrease, inhibit, or prevent an undesired autoimmune response (e.g., enterocolitis, hepatitis, dermatitis (including toxic epidermal necrolysis), neuropathy, and/or endocrinopathy), for example, hypothyroidism. Exemplary immunosuppressants include steroids, antibodies, immunoglobulin fusion proteins, and the like.

In some embodiments, an immunosuppressant inhibits B cell activity (e.g. rituximab). In some embodiments, an immunosuppressant is a decoy polypeptide antigen.

[143] In some embodiments, immune checkpoint modulators (or a composition or medicament containing immune checkpoint modulators) are administered in a therapeutically effective amount (e.g., a dosage amount and/or according to a dosage regimen that has been shown, when administered to a relevant population, to be sufficient to treat cancer, such as by ameliorating symptoms associated with the cancer, preventing or delaying the onset of the cancer, and/or also lessening the severity or frequency of symptoms of cancer). In some embodiments, long term clinical benefit is observed after treatment with immune checkpoint modulators, including, for example, PD-1 blockers such as pembrolizumab, and/or other agents. Those of ordinary skill in the art will appreciate that a dose which will be therapeutically effective for the treatment of cancer in a given patient may depend, at least to some extent, on the nature and extent of cancer, and can be determined by standard clinical techniques. In some embodiments, one or more in vitro or in vivo assays may optionally be employed to help identify optimal dosage ranges. In some embodmients, a particular dose to be employed in the treatment of a given individual may depend on the route of administration, the extent of cancer, and/or one or more other factors deemed relevant in the judgment of a practitioner in light of patient's circumstances. In some embodiments, effective doses may be extrapolated from dose-response curves derived from in vitro or animal model test systems (e.g., as described by the U.S. Department of Health and Human Services, Food and Drug Administration, and Center for Drug Evaluation and Research in "Guidance for Industry: Estimating Maximum Safe Starting Dose in Initial Clinical Trials for Therapeutics in Adult Healthy Volunteers", Pharmacology and Toxicology, July 2005.

[144] In some embodiments, a therapeutically effective amount of an immune check point modulator can be, for example, more than about 0.01 mg/kg, more than about 0.05 mg/kg, more than about 0.1 mg/kg, more than about 0.5 mg/kg, more than about 1.0 mg/kg, more than about 1.5 mg/kg, more than about 2.0 mg/kg, more than about 2.5 mg/kg, more than about 5.0 mg/kg, more than about 7.5 mg/kg, more than about 10 mg/kg, more than about 12.5 mg/kg, more than about 15 mg/kg, more than about 17.5 mg/kg, more than about 20 mg/kg, more than

about 22.5 mg/kg, or more than about 25 mg/kg body weight. In some embodiments, a therapeutically effective amount can be about 0.01-25 mg/kg, about 0.01-20 mg/kg, about 0.01-15 mg/kg, about 0.01-10 mg/kg, about 0.01-7.5 mg/kg, about 0.01-5 mg/kg, about 0.01-4 mg/kg, about 0.01-3 mg/kg, about 0.01-2 mg/kg, about 0.01-1.5 mg/kg, about 0.01-1.0 mg/kg, about 0.01-0.5 mg/kg, about 0.01-0.1 mg/kg, about 1-20 mg/kg, about 4-20 mg/kg, about 5-15 mg/kg, about 5-10 mg/kg body weight. In some embodiments, a therapeutically effective amount is about 0.01 mg/kg, about 0.05 mg/kg, about 0.1 mg/kg, about 0.2 mg/kg, about 0.3 mg/kg, about 0.4 mg/kg, about 0.5 mg/kg, about 0.6 mg/kg, about 0.7 mg/kg, about 0.8 mg/kg, about 0.9 mg/kg, about 1.0 mg/kg, about 1.1 mg/kg, about 1.2 mg/kg, about 1.3 mg/kg about 1.4 mg/kg, about 1.5 mg/kg, about 1.6 mg/kg, about 1.7 mg/kg, about 1.8 mg/kg, about 1.9 mg/kg, about 2.0 mg/kg, about 2.5 mg/kg, about 3.0 mg/kg, about 4.0 mg/kg, about 5.0 mg/kg, about 6.0 mg/kg, about 7.0 mg/kg, about 8.0 mg/kg, about 9.0 mg/kg, about 10.0 mg/kg, about 11.0 mg/kg, about 12.0 mg/kg, about 13.0 mg/kg, about 14.0 mg/kg, about 15.0 mg/kg, about 16.0 mg/kg, about 17.0 mg/kg, about 18.0 mg/kg, about 19.0 mg/kg, about 20.0 mg/kg, body weight, or more. In some embodiments, the therapeutically effective amount is no greater than about 30 mg/kg, no greater than about 20 mg/kg, no greater than about 15 mg/kg, no greater than about 10 mg/kg, no greater than about 7.5 mg/kg, no greater than about 5 mg/kg, no greater than about 4 mg/kg, no greater than about 3 mg/kg, no greater than about 2 mg/kg, or no greater than about 1 mg/kg body weight or less.

[145] In some embodiments, the administered dose for a particular individual is varied (e.g., increased or decreased) over time, depending on the needs of the individual.

[146] In yet another example, a loading dose (e.g., an initial higher dose) of a therapeutic composition may be given at the beginning of a course of treatment, followed by administration of a decreased maintenance dose (e.g., a subsequent lower dose) of the therapeutic composition.

[147] Without wishing to be bound by any theories, it is contemplated that a loading dose may clear out an initial and, in some cases massive, accumulation of undesirable materials (e.g., fatty materials and/or tumor cells, etc) in tissues (e.g., in the liver), and maintenance dosing may delay, reduce, or prevent buildup of fatty materials after initial clearance.

[148] It will be appreciated that a loading dose and maintenance dose amounts, intervals, and duration of treatment may be determined by any available method, such as those exemplified herein and those known in the art. In some embodiments, a loading dose amount is about 0.01-1 mg/kg, about 0.01-5 mg/kg, about 0.01-10 mg/kg, about 0.1-10 mg/kg, about 0.1-20 mg/kg, about 0.1-25 mg/kg, about 0.1-30 mg/kg, about 0.1-5 mg/kg, about 0.1-2 mg/kg, about 0.1-1 mg/kg, or about 0.1-0.5 mg/kg body weight. In some embodiments, a maintenance dose amount is about 0-10 mg/kg, about 0-5 mg/kg, about 0-2 mg/kg, about 0-1 mg/kg, about 0-0.5 mg/kg, about 0-0.4 mg/kg, about 0-0.3 mg/kg, about 0-0.2 mg/kg, about 0-0.1 mg/kg body weight. In some embodiments, a loading dose is administered to an individual at regular intervals for a given period of time (e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 or more months) and/or a given number of doses (e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30 or more doses), followed by maintenance dosing. In some embodiments, a maintenance dose ranges from 0 – 2 mg/kg, about 0-1.5 mg/kg, about 0-1.0 mg/kg, about 0-0.75 mg/kg, about 0-0.5 mg/kg, about 0-0.4 mg/kg, about 0-0.3 mg/kg, about 0-0.2 mg/kg, or about 0-0.1 mg/kg body weight. In some embodiments, a maintenance dose is about 0.01, 0.02, 0.04, 0.06, 0.08, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.2, 1.4, 1.6, 1.8, or 2.0 mg/kg body weight. In some embodiments, maintenance dosing is administered for 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 or more months. In some embodiments, maintenance dosing is administered for 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 or more years. In some embodiments, maintenance dosing is administered indefinitely (e.g., for life time).

[149] A therapeutically effective amount of an immune checkpoint modulator may be administered as a one-time dose or administered at intervals, depending on the nature and extent of the cancer, and on an ongoing basis. Administration at an "interval," as used herein indicates that the therapeutically effective amount is administered periodically (as distinguished from a one-time dose). The interval can be determined by standard clinical techniques. In some embodiments, an immune checkpoint modulator is administered bimonthly, monthly, twice monthly, triweekly, biweekly, weekly, twice weekly, thrice weekly, or daily. The administration interval for a single individual need not be a fixed interval, but can be varied over time, depending on the needs and rate of recovery of the individual.

[150] As used herein, the term "bimonthly" means administration once per two months (i.e., once every two months); the term "monthly" means administration once per month; the term "triweekly" means administration once per three weeks (i.e., once every three weeks); the term "biweekly" means administration once per two weeks (i.e., once every two weeks); the term "weekly" means administration once per week; and the term "daily" means administration once per day.

[151] The invention additionally pertains to a pharmaceutical composition comprising an immune checkpoint modulator, as described herein, in a container (e.g., a vial, bottle, bag for intravenous administration, syringe, etc.) with a label containing instructions for administration of the composition for treatment of cancer.

EXAMPLES

[152] The following examples are provided so as to describe to those of ordinary skill in the art how to make and use methods and compositions of the invention, and are not intended to limit the scope of what the inventors regard as their invention.

Overview

[153] Today, more than a century since the initial observation that the immune system can reject human cancers (1), immune checkpoint inhibitors are demonstrating that adaptive immunity can be harnessed for the treatment of cancer (2-5, 60, 61). In advanced non-small cell lung cancer (NSCLC), anti-PD-1 therapies have demonstrated response rates of 17-21%, with some responses being remarkably durable (3, 6).

[154] Understanding the molecular determinants of response to immunotherapies such as anti-PD-1 therapy is one of the critical challenges in oncology. Among the best responses to date have been seen in both melanomas and NSCLC, cancers largely caused by chronic exposure to mutagens (ultraviolet light (7) and carcinogens in cigarette smoke in lung cancers (8), respectively). However, within tumor types, there is a large variability in mutation burden,

ranging from 10s-1000s (9-11). This range is particularly broad in patients with NSCLCs as tumors in never-smokers generally have few somatic mutations compared to tumors in smokers (12). We hypothesized that the mutational landscape of NSCLCs may influence how patients respond to anti-PD-1 therapy. To determine how the genomic features of NSCLCs may impact benefit from anti-PD-1 therapy, we sequenced the exomes of NSCLCs from two independent cohorts of patients treated with pembrolizumab, a humanized IgG4-kappa isotype anti-PD-1 antibody (n=16 and n=18, respectively; total n=34) and their matched normal DNA (Figure 15).

[155] Those skilled in the art, reading the present disclosure will appreciate that particular examples included herein are representative and not limiting. For example, those skilled in the art, reviewing the data for ipilimumab response in melanoma, as provided in detail below, represent proof of concept and establish that neoepitope mutation signatures can be predictive of response to immune checkpoint modulators. Those of ordinary skill in the art, reading the present disclosure, will appreciate and understand that the approach is broadly applicable across cancers and immune checkpoint modulator therapies.

Example 1. Mutational landscape of tumors from patients with diverse clinical outcomes to pembrolizumab

[156] This example illustrates analysis of the mutational landscape of cancer, and demonstrates its effectiveness in defining useful hallmarks of patients that respond favorably or poorly to an immune checkpoint modulator. The example particularly exemplifies analysis of lung cancer patients treated with PD-1 blockade (e.g. pembrolizumab), and defines exemplary mutational characteristics in such patients.

[157] Overall, tumor DNA sequencing generated mean target coverage of 164x and a mean of 94.5% of the target sequence was covered to a depth of at least 10x; coverage and depth were similar between both cohorts as well as between those with or without durable clinical benefit (Fig. 5). We identified a median of 200 (range 11-1192) nonsynonymous mutations per sample (Fig. 6). The median number of total exonic mutations per sample was 327 (range 45-1732). The overall quantity and range of nonsynonymous and exonic mutation burden were

similar to published series of NSCLCs (13, 14) (Fig. 7A & 7B). The transition/transversion ratio (Ti/Tv) was 0.74 (Fig. 8), also similar to previously described NSCLCs (13-15). To ensure accuracy of our sequencing data, targeted resequencing with an orthogonal method (Ampliseq) was performed using 376 randomly selected variants and mutations were confirmed in 357 (95%).

[158] We observed that higher somatic nonsynonymous mutation burden predicted clinical efficacy of anti-PD1 therapy. In the discovery cohort (n=16), the median number of nonsynonymous mutations was 302 in patients with durable clinical benefit (DCB: partial or stable response lasting >6 months) versus 148 with no durable benefit (NDB) (p=0.02) (Fig. 1A). Seventy-three percent of patients with high nonsynonymous burden (defined as above the median burden of the cohort) experienced DCB compared to 13% of those with low mutation burden (p=0.04). Both confirmed objective response rate (ORR) and progression-free survival (PFS) were higher in patients with high nonsynonymous burden (ORR 63% vs. 0%, p=0.03; median PFS 14.5 vs. 3.7 months, p=0.02; HR 0.19, 95% CI 0.05-0.70) (Fig. 1B; Figure 16).

[159] The validation cohort included an independent set of 18 NSCLC samples from patients treated with pembrolizumab; three patients currently on therapy have not yet reached six months of follow up and are therefore not included in calculations of DCB. The clinical characteristics of the validation cohort were similar to the discovery cohort, although there were more never-smokers in the validation cohort (5/18 vs 1/16). The median nonsynonymous mutation burden was 244 in tumors from patients with DCB compared 125 in the NDB group (p=0.04) (Fig. 1C). The rate of DCB and PFS were again both significantly greater in tumors with a nonsynonymous mutation burden above the median (DCB 83% vs 22%, p=0.04; median PFS not reached vs. 3.4 months, log rank p=0.006; HR 0.15, 95% CI 0.04-0.59) (Fig. 1D; Figure 16).

[160] In the discovery cohort, there was high concordance between nonsynonymous mutation burden and DCB, with an area under the receiver operator characteristic curve (AUC) of 87% (Fig. 1E). Patients with nonsynonymous mutation burden ≥178, the cut point that combined maximal sensitivity with best specificity, had a likelihood ratio for DCB of 3.0; the sensitivity and specificity of DCB using this cut point was 100% (95% CI 59-100) and 67% (29-

93), respectively. Applying this cut point to patients within the validation cohort, the rate of durable benefit in patients with tumors harboring ≥178 mutations was 75% compared to 14% in those with <178. This corresponded to a sensitivity of 86% and specificity of 75%.

[161] There were few but important exceptions. 5 of 18 tumors with ≥178 nonsynonymous mutations had NDB and one tumor with a very low burden (56 nonsynonymous mutations) had a partial response to pembrolizumab. However, this response was transient, lasting only 8 months. Across both cohorts, this is the only patient with a tumor mutation burden <178 with a confirmed objective response. Notably, although higher nonsynonymous mutation burden was predictive of ORR, DCB, and PFS (Figs. 1F, 1G), this correlation was less evident when examining total exonic mutation burden (Figure 16).

Example 2. Somatic mutation signatures associated with treatment efficacy

[162] This example demonstrates that certain somatic mutation signatures are associated with efficacy of treatment with an immune checkpoint modulator.

[163] We examined all 34 exomes collectively to determine how patterns of mutational changes associated with response to pembrolizumab. C>A transversions were more frequent and C>T transitions were less frequent in patients with DCB compared to NDB (p=0.01 for both, Fig. 9). A previously validated binary classifier to identify the molecular signature of smoking (14) was applied to differentiate transversion-high (TH, smoking signature) from transversion-low (TL, never smoking signature) cases. Strikingly, patients with tumors harboring the smoking signature were more likely to respond to pembrolizumab. The ORR in TH tumors was 56% vs 17% in TL tumors, p=0.03; the rate of DCB was 77% vs 22%, p=0.004, and the PFS was also significantly longer in TH tumors (median not reached vs 3.5, p=0.0001) (Fig. 2A). Of note, self-reported smoking history did not significantly associate with DCB (never-smokers, 33%, vs. ever smokers, 48%, p=0.66) or PFS (Fig. 2B). Neither the rate of DCB nor PFS were significantly different in ever smokers versus never smokers (Fisher's exact p=0.66 and log-rank p=0.29, respectively) or heavy smokers (greater than median pack-years, 25) versus light/never smokers (≤25 pack-years) (Fisher's exact p=0.08 and log-rank p=0.15, respectively). The molecular

smoking signature correlated more significantly with nonsynonymous mutation burden than smoking history (Fig. 19).

[164] Although the multitude of carcinogens in tobacco smoke are largely responsible for the mutagenesis in lung cancers (16), the wide range of mutation burden within both smokers and never-smokers raises the question of whether additional pathways may also contribute to accumulation of somatic mutations. Interestingly, we found deleterious mutations in a number of genes that are important in DNA repair or are predicted to cause higher mutations rates when mutated. For example, in the three responders with the highest mutation burden, we identified deleterious mutations in polymerase (DNA directed), Delta 1, Catalytic Subunit (POLD1), polymerase (DNA directed), epsilon, catalytic subunit (POLE), and MutS Homolog 2 (MSH2) (Fig. 3). Of particular interest, a POLD1 E374K mutation (SIFT 0.0, POLYPHEN deleterious) was identified in the tumor of a never-smoker with DCB and whose tumor harbored the greatest nonsynonymous mutation burden (n=507) of all never-smokers in our series. POLD1 Glu374 lies in the exonuclease proofreading domain of Pol δ (17), and mutation of this residue may contribute to low fidelity replication of the lagging DNA strand. Consistent with this hypothesis, the exome of this patient was characterized by a relatively low proportion of C>A transversions (20%) and a predominance of C>T transitions (51%), which is similar to other POLD1 mutant, hypermutated tumors (18) and distinct from smoking-related lung cancers. Another responder, with the greatest mutation burden in our series, had a C284Y mutation in POLD1, which is also located in the exonuclease proofreading domain. Similarly, we observed nonsense mutations in PRKDC, the catalytic subunit of DNA-PK, and RAD17. Both genes are well known to be required for proper DNA repair and maintenance of genomic integrity (19, 20).

[165] In addition to specific DNA repair-associated genes, genes that harbored deleterious mutations common to four or more DCB patients and not present in NDB patients included POLR2A, KEAP1, PAPPA2, PXDNL, RYR1, SCN8A, and SLIT3. Mutations in KRAS were found in 7/14 tumors from patients with DCB compared to 1/17 in the NDB group, a finding that may be explained by the previously reported association between smoking and presence of KRAS mutations in NSCLC (21). There were no mutations or copy number

alterations in antigen presentation pathway-associated genes or CD274 (encoding programmed cell death ligand-1, PD-L1) that associated with response or resistance.

[166] How does increased mutation burden affect tumor immunogenicity? The observation that nonsynonymous mutation burden predicts clinical benefit is consistent with the hypothesis that recognition of neoantigens, formed as a consequence of somatic mutations, is important for the activity of anti-PD-1 therapy. We therefore examined the landscape of candidate neoantigens in this tumor set using our previously described computational pipeline (22) (Fig. 10). Briefly, this pipeline identifies mutant nonamers with ≤500nM binding affinity for patient-specific class I HLA alleles (23, 24), which are considered candidate neoantigens. We identified a median of 112 neoantigens per tumor (range 8-610) and, as expected (25), the quantity of candidate neoantigens per tumor correlated with mutation burden (Spearman ρ 0.91, $p<0.0001$), similar to the correlation recently reported across cancers (63). Tumors from patients with DCB had significantly higher neoantigen burden compared to those with NDB (median 203 vs 83, $p=0.001$, Fig. 4A), and high neoantigen burden was associated with improved PFS (median 14.5 vs 3.5 months, $p=0.002$; HR 0.23, 95% CI 0.09-0.58) (Fig. 4B). The presence of specific HLA alleles did not correlate with clinical efficacy (Figure 11). The absolute burden of neoantigens, but not the frequency of neoantigens per nonsynonymous mutation, correlated with the degree of response to anti-PD-1 therapy (Figure 12).

[167] In our study, the goal was not to seek to comprehensively validate all possible candidate neoantigens. Rather, we set out to determine whether anti-PD-1 therapy can alter neoantigen specific T-cell reactivity and whether this can be used for immune monitoring following treatment with anti-PD-1 therapy. To directly test this, candidate neoantigens identified from one patient with a 95% decrease in tumor burden with pembrolizumab were examined. Identified candidate neoantigens were examined in a patient (Study ID #9 in Fig. 3 and Figure 17) with exceptional response to pembrolizumab and available peripheral blood lymphocytes (PBLs). Predicted HLA-A restricted peptides were synthesized and used to screen for autologous T-cells using a validated high-throughput MHC multimer screening strategy (26, 27) to assess neoantigen-specific reactivity *ex vivo* in serially collected peripheral blood lymphocytes (PBLs) (Day 0, 21, 44, 63, 256, and 297, where Day 0 is the first date of treatment).

This analysis revealed a dominant CD8+ T-cell response against a neoantigen resulting from a HERC1 P3278S mutation (ASNA***S***SAAK) (Figs. 4C). Notably, this T-cell response was below the level of detection at start of therapy (level of detection of 0.005%), but increased to readily detectable levels within 3 weeks post therapy initiation (0.040% of CD8+ T-cells) and was maintained at Day 44 (0.044% of Cd8+ T-cells). This rapid induction of T cell reactivity correlated with tumor regression and returned to levels just above background in the subsequent months as tumor regression plateaued (Figs. 4D). HERC1 P3278S-multimer reactive T-cells from PBLs collected on day 44 were characterized by a CD45RA-CCR7-HLA-DR+LAG-3- phenotype, consistent with an activated effector population (Fig. 20). These data reveal autologous T-cell responses against cancer neoantigens in the context of a clinical response to anti-PD-1 therapy. To our knowledge, this is first use of cancer exome data to uncover autologous T-cell responses against cancer neoantigens in the context of a clinical response to anti-PD-1 therapy.

Example 3. In vitro analyses of immunogenic peptides

[168] This example demonstrates the *in vitro* validation of immunogenic peptides.

[169] To validate the specificity of the neoantigen reactive T-cells, PBLs from day 63 and 297 were expanded *in vitro* in the presence of the mutant peptide and subsequently re-stimulated with either mutant or wild-type peptide (ASNA***S***SAAK vs ASNA***P***SAAK), and analyzed by intracellular cytokine staining. At both time points, a substantial population of polyfunctional CD8+ T-cells (characterized by IFNγ, CD107a, MIP1β (the chemokine CCL4), and TNFα production) was detected in response to mutant but not wild-type peptide (Figs. 4E, 13A-D).

[170] The success of T-cell checkpoint therapies in a number of cancers (2-5) has confirmed the ability to re-establish a tumor-directed effector T-cell response. However, only a subset of patients benefit from these therapies and the determinants and mediators of response are unknown. In the current study, it is shown that in NSCLCs treated with pembrolizumab, elevated nonsynonymous mutation burden is strongly predictive of clinical efficacy and can be

used to identify patients with high likelihood of benefit. In addition, clinical efficacy correlates with a molecular signature characteristic of tobacco carcinogen-related mutagenesis, certain DNA repair mutations, and with the burden of neoantigens. Furthermore, we describe an example of using cancer exome data from a lung cancer patient to identify an autologous neoantigen-specific peripheral blood T-cell response that correlated temporally with a rapid and durable response to pembrolizumab.

[171] As expected, mutation burden, smoking signature, and neoantigen burden were closely associated, which limits the capacity for multivariate analysis to distinguish the independent influence of each factor on response to pembrolizumab. Nevertheless, it should be noted that the molecular smoking signature correlated with efficacy while self-reported smoking status did not, highlighting the power of the classifier to identify molecularly-related tumors within a heterogeneous group. Moreover, the correlation between the molecular signature of smoking in the exomes examined and clinical efficacy has important potential implications. As molecular evidence of smoking can be identified by limited genomic assessment (8), it would be interesting to examine whether the molecular smoking signature alone can be used to predict response to anti-PD-1 therapy without the need to sequence the entire exome.

[172] Nearly all tumors in this study (91%) were positive for PD-L1 expression (≥1% membranous staining; clone 22C3, Merck & Co., Inc. (6)). This marker appears to enrich for response (3, 6, 28), but many tumors deemed PD-L1 positive do not respond to anti-PD-1 therapies and responses are also seen in patients with PD-L1 negative tumors (6, 28). Previous studies have reported that pre-treatment PD-L1 expression enriches for response to anti-PD-1 therapies (3, 6, 28), but many tumors deemed PD-L1 positive do not respond and some responses occur in PD-L1 negative tumors (6, 28). Semi-quantitative PD-L1 staining results were available for 30 of 34 patients, where strong staining represented ≥50% PD-L1 expression, weak represented 1-49%, and negative represented <1% (clone 22C3, Merck (6)). As this trial largely enrolled patients with PD-L1 tumor expression, most samples had some degree of PD-L1 expression (24 of 30, 80%, Figure 17), limiting the capacity to determine relationships between mutation burden and PD-L1 expression. Among those with high nonsynonymous mutation burden (>200, above median of overall cohort) and some degree of PD-L1 expression

(weak/strong), the rate of DCB was 91% (10 of 11, 95% CI 59-99%). In contrast, in those with low mutation burden and some degree of PD-L1 expression, the rate of DCB was only 10% (1 of 10, 95% CI 0-44%). When exclusively examining patients with weak PD-L1 expression, high nonsynonymous mutation burden was associated with DCB in 75% (3 of 4, 95% CI 19-99%) while low mutation burden was associated with DCB in 11% (1 of 9, 0%-48%). Large-scale studies are needed to determine the relationship between PD-L1 intensity and mutation burden. Additionally, recent data have demonstrated that the localization of PD-L1 expression within the tumor microenvironment (on infiltrating immune cells (32), at the invasive margin, tumor core, etc. (33)) may affect the use of PD-L1 as a biomarker.

[173] T-cell recognition of cancers relies upon presentation of tumor-specific antigens on MHC molecules by cancer cells and professional antigen presenting cells (29). A few elegant pre- clinical (30-33, 66-68) and clinical (25, 34-36, 69) reports have demonstrated that neoantigen-specific effector T-cell response can recognize and shrink established tumors (36). Our finding that nonsynonymous mutation burden was more predictive of clinical benefit with anti-PD-1 therapy compared to total exonic mutation burden suggests the importance of neoantigens in dictating response. In support of this, for the first time, the temporal association between the expansion of neoantigen-specific T-cells in peripheral blood with radiographic response to anti-PD-1 therapy is shown. The observation that anti-PD-1-induced neoantigen specific T cell reactivity can be observed within the peripheral blood compartment may open the door to the development of blood-based assays to uncover functional neoantigens and to monitor response following anti- PD-1 therapy. Certain neoantigen sequences are included herein in Figure 21.

[174] The recent development of T-cell checkpoint inhibitors has begun to transform the treatment landscape for patients with a number of high prevalence malignancies. These findings impact our understanding of response to anti-PD-1 therapy and on its application in the clinic. The ability to identify those patients most likely to benefit from these therapies, as demonstrated here by analysis of nonsynonymous mutation burden, will contribute to maximizing the clinical value of these novel therapies.

Example 4. Materials and Methods for Examples 1-3

[175] The present example provides detailed Materials & Methods for the work presented herein in examples 1-3.

[176] We obtained tumor tissue from lung cancer patients who were treated with pembrolizumab. These samples were from pembrolizumab-treated patients who experienced a long term benefit (LB), or minimal/no benefit (NB). Whole exome sequencing was performed on these tumors and matching normal blood. Somatic mutations and candidate somatic neoantigens generated from these mutations were identified and characterized.

Patients and Clinical Characteristics

[177] All patients had stage IV non-small cell lung cancer (NSCLC) and were treated at Memorial Sloan Kettering Cancer Center (n=29) or the University of California at Los Angeles (n=5) on protocol NCT01295827 (Figure 17). All patients initiated therapy in 2012-2013 and were treated at 10mg/kg every 2-3 weeks, except for 5 patients treated at 2mg/kg every 3 weeks. The overall response rate and progression-free survival are reported to be similar across dose and schedules (6). All patients had consented to Institutional Review Board-approved protocols permitting tissue collection and sequencing. PD-L1 expression was assessed prospectively by immunohistochemistry using a previously validated murine anti-human anti-PD-L1 antibody (clone 22C3, Merck & Co., Inc.). Membranous expression of PD-L1 on tumor cells and infiltrating immune cells were scored. 31 (91%) scored at least 1% positive for PD-L1 expression; 2 patients were PD-L1 negative; and 1 was unknown. Smoking status was evaluated using previously completed self-reported smoking questionnaires executed as standard of care at MSKCC or review of medical records at UCLA. Patients eligible for this analysis all received at least two doses of study therapy and were evaluable for response to pembrolizumab, and did not prematurely discontinue therapy due to toxicity or withdrawal of consent.

Tumor samples

[178] All tumor tissue used for sequencing was obtained prior to dosing with pembrolizumab, except for one non-responder in whom post-treatment tissue was used (study ID DM123062). Tumor samples used for whole exome sequencing were paraffin-embedded (FFPE).

Peripheral blood was collected and DNA isolated from all patients (Nucleospin Blood L, Machery-Nagel). Presence of tumor tissue in the sequenced samples was confirmed by examination of a representative hematoxylin and eosin-stained slide by thoracic pathologists (N.R. or A.M). DNA extraction was performed using the DNEasy kit (Qiagen).

Clinical efficacy analysis

[179] Objective response to pembrolizumab was assessed by investigator-assessed immune-related response criteria (irRC) (37) by a study radiologist. Per protocol, CT scans were performed every nine weeks. Partial and complete responses were confirmed by a repeat imaging occurring at least 4 weeks after the initial identification of response; unconfirmed responses were considered stable or progressive disease dependent on results of the second CT scan. Durable clinical benefit (DCB) was defined as stable disease or partial response lasting longer than 6 months (week 27, the time of third protocol-scheduled response assessment). No durable benefit (NDB) was defined as progression of disease $\leq$ 6 months of beginning therapy. Patients who were still ongoing study therapy at the time of the data lock (October 10th, 2014) but who had not yet reached 6 months of follow up were considered "Not reached" (NR). These patients were not included in the analysis of DCB/NDB, but were included in assessments of objective response and progression-free survival. For patients with ongoing response to study therapy, progression free survival was censored at the date of the most recent imaging evaluation. For alive patients, overall survival was censored at the date of last known contact.

Whole Exome Capture and Sequencing

[180] Whole-exome capture libraries were constructed via the Agilent Sure-Select Human All Exon v2.0, 44Mb baited target with the Broad in-solution hybrid selection process. Enriched exome libraries were sequenced on the HiSeq 2000 platform (Illumina) to generate paired-end reads (2x76bp) to a goal of 150X mean target coverage (Broad Institute, Cambridge, MA) (Figs. 14A-14Q, Figure 18).

HLA Typing

[181] HLA typing was performed at the MSKCC HLA typing lab New York Blood Center by high resolution SeCore HLA sequence-based typing method (HLA-SBT) (Invitrogen).

ATHLATES (http://www.broadinstitute.org/scientific-community/science/projects/viral-genomics/athlates) (38) was also used for HLA typing and confirmation.

Exome Analysis Pipeline

[182] Raw sequencing data were aligned to the hg37 genome build using the Burrows-Wheeler Aligner (BWA) version 0.7.10 (39) (Fig. 6). Further indel realignment, base-quality score recalibration and duplicate-read removal were performed using the Genome Analysis Toolkit (GATK) version 3.2.2 (40). Mutations were annotated using SnpEffect version 3.5d (build 2014-03-05) (41). Somatic Sniper version 1.0.0 (42), VarScan version 2.2.3 (43), Strelka version 1.0.13 (44) and MuTect version 1.4 (45) were used to generate single nucleotide variant (SNV) calls using default parameters. VarScan and Strelka were used to generate indel calls. Baseline filters (depth of 7X coverage in tumor specimens, >97% normal allelic fraction, >10% tumor allelic fraction) were chosen. Known single nucleotide polymorphisms (SNPs) were eliminated by comparison to 1000 Genomes Project, ESP6500 (National Heart, Lung and Blood Institute [NHLBI] GO Exome Sequencing Project) and dbSNP132 (46-48). Single nucleotide polymorphisms (SNPs) that were rare in the SNP data bases and present in tumors with an allelic fraction of zero in the normal DNA were manually reviewed using Integrative Genomics Viewer (IGV) and included as somatic SNVs (49). Manual review using IGV was also conducted for all mutations in any of the following additional three categories: (i) called by one caller (ii) coverage between 7X and 35X (iii) tumor allelic frequency less than 10 percent but called by two or more callers. Called SNVs were evaluated as deleterious if denoted as such by snpEff (high), SIFT (50) (score <0.05) or PolyPhen-2 (“D” or "P") (51). SIFT and Polyphen2 prediction scores and GERP++ conservation scores were parsed from dbNSFP version 2.2 (52). Validation resequencing of detected mutations is >97% (53).

Molecular Signature Analysis

[183] The mutation spectrum in each sample was calculated by analyzing nonsynonymous exonic single nucleotide substitutions within their trinucleotide sequence context. That is, for each sample the percentage of each of the six possible single nucleotide changes (C>A:G>T, C>G:G>C, C>T:G>A, T>A:A>T, T>C:A>G, T>G:A>C, with the

pyrimidine of the Watson- Crick base pair referenced first) within each of the 16 possible combinations of flanking nucleotides was calculated to generate a 96-feature vector that is used to represent the mutation spectrum for that sample. We utilized a Support Vector Machine (R package e1071) to generate a binary classifier to distinguish transversion low (TL) and transversion high (TH) tumors. Similar to a previously published analysis (14), the classifier was trained using lifelong never smokers and patients with ≥60 pack-years of smoking history as the respective controls. The training set was derived from publicly available exome sequencing and smoking history data from TCGA and previously published results (54). This classifier was applied to all sequenced patients in order to classify all samples as belonging to either the TL or TH categories.

In silico neoantigen pipeline

[184] All nonsynonymous point mutations identified were translated into strings of 17 amino acids with the mutant amino acid situated centrally using a bioinformatic tool called NAseek (22). A sliding window method was used to identify the 9 amino acid substrings within the mutant 17mer that had MHC Class I binding affinity of ≤500nM to one (or more) of the patient-specific HLA alleles. Binding affinity for the mutant and corresponding wild type nonamer were analyzed using NetMHCv3.4 software (23, 24, 55-57).

Combinatorial Coding and Multimer Screening

[185] HLA-A restricted candidate neoantigens were synthesized in-house (Netherlands Cancer Institute) and HLA-multimers containing these peptides were produced by micro-scale parallel UV-induced peptide exchange reactions as previously described (26, 58). Briefly, peptide-MHC complexes loaded with UV-sensitive peptide were subjected to 366-nm UV light (CAMAG) for one hour at 4oC in the presence of candidate neoantigen peptide in a 384-well plate. pMHC multimers were generated using a total of 11 different fluorescent streptavidin (SA) conjugates (Invitrogen). For each pMHC monomer, conjugation was performed with two of these fluorochromes. NaN3 (0.02% w/v) and an excess of D-biotin (26.4 mM, Sigma) were added to block residual binding sites. For T cell staining an combinatorial encoding strategy was employed to be able to analyze for reactivity against up to 47 different peptides in parallel (27).

The PBMC samples were thawed, treated with DNAse for 1h and stained with pMHC multimer panels for 15 min at 37C. Subsequently, anti–CD8–AF700 (Invitrogen), anti–CD4-FITC (Invitrogen), anti–CD14-FITC (Invitrogen), anti–CD16-FITC (Invitrogen), anti–CD19-FITC (Invitrogen), and LIVE/DEAD Fixable IR Dead Cell Stain Kit (Invitrogen) were added for additional 20 min on ice. Data acquisition was performed on an LSR II flow cytometer (Becton Dickinson) with FACSDiva 6 software. Cutoff values for the definition of positive responses were ≥0.005% of total CD8+ cells and ≥10 events. For immunophenotypical analysis, day 44 PMLs were stained with HERC1 P3278S MHC multimers in two colors (qdot 625 (Invitrogen) and PerCPeFluor710 (ebioscience)) plus anti-CD45RA Ab (Invitrogen), anti-CCR7 Ab (BD Bioscience), anti-HLA-DR Ab (BD Bioscience), and anti-LAG-3 Ab (R&D systems). The immunophenotype of HERC1 P3278S reactive and bulk CD8+ T-cells were analyzed. Data were acquired using an LSR II flow cytometer (Becton Dickson) with FASCDiva 6 software.

Intracellular cytokine staining (ICS)

[186] HERC1 P>S mutant and wild type peptides of 9 amino acids in length (Mutant: ASNASSAAK, Wild type: ASNAPSAAK) were synthesized (GenScript Piscataway, NJ). 1.5 x 106 patient PBMCs were cultured with 1.5 x 106 autologous PBMCs pulsed with HERC1 P>S mutant peptide in RPMI media containing 10% pooled human serum (PHS), 10 mM HEPES, 2 mM L Glutamine, and 50 μM β-mercaptoethanol supplemented with IL-15 (10 ng/ml) and IL-2 (10 IU/ml), using methods previously described (59). Cells were harvested at day 12, stained with 3 μL PE-Cy5-CD107a (BD Pharmingen), and either left unstimulated, or stimulated by the addition of (a) mutant peptide or (b) wild type peptide for 2 hours. Cells were then treated with 1x Brefeldin A and monensin (BioLegend) for 4 hours, and subsequently stained with 1 μL Alexa Fluor 405-CD3 (Invitrogen), 3 μL APC-H7-CD8 (BD Bioscience), and 1 μL ECD-CD4 (Beckman Coulter). Upon subsequent washing and permeabilization, the cells were stained with the following antibodies to intracellular cytokines: 3 μL Alexa Fluor 647-IFN-γ (Biolegend), 3 μL PE-MIP-1β, and 1 μL PE-Cy7-TNF-α (BD Pharmingen). Data were acquired by flow cytometry (using CYAN flow cytometer, Summit software, Dako Cytomation California Inc., Carpinteria, CA). Analysis was done by FlowJo version 10.1, TreeStar, Inc. CD3+ single cell

lymphocytes were gated for analysis (SS vs. FS [low, mid], FS vs. Pulse Width [all, low], and CD3 vs. "dump" channel [high, low]).

Statistics

[187] Mann-Whitney test was used to compare mutation burdens and differences in the frequency of nucleotide changes. The Log-Rank and Mantel-Haenszel tests were used to compare Kaplan- Meier survival curves. The proportion of objective responders/non-responders or DCB/NDB were compared using Fisher's Exact Test. The receiver operator characteristic (ROC) curve was generated by plotting the proportion of all DCB patients with mutation burden above any given cut point (sensitivity) against the proportion of the NDB patients that would also exceed the same cut point (1 – specificity). The area under the curve and exact 95% confidence intervals are reported. Correlations between nonsynonymous mutation burden and neoantigen burden, neoantigen burden and best overall response, and frequency of neoantigen burden/nonsynonymous mutation and best overall response were calculated using Spearman correlation formula. Statistical analyses were performed using GraphPad Prism v.6 (Graphpad Prism Software, San Diego, CA).

Example 5. Treatment with Pembrolizumab

[188] This example provides instructions for treatment of a cancer (melanoma) with an antibody immunotherapy (pembrolizumab), as approved by the United States Food & Drug Administration for the treatment of metastatic melanoma. In some embodiments, long term clinical benefit is observed after pembrolizumab treatment.

[189] KEYTRUDA® (pembrolizumab) for injection, for intravenous use Initial U.S. Approval: 2014

[190] ----------INDICATIONS AND USAGE ----------

[191] KEYTRUDA is a human programmed death receptor-1 (PD-1)-blocking antibody indicated for the treatment of patients with unresectable or metastatic melanoma and disease progression following ipilimumab and, if BRAF V600 mutation positive, a BRAF inhibitor. This indication is approved under accelerated approval based on tumor response rate and durability of

response. An improvement in survival or disease-related symptoms has not yet been established. Continued approval for this indication may be contingent upon verification and description of clinical benefit in the confirmatory trials. (1)

[192] ---------- DOSAGE AND ADMINISTRATION ----------

[193] Administer 2 mg/kg as an intravenous infusion over 30 minutes every 3 weeks. (2.1)

[194] Reconstitute and dilute prior to intravenous infusion. (2.3)

[195] ----------DOSAGE FORMS AND STRENGTHS ----------

[196] For injection: 50 mg, lyophilized powder in single-use vial for reconstitution (3)

[197]

[198] ---------- CONTRAINDICATIONS----------

[199] None. (4)

[200] ---------- WARNINGS AND PRECAUTIONS ----------

[201] Immune-mediated adverse reactions: Administer corticosteroids based on the severity of the reaction. (5.1, 5.2, 5.3, 5.4, 5.5, 5.6)

[202] Immune-mediated pneumonitis: Withhold for moderate, and permanently discontinue for severe or life-threatening pneumonitis. (5.1)

[203] Immune-mediated colitis: Withhold for moderate or severe, and permanently discontinue for life-threatening colitis. (5.2)

[204] Immune-mediated hepatitis: Monitor for changes in hepatic function. Based on severity of liver enzyme elevations, withhold or discontinue. (5.3)

[205] Immune-mediated hypophysitis: Withhold for moderate, withhold or discontinue for severe, and permanently discontinue for life-threatening hypophysitis. (5.4)

[206] Immune-mediated nephritis: Monitor for changes in renal function. Withhold for moderate, and permanently discontinue for severe or life-threatening nephritis. (5.5)

[207] Immune-mediated hyperthyroidism and hypothyroidism: Monitor for changes in thyroid function. Withhold for severe and permanently discontinue for life-threatening hyperthyroidism. (5.6)

[208] Embryofetal Toxicity: KEYTRUDA may cause fetal harm. Advise females of reproductive potential of the potential risk to a fetus. (5.8)

[209] ---------- ADVERSE REACTIONS ----------

[210] Most common adverse reactions (reported in ≥20% of patients) included fatigue, cough, nausea, pruritus, rash, decreased appetite, constipation, arthralgia, and diarrhea. (6.1)

[211] To report SUSPECTED ADVERSE REACTIONS, contact Merck Sharp & Dohme Corp., a subsidiary of Merck & Co., Inc., at 1-877888-4231 or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

[212] ---------- USE IN SPECIFIC POPULATIONS ----------

[213] Nursing mothers: Discontinue nursing or discontinue KEYTRUDA. (8.3)

[214] 1 INDICATIONS AND USAGE

[215] KEYTRUDA® (pembrolizumab) is indicated for the treatment of patients with unresectable or metastatic melanoma and disease progression following ipilimumab and, if BRAF V600 mutation positive, a BRAF inhibitor [see Clinical Studies (14)].

[216] This indication is approved under accelerated approval based on tumor response rate and durability of response. An improvement in survival or disease-related symptoms has not yet been established. Continued approval for this indication may be contingent upon verification and description of clinical benefit in the confirmatory trials.

[217] 2 DOSAGE AND ADMINISTRATION

2.1 Recommended Dosing

The recommended dose of KEYTRUDA is 2 mg/kg administered as an intravenous infusion over 30 minutes every 3 weeks until disease progression or unacceptable toxicity.

2.2 Dose Modifications

Withhold KEYTRUDA for any of the following:

Grade 2 pneumonitis [see Warnings and Precautions (5.1)]

Grade 2 or 3 colitis [see Warnings and Precautions (5.2)]

Symptomatic hypophysitis [see Warnings and Precautions (5.4)]

Grade 2 nephritis [see Warnings and Precautions (5.5)]

Grade 3 hyperthyroidism [see Warnings and Precautions (5.6)]

Aspartate aminotransferase (AST) or alanine aminotransferase (ALT) greater than 3 and up to 5 times upper limit of normal (ULN) or total bilirubin greater than 1.5 and up to 3 times ULN

Any other severe or Grade 3 treatment-related adverse reaction [see Warnings and Precautions (5.7)]

Resume KEYTRUDA in patients whose adverse reactions recover to Grade 0-1.

Permanently discontinue KEYTRUDA for any of the following:

Any life-threatening adverse reaction

Grade 3 or 4 pneumonitis [see Warnings and Precautions (5.1)]

Grade 3 or 4 nephritis [see Warnings and Precautions (5.5)]

AST or ALT greater than 5 times ULN or total bilirubin greater than 3 times ULN

For patients with liver metastasis who begin treatment with Grade 2 AST or ALT, if AST or ALT increases by greater than or equal to 50% relative to baseline and lasts for at least 1 week

Grade 3 or 4 infusion-related reactions

Inability to reduce corticosteroid dose to 10 mg or less of prednisone or equivalent per day within 12 weeks

Persistent Grade 2 or 3 adverse reactions that do not recover to Grade 0-1 within 12 weeks after last dose of KEYTRUDA

[218] Any severe or Grade 3 treatment-related adverse reaction that recurs [see Warnings and Precautions (5.7)]

[219] 2.3 Preparation and Administration

[220] Preparation

[221] Add 2.3 mL of Sterile Water for Injection, USP by injecting the water along the walls of the vial and not directly on the lyophilized powder (resulting concentration 25 mg/mL).

[222] Slowly swirl the vial. Allow up to 5 minutes for the bubbles to clear. Do not shake the vial.

[223] Visually inspect the reconstituted solution for particulate matter and discoloration prior to administration. Reconstituted KEYTRUDA is a clear to slightly opalescent, colorless to slightly yellow solution. Discard reconstituted vial if extraneous particulate matter other than translucent to white proteinaceous particles is observed.

[224] Withdraw the required volume from the vial(s) of KEYTRUDA and transfer into an intravenous (IV) bag containing 0.9% Sodium Chloride Injection, USP. Mix diluted solution by gentle inversion. The final concentration of the diluted solution should be between 1 mg/mL to 10 mg/mL.

[225] Discard any unused portion left in the vial.

[226] Storage of Reconstituted and Diluted Solutions

[227] The product does not contain a preservative. Store the reconstituted and diluted solutions of KEYTRUDA either:

[228] At room temperature for no more than 4 hours from the time of reconstitution. This includes room temperature storage of reconstituted vials, storage of the infusion solution in the IV bag, and the duration of infusion.

[229] Under refrigeration at 2°C to 8°C (36°F to 46°F) for no more than 24 hours from the time of reconstitution. If refrigerated, allow the diluted solution to come to room temperature prior to administration.

[230] Do not freeze.

[231] Administration

[232] Administer infusion solution intravenously over 30 minutes through an intravenous line containing a sterile, non-pyrogenic, low-protein binding 0.2 micron to 5 micron in-line or add-on filter.

[233] Do not co-administer other drugs through the same infusion line.

[234] 3 DOSAGE FORMS AND STRENGTHS

[235] For injection: 50 mg lyophilized powder in a single-use vial for reconstitution

[236] 4 CONTRAINDICATIONS

[237] None.

[238] 5 WARNINGS AND PRECAUTIONS

[239] 5.1 Immune-Mediated Pneumonitis

[240] Pneumonitis occurred in 12 (2.9%) of 411 melanoma patients, including Grade 2 or 3 cases in 8 (1.9%) and 1 (0.2%) patients, respectively, receiving KEYTRUDA in Trial 1. The median time to development of pneumonitis was 5 months (range 0.3 weeks-9.9 months). The median duration was 4.9 months (range 1 week-14.4 months). Five of eight patients with Grade 2 and the one patient with Grade 3 pneumonitis required initial treatment with high-dose systemic corticosteroids (greater than or equal to 40 mg prednisone or equivalent per day) followed by a corticosteroid taper. The median initial dose of high-dose corticosteroid treatment was 63.4 mg/day of prednisone or equivalent with a median duration of treatment of 3 days (range 1-34) followed by a corticosteroid taper. Pneumonitis led to discontinuation of KEYTRUDA in 3 (0.7%) patients. Pneumonitis completely resolved in seven of the nine patients with Grade 2-3 pneumonitis. Monitor patients for signs and symptoms of pneumonitis. Evaluate patients with suspected pneumonitis with radiographic imaging and administer corticosteroids for Grade 2 or greater pneumonitis. Withhold KEYTRUDA for moderate (Grade 2) pneumonitis, and permanently discontinue KEYTRUDA for severe (Grade 3) or life-threatening (Grade 4) pneumonitis [see Dosage and Administration (2.2) and Adverse Reactions (6.1)].

[241] 5.2 Immune-Mediated Colitis

[242] Colitis (including microscopic colitis) occurred in 4 (1%) of 411 patients, including Grade 2 or 3 cases in 1 (0.2%) and 2 (0.5%) patients, respectively, receiving KEYTRUDA in Trial 1. The median time to onset of colitis was 6.5 months (range 2.3-9.8). The median duration was 2.6 months (range 0.6 weeks-3.6 months). All three patients with Grade 2 or 3 colitis were treated with high-dose corticosteroids (greater than or equal to 40 mg prednisone or equivalent per day) with a median initial dose of 70 mg/day of prednisone or equivalent; the median duration of initial treatment was 7 days (range 4-41), followed by a corticosteroid taper. One patient (0.2%) required permanent discontinuation of KEYTRUDA due to colitis. All four patients with colitis experienced complete resolution of the event. Monitor patients for signs and symptoms of colitis. Administer corticosteroids for Grade 2 or greater colitis. Withhold KEYTRUDA for moderate (Grade 2) or severe (Grade 3) colitis, and permanently discontinue KEYTRUDA for life threatening (Grade 4) colitis [see Dosage and Administration (2.2) and Adverse Reactions (6.1)].

[243] 5.3 Immune-Mediated Hepatitis

[244] Hepatitis (including autoimmune hepatitis) occurred in 2 (0.5%) of 411 patients, including a Grade 4 case in 1 (0.2%) patient, receiving KEYTRUDA in Trial 1. The time to onset was 22 days for the case of Grade 4 hepatitis which lasted 1.1 months. The patient with Grade 4 hepatitis permanently discontinued KEYTRUDA and was treated with high-dose (greater than or equal to 40 mg prednisone or equivalent per day) systemic corticosteroids followed by a corticosteroid taper. Both patients with hepatitis experienced complete resolution of the event. Monitor patients for changes in liver function. Administer corticosteroids for Grade 2 or greater hepatitis and, based on severity of liver enzyme elevations, withhold or discontinue KEYTRUDA [see Dosage and Administration (2.2) and Adverse Reactions (6.1)].

[245] 5.4 Immune-Mediated Hypophysitis

[246] Hypophysitis occurred in 2 (0.5%) of 411 patients, consisting of one Grade 2 and one Grade 4 case (0.2% each), in patients receiving KEYTRUDA in Trial 1. The time to onset was 1.7 months for the patient with Grade 4 hypophysitis and 1.3 months for the patient with Grade 2 hypophysitis. Both patients were treated with high-dose (greater than or equal to 40 mg

prednisone or equivalent per day) corticosteroids followed by a corticosteroid taper and remained on a physiologic replacement dose. Monitor for signs and symptoms of hypophysitis. Administer corticosteroids for Grade 2 or greater hypophysitis. Withhold KEYTRUDA for moderate (Grade 2) hypophysitis, withhold or discontinue KEYTRUDA for severe (Grade 3) hypophysitis, and permanently discontinue KEYTRUDA for lifethreatening (Grade 4) hypophysitis [see Dosage and Administration (2.2) and Adverse Reactions (6.1)].

[247] 5.5 Renal Failure and Immune-Mediated Nephritis

[248] Nephritis occurred in 3 (0.7%) patients, consisting of one case of Grade 2 autoimmune nephritis (0.2%) and two cases of interstitial nephritis with renal failure (0.5%), one Grade 3 and one Grade 4. The time to onset of autoimmune nephritis was 11.6 months after the first dose of KEYTRUDA (5 months after the last dose) and lasted 3.2 months; this patient did not have a biopsy. Acute interstitial nephritis was confirmed by renal biopsy in two patients with Grades 3-4 renal failure. All three patients fully recovered renal function with treatment with high-dose corticosteroids (greater than or equal to 40 mg prednisone or equivalent per day) followed by a corticosteroid taper. Monitor patients for changes in renal function. Administer corticosteroids for Grade 2 or greater nephritis. Withhold KEYTRUDA for moderate (Grade 2) nephritis, and permanently discontinue KEYTRUDA for severe (Grade 3), or life-threatening (Grade 4) nephritis [see Dosage and Administration (2.2) and Adverse Reactions (6.1)].

[249] 5.6 Immune-Mediated Hyperthyroidism and Hypothyroidism

[250] Hyperthyroidism occurred in 5 (1.2%) of 411 patients, including Grade 2 or 3 cases in 2 (0.5%) and 1 (0.2%) patients, respectively, receiving KEYTRUDA in Trial 1. The median time to onset was 1.5 months (range 0.5-2.1). The median duration was 2.8 months (range 0.9 to 6.1). One of two patients with Grade 2 and the one patient with Grade 3 hyperthyroidism required initial treatment with high-dose corticosteroids (greater than or equal to 40 mg prednisone or equivalent per day) followed by a corticosteroid taper. One patient (0.2%) required permanent discontinuation of KEYTRUDA due to hyperthyroidism. All five patients with hyperthyroidism experienced complete resolution of the event. Hypothyroidism occurred in 34 (8.3%) of 411 patients, including a Grade 3 case in 1 (0.2%) patient, receiving

KEYTRUDA in Trial 1. The median time to onset of hypothyroidism was 3.5 months (range 0.7 weeks-19 months). All but two of the patients with hypothyroidism were treated with long-term thyroid hormone replacement therapy. The other two patients only required short-term thyroid hormone replacement therapy. No patient received corticosteroids or discontinued KEYTRUDA for management of hypothyroidism. Thyroid disorders can occur at any time during treatment. Monitor patients for changes in thyroid function (at the start of treatment, periodically during treatment, and as indicated based on clinical evaluation) and for clinical signs and symptoms of thyroid disorders. Administer corticosteroids for Grade 3 or greater hyperthyroidism, withhold KEYTRUDA for severe (Grade 3) hyperthyroidism, and permanently discontinue KEYTRUDA for life-threatening (Grade 4) hyperthyroidism. Isolated hypothyroidism may be managed with replacement therapy without treatment interruption and without corticosteroids [see Dosage and Administration (2.2) and Adverse Reactions (6.1)].

[251] 5.7 Other Immune-Mediated Adverse Reactions

[252] Other clinically important immune-mediated adverse reactions can occur. The following clinically significant, immune-mediated adverse reactions occurred in less than 1% of patients treated with KEYTRUDA in Trial 1: exfoliative dermatitis, uveitis, arthritis, myositis, pancreatitis, hemolytic anemia, partial seizures arising in a patient with inflammatory foci in brain parenchyma, and adrenal insufficiency.

[253] Across clinical studies with KEYTRUDA in approximately 2000 patients, the following additional clinically significant, immune-mediated adverse reactions were reported in less than 1% of patients: myasthenic syndrome, optic neuritis, and rhabdomyolysis.

[254] For suspected immune-mediated adverse reactions, ensure adequate evaluation to confirm etiology or exclude other causes. Based on the severity of the adverse reaction, withhold KEYTRUDA and administer corticosteroids. Upon improvement to Grade 1 or less, initiate corticosteroid taper and continue to taper over at least 1 month. Restart KEYTRUDA if the adverse reaction remains at Grade 1 or less. Permanently discontinue KEYTRUDA for any severe or Grade 3 immune-mediated adverse reaction that recurs and for any life-threatening

immune-mediated adverse reaction [see Dosage and Administration (2.2) and Adverse Reactions (6.1)].

[255] 5.8 Embryofetal Toxicity

[256] Based on its mechanism of action, KEYTRUDA may cause fetal harm when administered to a pregnant woman. Animal models link the PD-1/PDL-1 signaling pathway with maintenance of pregnancy through induction of maternal immune tolerance to fetal tissue. If this drug is used during pregnancy, or if the patient becomes pregnant while taking this drug, apprise the patient of the potential hazard to a fetus. Advise females of reproductive potential to use highly effective contraception during treatment with KEYTRUDA and for 4 months after the last dose of KEYTRUDA [see Use in Specific Populations (8.1, 8.8)].

Equivalents

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

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Claims

We claim:

1. A composition comprising an immunogenic agent that is or comprises a neoepitope recognizable by a human patient's immune system as non-self, wherein the patient is suffering from cancer characterized by one or more tumors expressing the neoepitope.

2. The composition of claim 1, wherein, the neoepitope shares a consensus sequence with an infectious agent.

3. The composition of claim 1, wherein the neoepitope is or comprises a nonamer neoepitope.

4. The composition of claim 1, wherein the neoepitope shows increased binding affinity to MHC class I molecules or improved recognition by cytotoxic T cells.

5. The composition of claim 1, wherein the neoepitope has greater binding affinity to a major histocompatibility complex (MHC) molecule compared to a corresponding wildtype epitope that is not a neoepitope specifically associated with the one or more tumors.

6. The composition of claim 1, wherein the immunogenic agent is or comprises a peptide.

7. The composition of claim 1 or claim 6, wherein the immunogenic agent has a length appropriate for MHC presentation.

8. The composition of claim 7, wherein the length is that appropriate for presentation by MHC Class I.

9. The composition of claim 8, wherein the length is that of 8-11 amino acids.

10. The composition of claim 7, wherein the length is that appropriate for presentation by MHC Class II.

11. The composition of claim 1, wherein the neoepitope has an amino acid sequence selected from those set forth in Table1.

12. The composition of claim 1, wherein the cancer is or comprises a cancer selected from the group comprising: carcinoma, sarcoma, myeloma, leukemia, or lymphoma.

13. The composition of claim 12, wherein the cancer is selected from a group comprising: lung carcinoma, melanoma, renal carcinoma, bladder carcinoma, small cell carcinoma, and head and neck cancer.

14. The composition of claim 13, wherein the cancer is or comprises lung carcinoma.

15. A composition comprising a nucleic acid whose sequence comprises coding sequence for a neoepitope recognizable by a human patient's immune system as non-self, wherein the patient is suffering from cancer characterized by one or more tumors expressing the neoepitope.

16. The composition of claim 15, wherein, the neoepitope shares a consensus sequence with an infectious agent.

17. The composition of claim 15, wherein the neoepitope is or comprises a nonamer neoepitope.

18. The composition of claim 15, wherein the neoepitope shows increased binding affinity to MHC class I molecules or improved recognition by cytotoxic T cells.

19. The composition of claim 15, wherein the neoepitope has greater binding affinity to a major histocompatibility complex (MHC) molecule compared to a corresponding wildtype epitope that is not a neoepitope specifically associated with the one or more tumors.

20. The composition of claim 15, wherein the neoepitope has a length appropriate for MHC presentation.

21. The composition of claim 20, wherein the length is that appropriate for presentation by MHC Class I.

22. The composition of claim 21, wherein the length is that of 8-11 amino acids.

23. The composition of claim 20, wherein the length is that appropriate for presentation by MHC Class II.

24. The composition of claim 15, wherein the neoepitope has an amino acid sequence selected from those set forth in Table1.

25. The composition of claim 15, wherein the cancer is or comprises a cancer selected from the group comprising: carcinoma, sarcoma, myeloma, leukemia, or lymphoma.

26. The composition of claim 25, wherein the cancer is selected from a group comprising: lung carcinoma, melanoma, renal carcinoma, bladder carcinoma, small cell carcinoma, and head and neck cancer.

27. The composition of claim 15, wherein the cancer is or comprises lung carcinoma.

28. A composition comprising a nucleic acid that hybridizes with a nucleic acid encoding a neoepitope recognizable by a human patient's immune system as non-self, wherein the patient is suffering from cancer characterized by one or more tumors expressing the neoepitope.

29. The composition of claim 15 or claim 28, wherein the nucleic acid is capable of detecting the neoepitope, or expression thereof, at the nucleic acid level.

30. The composition of claim 28, wherein, the neoepitope shares a consensus sequence with an infectious agent.

31. The composition of claim 28, wherein the neoepitope is or comprises a nonamer neoepitope.

32. The composition of claim 28, wherein the neoepitope shows increased binding affinity to MHC class I molecules or improved recognition by cytotoxic T cells.

33. The composition of claim 28, wherein the neoepitope has greater binding affinity to a major histocompatibility complex (MHC) molecule compared to a corresponding otherwise identical epitope that is not a neoepitope specifically associated with the one or more tumors.

34. The composition of claim 28, wherein the neoepitope has a length appropriate for MHC presentation.

35. The composition of claim 28, wherein the length is that appropriate for presentation by MHC Class I.

36. The composition of claim 35, wherein the length is that of 8-11 amino acids.

37. The composition of claim 28, wherein the length is that appropriate for presentation by MHC Class II.

38. The composition of claim 28, wherein the neoepitope has an amino acid sequence selected from those set forth in Table1.

39. The composition of claim 28, wherein the cancer is or comprises a cancer selected from the group comprising: carcinoma, sarcoma, myeloma, leukemia, or lymphoma.

40. The composition of claim 39, wherein the cancer is selected from a group comprising: lung carcinoma, melanoma, renal carcinoma, bladder carcinoma, small cell carcinoma, and head and neck cancer.

41. The composition of claim 28, wherein the cancer is or comprises lung carcinoma.

42. A composition comprising an agent that specifically detects a neoepitope recognizable by a human patient's immune system as non-self, wherein the patient is suffering from cancer characterized by one or more tumors expressing the neoepitope.

43. The composition of claim 42, wherein the agent specifically detects the neoepitope at the protein level.

44. The composition of claim 42, wherein the agent specifically detects the neoepitope at the nucleic acid level.

45. The composition of claim 42, wherein, the neoepitope shares a consensus sequence with an infectious agent.

46. The composition of claim 42, wherein the neoepitope is or comprises a nonamer neoepitope.

47. The composition of claim 42, wherein the neoepitope shows increased binding affinity to MHC class I molecules or improved recognition by cytotoxic T cells.

48. The composition of claim 42, wherein the neoepitope has greater binding affinity to a major histocompatibility complex (MHC) molecule compared to a corresponding otherwise identical epitope that is not a neoepitope specifically associated with the one or more tumors.

49. The composition of claim 42, wherein the neoepitope has a length appropriate for MHC presentation.

50. The composition of claim 49, wherein the length is that appropriate for presentation by MHC Class I.

51. The composition of claim 50, wherein the length is that of 8-11 amino acids.

52. The composition of claim 49, wherein the length is that appropriate for presentation by MHC Class II.

53. The composition of claim 42, wherein the neoepitope has an amino acid sequence selected from those set forth in Table1.

54. The composition of claim 42, wherein the cancer is or comprises a cancer selected from the group comprising: carcinoma, sarcoma, myeloma, leukemia, or lymphoma.

55. The composition of claim 54, wherein the cancer is selected from a group comprising: lung carcinoma, melanoma, renal carcinoma, bladder carcinoma, small cell carcinoma, and head and neck cancer.

56. The composition of claim 42, wherein the cancer is or comprises lung carcinoma.

57. A method of treating cancer comprising steps of:

administering to a subject determined to have cancer characterized by a tumor expressing one or more nonamer neoepitopes a therapy that enhances neoantigen-specific effector T-cell response.

58. The method of claim 57, wherein the subject is receiving or will receive therapy with an immune checkpoint modulator.

59. The method of claim 57, wherein the subject has established tumors.

60. The method of claim 57, wherein the cancer is or comprises a cancer selected from the group comprising: carcinoma, sarcoma, myeloma, leukemia, or lymphoma.

61. The method of claim 60, wherein the cancer is selected from a group comprising: lung carcinoma, melanoma, renal carcinoma, bladder carcinoma, small cell carcinoma, and head and neck cancer.

62.The method of claim 57, wherein the cancer is or comprises lung carcinoma.

63.The method of claim 57, wherein the therapy is or comprises an immune checkpoint modulator.

64. A method comprising steps of:

detecting a marker of high mutations in a cancer sample from a subject; and

identifying the subject as a candidate for treatment with an

immune checkpoint modulator.

65. The method of claim 64, wherein the step of detecting comprises sequencing one or more exomes from the cancer sample.

66. The method of claim 64, wherein the number of mutations identifies the subject as a candidate for treatment with an immune checkpoint modulator.

67. The method of claim 66, wherein a high number of mutations identifies the subject as a candidate for treatment with an immune checkpoint modulator.

68. The method of claim 67, wherein a high number of nonsynonymous mutations identifies the subject as a candidate for treatment with an immune checkpoint modulator.

69. The method of claim 64, wherein the ratio of transition mutations to transversion mutations identifies the subject as a candidate for treatment with an immune checkpoint modulator.

70. The method of claim 69, wherein the ratio comprises the molecular smoking signature.

71. The method of claim 64, wherein the somatic mutation comprises a neoepitope recognized by a T cell.

72. The method of claim 71, wherein the number of neoepitopes identifies the subject as a candidate for treatment with an immune checkpoint modulator.

73. The method of claim 64 wherein the neoepitopes identifies the subject as a candidate for treatment with an immune checkpoint modulator.

74. The method of claim 73, wherein the neoepitopes are associated with high mutation rate.

75. The method of claim 74, wherein high mutations are present in genes encoding proteins involved in DNA repair.

76. The method of claim 74, wherein high mutations are present in genes encoding proteins involved in cell signal transduction.

77. The method of claim 64, wherein the neoepitope has greater binding affinity to a major histocompatibility complex (MHC) molecule compared to a corresponding epitope that does not have a mutation.

78. The method of claim 64,wherein the somatic mutation comprises a neoepitope comprising a nonamer that is not expressed in the same cell type that does not have a somatic mutation.

79. The method of claim 78, wherein the neoepitope shares a consensus sequence with an infectious agent.

80. The method of claim 64, wherein the cancer is or comprises a cancer selected from the group comprising: carcinoma, sarcoma, myeloma, leukemia, or lymphoma.

81. The method of claim 80, wherein the cancer is selected from a group comprising: lung carcinoma, melanoma, renal carcinoma, bladder carcinoma, small cell carcinoma, and head and neck cancer.

82. The method of claim 64, wherein the immune checkpoint modulator interacts with cytotoxic T-lymphocyte antigen 4 (CTLA4), programmed death 1 (PD-1) or its ligands, lymphocyte activation gene-3 (LAG3), B7 homolog 3 (B7-H3), B7 homolog 4 (B7-H4), indoleamine (2,3)-dioxygenase (IDO), adenosine A2a receptor, neuritin, B- and T-lymphocyte attenuator (BTLA), killer immunoglobulin-like receptors (KIR), T cell immunoglobulin and mucin domain-containing protein 3 (TIM-3), inducible T cell costimulator (ICOS), CD27, CD28, CD40, CD137, or combinations thereof.

83. The method of claim 64, wherein the immune checkpoint modulator is an antibody agent.

84. The method of claim 83, wherein the antibody agent is or comprises a monoclonal antibody or antigen binding fragment thereof.

85. The method of claim 84, wherein the antibody is pembrolizumab.

86. The method of claim 64,wherein the subject has not previously been treated with a cancer therapeutic.

87. The method of claim 64, wherein the subject has not previously been treated with a cancer immunotherapeutic.

88. The method of claim 85, further comprising a step of administering pembrolizumab to the subject.

89. A method comprising steps of:

detecting a low number of mutations in a cancer sample from a subject; and

identifying the subject as a poor candidate for treatment with an immune checkpoint modulator.

90. A method comprising steps of:

determining a subject has a cancer comprising a marker of high mutations, wherein the mutations comprises a neoepitope comprising a nonamer, and

selecting for the subject a cancer treatment comprising an immune checkpoint modulator.

91. The method of claim 90, wherein the cancer comprises lung carcinoma.

92. The method of claim 90, wherein the immune checkpoint modulator interacts with cytotoxic T-lymphocyte antigen 4 (CTLA4), programmed death 1 (PD-1) or its ligands, lymphocyte activation gene-3 (LAG3), B7 homolog 3 (B7-H3), B7 homolog 4 (B7-H4), indoleamine (2,3)-dioxygenase (IDO), adenosine A2a receptor, neuritin, B- and T-lymphocyte attenuator (BTLA), killer immunoglobulin-like receptors (KIR), T cell immunoglobulin and mucin domain-containing protein 3 (TIM-3), inducible T cell costimulator (ICOS), CD27, CD28, CD40, CD137, or combinations thereof.

93. The method of claim 92, wherein the immune checkpoint modulator is an antibody agent.

94. The method of claim 93, wherein the antibody agent is or comprises a monoclonal antibody or antigen binding fragment thereof.

95. The method of claim 94, wherein the antibody is pembrolizumab.

96. The method of claim 90, wherein the subject has not previously been treated with a cancer therapeutic.

97. The method of claim 90, wherein the subject has not previously been treated with a cancer immunotherapeutic.

98. A method of treating a subject with an immune checkpoint modulator wherein the subject has previously been identified to have a cancer with a high marker of mutations, wherein the one mutations comprise a neoepitope recognized by a T cell.

99. The method of claim 98, wherein the cancer comprises lung carcinoma.

100. The method of claim 98, wherein the immune checkpoint modulator interacts with cytotoxic T-lymphocyte antigen 4 (CTLA4), programmed death 1 (PD-1) or its ligands, lymphocyte activation gene-3 (LAG3), B7 homolog 3 (B7-H3), B7 homolog 4 (B7-H4), indoleamine (2,3)-dioxygenase (IDO), adenosine A2a receptor, neuritin, B- and T-lymphocyte attenuator (BTLA), killer immunoglobulin-like receptors (KIR), T cell immunoglobulin and mucin domain-containing protein 3 (TIM-3), inducible T cell costimulator (ICOS), CD27, CD28, CD40, CD137, or combinations thereof.

101. The method of claim 98, wherein the immune checkpoint modulator is an antibody agent.

102. The method of claim 101, wherein the antibody agent is or comprises a monoclonal antibody or antigen binding fragment thereof.

103. The method of claim 102, wherein the antibody is pembrolizumab.

104. The method of claim 98, wherein the subject has not previously been treated with a cancer therapeutic.

105. The method of claim 98, wherein the subject has not previously been treated with a cancer immunotherapeutic.

106. A method of improving efficacy of cancer therapy with an immune checkpoint modulator, the method comprising a step of:

selecting for receipt of the therapy a subject identified as having a cancer with markers of high mutation comprising a neoepitope recognized by a T cell.

107. In a method of treating cancer by administering immune checkpoint modulator therapy, the improvement that comprises:

administering the therapy to a subject identified as having a cancer with one or more markers of high mutation comprising a neoepitope recognized by a T cell.

108. A method of treating a cancer selected from the group consisting of carcinoma, sarcoma, myeloma, leukemia, or lymphoma, the method comprising a step of:

administering immune checkpoint modulator therapy to a subject identified as having a cancer with a marker of high mutations comprising a neoepitope recognized by a T cell.

109. The method of claim 108, wherein the cancer is or comprises lung carcinoma.

110. A method of defining a mutation signature that correlates with responsiveness to therapy with an immune checkpoint modulator, the method comprising:

determining one or more mutation characteristics in a plurality of samples of tumors sharing a response characteristic to immune checkpoint modulator therapy;

comparing the determined one or more mutation characteristics with those in a plurality of samples of tumors that do not share the response characteristic; and

identifying a set of mutation characteristics whose presence correlates with the response characteristic.

111. The method of claim 110, wherein the one or more mutation characteristics include a mutation characteristic selected from the group consisting of mutation burden, nonsynonymous mutation burden, neoantigen burden, transversion burden, transition burden, relative transversion vs transition burden, mutation burden in genes associated with DNA repair, presence of mutation in one or more particular genes associated with DNA repair, identity of mutation in one or more particular genes associated with DNA repair, and combinations thereof.

112. The method of claim 111, wherein the determined burden is or comprises rate or number.

113. The method of claim 111, wherein the genes associated with DNA repair are or include a genes selected from the group consisting of POLD1, PRKDC, DNA-PK, RAD17, POLE, and MSH2.

114. The method of any one of claims 111-113, wherein the response characteristic is or comprises a characteristic selected from the group consisting of partial or stable response lasting longer than 6 months ("durable clinical benefit"; "DCB"), a reduction in tumor size for more than 4 weeks ("objective response rate"; "ORR"); no disease progression for more than 9 weeks ("progression-free survival"; "PFS"), and combinations thereof.

115. A method of characterizing a tumor sample by determining presence of a set of mutation characteristics that correlates with a response characteristic to immune checkpoint modulator therapy.

116. The method of claim 115, wherein the set of mutation characteristics includes a mutation characteristic selected from the group consisting of mutation burden, nonsynonymous mutation burden, neoantigen burden, transversion burden, transition burden, relative transversion vs transition burden, mutation burden in genes associated with DNA repair, presence of mutation in one or more particular genes associated with DNA repair, identity of mutation in one or more particular genes associated with DNA repair, and combinations thereof.

117. The method of claim 116, wherein the determined burden is or comprises rate or number.

I

118. The method of claim 116, wherein the genes associated with DNA repair are or include genes selected from the group consisting of POLD1, PRKDC, DNA-PK, RAD17, POLE, and MSH2.

119. The method of any one of claims 115-117, wherein the response characteristic is or comprises a characteristic selected from the group consisting of partial or stable response lasting longer than 6 months ("durable clinical benefit"; "DCB"), a reduction in tumor size for more than 4 weeks ("objective response rate"; "ORR"); no disease progression for more than 9 weeks ("progression-free survival"; "PFS"), and combinations thereof.

120. The method of any one of claims 115-118, wherein the step of determining comprises detecting at least one of the mutation characteristics by nucleic acid sequencing.

121. The method of claim 119, wherein the nucleic acid sequencing is or comprises whole exome sequencing.

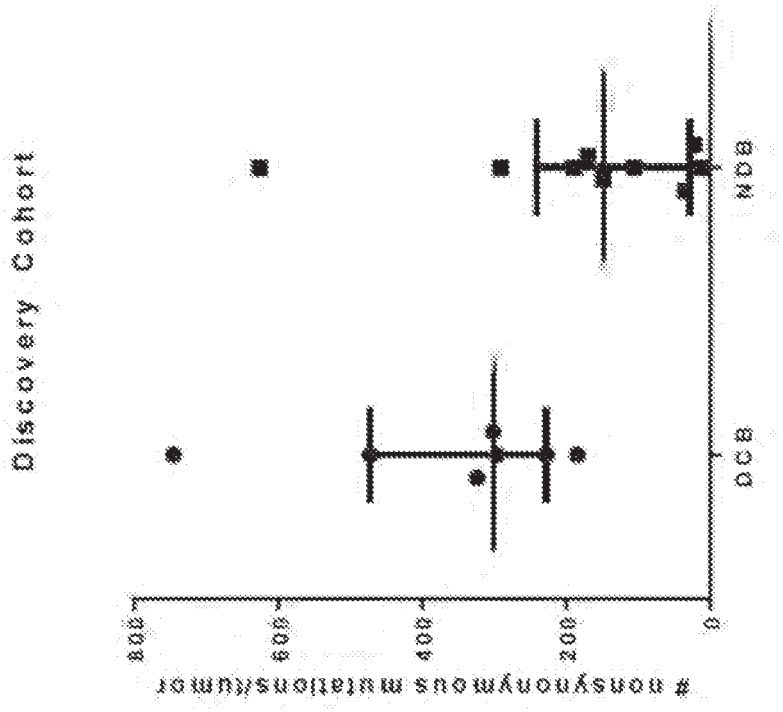

Discovery Cohort
nonsynonymous mutations/tumor
800
600
400
200
0
DCB
NDB

Figure 1A

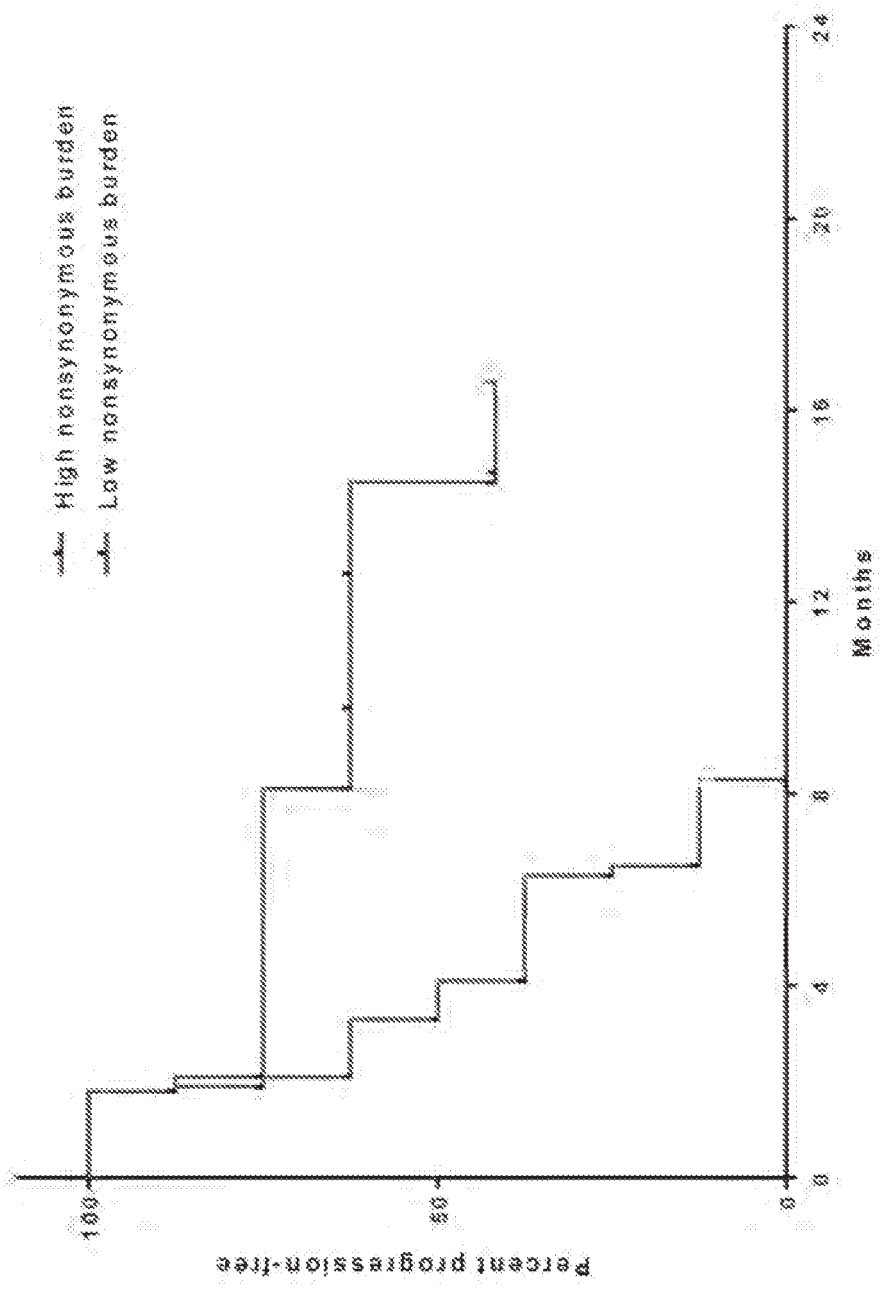

Discovery Cohort
High nonsynonymous burden
Low nonsynonymous burden
Percent progression-free
100
50
0
0
4
8
12
16
20
24
Months

Figure 1B

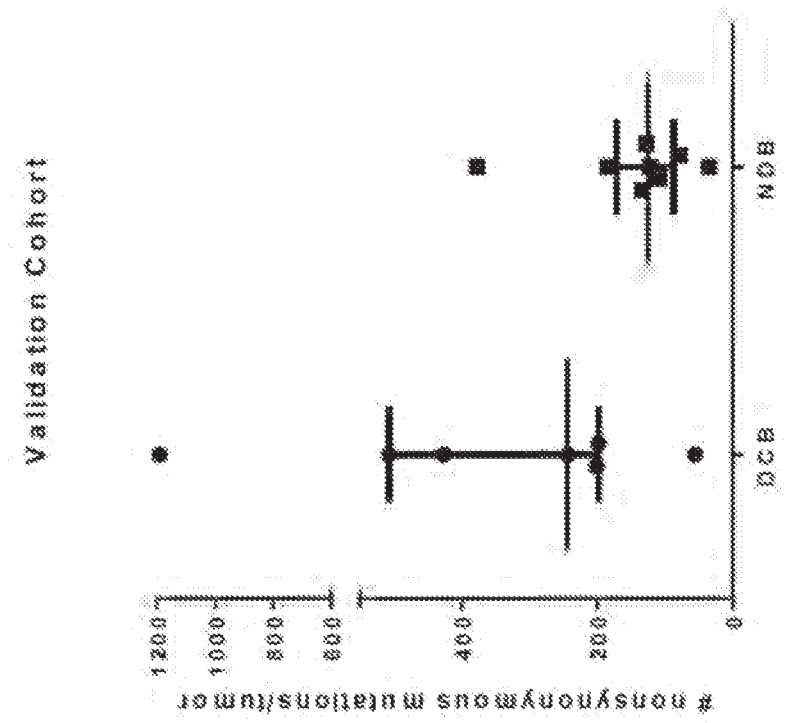

Validation Cohort
nonsynonymous mutations/tumor
1200
1000
800
600
400
200
0
BCB
NOB

Figure 1C

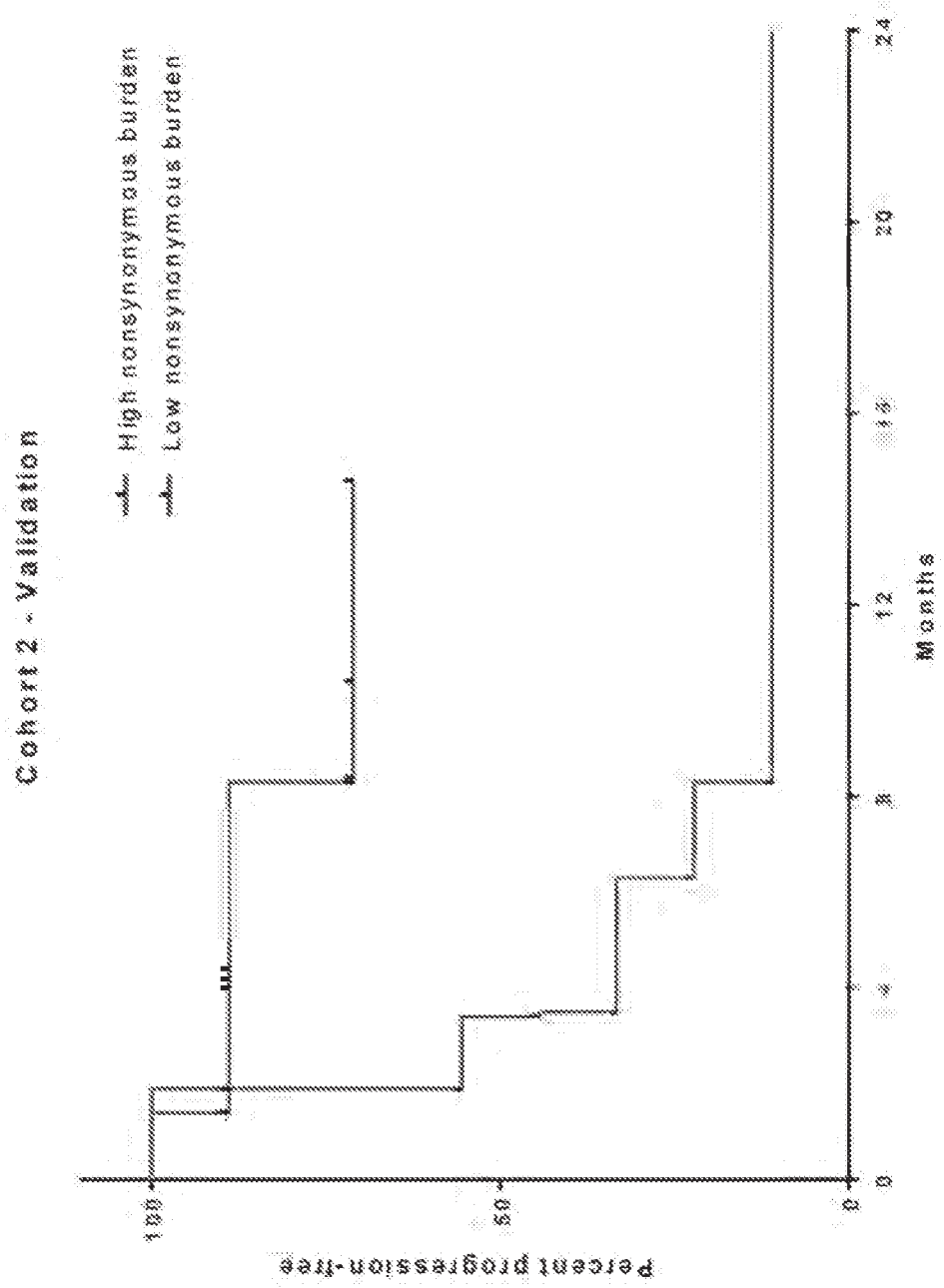

Cohort 2 - Validation
High nonsynonymous burden
Low nonsynonymous burden
Percent progression-free
100
50
0
0
4
8
12
16
20
24
Months

Figure 1D

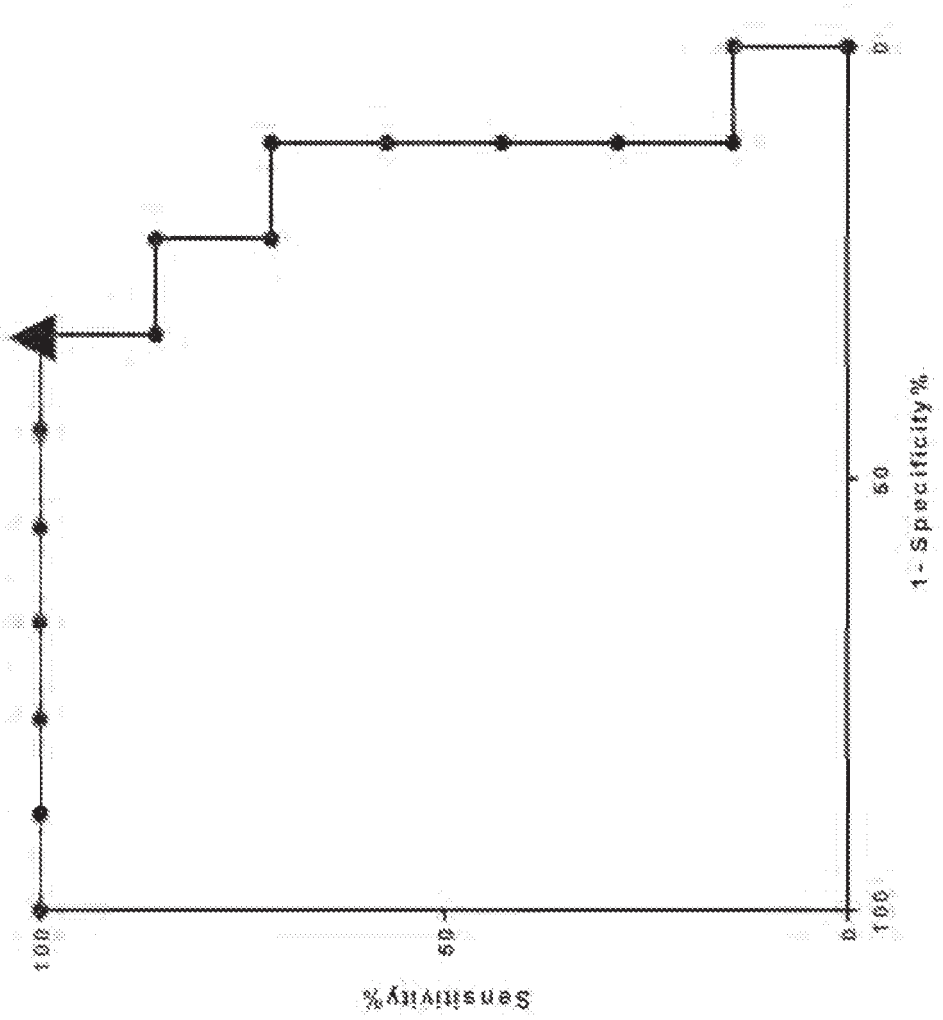


Figure 1E

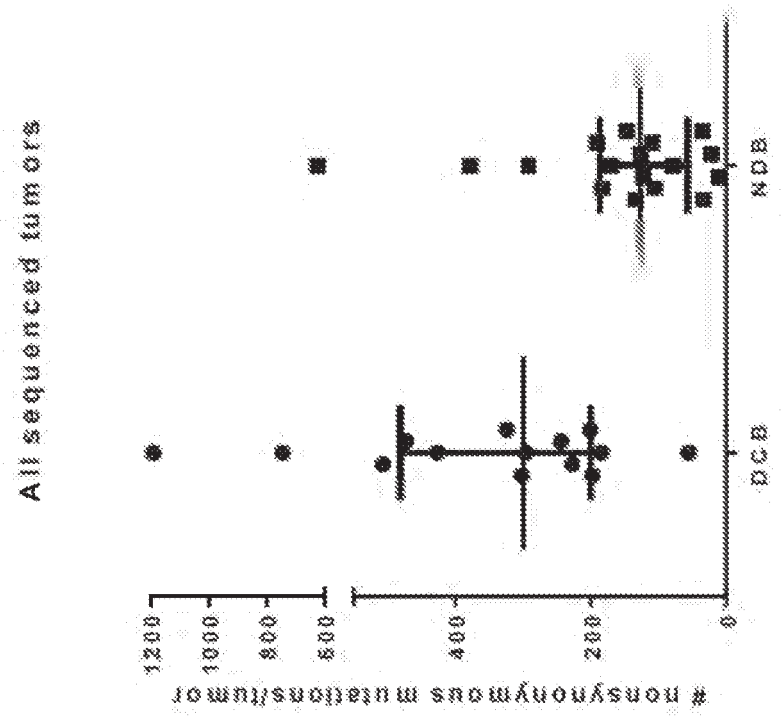

All sequenced tumors
nonsynonymous mutations/tumor
1200
1000
800
400
200
0
DCB
NDB

Figure 1F

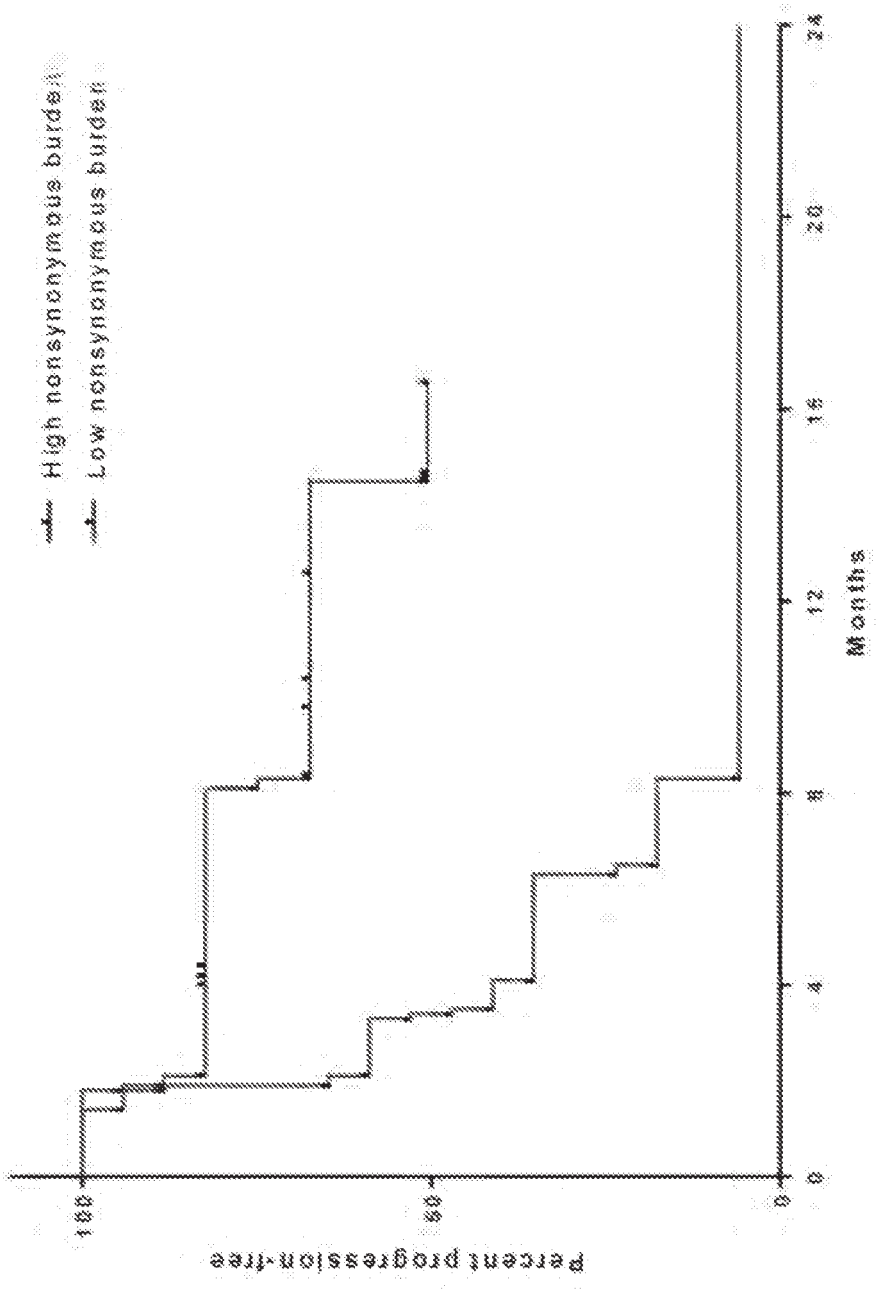

All sequenced tumors
High nonsynonymous burden
Low nonsynonymous burden
Percent progression-free
100
50
0
0
4
8
12
16
20
24
Months

Figure 1G

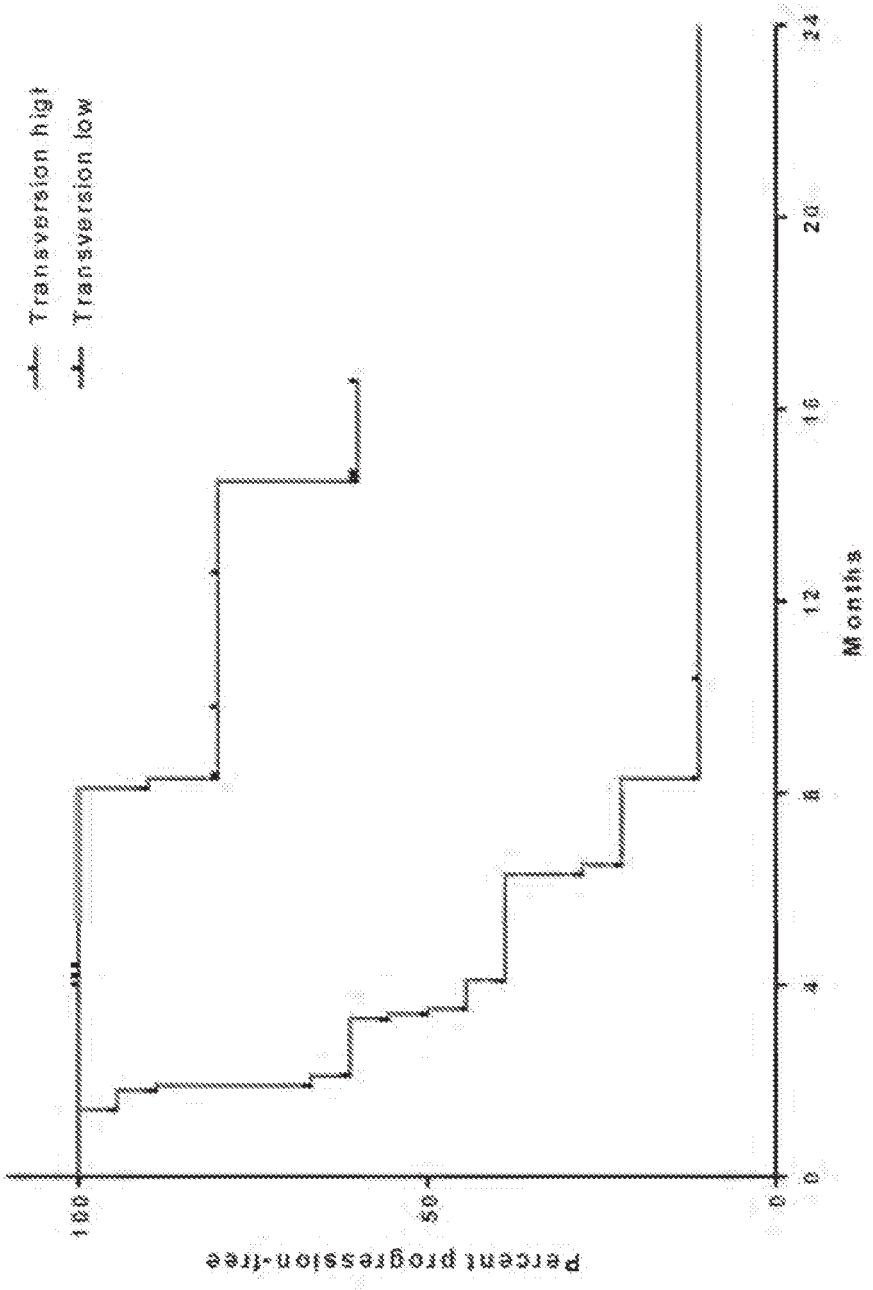

All sequenced tumors
Transversion high
Transversion low
Percent progression-free
100
50
0
0
4
8
12
16
20
24
Months

Figure 2A

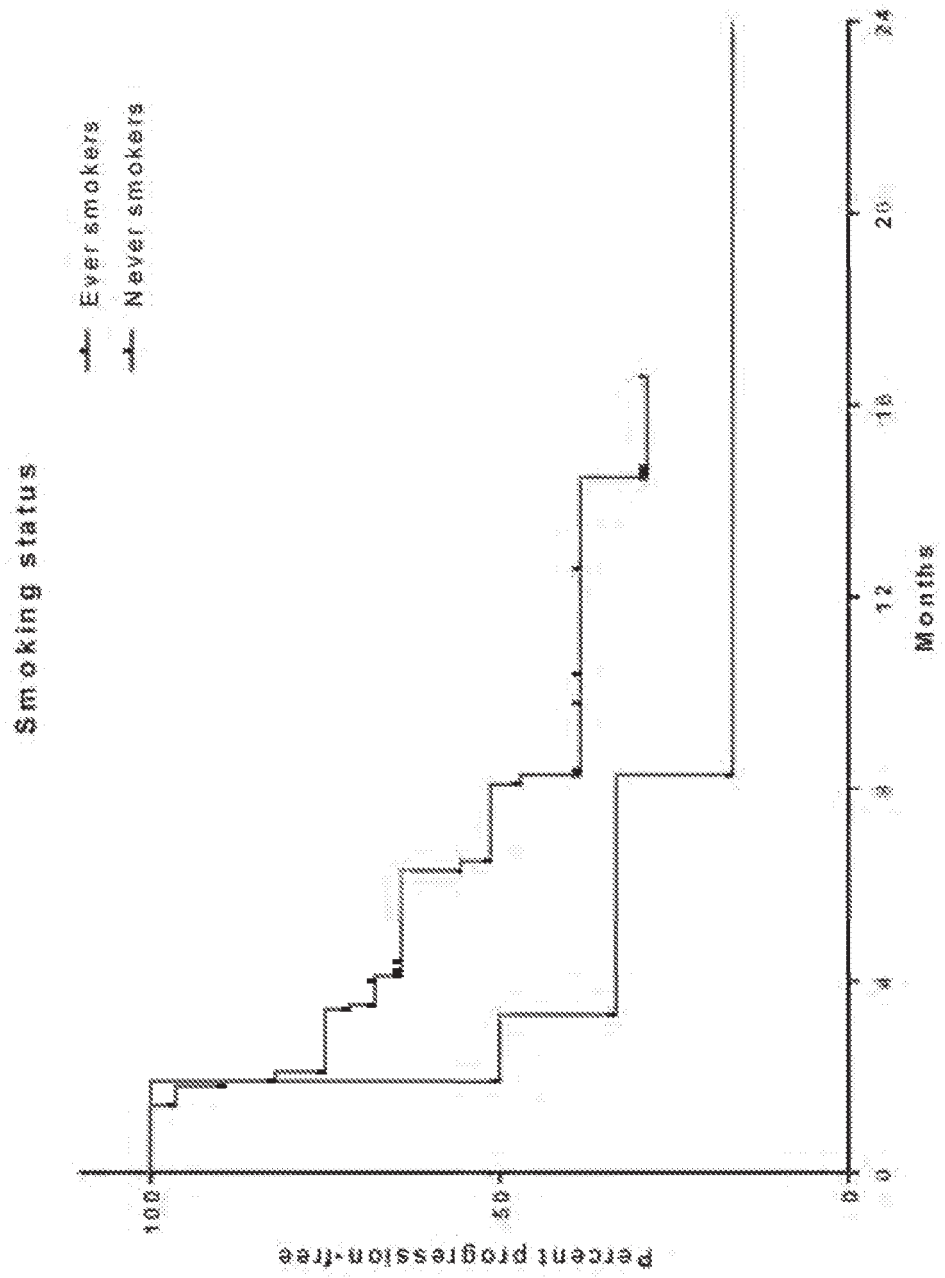
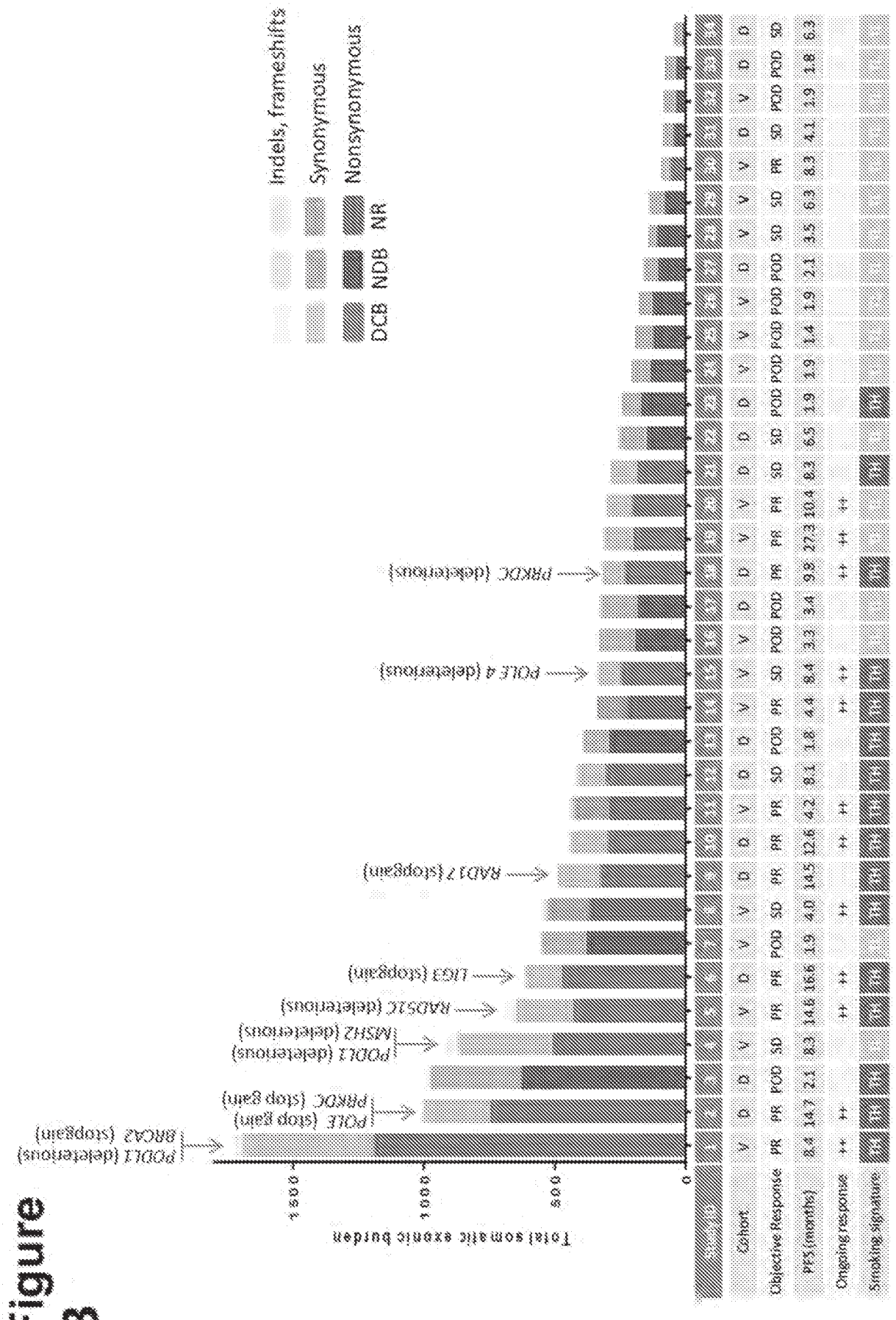

Smoking status
Ever smokers
Never smokers
Percent progression-free
100
50
0
0
4
8
12
16
20
24
Months

Figure 2B

Figure 3


Indels, frameshifts
Synonymous
Nonsynonymous
DCB
NDB
NR
Total somatic exonic burden
PPM1D (deleterious)
BRCA2 (stopgain)
POLE (stop gain)
PRKDC (stop gain)
PODXL1 (deleterious)
NSHZ (deleterious)
RADS1C (deleterious)
LIG3 (stopgain)
RAD17 (stopgain)
POLE 4 (deleterious)
PRKDC (deleterious)
Cohort
Objective Response
PFS (months)
Ongoing response
Smoking signature

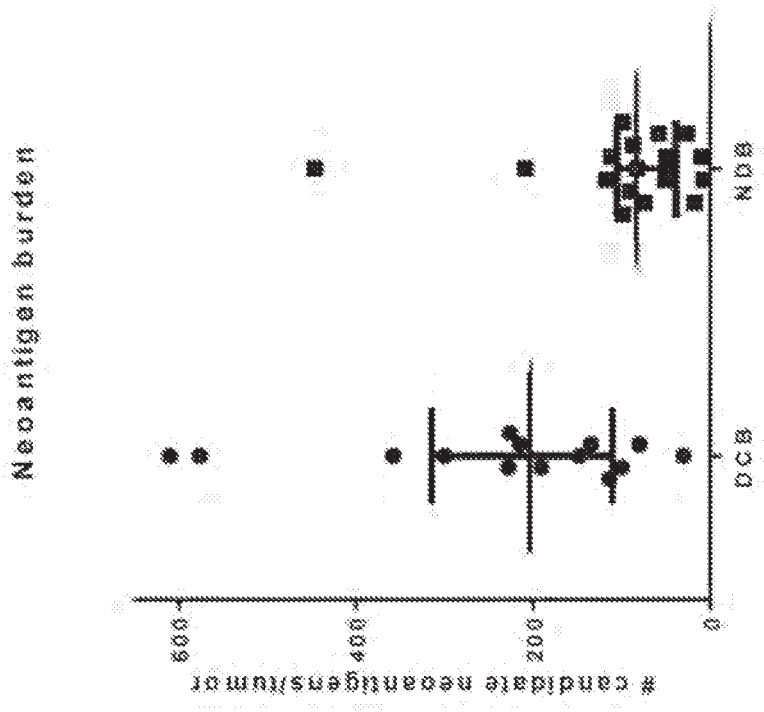

Neoantigen burden
candidate neoantigens/tumor
600
400
200
0
DCB
NDB

Figure 4A

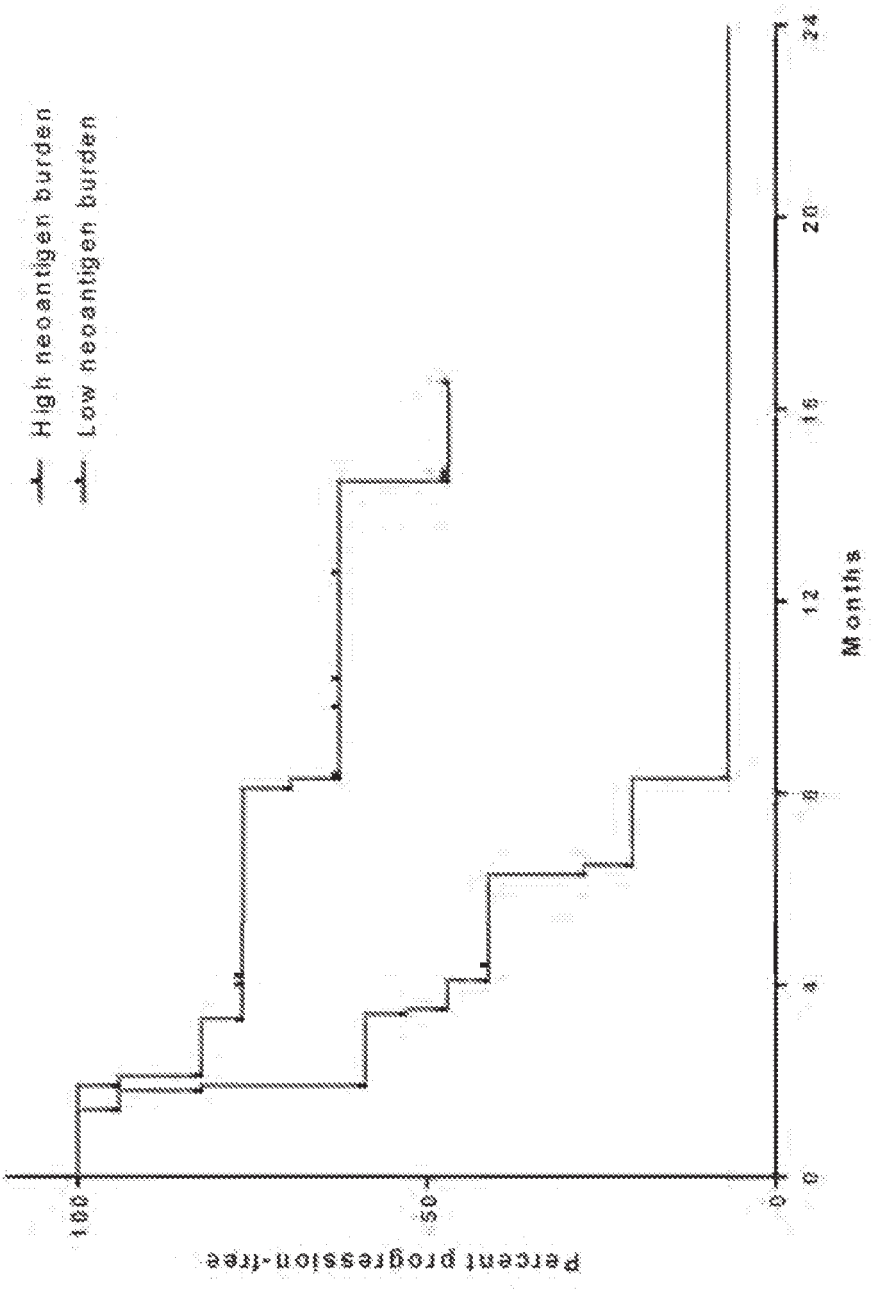

Neoantigen burden
High neoantigen burden
Low neoantigen burden
Percent progression-free
100
50
0
0
4
8
12
16
20
24
Months

Figure 4B

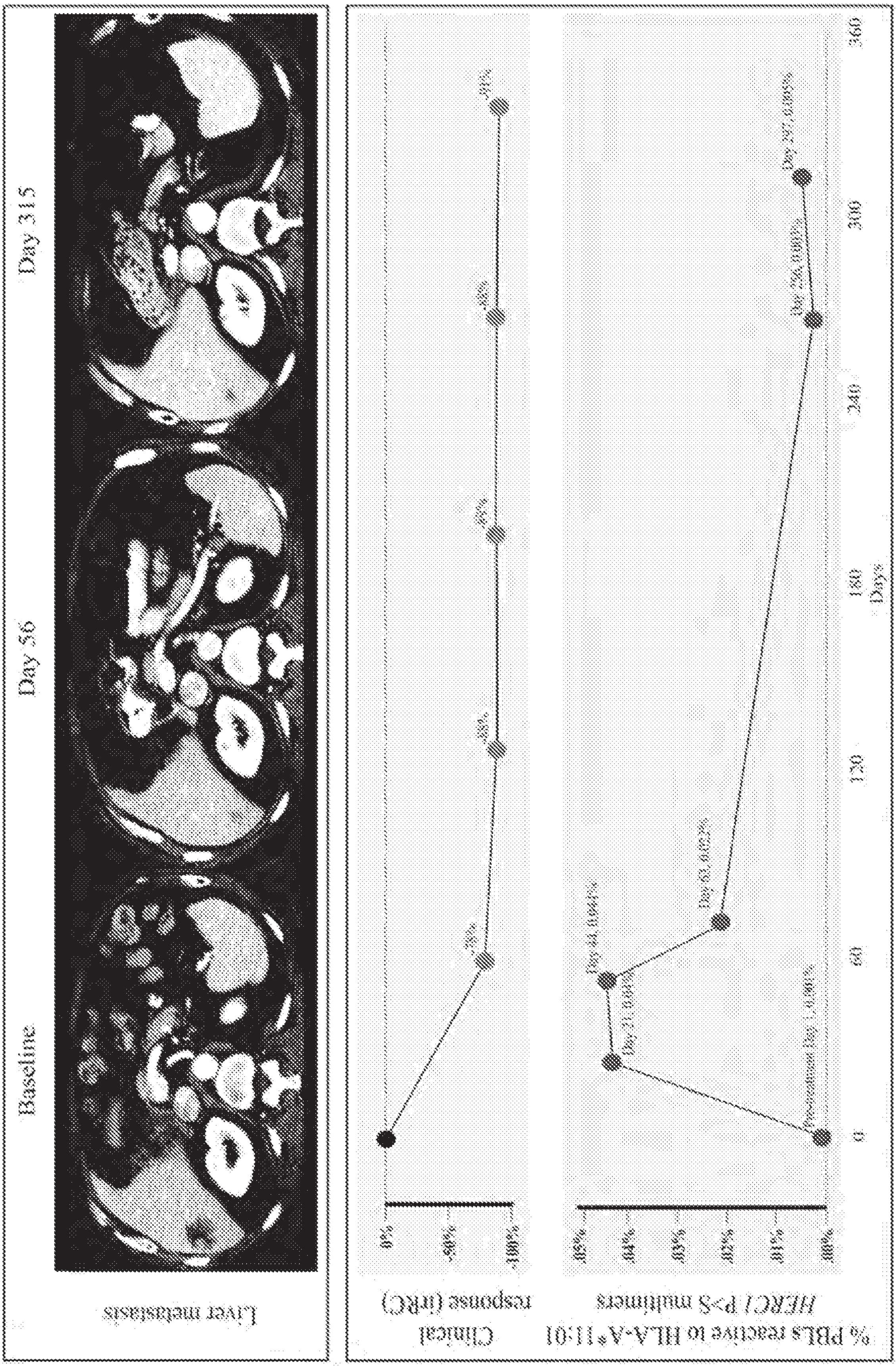
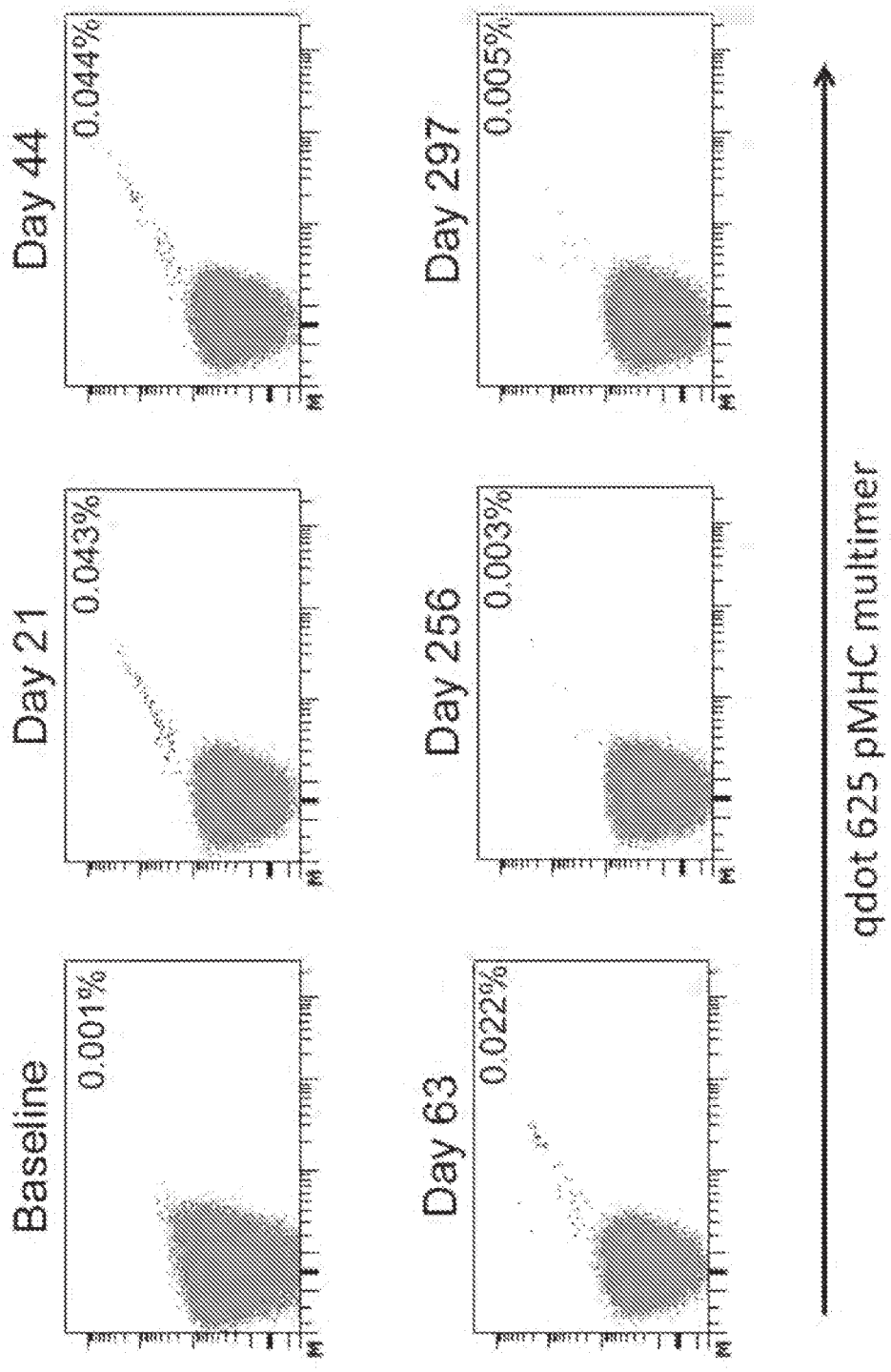

Liver metastasis
Baseline
Day 56
Day 315
Clinical response (irRC)
0%
-50%
-100%
% PBLs reactive to HLA-A*11:01 HERC1 P>S multimers
Days
0
60
120
180
240
300
360

Figure 4C

Figure 4D


Baseline
0.001%
Day 21
0.043%
Day 44
0.044%
Day 63
0.022%
Day 256
0.003%
Day 297
0.005%
BV421 pMHC multimer
qdot 625 pMHC multimer

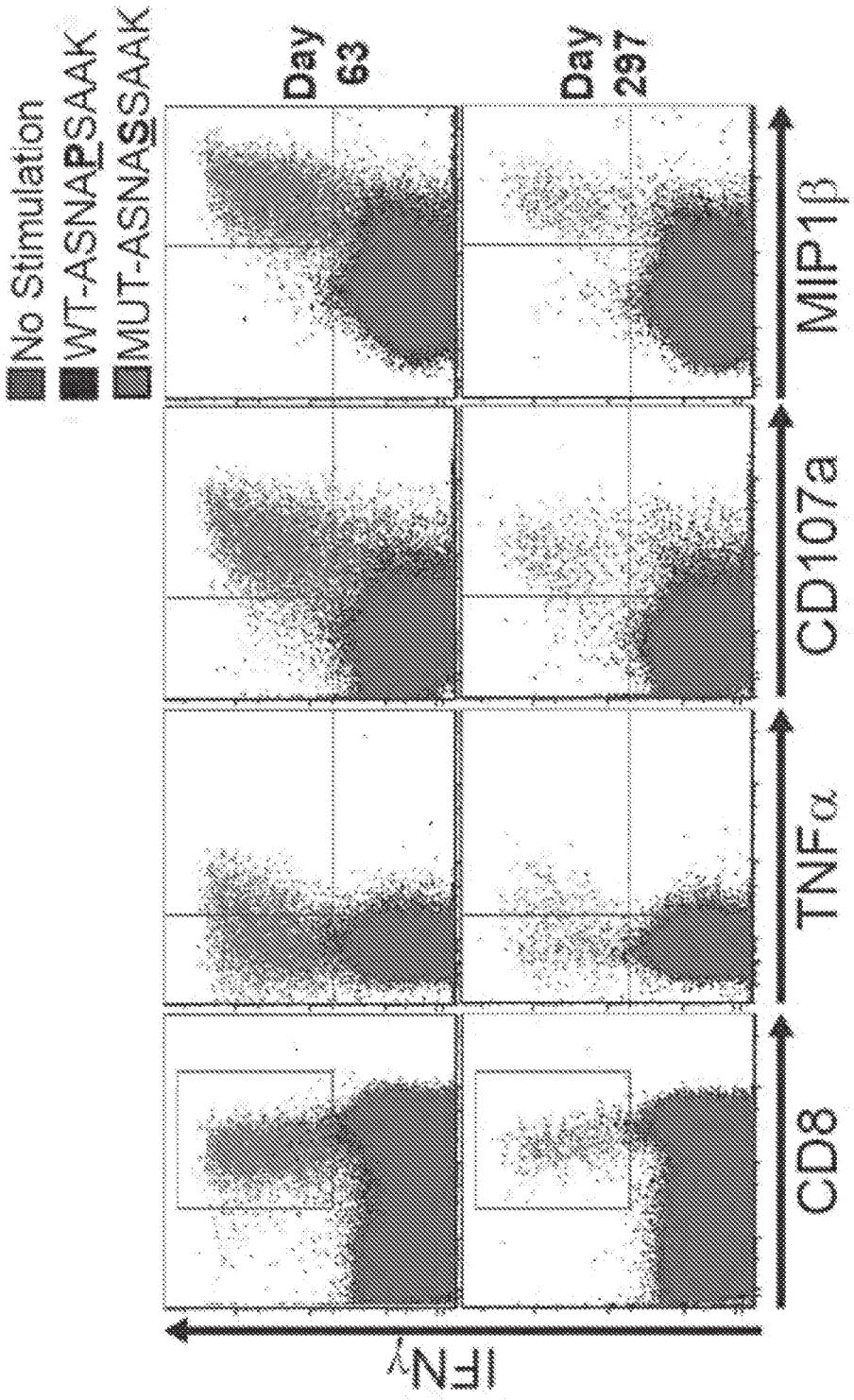

No Stimulation
WT-ASNAPSAAK
MUT-ASNASSAAK
Day 63
Day 297
IFNγ
CD8
TNFα
CD107a
MIP1β

Figure 4E

Figure 5

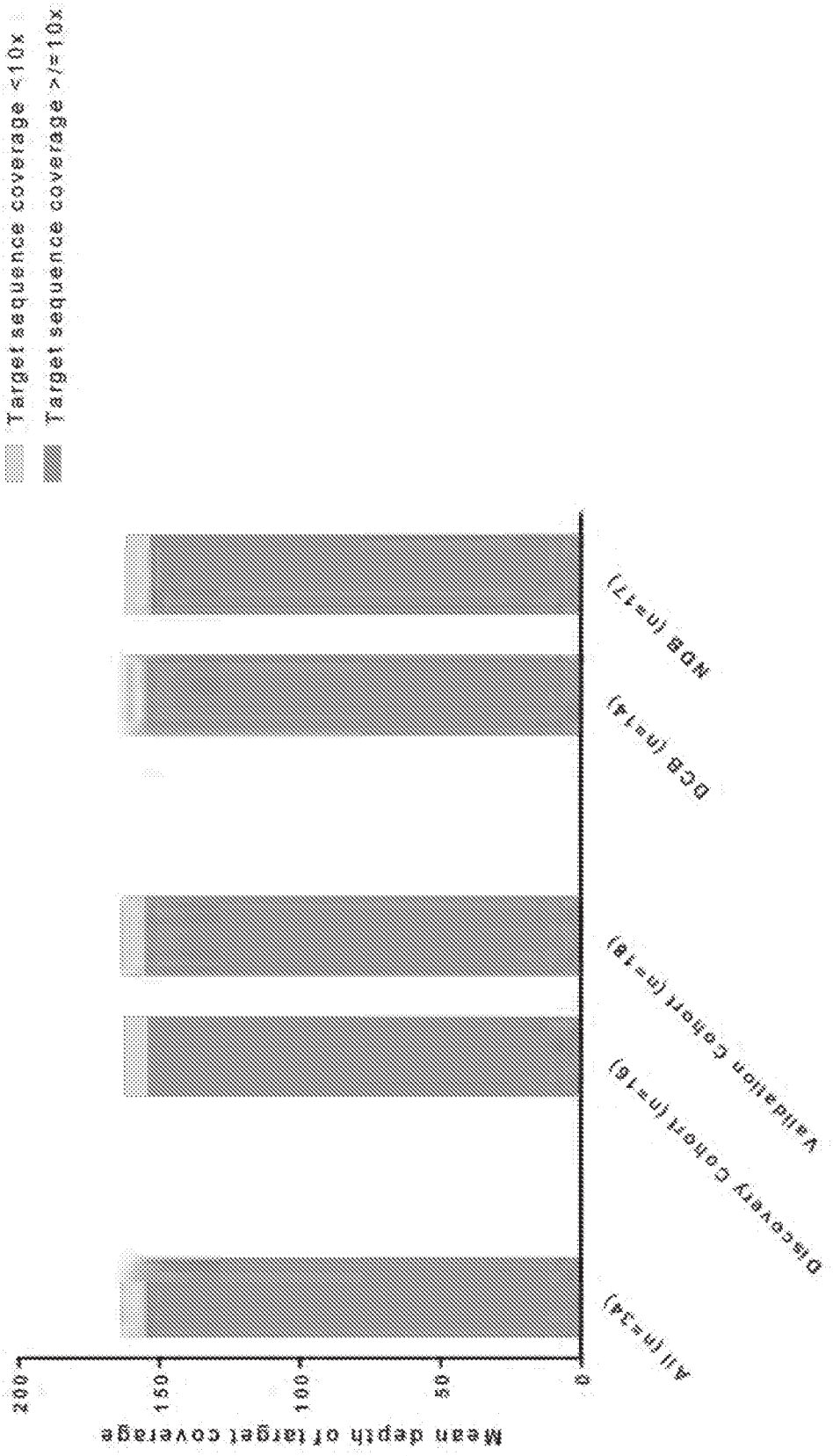
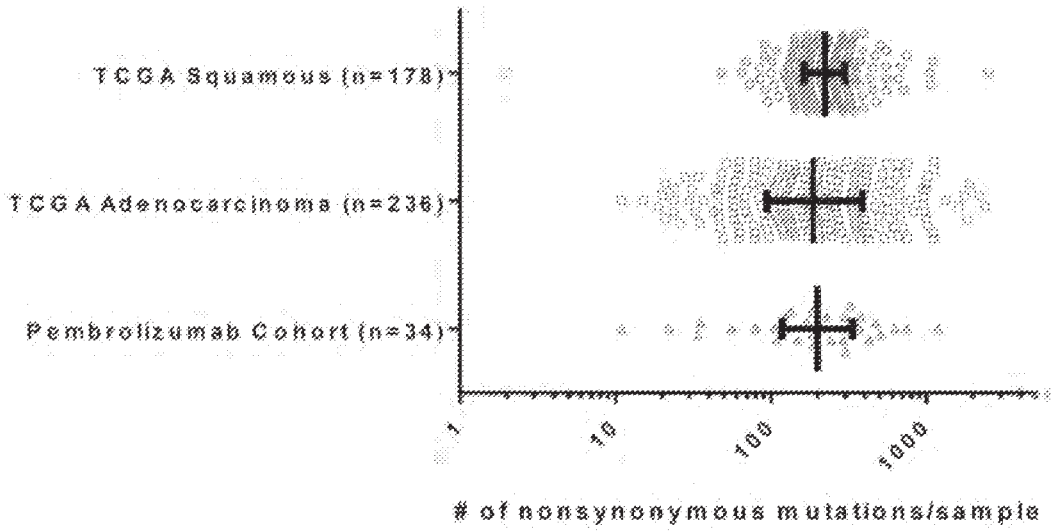


Figure 5: Coverage and depth of target exome sequence. Coverage and depth of sequenced exomes is similar in discovery compared to validation cohorts and is similar in those with durable clinical benefit (DCB) compared to those with no durable benefit (NDB).

Figure 6

Figure 6. Exome analysis pipeline.

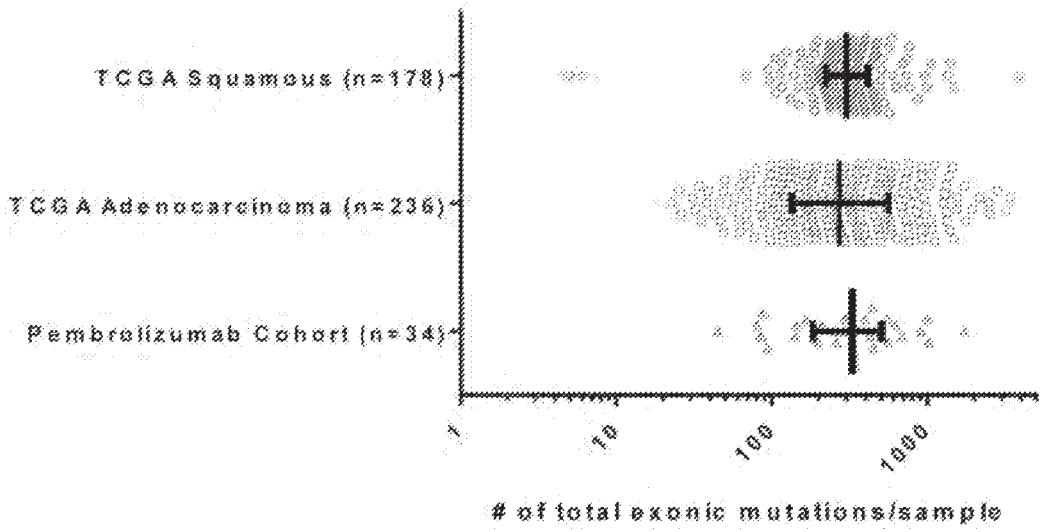
Figure 7A



	Pembrolizumab Cohort	TCGA Lung Adenocarcinoma [10]	TCGA Lung Squamous Cell Carcinoma [12]
Number of values	34	236	178
Minimum	11	11	0
25% Percentile	118.8	93.5	163.5
Median	199.5	188	222.5
75% Percentile	335	387.8	298.5
Maximum	1192	2402	2508

Figure 7A: Median and interquartile range of mutations in the current study and in published series of NSCLC (*13*, *14*). (A) Somatic nonsynonymous mutation burden.

Figure 7B



	Pembrolizumab Cohort	TCGA Lung Adenocarcinoma	TCGA Lung Squamous Cell Carcinoma
Number of values	34	236	178
Minimum	94	22	3
25% Percentile	235.3	131	219.5
Median	420	264.5	296
75% Percentile	602.3	546	409.8
Maximum	2219	3306	3889

Figure 7B: Median and interquartile range of mutations in the current study and in published series of NSCLC (*13*, *14*). (B) Total exonic mutations.

Figure 8

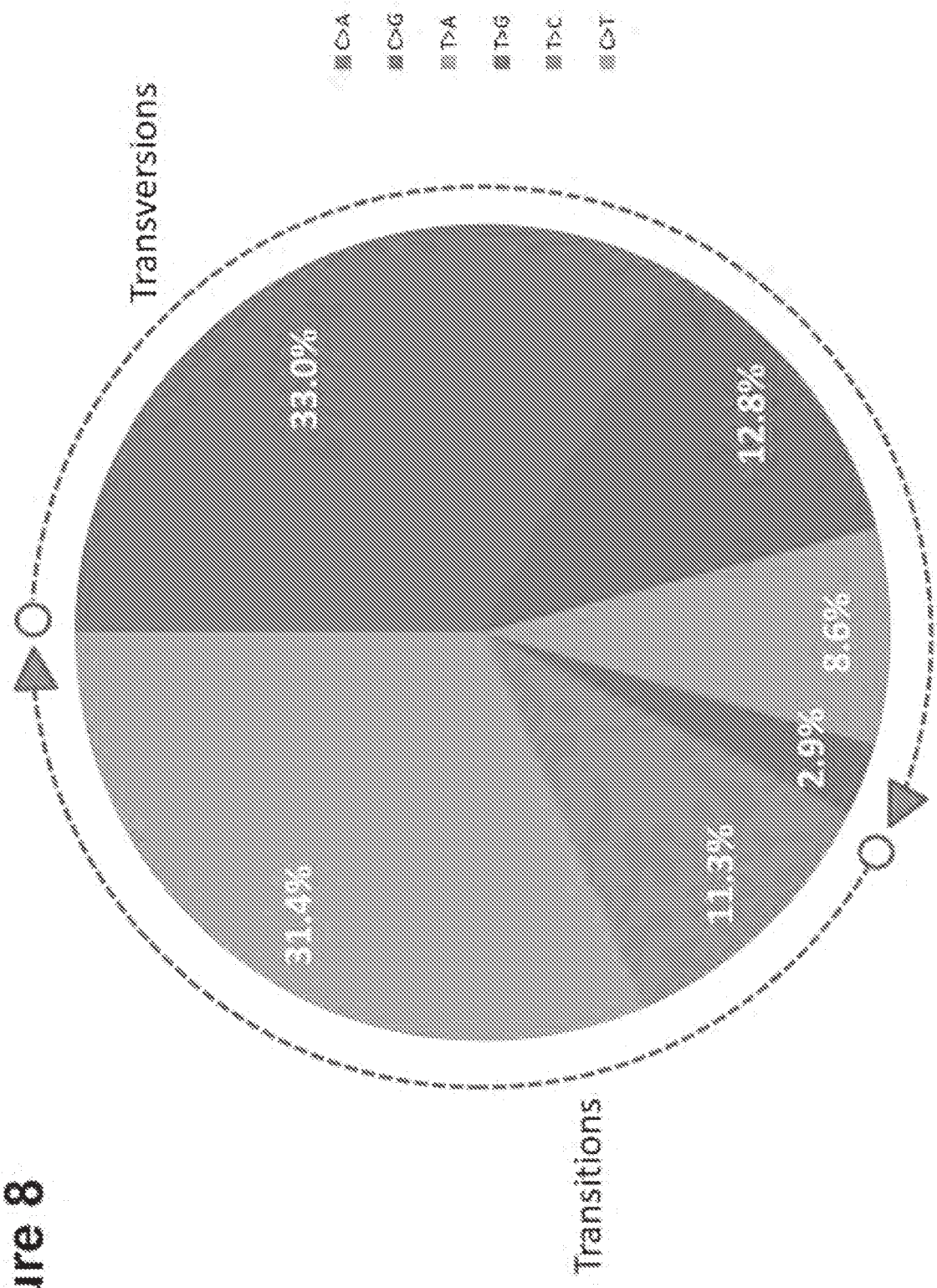


Figure 8: Pattern of nucleotide changes in tumors sequenced. The spectrum and frequency of nucleotide changes in the pembrolizumab-treated NSCLCs is typical of non-small cell lung cancers.

Figure 9

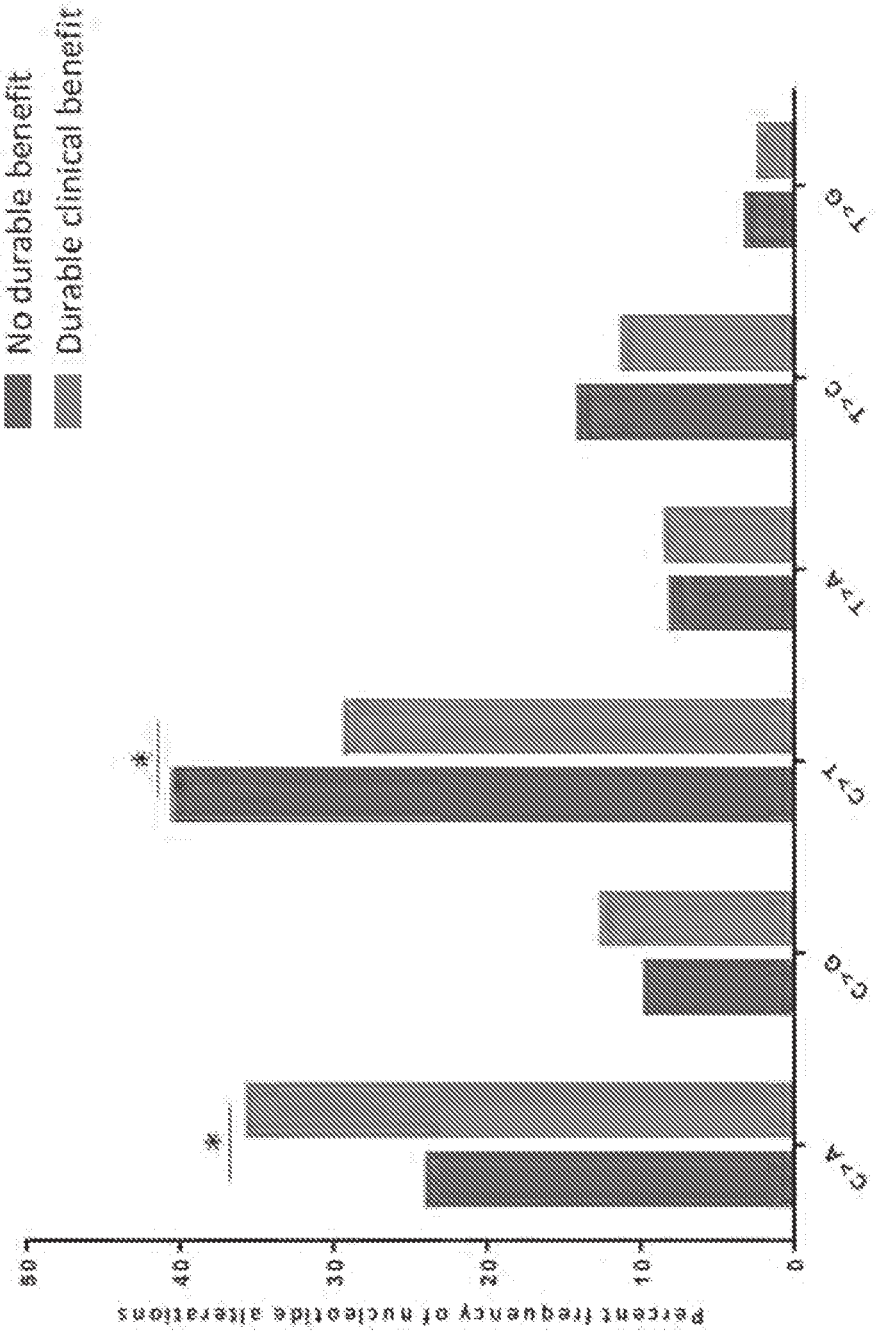


Figure 9: Distribution of nucleotide alterations in nonsynonymous mutations. Across the overall set of sequenced NSCLCs treated with pembrolizumab, C>A transversions are more frequent in those with DCB, while C>T transitions are more frequent in those with NDB (* denotes p=0.01).

Figure 10

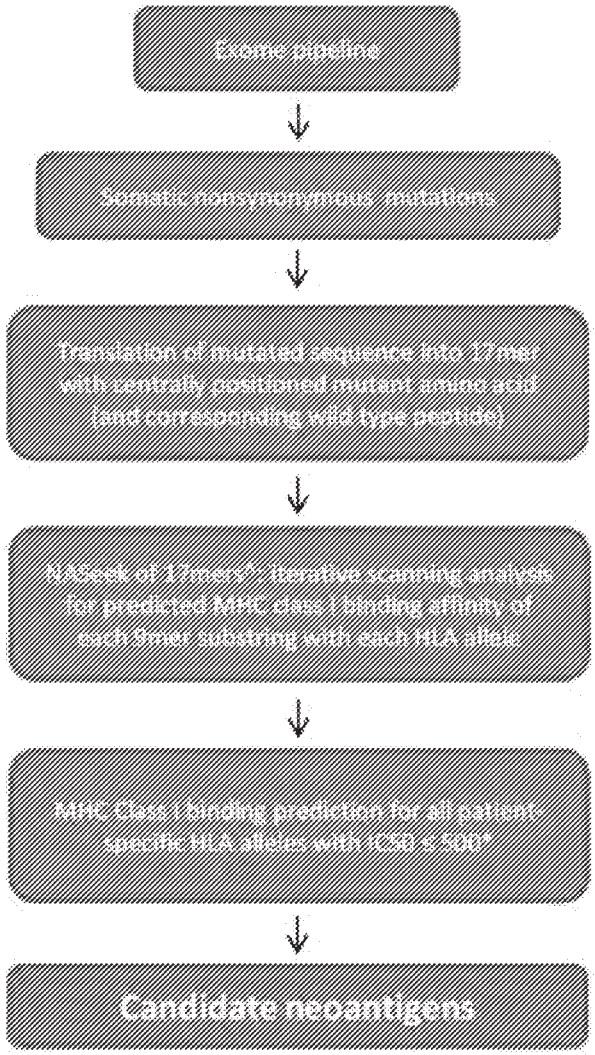


Figure 10. Neoantigen analysis pipeline. ^All steps are executed for predicted wild type and mutant. *MHC Class I prediction by NetMHCv3.4

Figure 11

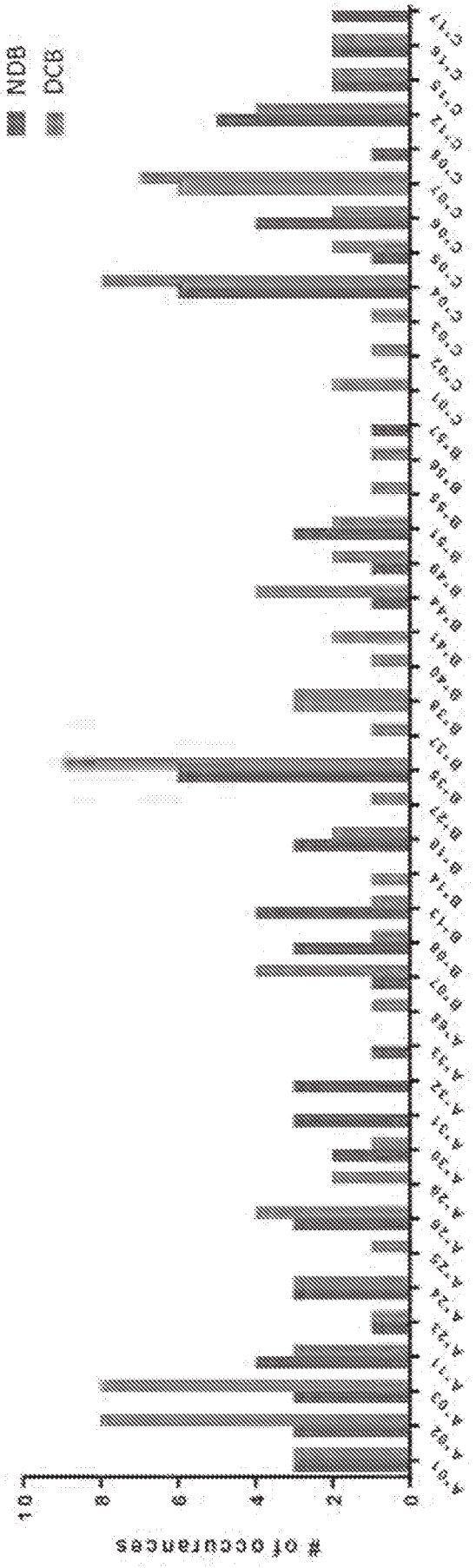


Figure 11: HLA type and benefit to pembrolizumab. There was no evident association between the presence of any specific HLA allele and benefit from pembrolizumab.

Figure 12

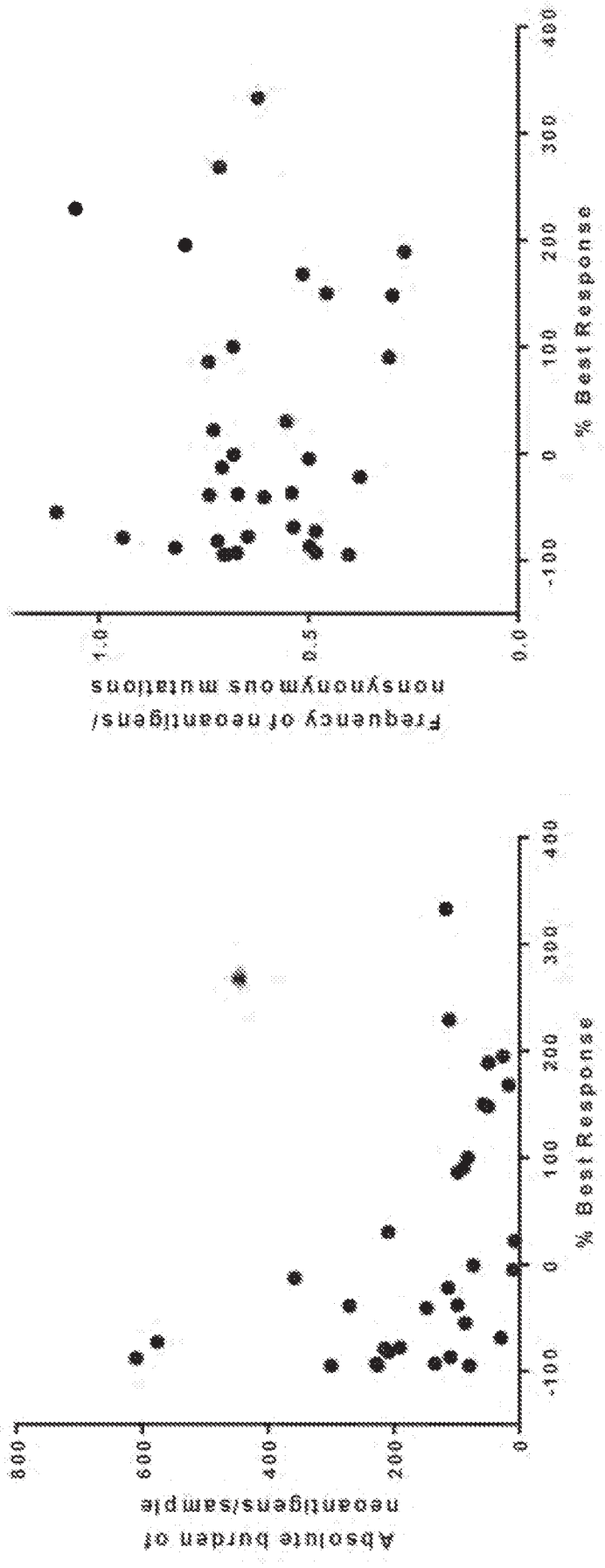


Figure 12: Neoantigens and best objective response. The absolute quantity of predicted neoantigens correlates with best overall response (Spearman ρ -0.43, 95% CI -0.68- -0.10, p=0.01), but the frequency of neoantigens/nonsynonymous mutation does not (Spearman ρ -0.04, 95% CI -0.39-0.30, p=0.78).

Figure 13A

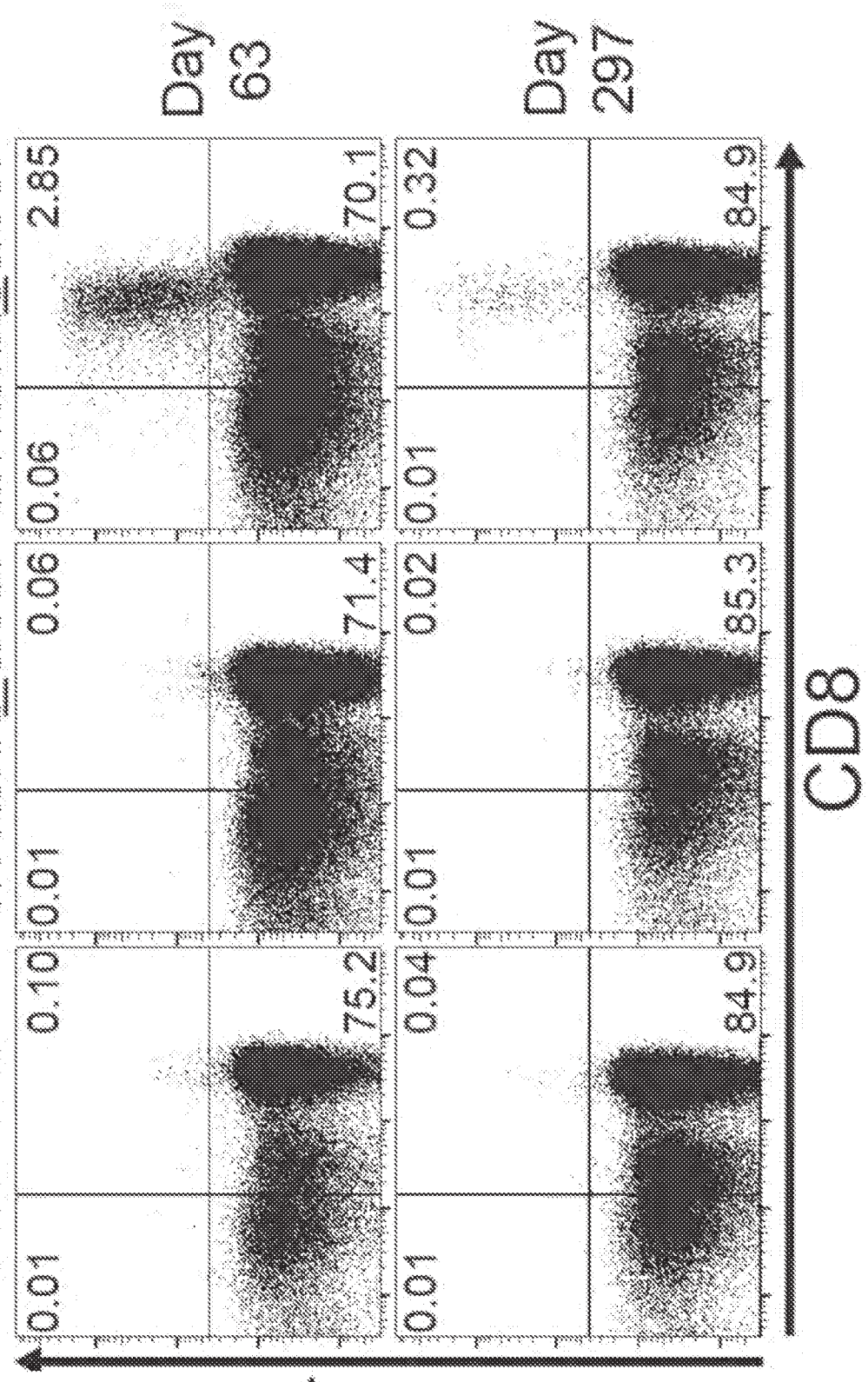


Figure 13A: Following expansion, stimulation of peripheral blood mononuclear cells with wild type or mutant peptide versus no stimulation control shows a polyfunctional CD8+ T cell response to the mutant peptide only. (A) Neoantigen-induced IFNγ production by CD3+CD8+ T-cells at day 63 and day 297 after initiation of therapy.

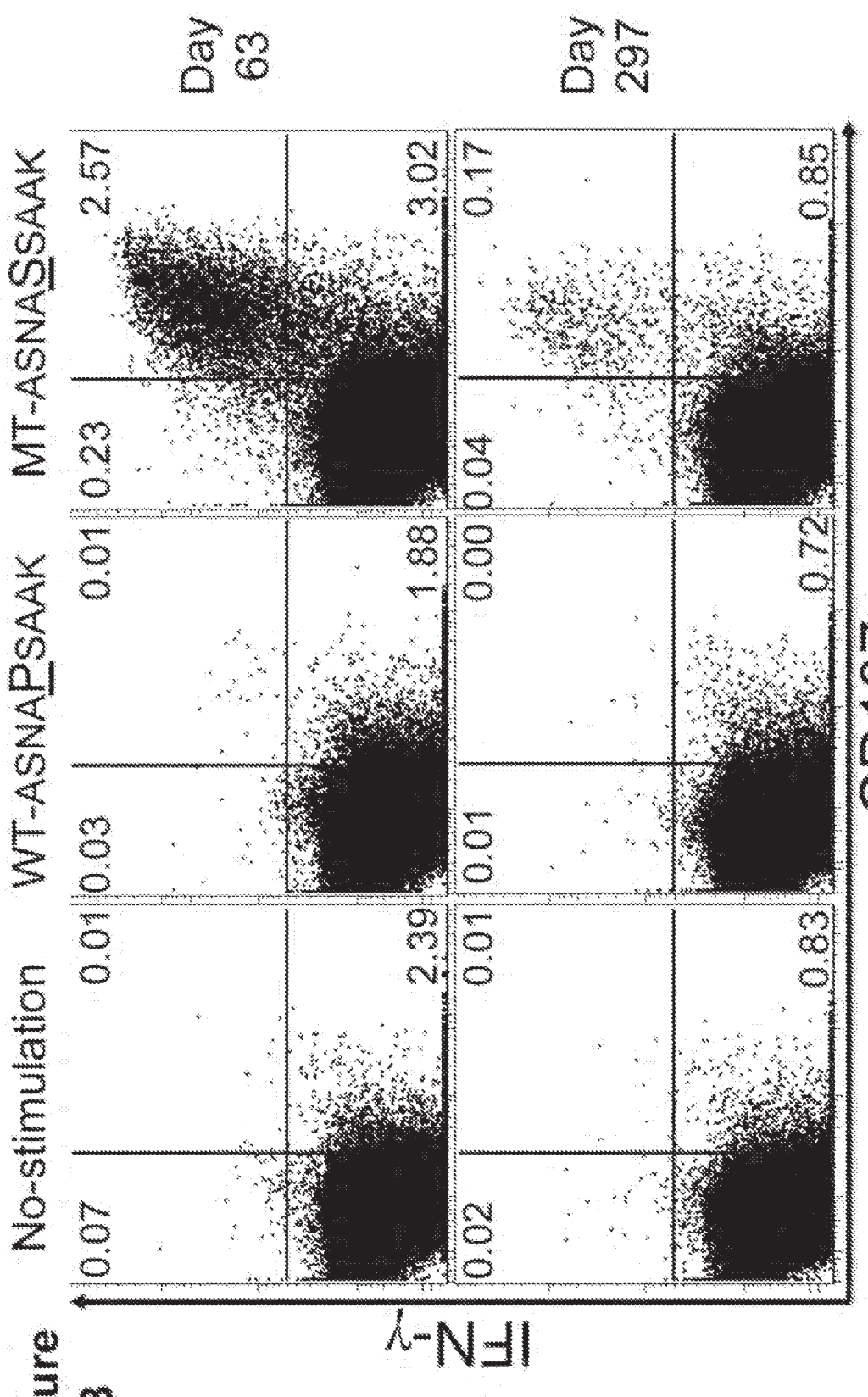


Figure 13B

Figure 13B: Following expansion, stimulation of peripheral blood mononuclear cells with wild type or mutant peptide versus no stimulation control shows a polyfunctional CD8+ T cell response to the mutant peptide only. (B) Co-staining of CD107a in CD3+CD8+IFNγ+ cells when stimulated with mutant peptide versus no stimulation or wild type.

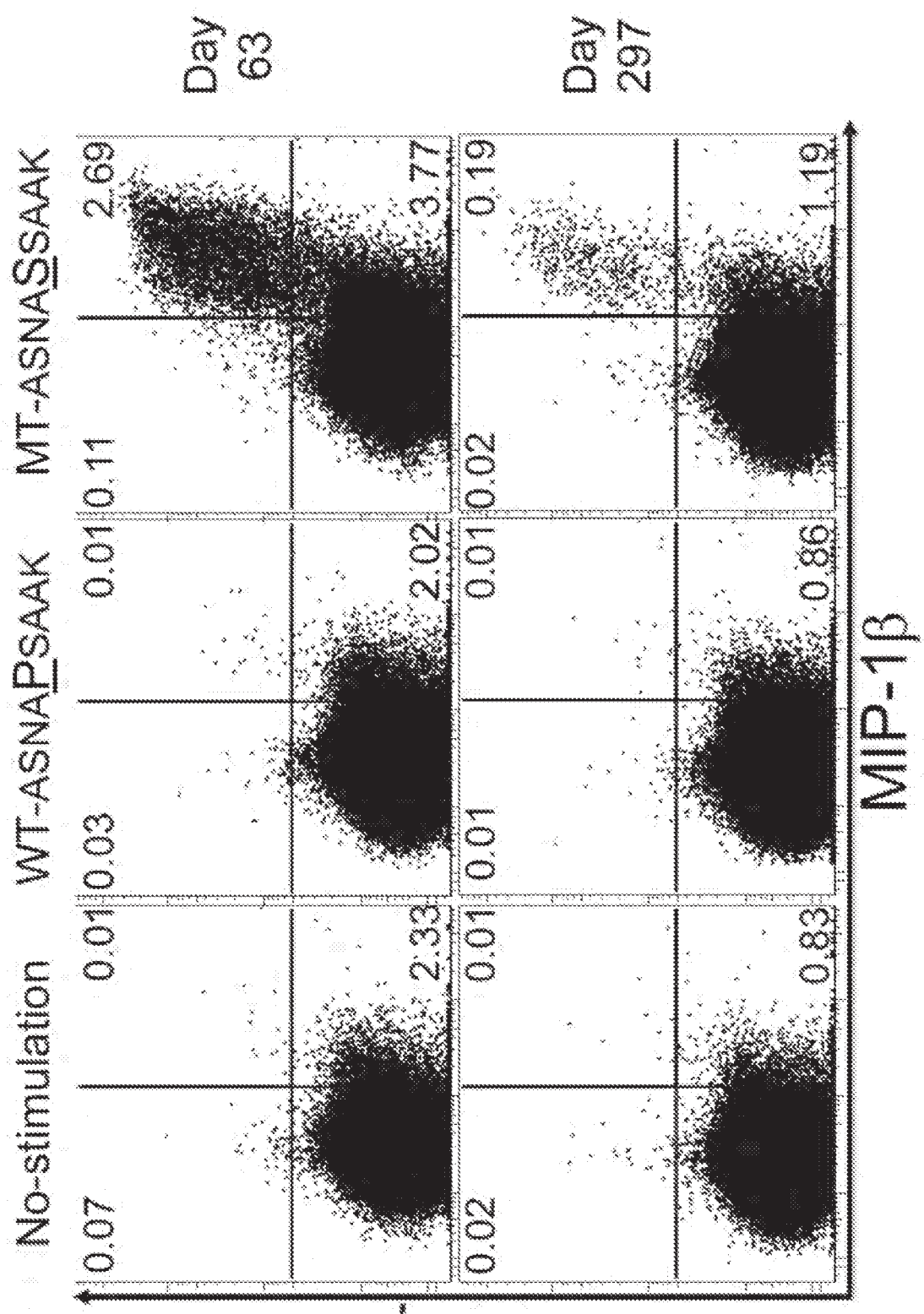


Figure 13C

Figure 13C: Following expansion, stimulation of peripheral blood mononuclear cells with wild type or mutant peptide versus no stimulation control shows a polyfunctional CD8+ T cell response to the mutant peptide only. (C) Co-staining of MIP-1β in CD3+CD8+IFNγ+ cells when stimulated with mutant peptide versus no stimulation or wild type.

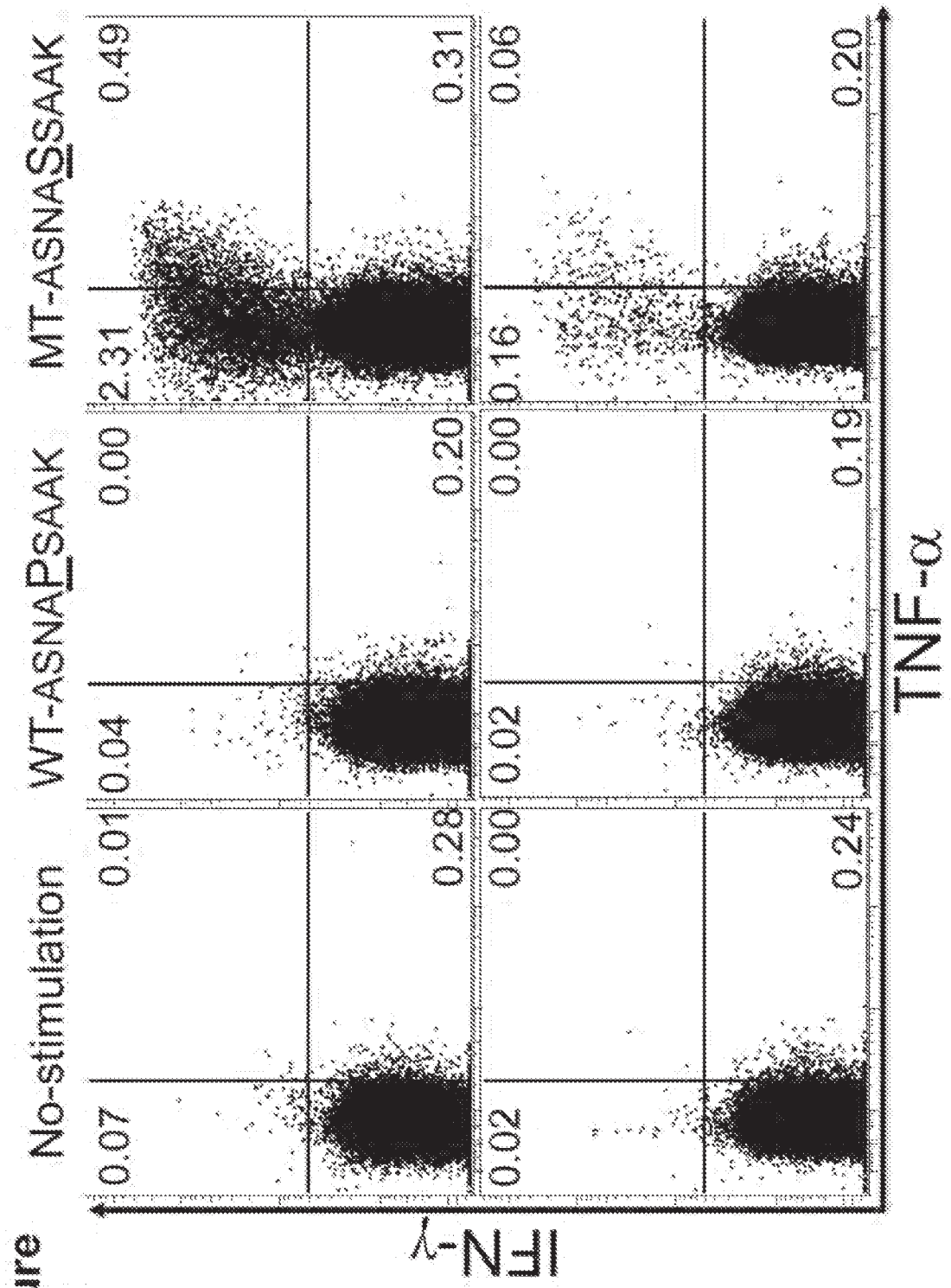
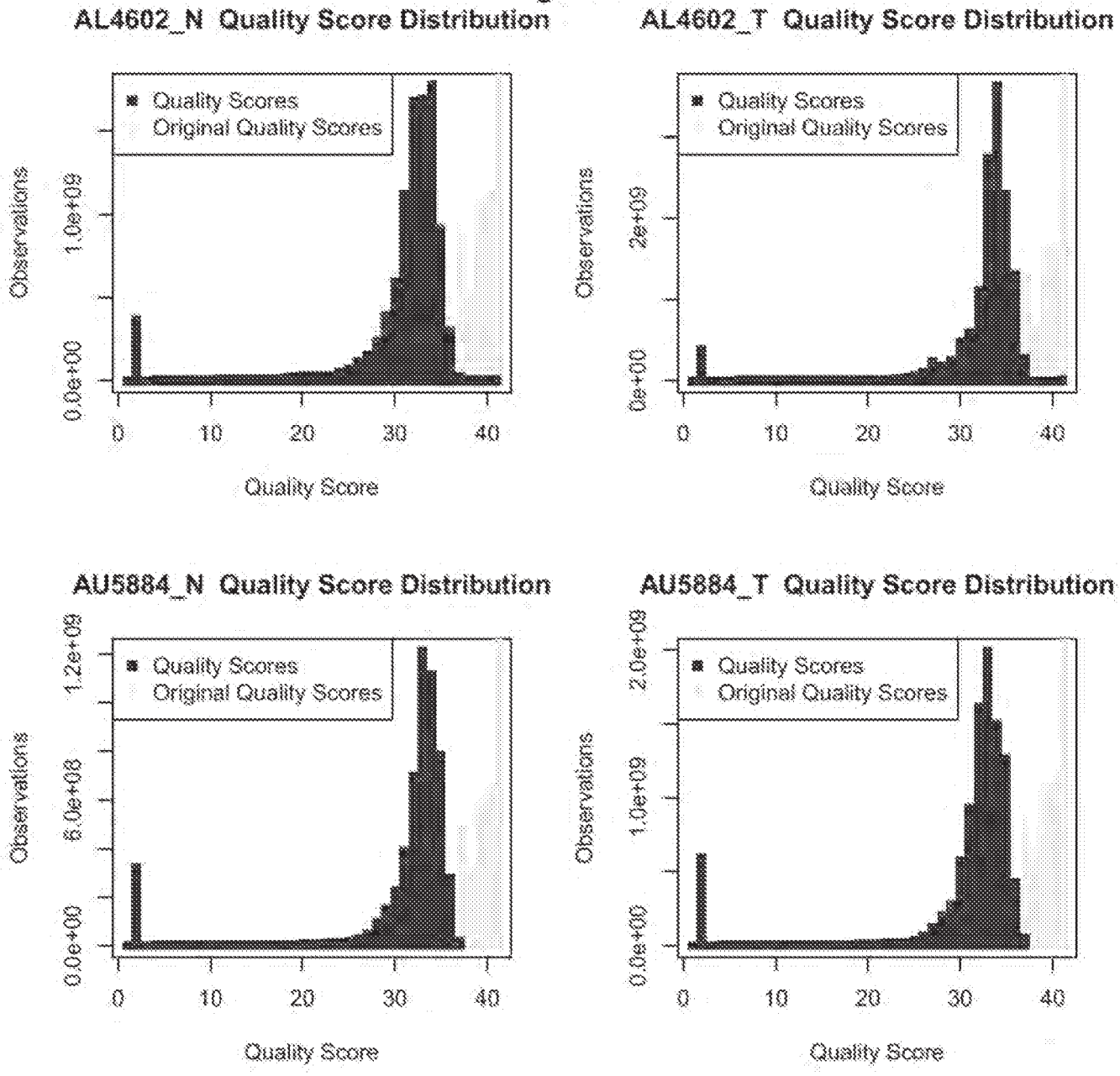


Figure 13D

Figure 13D:Following expansion, stimulation of peripheral blood mononuclear cells with wild type or mutant peptide versus no stimulation control shows a polyfunctional CD8+ T cell response to the mutant peptide only. (D) Co-staining of TNF-α in CD3+CD8+IFNγ+ cells when stimulated with mutant peptide versus no stimulation or wild type.

Figure 14A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AL4602_T Quality Score Distribution
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AU5884_T Quality Score Distribution
Quality Scores
Original Quality Scores
Observations
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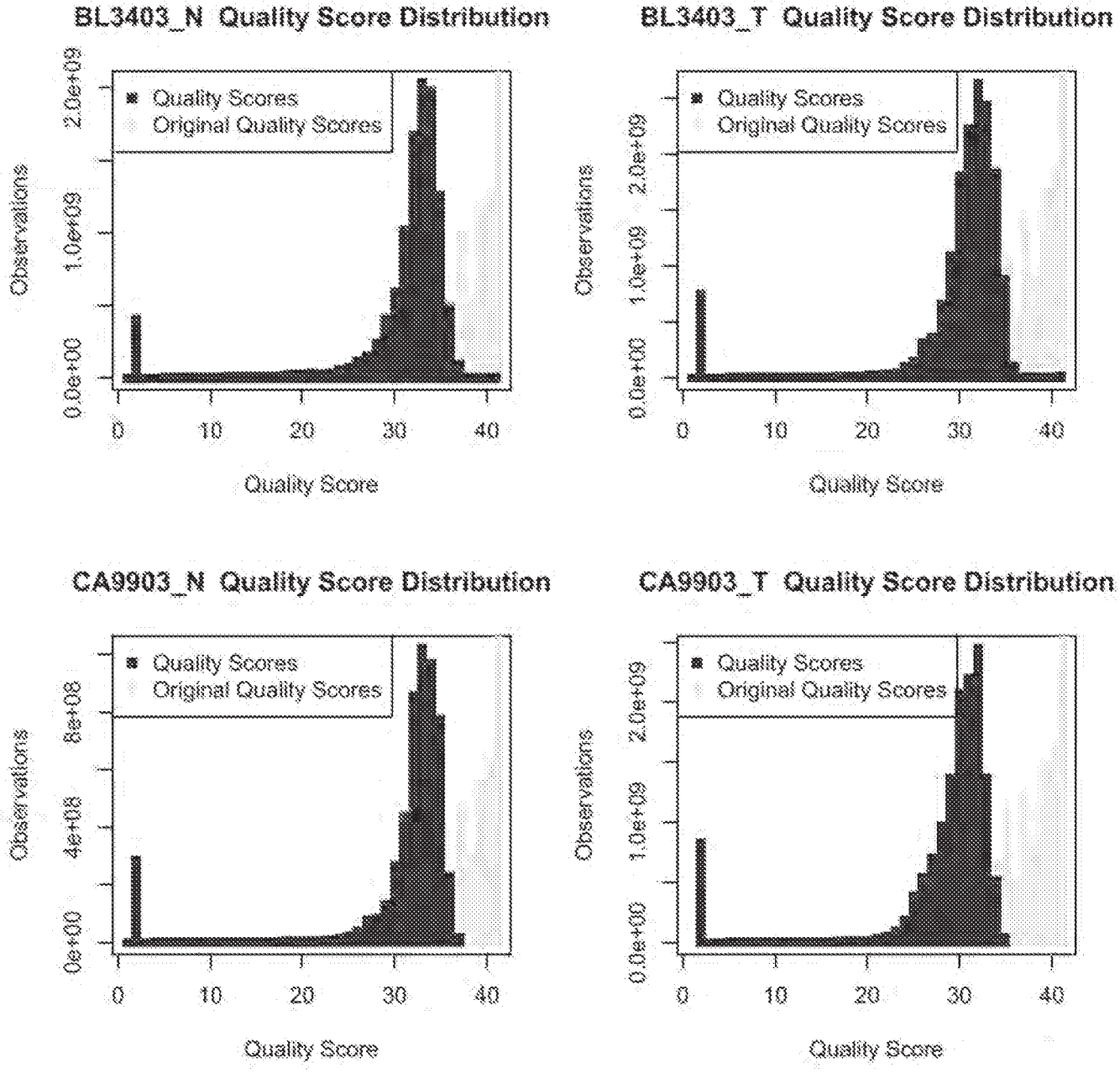
40

Figure 14B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CA9903_T Quality Score Distribution
Quality Scores
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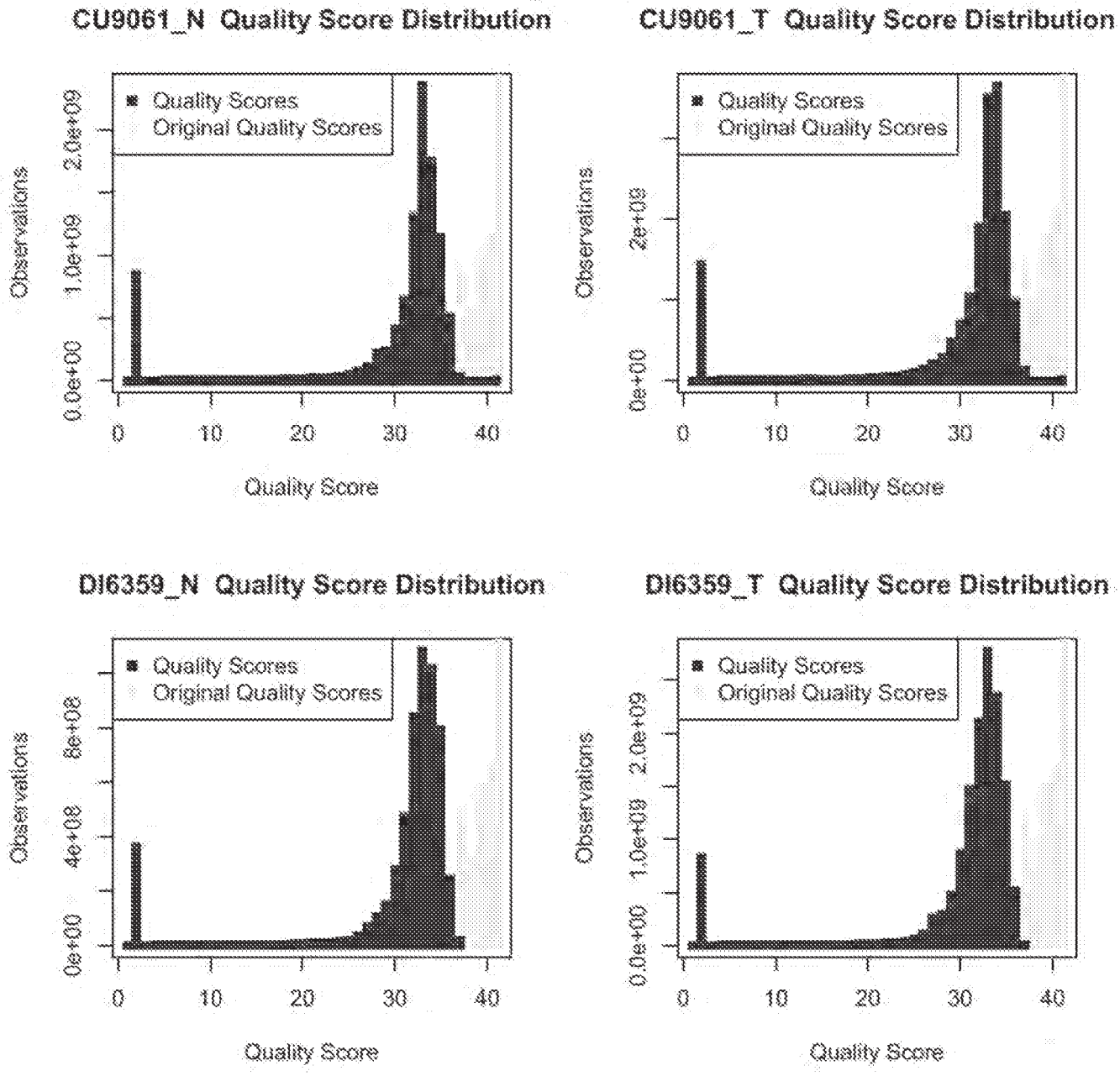
Figure 14C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DI6359_T Quality Score Distribution
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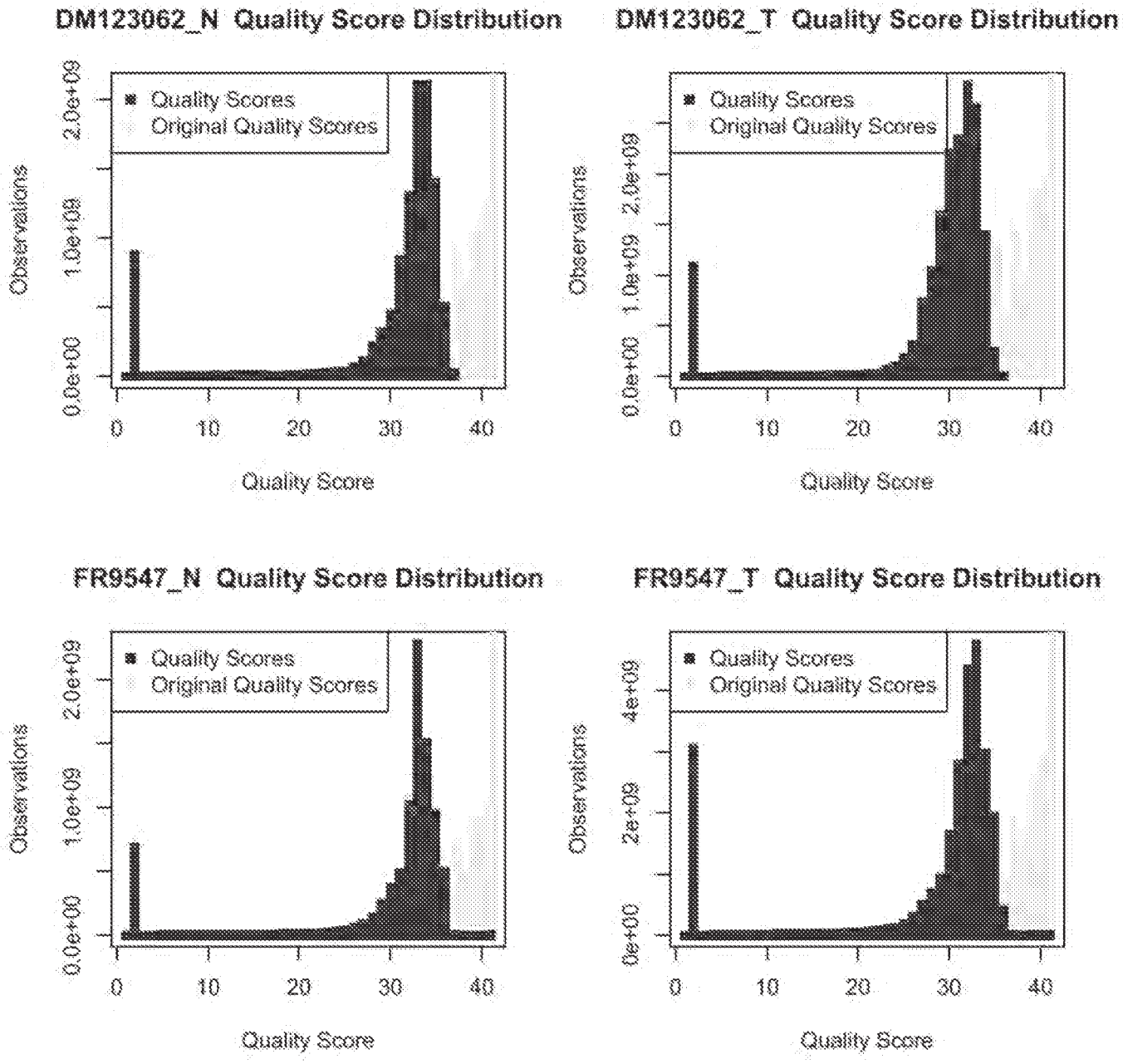
Figure 14D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Observations
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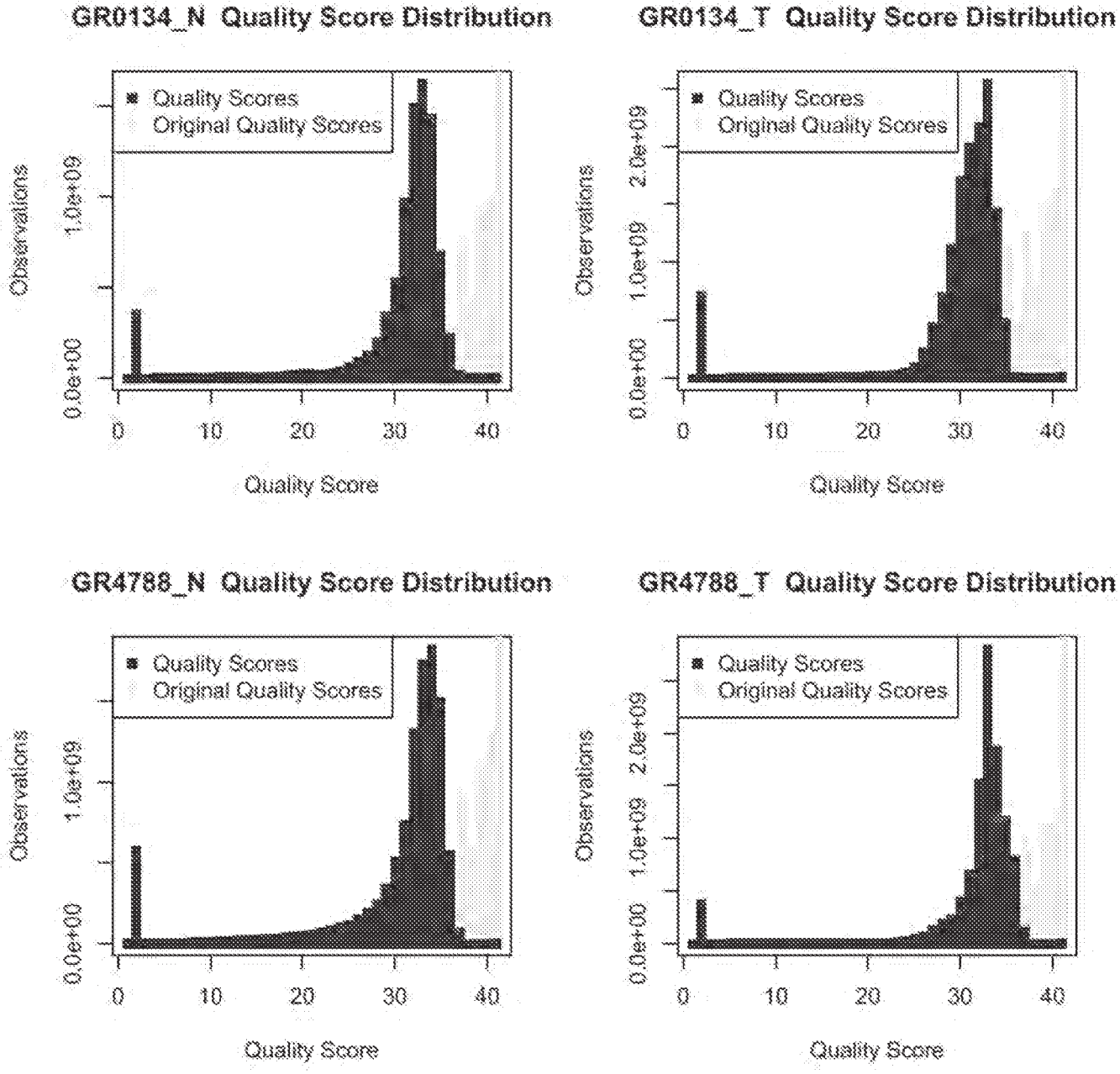
Figure 14E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GR4788_T Quality Score Distribution
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30
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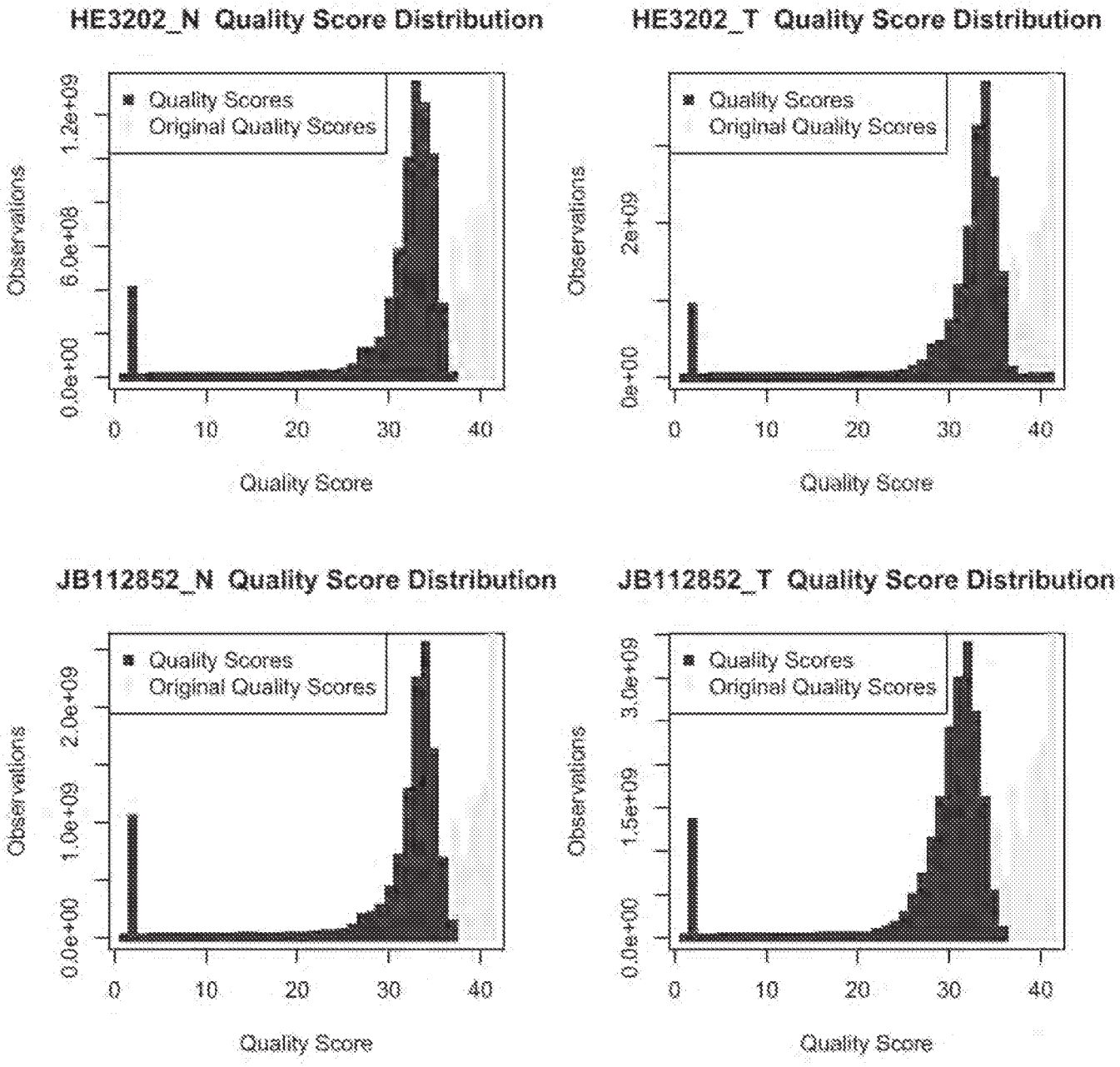
Figure 14F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JB112852_N Quality Score Distribution
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Quality Scores
Original Quality Scores
Observations
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Figure 14G

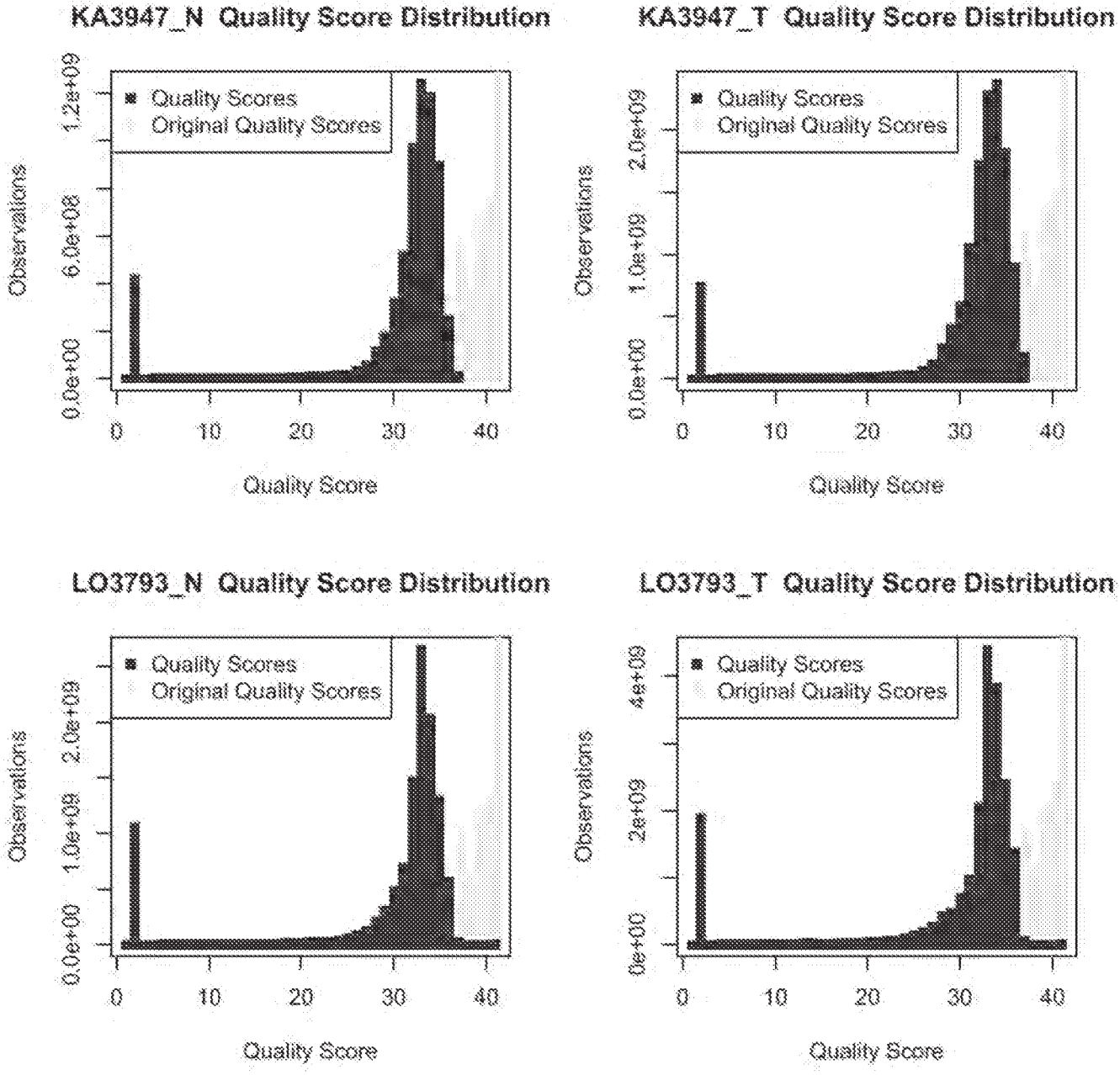
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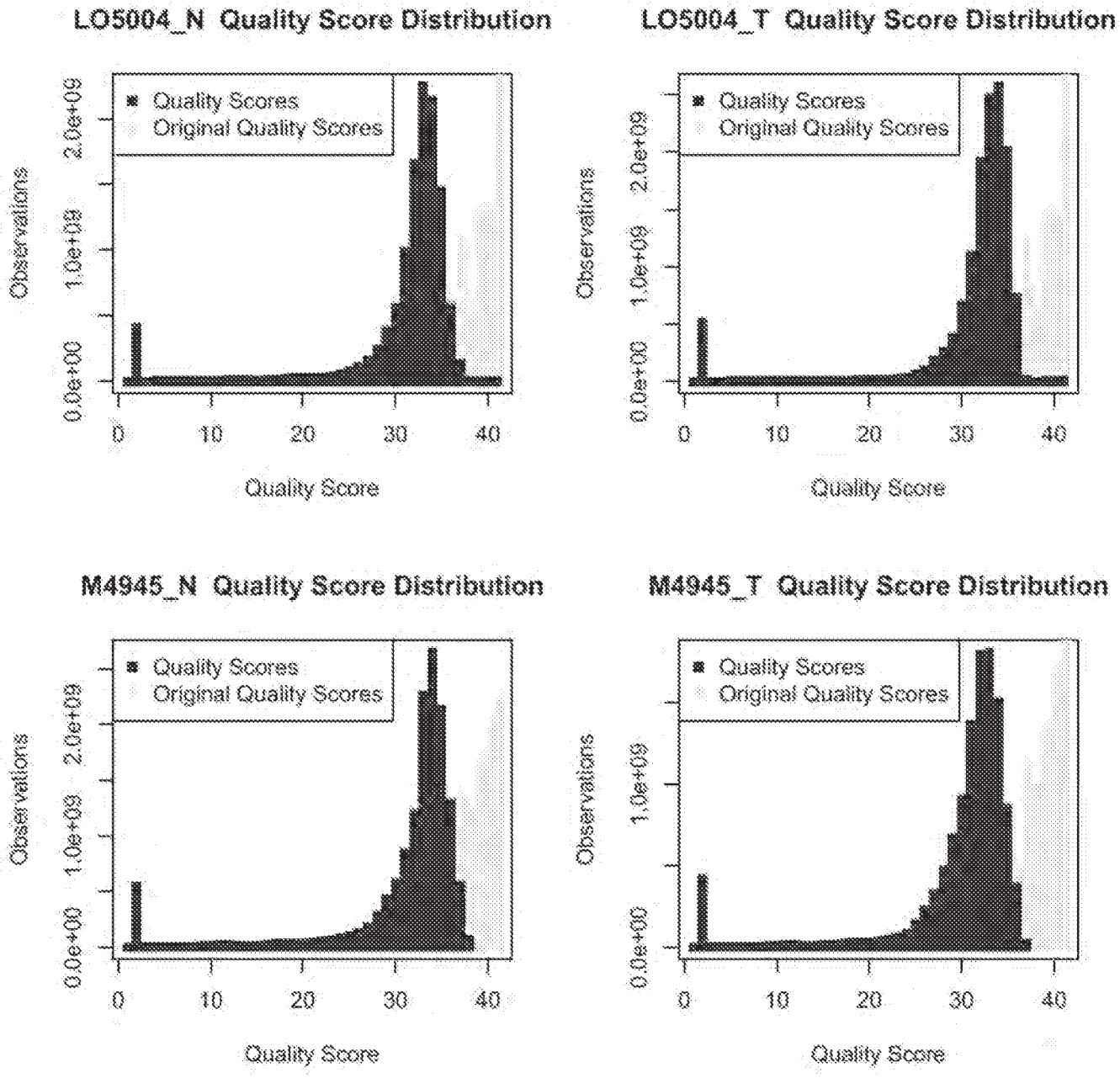
Figure 14H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M4945_N Quality Score Distribution
M4945_T Quality Score Distribution
Quality Scores
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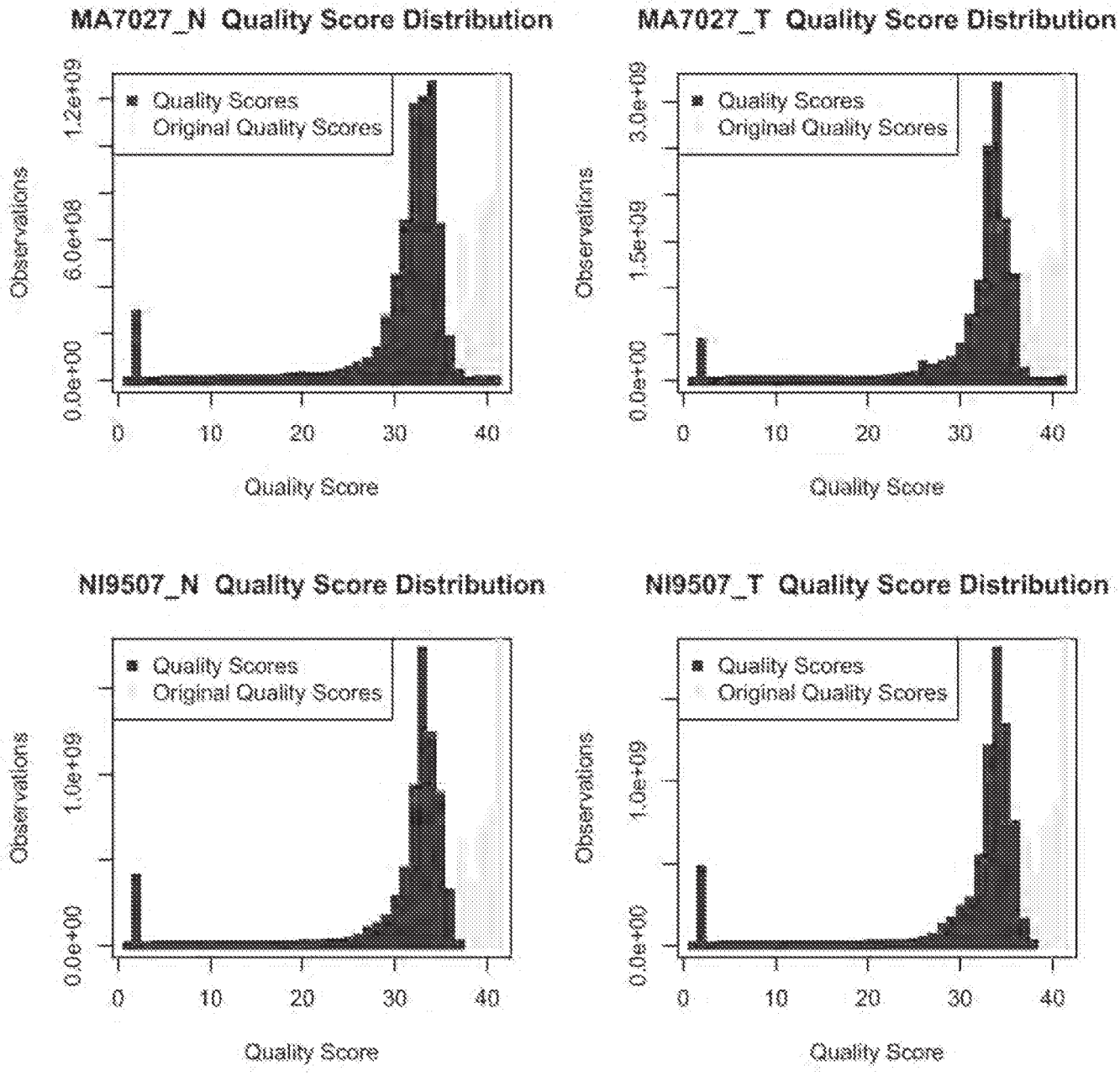
40

Figure 14I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NI9507_T Quality Score Distribution
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Original Quality Scores
Observations
Quality Score
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30
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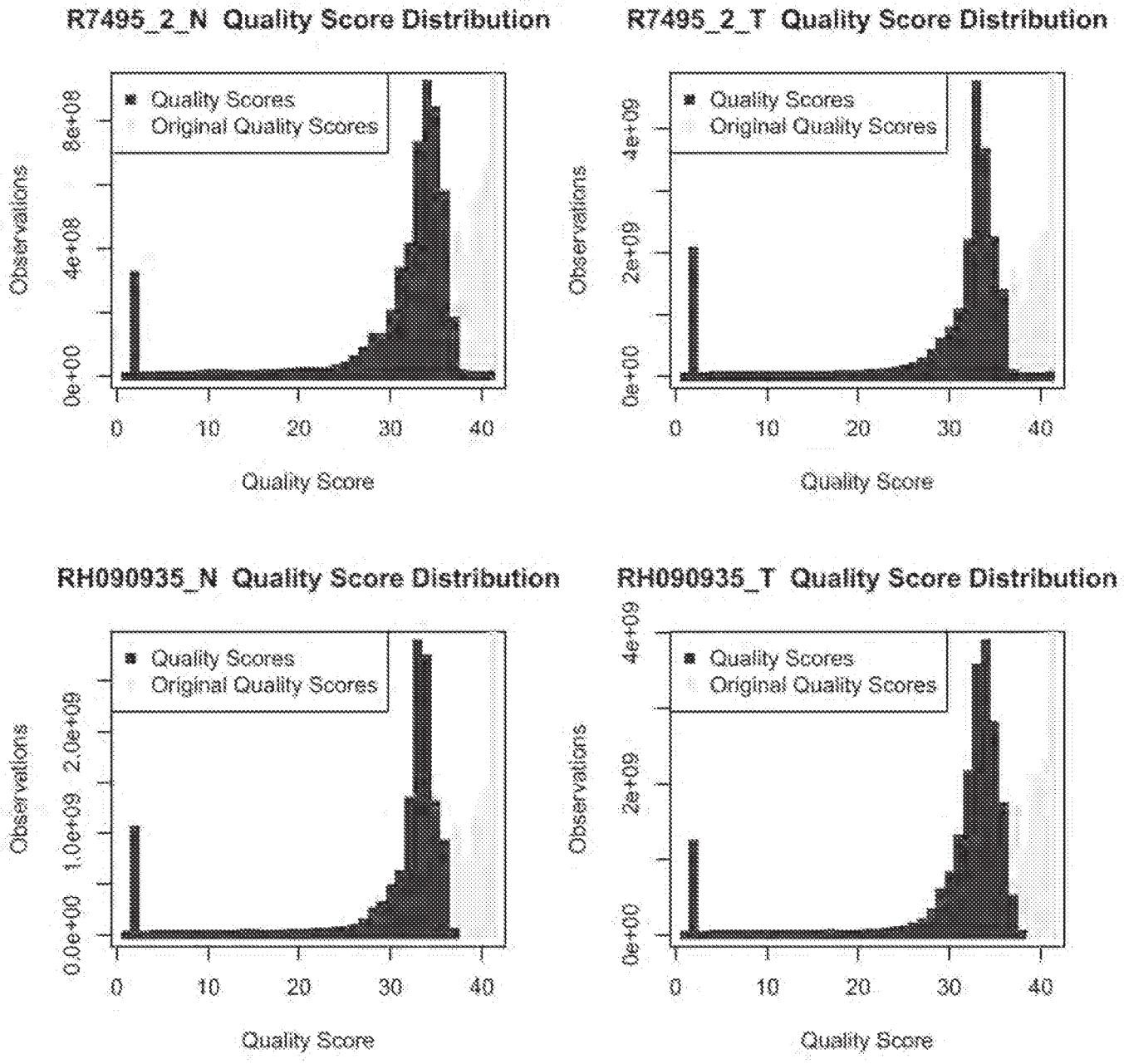
Figure 14J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Observations
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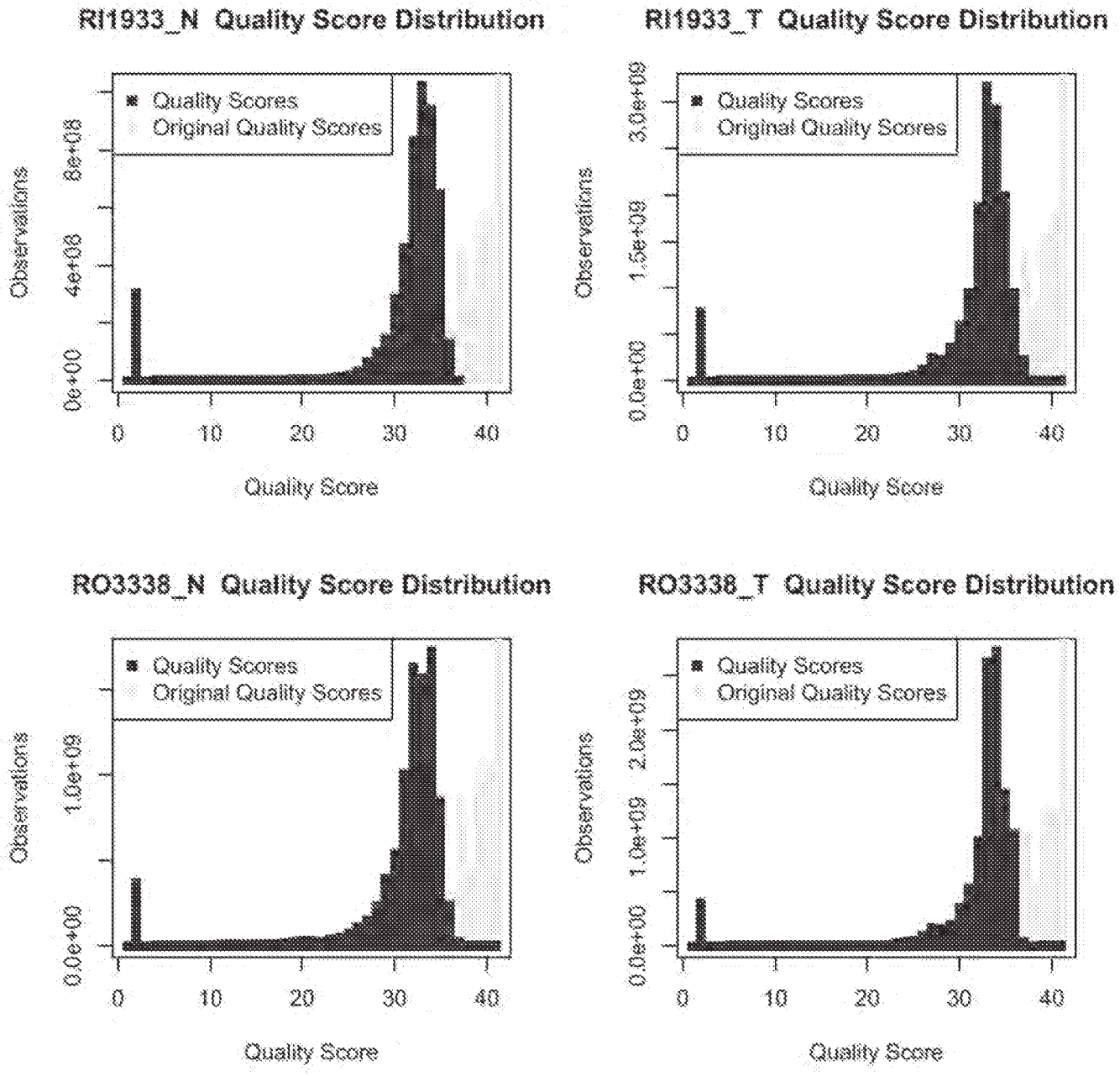
Figure 14K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Observations
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Figure 14L

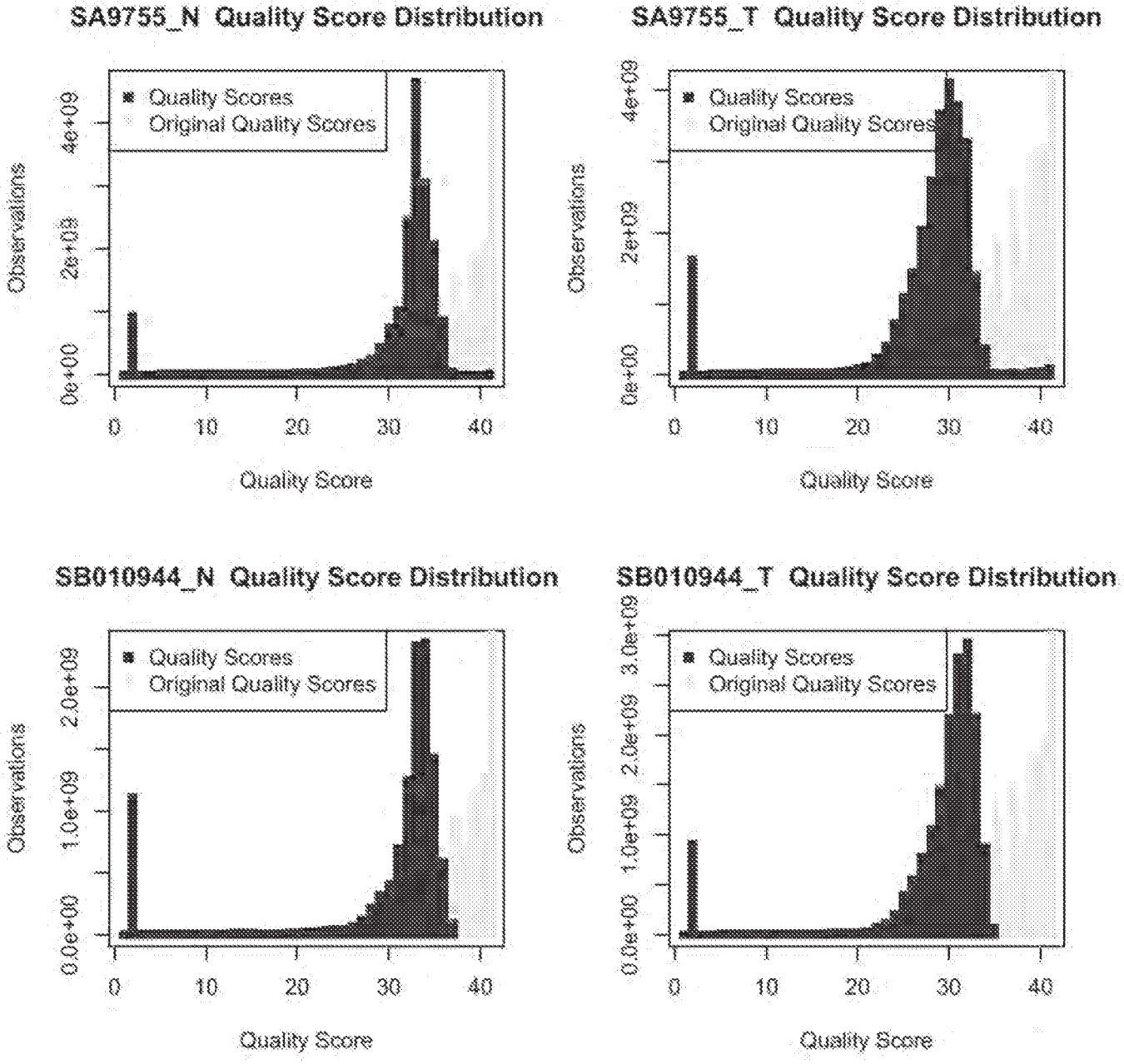
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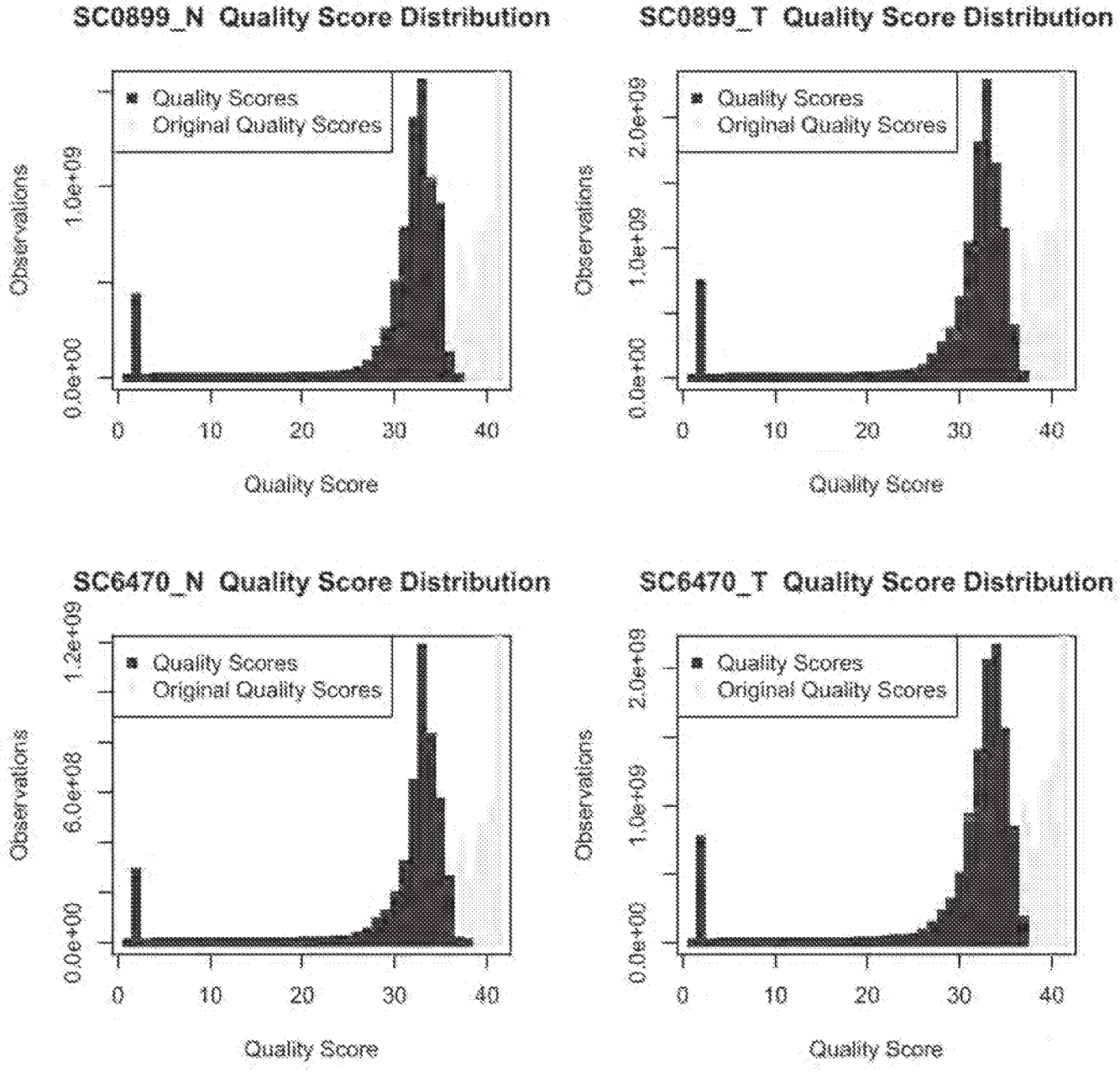
Figure 14M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SC6470_T Quality Score Distribution
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Observations
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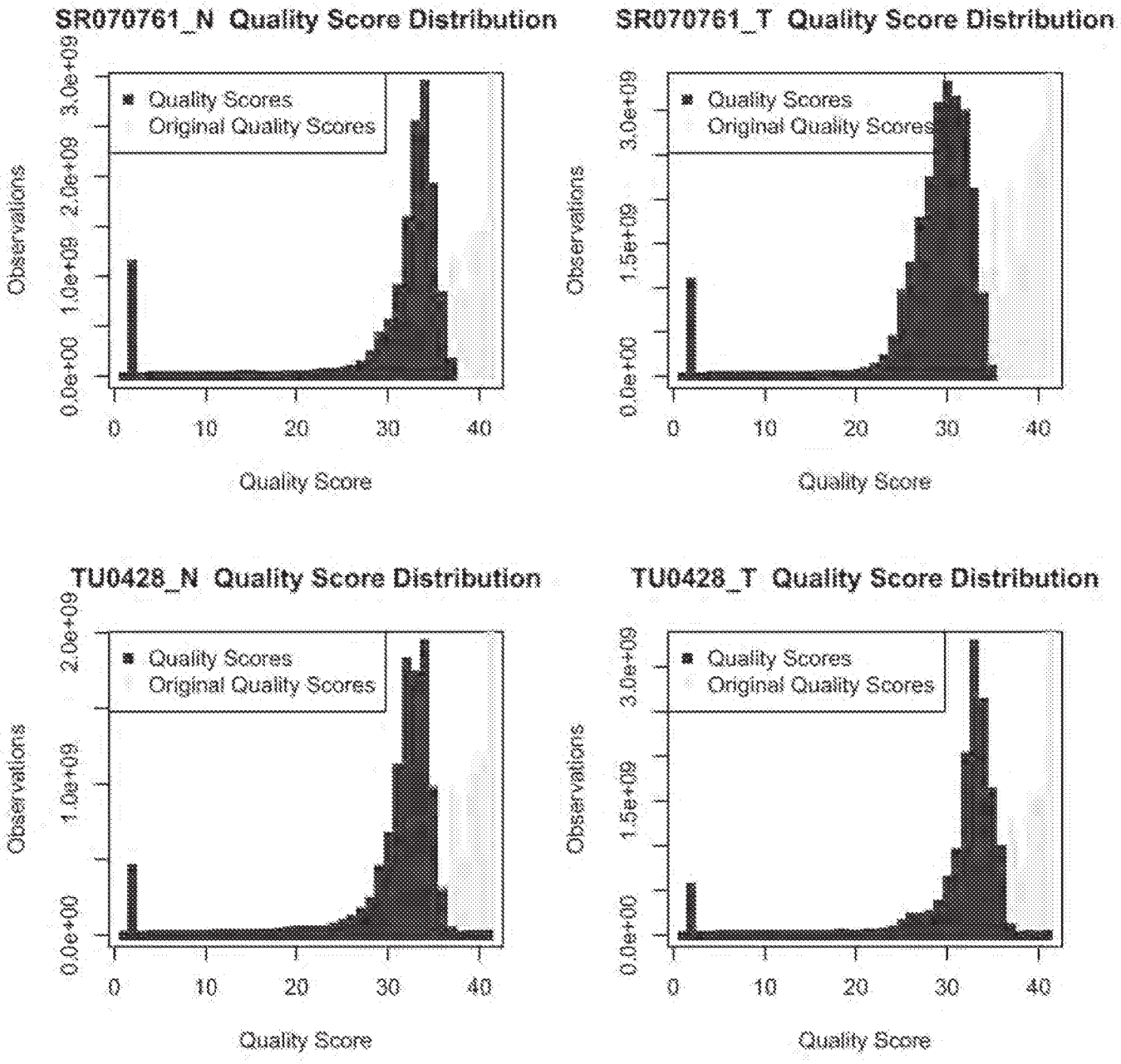
Figure 14N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Quality Scores
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Observations
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40

Figure 14O

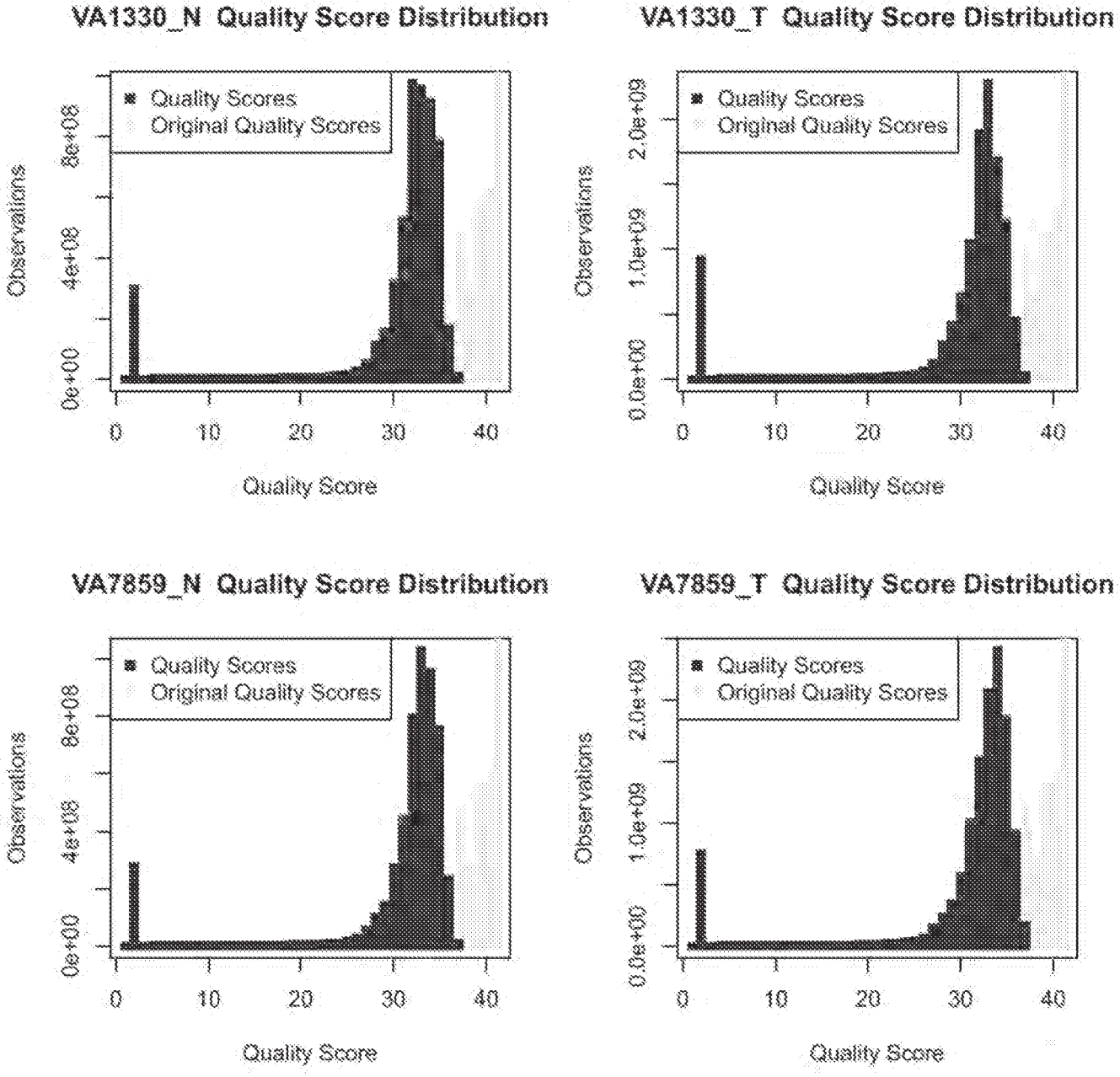
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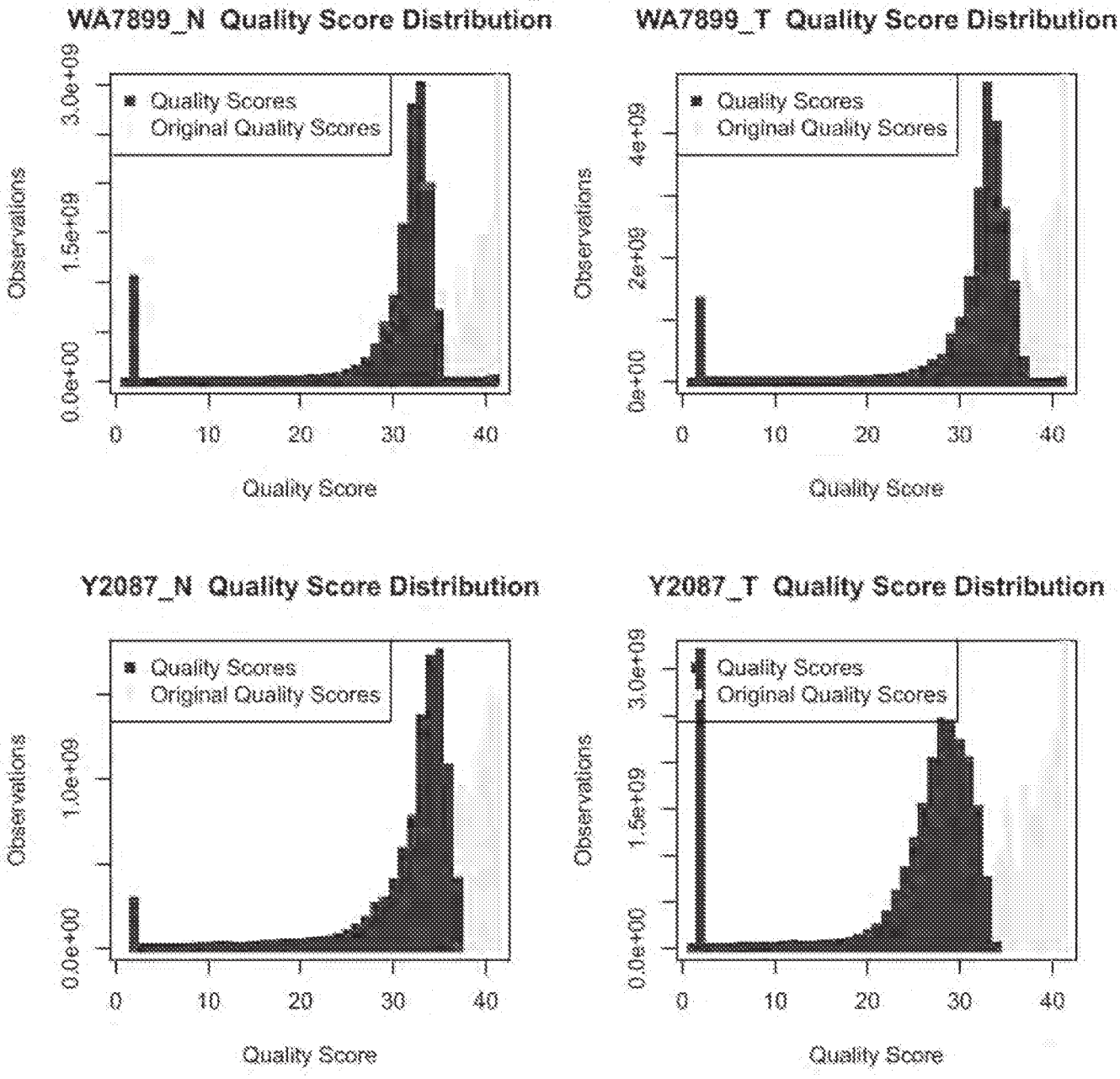
Figure 14P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Y2087_N Quality Score Distribution
Y2087_T Quality Score Distribution
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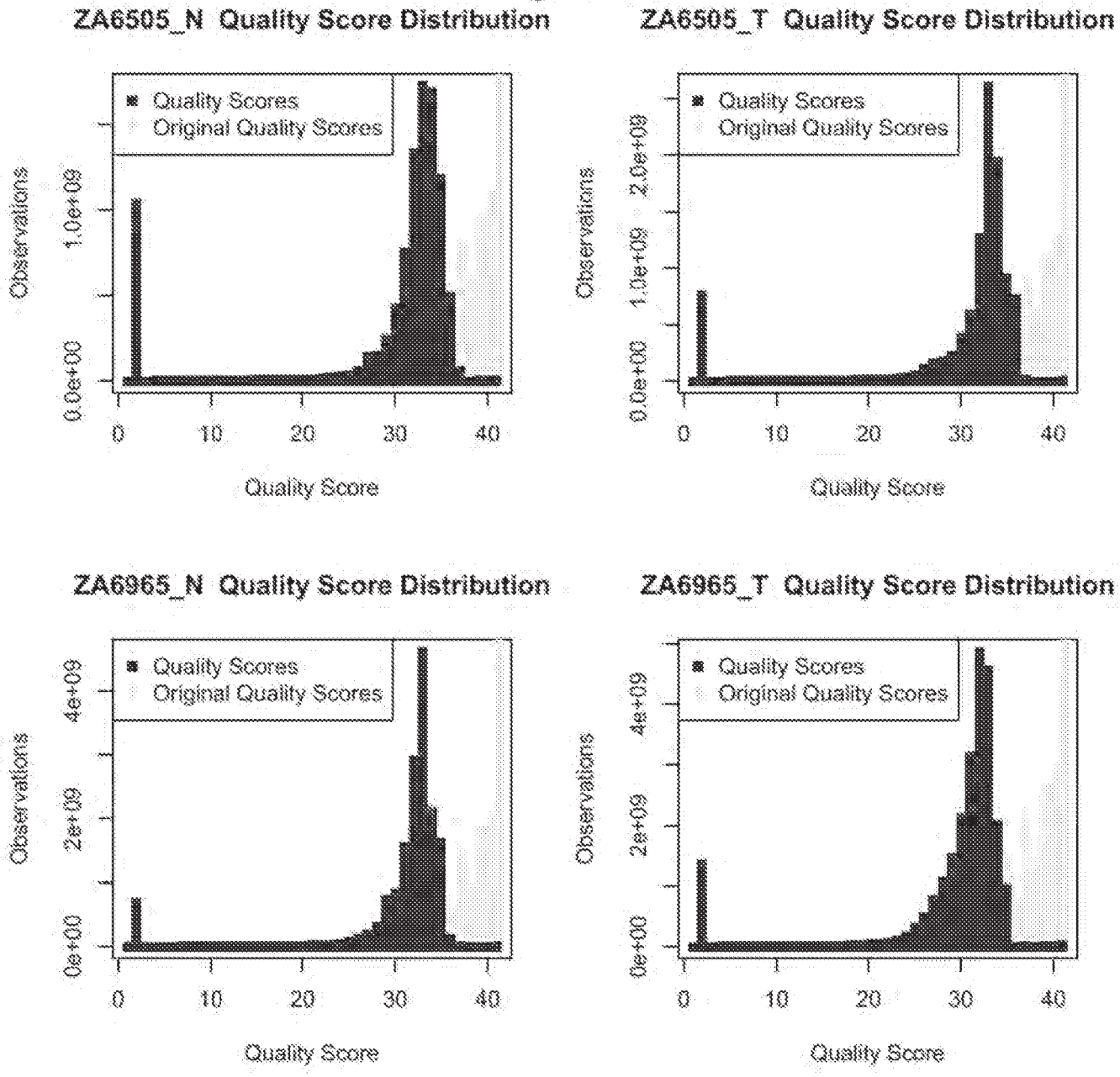
Figure 14Q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ZA6505_T Quality Score Distribution
ZA6965_N Quality Score Distribution
ZA6965_T Quality Score Distribution
Quality Scores
Original Quality Scores
Observations
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0e+00
2e+09
4e+09
0
10
20
30
40

	All patients	Discovery cohort	Validation cohort
n	34	16	18
Age (median, range)	63 years (41-80)	62 (56-73)	63 (41-80)
Gender (n, %)			
Male	16 (47)	8 (50)	8 (44)
Female	18 (53)	8 (50)	10 (56)
Smoking status (n, %)			
Current	7 (21)	5 (31)	2 (11)
Former	21 (62)	10 (63)	11 (61)
Never	6 (17)	1 (6)	5 (28)
Histology (n, %)			
Adenocarcinoma	29 (85)	15 (94)	14 (78)
Squamous	4 (12)	1 (6)	3 (17)
NSCLC NOS	1 (3)	0 (0)	1 (6)
Driver oncogenes (n, %)			
KRAS mutant	8 (24)	5 (31)	3 (17)
EGFR mutant	2 (6)	1 (6)	1 (6)
ALK re-arranged	1 (3)	0	1 (6)
MK3475 as n line of therapy (n, %)			
1st	9 (26)	5 (31)	4 (22)
2nd	11 (33)	6 (38)	5 (28)
3rd	5 (15)	1 (6)	4 (22)
4th and beyond	9 (26)	4 (25)	5 (28)
PD-L1 expression (n, %)			
≥1%	31 (91)	15 (94)	16 (88)
<1%	2 (6)	1 (6)	1 (6)
Unknown	1 (3)	0 (0)	1 (6)
Dose of pembrolizumab (n, %)			
2mg/kg	5 (15)	0 (0)	5 (28)
10mg/kg	29 (85)	16 (100)	13 (72)
Confirmed objective response by irRC			
Partial response	12 (35)	5 (31)	7 (39)
Stable disease	9 (26)	5 (31)	5 (28)
Progressive disease	13 (39)	6 (38)	6 (33)
Durable clinical benefit (PR/SD) > 6 months			
Yes	14 (41)	7 (44)	7 (39)
No	17 (50)	9 (56)	8 (44)
Not yet reached 6 month follow up	3 (9)	0	3 (17)
Somatic non-synonymous mutation burden (median, range)	250 (11-1192)	207 (11-746)	290 (35-1192)
Total somatic exonic mutation burden (median, range)	327 (45-1732)	309 (45-1011)	322 (85-1732)

Figure 15: Summary of clinical and genomic characteristics.

Mutations counted	Patient population	n	Median # mutations/ sample (range)	ORR (n, %)	Fisher's exact p	DCB (n of N patients, % patients)	Fisher's exact p	Median PFS (months)	log rank p	HR for PFS (95% CI)
Nonsynonymous mutations	Disc. Cohort: high burden	8	313 (228-746)	5 (63)	0.03	6 of 8 (75)	0.04	14.5	0.01	0.19 (0.05-0.70)
	Disc. Cohort: low burden	8	127 (11-190)	0 (0)		1 of 8 (13)		3.7		
	Valid. Cohort: high burden	9	368 (201-1192)	5 (56)	0.33	5 of 6^ (83)	0.04	Not reached	0.006	0.15 (0.04-0.59)
	Valid. Cohort: low burden	9	122 (35-198)	2 (22)		2 of 9 (22)		3.4		
Nonsynonymous mutations	All patients: high burden	17	324 (201-1192)	10 (59)	0.01	11 of 14^ (79)	0.0011	Not reached	0.0004	0.19 (0.08-0.47)
	All patients: low burden	17	122 (11-198)	2 (12)		3 of 17 (18)		3.4		
Total exonic mutations	All patients: high burden	17	494 (328-1732)	8	0.28	9 of 14^	0.08	14.5	0.045	0.40 (0.17-0.98)
	All patients: low burden	17	190 (45-326)	4		5 of 17		4.1		

Figure 16: Nonsynonymous, total exonic mutation burden, and association with clinical efficacy to pembrolizumab. Analyzed independently, nonsynonymous mutation burden significantly correlates with improved confirmed ORR, DCB, and PFS (with the exception of ORR for the validation cohort, p=0.33). Clinical efficacy strongly correlates with nonsynonymous mutation burden in the overall set of sequenced NSCLCs. High total exonic mutation burden less strongly correlates with improved clinical efficacy. ^Denotes that three patients are currently undergoing therapy and have not yet reached 6 months of follow-up; as such, these patients are not included in the DCB/NDB calculations and are removed from the numerator and denominator.

Figure 17: Detailed clinical and genomic characteristics of individual patients

#	Study ID	Cohort (Discovery, Validation)	Histology	Age (years)	Sex	Smok.^	Pack-years	PD-L1*	Priors^^	Dose (mg/kg)	Sched.**	PFS (mos)	Event ^^^	Resp ^^^^	Durable Clinical Benefit	Nonsyn.	Smok. Sig. ^^^^^	Neoant.	Total exonic
1	SA9755	Valid	NSCLC NOS	63	F	Former	36	P	1	10	3	8.4	0	PR	DCB	1192	TH	576	1732
2	HE3202	Disc	Adeno	63	F	Former	58	P	3	10	3	14.7	0	PR	DCB	746	TH	610	1011
3	TU0428	Disc	Adeno	66	M	Current	48	P	0	10	3	2.1	1	POD	NDB	626	TH	446	992
4	Y2087	Valid	Adeno	68	F	Never	0	P	5	10	3	8.3	1	SD	DCB	507	TL	358	914
5	M4945	Valid	Adeno	66	M	Former	40	P	3	10	2	14.6	0	PR	DCB	427	TH	300	685
6	RI3933	Disc	Adeno	60	F	Former	21	P	1	10	3	16.6	0	PR	DCB	473	TH	228	622
7	ZA6505	Valid	Adeno	76	F	Never	0	P	6	10	3	1.9	1	POD	NDB	378	TL	209	558
8	CU9061	Valid	Squam	57	M	Former	39	P	1	2	3	4.0	0	SD	NB	368	TH	271	552
9	CA9903	Disc	Adeno	57	M	Former	80	P	3	10	3	14.5	1	PR	DCB	324	TH	226	494
10	SC0839	Disc	Adeno	64	F	Current	25	P	0	10	3	12.6	0	PR	DCB	296	TH	191	450
11	FR9547	Valid	Adeno	65	F	Current	25	P	1	2	3	4.2	0	PR	NB	290	TH	208	441
12	KA3947	Disc	Adeno	64	F	Former	52.5	P	0	10	3	8.1	1	SD	DCB	302	TH	114	426
13	MA7027	Disc	Adeno	56	M	Former	37.5	P	1	10	3	1.8	1	POD	NDB	292	TH	90	396
14	ZA8965	Valid	Adeno	57	F	Former	25	P	1	2	3	4.4	0	PR	NB	223	TH	111	342
15	AL4602	Valid	Adeno	59	M	Former	34	P	0	10	3	8.4	0	SD	DCB	244	TH	148	341
16	JB112852	Disc	Adeno	60	M	Never	0	N	5	10	2	3.3	1	POD	NDB	190	TL	118	341
17	SR070761	Valid	Squam	51	F	Former	2.5	P	4	10	2	3.4	1	POD	NDB	184	TL	50	328
18	DI6359	Disc	Adeno	61	F	Current	60	P	6	10	3	9.8	0	PR	DCB	228	TH	215	326
19	SB010944	Valid	Squam	68	M	Never	0	U	2	10	3	27.3	0	PR	DCB	198	TL	80	316
20	RH090935	Valid	Adeno	78	F	Former	60	P	0	10	3	10.4	0	PR	DCB	201	TL	135	305
21	SC6470	Disc	Adeno	59	M	Current	15	P	0	10	2	8.3	1	SD	DCB	185	TH	100	292
22	BL3403	Disc	Adeno	73	F	Former	43.75	P	1	10	2	6.5	1	SD	NDB	148	TL	99	261
23	GR4788	Disc	Squam	59	M	Current	45	P	0	10	2	1.9	1	POD	NDB	170	TH	51	255
24	DM123062	Valid	Adeno	50	M	Never	0	N	6	10	2	1.9	1	POD	NDB	134	TL	99	209
25	R7495	Valid	Adeno	63	M	Former	73.5	P	2	2	3	1.4	1	POD	NDB	122	TL	83	199
26	WA7899	Valid	Adeno	49	M	Never	0	P	2	10	3	1.9	1	POD	NDB	127	TL	58	190
27	RQ3338	Disc	Adeno	71	M	Former	30	P	1	10	3	2.1	1	POD	NDB	106	TL	112	167
28	LO3793	Valid	Adeno	62	F	Former	6	P	2	2	3	3.5	1	SD	NDB	109	TL	74	145
29	LOS004	Valid	Adeno	56	F	Former	8	P	0	10	2	6.3	1	SD	NDB	79	TL	87	140
30	GR0134	Valid	Adeno	80	M	Former	56	P	0	10	3	8.3	1	PR	DCB	56	TL	30	94
31	VA1330	Disc	Adeno	71	F	Former	0.5	P	1	10	3	4.1	1	SD	NDB	22	TL	11	88
32	NI9507	Valid	Adeno	41	F	Current	2.25	P	1	10	3	1.9	1	POD	NDB	35	TL	18	85
33	AU5884	Disc	Adeno	64	M	Former	10	P	2	10	2	1.8	1	POD	NDB	34	TL	27	80
34	VA7859	Disc	Adeno	57	F	Former	3.15	P	1	10	3	6.3	1	SD	NDB	11	TL	8	45

*PDL-1 expression. P, >/=1% membraneous staining, N, <1% membraneous staining, U, unknown.

**Pembrolizumab dosed every 2 or 3 weeks as indicated.

^Self-reported smoking status.
^^Prior courses of cytotoxic chemotherapy. Combination chemotherapy counted as a single course. No patient had received prior immunotherapy.
^^^Event (1) or censure (0) for progression-free survival.
^^^^Resp. denotes best overall response to pembrolizumab.
^^^^^Smok. sig. denotes molecular smoking signature, as determined by transversion high (TH) or transversion low (TL) across all sequencing data.
#, patient number. Adeno, adenocarcinoma. Squam, squamous cell carcinoma. NSCLC NOS, non small-cell lung cancer, not otherwise specified. PFS, progression free survival. F, Female. M, Male. P, positive. No, negative. U, unknown. Smok., Smoking status. Pack-years, product of number of packs per day and number of years smoked. Sched., Schedule of administration in weeks. Mos, months. Resp., best overall response.
DCB, durable clinical benefit beyond 6 months. NDB, no durable benefit. NR, not reached 6 months follow-up.
Nonsyn. burden, nonsynonymous mutation burden. Smok. Sig., molecular smoking signature. Neoant. burden, candidate neoantigen burden.
Total exonic, Total exonic mutation burden.

Figure 18. Quality Metrics for All Samples.

N denotes corresponding normal. T denotes tumor DNA.

Sample	Target Regions	Bases in Target Region	Bases Sequenced (after quality filtering)	Bases Mapped to Genome	Bases Mapped to Targeted Region	Mean Target Coverage	Targeted bases with at least 10 reads (%)
AL4602_N	189894	32950014	122241930	97695214	4164823498	127.918427	0.947177
AL4602_T	189894	32950014	174485170	120860811	5253119108	161.46365	0.929297
AU5884_N	189894	32950014	66835458	55734427	2304570612	70.843604	0.921004
AU5884_T	189894	32950014	118497954	94583875	4170777521	128.058385	0.944011
BL3403_N	189894	32950014	136844124	108868175	4629994777	142.309651	0.948924
BL3403_T	189894	32950014	193969718	128204954	5821496526	178.814652	0.948857
CA0903_N	189894	32950014	64979750	54918581	2330210601	71.664856	0.922207
CA0903_T	189894	32950014	168826212	86438802	3863459107	118.675283	0.935412
CU0061_N	189894	32950014	117298618	94106296	3899679871	119.727037	0.943262
CU0061_T	189894	32950014	201703718	150891280	6320749651	193.970315	0.948994
DI6359_N	189894	32950014	68049462	56550125	2407997050	74.122135	0.925119
DI6359_T	189894	32950014	168308292	111211926	5019682373	154.343326	0.93995
DM123062_N	189894	32950014	124307148	98892833	4144985321	127.271345	0.940088
DM123062_T	189894	32950014	204623226	144255724	6221869654	190.844881	0.957608
FR9547_N	189894	32950014	101950654	84261089	3503354252	107.733974	0.937841
FR9547_T	189894	32950014	289002628	183741554	8143266088	249.718474	0.961299
GR0134_N	189894	32950014	104653358	85484969	3605380860	110.734625	0.940999
GR0134_T	189894	32950014	171945148	119503807	5065491487	155.356158	0.958604
GR4788_N	189894	32950014	130304080	105883167	4296757787	131.869851	0.946906
GR4788_T	189894	32950014	132101358	99136708	4175677808	128.244339	0.937001
HE3202_N	189894	32950014	82775862	67786929	2899163034	89.139081	0.937354
HE3202_T	189894	32950014	210311958	146137890	6177199349	189.705252	0.953064
JB112852_N	189894	32950014	134678418	105168597	4282340768	131.36132	0.948069
JB112852_T	189894	32950014	230739280	144875778	6466021163	198.480088	0.948037
KA3947_N	189894	32950014	77058996	63313850	2663182054	81.930677	0.930997
KA3947_T	189894	32950014	155786088	120766066	5290255334	162.673575	0.945223
LO3793_N	189894	32950014	132239512	105621709	4373397268	134.371784	0.947441
LO3793_T	189894	32950014	232306320	156548630	6447683860	197.894255	0.953127
LO5004_N	189894	32950014	144552248	114238356	4967705952	152.779572	0.945469
LO5004_T	189894	32950014	165443838	118709865	5123970335	157.417225	0.948988
M4945_N	189894	32950014	173996668	120449383	4973895139	152.876338	0.944888
M4945_T	189894	32950014	142673104	98036127	4379381020	134.605136	0.937004
MA7027_N	189894	32950014	83057034	68260266	2709982859	83.373941	0.927823
MA7027_T	189894	32950014	150331378	97286744	4207985362	128.24121	0.942497
NI9507_N	189894	32950014	81283298	67141865	2773039135	85.307115	0.934554
NI9507_T	189894	32950014	87518556	72125675	3122392732	96.15003	0.921913
R7495_2_N	189894	32950014	61239422	47497172	2068983168	63.709224	0.905356
R7495_2_T	189894	32950014	232334688	166758347	7041823600	216.094387	0.954393
RH090935_N	189894	32950014	142939372	110822654	4593839588	141.086216	0.947859
RH090935_T	189894	32950014	231189894	158799365	6670585461	204.845435	0.945123
RI1933_N	189894	32950014	61514952	51634672	2214858840	68.188706	0.921412
RI1933_T	189894	32950014	181659848	126801454	5374555098	164.985052	0.952561
RO3338_N	189894	32950014	114933782	92345228	3941073553	121.010249	0.945127
RO3338_T	189894	32950014	136807956	98927640	4122322718	126.57824	0.942479
SA9755_N	189894	32950014	212193658	155714066	6280943203	192.859379	0.955406
SA9755_T	189894	32950014	337403682	147938917	6738038155	206.866007	0.954466
SB010944_N	189894	32950014	130379650	101376126	4127460552	126.687776	0.943184
SB010944_T	189894	32950014	209661878	128276889	5703056938	175.015936	0.953241
SC0899_N	189894	32950014	88196986	70871472	3026465969	93.073728	0.939313
SC0899_T	189894	32950014	127991220	100522435	4377068882	134.579314	0.945167
SC6470_N	189894	32950014	55733342	47099980	1993400576	61.39547	0.911818

SC6470_T	189894	32950014	135739362	105861548	4692875686	144.26427	0.94648
SR070761_N	189894	32950014	158234930	124099331	5182991030	159.200373	0.949353
SR070761_T	189894	32950014	292050470	131933890	6207870162	190.519262	0.956545
TU0428_N	189894	32950014	127303050	101189405	4235332792	130.048835	0.947366
TU0428_T	189894	32950014	173450270	86584996	3689714094	113.278032	0.937217
VA1330_N	189894	32950014	65827552	55120833	2312376779	71.166279	0.922597
VA1330_T	189894	32950014	135610336	96504297	4088027942	125.711679	0.934442
VA7859_N	189894	32950014	63607140	53269713	2284415774	70.285595	0.924709
VA7859_T	189894	32950014	148703334	111998475	4935762628	151.640293	0.950753
WA7899_N	189894	32950014	160212294	123379606	4393264721	134.733791	0.948183
WA7899_T	189894	32950014	279269126	182086921	7605022449	233.266847	0.957596
Y2087_N	189894	32950014	122411904	80118304	3743922360	114.936891	0.940341
Y2087_T	189894	32950014	231934998	82257541	3928385204	120.578421	0.947763
ZA6505_N	189894	32950014	109178546	89123821	3725962819	114.531038	0.943478
ZA6505_T	189894	32950014	121383396	82900539	3440391275	105.85472	0.927032
ZA6965_N	189894	32950014	203920638	151245038	6220321627	190.965368	0.956287
ZA6965_T	189894	32950014	295234318	170201302	7363403623	226.270477	0.940573

FIGURE 19

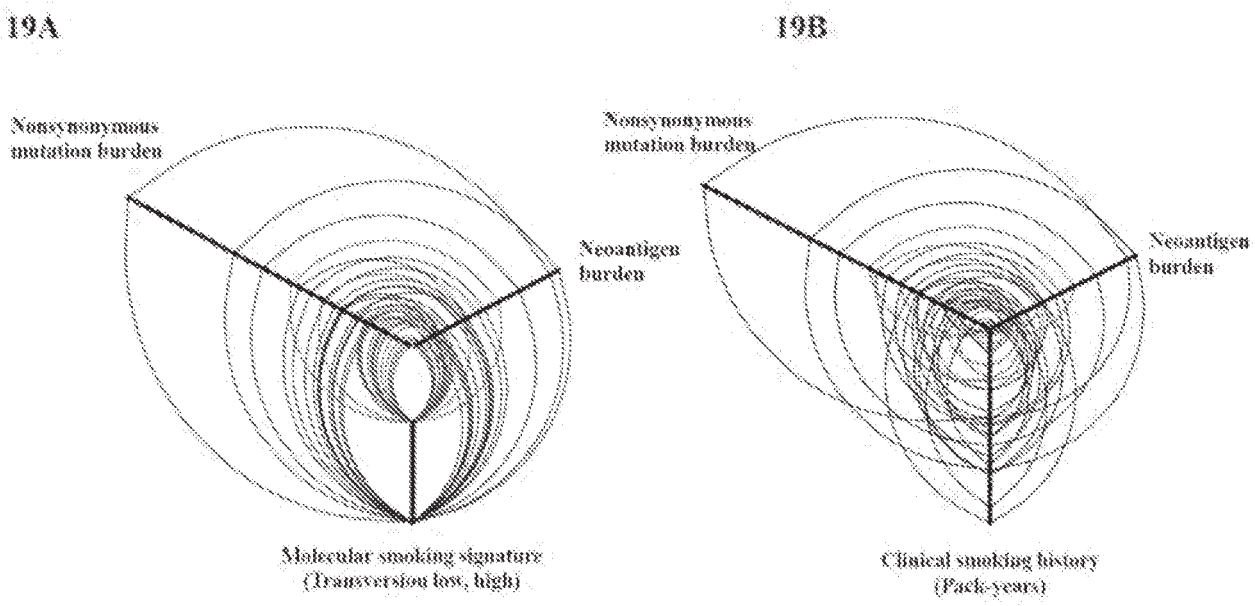

Fig. 19.

Correlation of molecular smoking signature, nonsynonymous mutation burden, and neoantigen burden. (A) This hive plot displays the relationship between molecular smoking signature, mutation and neoantigen burden for each tumor. Red lines depict transversion low tumors; blue lines depict transversion high tumors. Transversion low tumors have significantly lower mutation and neoantigen burden compared to transversion high tumors (Mann Whitney $p<0.0001$ for both). Nonsynonymous mutation burden correlates with neoantigen burden (Spearman ρ 0.91, 95% CI 0.83-0.96, $p<0.0001$). (B) This hive plot displays the relationship between pack-years of tobacco consumption, mutation and neoantigen burden for each tumor. Red lines depict those who are light/never smokers (≤median pack-years of the cohort, 25); blue lines heavy smokers (>25 pack-years). Modest correlation is seen between pack-years and non-synonymous mutation burden (Spearman ρ 0.31, 95% CI -0.05-0.59, $p=0.08$) as well as between pack-years and neoantigen burden (Spearman ρ 0.35, 95% CI 0-0.62, $p=0.04$).

FIGURE 20

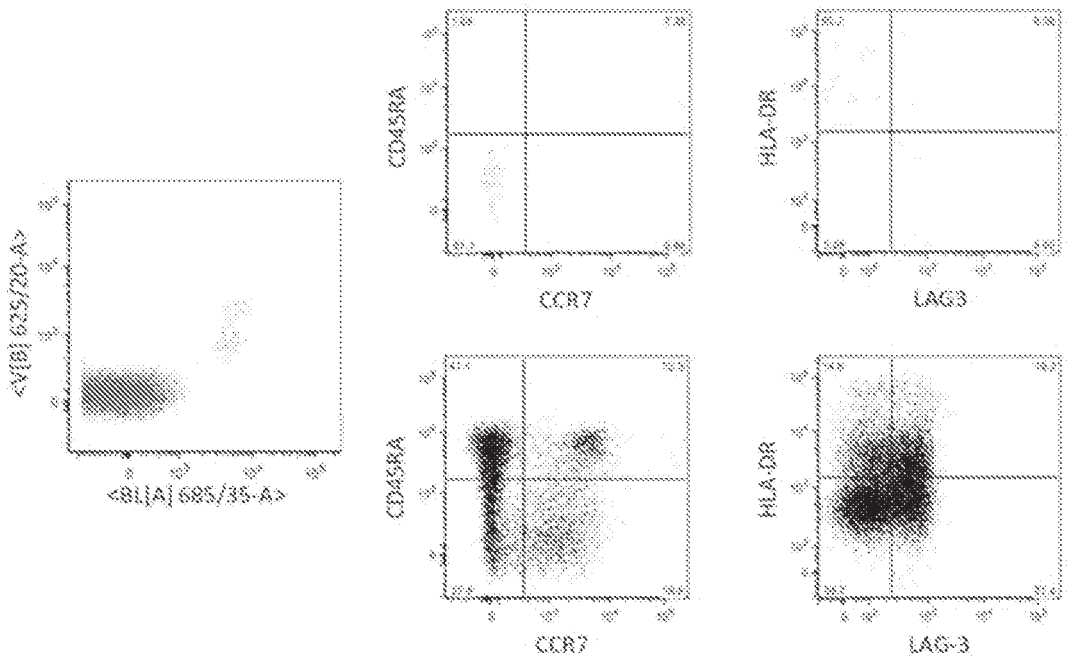

Fig. 20.

Immunophenotype of neoantigen-specific T-cells. In the left panel, peripheral blood lymphocytes (PBLs) from day 44 were used to identify HERC1 P3278S neoantigen (ASNASSAAK) reactive T-cells using two-color MHC multimer staining, as described. Neoantigen-specific T-cells are represented by the events in the double positive position. Flow cytometry dot plots of staining of HERC1 P3278S neoantigen-specific T-cells (Top panels) and bulk CD8+ T-cells (Bottom panels) show expression of indicated phenotypic markers.

Figure 21: Immunogenic mutations, HLA Types, neoantigens, and predicted MHC binding

Chr=chromosome. Position=location of mutation.

Ref=reference nucleotide (hg37 build). Alt=mutation.

Allele=HLA Class I allele predicted to bind mutant peptide

Mut Score=predicted MHC Class I binding score by NetMHC. Only those with a score ≤500nM are included.

WT Score=predicted MHC Class I binding score by NetMHC of wild type peptide corresponding to mutant.

Mut peptide=nonamer within a 17-amino acid sequence with centrally positioned mutant amino acid predicted to bind to the patient's MHC Class I.

WT peptide=wild type nonamer corresponding to the Mut peptide above.

Sample	Gene	Chr	Position	Ref	Alt	HLA I Type	Allele	Mut Score	WT Score	Mut peptide	WT peptide
AL4602	VWA1	1	1374587	C	A	A0301,A3201,B0801,B5101,C0702,C1502	B0801	430	4159	Qgaarrqql	Pgaarrqql
AL4602	CASZ1	1	10699817	C	T	A0301,A3201,B0801,B5101,C0702,C1502	A0301	103	195	Mlddfkrfk	Vlddfkrfk
AL4602	ATP13A2	1	17318822	C	A	A0301,A3201,B0801,B5101,C0702,C1502	A3201	98	368	alqrmsvvL	alqrmsvvV
AL4602	ATP13A2	1	17318822	C	A	A0301,A3201,B0801,B5101,C0702,C1502	C0702	490	411	qrmsvvLaw	qrmsvvVaw
AL4602	SH2D5	1	21049266	C	T	A0301,A3201,B0801,B5101,C0702,C1502	A0301	424	626	qvfrnhlSr	qvfrnhlGr
AL4602	SH2D5	1	21049266	C	T	A0301,A3201,B0801,B5101,C0702,C1502	A0301	373	1185	hlSrycleh	hlGrycleh
AL4602	SH2D5	1	21049266	C	T	A0301,A3201,B0801,B5101,C0702,C1502	C0702	355	448	vfrnhlSry	vfrnhlGry
AL4602	HSPG2	1	22198776	G	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	385	21971	ltgeftveL	ltgeftveP
AL4602	ZNF683	1	26694272	C	T	A0301,A3201,B0801,B5101,C0702,C1502	C1502	471	571	qvfsacKpl	qvfsacRpl
AL4602	ARID1A	1	27023633	G	A	A0301,A3201,B0801,B5101,C0702,C1502	A0301	372	581	gaaaaTgsk	gaaaaAgsk
AL4602	PPAP2B	1	56990069	C	A	A0301,A3201,B0801,B5101,C0702,C1502	B0801	165	305	iVrlrphfl	iGrlrphfl
AL4602	HRNR	1	152192039	C	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	210	73	ssnVphgsv	ssnGphgsv
AL4602	NPR1	1	153652095	G	A	A0301,A3201,B0801,B5101,C0702,C1502	A3201	68	118	kigdfvaTl	kigdfvaAl
AL4602	NPR1	1	153652095	G	A	A0301,A3201,B0801,B5101,C0702,C1502	A3201	218	6745	aTlhrrlgw	aAlhrrlgw
AL4602	CD1A	1	158227298	G	T	A0301,A3201,B0801,B5101,C0702,C1502	A3201	284	547	alwfrkLcf	alwfrkRcl
AL4602	OR6P1	1	158532614	G	A	A0301,A3201,B0801,B5101,C0702,C1502	A0301	127	139	tlftyaWpr	tlftyaRpr
AL4602	OR6P1	1	158532614	G	A	A0301,A3201,B0801,B5101,C0702,C1502	A3201	28	11403	sstlftyaW	sstlftyaR
AL4602	OR6P1	1	158532614	G	A	A0301,A3201,B0801,B5101,C0702,C1502	C0702	151	239	ftyaWpram	ftyaRpram
AL4602	OR6P1	1	158532614	G	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	32	30	ftyaWpram	ftyaRpram
AL4602	OR6P1	1	158532614	G	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	59	141	yaWpramyt	yaRpramyt
AL4602	OR10J1	1	159410378	C	G	A0301,A3201,B0801,B5101,C0702,C1502	C1502	42	41	nSrehdqli	nTrehdqli
AL4602	MARC2	1	220922141	G	T	A0301,A3201,B0801,B5101,C0702,C1502	A0301	345	20238	girsgnlrY	girsgnlrD
AL4602	MARC2	1	220922141	G	T	A0301,A3201,B0801,B5101,C0702,C1502	A3201	23	916	rsgnlrYrf	rsgnlrDrf
AL4602	MARC2	1	220922141	G	T	A0301,A3201,B0801,B5101,C0702,C1502	B0801	10	24	nlrYrfwlv	nlrDrfwlv
AL4602	TRIM67	1	231349643	G	T	A0301,A3201,B0801,B5101,C0702,C1502	A3201	59	11745	htltffinW	htltffinG
AL4602	IRF2BP2	1	234744526	C	A	A0301,A3201,B0801,B5101,C0702,C1502	B0801	77	106	gahkrpSsv	gahkrpAsv
AL4602	IRF2BP2	1	234744526	C	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	486	666	gahkrpSsv	gahkrpAsv
AL4602	IRF2BP2	1	234744526	C	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	78	128	Ssvsssaav	Asvsssaav
AL4602	OR2M3	1	248367272	C	A	A0301,A3201,B0801,B5101,C0702,C1502	A0301	89	36	raLmkllgk	raFmkllgk
AL4602	OR2M3	1	248367272	C	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	327	241	evtraLmki	evtraFmki
AL4602	PSAP	10	73579374	C	T	A0301,A3201,B0801,B5101,C0702,C1502	A0301	460	442	ltvhMtqpk	ltvhVtqpk
AL4602	TCERG1L	10	132902598	C	A	A0301,A3201,B0801,B5101,C0702,C1502	A0301	40	130	vsafstLek	vsafstWek
AL4602	TCERG1L	10	132902598	C	A	A0301,A3201,B0801,B5101,C0702,C1502	A0301	212	189	stLekelhk	stWekelhk
AL4602	OR4C15	11	55322010	G	T	A0301,A3201,B0801,B5101,C0702,C1502	C1502	222	341	nvHeivfvv	nvQeivfvv
AL4602	OR8K1	11	56114447	A	T	A0301,A3201,B0801,B5101,C0702,C1502	A0301	359	670	alkrtFtnr	alkrtLtnr

AL4602	OR8K1	11	56114447	A	T	A0301,A3201,B0801,B5101,C0702,C1502	A3201	14	36	rtFtnrfki	rtLtnrfki
AL4602	OR8K1	11	56114447	A	T	A0301,A3201,B0801,B5101,C0702,C1502	A3201	377	104	Ftnrfkipi	Ltnrfkipi
AL4602	OR8K1	11	56114447	A	T	A0301,A3201,B0801,B5101,C0702,C1502	C1502	154	136	rtFtnrfki	rtLtnrfki
AL4602	OR8K1	11	56114447	A	T	A0301,A3201,B0801,B5101,C0702,C1502	C1502	78	148	Ftnrfkipi	Ltnrfkipi
AL4602	SLC22A9	11	63137761	C	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	452	310	isiQldsnm	isiPldsnm
AL4602	SLC22A20	11	64981692	C	T	A0301,A3201,B0801,B5101,C0702,C1502	C1502	164	30	Csvfpstiv	Rsvfpstiv
AL4602	TENM4	11	78440432	G	A	A0301,A3201,B0801,B5101,C0702,C1502	A3201	5	4	kvfglLeaf	kvfglSeaf
AL4602	PCF11	11	82878199	C	T	A0301,A3201,B0801,B5101,C0702,C1502	C1502	178	17298	qvdehskpL	qvdehskpP
AL4602	B3GAT1	11	134252876	C	A	A0301,A3201,B0801,B5101,C0702,C1502	A3201	10	10	rvsLwpvaf	rvsVwpvaf
AL4602	B3GAT1	11	134252876	C	A	A0301,A3201,B0801,B5101,C0702,C1502	B0801	17	35	mrstrrvsL	mrstrrvsV
AL4602	B3GAT1	11	134252876	C	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	231	221	vsLwpvafv	vsVwpvafv
AL4602	RAD51AP1	12	4662254	A	T	A0301,A3201,B0801,B5101,C0702,C1502	A0301	89	19358	vMvkspvek	vKvkspvek
AL4602	RAD51AP1	12	4662254	A	T	A0301,A3201,B0801,B5101,C0702,C1502	A0301	155	99	Mvkspvekk	Kvkspvekk
AL4602	SLCO1B3	12	21007975	C	T	A0301,A3201,B0801,B5101,C0702,C1502	A0301	24	27	Vlsfsyiak	Alsfsyiak
AL4602	SLCO1B3	12	21007975	C	T	A0301,A3201,B0801,B5101,C0702,C1502	A3201	3	4	kmflaVlsf	kmflaAlsf
AL4602	SLCO1B3	12	21007975	C	T	A0301,A3201,B0801,B5101,C0702,C1502	B5101	282	295	laVlsfsyi	laAlsfsyi
AL4602	SLCO1B3	12	21051402	T	C	A0301,A3201,B0801,B5101,C0702,C1502	A3201	125	75	aTgfqsmvi	aMgfqsmvi
AL4602	SLCO1B3	12	21051402	T	C	A0301,A3201,B0801,B5101,C0702,C1502	C1502	181	49	laTgfqsmv	laMgfqsmv
AL4602	SLCO1B3	12	21051402	T	C	A0301,A3201,B0801,B5101,C0702,C1502	C1502	79	2826	aTgfqsmvi	aMgfqsmvi
AL4602	KRAS	12	25398285	C	T	A0301,A3201,B0801,B5101,C0702,C1502	A0301	217	410	vvgaSgvgk	vvgaGgvgk
AL4602	KRT75	12	52820621	C	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	238	771	lsgeVvspv	lsgeGvspv
AL4602	KRT75	12	52820621	C	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	364	2091	Vvspvnisv	Gvspvnisv
AL4602	GRIP1	12	66788093	T	A	A0301,A3201,B0801,B5101,C0702,C1502	A0301	127	527	aiiytvVlk	aiiytvElk
AL4602	GRIP1	12	66788093	T	A	A0301,A3201,B0801,B5101,C0702,C1502	A0301	33	69	iiytvVlkr	iiytvElkr
AL4602	GRIP1	12	66788093	T	A	A0301,A3201,B0801,B5101,C0702,C1502	B0801	86	38	Vlkryggpl	Elkryggpl
AL4602	NAP1L1	12	76453955	C	A	A0301,A3201,B0801,B5101,C0702,C1502	B0801	131	165	dleMkyavl	dleRkyavl
AL4602	KSR2	12	117914279	A	T	A0301,A3201,B0801,B5101,C0702,C1502	C0702	227	142	skhsdvlal	skhsdvFal
AL4602	ATP6V0A2	12	124220082	C	T	A0301,A3201,B0801,B5101,C0702,C1502	C0702	58	74	cyYchvypy	cyHchvypy
AL4602	PCNX	14	71514552	G	T	A0301,A3201,B0801,B5101,C0702,C1502	A0301	38	28	lmitvaClk	lmitvaGlk
AL4602	PCNX	14	71514552	G	T	A0301,A3201,B0801,B5101,C0702,C1502	B0801	44	214	Clkllrssf	Glkllrssf
AL4602	PLD4	14	105395734	T	C	A0301,A3201,B0801,B5101,C0702,C1502	C1502	135	42	rtPtdlqvl	rtStdlqvl
AL4602	JAG2	14	105615331	C	T	A0301,A3201,B0801,B5101,C0702,C1502	B0801	144	2327	qpRgnfsci	qpGgnfsci
AL4602	ATP10A	15	25932909	C	A	A0301,A3201,B0801,B5101,C0702,C1502	A3201	21	369	rllllhWhw	rllllhGhw
AL4602	ATP10A	15	25932909	C	A	A0301,A3201,B0801,B5101,C0702,C1502	C0702	332	3781	hWhwcysrl	hGhwcysrl
AL4602	CHST14	15	40763569	T	A	A0301,A3201,B0801,B5101,C0702,C1502	A3201	226	733	aTsglllmi	aSsglllmi
AL4602	CHST14	15	40763569	T	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	59	48	aTsglllmi	aSsglllmi
AL4602	SPTBN5	15	42163599	C	A	A0301,A3201,B0801,B5101,C0702,C1502	B0801	158	17	Ivrqrqqdl	Mvrqrqqdl
AL4602	FAM192A	16	57188221	G	C	A0301,A3201,B0801,B5101,C0702,C1502	A3201	17	13	ssifrtnSf	ssifrtnTf
AL4602	FAM192A	16	57188221	G	C	A0301,A3201,B0801,B5101,C0702,C1502	B0801	425	1411	ssifrtnSf	ssifrtnTf
AL4602	LCAT	16	67973956	G	T	A0301,A3201,B0801,B5101,C0702,C1502	C0702	334	223	grqpqpvNl	grqpqpvHl
AL4602	OR1E2	17	3336201	C	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	339	23691	rdmkgaieM	rdmkgaieR
AL4602	HGS	17	79660723	G	C	A0301,A3201,B0801,B5101,C0702,C1502	C1502	216	493	talqeeQel	talqeeEel
AL4602	LRRC45	17	79981688	G	A	A0301,A3201,B0801,B5101,C0702,C1502	A0301	74	22340	algkllprK	algkllprE
AL4602	LRRC45	17	79981688	G	A	A0301,A3201,B0801,B5101,C0702,C1502	A3201	266	13404	Ktlctelvl	Etlctelvl
AL4602	LRRC45	17	79981688	G	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	42	145	Ktlctelvl	Etlctelvl
AL4602	HRH4	18	22057240	T	C	A0301,A3201,B0801,B5101,C0702,C1502	B0801	104	89	lPrarrlak	lLrarrlak
AL4602	HRH4	18	22057240	T	C	A0301,A3201,B0801,B5101,C0702,C1502	C0702	318	1836	velPrarrl	velLrarrl
AL4602	INSR	19	7122909	G	A	A0301,A3201,B0801,B5101,C0702,C1502	B0801	487	39	dlksylrFl	dlksylrSl
AL4602	ZNF560	19	9577668	C	A	A0301,A3201,B0801,B5101,C0702,C1502	A0301	19	15	hlrthtVyk	hlrthtGyk

Figure 21 (Cont.)

AL4602	ZNF560	19	9577658	C	A	A0301,A3201,B0801,B5101,C0702,C1502	A3201	122	310	rthtVykpy	rthtGykpy
AL4602	LPHN1	19	14272252	C	T	A0301,A3201,B0801,B5101,C0702,C1502	C0702	126	77	trQppapnl	trRppapnl
AL4602	AP1M1	19	16344422	G	A	A0301,A3201,B0801,B5101,C0702,C1502	B5101	88	65	ipyftsDi	ipyftsGi
AL4602	LGI4	19	35624607	G	T	A0301,A3201,B0801,B5101,C0702,C1502	A3201	325	421	glshMqyif	glshLqyif
AL4602	LGI4	19	35624607	G	T	A0301,A3201,B0801,B5101,C0702,C1502	C1502	306	501	lshMqyifi	lshLqyifi
AL4602	KCNH7	2	163361083	G	A	A0301,A3201,B0801,B5101,C0702,C1502	A3201	6	17	kiLqltinf	kiPqltinf
AL4602	KCNH7	2	163361083	G	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	188	1222	stinkiLqi	stinkiPql
AL4602	ERBB4	2	212495306	C	A	A0301,A3201,B0801,B5101,C0702,C1502	B5101	331	321	tpliSagvi	tpliAagvi
AL4602	ERBB4	2	212495306	C	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	242	286	rtpliSagv	rtpliAagv
AL4602	PAK7	20	9546965	C	A	A0301,A3201,B0801,B5101,C0702,C1502	A0301	342	428	dtyprCpak	dtyprGpak
AL4602	DZANK1	20	18393435	C	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	234	17663	kSdigtqtv	kRdigtqtv
AL4602	JPH2	20	42744639	T	A	A0301,A3201,B0801,B5101,C0702,C1502	C0702	137	141	srepVvaly	srepEvaly
AL4602	GNAS	20	57429964	G	C	A0301,A3201,B0801,B5101,C0702,C1502	B0801	148	1110	llrgllaPl	llrgllaRl
AL4602	ZDHHC8	22	20119484	C	G	A0301,A3201,B0801,B5101,C0702,C1502	B0801	10	1020	mprsRgtrl	mprsPgtrl
AL4602	ZDHHC8	22	20119484	C	G	A0301,A3201,B0801,B5101,C0702,C1502	B0801	299	29	sRgtrlkpa	sPgtrlkpa
AL4602	SCARF2	22	20791830	C	T	A0301,A3201,B0801,B5101,C0702,C1502	C1502	495	909	elnprgHnv	elnprgRnv
AL4602	CDC42EP1	22	37964115	G	T	A0301,A3201,B0801,B5101,C0702,C1502	C1502	20	5392	stdghssyV	stdghssyG
AL4602	SEMA3G	3	52476882	G	T	A0301,A3201,B0801,B5101,C0702,C1502	A0301	47	19031	rsaiflgpK	rsaiflgpQ
AL4602	SEMA3G	3	52476882	G	T	A0301,A3201,B0801,B5101,C0702,C1502	C0702	480	440	iflgpKgsl	iflgpQgsl
AL4602	ROBO1	3	78710282	C	A	A0301,A3201,B0801,B5101,C0702,C1502	A0301	121	653	svvipYlrk	svvipDlrk
AL4602	SLC26A1	4	983192	A	T	A0301,A3201,B0801,B5101,C0702,C1502	B0801	234	1126	tqrprtaQl	tqrprtaLl
AL4602	OTP	5	76926156	C	A	A0301,A3201,B0801,B5101,C0702,C1502	B0801	249	2428	wLgtsiasl	wRgtsiasl
AL4602	PCDH12	5	141336680	T	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	154	3485	aVsslalei	aEsslalei
AL4602	GABRP	5	170239030	G	A	A0301,A3201,B0801,B5101,C0702,C1502	A0301	334	249	ssissfkQk	ssissfkRk
AL4602	GABRP	5	170239030	G	A	A0301,A3201,B0801,B5101,C0702,C1502	A3201	149	158	ssfkQkisf	ssfkRkisf
AL4602	GABRP	5	170239030	G	A	A0301,A3201,B0801,B5101,C0702,C1502	B0801	470	212	sfkQkisfa	sfkRkisfa
AL4602	GPRIN1	5	176026256	C	T	A0301,A3201,B0801,B5101,C0702,C1502	C1502	129	210	eilgkgNpv	eilgkgDpv
AL4602	RANBP9	6	13711284	T	C	A0301,A3201,B0801,B5101,C0702,C1502	B0801	143	29	elqrrlErl	elqrrlKrl
AL4602	RANBP9	6	13711284	T	C	A0301,A3201,B0801,B5101,C0702,C1502	B0801	328	53	rrlErlypa	rrlKrlypa
AL4602	HLA-DRB5	6	32489882	T	A	A0301,A3201,B0801,B5101,C0702,C1502	C0702	386	241	vrflLrdiy	vrflHrdiy
AL4602	CUL9	6	43153826	G	T	A0301,A3201,B0801,B5101,C0702,C1502	B0801	495	4819	sLgqrelef	sRgqrelef
AL4602	PAPOLB	7	4899715	G	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	276	502	atefFlqqv	atefSlqqv
AL4602	TNRC18	7	5415693	A	G	A0301,A3201,B0801,B5101,C0702,C1502	B0801	399	368	Selqrsaql	Lelqrsaql
AL4602	SEMA3E	7	82997239	G	T	A0301,A3201,B0801,B5101,C0702,C1502	A0301	312	23007	tvehsfvhK	tvehsfvhT
AL4602	SEMA3E	7	82997239	G	T	A0301,A3201,B0801,B5101,C0702,C1502	A0301	37	24	hsfvhKvrk	hsfvhTvrk
AL4602	SEMA3E	7	82997239	G	T	A0301,A3201,B0801,B5101,C0702,C1502	C1502	42	180	Kvrkitlev	Tvrkitlev
AL4602	AP4M1	7	99701067	G	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	80	133	yvqttstei	yvqttsteM
AL4602	CTTNBP2	7	117407155	C	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	92	614	kcnrtvhYv	kcnrtvhDv
AL4602	OR2F1	7	143657664	G	T	A0301,A3201,B0801,B5101,C0702,C1502	C1502	43	23	ssnevtimL	ssnevtimV
AL4602	OR2F1	7	143657664	G	T	A0301,A3201,B0801,B5101,C0702,C1502	C1502	45	38	vtimLssiv	vtimVssiv
AL4602	STAR	8	38001823	C	T	A0301,A3201,B0801,B5101,C0702,C1502	B0801	219	1129	hlrkrlKsh	hlrkrlEsh
AL4602	STAR	8	38001823	C	T	A0301,A3201,B0801,B5101,C0702,C1502	B0801	133	6157	rkrlKshpa	rkrlEshpa
AL4602	IDO2	8	39836608	T	A	A0301,A3201,B0801,B5101,C0702,C1502	A0301	189	63	pllscqYlk	pllscqFlk
AL4602	IDO2	8	39836608	T	A	A0301,A3201,B0801,B5101,C0702,C1502	B0801	367	454	mpllscqYl	mpllscqFl
AL4602	IDO2	8	39836608	T	A	A0301,A3201,B0801,B5101,C0702,C1502	B5101	345	421	mpllscqYl	mpllscqFl
AL4602	NDUFAF6	8	96037306	C	T	A0301,A3201,B0801,B5101,C0702,C1502	C0702	168	269	crWppigly	crRppigly
AL4602	OXR1	8	107705038	C	A	A0301,A3201,B0801,B5101,C0702,C1502	A3201	286	2958	stYeeeeaf	stSeeeeaf
AL4602	OXR1	8	107705038	C	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	354	2146	stYeeeeaf	stSeeeeaf
AL4602	MROH5	8	142484263	G	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	147	259	Ltadeihfl	Ptadeihfl

Figure 21 (Cont.)

AL4602	CCNMD5	8	146076346	C	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	315	375	lvgdfasvv	lvgdfasvv	lvgdlasvv
AL4602	SUSD1	9	114820943	G	A	A0301,A3201,B0801,B5101,C0702,C1502	A3201	372	9775	ssyqvlvlL	ssyqvlvlL	ssyqvlvlP
AL4602	SUSD1	9	114820943	G	A	A0301,A3201,B0801,B5101,C0702,C1502	A3201	289	25378	lIalqstf	lIalqstf	lPalqstf
AL4602	SUSD1	9	114820943	G	A	A0301,A3201,B0801,B5101,C0702,C1502	C0702	174	73	syqvlvlL	syqvlvlL	syqvlvlP
AL4602	SUSD1	9	114820943	G	A	A0301,A3201,B0801,B5101,C0702,C1502	C1502	63	12344	ssyqvlvlL	ssyqvlvlL	ssyqvlvlP
AL4602	ASTN2	9	119976922	C	T	A0301,A3201,B0801,B5101,C0702,C1502	C1502	37	38	TstrgthaI	TstrgthaI	AstrgthaI
AL4602	C9orf50	9	132382765	G	A	A0301,A3201,B0801,B5101,C0702,C1502	A0301	200	116	rssdLrlpk	rssdLrlpk	rssdPrlpk
AL4602	C9orf50	9	132382765	G	A	A0301,A3201,B0801,B5101,C0702,C1502	C0702	65	82	frrssdLrl	frrssdLrl	frrssdPrl
AL4602	ABCA2	9	139908362	G	T	A0301,A3201,B0801,B5101,C0702,C1502	C1502	29	31	vamtvaMsv	vamtvaMsv	vamtvaIsv
AL4602	DPP7	9	140008360	C	T	A0301,A3201,B0801,B5101,C0702,C1502	B0801	212	187	lIralrrNl	lIralrrNl	lIralrrDl
AL4602	KLHL34	X	21675269	A	C	A0301,A3201,B0801,B5101,C0702,C1502	B0801	397	2070	erRahctel	erRahctel	erLahctel
AL4602	PCDH19	X	99551442	G	T	A0301,A3201,B0801,B5101,C0702,C1502	C1502	240	228	pardMeqyv	pardMeqyv	pardLeqyv
AL4602	PLXNB3	X	153041663	G	T	A0301,A3201,B0801,B5101,C0702,C1502	A3201	257	705	svhalMew	svhalMew	svhalDew
AL4602	PLXNB3	X	153041663	G	T	A0301,A3201,B0801,B5101,C0702,C1502	C0702	143	4684	lVewrsgl	lVewrsgl	lDewrsgl
AL4602	PLXNB3	X	153041663	G	T	A0301,A3201,B0801,B5101,C0702,C1502	C1502	333	3251	rpsvhalM	rpsvhalM	rpsvhalDl
AL4602	LRRC3	1	74506367	G	T	A0201,A2402,B1302,B5101,C0602,C1502	A0201	305	321	vlkeksMw	vlkeksMw	vlkeksLw
AL4602	LRRC3	1	74506367	G	T	A0201,A2402,B1302,B5101,C0602,C1502	C1502	52	137	ksMvlvkqkl	ksMvlvkqkl	ksLvlvkqkl
AL4602	KIF26B	10	91518521	A	G	A0201,A2402,B1302,B5101,C0602,C1502	C0602	55	20	wreGrdqlv	wreGrdqlv	wreErdqlv
AL4602	ABCB9	12	123414607	C	T	A0201,A2402,B1302,B5101,C0602,C1502	C1502	269	129	vvldkgrlv	vvldkgrlv	vvldkgrVv
AL4602	CLMN	14	95670049	G	A	A0201,A2402,B1302,B5101,C0602,C1502	A0201	68	1238	fqikvrlmI	fqikvrlmI	fqikvrlmT
AL4602	NFE2L1	17	46136777	G	T	A0201,A2402,B1302,B5101,C0602,C1502	A0201	8	146	lIskvefl	lIskvefl	lIskveft
AL4602	NFE2L1	17	46136777	G	T	A0201,A2402,B1302,B5101,C0602,C1502	C0602	98	11095	qrdkarlIL	qrdkarlIL	qrdkarlIR
AL4602	NFE2L1	17	46136777	G	T	A0201,A2402,B1302,B5101,C0602,C1502	C1502	265	390	karlIskv	karlIskv	karlIskv
AL4602	SGIP1	19	52132769	G	A	A0201,A2402,B1302,B5101,C0602,C1502	A0201	23	1975	wMgnalspl	wTgnalspl	wTgnalspl
AL4602	MYO1B	2	192460895	C	T	A0201,A2402,B1302,B5101,C0602,C1502	B5101	314	323	lpylpskv	lpylpskv	lpylpskv
AL4602	SCN	21	34948584	G	A	A0201,A2402,B1302,B5101,C0602,C1502	C0602	55	237	frvlrnEal	frvlrnEal	frvlrnGal
AL4602	SCN	21	34948584	G	A	A0201,A2402,B1302,B5101,C0602,C1502	C1502	262	1277	Ealtrpncm	Ealtrpncm	Galtrpncm
AL4602	SCN	21	34948686	G	A	A0201,A2402,B1302,B5101,C0602,C1502	C0602	73	237	frvlrngTl	frvlrngTl	frvlrngAl
AL4602	SCN	21	34948686	G	A	A0201,A2402,B1302,B5101,C0602,C1502	C1502	480	1277	gTkrpncm	gTkrpncm	gAlrpncm
AL4602	FANCD2	3	10108913	G	T	A0201,A2402,B1302,B5101,C0602,C1502	C0602	341	1382	fcHetspem	fcHetspem	fcQetspem
AL4602	BFSP2	3	133191330	G	T	A0201,A2402,B1302,B5101,C0602,C1502	C0602	264	437	qqqerShl	qqqerShl	qqqerAhl
AL4602	BFSP2	3	133191330	G	T	A0201,A2402,B1302,B5101,C0602,C1502	C1502	428	558	qqqerShl	qqqerShl	qqqerAhl
AL4602	BCHE	3	165549427	G	A	A0201,A2402,B1302,B5101,C0602,C1502	A0201	364	23836	klknatvli	klknatvli	kPknatvli
AL4602	DNDI	5	140052407	G	A	A0201,A2402,B1302,B5101,C0602,C1502	A0201	182	40	qlkIfqrv	qlkIfqrv	qlkPfqrv
AL4602	DNDI	5	140052407	G	A	A0201,A2402,B1302,B5101,C0602,C1502	A0201	252	7397	lIfqrvgt	lIfqrvgt	PIfqrvgt
AL4602	DNDI	5	140052407	G	A	A0201,A2402,B1302,B5101,C0602,C1502	C1502	197	21649	dvyehqlL	dvyehqlL	dvyehqlP
AL4602	TFEC	7	115614304	C	A	A0201,A2402,B1302,B5101,C0602,C1502	A0201	240	3091	aqwhmeYvl	aqwhmeYvl	aqwhmeDvl
AL4602	TFEC	7	115614304	C	A	A0201,A2402,B1302,B5101,C0602,C1502	A0201	21	12574	Yvedligm	Yvedligm	Dvedligm
AL4602	TFEC	7	115614304	C	A	A0201,A2402,B1302,B5101,C0602,C1502	C1502	74	694	naqwhmeYv	naqwhmeYv	naqwhmeDv
AL4602	CPXCR1	X	880090030	T	A	A0201,A2402,B1302,B5101,C0602,C1502	C0602	30	35	frrpsrEhy	frrpsrEhy	frrpsrVhy
AL4602	CPXCR1	X	880090030	T	A	A0201,A2402,B1302,B5101,C0602,C1502	C0602	226	41	rrpsrEhyy	rrpsrEhyy	rrpsrVhyy
AL4602	NKAP	X	119065974	T	A	A0201,A2402,B1302,B5101,C0602,C1502	C1502	436	132	Maeepsdh	Maeepsdh	Kaeepsdh
BL3403	GPR88	1	101004563	G	A	A0201,A2601,B3501,B4402,C0401,C0501	C0501	143	24739	ttDgslll	ttDgslll	ttGgslll
BL3403	HRNR	1	152185879	C	G	A0201,A2601,B3501,B4402,C0401,C0501	A2603	118	769	sstgHsssy	sstgHsssy	sstgQsssy
BL3403	HRNR	1	152185879	C	G	A0201,A2601,B3501,B4402,C0401,C0501	B3501	64	248	sstgHsssy	sstgHsssy	sstgQsssy
BL3403	PROX1	1	214171319	C	T	A0201,A2601,B3501,B4402,C0401,C0501	A0201	18	57	stfChpfpl	stfChpfpl	stfRhpfpl
BL3403	PROX1	1	214171319	C	T	A0201,A2601,B3501,B4402,C0401,C0501	B3501	418	1825	ttstfChpf	ttstfChpf	ttstfRhpf
BL3403	CYP26C1	10	94828338	G	A	A0201,A2601,B3501,B4402,C0401,C0501	B3501	53	4	lTtpafpsm	lTtpafpsm	lAtpafpsm
BL3403	USH1C	11	17531178	G	A	A0201,A2601,B3501,B4402,C0401,C0501	A0201	481	13469	Svfplsghv	Svfplsghv	Pvfplsghv

Figure 21 (Cont.)

BL3403	USP1C	11	17531178	G	A	A0201,A2601,B3501,B4402,C0401,C0501	B3501	20	74	vpapSvlpl	vpapPvlpl
BL3403	FRMD8	11	65164490	G	T	A0201,A2601,B3501,B4402,C0401,C0501	B3501	16	13	lpfyWcaff	lpfyGcaff
BL3403	BEST3	12	70087519	G	A	A0201,A2601,B3501,B4402,C0401,C0501	A0201	400	1113	lifrSvst	lifrSvst
BL3403	POC1B-GALNT4	12	89919707	G	A	A0201,A2601,B3501,B4402,C0401,C0501	B3501	333	2074	lpsplrvpS	lpsplrvpP
BL3403	EXOC3L4	14	103569099	G	A	A0201,A2601,B3501,B4402,C0401,C0501	A0201	6	3	iltdwaanI	iltdwaanV
BL3403	EXOC3L4	14	103569099	G	A	A0201,A2601,B3501,B4402,C0401,C0501	B3501	139	79	ildwaanIy	ildwaanVy
BL3403	EXOC3L4	14	103569099	G	A	A0201,A2601,B3501,B4402,C0401,C0501	C0501	51	31	ildwaanIy	ildwaanVy
BL3403	HBZ	16	204060	G	A	A0201,A2601,B3501,B4402,C0401,C0501	A0201	12	12	klselhTyl	klselhAyl
BL3403	HBZ	16	204060	G	A	A0201,A2601,B3501,B4402,C0401,C0501	A0201	173	115	elhTyllv	elhAyllv
BL3403	CACNA1H	16	1265531	C	T	A0201,A2601,B3501,B4402,C0401,C0501	B3501	395	889	vpasaShpr	vpasaPhpr
BL3403	BAIAP3	16	1396452	G	T	A0201,A2601,B3501,B4402,C0401,C0501	A2601	265	24751	hlskmvgY	hlskmvgD
BL3403	ITGAM	16	31309111	C	G	A0201,A2601,B3501,B4402,C0401,C0501	B3501	487	691	Epwgrfgaa	Qpwgrfgaa
BL3403	GAS8	16	90102977	C	T	A0201,A2601,B3501,B4402,C0401,C0501	A0201	227	463	ilnnlaFi	ilnnlaLi
BL3403	GAS8	16	90102977	C	T	A0201,A2601,B3501,B4402,C0401,C0501	B3501	334	3888	dilnnlaF	dilnnlaL
BL3403	GGT6	17	4461888	G	A	A0201,A2601,B3501,B4402,C0401,C0501	B4402	272	202	aeqlPvpag	aeqlPvpag
BL3403	GGT6	17	4461888	G	A	A0201,A2601,B3501,B4402,C0401,C0501	C0501	380	5495	lSvpqglf	lPvpqglf
BL3403	TP53	17	7578190	T	C	A0201,A2601,B3501,B4402,C0401,C0501	A0201	350	343	vvpCeppev	vvpYeppev
BL3403	SARM1	17	26708758	C	T	A0201,A2601,B3501,B4402,C0401,C0501	A0201	194	1115	lfSnrlea	lfDnrlea
BL3403	AATF	17	35306433	G	A	A0201,A2601,B3501,B4402,C0401,C0501	B3501	44	41	maEpqplal	maGpqplal
BL3403	AATF	17	35306433	G	A	A0201,A2601,B3501,B4402,C0401,C0501	C0501	15	618	maEpqplal	maGpqplal
BL3403	MED24	17	38176135	G	A	A0201,A2601,B3501,B4402,C0401,C0501	A0201	111	17960	ilgstagL	ilgstagP
BL3403	ETV4	17	41622971	C	T	A0201,A2601,B3501,B4402,C0401,C0501	B4402	460	263	merrMkagy	merrAkagy
BL3403	ST6GALNAC2	17	74561812	A	G	A0201,A2601,B3501,B4402,C0401,C0501	A0201	10	8	lfalYfsa	lfalYfsa
BL3403	SLC16A3	17	80195221	T	C	A0201,A2601,B3501,B4402,C0401,C0501	A0201	51	54	lihccVca	lihccVca
BL3403	SLC16A3	17	80195221	T	C	A0201,A2601,B3501,B4402,C0401,C0501	A0201	479	93	lihccAca	lihccVca
BL3403	PCLRMT	19	622354	G	T	A0201,A2601,B3501,B4402,C0401,C0501	B4402	284	962	pepclQrqy	pepclPrqy
BL3403	ZBTB7A	19	4054707	G	A	A0201,A2601,B3501,B4402,C0401,C0501	A0201	233	428	slppVaaaa	slppAaaaa
BL3403	ZBTB7A	19	4054707	G	A	A0201,A2601,B3501,B4402,C0401,C0501	B3501	473	326	npmnslppV	npmnslppA
BL3403	ZBTB7A	19	4054707	G	A	A0201,A2601,B3501,B4402,C0401,C0501	B3501	306	92	lppVaaaaa	lppAaaaaa
BL3403	ZBTB7A	19	4054707	G	A	A0201,A2601,B3501,B4402,C0401,C0501	B3501	229	280	ppVaaaaaa	ppAaaaaaa
BL3403	ZBTB7A	19	4054707	G	A	A0201,A2601,B3501,B4402,C0401,C0501	B3501	9	20	Vaaaaaasf	Aaaaaaasf
BL3403	LOC100131094	19	4683767	C	A	A0201,A2601,B3501,B4402,C0401,C0501	B3501	380	334	wlagspMsf	wlagspLsf
BL3403	LOC100131094	19	4683767	C	A	A0201,A2601,B3501,B4402,C0401,C0501	B3501	327	2455	Msfqplfl	Lsfqplfl
BL3403	KDM4B	19	5144311	G	A	A0201,A2601,B3501,B4402,C0401,C0501	A2603	90	349	itknRngly	itknKngly
BL3403	HSD11B11	19	5685078	G	T	A0201,A2601,B3501,B4402,C0401,C0501	A0201	37	3509	yalRgshv	yaRgshv
BL3403	HSD11B11	19	5685078	G	T	A0201,A2601,B3501,B4402,C0401,C0501	A0201	108	23567	alRgshvl	aRgshvl
BL3403	HSD11B11	19	5685078	G	T	A0201,A2601,B3501,B4402,C0401,C0501	A2603	48	86	elayhyalL	elayhyaRl
BL3403	HSD11B11	19	5685078	G	T	A0201,A2601,B3501,B4402,C0401,C0501	B4402	353	4909	eelayhyaL	eelayhyaR
BL3403	ZNF814	19	8577545	C	T	A0201,A2601,B3501,B4402,C0401,C0501	B3501	57	58	fpslrdlaq	fpsVrdlaq
BL3403	FKRP	19	47259268	T	A	A0201,A2601,B3501,B4402,C0401,C0501	A0201	385	306	aldgEavvl	aldgDavvl
BL3403	FKRP	19	47259268	T	A	A0201,A2601,B3501,B4402,C0401,C0501	C0501	119	90	aldgEavvl	aldgDavvl
BL3403	KCNC3	19	50823531	G	A	A0201,A2601,B3501,B4402,C0401,C0501	A0201	10	14	flpdlnVna	flpdlnAna
BL3403	KCNC3	19	50823531	G	A	A0201,A2601,B3501,B4402,C0401,C0501	B3501	205	155	lpdlnVnaa	lpdlnAnaa
BL3403	POLD1	19	50919698	T	A	A0201,A2601,B3501,B4402,C0401,C0501	B3501	80	30	lpidtqNyl	lpidtqYyl
BL3403	PPP2R1A	19	52714607	C	T	A0201,A2601,B3501,B4402,C0401,C0501	B3501	138	182	spSdleahf	spSdleanf
BL3403	ZNF480	19	52826068	G	A	A0201,A2601,B3501,B4402,C0401,C0501	A0201	67	190	kafsHsyl	kafsRsyl
BL3403	APCDD1L	20	57036139	G	A	A0201,A2601,B3501,B4402,C0401,C0501	A0201	451	3388	plgWlphv	plgRlphv
BL3403	APCDD1L	20	57036139	G	A	A0201,A2601,B3501,B4402,C0401,C0501	A0201	29	52	Wlphveyel	Rlphveyel
BL3403	APCDD1L	20	57036139	G	A	A0201,A2601,B3501,B4402,C0401,C0501	B3501	17	54	lplgWlph	lplgRlph

Figure 21 (Cont.)

BL3403	UMODL1	21	43531056	G	T	A0201,A2601,B3501,B4402,C0403,C0501	A0201	86	148	glVtgtaal	glGtgtaal
BL3403	MYO16B	22	26247463	C	T	A0201,A2601,B3501,B4402,C0403,C0501	C0501	10	13	yadhmgltC	yadhmgltR
BL3403	CHEK2	22	29031840	T	C	A0201,A2601,B3501,B4402,C0401,C0501	A2601	82	14103	Eligetslm	Kligetslm
BL3403	CHEK2	22	29031840	T	C	A0201,A2601,B3501,B4402,C0403,C0501	C0501	2	6	itdfghtsEi	itdfghtsKi
BL3403	PPP6R2	22	50882314	C	T	A0201,A2601,B3501,B4402,C0401,C0501	A0201	84	180	Wlspaepa	Rlspaepa
BL3403	SBF1	22	50904302	T	A	A0201,A2601,B3501,B4402,C0401,C0501	A0201	221	788	rqlgitlvl	rqlgitNvl
BL3403	DHX30	3	47890437	G	A	A0201,A2601,B3501,B4402,C0401,C0501	A0201	259	2159	sSsdthlafv	sGsdthlafv
BL3403	DHX30	3	47890437	G	A	A0201,A2601,B3501,B4402,C0403,C0501	B3501	70	257	dsSsdthlaf	dsGsdthlaf
BL3403	PLXNA1	3	126707449	C	T	A0201,A2601,B3501,B4402,C0403,C0501	B3501	202	2586	lpSrsfqvl	lpPrsfqvl
BL3403	MUC4	3	195513112	G	A	A0201,A2601,B3501,B4402,C0401,C0501	B3501	206	193	lpvlglssa	lpvTglssa
BL3403	ID4	6	19839367	G	T	A0201,A2601,B3501,B4402,C0401,C0501	B3501	50	35	hpSgtcpaa	hpAgtcpaa
BL3403	RIMS1	6	72962515	G	C	A0201,A2601,B3501,B4402,C0403,C0501	A2601	376	7797	dAlgvvppv	dGlgvvppv
BL3403	RIMS1	6	72962515	G	C	A0201,A2601,B3501,B4402,C0401,C0501	C0501	55	8	svddAlgvv	svdtGlgvv
BL3403	GPRC6A	6	117113765	T	C	A0201,A2601,B3501,B4402,C0403,C0501	A2601	44	51	tlfafkgKv	tlfafkgKy
BL3403	GPRC6A	6	117113765	T	C	A0201,A2601,B3501,B4402,C0401,C0501	B3501	189	202	tlfafkgKy	tlfafkgKy
BL3403	INTS1	7	1510311	G	A	A0201,A2601,B3501,B4402,C0401,C0501	A0201	6	7	vlfhrafv	vlThrafv
BL3403	INTS1	7	1510311	G	A	A0201,A2601,B3501,B4402,C0403,C0501	B3501	320	368	aavdlhraf	aavdThraf
BL3403	RADIL	7	4839876	C	T	A0201,A2601,B3501,B4402,C0403,C0501	B3501	240	100	ssstelKfcy	ssstelDfcy
BL3403	RADIL	7	4839876	C	T	A0201,A2601,B3501,B4402,C0401,C0501	C0501	251	85	stelKfcyvf	stelDfcyvf
BL3403	SAMD9	7	92733498	G	A	A0201,A2601,B3501,B4402,C0403,C0501	A0201	50	5158	rlpsigll	rlpsigIS
BL3403	SAMD9	7	92733498	G	A	A0201,A2601,B3501,B4402,C0403,C0501	B3501	326	359	lpsigltv	lpsigISv
BL3403	CHD7	8	61775123	C	T	A0201,A2601,B3501,B4402,C0401,C0501	B3501	114	79	rnggamVppm	rnggamAppm
BL3403	NAPRT1	8	144660329	A	G	A0201,A2601,B3501,B4402,C0401,C0501	B3501	6	5	cpfggalal	cpfggaIal
BL3403	ADCK5	8	145618766	C	A	A0201,A2601,B3501,B4402,C0401,C0501	A0201	476	255	slvppaeel	slvppaeeL
BL3403	ADCK5	8	145618766	C	A	A0201,A2601,B3501,B4402,C0403,C0501	B3501	388	539	lvppaeely	lvppaeeLy
BL3403	ADCK5	8	145618766	C	A	A0201,A2601,B3501,B4402,C0401,C0501	B3501	45	55	ppaeelyqy	ppaeeLyqy
BL3403	ZNF34	8	146002947	C	T	A0201,A2601,B3501,B4402,C0401,C0501	C0501	15	24423	paDpkpgvl	paGpkpgvl
BL3403	ERMP1	9	5832814	G	A	A0201,A2601,B3501,B4402,C0403,C0501	A0201	27	116	glsevCaal	glsevRaal
BL3403	ERMP1	9	5832814	G	A	A0201,A2601,B3501,B4402,C0401,C0501	B3501	42	316	Caalglaly	Raalglaly
BL3403	ERMP1	9	5832814	G	A	A0201,A2601,B3501,B4402,C0403,C0501	B4402	50	419	sevCaalgl	sevRaalgl
BL3403	CNTFR	9	34552193	C	T	A0201,A2601,B3501,B4402,C0401,C0501	A0201	317	986	tlalaTaaa	tlalaAaaa
BL3403	CNTFR	9	34552193	C	T	A0201,A2601,B3501,B4402,C0403,C0501	A0201	268	165	alaTaaata	alaAaaata
BL3403	CNTFR	9	34552193	C	T	A0201,A2601,B3501,B4402,C0401,C0501	B3501	80	65	vpitalaT	vpitalaA
BL3403	CNTFR	9	34552193	C	T	A0201,A2601,B3501,B4402,C0403,C0501	B3501	423	192	lalaTaaat	lalaAaaat
BL3403	CNTFR	9	34552193	C	T	A0201,A2601,B3501,B4402,C0403,C0501	B3501	185	78	laTaaatas	laAaaatas
BL3403	CNTFR	9	34552193	C	T	A0201,A2601,B3501,B4402,C0401,C0501	B3501	140	1099	Taaatassl	Aaaatassl
BL3403	KCNT1	9	138678262	A	T	A0201,A2601,B3501,B4402,C0403,C0501	A2601	163	5853	Fsqqrtsly	Isqqrtsly
BL3403	KCNT1	9	138678262	A	T	A0201,A2601,B3501,B4402,C0401,C0501	B4402	94	54	aewFsqqrl	aewIsqqrl
BL3403	RNF208	9	140114887	T	C	A0201,A2601,B3501,B4402,C0403,C0501	B3501	20	33	npisacsVm	npIsacsVm
BL3403	MIDI	X	10427815	C	T	A0201,A2601,B3501,B4402,C0401,C0501	B3501	428	1060	lpnikqnfy	lpnIkqnfy
BL3403	CASK	X	41712385	G	A	A0201,A2601,B3501,B4402,C0403,C0501	A2601	163	9985	dvakftssL	dvaKftssL
BL3403	WNK3	X	54319707	T	A	A0201,A2601,B3501,B4402,C0401,C0501	B3501	178	32	tsCqpsvay	tsSqpsvay
BL3403	PLXNB3	X	153040204	G	A	A0201,A2601,B3501,B4402,C0403,C0501	A0201	473	905	kvlRqlesl	kvlVqlesl
CA9903	TAS1R2	1	19166269	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	21	22	fmsSysgyl	fmsAysgyl
CA9903	TAS1R2	1	19166269	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	73	91	slctfmsSy	slctfmsAy
CA9903	TAS1R2	1	19166269	C	A	A0201,A1101,B1801,B5108,C0701,C1602	C0701	368	676	fmsSysgyl	fmsAysgyl
CA9903	TMCC4	1	20072046	A	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	51	32	vtgRlasgk	vtgWlasgk
CA9903	SRRM1	1	24978938	G	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	33	55	tsdlikipk	tsdlikVpk
CA9903	INADL	1	62550226	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	43	403	svdpatfpi	svdpatCpi

Figure 21 (Cont.)

CA9903	DNAJB4	1	78479867	G	A	A0201,A1101,B1801,B5108,C0701,C1602	B1801	67	192	feiffgrKm	feiffgrKm	feiffgrKm
CA9903	MCOLN2	1	85462501	C	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	464	12489	sSvfrftvr	sSvfrftvr	sGvfrftvr
CA9903	NTNG1	1	107867043	C	A	A0201,A1101,B1801,B5108,C0701,C1602	C0701	358	22412	kHqvniti	kHqvniti	kPiqvniti
CA9903	S100A12	1	153346398	C	G	A0201,A1101,B1801,B5108,C0701,C1602	C0701	95	10769	lHanqdeqv	lHanqdeqv	lDanqdeqv
CA9903	OR6N2	1	158746857	T	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	200	466	slacMdtsa	slacMdtsa	slacKdtsa
CA9903	ATP1A4	1	160136781	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	43	8973	Ytwfmlari	Ytwfmlari	Dtwfmlari
CA9903	ATP1A4	1	160136781	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	103	1951	sYtwfmla	sYtwfmla	ssDtwfmla
CA9903	ATP1A4	1	160136781	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	292	5238	sYtwfmlar	sYtwfmlar	sDtwfmlar
CA9903	ATP1A4	1	160136781	G	T	A0201,A1101,B1801,B5108,C0701,C1602	C0701	437	1717	tksYtwfm	tksYtwfm	tkssDtwfm
CA9903	NOS1AP	1	162313652	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	43	233	rtLpqafev	rtLpqafev	rVpqafev
CA9903	DUSP27	1	167093803	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	66	119	stwdAwnar	stwdAwnar	stwdSwnar
CA9903	PAPPA2	1	176525894	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	59	28	lkgddAyl	lkgddAyl	lkgddSyl
CA9903	ASPM	1	197070277	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	151	505	iqsfymNr	iqsfymNr	iqsfymNr
CA9903	ASPM	1	197070277	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	262	199	sfymNrak	sfymNrak	sfymNrak
CA9903	CR2	1	207641886	T	A	A0201,A1101,B1801,B5108,C0701,C1602	B1801	313	204	leCpaipmi	leCpaipmi	leCpaipmi
CA9903	KCNH1	1	210857395	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	35	83	lipQdhpv	lipQdhpv	lipPdhpv
CA9903	KCNH1	1	210857395	G	T	A0201,A1101,B1801,B5108,C0701,C1602	B1801	22	436	ntaaplipQ	ntaaplipQ	neaplipP
CA9903	PROX1	1	214171160	C	A	A0201,A1101,B1801,B5108,C0701,C1602	C0701	224	125	fntanqSlq	fntanqSlq	ftnanqRlq
CA9903	GPR137B	1	236341907	T	C	A0201,A1101,B1801,B5108,C0701,C1602	A0201	37	20	krnPlaniyl	krnPlaniyl	krnSlaniyl
CA9903	EDARADD	1	236577563	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	332	1921	fnmsYkypl	fnmsYkypl	fnmsDkypl
CA9903	EDARADD	1	236577563	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	15	6397	stlsfnmsY	stlsfnmsY	stlsfnmsD
CA9903	EDARADD	1	236577563	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	16	86	tlsfnmsYk	tlsfnmsYk	tlsfnmsDk
CA9903	EDARADD	1	236577563	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	92	670	lsfnmsYky	lsfnmsYky	lsfnmsDky
CA9903	RYR2	1	237517843	T	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	39	26	kqnrlralk	kqnrlralk	kqnrlralk
CA9903	RYR2	1	237801694	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	17	25	glqsfqrnlv	glqsfqrnlv	glqsfqrnlv
CA9903	RYR2	1	237801694	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	27	68	qsfqrnlvsk	qsfqrnlvsk	qsfqrnlvsk
CA9903	MLLT10	10	21845663	G	A	A0201,A1101,B1801,B5108,C0701,C1602	C0701	408	592	caspihpQcl	caspihpQcl	caspihpRcl
CA9903	PARD3	10	34420482	C	A	A0201,A1101,B1801,B5108,C0701,C1602	C0701	126	21	snhdtiqrl	snhdtiqrl	snhdRiqrl
CA9903	MYPN	10	69961673	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	15	19	Lvigrnpppw	Lvigrnpppw	Rvigrnpppw
CA9903	MYPN	10	69961673	G	T	A0201,A1101,B1801,B5108,C0701,C1602	C0701	279	13281	ghnvrlecL	ghnvrlecL	ghnvrlecR
CA9903	AHR2	10	71883672	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	18	23	asLetgfak	asLetgfak	asVetgfak
CA9903	AHR2	10	71883672	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	192	42	sLetgfakk	sLetgfakk	sVetgfakk
CA9903	UNC5B	10	85992387	G	A	A0201,A1101,B1801,B5108,C0701,C1602	C0701	23	17	shldFgdyi	shldFgdyi	shldSgdyi
CA9903	DUSP5	10	112269893	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	231	244	rlkDafdyi	rlkDafdyi	rlkEafdyi
CA9903	WDR11	10	122662647	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	22	16	ksDsttapk	ksDsttapk	ksAsttapk
CA9903	ACADSB	10	124810613	A	G	A0201,A1101,B1801,B5108,C0701,C1602	B1801	6	12	leaaGilty	leaaGilty	leaaRilty
CA9903	OR10A3	11	79603443	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	14	12	ilvmfpfl	ilvmfpfl	ilvmVpfl
CA9903	OR10A3	11	79603443	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	75	141	ivmfpfll	ivmfpfll	ivmVpfll
CA9903	OR10A3	11	79603443	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	325	613	ivmfpflli	ivmfpflli	ivmVpflli
CA9903	OR10A3	11	79603443	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	11	29	vmfpflli	vmfpflli	vmVpflli
CA9903	LRRC4C	11	40136052	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	36	28	hlnQymsyk	hlnQymsyk	hlnHymsyk
CA9903	LRRC4C	11	40136052	G	T	A0201,A1101,B1801,B5108,C0701,C1602	B1801	12	22	iehehlnQy	iehehlnQy	iehehlnHy
CA9903	OR4A5	11	51412022	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	47	755	aiKkplhyl	aiKkplhyl	aiCkplhyl
CA9903	OR8K1	11	56114142	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	58	254	iifsGcnl	iifsGcnl	iifsGcnl
CA9903	OR8K1	11	56114142	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	78	128	iifsGcnll	iifsGcnll	iifsGcnll
CA9903	OR9Q2	11	57958288	C	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	4	5	fifffaFi	fifffaFi	fifffaSi
CA9903	OR9Q2	11	57958288	C	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	99	772	faFidcyll	faFidcyll	faSidcyll
CA9903	OR9Q2	11	57958288	C	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	8	59	Fidcyllai	Fidcyllai	Sidcyllai
CA9903	OR9Q2	11	57958288	C	T	A0201,A1101,B1801,B5108,C0701,C1602	B1801	451	11941	fffffffaF	fffffffaF	fffffffaS

Figure 21 (Cont.)

CA9903	GLYATL1	11	58711064	G	A	A0201,A1101,B1801,B5108,C0701,C1602	C0701	4	5	Trsehgryf	Arsehgryl
CA9903	CCDC88B	11	64112394	G	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	81	1172	rlQeaveaaa	rlReaveaaa
CA9903	OR8B8	11	124310402	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	3	6	ylneivvfv	yVneivvfv
CA9903	PRDM10	11	129782029	T	A	A0201,A1101,B1801,B5108,C0701,C1602	C0701	275	136	qhaiqvlhi	qhaiqvQhi
CA9903	VWF	12	6155892	G	C	A0201,A1101,B1801,B5108,C0701,C1602	A1101	165	257	ssplshRsk	ssplshRsk
CA9903	PIK3C2G	12	18719941	C	G	A0201,A1101,B1801,B5108,C0701,C1602	C0701	439	968	rrfrdVnhy	rrfrdLnhy
CA9903	KRAS	12	25398285	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	69	107	vvgaGgvgk	vvgaGgvgk
CA9903	POP5	12	121018918	C	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	70	4141	aSrirrcqk	aGrirrcqk
CA9903	LATS2	13	21549285	C	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	50	381	yvptishpi	yvptishpM
CA9903	UPF3A	13	115047496	G	C	A0201,A1101,B1801,B5108,C0701,C1602	A1101	370	221	aiskVsirr	aiskVsirr
CA9903	UPF3A	13	115047496	G	C	A0201,A1101,B1801,B5108,C0701,C1602	C0701	388	591	krtaiskVv	krtaiskVv
CA9903	TGM1	14	24730916	G	A	A0201,A1101,B1801,B5108,C0701,C1602	B1801	6	37	yessdrtL	yessdrtL
CA9903	BCL11B	14	99641604	G	T	A0201,A1101,B1801,B5108,C0701,C1602	C0701	37	55	rthesEpsi	rthesDpsi
CA9903	MTA3	14	105329881	C	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	22	24	qvyiSnynk	qvyiPnynk
CA9903	HERC1	15	63948325	G	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	17	18	asnaSsaak	asnaPsaak
CA9903	SLC9A3R2	16	2087885	C	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	442	798	hlspMaaea	hlspTaaea
CA9903	DNAH3	16	21151969	A	G	A0201,A1101,B1801,B5108,C0701,C1602	A1101	321	274	tsSlfpgsr	tsLlfpgsr
CA9903	DNAH3	16	21151969	A	G	A0201,A1101,B1801,B5108,C0701,C1602	B1801	117	63	kevktsSlf	kevktsLlf
CA9903	MMP2	16	55518075	G	T	A0201,A1101,B1801,B5108,C0701,C1602	B1801	5	3	Cehgdgypf	Wehgdgypf
CA9903	VPS53	17	526807	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	87	20112	klfsgctlt	kMfsgctlt
CA9903	VPS53	17	526807	C	A	A0201,A1101,B1801,B5108,C0701,C1602	B1801	65	267	fegfiaklf	fegfiaKlf
CA9903	ATP2A3	17	3832738	C	T	A0201,A1101,B1801,B5108,C0701,C1602	C0701	189	114	slsenqsll	slsenqsil
CA9903	PELP1	17	4576733	G	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	3	8	rlhdlvfpl	rlhdlvlpl
CA9903	PELP1	17	4576733	G	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	20	25	lvfplsmgv	lvlplsmgv
CA9903	SLC2A4	17	7187403	G	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	23	18	iiiTqvlgi	iiAqvlgl
CA9903	TP53	17	7578394	T	C	A0201,A1101,B1801,B5108,C0701,C1602	C0701	337	431	rrcphHerc	rrcphLherc
CA9903	CTC1	17	8136328	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	72	41	gvlvDsshk	gvlvAsshk
CA9903	MYOCD	17	12655927	C	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	22	538	yqssstsV	yqssstsA
CA9903	MYOCD	17	12655927	C	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	36	190	sVlsrgfyh	sAlsrgfyh
CA9903	TMEM98	17	31263385	G	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	51	216	tlekliat	tlekliaM
CA9903	TMEM98	17	31263385	G	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	140	212	altmlggak	aMtmlggak
CA9903	TMEM98	17	31263385	G	A	A0201,A1101,B1801,B5108,C0701,C1602	B1801	36	29	tekivaltm	tekIvaMtm
CA9903	UHX1	17	35297786	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	21	53	ylsnssFak	ylsnssVak
CA9903	KRT14	17	39739912	C	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	393	6418	kteednHev	kteednRev
CA9903	CDC27	17	45247329	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	488	2811	fCdsacftl	fGdsacftl
CA9903	CDC27	17	45247329	C	A	A0201,A1101,B1801,B5108,C0701,C1602	B1801	34	17	tefCdsacf	tefGdsacf
CA9903	PRAC1	17	46799723	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	94	10796	gQahlttsk	gPahlttsk
CA9903	TRIM37	17	57125098	G	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	120	2189	qldgsssSV	qldgsssSA
CA9903	INTS2	17	59975056	A	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	59	37	rnvvwlswKi	rnvvwlswMi
CA9903	INTS2	17	59975056	A	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	288	20377	lnvvwlswK	lnvvwlswM
CA9903	INTS2	17	59975056	A	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	176	19	vwslswKik	vwslswMik
CA9903	BPTF	17	65890224	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	15	84	alaileFav	alaileCav
CA9903	BPTF	17	65890224	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	313	235	ileFavkpv	ileCavkpv
CA9903	BPTF	17	65890224	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	242	1500	lailefavk	laileCavk
CA9903	BPTF	17	65890224	G	T	A0201,A1101,B1801,B5108,C0701,C1602	B1801	24	133	lefavkpvv	leCavkpvv
CA9903	ABCA6	17	67075130	T	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	282	26088	tmrwklipL	tmrwklipM
CA9903	SDK2	17	71398257	C	A	A0201,A1101,B1801,B5108,C0701,C1602	C0701	36	3268	eHeeevtmv	eQeeevtmv
CA9903	PIEZO2	18	10696494	G	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	87	1434	Fihpeysav	Lihpeysav
CA9903	PIEZO2	18	10696494	G	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	167	489	kqffynLih	kqffynLih

Figure 21 (Cont.)

CA9903	MUC16	19	9002632	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	143	793	rvdavfthr	rvdavCthr
CA9903	OR7G1	19	9225670	C	G	A0201,A1101,B1801,B5108,C0701,C1602	A0201	21	1101	sHygtafA	sHygtafG
CA9903	OR7G1	19	9225670	C	G	A0201,A1101,B1801,B5108,C0701,C1602	A0201	146	3144	fAvyissav	fGvyissav
CA9903	ZNF675	19	23836812	C	A	A0201,A1101,B1801,B5108,C0701,C1602	C0701	203	15327	tthkkihtV	tthkkihtG
CA9903	ZNF675	19	23836812	C	A	A0201,A1101,B1801,B5108,C0701,C1602	C0701	250	58	iitVeqpyi	iitGeqpyi
CA9903	ZNF226	19	44679169	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	99	344	iHyYiaqt	iHyDiaqt
CA9903	ZNF226	19	44679169	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	183	17569	lvkaiHyY	lvkaiHyD
CA9903	C5AR1	19	47823770	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	64	60	ktkvvYav	ktkvvDav
CA9903	LILRB3	19	54725905	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	487	945	sqkgyChfv	sqkgyHhfv
CA9903	LILRB3	19	54725905	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	63	83	gyChhfvimk	gyHhfvimk
CA9903	NLRP7	19	55450270	G	T	A0201,A1101,B1801,B5108,C0701,C1602	B1801	116	82	mdfeEtief	mdfeEtief
CA9903	NLRP7	19	55450270	G	T	A0201,A1101,B1801,B5108,C0701,C1602	B1801	474	1478	feEtiefes	feEtiefes
CA9903	NLRP7	19	55450270	G	T	A0201,A1101,B1801,B5108,C0701,C1602	C0701	286	1482	nymdfeifEi	nymdfeifEi
CA9903	NLRP11	19	56303739	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	126	16885	rqkdicvnR	rqkdicvnR
CA9903	NLRP11	19	56303739	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	448	765	qkdicvnRI	qkdicvnRI
CA9903	DCDC1	2	74750345	C	A	A0201,A1101,B1801,B5108,C0701,C1602	C0701	249	120	lrsfvnpri	lrsVvnpri
CA9903	SEMA4C	2	97527324	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	72	43	gicnlrgik	gicnlrgSk
CA9903	KIAA0376	2	128396864	G	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	196	250	kqpphqMev	kqpphqVev
CA9903	WDR33	2	128471571	T	A	A0201,A1101,B1801,B5108,C0701,C1602	C0701	108	93	srgppnHhm	srgppnHtm
CA9903	LRP1B	2	141533727	G	T	A0201,A1101,B1801,B5108,C0701,C1602	C0701	143	275	lrnktsgvv	lrnktsgvv
CA9903	GALNT5	2	158142604	G	T	A0201,A1101,B1801,B5108,C0701,C1602	C0701	318	304	lrlkerhGi	lrlkerhGi
CA9903	TTN	2	179612473	T	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	31	9573	emiestfsL	emiestfsQ
CA9903	TTN	2	179612473	T	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	10	11	tsfsLnipk	tsfsQnipk
CA9903	TTN	2	179654796	G	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	63	108	kvivAtpkv	kvivAtpkv
CA9903	ALS2	2	202591214	C	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	56	17266	sgmfrngiK	sgmfrngiE
CA9903	ALS2	2	202591214	C	T	A0201,A1101,B1801,B5108,C0701,C1602	C0701	356	677	frngiKdgy	frngiEdgy
CA9903	CD28	2	204594440	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	96	526	wvivvvVgv	wvivvvEgv
CA9903	ITM2C	2	231729855	G	A	A0201,A1101,B1801,B5108,C0701,C1602	B1801	158	218	teiitpTr	teiitpAr
CA9903	OR6B2	2	240869313	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	251	449	vlnhfLcdi	vlnhfFcdi
CA9903	OR6B2	2	240869313	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	5	3107	fLcdispil	fFcdispil
CA9903	ARMC9	20	24952097	T	A	A0201,A1101,B1801,B5108,C0701,C1602	C0701	221	280	evnpwkrev	evnpwkrev
CA9903	KCNG1	20	49626754	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	110	173	qaikgSfyr	qaikgAfyr
CA9903	KCNG1	20	49626764	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	224	511	aikgSfyrr	aikgAfyrr
CA9903	KCNG1	20	49626764	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	121	587	gSfyrraqr	gAfyrraqr
CA9903	KCNG1	20	49626764	C	A	A0201,A1101,B1801,B5108,C0701,C1602	C0701	236	678	Sfyrraqrl	Afyrraqrl
CA9903	TSHZ2	20	51870152	A	T	A0201,A1101,B1801,B5108,C0701,C1602	B1801	328	516	Velelgpeq	Eelelgpeq
CA9903	SMTN	22	31484745	C	T	A0201,A1101,B1801,B5108,C0701,C1602	C0701	21	19	irrvRaqei	irrvWaqei
CA9903	INPP5J	22	31520945	G	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	151	17648	aamsassek	aamsassekG
CA9903	KCNJ4	22	38823622	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	44	34	fmigtlak	fmigtlMak
CA9903	KCNJ4	22	38823622	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	252	99	gtlakmar	gtlMakmar
CA9903	KCNJ4	22	38823622	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	80	124	ilakmarpk	ilMakmarpk
CA9903	SREBF2	22	42266968	A	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	81	70	vlaavqnpa	vlAaavqnpa
CA9903	ITGA9	3	37670769	C	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	303	2762	elkpltpvl	elPpltpvl
CA9903	BSN	3	49689586	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	20	20	atsVrglak	atsGrglak
CA9903	STAB1	3	52551123	A	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	17	4600	vrrggdgelcl	vrrggdgelcQ
CA9903	VGLL3	3	87027729	T	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	101	25233	algqaitlL	algqaitlH
CA9903	BOC	3	112968686	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	310	4892	gmSpevtla	gmKpevtla
CA9903	SIDT1	3	113330984	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	9	44	vifsaihfl	vifsaihVl
CA9903	SIDT1	3	113330984	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	282	504	saihVlasl	saihVlasl

Figure 21 (Cont.)

CA9903	SIDT1	3	113330984	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	42	489	Flaslalst	Vlaslalst
CA9903	SIDT1	3	113330984	G	T	A0201,A1101,B1801,B5108,C0701,C1602	C0701	50	457	ihFlaslal	ihVlaslal
CA9903	PDIA5	3	122873818	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	47	17692	tlvmfyapL	tlvmfyapW
CA9903	SHOX2	3	157815905	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	28	37	vvaaSaaak	vvaaAaaak
CA9903	SHOX2	3	157815905	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	42	68	Saaakttsk	Aaaakttsk
CA9903	WDR49	3	167277886	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	191	433	aldanetLl	aldanetRl
CA9903	WDR49	3	167277886	C	A	A0201,A1101,B1801,B5108,C0701,C1602	B1801	456	1943	netLlltgs	netRlltgs
CA9903	WDR49	3	167277886	C	A	A0201,A1101,B1801,B5108,C0701,C1602	C0701	294	11496	maldanetL	maldanetR
CA9903	JAKMIP1	4	6107622	A	G	A0201,A1101,B1801,B5108,C0701,C1602	A1101	30	26	htaHiselk	htaYiselk
CA9903	JAKMIP1	4	6107622	A	G	A0201,A1101,B1801,B5108,C0701,C1602	C0701	9	11	rhtaHisel	rhtaYisel
CA9903	APBB2	4	40827923	T	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	6	24	vqylgmFpv	vqylgmLpv
CA9903	APBB2	4	40827923	T	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	27	43	gmFpvdkpv	gmLpvdkpv
CA9903	APBB2	4	40827923	T	A	A0201,A1101,B1801,B5108,C0701,C1602	C0701	170	26	fhvqylgmF	fhvqylgmL
CA9903	GABRB1	4	47322211	C	A	A0201,A1101,B1801,B5108,C0701,C1602	B1801	167	402	deqnctMei	deqnctLei
CA9903	EGF	4	110862211	G	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	72	102	iIdfhynek	iMdfhynek
CA9903	UGT8	4	115597231	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	415	878	isfcHyfll	isfcQyfll
CA9903	UGT8	4	115597231	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	427	9022	avhqisfcH	avhqisfcQ
CA9903	UGT8	4	115597231	G	T	A0201,A1101,B1801,B5108,C0701,C1602	B1801	398	835	Hyflldiaf	Qyflldiaf
CA9903	ZNF827	4	146770524	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	55	15	nlflqdisv	nlfSqdisv
CA9903	ZNF827	4	146770524	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	145	6730	flqdisvkm	fSqdisvkm
CA9903	TENM3	4	183603095	C	A	A0201,A1101,B1801,B5108,C0701,C1602	B1801	178	49	dqcsgNgty	dqcsgHgty
CA9903	CTNND2	5	11159732	C	G	A0201,A1101,B1801,B5108,C0701,C1602	C0701	34	2148	iHlhssqvl	iQlhssqvl
CA9903	SPEF2	5	35704717	C	G	A0201,A1101,B1801,B5108,C0701,C1602	A1101	38	17123	isqrvaaeK	isqrvaaeN
CA9903	RASGRF2	5	80375978	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	4	370	flheifhqV	flheifhqG
CA9903	RASGRF2	5	80375978	G	T	A0201,A1101,B1801,B5108,C0701,C1602	C0701	182	427	lheifhqVl	lheifhqGl
CA9903	RASGRF2	5	80375978	G	T	A0201,A1101,B1801,B5108,C0701,C1602	C0701	215	58	fhqVlkarl	fhqGlkarl
CA9903	TMED7-TICAM2	5	114916850	T	C	A0201,A1101,B1801,B5108,C0701,C1602	C0701	171	5535	sRksedlsl	sKksedlsl
CA9903	ARSI	5	149677904	C	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	23	15750	gvcgfdlhK	gvcgfdlhE
CA9903	KIF13A	6	17837806	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	51	19518	gsninkslK	gsninkslT
CA9903	SLC17A3	6	25850739	A	G	A0201,A1101,B1801,B5108,C0701,C1602	A1101	180	424	stmAvyipt	stmVvyipt
CA9903	HIST1H2BI	6	27100417	T	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	18	19	esFsiyvyk	esYsiyvyk
CA9903	HIST1H2BI	6	27100417	T	A	A0201,A1101,B1801,B5108,C0701,C1602	B1801	15	16	kesFsiyvy	kesYsiyvy
CA9903	FOXP4	6	41545819	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	434	587	kqsasavHv	kqsasavQv
CA9903	FOXP4	6	41545819	G	T	A0201,A1101,B1801,B5108,C0701,C1602	C0701	241	9947	vHvpvsvam	vQvpvsvam
CA9903	RPL7L1	6	42852473	C	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	111	50	mlriveLyv	mlrivePyv
CA9903	RPL7L1	6	42852473	C	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	307	342	kmlriveLy	kmlrivePy
CA9903	RPL7L1	6	42852473	C	T	A0201,A1101,B1801,B5108,C0701,C1602	B1801	6	36	veLyvtwgf	vePyvtwgf
CA9903	FAM83B	6	54806671	A	C	A0201,A1101,B1801,B5108,C0701,C1602	A1101	105	29	atLgnsygr	atMgnsygr
CA9903	MYO6	6	76624595	G	C	A0201,A1101,B1801,B5108,C0701,C1602	C0701	130	206	trkrgPeil	trkrgAeil
CA9903	DOPEY1	6	83840101	G	C	A0201,A1101,B1801,B5108,C0701,C1602	A1101	76	163	iaeNteffk	iaeKteffk
CA9903	ZNF292	6	87967981	C	T	A0201,A1101,B1801,B5108,C0701,C1602	C0701	382	7555	lhtvchpnI	lhtvchpnT
CA9903	CCR6	6	167550402	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	74	114	ffipllfmi	ffiplMfmi
CA9903	IGFBP1	7	45931537	T	G	A0201,A1101,B1801,B5108,C0701,C1602	C0701	131	91	Grielyrvv	Crielyrvv
CA9903	ABCA13	7	48556373	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	213	4293	rifsssYva	rifsssDva
CA9903	ABCA13	7	48556373	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	93	637	fsssYvafi	fsssDvafi
CA9903	ABCA13	7	48556373	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	21	160	ssYvafisy	ssDvafisy
CA9903	ABCA13	7	48556373	G	T	A0201,A1101,B1801,B5108,C0701,C1602	C0701	151	967	srifsssYv	srifsssDv
CA9903	ABCA13	7	48556373	G	T	A0201,A1101,B1801,B5108,C0701,C1602	C0701	399	1527	fsssYvafi	fsssDvafi
CA9903	GRM3	7	86479774	T	C	A0201,A1101,B1801,B5108,C0701,C1602	A1101	21	28	hiiPfqpqk	hiiLfqpqk

Figure 21 (Cont.)

CA9903	PNPLA8	7	108154667	G	C	A0201,A1101,B1801,B5108,C0701,C1602	C0701	312	875	lrrttdRkl	lrrttdRkl	lrrttdPkl
CA9903	CPA4	7	1299838639	G	T	A0201,A1101,B1801,B5108,C0701,C1602	B1801	129	411	deiskIkql	deiskIkql	deiskIkql
CA9903	ATG9B	7	1507183318	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A1101	451	15752	ylddqvfyr	ylddqvfyr	yWdlqvfyr
CA9903	CHPF2	7	1509336447	C	T	A0201,A1101,B1801,B5108,C0701,C1602	B1801	128	523	leleWaysa	leleWaysa	leleRaysa
CA9903	TRPA1	8	72951978	A	G	A0201,A1101,B1801,B5108,C0701,C1602	C0701	102	47	nhpvckeHl	nhpvckeHl	nhpvckeYl
CA9903	DCAF4L2	8	888885945	C	A	A0201,A1101,B1801,B5108,C0701,C1602	C0701	473	1111	tntdQHftv	tntdHHftv	tntdQffrv
CA9903	SLC39A4	8	1456337974	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	83	96	gHgVswtvl	gHgVswtvl	gHgGwtvl
CA9903	SLC39A4	8	1456337974	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	70	21	HgVwtvll	HgVwtvll	HgGwtvll
CA9903	SLC39A4	8	1456337974	C	A	A0201,A1101,B1801,B5108,C0701,C1602	A0201	74	3629	gVwtvlll	gVwtvlll	gGwtvlll
CA9903	SLC39A4	8	1456337974	C	A	A0201,A1101,B1801,B5108,C0701,C1602	C0701	404	18749	lhrvgHgV	lhrvgHgV	lhrvgHgG
CA9903	SLC39A4	8	1456337975	C	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	119	98	gHgSwtvl	gHgSwtvl	gHgGwtvl
CA9903	SLC39A4	8	1456337975	C	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	17	21	HgSwtvll	HgSwtvll	HgGwtvll
CA9903	KCNV2	9	2718284	T	C	A0201,A1101,B1801,B5108,C0701,C1602	C0701	463	3998	rifPeeIgy	rifPeeIgy	rifLeeIgy
CA9903	PREM1	9	14859259	G	T	A0201,A1101,B1801,B5108,C0701,C1602	C0701	196	275	trlpaNgqm	trlpaNgqm	trlpaHgqm
CA9903	FRMPD1	9	37735582	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	19	136	lIFgakygi	lIFgakygi	lIFgakygi
CA9903	FRMPD1	9	37735582	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	70	140	ylallfgak	ylallfgak	ylallVgak
CA9903	FRMPD1	9	37735582	G	T	A0201,A1101,B1801,B5108,C0701,C1602	B1801	82	6289	resyialIF	resyialIF	resyialIV
CA9903	CNTNAP3	9	39171536	C	T	A0201,A1101,B1801,B5108,C0701,C1602	B1801	51	264	Eedkvsvtf	Eedkvsvtf	Eedkvsvtf
CA9903	SPATA31D1	9	84607496	G	A	A0201,A1101,B1801,B5108,C0701,C1602	C0701	112	78	rrwgtpkri	rrwgtpkri	rrwgtpkri
CA9903	SPATA31D1	9	84607496	G	A	A0201,A1101,B1801,B5108,C0701,C1602	C0701	252	258	Mrlhesisl	Mrlhesisl	Mrlhesisl
CA9903	TDRD7	9	1002224479	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A1101	385	12664	sYgqndlly	sYgqndlly	sGgqdlly
CA9903	FAM47B	X	349661252	G	T	A0201,A1101,B1801,B5108,C0701,C1602	A0201	4	4	Slfaeispv	Slfaeispv	Alfaeispv
CA9903	KLHL4	X	86919804	C	G	A0201,A1101,B1801,B5108,C0701,C1602	A1101	28	36	twapVswpr	twapVswpr	twapLswpr
CA9903	ARHGAP36	X	130220385	G	T	A0201,A1101,B1801,B5108,C0701,C1602	C0701	67	38	irrmlrNi	irrmlrNi	irrmlrKi
CU9061	TTLL10	1	1118412	C	G	A0101,A2902,B3801,B4403,C1601,C1203	C1203	84	101	frgpqGrvv	frgpqGrvv	frgpqArvv
CU9061	DVL1	1	1271541	A	G	A0101,A2902,B3801,B4403,C1601,C1203	C1203	451	1526	rngmpceSfv	rngmpceSfv	rngmpceFfv
CU9061	DVL1	1	1271541	A	G	A0101,A2902,B3801,B4403,C1601,C1203	C1203	269	122	npceSfvdi	npceSfvdi	npceFfvdi
CU9061	NPHP4	1	6007239	C	T	A0101,A2902,B3801,B4403,C1601,C1203	B4403	500	341	peivghpaf	peivghpaf	peMvghpaf
CU9061	SLC2A7	1	9083069	C	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	492	1828	atlrrdgkll	atlrrdgkll	atlrrdgklM
CU9061	SLC2A7	1	9083069	C	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	160	198	frndgkIIll	frndgkIIll	frndgkMll
CU9061	SLC2A7	1	9083069	C	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	179	116	lIlkwsctv	lIlkwsctv	MIlkwsctv
CU9061	ARHGEF19	1	165536297	T	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	219	302	spqedkVvi	spqedkVvi	spqedkEvi
CU9061	SPOCD1	1	32259884	C	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	340	593	dlqalptv	dlqalptv	rlVqalptv
CU9061	AGO3	1	36432575	G	C	A0101,A2902,B3801,B4403,C1601,C1203	C1203	64	25	mLqhfkvti	mLqhfkvti	mVqhfkvti
CU9061	GRIK3	1	37270593	C	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	127	240	Kqrsfcstv	Kqrsfcstv	Eqrsfcstv
CU9061	EPS15	1	51860085	G	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	28	19	dpfaLggtv	dpfaLggtv	dpfaPggtv
CU9061	EPS15	1	51860085	G	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	26	95	faLggtvva	faLggtvva	faPggtvva
CU9061	DDX20	1	112303368	G	T	A0101,A2902,B3801,B4403,C1601,C1203	A2902	10	10	qmlSvsaty	qmlSvsaty	qmlAvsaty
CU9061	DDX20	1	112303368	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	372	359	qrnlSvsaty	qrnlSvsaty	qrnlAvsaty
CU9061	GATAD2B	1	153789964	A	G	A0101,A2902,B3801,B4403,C1601,C1203	C1203	148	387	hrnlmPqrvl	hrnlmPqrvl	hrnlmSqrvl
CU9061	NTRK1	1	156843526	A	T	A0101,A2902,B3801,B4403,C1601,C1203	A2902	183	25216	apslrwlfN	apslrwlfN	apslrwlfN
CU9061	ETV3L	1	157062713	G	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	467	152	lIlGgprsl	lIlGgprsl	lIlPgprsl
CU9061	FMO1	1	171254428	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	215	140	ylnakpKlf	ylnakpKlf	ylnakpNlf
CU9061	FMO1	1	171254428	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	115	54	nakpKlfsm	nakpKlfsm	nakpNlfsm
CU9061	TNR	1	175324727	C	G	A0101,A2902,B3801,B4403,C1601,C1203	B4403	432	1975	sevtfqsal	sevtfqsal	sevtRqsal
CU9061	CFH	1	196682918	C	G	A0101,A2902,B3801,B4403,C1601,C1203	A0101	284	124	fisesEyty	fisesEyty	fisesQyty
CU9061	CFH	1	196682918	C	G	A0101,A2902,B3801,B4403,C1601,C1203	A2902	26	10	fisesEyty	fisesEyty	fisesQyty
CU9061	CFH	1	196682918	C	G	A0101,A2902,B3801,B4403,C1601,C1203	B4403	79	60	sesEyyal	sesEyyal	sesQyyal
CU9061	CFH	1	196682918	C	G	A0101,A2902,B3801,B4403,C1601,C1203	B4403	372	18919	sEytyalke	sEytyalke	sQytyalke

Figure 21 (Cont.)

CU9061	CFH	1	196682918	C	G	A0101,A2902,B3801,B4403,C1601,C1203	C1203	58	54	fisesEyty	fisesCyty	fisesCyty
CU9061	SOX13	1	204093838	G	T	A0101,A2902,B3801,B4403,C1603,C1203	A2902	201	1138	isEqhleky	isEqhleky	isRqhleky
CU9061	SOX13	1	204093838	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	172	181	qarlsEqhl	qarlsEqhl	qarlsRqhl
CU9061	SOX13	1	204093838	G	T	A0101,A2902,B3801,B4403,C1603,C1203	C1203	309	551	isEqhleky	isEqhleky	isRqhleky
CU9061	SLC30A10	1	220091782	G	A	A0101,A2902,B3801,B4403,C1601,C1203	A2902	32	34	vvlTaiify	vvlTaiify	vvlTaiify
CU9061	SLC30A10	1	220091782	G	A	A0101,A2902,B3801,B4403,C1603,C1203	C1203	475	430	vvvvlMail	vvvvlMail	vvvvlTail
CU9061	EPB5	1	220198569	G	C	A0101,A2902,B3801,B4403,C1601,C1203	C1203	245	379	kaaVlnqhy	kaaVlnqhy	kaaLlnqhy
CU9061	RYR2	1	237947175	C	T	A0101,A2902,B3801,B4403,C1603,C1203	C1203	9	15	kameeYkhy	kameeYkhy	kameeVkhy
CU9061	OR2T12	1	248458093	T	A	A0101,A2902,B3801,B4403,C1603,C1203	C1203	124	203	Wstnhdkvv	Wstnhdkvv	Rstnhdkvv
CU9061	OR2T12	1	248458277	C	A	A0101,A2902,B3801,B4403,C1601,C1203	A2902	61	651	amyiccLlm	amyiccLlm	amyiccVlm
CU9061	OR2T12	1	248458277	C	A	A0101,A2902,B3801,B4403,C1603,C1203	C1203	230	105	namyiccLl	namyiccLl	namyiccVl
CU9061	OR2T12	1	248458277	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	330	303	yiccLlmii	yiccLlmii	yiccVlmii
CU9061	MCM10	10	13246296	G	T	A0101,A2902,B3801,B4403,C1601,C1203	B3801	20	42	wfvdgvNrff	wfvdgvNrff	wfvdgvKrff
CU9061	PRTFDC1	10	25160950	C	T	A0101,A2902,B3801,B4403,C1603,C1203	C1203	363	1048	iggdNlsti	iggdNlsti	iggdDlsti
CU9061	NRAP	10	115405604	C	A	A0101,A2902,B3801,B4403,C1603,C1203	C1203	229	192	qaqsLnkiv	qaqsLnkiv	qaqsVnkiv
CU9061	BBOX1	11	27148867	G	T	A0101,A2902,B3801,B4403,C1601,C1203	A2902	213	3523	itdnwLll	itdnwLll	itdnwRll
CU9061	BBOX1	11	27148867	G	T	A0101,A2902,B3801,B4403,C1603,C1203	A2902	152	266	tfdnwLlh	tfdnwLlh	tfdnwRlh
CU9061	BBOX1	11	27148867	G	T	A0101,A2902,B3801,B4403,C1603,C1203	A2902	172	1131	Llhgrrsv	Llhgrrsv	Rlhgrrsv
CU9061	BBOX1	11	27148867	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	25	23	itdnwLll	itdnwLll	itdnwRll
CU9061	NR1H3	11	47250170	G	A	A0101,A2902,B3801,B4403,C1603,C1203	B3801	277	212	vhsKqvfal	vhsKqvfal	vhsEqvfal
CU9061	OR4C15	11	55322235	G	T	A0101,A2902,B3801,B4403,C1603,C1203	B4403	187	188	fegchmqff	fegchmqff	fegcMmqff
CU9061	OR5AP2	11	56409562	G	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	111	10962	asyssvtL	asyssvtL	asyssvtP
CU9061	OR5AP2	11	56409562	G	A	A0101,A2902,B3801,B4403,C1603,C1203	C1203	77	142	yssvtLkm	yssvtLkm	yssvtPkm
CU9061	GLYAT	11	58478118	G	T	A0101,A2902,B3801,B4403,C1603,C1203	C1203	65	192	takeiTfi	takeiTfi	takeiPfi
CU9061	ZBTB3	11	62521122	T	G	A0101,A2902,B3801,B4403,C1601,C1203	C1203	140	246	fpDhsqqfi	fpDhsqqfi	fpEhsqqfi
CU9061	BACE1	11	117160430	G	A	A0101,A2902,B3801,B4403,C1601,C1203	A0101	80	90	qtdeLtlms	qtdeLtlms	qtdeSlmt
CU9061	BACE1	11	117160430	G	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	156	10148	ynlpqtdeL	ynlpqtdeL	ynlpqtdeS
CU9061	BACE1	11	117160430	G	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	349	1044	tltmtiayv	tltmtiayv	Sltmtiayv
CU9061	ARHGAP32	11	128642745	G	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	426	19583	fidqdqspL	fidqdqspL	fidqdqspP
CU9061	OLR1	12	10321718	G	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	367	177	laaatlgvL	laaatlgvL	laaatlgvL
CU9061	OLR1	12	10321718	G	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	380	2022	gvtdglvv	gvtdglvv	gvtdglvv
CU9061	OLR1	12	10321718	G	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	20	138	Fdghvvti	Fdghvvti	Ldghvvti
CU9061	UNC5C	12	25257316	G	C	A0101,A2902,B3801,B4403,C1601,C1203	B3801	63	585	kHsehrpsl	kHsehrpsl	kQsehrpsl
CU9061	ITPR2	12	26580911	T	C	A0101,A2902,B3801,B4403,C1601,C1203	C1203	296	445	rpflvsVml	rpflvsVml	rpflvsIml
CU9061	ITPR2	12	26580911	T	C	A0101,A2902,B3801,B4403,C1601,C1203	C1203	55	37	Vmlrsiyti	Vmlrsiyti	Imlrsiyti
CU9061	ASUN	12	27069110	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	36	32	flngLsvl	flngLsvl	flngRsvl
CU9061	ASUN	12	27069111	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	40	32	flngSsvl	flngSsvl	flngRsvl
CU9061	GXYLT1	12	42523633	C	A	A0101,A2902,B3801,B4403,C1601,C1203	A0101	62	93	fsiFywnpy	fsiFywnpy	fsiCywnpy
CU9061	GXYLT1	12	42523633	C	A	A0101,A2902,B3801,B4403,C1601,C1203	A2902	300	876	rckdfsiFy	rckdfsiFy	rckdfsiCy
CU9061	GXYLT1	12	42523633	C	A	A0101,A2902,B3801,B4403,C1601,C1203	A2902	11	24	fsiFywnpy	fsiFywnpy	fsiCywnpy
CU9061	GXYLT1	12	42523633	C	A	A0101,A2902,B3801,B4403,C1601,C1203	A2902	40	2632	ifywnpywm	ifywnpywm	lCywnpywm
CU9061	GXYLT1	12	42523633	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	52	28	fsiFywnpy	fsiFywnpy	fsiCywnpy
CU9061	GXYLT1	12	42523633	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	421	6735	Fywnpywml	Fywnpywml	Cywnpywml
CU9061	SEMP1	12	48457493	C	A	A0101,A2902,B3801,B4403,C1601,C1203	A0101	481	336	lndDimfy	lndDimfy	lndEimfy
CU9061	ZBTB39	12	57386735	G	A	A0101,A2902,B3801,B4403,C1601,C1203	A0101	171	147	kthlgaimy	kthlgaimy	kthSgaimy
CU9061	ZBTB39	12	57386735	G	A	A0101,A2902,B3801,B4403,C1601,C1203	A2902	9	6	kthlgaimy	kthlgaimy	kthSgaimy
CU9061	SLC6A15	12	85266538	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	126	18713	timkflkmV	timkflkmV	timkflkmG
CU9061	SLC6A15	12	85266538	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	463	830	mkflkmVni	mkflkmVni	mkflkmGni
CU9061	NAA25	12	112493013	C	T	A0101,A2902,B3801,B4403,C1601,C1203	A2902	31	16	vrrelMly	vrrelMly	vrrelMly

Figure 21 (Cont.)

CU9061	GCN1L1	12	120574439	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	84	112	kalgvilI	kalgvilRl	kalgvilRl
CU9061	CSNK1A1L	13	37678582	A	G	A0101,A2902,B3801,B4403,C1603,C1203	A2902	490	872	feeApdymy	feeVpdymy	feeVpdymy
CU9061	CSNK1A1L	13	37678582	A	G	A0101,A2902,B3801,B4403,C1601,C1203	B4403	388	633	feeApdymy	feeVpdymy	feeVpdymy
CU9061	SIAH3	13	46357750	G	A	A0101,A2902,B3801,B4403,C1603,C1203	A0101	233	992	ltqadcfy	ltqadcfy	ltqadcfy
CU9061	SIAH3	13	46357750	G	A	A0101,A2902,B3801,B4403,C1601,C1203	A2902	359	1869	mmligtLtq	mmligtPtq	mmligtPtq
CU9061	SIAH3	13	46357750	G	A	A0101,A2902,B3801,B4403,C1601,C1203	A2902	12	98	ltqadcfy	ltqadcfy	ltqadcfy
CU9061	AR111	13	50204855	C	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	278	350	yvtdsTdea	yvtdsTdea	yvtdsTdea
CU9061	CHAMP1	13	1150913376	G	A	A0101,A2902,B3801,B4403,C1603,C1203	C1203	20	33	ftKekeafi	ftPekeafi	ftPekeafi
CU9061	NGDN	14	23944783	G	T	A0101,A2902,B3801,B4403,C1603,C1203	C1203	448	339	tvlekMLpi	tvlekMLpi	tvlekMLpi
CU9061	NGDN	14	23944783	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	500	571	tpkdqkKky	tpkdqkKky	tpkdqkKky
CU9061	VSX2	14	74727456	C	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	268	445	ehrensiAv	ehrensiVv	ehrensiAv
CU9061	NPAP1	15	24922911	C	A	A0101,A2902,B3801,B4403,C1603,C1203	C1203	109	303	fifhntTTs	fifhntTPs	fifhntTPs
CU9061	GPR176	15	40033678	C	G	A0101,A2902,B3801,B4403,C1601,C1203	C1203	85	366	saffQaKei	saffQaKei	saffQaKei
CU9061	GPR176	15	40033678	C	G	A0101,A2902,B3801,B4403,C1602,C1203	C1203	215	370	Makelfstc	Qakelfstc	Qakelfstc
CU9061	VPS13C	15	62304329	T	C	A0101,A2902,B3801,B4403,C1603,C1203	A2902	131	239	tsgSippnvy	tsgNippnv	tsgNippnv
CU9061	VPS13C	15	62304329	T	C	A0101,A2902,B3801,B4403,C1601,C1203	A2902	21	31	gSippnvqy	gNippnvqy	gNippnvqy
CU9061	VPS13C	15	62304329	T	C	A0101,A2902,B3801,B4403,C1603,C1203	C1203	383	125	Sippnvqy	Nippnvqy	Nippnvqy
CU9061	LCTL	15	66857625	G	A	A0101,A2902,B3801,B4403,C1603,C1203	A0101	51	1824	gsPeeasfy	gsPeeasfy	gsPeeasfy
CU9061	LCTL	15	66857625	G	A	A0101,A2902,B3801,B4403,C1601,C1203	A0101	10	11360	sSeeasfyy	sPeeasfyy	sPeeasfyy
CU9061	LCTL	15	66857625	G	A	A0101,A2902,B3801,B4403,C1603,C1203	A2902	151	1050	gsSeeasfy	gsPeeasfy	gsPeeasfy
CU9061	LCTL	15	66857625	G	A	A0101,A2902,B3801,B4403,C1603,C1203	A2902	273	1206	sSeeasfyy	sPeeasfyy	sPeeasfyy
CU9061	HCN4	15	73659842	G	A	A0101,A2902,B3801,B4403,C1601,C1203	A2902	11	45	agfwiihLy	agfwiihPy	agfwiihPy
CU9061	HCN4	15	73659842	G	A	A0101,A2902,B3801,B4403,C1603,C1203	A2902	300	1030	gfwiihLys	gfwiihPys	gfwiihPys
CU9061	HCN4	15	73659842	G	A	A0101,A2902,B3801,B4403,C1603,C1203	A2902	159	372	wiihLysdf	wiihPysdf	wiihPysdf
CU9061	HCN4	15	73659842	G	A	A0101,A2902,B3801,B4403,C1601,C1203	A2902	21	728	hLysdfrfy	hPysdfrfy	hPysdfrfy
CU9061	HCN4	15	73659842	G	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	219	10193	sagfwiihL	sagfwiihP	sagfwiihP
CU9061	HCN4	15	73659842	G	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	303	98	hLysdfrfy	hPysdfrfy	hPysdfrfy
CU9061	IQGAP1	15	91017318	A	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	147	5015	hindiikiL	hindiikiQ	hindiikiQ
CU9061	IQGAP1	15	91017318	A	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	297	465	Lafiranka	Qafiranka	Qafiranka
CU9061	CHD2	15	93486145	A	C	A0101,A2902,B3801,B4403,C1601,C1203	A0101	9	11661	eKdegeiqy	eKdegeiqy	eKdegeiqy
CU9061	SYNGR3	16	20420078	G	T	A0101,A2902,B3801,B4403,C1601,C1203	B3801	419	847	frfgvalgl	Crfgvalgl	Crfgvalgl
CU9061	SYNGR3	16	20420078	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	52	345	gaFrfgval	gaCrfgval	gaCrfgval
CU9061	NLRC3	16	36130038	G	T	A0101,A2902,B3801,B4403,C1601,C1203	A0101	133	524	qslfTqiy	qslPqiy	qslPqiy
CU9061	NLRC3	16	36130038	G	T	A0101,A2902,B3801,B4403,C1601,C1203	A2902	7	8	qslfTqiy	qslPqiy	qslPqiy
CU9061	SEPT12	16	48334495	T	G	A0101,A2902,B3801,B4403,C1601,C1203	C1203	407	296	fdedLntki	fdedlndki	fdedlndki
CU9061	ZP2	16	21210936	G	A	A0101,A2902,B3801,B4403,C1601,C1203	B3801	428	1902	nrlspdsSl	nrlspdsPl	nrlspdsPl
CU9061	CRYM	16	21278893	G	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	248	186	kSgahinav	kPgahinav	kPgahinav
CU9061	NLRC5	16	57059933	G	T	A0101,A2902,B3801,B4403,C1601,C1203	B4403	22	27	aeaSmvhml	aeaRmvhml	aeaRmvhml
CU9061	NLRC5	16	57059933	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	424	420	paeaSmvhm	paeaRmvhm	paeaRmvhm
CU9061	FMOD1	16	67263568	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	281	380	tskgpgtev	tskgpgtev	tskgpgtev
CU9061	OR1G1	17	3030327	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	425	73	lsfcanhDi	lsfcanhEi	lsfcanhEi
CU9061	OR1G1	17	3030327	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	305	372	canhDiphf	canhEiphf	canhEiphf
CU9061	KIF1C	17	4925705	C	A	A0101,A2902,B3801,B4403,C1601,C1203	B4403	41	41	aeiealaal	aeiealaal	aeiealaal
CU9061	KIF1C	17	4925709	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	455	347	laalkmrel	laalkmrel	laalkmrel
CU9061	TP53	17	7579473	G	C	A0101,A2902,B3801,B4403,C1601,C1203	C1203	408	286	rmpeaapAv	rmpeaapPv	rmpeaapPv
CU9061	WRAP53	17	7592241	G	C	A0101,A2902,B3801,B4403,C1601,C1203	C1203	491	965	spselspPi	spselspRi	spselspRi
CU9061	NOS2	17	26106080	T	C	A0101,A2902,B3801,B4403,C1601,C1203	B4403	139	75	mehpkCewf	mehpkYewf	mehpkYewf
CU9061	CDC27	17	45234357	G	T	A0101,A2902,B3801,B4403,C1601,C1203	A2902	131	25933	lgtgtsiY	lgtgtsiV	lgtgtsiV
CU9061	SPG9	17	47699411	A	C	A0101,A2902,B3801,B4403,C1601,C1203	C1203	126	1107	fAymwtinn	fSymwtinn	fSymwtinn

Figure 21 (Cont.)

CU9061	KIF2B	17	51902313	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	108	45	fciaLsisi	fcaRslsi	fcaRslsi
CU9061	HELZ	17	65162648	C	T	A0101,A2902,B3801,B4403,C1601,C1203	B3801	328	1212	drikdnGyf	drikdnGyf	drikdnGyf
CU9061	BAHCC1	17	79410450	C	T	A0101,A2902,B3801,B4403,C1601,C1203	A2902	317	85	samknlMky	samknlMky	samknlMky
CU9061	BAHCC1	17	79410450	C	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	63	54	samknlMky	samknlMky	samknlMky
CU9061	BAHCC1	17	79410450	C	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	213	437	lMkyssqaiv	lkyssqaiv	lkyssqaiv
CU9061	MARF	17	90430515	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	250	400	sqkefvrfy	sqkefvrfy	sqkefvrfy
CU9061	SYT4	18	40854056	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	26	6332	fpktnlkpV	fpktnlkpG	fpktnlkpG
CU9061	ST8SIA5	18	44260450	C	A	A0101,A2902,B3801,B4403,C1601,C1203	B4403	481	3536	lekwLrpfy	lekwRrpfy	lekwRrpfy
CU9061	ST8SIA5	18	44260450	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	127	388	wLrpfyrvl	wRrpfyrvl	wRrpfyrvl
CU9061	FSTL3	19	681368	T	G	A0101,A2902,B3801,B4403,C1601,C1203	C1203	423	542	cprpqAcvv	cprpqScvv	cprpqScvv
CU9061	FUT5	19	5866821	C	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	185	67	lppdafihM	lppdafihV	lppdafihV
CU9061	FUT5	19	5866821	C	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	458	328	dafihMddf	dafihVddf	dafihVddf
CU9061	VMAC	19	5909136	T	C	A0101,A2902,B3801,B4403,C1601,C1203	C1203	183	62	qpavlgitv	qpavFgitv	qpavFgitv
CU9061	MUC16	19	9068646	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	159	306	dmdKnlcpw	dmdTnlcpv	dmdTnlcpv
CU9061	CEACAM3	19	42301806	T	C	A0101,A2902,B3801,B4403,C1601,C1203	A0101	25	84	vtqndTgfy	vtqndTgfy	vtqndTgfy
CU9061	CEACAM3	19	42301806	T	C	A0101,A2902,B3801,B4403,C1601,C1203	A2902	106	120	vtqndTgfy	vtqndTgfy	vtqndTgfy
CU9061	GLTSCR1	19	48197349	A	G	A0101,A2902,B3801,B4403,C1601,C1203	C1203	106	1049	pApppthi	pTpppthi	pTpppthi
CU9061	BCAT2	19	49303285	C	G	A0101,A2902,B3801,B4403,C1601,C1203	C1203	224	855	vpdAagtsl	vpdPagtsl	vpdPagtsl
CU9061	ZNF616	19	52619315	G	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	27	18	kafrhrsnf	kafrhrsnf	kafrhrsnf
CU9061	PRPF31	19	54621304	A	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	35	22	lsgdsvMti	lsgdsvMti	lsgdsvMti
CU9061	KIR2DL3	19	55253465	C	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	313	545	ilahpgLlv	ilahpgPlv	ilahpgPlv
CU9061	NLRP7	19	55451170	G	T	A0101,A2902,B3801,B4403,C1601,C1203	B4403	73	304	Eedqamraf	Dedqamraf	Dedqamraf
CU9061	EMI4	2	42508025	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	19	40	kmfmrgrFi	kmfmrgrFi	kmfmrgrFi
CU9061	EMI4	2	42508025	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	21	28	fmrgrFtm	fmrgrFtm	fmrgrFtm
CU9061	RAB11FIP5	2	73902653	T	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	48	6211	lqlppggpl	lqlppggpK	lqlppggpK
CU9061	TLX2	2	74742781	G	T	A0101,A2902,B3801,B4403,C1601,C1203	A2902	45	43	Vtrrlghpy	Gtrrlghpy	Gtrrlghpy
CU9061	TLX2	2	74742781	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	113	70	spfsVtrri	spfsGtrri	spfsGtrri
CU9061	EIF2AK3	2	88874369	T	C	A0101,A2902,B3801,B4403,C1601,C1203	A2902	257	81	pGspkvyfy	pSspkvyfy	pSspkvyfy
CU9061	XIRP2	2	168101413	A	G	A0101,A2902,B3801,B4403,C1601,C1203	C1203	14	23	feAerldsi	feTerldsi	feTerldsi
CU9061	DYNC1I2	2	172582501	A	G	A0101,A2902,B3801,B4403,C1601,C1203	B4403	220	367	eefisfGh	eefksfDh	eefksfDh
CU9061	DYNC1I2	2	172582501	A	G	A0101,A2902,B3801,B4403,C1601,C1203	C1203	218	76	fGhstriv	fDhstriv	fDhstriv
CU9061	HOXD3	2	176036808	G	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	448	317	rapTsgpvf	rapAsgpvf	rapAsgpvf
CU9061	TTN	2	179493045	A	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	155	75	raesSeftv	raesSeftv	raesSeftv
CU9061	TTN	2	179529195	G	T	A0101,A2902,B3801,B4403,C1601,C1203	B4403	291	600	aevvHvkvh	aevvPvkvh	aevvPvkvh
CU9061	TTN	2	179529195	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	262	84	raevvHvkv	raevvPvkv	raevvPvkv
CU9061	TTN	2	179593805	G	T	A0101,A2902,B3801,B4403,C1601,C1203	A2902	212	66	vrkkdsggy	vnkQdsggy	vnkQdsggy
CU9061	C2orf62	2	219227539	A	G	A0101,A2902,B3801,B4403,C1601,C1203	C1203	339	40	Gvrnawrrnv	Rvrnawrrnv	Rvrnawrrnv
CU9061	RBM44	2	238727067	G	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	224	175	Ratsarpsv	Ratsarpsv	Ratsarpsv
CU9061	SIRPD	20	1517832	A	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	214	126	dahtGsai	dahtGsai	dahtGsai
CU9061	NCAM2	21	22664458	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	127	379	mlamnnHi	mlamnnQi	mlamnnQi
CU9061	NCAM2	21	22664458	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	17	14	lamnnHil	lamnnQil	lamnnQil
CU9061	EIF4ENIF1	22	31859039	G	C	A0101,A2902,B3801,B4403,C1601,C1203	C1203	261	583	ytesepewl	ytesepewf	ytesepewf
CU9061	SH3BP1	22	38051297	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	104	91	rpapDrptm	rpapArptm	rpapArptm
CU9061	CCDC134	22	42205893	G	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	386	1467	psfeiykkl	psfeiykkM	psfeiykkM
CU9061	CCDC134	22	42205893	G	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	420	513	eiykklfev	eiykklMev	eiykklMev
CU9061	ULK4	3	41746602	C	T	A0101,A2902,B3801,B4403,C1601,C1203	A2902	18	138	sTfeaiiqy	sAfeaiiqy	sAfeaiiqy
CU9061	ULK4	3	41746602	C	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	463	2235	fikitlsTf	fikitlsAf	fikitlsAf
CU9061	ULK4	3	41746602	C	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	254	164	itlsTfesi	itlsAfesi	itlsAfesi
CU9061	ULK4	3	41746602	C	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	145	15	sTfeaiiqy	sAfeaiiqy	sAfeaiiqy

Figure 21 (Cont.)

CU9061	TMPRSS7	3	111775893	A	T	A0101,A2902,B3801,B4403,C1601,C1203	A2902	54	40	stlgLaikf	stlgLaikf	stlgtaikf
CU9061	TMPRSS7	3	111775893	A	T	A0101,A2902,B3801,B4403,C1603,C1203	A2902	468	465	tlgLaikfy	tlgLaikfy	tlgtaikfy
CU9061	TMPRSS7	3	111775893	A	T	A0101,A2902,B3801,B4403,C1601,C1203	A2902	10	13	glaikfyny	glaikfyny	glaikfyny
CU9061	ACAD11	3	132353341	T	C	A0101,A2902,B3801,B4403,C1603,C1203	C1203	70	373	fhpEecrvi	fhpEecrvi	fhpKecrvi
CU9061	CLCN2	3	184071983	C	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	17	84	iavlianTv	iavlianTv	iavliamAv
CU9061	CLCN2	3	184071983	C	T	A0101,A2902,B3801,B4403,C1603,C1203	C1203	128	63	lsnTveqsi	lsnTveqsi	lsnAveqsi
CU9061	RFC4	3	186507842	T	A	A0101,A2902,B3801,B4403,C1601,C1203	B4403	208	817	aevdNcIad	aevdNcIad	aevdKcIad
CU9061	IQCG	3	197670669	C	T	A0101,A2902,B3801,B4403,C1603,C1203	C1203	13	12	vtpyeRrqsi	vtpyeRrqsi	vqyeGrqsi
CU9061	IQCG	3	197670669	C	T	A0101,A2902,B3801,B4403,C1603,C1203	C1203	452	1294	yeRrqsicv	yeRrqsicv	yeGrqsicv
CU9061	STK32B	4	5170103	G	C	A0101,A2902,B3801,B4403,C1601,C1203	C1203	451	388	ieSdevrnv	ieSdevrnv	ieRdevrnv
CU9061	RBM47	4	40440501	C	A	A0101,A2902,B3801,B4403,C1601,C1203	B4403	344	300	yeiLpgrtl	yeiLpgrtl	yeiRpgrtl
CU9061	RBM47	4	40440501	C	A	A0101,A2902,B3801,B4403,C1603,C1203	C1203	187	58	yeiLpgrtl	yeiLpgrtl	yeiRpgrtl
CU9061	PDGFRA	4	55127579	G	C	A0101,A2902,B3801,B4403,C1601,C1203	C1203	101	107	yivypHpdvf	yivypHpdvf	yivypDpdvf
CU9061	PDGFRA	4	55127579	G	C	A0101,A2902,B3801,B4403,C1603,C1203	C1203	208	59	yvpHpdvaf	yvpHpdvaf	yvpDpdvaf
CU9061	PDGFRA	4	55127579	G	C	A0101,A2902,B3801,B4403,C1603,C1203	C1203	45	58	vpHpdvafv	vpHpdvafv	vpDpdvafv
CU9061	TMPRSS11D	4	68688104	G	T	A0101,A2902,B3801,B4403,C1601,C1203	A2902	86	100	gvyNrvtay	gvyNrvtay	gvyTrvtay
CU9061	TMPRSS11D	4	68688104	G	T	A0101,A2902,B3801,B4403,C1603,C1203	C1203	104	426	gvyNrvtay	gvyNrvtay	gvyTrvtay
CU9061	ABCG2	4	89020583	C	T	A0101,A2902,B3801,B4403,C1603,C1203	A2902	25	35	fiheyisEy	fiheyisEy	fiheyisGy
CU9061	ABCG2	4	89020583	C	T	A0101,A2902,B3801,B4403,C1601,C1203	B4403	69	36626	sEyyrvssy	sEyyrvssy	sGyyrvssy
CU9061	ABCG2	4	89020583	C	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	25	115	fiheyisEy	fiheyisEy	fiheyisGy
CU9061	ABCG2	4	89020583	C	T	A0101,A2902,B3801,B4403,C1603,C1203	C1203	281	834	sEyyrvssy	sEyyrvssy	sGyyrvssy
CU9061	EIF4EP1L	4	109677623	G	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	254	109	eandlaiRl	eandlaiRl	eandlaiRl
CU9061	EIF4EP1L	4	109677623	G	A	A0101,A2902,B3801,B4403,C1603,C1203	C1203	339	255	laiRlarqf	laiRlarqf	laiRlarqf
CU9061	FSTL5	4	162841783	G	A	A0101,A2902,B3801,B4403,C1603,C1203	A2902	279	1273	gfmiqdglf	gfmiqdglf	gfmiqdglf
CU9061	FSTL5	4	162841783	G	A	A0101,A2902,B3801,B4403,C1601,C1203	A2902	152	682	tlgscenky	tlgscenky	tlgscenky
CU9061	VEGFC	4	177609049	T	C	A0101,A2902,B3801,B4403,C1601,C1203	C1203	14	69	tSymwmnfi	tSymwmnfi	tNymwmnfi
CU9061	KIAA0947	5	5489291	G	T	A0101,A2902,B3801,B4403,C1601,C1203	A2902	16	300	wglqlaaly	wglqlaaly	wglqlaaVy
CU9061	CDH18	5	19483546	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	43	81	issSttti	issSttti	issSttti
CU9061	C1QTNF3	5	34043080	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	318	830	rsGsrrekv	rsGsrrekv	rsGsrrekv
CU9061	C6	5	41195895	C	T	A0101,A2902,B3801,B4403,C1601,C1203	A2902	341	192	qimgnRthf	qimgnRthf	qimgnGthf
CU9061	PCDHB8	5	140558636	G	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	106	111	dVndhapev	dVndhapev	dVndhapev
CU9061	ANXA6	5	150516820	C	T	A0101,A2902,B3801,B4403,C1601,C1203	A2902	217	38	qlnqlvaay	qlnqlvaay	qMnqlvaay
CU9061	ANXA6	5	150516820	C	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	170	687	lasrtneql	lasrtneql	lasrtneqM
CU9061	PGBD3	6	28251891	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	142	204	elKpcvkty	elKpcvkty	eiQpcvkty
CU9061	TNXB	6	32035473	C	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	116	134	ygthegQrv	ygthegQrv	ygthegRrv
CU9061	ITPR3	6	33658760	C	T	A0101,A2902,B3801,B4403,C1601,C1203	B3801	145	1637	trngCsil	trngCsil	trngRsil
CU9061	ITPR3	6	33658760	C	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	490	301	vtrngCsil	vtrngCsil	vtrngRsil
CU9061	HS3ST5	6	114378951	T	C	A0101,A2902,B3801,B4403,C1601,C1203	B4403	74	20747	yEmnssiKl	yEmnssiKl	yKmnssiKl
CU9061	HS3ST5	6	114378951	T	C	A0101,A2902,B3801,B4403,C1601,C1203	C1203	28	84	rlyEmnssi	rlyEmnssi	rlyKmnssi
CU9061	HS3ST5	6	114378951	T	C	A0101,A2902,B3801,B4403,C1601,C1203	C1203	89	155	yEmnssiKl	yEmnssiKl	yKmnssiKl
CU9061	KIAA0408	6	127771480	A	G	A0101,A2902,B3801,B4403,C1601,C1203	A2902	483	135	kvTesspnv	kvTesspnv	kdesspnv
CU9061	SLC35D3	6	137243879	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	395	238	ishpmylvf	ishpmylvf	kipmylvf
CU9061	SLC35D3	6	137243879	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	193	233	lvfkrclpl	lvfkrclpl	Vvfkrclpl
CU9061	SAMD8	6	147830446	C	G	A0101,A2902,B3801,B4403,C1601,C1203	C1203	68	112	ypkVkkkim	ypkVkkkim	ypkLkkkim
CU9061	SYNE1	6	152527366	C	G	A0101,A2902,B3801,B4403,C1601,C1203	B4403	493	421	aeiqEkwks	aeiqEkwks	aeiqEkwks
CU9061	GNA12	7	2771305	T	A	A0101,A2902,B3801,B4403,C1601,C1203	B3801	153	699	ehdfvlMki	ehdfvlMki	ehdfvlKki
CU9061	GNA12	7	2771305	T	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	219	1528	iMkipfkmv	iMkipfkmv	iKkipfkmv
CU9061	PDE1C	7	31918657	C	G	A0101,A2902,B3801,B4403,C1601,C1203	C1203	195	159	dekpPfksi	dekpPfksi	dekpRfksi
CU9061	TYW1B	7	72277814	A	G	A0101,A2902,B3801,B4403,C1601,C1203	C1203	359	373	frawktkfi	frawktkfi	frawktkfi

Figure 21 (Cont.)

CU9061	MUC17	7	100685003	C	A	A0101,A2902,B3801,B4403,C1601,C1203	B3801	380	13092	fHesstpsi	fHesstpsi	fPesstpsi
CU9061	MUC17	7	100686003	C	A	A0101,A2902,B3801,B4403,C1603,C1203	C1203	353	71	fHesstpsi	fHesstpsi	fPesstpsi
CU9061	PLXNA4	7	131912238	C	G	A0101,A2902,B3801,B4403,C1601,C1203	C1203	354	755	paaNevpri	paaNevpri	paaKevpri
CU9061	PLXNA4	7	131912238	C	G	A0101,A2902,B3801,B4403,C1603,C1203	C1203	20	31	aaNevpri	aaNevpri	aaKevpri
CU9061	TRPV6	7	142575508	G	T	A0101,A2902,B3801,B4403,C1601,C1203	A2902	33	9	tEthiaaly	tEthiaaly	tAthiaaly
CU9061	TRPV6	7	142575508	G	T	A0101,A2902,B3801,B4403,C1603,C1203	B4403	24	30047	tEthiaaly	tEthiaaly	tAthiaaly
CU9061	TRPV6	7	142575509	C	T	A0101,A2902,B3801,B4403,C1601,C1203	A0101	437	9314	tThiaaly	tThiaaly	tAthiaaly
CU9061	TRPV6	7	142575509	C	T	A0101,A2902,B3801,B4403,C1603,C1203	A2902	3	9	tThiaaly	tThiaaly	tAthiaaly
CU9061	OR2A2	7	143806866	A	T	A0101,A2902,B3801,B4403,C1603,C1203	A2902	70	119	myfftsLla	myfftsLla	myfftsHla
CU9061	OR2A2	7	143806866	A	T	A0101,A2902,B3801,B4403,C1601,C1203	A2902	15	35	Llaidmsy	Llaidmsy	Hlaidmsy
CU9061	OR2A2	7	143806866	A	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	198	198	pmyfftsLl	pmyfftsLl	pmyfftsHl
CU9061	OR2A2	7	143806866	A	T	A0101,A2902,B3801,B4403,C1603,C1203	C1203	77	121	yffstLlai	yffstLlai	yffstHlai
CU9061	OR2A2	7	143806866	A	T	A0101,A2902,B3801,B4403,C1603,C1203	C1203	118	55	ffstLlai	ffstLlai	ffsHlai
CU9061	NUB1	7	151064151	G	C	A0101,A2902,B3801,B4403,C1602,C1203	C1203	473	5160	Faqkcfkne	Faqkcfkne	Laqkcfkne
CU9061	HTR5A	7	154863152	G	C	A0101,A2902,B3801,B4403,C1603,C1203	A2902	15	6	IlgCgety	IlgCgety	IlgWgety
CU9061	HTR5A	7	154863152	G	C	A0101,A2902,B3801,B4403,C1601,C1203	C1203	42	36	IlgCgety	IlgCgety	IlgWgety
CU9061	DLGAP2	8	1514017	C	A	A0101,A2902,B3801,B4403,C1603,C1203	C1203	160	177	lpepMksi	lpepMksi	lpeplksi
CU9061	DEFB134	8	11851538	T	C	A0101,A2902,B3801,B4403,C1603,C1203	B4403	92	33	semlvaCcm	semlvaCcm	semlvaYcm
CU9061	SH2D4A	8	19214752	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	452	148	mFadsinrm	mFadsinrm	mLadsinrm
CU9061	KIF13B	8	28929774	C	A	A0101,A2902,B3801,B4403,C1603,C1203	C1203	127	196	Mcdkpskv	Mcdkpskv	Kcdkpskv
CU9061	PCMTD1	8	52733138	G	T	A0101,A2902,B3801,B4403,C1603,C1203	C1203	65	65	rvkQrnty	rvkQrnty	rvkKrnty
CU9061	CSMD3	8	113564916	G	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	304	344	fkgesLgri	fkgesLgri	fkgesSgri
CU9061	ASAP1	8	131127945	C	A	A0101,A2902,B3801,B4403,C1601,C1203	A2902	180	568	fnphfhvey	fnphfhvey	fnphVhvey
CU9061	ASAP1	8	131127945	C	A	A0101,A2902,B3801,B4403,C1603,C1203	B3801	83	317	Fhveyewni	Fhveyewni	Vhveyewni
CU9061	PIP5K1B	9	71532480	A	G	A0101,A2902,B3801,B4403,C1601,C1203	A2902	398	542	lesfKimdy	lesfKimdy	lesfKimdy
CU9061	PIP5K1B	9	71532480	A	G	A0101,A2902,B3801,B4403,C1601,C1203	B3801	391	1581	fKimdysll	fKimdysll	fKimdysll
CU9061	PIP5K1B	9	71532480	A	G	A0101,A2902,B3801,B4403,C1601,C1203	C1203	128	119	rvlesfKim	rvlesfKim	rvlesfKim
CU9061	SLC28A3	9	86909155	C	A	A0101,A2902,B3801,B4403,C1601,C1203	A0101	13	10	fstvlsmly	fstvlsmly	fstvMsmly
CU9061	SLC28A3	9	86909155	C	A	A0101,A2902,B3801,B4403,C1601,C1203	A0101	37	18	stvlsmlyy	stvlsmlyy	stvMsmlyy
CU9061	SLC28A3	9	86909155	C	A	A0101,A2902,B3801,B4403,C1601,C1203	A2902	5	6	fstvlsmly	fstvlsmly	fstvMsmly
CU9061	SLC28A3	9	86909155	C	A	A0101,A2902,B3801,B4403,C1601,C1203	A2902	6	4	stvlsmlyy	stvlsmlyy	stvMsmlyy
CU9061	SLC28A3	9	86909155	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	135	513	ivvffstvl	ivvffstvl	ivvffstvM
CU9061	SYK	9	93624510	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	23	23	rardnnCsy	rardnnCsy	rardnnSsy
CU9061	SVEP1	9	113312302	C	G	A0101,A2902,B3801,B4403,C1601,C1203	C1203	481	246	dpFpiasl	dpFpiasl	dpKpiasl
CU9061	BRINP1	9	121929645	A	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	48	194	nadhlrsw	nadhlrsw	nadtlrsw
CU9061	NUP188	9	131733097	G	T	A0101,A2902,B3801,B4403,C1601,C1203	B3801	92	304	hhapvflSw	hhapvflSw	hhapvflAw
CU9061	ABO	9	136131365	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	132	391	ftyerrpls	ftyerrpls	ftyerrpQs
CU9061	AMELX	X	113116830	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	31	212	mpkfpgphsm	mpkfpgphsm	mpVfpgphsm
CU9061	ARX	X	25025270	G	T	A0101,A2902,B3801,B4403,C1601,C1203	B4403	87	29022	aEvfthpaf	aEvfthpaf	aEvfthpaf
CU9061	ARX	X	25025270	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	37	68	Evfthpafi	Evfthpafi	Avfthpafi
CU9061	MAGEB16	X	35821217	C	A	A0101,A2902,B3801,B4403,C1601,C1203	A0101	53	18368	yThsfpsqy	yThsfpsqy	yPhsfpsqy
CU9061	MAGEB16	X	35821217	C	A	A0101,A2902,B3801,B4403,C1601,C1203	A2902	6	128	yThsfpsqy	yThsfpsqy	yPhsfpsqy
CU9061	MAGEB16	X	35821217	C	A	A0101,A2902,B3801,B4403,C1601,C1203	B3801	279	416	vhgsyThsf	vhgsyThsf	vhgsyPhsf
CU9061	MAGEB16	X	35821217	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	27	35	yThsfpsqy	yThsfpsqy	yPhsfpsqy
CU9061	ABCB7	X	74293779	C	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	206	807	Saqfaivl	Saqfaivl	Gaqfaivl
CU9061	DACH2	X	86067934	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	174	1096	Hagfpgpfi	Hagfpgpfi	Pagfpgpfi
CU9061	ARMCX3	X	100881008	G	T	A0101,A2902,B3801,B4403,C1601,C1203	C1203	455	182	fqvcadkfl	fqvcadkfl	fqvcadkVl
CU9061	NXF2B	X	101623751	G	T	A0101,A2902,B3801,B4403,C1601,C1203	A2902	76	20789	vnhstapyV	vnhstapyV	vnhstapyS
CU9061	HS6ST2	X	132092223	C	A	A0101,A2902,B3801,B4403,C1601,C1203	C1203	29	39	Nfggpmasv	Nfggpmasv	Kfggpmasv

Figure 21 (Cont.)

CU9061	SOX3	X	139586109	C	G	A0101,A2902,B3801,B4403,C1601,C1203	C1203	173	58	msigpmgsL	msigpmgsV
DI6359	PTPRU	1	29642003	A	G	A0301,A1101,B1801,B5101,C1203,C1504	C1203	162	101	lcsrrvSmi	lcsrrvNmi
DI6359	PPCS	1	42922400	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	234	7597	vplearpvL	vplearpvR
DI6359	LPPR4	1	99771576	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	295	182	dpvrrnaRi	dpvrrnaSi
DI6359	SLC22A15	1	116562272	G	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	28	26	fsgvIlgvi	fsgvfVgvi
DI6359	SETDB1	1	150902580	T	C	A0301,A1101,B1801,B5101,C1203,C1504	B1801	390	519	dedddvPsi	dedddvLsi
DI6359	SETDB1	1	150902580	T	C	A0301,A1101,B1801,B5101,C1203,C1504	C1203	463	256	dedddvPsi	dedddvLsi
DI6359	CGN	1	151503193	G	T	A0301,A1101,B1801,B5101,C1203,C1504	A0301	342	691	rllYrtvdr	rllDrtvdr
DI6359	CGN	1	151503193	G	T	A0301,A1101,B1801,B5101,C1203,C1504	B1801	190	17049	leeqkrllY	leeqkrllD
DI6359	CGN	1	151503193	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	314	4580	llYrtvdrl	llDrtvdrl
DI6359	TPM3	1	154164379	T	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	34	67	qaeerskLl	qaeerskQl
DI6359	OR10Z1	1	158576775	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	111	418	hffcdtpTv	hffcdtpPv
DI6359	OR10Z1	1	158576775	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	107	190	ffcdtpTvl	ffcdtpPvl
DI6359	FMO2	1	171165828	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	31	449	fsYsgqwkv	fsSsgqwkv
DI6359	SHCBP1L	1	182874684	C	G	A0301,A1101,B1801,B5101,C1203,C1504	A1101	225	844	tviifpAey	tviifpGey
DI6359	HMCN1	1	186114963	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	63	70	Llcdhpvpv	Rlcdhpvpv
DI6359	HHIPL2	1	222695025	T	A	A0301,A1101,B1801,B5101,C1203,C1504	A0301	120	364	hvrqgMrrk	hvrqgKrrk
DI6359	GALNT2	1	230379165	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	6	6	Laedrtrvv	Vaedrtrvv
DI6359	GALNT2	1	230415134	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	46	62	taksgVlsv	taksgGlsv
DI6359	RYR2	1	237791213	G	T	A0301,A1101,B1801,B5101,C1203,C1504	A1101	393	11913	amfvllhrH	amfvllhrQ
DI6359	RYR2	1	237791213	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	350	93	rHydgiggl	rQydgiggl
DI6359	EXO1	1	242016683	A	T	A0301,A1101,B1801,B5101,C1203,C1504	A0301	52	518	rqanllMgk	rqanllKgk
DI6359	EXO1	1	242016683	A	T	A0301,A1101,B1801,B5101,C1203,C1504	A0301	124	727	llMgkqllr	llKgkqllr
DI6359	EXO1	1	242016683	A	T	A0301,A1101,B1801,B5101,C1203,C1504	A1101	24	325	rqanllMgk	rqanllKgk
DI6359	OR2T33	1	248436344	A	G	A0301,A1101,B1801,B5101,C1203,C1504	A0301	29	30	aiftyTrpk	aiftyMrpk
DI6359	OR2T33	1	248436344	A	G	A0301,A1101,B1801,B5101,C1203,C1504	A1101	486	200	gaaiftyTr	gaaiftyMr
DI6359	OR2T33	1	248436344	A	G	A0301,A1101,B1801,B5101,C1203,C1504	A1101	14	13	aiftyTrpk	aiftyMrpk
DI6359	OR2T33	1	248436344	A	G	A0301,A1101,B1801,B5101,C1203,C1504	C1203	287	230	ftyTrpksh	ftyMrpksh
DI6359	ITIH2	10	7751016	A	G	A0301,A1101,B1801,B5101,C1203,C1504	C1203	13	4	ysCkvqsti	ysYkvqsti
DI6359	TET1	10	70446123	T	C	A0301,A1101,B1801,B5101,C1203,C1504	A1101	119	50	stvvctStr	stvvctLtr
DI6359	CHST3	10	73767570	G	T	A0301,A1101,B1801,B5101,C1203,C1504	A1101	250	541	vtlaSeacr	vtlaAeacr
DI6359	CPN1	10	101835811	G	A	A0301,A1101,B1801,B5101,C1203,C1504	B1801	202	76	nealgCelm	nealgRelm
DI6359	CPN1	10	101835811	G	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	205	218	ealgCelml	ealgRelml
DI6359	OR52M1	11	4567100	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	26	19	yvmifrDvm	yvmifrAvm
DI6359	OR52M1	11	4567227	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	286	233	lihrfgHcv	lihrfgQcv
DI6359	OR52M1	11	4567227	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	280	752	fgHcvpppv	fgQcvpppv
DI6359	OR51G2	11	4936230	A	G	A0301,A1101,B1801,B5101,C1203,C1504	B1801	55	93	dsllllfPy	dsllllfSy
DI6359	OR51G2	11	4936230	A	G	A0301,A1101,B1801,B5101,C1203,C1504	C1203	410	1035	lllfPyali	lllfSyali
DI6359	OR51G2	11	4936230	A	G	A0301,A1101,B1801,B5101,C1203,C1504	C1203	124	326	llfPyalil	llfSyalil
DI6359	OR51G2	11	4936230	A	G	A0301,A1101,B1801,B5101,C1203,C1504	C1203	140	145	fPyalilrt	fSyalilrt
DI6359	NLRP14	11	7064290	G	A	A0301,A1101,B1801,B5101,C1203,C1504	A0301	66	226	yiyqffeNk	yiyqffeDk
DI6359	NLRP14	11	7064290	G	A	A0301,A1101,B1801,B5101,C1203,C1504	A1101	16	33	yiyqffeNk	yiyqffeDk
DI6359	NLRP14	11	7064290	G	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	464	1566	yiyqffeNk	yiyqffeDk
DI6359	C11orf16	11	8953842	G	T	A0301,A1101,B1801,B5101,C1203,C1504	A0301	467	2516	Kgprmpllk	Tgprmpllk
DI6359	ANO3	11	26677704	C	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	285	61	yvnnslFff	yvnnslSff
DI6359	PRDM11	11	45204602	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	307	757	evipNghif	evipKghif
DI6359	OR4A15	11	55136321	A	C	A0301,A1101,B1801,B5101,C1203,C1504	A0301	238	2010	ytlknaAmk	ytlknaEmk
DI6359	OR4A15	11	55136321	A	C	A0301,A1101,B1801,B5101,C1203,C1504	A0301	36	935	aAmksamrk	aEmksamrk
DI6359	OR4A15	11	55136321	A	C	A0301,A1101,B1801,B5101,C1203,C1504	A1101	49	97	ytlknaAmk	ytlknaEmk

Figure 21 (Cont.)

DI6359	OR4A15	11	55136321	A	C	A0301,A1101,B1801,B5101,C1203,C1504	A1101	16	558	aAmksamrk	aAmksamrk	aAmksamrk
DI6359	OR5T2	11	56000423	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	194	19123	aiyftfimV	aiyftfimG	aiyftfimG
DI6359	OR5T2	11	56000423	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	78	138	yiftimVni	yiftimGni	yiftimGni
DI6359	OR5T2	11	56000423	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	387	3479	mVnlgiiv	mGnlgiiv	mGnlgiiv
DI6359	CACNA1C	12	2694542	G	T	A0301,A1101,B1801,B5101,C1203,C1504	A1101	317	5870	laStaspek	laRtaspek	laRtaspek
DI6359	CACNA1C	12	2694542	G	T	A0301,A1101,B1801,B5101,C1203,C1504	A1101	102	16553	aStaspekk	aRtaspekk	aRtaspekk
DI6359	PRMT8	12	3701468	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	205	159	ltvrrWeei	ltvrrGeei	ltvrrGeei
DI6359	ST8SIA1	12	22354591	A	T	A0301,A1101,B1801,B5101,C1203,C1504	B5101	360	310	ipfsgfQam	ipfsgfNam	ipfsgfNam
DI6359	ST8SIA1	12	22354591	A	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	130	162	ipfsgfQam	ipfsgfNam	ipfsgfNam
DI6359	ST8SIA1	12	22354591	A	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	385	1300	fQampeefl	fNampeefl	fNampeefl
DI6359	KRAS	12	25398284	C	T	A0301,A1101,B1801,B5101,C1203,C1504	A1101	194	107	vvgaGgvgk	vvgaSgvgk	vvgaSgvgk
DI6359	CNTN1	12	41316228	G	T	A0301,A1101,B1801,B5101,C1203,C1504	B1801	7	14	teaisfVy	teaisfGy	teaisfGy
DI6359	GRIP1	12	66773190	T	A	A0301,A1101,B1801,B5101,C1203,C1504	A0301	497	16379	tsfqasgyY	tsfnasgyY	tsfnasgyY
DI6359	GRIP1	12	66773190	T	A	A0301,A1101,B1801,B5101,C1203,C1504	A1101	116	11963	tsfqasgyY	tsfnasgyY	tsfnasgyY
DI6359	RFX4	12	107126804	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	155	221	evQppssgv	evPppssgv	evPppssgv
DI6359	DHX37	12	125467165	G	T	A0301,A1101,B1801,B5101,C1203,C1504	A1101	158	96	sqrAemlqk	sqrAemlqk	sqrAemlqk
DI6359	PABPC3	13	25671509	C	A	A0301,A1101,B1801,B5101,C1203,C1504	B5101	199	2257	yppsqiarl	yppsqiarl	yppsqiarl
DI6359	PABPC3	13	25671609	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	50	177	yppsqiarl	yppsqiarl	yppsqiarl
DI6359	RALGAPA1	14	36097083	C	A	A0301,A1101,B1801,B5101,C1203,C1504	A0301	333	267	hlvnhiChy	hlvnhiGhy	hlvnhiGhy
DI6359	MIDGA2	14	47342794	C	A	A0301,A1101,B1801,B5101,C1203,C1504	A1101	318	1079	gskeVfymy	gskeSfymy	gskeSfymy
DI6359	CEP152	15	49034170	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	41	148	yyiicqYi	yyiicqQi	yyiicqQi
DI6359	CEP152	15	49034170	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	213	193	yiiclqHil	yiiclqQil	yiiclqQil
DI6359	ITGA11	15	68631894	C	T	A0301,A1101,B1801,B5101,C1203,C1504	A1101	173	205	kvipiHesy	kvipiResy	kvipiResy
DI6359	ADAMTS7	15	79058418	C	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	391	1066	Mdsehwptv	Vdsehwptv	Vdsehwptv
DI6359	OTOA	16	21739728	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	487	134	kaavMiksl	kaavRiksl	kaavRiksl
DI6359	ITGAX	16	31373932	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	212	2494	dmrdsyNy	dmrdsyRy	dmrdsyRGy
DI6359	ITGAX	16	31373932	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	396	3273	iVystelal	iVystelal	iGystelal
DI6359	ABCA6	17	67081310	C	A	A0301,A1101,B1801,B5101,C1203,C1504	A0301	300	7417	kVcssvlgh	kVcssvlgh	kGcssvlgh
DI6359	ABCA6	17	67081310	C	A	A0301,A1101,B1801,B5101,C1203,C1504	A1101	261	11678	kVcssvlgh	kVcssvlgh	kGcssvlgh
DI6359	ABCA6	17	67081310	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	222	19371	tagevelkV	tagevelkG	tagevelkG
DI6359	MISP	19	758424	A	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	280	598	cpLamrgyv	cpQamrgyv	cpQamrgyv
DI6359	MISP	19	758424	A	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	309	503	tamrgvvrw	tamrgvvrw	Qamrgvvrw
DI6359	UMMD2	19	2438524	T	C	A0301,A1101,B1801,B5101,C1203,C1504	C1203	365	466	Rkregeltv	Rkregeltv	Rkregeltv
DI6359	ZFR2	19	3806120	C	T	A0301,A1101,B1801,B5101,C1203,C1504	A0301	167	1054	hTimlafr	hTimlafr	hAimlafr
DI6359	ZFR2	19	3806120	C	T	A0301,A1101,B1801,B5101,C1203,C1504	A1101	57	592	hTimlafr	hTimlafr	hAimlafr
DI6359	ZFR2	19	3806120	C	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	319	185	saqhTimi	saqhAimi	saqhAimi
DI6359	COL9A1T1	19	17691573	T	C	A0301,A1101,B1801,B5101,C1203,C1504	B1801	63	2052	nPveadysv	nLveadysv	nLveadysv
DI6359	UNC33A	19	17786501	C	A	A0301,A1101,B1801,B5101,C1203,C1504	A1101	432	5165	nVvwynldk	nDvwynldk	nDvwynldk
DI6359	RYR1	19	39034227	A	T	A0301,A1101,B1801,B5101,C1203,C1504	B1801	366	434	ieeLgkrnf	ieeQgkrnf	ieeQgkrnf
DI6359	MAP4K1	19	39105080	C	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	101	191	dlyqvtSsl	dlyqvtGsl	dlyqvtGsl
DI6359	SELV	19	40009784	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	462	13927	vldeeikkM	vldeeikkR	vldeeikkR
DI6359	IRF3	19	50165574	C	G	A0301,A1101,B1801,B5101,C1203,C1504	B1801	72	122	eewefQvta	eewefEvta	eewefEvta
DI6359	IRF3	19	50165574	C	G	A0301,A1101,B1801,B5101,C1203,C1504	B1801	3	2	wefQvtaly	wefEvtaly	wefEvtaly
DI6359	IRF3	19	50165574	C	G	A0301,A1101,B1801,B5101,C1203,C1504	C1203	354	78	wefQvtaly	wefEvtaly	wefEvtaly
DI6359	IL4I1	19	50394689	C	G	A0301,A1101,B1801,B5101,C1203,C1504	A0301	178	101	algcrkalk	algcrkalk	algcrkalk
DI6359	IL4I1	19	50394689	C	G	A0301,A1101,B1801,B5101,C1203,C1504	C1203	16	44	kalgcrkal	kalgcrkal	kalgcrkal
DI6359	ZNF836	19	52658275	T	A	A0301,A1101,B1801,B5101,C1203,C1504	A0301	133	100	hqrnihsgDk	hqrnihsgEk	hqrnihsgEk
DI6359	MYADM	19	54377507	G	T	A0301,A1101,B1801,B5101,C1203,C1504	B5101	418	2961	ipfpsfkW	ipfpsfkW	ipfpsfsG
DI6359	MYADM	19	54377507	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	281	3892	ipfpsfkW	ipfpsfkW	ipfpsfsG

Figure 21 (Cont.)

DI6359	ULRA3	19	54802193	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	151	55	lsvrDgptv	lsvrDgptv	lsvrDgptv	lsvrDgptv
DI6359	ZNF524	19	56114088	C	T	A0301,A1101,B1801,B5101,C1203,C1504	A1101	332	4554	ypqpicWir	ypqpicWir	ypqpicWir	ypqpicWir
DI6359	NT5C1B	2	18765932	C	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	147	869	Glypastql	Glypastql	Glypastql	Glypastql
DI6359	APOB	2	21230763	C	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	311	812	qsqvNsqhv	qsqvNsqhv	qsqvDsqhv	qsqvDsqhv
DI6359	APOB	2	21230763	C	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	367	469	Nsqhvghsv	Nsqhvghsv	Dsqhvghsv	Dsqhvghsv
DI6359	NRXN1	2	51254990	T	A	A0301,A1101,B1801,B5101,C1203,C1504	B1801	208	7911	vesksvvevM	vesksvvevM	vesksvvevM	vesksvvevK
DI6359	NRXN1	2	51254990	T	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	68	240	Mskrrdmtv	Mskrrdmtv	Mskrrdmtv	Kskrrdmtv
DI6359	ANKRD36	2	97877478	G	A	A0301,A1101,B1801,B5101,C1203,C1504	A0301	266	242	isgtMscqk	isgtMscqk	isgtMscqk	isgtVscqk
DI6359	ANKRD36	2	97877478	G	A	A0301,A1101,B1801,B5101,C1203,C1504	A1101	61	46	isgtMscqk	isgtMscqk	isgtMscqk	isgtVscqk
DI6359	RANBP2	2	109384632	G	T	A0301,A1101,B1801,B5101,C1203,C1504	A1101	304	337	Vfsfnapik	Vfsfnapik	Vfsfnapik	Gfsfnapik
DI6359	RANBP2	2	109384632	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	11	50	fVfsfnapi	fVfsfnapi	fVfsfnapi	fGfsfnapi
DI6359	DPP10	2	116101477	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	60	2538	fvthdpeak	fvthdpeak	fvthdpeak	fvthdpeak
DI6359	LRP1B	2	141283442	C	A	A0301,A1101,B1801,B5101,C1203,C1504	A1101	244	10035	cVdysdelk	cVdysdelk	cVdysdelk	cGdysdelk
DI6359	XIRP2	2	168107506	G	C	A0301,A1101,B1801,B5101,C1203,C1504	B5101	191	291	cpaPtpvpi	cpaPtpvpi	cpaPtpvpi	cpaAtpvpi
DI6359	XIRP2	2	168107506	G	C	A0301,A1101,B1801,B5101,C1203,C1504	C1203	39	46	ipcpaPtpv	ipcpaPtpv	ipcpaPtpv	ipcpaAtpv
DI6359	XIRP2	2	168107506	G	C	A0301,A1101,B1801,B5101,C1203,C1504	C1203	196	629	cpaPtpvpi	cpaPtpvpi	cpaPtpvpi	cpaAtpvpi
DI6359	XIRP2	2	168107506	G	C	A0301,A1101,B1801,B5101,C1203,C1504	C1203	388	215	paPtpvpiv	paPtpvpiv	paPtpvpiv	paAtpvpiv
DI6359	TTN	2	179428111	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	104	1849	dtVrssvsl	dtVrssvsl	dtVrssvsl	dtSrssvsl
DI6359	TTN	2	179532034	G	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	187	9487	patkepdtl	patkepdtl	patkepdtl	patkepdtT
DI6359	TTN	2	179634660	T	C	A0301,A1101,B1801,B5101,C1203,C1504	A0301	121	133	tlfitktmk	tlfitktmk	tlfitktmk	tlHitktmk
DI6359	TTN	2	179634660	T	C	A0301,A1101,B1801,B5101,C1203,C1504	A1101	359	270	tvetlRik	tvetlRik	tvetlRik	tvetlHik
DI6359	TTN	2	179634660	T	C	A0301,A1101,B1801,B5101,C1203,C1504	C1203	178	178	etlRiktm	etlRiktm	etlRiktm	etlHiktm
DI6359	IQCA1	2	237406003	C	A	A0301,A1101,B1801,B5101,C1203,C1504	A0301	99	226	qtlatfyLk	qtlatfyLk	qtlatfyLk	qtlatfyVk
DI6359	IQCA1	2	237406003	C	A	A0301,A1101,B1801,B5101,C1203,C1504	A0301	97	348	tlatfyLky	tlatfyLky	tlatfyLky	tlatfyVky
DI6359	IQCA1	2	237406003	C	A	A0301,A1101,B1801,B5101,C1203,C1504	A0301	389	1155	ytkyvqifr	ytkyvqifr	ytkyvqifr	yVkyvqifr
DI6359	IQCA1	2	237406003	C	A	A0301,A1101,B1801,B5101,C1203,C1504	A1101	14	19	qtlatfyLk	qtlatfyLk	qtlatfyLk	qtlatfyVk
DI6359	IQCA1	2	237406003	C	A	A0301,A1101,B1801,B5101,C1203,C1504	A1101	139	390	tlatfyLky	tlatfyLky	tlatfyLky	tlatfyVky
DI6359	IQCA1	2	237406003	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	120	57	latfyLkyv	latfyLkyv	latfyLkyv	latfyVkyv
DI6359	IQCA1	2	237406003	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	213	315	fyLkyvqif	fyLkyvqif	fyLkyvqif	fyVkyvqif
DI6359	PTPRT	20	40713445	A	G	A0301,A1101,B1801,B5101,C1203,C1504	B1801	207	269	lqyTgwpay	lqyTgwpay	lqyTgwpay	lqylgwpay
DI6359	PTPRT	20	40713445	A	G	A0301,A1101,B1801,B5101,C1203,C1504	C1203	181	328	lqyTgwpay	lqyTgwpay	lqyTgwpay	lqylgwpay
DI6359	MC3R	20	54823903	A	C	A0301,A1101,B1801,B5101,C1203,C1504	C1203	43	57	Masccfpsv	Masccfpsv	Masccfpsv	Masccipsv
DI6359	ADAMTS1	21	28210265	T	A	A0301,A1101,B1801,B5101,C1203,C1504	B1801	245	6278	Mesfnaipt	Mesfnaipt	Mesfnaipt	Kesfnaipt
DI6359	ADAMTS1	21	28210265	T	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	30	1438	ytyfvkkkM	ytyfvkkkM	ytyfvkkkM	ytyfvkkkK
DI6359	ADAMTS1	21	28210265	T	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	142	498	fvkkkMesf	fvkkkMesf	fvkkkMesf	fvkkkKesf
DI6359	ADAMTS1	21	28210265	T	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	163	599	kkMesfnai	kkMesfnai	kkMesfnai	kkKesfnai
DI6359	KRTAP27-1	21	31709737	C	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	144	121	qsnCfpgVv	qsnCfpgVv	qsnCfpgVv	qsnCfpgVv
DI6359	KRTAP27-1	21	31709737	C	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	365	199	fpgVvqitv	fpgVvqitv	fpgVvqitv	fpgVvqitv
DI6359	BMLHE40	3	5024689	A	T	A0301,A1101,B1801,B5101,C1203,C1504	A0301	28	74	ilLggtsrk	ilLggtsrk	ilLggtsrk	ilQggtsrk
DI6359	BMLHE40	3	5024689	A	T	A0301,A1101,B1801,B5101,C1203,C1504	A1101	462	578	ilLggtsrk	ilLggtsrk	ilLggtsrk	ilQggtsrk
DI6359	ITGA9	3	37550061	C	G	A0301,A1101,B1801,B5101,C1203,C1504	A0301	307	181	kvyiLradr	kvyiLradr	kvyiLradr	kvyiFradr
DI6359	ITGA9	3	37550061	C	G	A0301,A1101,B1801,B5101,C1203,C1504	A1101	122	74	gigkvyiLr	gigkvyiLr	gigkvyiLr	gigkvyiFr
DI6359	ITGA9	3	37550061	C	G	A0301,A1101,B1801,B5101,C1203,C1504	A1101	319	97	kvyiLradr	kvyiLradr	kvyiLradr	kvyiFradr
DI6359	XCR1	3	46062830	A	G	A0301,A1101,B1801,B5101,C1203,C1504	A0301	410	19002	lslgiiflR	lslgiiflR	lslgiiflR	lslgiiflC
DI6359	XCR1	3	46062830	A	G	A0301,A1101,B1801,B5101,C1203,C1504	A1101	60	18239	lslgiiflR	lslgiiflR	lslgiiflR	lslgiiflC
DI6359	XCR1	3	46062830	A	G	A0301,A1101,B1801,B5101,C1203,C1504	C1203	436	382	iiifRyvei	iiifRyvei	iiifRyvei	iiifCyvei
DI6359	XCR1	3	46062830	A	G	A0301,A1101,B1801,B5101,C1203,C1504	C1203	108	140	iiifRyvei	iiifRyvei	iiifRyvei	iiifCyvei
DI6359	XCR1	3	46062830	A	G	A0301,A1101,B1801,B5101,C1203,C1504	C1203	303	1603	Ryveiirtl	Ryveiirtl	Ryveiirtl	Cyveiirtl
DI6359	EPHA3	3	89498444	G	C	A0301,A1101,B1801,B5101,C1203,C1504	A1101	96	321	tsasDvwsy	tsasDvwsy	tsasDvwsy	tsasDvwsy

Figure 21 (Cont.)

DI6359	EPHA3	3	89498444	G	C	A0301,A1101,B1801,B5101,C1203,C1504	C1203	243	4028	rkftsasDv	rkftsasDv	rkftsasDv	rkftsasDv
DI6359	CD80	3	119263433	G	A	A0301,A1101,B1801,B5101,C1203,C1504	B1801	26	890	Wehlaevtl	Wehlaevtl	Rehlaevtl	Rehlaevtl
DI6359	CD80	3	119263433	G	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	21	20	fkWehlaev	fkWehlaev	fkRehlaev	fkRehlaev
DI6359	WDR49	3	167240216	T	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	148	155	lpkrdtnFv	lpkrdtnFv	lpkrdtnLv	lpkrdtnLv
DI6359	MECOM	3	168840388	C	G	A0301,A1101,B1801,B5101,C1203,C1504	C1203	12	20	yQcencakv	yQcencakv	yEcencakv	yEcencakv
DI6359	TACC3	4	1737528	G	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	53	291	dspDrpvpv	dspDrpvpv	dspGrpvpv	dspGrpvpv
DI6359	CASS1	4	71201795	G	A	A0301,A1101,B1801,B5101,C1203,C1504	A1101	355	1969	tNntetvpk	tNntetvpk	tDntetvpk	tDntetvpk
DI6359	CASS1	4	71201795	G	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	325	128	setNntetv	setNntetv	setDntetv	setDntetv
DI6359	SCD5	4	93601963	T	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	373	226	fffshFgwl	fffshFgwl	ffshlgwl	ffshlgwl
DI6359	SCD5	4	93601963	T	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	37	61	fshFgwlfv	fshFgwlfv	tshlgwlfv	tshlgwlfv
DI6359	PPP3CA	4	101347178	G	T	A0301,A1101,B1801,B5101,C1203,C1504	A1101	192	68	kitsLeeak	kitsLeeak	kitsFeeak	kitsFeeak
DI6359	FAT4	4	126369637	C	G	A0301,A1101,B1801,B5101,C1203,C1504	C1203	434	86	gsfvfayRv	gsfvfayRv	gsfvfayTv	gsfvfayTv
DI6359	PCDH18	4	138431064	C	G	A0301,A1101,B1801,B5101,C1203,C1504	A0301	394	1300	atrcnrEkk	atrcnrQkk	atrcnrEkk	atrcnrEkk
DI6359	DCHS2	4	155219345	T	A	A0301,A1101,B1801,B5101,C1203,C1504	B1801	398	3877	dpvteqYpf	dpvteqYpf	dpvteqYpf	dpvteqYpf
DI6359	DCHS2	4	155219345	T	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	92	968	eqYpfdlvfl	eqYpfdlvfl	eqYpfdlvfl	eqYpfdlvfl
DI6359	DCHS2	4	155219345	T	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	319	3700	Ypidvftsp	Ypidvftsp	Ypidvftsp	Ypidvftsp
DI6359	DNAH5	5	13916517	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	168	60	klysishy	klysishy	kMysishy	kMysishy
DI6359	DNAH5	5	13916517	C	A	A0301,A1101,B1801,B5101,C1203,C1504	A0301	43	34	lIysishyy	lIysishyy	MIysishyy	MIysishyy
DI6359	DNAH5	5	13916517	C	A	A0301,A1101,B1801,B5101,C1203,C1504	A1101	294	503	klysishy	klysishy	kMysishy	kMysishy
DI6359	DNAH5	5	13916517	C	A	A0301,A1101,B1801,B5101,C1203,C1504	A1101	17	14	lIysishyy	lIysishyy	MIysishyy	MIysishyy
DI6359	DNAH5	5	13916517	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	201	193	tlnaikMi	tlnaikMi	tlnaikMi	tlnaikMi
DI6359	DNAH5	5	13916517	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	28	32	naikMlysi	naikMlysi	naikMlysi	naikMlysi
DI6359	DNAH5	5	13916517	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	139	85	lIysishyy	lIysishyy	MIysishyy	MIysishyy
DI6359	C6	5	41199926	G	A	A0301,A1101,B1801,B5101,C1203,C1504	A1101	48	126	akqpcipFk	akqpcipFk	afqpcipSk	afqpcipSk
DI6359	C6	5	41199926	G	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	41	1370	vafqpcipF	vafqpcipF	vafqpcipS	vafqpcipS
DI6359	RGS7BP	5	63803656	G	T	A0301,A1101,B1801,B5101,C1203,C1504	A1101	465	464	rtkYcemar	rtkYcemar	rtkGcemar	rtkGcemar
DI6359	ARSB	5	78260384	G	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	230	7408	dyyshercl	dyyshercl	dyyshercT	dyyshercT
DI6359	ARSB	5	78260384	G	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	330	131	yysherclI	yysherclI	yysherclT	yysherclT
DI6359	ARSB	5	78260384	G	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	9	7	ysherclIi	ysherclIi	ysherclTi	ysherclTi
DI6359	PCDH8B	5	140566903	G	T	A0301,A1101,B1801,B5101,C1203,C1504	A0301	76	163	ktMgfsfpr	ktMgfsfpr	ktRgfsfpr	ktRgfsfpr
DI6359	PCDH8B	5	140566903	G	T	A0301,A1101,B1801,B5101,C1203,C1504	A1101	10	34	ktMgfsfpr	ktMgfsfpr	ktRgfsfpr	ktRgfsfpr
DI6359	SLIT3	5	168112795	C	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	7	11	faDprcekl	faDprcekl	faSprcekl	faSprcekl
DI6359	TNXB	6	32020482	T	C	A0301,A1101,B1801,B5101,C1203,C1504	A0301	343	14829	hlvglhegR	hlvglhegR	hlvglhegQ	hlvglhegQ
DI6359	TNXB	6	32020482	T	C	A0301,A1101,B1801,B5101,C1203,C1504	C1203	134	116	vglhegRrv	vglhegRrv	vglhegQrv	vglhegQrv
DI6359	UNC5CL	6	40999457	G	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	161	75	salhneiv	salhneiv	salTneiv	salTneiv
DI6359	UNC5CL	6	40999457	G	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	42	23	lhneivtm	lhneivtm	lTneivtm	lTneivtm
DI6359	PREP	6	105776727	T	A	A0301,A1101,B1801,B5101,C1203,C1504	B1801	58	316	teifyLfs	teifyLfs	teifyQfs	teifyQfs
DI6359	PREP	6	105776727	T	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	241	101	ifyLftsfl	ifyLftsfl	ifyQftsfl	ifyQftsfl
DI6359	MLLT4	6	168299059	A	C	A0301,A1101,B1801,B5101,C1203,C1504	C1203	338	371	gashvfKfv	gashvfKfv	gashvfKfv	gashvfKfv
DI6359	MAGI2	7	77755074	T	G	A0301,A1101,B1801,B5101,C1203,C1504	C1203	197	384	reyNmndlyv	reyNmndlyv	reyKmndlyv	reyKmndlyv
DI6359	PLCD3	7	100853673	G	A	A0301,A1101,B1801,B5101,C1203,C1504	B1801	45	156	hefgrilaI	hefgrilaI	hefgrllaT	hefgrllaT
DI6359	PLCD3	7	100853673	G	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	137	8556	hefgrllaI	hefgrllaI	hefgrllaT	hefgrllaT
DI6359	CUX1	7	101844886	C	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	112	7672	isikkpsaV	isikkpsaV	isikkpsaA	isikkpsaA
DI6359	GRM8	7	126173280	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	9	8	fvvdpHhii	fvvdpHhii	fvvdpPhii	fvvdpPhii
DI6359	GRM8	7	126173280	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	84	87	vvdpHhiii	vvdpHhiii	vvdpPhiii	vvdpPhiii
DI6359	CHRM2	7	136700181	C	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	297	173	aavtfgMai	aavtfgMai	aavtfgTai	aavtfgTai
DI6359	CHRM2	7	136700181	C	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	289	2108	fgMaiaafy	fgMaiaafy	fgTaiaafy	fgTaiaafy
DI6359	RP11	8	10467730	G	T	A0301,A1101,B1801,B5101,C1203,C1504	B1801	488	15314	Dentvqeev	Dentvqeev	Aentvqeev	Aentvqeev
DI6359	ADAMDEC1	8	24259478	G	T	A0301,A1101,B1801,B5101,C1203,C1504	C1203	364	663	rahfeAyii	rahfeAyii	rahfeAyii	rahfeAyii

Figure 21 (Cont.)

DI6359	DOCK5	8	25149586	C	G	A0301,A1101,B1801,B5101,C1203,C1504	A1101	45	19767	vtakidhgN	vtakidhgN
DI6359	CHRNA6	8	42611226	T	G	A0301,A1101,B1801,B5101,C1203,C1504	A1101	298	644	Sglarrpak	Rglarrpak
DI6359	PRKDC	8	48777155	C	A	A0301,A1101,B1801,B5101,C1203,C1504	A1101	74	42	Cvdaidvik	Vvdaidvik
DI6359	PRKDC	8	48777155	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	84	179	fstiVvdai	fstiVvdai
DI6359	PRKDC	8	48777155	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	416	105	iCvdaidvi	iVvdaidvi
DI6359	FAM98D1	9	37746438	T	C	A0301,A1101,B1801,B5101,C1203,C1504	C1203	118	277	ifsscrhvi	ilsscrhvi
DI6359	PPAPDC3	9	134183375	G	A	A0301,A1101,B1801,B5101,C1203,C1504	A0301	52	20527	iikrrgpyK	iikrrgpyE
DI6359	PPAPDC3	9	134183375	G	A	A0301,A1101,B1801,B5101,C1203,C1504	A0301	248	9971	Ktspsiidy	Etspsiidy
DI6359	PPAPDC3	9	134183375	G	A	A0301,A1101,B1801,B5101,C1203,C1504	A1101	91	20410	iikrrgpyK	iikrrgpyE
DI6359	PPAPDC3	9	134183375	G	A	A0301,A1101,B1801,B5101,C1203,C1504	A1101	104	5004	Ktspsiidy	Etspsiidy
DI6359	COL5A1	9	137726883	G	A	A0301,A1101,B1801,B5101,C1203,C1504	A1101	97	40	gMvqmtfir	gVvqmtfir
DI6359	GLRA2	X	145994405	T	C	A0301,A1101,B1801,B5101,C1203,C1504	A1101	143	376	psmPdsiwk	psmLdsiwk
DI6359	SERPINA7	X	105280479	C	A	A0301,A1101,B1801,B5101,C1203,C1504	A0301	323	2249	vvgIiqYIk	vvgIiqDIk
DI6359	SERPINA7	X	105280479	C	A	A0301,A1101,B1801,B5101,C1203,C1504	A1101	24	68	vvgIiqYIk	vvgIiqDIk
DI6359	SERPINA7	X	105280479	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	21	101	iqYIkpntI	iqDIkpntI
DI6359	SERPINA7	X	105280479	C	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	13	117	YIkpntimv	DIkpntimv
DI6359	MAGEC2	X	141291382	G	A	A0301,A1101,B1801,B5101,C1203,C1504	B1801	483	6772	Ldsessfty	Pdsessfty
DI6359	MAGEA4	X	151092860	G	A	A0301,A1101,B1801,B5101,C1203,C1504	A0301	473	777	htvygKprk	htvygEprk
DI6359	MAGEA4	X	151092860	G	A	A0301,A1101,B1801,B5101,C1203,C1504	A1101	221	184	htvygKprk	htvygEprk
DI6359	MAGEA4	X	151092860	G	A	A0301,A1101,B1801,B5101,C1203,C1504	C1203	214	247	tvygKprkI	tvygEprkI
DM1230062	ERMAP	1	43296520	C	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0301	48	72	skwPgtvpk	skwPgtvpk
DM1230062	PPIAL4A	1	147955256	A	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0301	26	22	kIfadkiPk	kIfadkiLk
DM1230062	PPIAL4A	1	147955256	A	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	C0501	137	856	fadkiPkta	fadkiLkta
DM1230062	NID1	1	236180468	G	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	8	2765	fLdegtcva	fSdegtcva
DM1230062	NID1	1	236180468	G	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	C0501	11	5	fLdegtcva	fSdegtcva
DM1230062	SLC25A16	10	70243327	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	241	561	tmrdtIkyv	tmrdtMkyv
DM1230062	ERLIN1	10	101933965	C	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	469	936	gItitHavrv	gItiQavrv
DM1230062	ERLIN1	10	101933965	C	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0301	84	223	tiHavrvtk	tiQavrvtk
DM1230062	ORSM3	11	56237144	G	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	55	51	krvvavlyNt	krvvavlyTt
DM1230062	ORSM3	11	56237144	G	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	70	45	rvvavlyNtv	rvvavlyTtv
DM1230062	CAND1	12	67699993	A	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	27	103	slgevghhV	slgevghhI
DM1230062	CAND1	12	67699993	A	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B4002	44	52	gevghhVdI	gevghhIdI
DM1230062	TRAFD1	12	112583390	G	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	105	1219	sisdikVaa	sisdikGaa
DM1230062	POLR1D	13	28197374	A	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	C0501	166	670	kasrnGstf	kasrnEstf
DM1230062	MYCBP2	13	77730266	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	172	4530	Ygwptitv	Cgwptitv
DM1230062	AKAP6	14	33242951	T	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	C0501	237	110	Hddretcn	Lddretcn
DM1230062	GABRG3	15	27772665	C	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0301	20	24	ymtamdiiv	ymtamdLiv
DM1230062	GABRG3	15	27772665	C	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	34	36	tamdIvtv	tamdLvtv
DM1230062	SCAPER	15	76641041	G	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B1801	88	51	leiVnrfpq	leiAnrfpq
DM1230062	SCAPER	15	76641041	G	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B4002	148	83	leiVnrfpq	leiAnrfpq
DM1230062	PRRT2	16	29824976	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B1801	54	4665	eegpapepY	eegpapepH
DM1230062	SLC9A5	16	67286520	G	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	373	1099	IIghVEgi	IIghLEgi
DM1230062	SLC9A5	16	67286520	G	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	76	248	lvIEgivla	lvILgivla
DM1230062	SLC9A5	16	67286520	G	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	60	27	vIEgivlav	vILgivlav
DM1230062	BAMP	16	88105690	C	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	203	196	IggaKIav	IggaQIav
DM1230062	DHX33	17	53569947	T	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	363	9221	vmlqIamK	vmlqHamK
DM1230062	DHX33	17	53569947	T	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	28	52	mlqIamTv	mlqHamKv
DM1230062	DHX33	17	53569947	T	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	8	9	IamTvpnv	HamKvpnv
DM1230062	DHX33	17	53569947	T	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	C0501	374	24549	mTvpnvttf	mKvpnvttf

Figure 21 (Cont.)

DM123062	DHX33	17	5356949	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	295	1296	svmiqllal	svmlqllaM
DM123062	DHX33	17	5356949	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	47	52	mlqllalkv	mlqllaMkv
DM123062	DHX33	17	5356949	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	16	9	llalkvpnv	llaMkvpnv
DM123062	DHX33	17	5356949	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0301	67	45	vmlqllalk	vmlqllaMk
DM123062	SREBF1	17	17717594	G	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	27	23	ylqdsMatt	ylqdsLatt
DM123062	TEX2	17	62238232	T	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	13	20	flmtletNm	flmtletKm
DM123062	TEX2	17	62238232	T	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	77	464	mtletNmnl	mtletKmnl
DM123062	TEX2	17	62238232	T	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0301	250	38	Nmnltklgk	Kmnltklgk
DM123062	TEX2	17	62238232	T	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B4002	496	688	letNmnltk	letKmnltk
DM123062	RBBP8	18	20570906	C	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B1801	427	246	eesetEgpm	eesetQgpm
DM123062	KCNG2	18	77623972	G	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B4002	387	463	Hdelaywgi	Rdelaywgi
DM123062	MADCAM1	19	496508	C	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B4002	329	92	mdLgialll	mdFgialll
DM123062	WDR18	19	991295	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B1801	146	419	deivrlwdv	deTvrlwdv
DM123062	WTIP	19	34986636	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	73	991	Fmdrdyhva	Smdrdyhva
DM123062	WTIP	19	34986636	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B1801	21	2901	cettirvvF	cettirvvS
DM123062	WTIP	19	34986636	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B4002	82	555	cettirvvF	cettirvvS
DM123062	PAK4	19	39663564	G	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0301	31	76	iMrgskgak	iVrgskgak
DM123062	KLK1	19	51323463	T	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B4002	420	7469	velpteepV	velpteepE
DM123062	ZNF17	19	57931138	T	C	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	61	17	slPkdilhl	slLkdilhl
DM123062	A1BG	19	58861808	A	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	C0501	219	224	vadsanysR	vadsanysC
DM123062	ASAP2	2	9490950	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0301	45	68	gtanrpLak	gtanrpPak
DM123062	XIRP2	2	168102494	C	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0301	57	19700	ktttwlfeK	ktttwlfeT
DM123062	XIRP2	2	168102494	C	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B1801	86	39	feKtplhef	feTtplhef
DM123062	XIRP2	2	168102494	C	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B4002	241	168	feKtplhef	feTtplhef
DM123062	TTN	2	179611639	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B1801	11	31	yeiwHsdsf	yeiwRsdsf
DM123062	TTN	2	179611639	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B4002	139	334	yeiwHsdsf	yeiwRsdsf
DM123062	PAK7	20	9561540	G	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B4002	77	152	ketFingll	ketSingll
DM123062	RBM39	20	34312584	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B1801	66	556	Mefvdvssv	Vefvdvssv
DM123062	RBM39	20	34312584	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B4002	27	46	Mefvdvssv	Vefvdvssv
DM123062	ZFP64	20	50776706	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	C0501	269	324	yaNrnssql	yaSrnssql
DM123062	SLC16A8	22	38478021	A	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	C0501	427	982	vssiPvtrf	vssiLvtrf
DM123062	CELSR1	22	46763647	G	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	237	93	aisfhylLa	aisfhylFa
DM123062	CELSR1	22	46763647	G	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	5	5	ylLaifsgi	ylFaifsgi
DM123062	CELSR3	3	48678778	G	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B1801	9	75	detslgWaq	detslgRaq
DM123062	CNTN3	3	74413674	C	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	79	3926	Fiaenkhgl	Ciaenkhgl
DM123062	CNTN3	3	74413674	C	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	C0501	3	263	vtdsgmfqF	vtdsgmfqC
DM123062	CD47	3	107777256	C	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	443	2494	aigltsfFi	aigltsfVi
DM123062	CD47	3	107777256	C	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	35	26	gltsfFiai	gltsfViai
DM123062	CD47	3	107777256	C	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	19	134	Fiailviqv	Viailviqv
DM123062	HEG1	3	124696730	C	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0301	421	1729	gllllVia	glllIGia
DM123062	HEG1	3	124696730	C	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	50	179	lllllVial	lllllGial
DM123062	HEG1	3	124696730	C	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	73	45	llllViall	llllGiall
DM123062	HEG1	3	124696730	C	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	430	108	lllVialiv	lllGialiv
DM123062	NPHP3	3	132402361	A	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0301	105	5158	ilykkmgkH	ilykkmgkL
DM123062	ZAR1	4	48492870	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	67	354	alCrltafl	alRrltafl
DM123062	FCHO2	5	72383578	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	115	1939	slikkrfal	slikkrfaT
DM123062	DMGDH	5	78359507	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	108	93	slayhlTka	slayhlAka
DM123062	DMGDH	5	78359507	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0301	48	43	vslayhlTk	vslayhlAk
DM123062	PCDHGA6	5	140754269	G	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	482	854	alyrlvlta	aVyrlvlta

Figure 21 (Cont.)

DM1123062	PCDHGA6	5	140754269	G	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B4002	38	37	rqgeaVyrl	rqgeaVyrl	rqgeaVyrl	rqgeaVyrl
DM1123062	PCDHGA6	5	140754269	G	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B4002	29	27	geaVyrlvl	geaVyrlvl	geaVyrlvl	geaVyrlvl
DM1123062	PCDHGA6	5	140754269	G	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	C0501	138	171	tldrqgeaI	tldrqgeaI	tldrqgeaI	tldrqgeaI
DM1123062	ADAMTS2	5	178555013	A	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	145	534	svAyewaik	svAyewaik	svAyewaik	svAyewaik
DM1123062	ADAMTS2	5	178555013	A	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	27	24	vAyewaikk	vAyewaikk	vAyewaikk	vAyewaikk
DM1123062	ADAMTS2	5	178555013	A	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B1801	494	160	eedsvAyew	eedsvAyew	eedsvAyew	eedsvAyew
DM1123062	ADAMTS2	5	178555013	A	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	C0501	185	168	vleedsvAy	vleedsvAy	vleedsvAy	vleedsvAy
DM1123062	SNAP91	6	843267 16	T	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	43	43	hlnSlegkk	hlnSlegkk	hlnSlegkk	hlnSlegkk
DM1123062	FBXL4	6	99365471	G	C	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	19	4	slkeyltel	slkeyltel	slkeyltel	slkeyltel
DM1123062	MAP7	6	136693744	G	C	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	376	1539	ikmpykaah	ikmpykaah	ikmpykaah	ikmpykaah
DM1123062	CRHR2	7	30693171	G	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	C0501	350	695	wqdhksiv	wqdhksiv	wqdhksiv	wqdhksiv
DM1123062	UBXN8	8	30638405	A	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B4002	180	687	kefpdlpee	kefpdlpee	kefpdlpee	kefpdlpee
DM1123062	GOT1L1	8	37795189	C	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B4002	439	451	kdSrivyli	kdSrivyli	kdSrivyli	kdSrivyli
DM1123062	ZFHX4	8	77761275	G	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	207	279	svagGtqpl	svagGtqpl	svagGtqpl	svagGtqpl
DM1123062	ZFHX4	8	77761275	G	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0301	303	316	Gtqplllak	Gtqplllak	Gtqplllak	Gtqplllak
DM1123062	ZFHX4	8	77764707	G	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0301	23	30	imNdvpsyk	imNdvpsyk	imNdvpsyk	imNdvpsyk
DM1123062	KLF10	8	103663584	C	G	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	31	1049	vlqsskpgv	vlqsskpgv	vlqsskpgv	vlqsskpgv
DM1123062	DCSTAMP	8	105361043	C	T	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0201	113	142	llvffSqpl	llvffSqpl	llvffSqpl	llvffSqpl
DM1123062	WNK2	9	960860263	G	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	A0301	333	13866	rQrktsksk	rQrktsksk	rQrktsksk	rQrktsksk
DM1123062	ZNF462	9	1096090335	T	C	A0301,A0201,A0321,B1801,B4002,C0202,C0501	B4002	71	56	feavsTwdi	feavsTwdi	feavsTwdi	feavsTwdi
DM1123062	LHX6	9	124976279	T	A	A0301,A0201,A0321,B1801,B4002,C0202,C0501	C0501	150	263	ladmTgfsr	ladmTgfsr	ladmTgfsr	ladmTgfsr
FR9547	NBPF1	1	16891341	C	G	A2402,A0201,B0801,B1801,C0701,	A0201	171	54	lteaQepev	lteaQepev	lteaQepev	lteaQepev
FR9547	CROCC	1	17285204	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	62	73	rlMkgeasl	rlMkgeasl	rlMkgeasl	rlMkgeasl
FR9547	CROCC	1	17285204	C	A	A2402,A0201,B0801,B1801,C0701,	B0801	219	627	tlgirqrll	tlgirqrll	tlgirqrll	tlgirqrll
FR9547	MSH4	1	76288113	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	94	60	tlfGvknyt	tlfGvknyt	tlfGvknyt	tlfGvknyt
FR9547	MSH4	1	76288113	G	T	A2402,A0201,B0801,B1801,C0701,	C0701	34	492	yrnnhtlfC	yrnnhtlfC	yrnnhtlfC	yrnnhtlfC
FR9547	FRRS1	1	101174558	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	74	742	ktlafaGqv	ktlafaGqv	ktlafaGqv	ktlafaGqv
FR9547	NTNG1	1	107867028	A	T	A2402,A0201,B0801,B1801,C0701,	A2402	376	3767	twMeypkpl	twMeypkpl	twMeypkpl	twMeypkpl
FR9547	NTNG1	1	107867028	A	T	A2402,A0201,B0801,B1801,C0701,	B1801	225	1236	wqsatwMey	wqsatwMey	wqsatwMey	wqsatwMey
FR9547	NTNG1	1	107867028	A	T	A2402,A0201,B0801,B1801,C0701,	C0701	130	944	Meypkplqv	Meypkplqv	Meypkplqv	Meypkplqv
FR9547	SYCP1	1	115469129	C	T	A2402,A0201,B0801,B1801,C0701,	B0801	491	919	Vlkkkgtae	Vlkkkgtae	Vlkkkgtae	Vlkkkgtae
FR9547	PDE4DIP	1	145075756	G	A	A2402,A0201,B0801,B1801,C0701,	C0701	487	969	yrsgdAtrt	yrsgdAtrt	yrsgdAtrt	yrsgdAtrt
FR9547	ARHGEF11	1	156929609	A	T	A2402,A0201,B0801,B1801,C0701,	A0201	121	59	slygendLl	slygendLl	slygendLl	slygendLl
FR9547	FCER1A	1	159277630	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	266	2261	Qqvtflkk	Qqvtflkk	Qqvtflkk	Qqvtflkk
FR9547	DDR2	1	162745477	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	341	23727	slIkdpnii	slIkdpnii	slIkdpnii	slIkdpnii
FR9547	DUSP27	1	167097360	G	A	A2402,A0201,B0801,B1801,C0701,	C0701	11	12	ylkeanSnsv	ylkeanSnsv	ylkeanSnsv	ylkeanSnsv
FR9547	OR14C36	1	248512179	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	145	141	ffmlylLti	ffmlylLti	ffmlylLti	ffmlylLti
FR9547	OR14C36	1	248512179	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	12	14	fmlylLtim	fmlylLtim	fmlylLtim	fmlylLtim
FR9547	OR14C36	1	248512179	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	22	87	ylLtimgni	ylLtimgni	ylLtimgni	ylLtimgni
FR9547	OR14C36	1	248512179	G	T	A2402,A0201,B0801,B1801,C0701,	A2402	339	638	ffmlylLti	ffmlylLti	ffmlylLti	ffmlylLti
FR9547	OR14C36	1	248512179	G	T	A2402,A0201,B0801,B1801,C0701,	B0801	54	104	ffmlylLti	ffmlylLti	ffmlylLti	ffmlylLti
FR9547	ITIH5	10	7657949	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	462	9483	kLtqtkdal	kLtqtkdal	kLtqtkdal	kLtqtkdal
FR9547	RBP3	10	48390487	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	160	1205	vlegnvGyl	vlegnvGyl	vlegnvGyl	vlegnvGyl
FR9547	ZWINT	10	58118447	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	9	3783	hlaevsaeV	hlaevsaeV	hlaevsaeV	hlaevsaeG
FR9547	ZWINT	10	58118447	C	A	A2402,A0201,B0801,B1801,C0701,	A2402	436	868	vsaeVkIf	vsaeVkIf	vsaeVkIf	vsaeGkIf
FR9547	PBLD	10	70056708	C	A	A2402,A0201,B0801,B1801,C0701,	B1801	253	4851	Memnlseta	Memnlseta	Memnlseta	Memnlseta
FR9547	PBLD	10	70056708	C	A	A2402,A0201,B0801,B1801,C0701,	C0701	28	21	mnqkiaMem	mnqkiaMem	mnqkiaMem	mnqkiaKem
FR9547	MARCH5	10	94109442	G	T	A2402,A0201,B0801,B1801,C0701,	A2402	162	4415	ifpgigcpF	ifpgigcpF	ifpgigcpF	ifpgigcpV
FR9547	NEURL1	10	105330826	T	C	A2402,A0201,B0801,B1801,C0701,	A0201	305	20269	tLsnrpvli	tLsnrpvli	tLsnrpvli	tFsnrpvli

Figure 21 (Cont.)

FR9547	NEURL1	10	105330826	T	C	A2402,A0201,B0801,B1801,C0701,	C0701	204	200	tLsnrpvli	tFsnrpvli
FR9547	TMEM86A	11	18723155	G	T	A2402,A0201,B0801,B1801,C0701,	A2402	360	491	thmfySsaf	thmfyAsaf
FR9547	TMEM86A	11	18723155	G	T	A2402,A0201,B0801,B1801,C0701,	C0701	202	294	thmfySsaf	thmfyAsaf
FR9547	ARL14EP	11	30354528	C	T	A2402,A0201,B0801,B1801,C0701,	C0701	249	7244	rtlkhatV	rtlkhatA
FR9547	MYEOV	11	69063307	C	G	A2402,A0201,B0801,B1801,C0701,	A0201	116	88	imwGrmdva	imwArmdva
FR9547	MMP10	11	102643704	A	T	A2402,A0201,B0801,B1801,C0701,	B1801	63	16	neVqagypr	neVqagypr
FR9547	C11orf63	11	122756722	G	T	A2402,A0201,B0801,B1801,C0701,	B1801	31	18	qeitchsef	qeiMchsef
FR9547	IQSEC2	12	747458	G	A	A2402,A0201,B0801,B1801,C0701,	C0701	178	208	ehkyDgtiv	ehkyGgtiv
FR9547	KCNA5	12	5155015	G	T	A2402,A0201,B0801,B1801,C0701,	A2402	314	5063	sfckagWtl	sfckagGti
FR9547	ANO2	12	5938605	C	A	A2402,A0201,B0801,B1801,C0701,	C0701	99	52	trsLivhei	trsRivhei
FR9547	NOP2	12	6672916	G	T	A2402,A0201,B0801,B1801,C0701,	B1801	140	840	eeTfvlppa	eePfvlppa
FR9547	IN54	12	6761483	C	A	A2402,A0201,B0801,B1801,C0701,	C0701	173	1931	fhevsygem	Chqvsygem
FR9547	SLC2A3	12	8083229	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	30	8	ivaqifgM	ivaqifgL
FR9547	SLC2A3	12	8083229	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	277	159	aqifgMefi	aqifgLefi
FR9547	SLC2A3	12	8083229	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	489	384	qifgMefil	qifgLefil
FR9547	SLC2A3	12	8083229	G	T	A2402,A0201,B0801,B1801,C0701,	B1801	346	1318	Mefilgsee	Lefilgsee
FR9547	CAPZA3	12	18891440	G	T	A2402,A0201,B0801,B1801,C0701,	A2402	373	983	nvmgYyrff	nvmgDyrff
FR9547	CAPZA3	12	18891440	G	T	A2402,A0201,B0801,B1801,C0701,	C0701	300	2403	shhnvmgYy	shhnvmgDy
FR9547	DBX2	12	45417596	G	T	A2402,A0201,B0801,B1801,C0701,	C0701	101	396	fVedqrkal	fSedqrkal
FR9547	ADCY6	12	49169202	C	T	A2402,A0201,B0801,B1801,C0701,	B1801	403	161	Mevdefisr	Devdefisr
FR9547	KMT2D	12	49431079	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	116	6284	amvsnqWlms	amvsnqGlms
FR9547	SLC26A10	12	58014868	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	168	11	Elmlgmfvl	Almlgmfvl
FR9547	SLC26A10	12	58014868	C	A	A2402,A0201,B0801,B1801,C0701,	C0701	344	1057	vafigsgEim	vafigsgAlm
FR9547	NUAK1	12	106480828	T	A	A2402,A0201,B0801,B1801,C0701,	A0201	107	78	vlsFdsfdl	vlsSdsfdl
FR9547	BTBD11	12	107937819	G	A	A2402,A0201,B0801,B1801,C0701,	A0201	194	51	alywepKal	alywepEal
FR9547	BTBD11	12	107937819	G	A	A2402,A0201,B0801,B1801,C0701,	B1801	12	6	wepKalyrl	wepEalyrl
FR9547	ACACB	12	109665243	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	97	1336	rqlpdVtcv	rqlpdGtcv
FR9547	ACACB	12	109665243	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	49	74	qlpdVtcvv	qlpdGtcvv
FR9547	TMEM132B	12	126128721	T	G	A2402,A0201,B0801,B1801,C0701,	A0201	134	83	fisqVevtv	ltsqFevtv
FR9547	TMEM132B	12	126128721	T	G	A2402,A0201,B0801,B1801,C0701,	A0201	310	44	sqVevtvwa	sqFevtvwa
FR9547	TMEM132B	12	126128721	T	G	A2402,A0201,B0801,B1801,C0701,	C0701	82	380	thqhftsqV	thqhftsqF
FR9547	TMEM132B	12	126128721	T	G	A2402,A0201,B0801,B1801,C0701,	C0701	33	60	qhftsqVev	qhftsqFev
FR9547	TMTC4	13	101315388	C	T	A2402,A0201,B0801,B1801,C0701,	C0701	171	156	fhpvgfhMv	fhpvgfhVv
FR9547	TMTC4	13	101315388	C	T	A2402,A0201,B0801,B1801,C0701,	C0701	88	525	fhMvnilih	fhVvnilih
FR9547	ARHGEF7	13	111926265	C	G	A2402,A0201,B0801,B1801,C0701,	A0201	352	44	ridkyRtl	ridkyPtl
FR9547	ARHGEF7	13	111926265	C	G	A2402,A0201,B0801,B1801,C0701,	B0801	185	348	mridkyRtl	mridkyPtl
FR9547	ARHGEF7	13	111926265	C	G	A2402,A0201,B0801,B1801,C0701,	C0701	12	24	mridkyRtl	mridkyPtl
FR9547	ORAI3	14	20444659	C	T	A2402,A0201,B0801,B1801,C0701,	B0801	19	40	mskikaRyl	mskikaPyl
FR9547	TEP1	14	29852650	C	A	A2402,A0201,B0801,B1801,C0701,	A2402	149	500	rypcewVgy	rypcewCgy
FR9547	MYH7	14	23899064	G	T	A2402,A0201,B0801,B1801,C0701,	B0801	378	7767	mykIKgaim	mykITgaim
FR9547	CBLN3	14	24898214	G	T	A2402,A0201,B0801,B1801,C0701,	C0701	125	45	ihsFgipiv	ihsPgipiv
FR9547	RALGAPA1	14	36037115	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	480	1050	gtisiaatL	gtisiaaRt
FR9547	RALGAPA1	14	36037115	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	29	15824	altvithlv	aRtvithlv
FR9547	TMEM229B	14	67940427	G	T	A2402,A0201,B0801,B1801,C0701,	B0801	153	354	yirlrgrcT	yirlrgrcP
FR9547	TMEM229B	14	67940427	G	T	A2402,A0201,B0801,B1801,C0701,	B0801	57	139	rlrgrcTll	rlrgrcPll
FR9547	TMEM229B	14	67940427	G	T	A2402,A0201,B0801,B1801,C0701,	C0701	74	68	lrgrcTlll	lrgrcPlll
FR9547	VRTN	14	74824097	G	A	A2402,A0201,B0801,B1801,C0701,	C0701	259	201	irpyfnfvi	irpyfnfvi
FR9547	CDC42BPB	14	103432670	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	62	272	ylqaiaskl	ylqaiaskM
FR9547	CDC42BPB	14	103432670	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	325	27	kltaelaal	kMteelaal

Figure 21 (Cont.)

FR9547	OR4N4	15	22382530	C	T	A2402,A0201,B0801,B1801,C0701,	C0701	443	639	irsdtgkta	irsdPgkta
FR9547	IL16	15	81571918	T	A	A2402,A0201,B0801,B1801,C0701,	B0801	465	624	qakkgHti	qakkgHti
FR9547	MFGE8	15	89449071	T	A	A2402,A0201,B0801,B1801,C0701,	A0201	90	30	nlfetpvVa	nlfetpvEa
FR9547	MFGE8	15	89449071	T	A	A2402,A0201,B0801,B1801,C0701,	B1801	9	30	fetpvEaqy	fetpvEaqy
FR9547	SLCO3A1	15	92647532	G	T	A2402,A0201,B0801,B1801,C0701,	A2402	248	24260	dYprwigaw	dDprwigaw
FR9547	BAIAP3	16	1394815	G	A	A2402,A0201,B0801,B1801,C0701,	A0201	19	27	ilnvdVfti	ilnvdVfti
FR9547	BAIAP3	16	1394815	G	A	A2402,A0201,B0801,B1801,C0701,	C0701	313	315	fhslinvdt	fhslinvdV
FR9547	SMG1	16	18849990	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	19	202	fmsnvgyii	Vmsnvgyii
FR9547	SMG1	16	18849990	C	A	A2402,A0201,B0801,B1801,C0701,	A2402	163	483	syarstaFm	syarstaVm
FR9547	SMG1	16	18849990	C	A	A2402,A0201,B0801,B1801,C0701,	A2402	284	4219	aFmsnvgyi	aVmsnvgyi
FR9547	SMG1	16	18849990	C	A	A2402,A0201,B0801,B1801,C0701,	B0801	440	463	qsyarstaf	qsyarstaV
FR9547	ANKS4B	16	21261957	T	A	A2402,A0201,B0801,B1801,C0701,	B1801	241	7237	hQeefipif	hLeefipif
FR9547	WWOX	16	78142341	G	T	A2402,A0201,B0801,B1801,C0701,	B1801	150	873	teektiQweh	teektiNweh
FR9547	OR1A1	17	3118931	A	T	A2402,A0201,B0801,B1801,C0701,	A0201	101	1761	nLsstefi	nQsstefi
FR9547	OR1A1	17	3118931	A	T	A2402,A0201,B0801,B1801,C0701,	C0701	405	456	mrennLsst	mrennQsst
FR9547	KCNAB3	17	7830726	G	C	A2402,A0201,B0801,B1801,C0701,	A0201	302	345	Vtvayehgv	Ltvayehgv
FR9547	KCNAB3	17	7830726	G	C	A2402,A0201,B0801,B1801,C0701,	B1801	158	196	aedvVtvay	aedvLtvay
FR9547	KCNJ12	17	21319499	G	T	A2402,A0201,B0801,B1801,C0701,	B1801	164	558	deaspifVi	deaspifGi
FR9547	LGALS9	17	25967713	G	T	A2402,A0201,B0801,B1801,C0701,	B0801	140	3317	Wpeerkthm	Gpeerkthm
FR9547	TBC1D29	17	28830301	G	A	A2402,A0201,B0801,B1801,C0701,	C0701	309	352	sesNrgpsi	sesSrgpsi
FR9547	SAMD14	17	48190280	C	T	A2402,A0201,B0801,B1801,C0701,	B0801	33	170	khrrKqea	khrrEqea
FR9547	ABCC3	17	48753888	C	G	A2402,A0201,B0801,B1801,C0701,	A0201	430	529	vdmGstpi	vdmAstpi
FR9547	ABCC3	17	48753888	C	G	A2402,A0201,B0801,B1801,C0701,	A2402	224	205	vimGstpif	vimAstpif
FR9547	RIT2	18	40613799	G	A	A2402,A0201,B0801,B1801,C0701,	A0201	11	11130	fLtyhdpti	fPtyhdpti
FR9547	SEMA6B	19	4546284	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	456	65	fispgtrDa	fispgtrAa
FR9547	KEAP1	19	10600330	C	A	A2402,A0201,B0801,B1801,C0701,	C0701	299	86	irsWagvcv	irsGagvcv
FR9547	SLC25A42	19	19221390	G	T	A2402,A0201,B0801,B1801,C0701,	B0801	491	19340	sfnrysgi	sfnrysgR
FR9547	TSHZ3	19	31768177	T	A	A2402,A0201,B0801,B1801,C0701,	A0201	12	12057	fmsnspirV	fmsnspirE
FR9547	TYRO3P	19	36398659	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	284	1592	lavsglRpv	lavsglRpv
FR9547	TYRO3P	19	36398659	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	324	4162	glSpvpaqa	glRpvpaqa
FR9547	PHLDB3	19	43979606	T	A	A2402,A0201,B0801,B1801,C0701,	A0201	165	111	wIdlvitaa	wMdlvitaa
FR9547	CCDC61	19	46509887	G	A	A2402,A0201,B0801,B1801,C0701,	B0801	143	359	slnrkmfg	slnrkmGg
FR9547	KIR3DL3	19	55246755	T	C	A2402,A0201,B0801,B1801,C0701,	A0201	128	119	vlgtPwi	vlgtSwi
FR9547	ABCG5	2	44059193	T	A	A2402,A0201,B0801,B1801,C0701,	A0201	399	534	ildaMsgri	ildaTsgri
FR9547	NRXN1	2	50280645	A	G	A2402,A0201,B0801,B1801,C0701,	B0801	492	5845	lPglyyngf	lSglyyngf
FR9547	NRXN1	2	50758386	C	T	A2402,A0201,B0801,B1801,C0701,	C0701	435	3030	grMktvni	grVktvni
FR9547	MOGS	2	74692184	G	A	A2402,A0201,B0801,B1801,C0701,	A0201	57	540	gmsgrwvlA	gmsgrwvlA
FR9547	IL1RL2	2	102805737	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	112	13173	wlflpmeL	wlflpmeW
FR9547	IL1RL2	2	102805737	G	T	A2402,A0201,B0801,B1801,C0701,	B1801	13	8	meLgtdsgvy	meWgdsgvy
FR9547	SLC9A4	2	103090441	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	447	303	vqipyevti	vqipyevtI
FR9547	SLC9A4	2	103090441	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	135	47	tlwiIasi	tLwiIasi
FR9547	SLC9A4	2	103090441	C	A	A2402,A0201,B0801,B1801,C0701,	B1801	60	50	yevtlwiI	yevtLwiI
FR9547	TMEM169	2	216964702	G	T	A2402,A0201,B0801,B1801,C0701,	C0701	179	495	trGkkkgqm	trGkkkgqm
FR9547	SLC23A3	2	220033426	C	A	A2402,A0201,B0801,B1801,C0701,	C0701	140	429	Shrevaqfc	Ahrevaqfc
FR9547	COL6A3	2	238287281	G	A	A2402,A0201,B0801,B1801,C0701,	B1801	266	5317	Leskrdiif	Peskrdiif
FR9547	PTK6	20	62166372	G	A	A2402,A0201,B0801,B1801,C0701,	C0701	16	8	srseavrWi	srseavrRi
FR9547	ZGPAT	20	62340323	G	A	A2402,A0201,B0801,B1801,C0701,	B1801	141	470	deeeisRtk	deeeisGtk
FR9547	TTC3	21	38572549	C	G	A2402,A0201,B0801,B1801,C0701,	A0201	255	209	algasCcei	algasScei
FR9547	AIRE	21	45712263	G	T	A2402,A0201,B0801,B1801,C0701,	B0801	313	2809	eprrQeppv	eprrQeppv

Figure 21 (Cont.)

FR9547	TBC1D5	3	17550029	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	313	47	slsetrhpM	slsetrhpL
FR9547	PLXNB1	3	48465147	C	G	A2402,A0201,B0801,B1801,C0701,	A0201	27	30	Llfaafssa	Vlfaafssa
FR9547	PLXNB1	3	48465147	C	G	A2402,A0201,B0801,B1801,C0701,	C0701	338	522	srevahgeL	srevahgeV
FR9547	STAB1	3	52537457	T	A	A2402,A0201,B0801,B1801,C0701,	A0201	69	11921	yQgdgmvcl	yHgdgmvcl
FR9547	GOLGB1	3	121415453	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	324	3242	salqgVtsv	salqgGtsv
FR9547	CLDN18	3	137717862	G	A	A2402,A0201,B0801,B1801,C0701,	A0201	246	831	yqglwHscv	yqglwRscv
FR9547	TRPC1	3	142467213	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	15	25	mllkHdvsl	mllkQdvsl
FR9547	TRPC1	3	142467213	G	T	A2402,A0201,B0801,B1801,C0701,	B0801	9	26	mllkHdvsl	mllkQdvsl
FR9547	ZIC4	3	147114166	G	T	A2402,A0201,B0801,B1801,C0701,	C0701	219	3289	lheeppqaY	lheeppqaS
FR9547	GMPS	3	155629013	A	T	A2402,A0201,B0801,B1801,C0701,	B0801	368	135	fmrNresqs	fmrKresqs
FR9547	GMPS	3	155629013	A	T	A2402,A0201,B0801,B1801,C0701,	C0701	36	69	mrNresqsv	mrKresqsv
FR9547	KIAA0226	3	197428713	G	A	A2402,A0201,B0801,B1801,C0701,	B0801	28	4746	mfarkhesL	mfarkhesP
FR9547	KIAA0226	3	197428713	G	A	A2402,A0201,B0801,B1801,C0701,	B0801	49	13	farkhesLl	farkhesPl
FR9547	KIAA0226	3	197428713	G	A	A2402,A0201,B0801,B1801,C0701,	B1801	173	203	hesLllvtk	hesPllvtk
FR9547	KIAA0226	3	197428713	G	A	A2402,A0201,B0801,B1801,C0701,	C0701	278	3739	farkhesLl	farkhesPl
FR9547	KIAA0226	3	197428713	G	A	A2402,A0201,B0801,B1801,C0701,	C0701	125	204	arkhesLll	arkhesPll
FR9547	NDST4	4	115997409	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	227	15	glhdgiqrv	gLhdgiqrv
FR9547	NDST4	4	115997409	G	T	A2402,A0201,B0801,B1801,C0701,	C0701	35	62	lhdgiqrvl	Lhdgiqrvl
FR9547	ANKH	5	14756014	T	A	A2402,A0201,B0801,B1801,C0701,	A2402	420	428	illkhkyCf	illkhkySf
FR9547	ANKH	5	14756014	T	A	A2402,A0201,B0801,B1801,C0701,	B0801	58	25	illkhkyCf	illkhkySf
FR9547	ANKH	5	14756014	T	A	A2402,A0201,B0801,B1801,C0701,	B0801	14	16	llkhkyCfl	llkhkySfl
FR9547	CDH10	5	24491716	G	C	A2402,A0201,B0801,B1801,C0701,	A0201	13	31	alMaillcl	allaillcl
FR9547	CDH10	5	24491716	G	C	A2402,A0201,B0801,B1801,C0701,	A0201	173	1625	lMaillcll	llaillcll
FR9547	GPR98	5	89938854	C	T	A2402,A0201,B0801,B1801,C0701,	B1801	465	8437	Leldehywv	Peldehywv
FR9547	GPR98	5	89938854	C	T	A2402,A0201,B0801,B1801,C0701,	C0701	28	39	arldgiLel	arldgiPel
FR9547	GPR98	5	90124879	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	20	40	sqllvyfsv	sqSlvyfsv
FR9547	GPR98	5	90124879	G	T	A2402,A0201,B0801,B1801,C0701,	B1801	4	7	desqllvyf	desqSlvyf
FR9547	FBN2	5	127615930	C	A	A2402,A0201,B0801,B1801,C0701,	C0701	14	22	yrcDcnegf	yrcEcnegf
FR9547	PCDHA1	5	140166966	C	T	A2402,A0201,B0801,B1801,C0701,	A0201	21	13509	aLlstvial	aPlstvial
FR9547	PCDHA1	5	140166966	C	T	A2402,A0201,B0801,B1801,C0701,	A0201	28	1523	Llstviall	Plstviall
FR9547	ARAP3	5	141050949	C	A	A2402,A0201,B0801,B1801,C0701,	C0701	491	1476	Srpnllknm	Arpnllknm
FR9547	ANXA6	5	150518964	T	A	A2402,A0201,B0801,B1801,C0701,	C0701	316	956	rsYrqrqev	rsNrqrqev
FR9547	STC2	5	172755129	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	18	16971	vlatfdpaL	vlatfdpaR
FR9547	WRNIP1	6	2779689	G	T	A2402,A0201,B0801,B1801,C0701,	B0801	304	87	Dglqrshll	Eglqrshll
FR9547	EYS	6	66205160	G	T	A2402,A0201,B0801,B1801,C0701,	B1801	328	89	teKicldfy	teNicldfy
FR9547	HTR1B	6	78172870	G	C	A2402,A0201,B0801,B1801,C0701,	A0201	496	225	klhtpGnyl	klhtpAnyl
FR9547	HTR1B	6	78172870	G	C	A2402,A0201,B0801,B1801,C0701,	C0701	64	38	lhtpGnyli	lhtpAnyli
FR9547	GPR6	6	110301318	G	A	A2402,A0201,B0801,B1801,C0701,	A0201	96	5928	Kiqralwll	Eiqralwll
FR9547	GPR6	6	110301318	G	A	A2402,A0201,B0801,B1801,C0701,	A2402	15	17	iyafrnqKi	iyafrnqEi
FR9547	GPR6	6	110301318	G	A	A2402,A0201,B0801,B1801,C0701,	A2402	224	1767	Kiqralwll	Eiqralwll
FR9547	GPR6	6	110301318	G	A	A2402,A0201,B0801,B1801,C0701,	C0701	49	146	frnqKiqra	frnqEiqra
FR9547	DDO	6	110714517	T	A	A2402,A0201,B0801,B1801,C0701,	B0801	423	991	tlSrriedl	tlTrriedl
FR9547	KATNA1	6	149916369	C	A	A2402,A0201,B0801,B1801,C0701,	B0801	137	1091	tnvcrYasl	tnvcrDasl
FR9547	KATNA1	6	149916369	C	A	A2402,A0201,B0801,B1801,C0701,	C0701	156	895	crYaslmam	crDaslmam
FR9547	ULBP2	6	150267723	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	132	32	smgYcigwl	smgDcigwl
FR9547	ULBP2	6	150267723	G	T	A2402,A0201,B0801,B1801,C0701,	A2402	47	336	hyfsmgYci	hyfsmgDci
FR9547	SLC22A3	6	160858208	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	37	14395	faasnivaV	faasnivaG
FR9547	SLC22A3	6	160858208	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	441	145	ivaVvaclv	ivaGvaclv
FR9547	TNRC18	7	5352259	C	T	A2402,A0201,B0801,B1801,C0701,	C0701	98	100	srpkkregl	srpkkregV

Figure 21 (Cont.)

FR9547	TNFRC18	7	5352259	C	T	A2402,A0201,B0801,B1801,C0701,	C0701	50	53	thiptkel	Vhiptkel
FR9547	MUC17	7	100685963	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	199	48	stiVtsliv	stiGtsliv
FR9547	MUC17	7	100685963	G	T	A2402,A0201,B0801,B1801,C0701,	B1801	172	885	meistiVst	meistiGt
FR9547	DUSP26	8	33449719	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	9	29	illhcavgv	iiVhcavgv
FR9547	POTEA	8	43157139	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	295	8795	avitgsasi	avRtgsasi
FR9547	KCNB2	8	73848416	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	5	7	ltaiiTyyv	ltaiiPyyv
FR9547	KCNB2	8	73848416	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	97	56	aiiTyyvti	aiiPyyvti
FR9547	KCNB2	8	73848416	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	111	6895	iTyyvtiM	iPyyvtiM
FR9547	KCNB2	8	73848416	C	A	A2402,A0201,B0801,B1801,C0701,	B1801	230	218	idltaiiTy	idltaiiPy
FR9547	CSMD3	8	113662524	C	A	A2402,A0201,B0801,B1801,C0701,	C0701	64	50	krygfidfsi	Krygfidfsi
FR9547	TRPM6	9	77377163	C	A	A2402,A0201,B0801,B1801,C0701,	A2402	337	30664	sikkkwqtF	sikkkwqtC
FR9547	TRPM6	9	77377163	C	A	A2402,A0201,B0801,B1801,C0701,	B0801	24	284	sikkkwqtF	sikkkwqtC
FR9547	PRUNE2	9	79320300	G	A	A2402,A0201,B0801,B1801,C0701,	B1801	11	13	seVafdhsf	seAafdhsf
FR9547	PRUNE2	9	79320301	C	A	A2402,A0201,B0801,B1801,C0701,	B1801	13	13	seSafdhsf	seAafdhsf
FR9547	SPATA31D1	9	84608596	A	G	A2402,A0201,B0801,B1801,C0701,	B0801	365	5239	tirrefsdA	tirrefsdT
FR9547	TLR4	9	120470841	G	C	A2402,A0201,B0801,B1801,C0701,	B1801	29	44	velvpnity	veVvpnity
FR9547	TSC1	9	135801029	C	A	A2402,A0201,B0801,B1801,C0701,	B0801	43	4116	slkhkisqa	sWkhkisqa
FR9547	SHROOM2	X	9841741	A	T	A2402,A0201,B0801,B1801,C0701,	A0201	97	26071	avdkllagV	avdkllagD
FR9547	SHROOM2	X	9841741	A	T	A2402,A0201,B0801,B1801,C0701,	A0201	11	42	kllagVeiv	kllagDeiv
FR9547	RBM10	X	47038529	G	C	A2402,A0201,B0801,B1801,C0701,	B0801	30	72	nfkrrtkcf	nfkrrtkcf
FR9547	ITIH5	X	54777561	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	88	969	itrfVpyl	itrfGpyl
FR9547	ITIH5	X	54777561	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	10	19	rfVpyleft	rfGpyleft
FR9547	ITIH5	X	54777561	C	A	A2402,A0201,B0801,B1801,C0701,	A0201	97	7934	lVpyleflv	lGpyleflv
FR9547	HEPH	X	65409681	G	T	A2402,A0201,B0801,B1801,C0701,	C0701	259	290	hntdlanif	hntdVanif
FR9547	CITED1	X	71521928	G	T	A2402,A0201,B0801,B1801,C0701,	C0701	327	23473	thptkppsf	tPptkppsf
FR9547	MAGEE1	X	75651039	C	T	A2402,A0201,B0801,B1801,C0701,	A0201	356	408	fvwgpraCl	fvwgpraRl
FR9547	IRS4	X	107978317	G	T	A2402,A0201,B0801,B1801,C0701,	B0801	444	994	Srsrrawsv	Rsrrawsv
FR9547	IRS4	X	107978317	G	T	A2402,A0201,B0801,B1801,C0701,	C0701	47	97	Srsrrawsv	Rsrrawsv
FR9547	PGRMC1	X	118370465	C	A	A2402,A0201,B0801,B1801,C0701,	B0801	158	1700	fiykivSg	fiykivRg
FR9547	GRIA3	X	122538672	A	C	A2402,A0201,B0801,B1801,C0701,	C0701	26	51	vriNykti	vriKykti
FR9547	ELMA	X	153578462	C	T	A2402,A0201,B0801,B1801,C0701,	C0701	198	416	Rhggdpgiv	Ghggdpgiv
FR9547	ATP6AP1	X	153660705	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	27	1316	yfqekWas	yfqekKas
FR9547	ATP6AP1	X	153660705	G	T	A2402,A0201,B0801,B1801,C0701,	A0201	9	39	kWaspihv	kKaspihv
GR0134	MPL	1	43814578	G	A	A0201,A3301,B1302,B1402,C0602,C0802	A3301	350	201	rsryfkqlr	rsryfkqlr
GR0134	MPL	1	43814578	G	A	A0201,A3301,B1302,B1402,C0602,C0802	C0602	358	129	prsryfkql	prsryfkql
GR0134	MPL	1	43814578	G	A	A0201,A3301,B1302,B1402,C0602,C0802	C0602	178	95	yfklqlrel	yfklqlrel
GR0134	NBPF24	1	147580910	T	C	A0201,A3301,B1302,B1402,C0602,C0802	A0201	9	8	lldekGpev	lldekEpev
GR0134	NBPF24	1	147580910	T	C	A0201,A3301,B1302,B1402,C0602,C0802	C0602	61	1513	lldekGpev	lldekEpev
GR0134	RYR2	1	237433822	C	T	A0201,A3301,B1302,B1402,C0602,C0802	A0201	221	320	vvlqcTati	vvlqcTati
GR0134	ZDHHC17	12	77209663	C	T	A0201,A3301,B1302,B1402,C0602,C0802	A0201	11	5	iiiffnvsv	iiiffnvsv
GR0134	ZDHHC17	12	77209663	C	T	A0201,A3301,B1302,B1402,C0602,C0802	A0201	75	402	iiffnvsvnl	iiffnvsvnl
GR0134	KIAA1199	15	81166237	G	T	A0201,A3301,B1302,B1402,C0602,C0802	A0201	10	16413	gMqdfiiks	gRqdfiiks
GR0134	TANGO6	16	69074302	G	T	A0201,A3301,B1302,B1402,C0602,C0802	A0201	65	109	Visqkatev	Glsqkatev
GR0134	ENGASE	17	77071054	C	T	A0201,A3301,B1302,B1402,C0602,C0802	A3301	158	310	vtvtWsatr	vtvtRsatr
GR0134	ENGASE	17	77071054	C	T	A0201,A3301,B1302,B1402,C0602,C0802	A3301	497	6114	tWsatrrrr	tRsatrrrr
GR0134	SH2D3A	19	6763691	C	A	A0201,A3301,B1302,B1402,C0602,C0802	C0602	94	398	srtKaeall	srQkaeall
GR0134	MYO9B	19	17303759	G	A	A0201,A3301,B1302,B1402,C0602,C0802	C0602	83	131	ertqaaWyl	ertqaaVyl
GR0134	LRP3	19	33697976	G	C	A0201,A3301,B1302,B1402,C0602,C0802	A3301	72	295	rRlgrlwnr	rRlgrlwnr
GR0134	TMEM87B	2	112813185	G	A	A0201,A3301,B1302,B1402,C0602,C0802	A3301	195	3340	Rsvaglpr	Rsvaglpr

Figure 21 (Cont.)

GR0134	ADAM33	20	3651716	C	A	A0201,A3301,B1302,B1402,C0602,C0802	A0201	9	11	glawccyLl	glawccyRl
GR0134	COL7A1	3	48632550	G	T	A0201,A3301,B1302,B1402,C0602,C0802	A0201	42	138	giMaeaprv	giLaeaprv
GR0134	COL7A1	3	48632562	A	T	A0201,A3301,B1302,B1402,C0602,C0802	A0201	451	1033	rllvaalSa	rllvaalCa
GR0134	COL7A1	3	48632562	A	T	A0201,A3301,B1302,B1402,C0602,C0802	A0201	449	626	lvaalSagi	lvaalCagi
GR0134	BMP2K	4	79792166	C	G	A0201,A3301,B1302,B1402,C0602,C0802	C0602	31	37	Qhhhhhhhl	Hhhhhhhhl
GR0134	C2	6	31895543	T	C	A0201,A3301,B1302,B1402,C0602,C0802	A0201	124	30	Tvlfcllfl	Mvlfcllfl
GR0134	ZNF76	6	35248963	G	T	A0201,A3301,B1302,B1402,C0602,C0802	A0201	19	745	lldgttayv	lSdgttayv
GR0134	ZNF76	6	35248963	G	T	A0201,A3301,B1302,B1402,C0602,C0802	C0802	337	196	lldgttayv	lSdgttayv
GR0134	SNAP91	6	84317434	C	T	A0201,A3301,B1302,B1402,C0602,C0802	A0201	241	251	atasTavpv	atasAavpv
GR0134	TNRC18	7	5385303	C	T	A0201,A3301,B1302,B1402,C0602,C0802	A0201	78	154	llaHfaasa	llaRfaasa
GR0134	SLC26A5	7	103019706	T	C	A0201,A3301,B1302,B1402,C0602,C0802	A3301	180	283	dlysSalkr	dlysNalkr
GR0134	ZNF777	7	149152750	G	A	A0201,A3301,B1302,B1402,C0602,C0802	C0602	193	147	shsShhqea	shsPhhqea
GR0134	CPXCR1	X	88008737	G	T	A0201,A3301,B1302,B1402,C0602,C0802	A3301	424	5507	vshkplnYr	vshkplnDr
GR0134	MORC4	X	106184842	C	T	A0201,A3301,B1302,B1402,C0602,C0802	A0201	136	226	kltQlrihv	kltRlrihv
GR4788	AGRN	1	983540	G	T	A0101,A2601,B3501,B3701,C0401,C0602	B3501	17	71	qpvaNttaa	qpvaKttaa
GR4788	MXRA8	1	1290475	C	T	A0101,A2601,B3501,B3701,C0401,C0602	B3501	477	1375	lavarDapa	lavarGapa
GR4788	COL9A2	1	40782848	G	T	A0101,A2601,B3501,B3701,C0401,C0602	B3501	277	191	maaatasTr	maaatasPr
GR4788	ARHGEF11	1	156909555	C	A	A0101,A2601,B3501,B3701,C0401,C0602	B3501	128	169	hpwdpgspV	hpwdpgspG
GR4788	ARHGEF11	1	156909556	C	A	A0101,A2601,B3501,B3701,C0401,C0602	B3501	60	169	hpwdpgspW	hpwdpgspG
GR4788	SNAP47	1	227923184	C	T	A0101,A2601,B3501,B3701,C0401,C0602	C0602	87	9294	rrrgrlwdL	rrrgrlwdS
GR4788	HK1	10	71142517	T	C	A0101,A2601,B3501,B3701,C0401,C0602	B3501	299	1116	avvkmlpPf	avvkmlpSf
GR4788	FBXW4	10	103454202	G	T	A0101,A2601,B3501,B3701,C0401,C0602	C0602	241	161	rrftscdMl	rrftscdLl
GR4788	NAALADL1	11	64815177	A	T	A0101,A2601,B3501,B3701,C0401,C0602	A2601	167	45	siNdnwiry	siYdnwiry
GR4788	NAALADL1	11	64815177	A	T	A0101,A2601,B3501,B3701,C0401,C0602	B3501	219	162	siNdnwiry	siYdnwiry
GR4788	MMP7	11	102398519	G	A	A0101,A2601,B3501,B3701,C0401,C0602	B3501	134	514	fpnsSkwts	fpnsPkwts
GR4788	TREH	11	118529026	G	A	A0101,A2601,B3501,B3701,C0401,C0602	B3501	378	352	laatllpVl	laatllpSl
GR4788	TREH	11	118529026	G	A	A0101,A2601,B3501,B3701,C0401,C0602	B3501	97	197	lpVlllsll	lpSlllsll
GR4788	PDE3A	12	20766470	A	T	A0101,A2601,B3501,B3701,C0401,C0602	A0101	33	18851	ladpslppY	ladpslppN
GR4788	PDE3A	12	20766470	A	T	A0101,A2601,B3501,B3701,C0401,C0602	B3501	3	4764	ladpslppY	ladpslppN
GR4788	PDE3A	12	20766470	A	T	A0101,A2601,B3501,B3701,C0401,C0602	B3501	270	443	lppYvctsl	lppNvctsl
GR4788	MTFMT	15	65321764	A	T	A0101,A2601,B3501,B3701,C0401,C0602	B3501	80	67	fareaQral	fareaLral
GR4788	MTFMT	15	65321764	A	T	A0101,A2601,B3501,B3701,C0401,C0602	C0602	369	248	fareaQral	fareaLral
GR4788	MSLN	16	818722	A	G	A0101,A2601,B3501,B3701,C0401,C0602	B3501	179	454	lalllasAl	lalllasTl
GR4788	NDE1	16	15790676	G	T	A0101,A2601,B3501,B3701,C0401,C0602	C0602	306	117	Drrpsstsv	Errpsstsv
GR4788	TRIM72	16	31235994	C	T	A0101,A2601,B3501,B3701,C0401,C0602	B3501	15	37	lprpvyLff	lprpvyPff
GR4788	TRIM72	16	31235994	C	T	A0101,A2601,B3501,B3701,C0401,C0602	C0602	32	5428	erlprpvyL	erlprpvyP
GR4788	WDR59	16	74985433	T	A	A0101,A2601,B3501,B3701,C0401,C0602	A0101	89	88	ssnHrvdly	ssnQrvdly
GR4788	SMG6	17	1964830	C	T	A0101,A2601,B3501,B3701,C0401,C0602	B3501	7	7	vplrdipaf	vpVrdipaf
GR4788	SMG6	17	1964830	C	T	A0101,A2601,B3501,B3701,C0401,C0602	C0602	141	105	trnvplrdi	trnvpVrdi
GR4788	HEATR6	17	58137346	C	A	A0101,A2601,B3501,B3701,C0401,C0602	B3501	200	233	tpfsLmiac	tpfsVmiac
GR4788	TMC6	17	76113703	C	A	A0101,A2601,B3501,B3701,C0401,C0602	B3501	83	122	kpsstcCpf	kpsstcGpf
GR4788	TMC6	17	76113703	C	A	A0101,A2601,B3501,B3701,C0401,C0602	B3501	15	287	Cpfrtldtm	Gpfrtldtm
GR4788	DUS3L	19	5786768	G	T	A0101,A2601,B3501,B3701,C0401,C0602	B3501	232	206	qaaspmHlf	qaaspmPlf
GR4788	ZNF568	19	37487926	C	T	A0101,A2601,B3501,B3701,C0401,C0602	C0602	203	79	frhqriYtg	frhqriHtg
GR4788	ZNF17	19	57929304	G	C	A0101,A2601,B3501,B3701,C0401,C0602	B3501	64	76	mvfedvPih	mvfedvAih
GR4788	MAP1LC3A	20	33146689	C	A	A0101,A2601,B3501,B3701,C0401,C0602	C0602	56	9370	rHfkqrrsf	rPfkqrrsf
GR4788	MROH8	20	35788539	G	T	A0101,A2601,B3501,B3701,C0401,C0602	C0602	51	3561	vhtlnvlvL	vhtlnvlvQ
GR4788	DMC1	22	38951382	G	C	A0101,A2601,B3501,B3701,C0401,C0602	A2601	41	90	esmGiteaf	esmAiteaf
GR4788	DMC1	22	38951382	G	C	A0101,A2601,B3501,B3701,C0401,C0602	B3501	111	57	esmGiteaf	esmAiteaf

Figure 21 (Cont.)

GR4788	PCDH10	4	134073156	G	A	A0101,A2601,B3501,B3701,C0401,C0602	C0602	438	472	ysiVrgnem	ysiVrgnem	ysiVrgnem
GR4788	PCDH10	4	134073156	G	A	A0101,A2601,B3501,B3701,C0401,C0602	C0602	227	587	Mrgnemrif	Mrgnemrif	Vrgnemrif
GR4788	CTNND2	5	11236868	C	A	A0101,A2601,B3501,B3701,C0401,C0602	B3501	17	21	fpsFqsnaa	fpsFqsnaa	fpsVqsnaa
GR4788	CTNND2	5	11236868	C	A	A0101,A2601,B3501,B3701,C0401,C0602	B3501	255	20	sFqsnaaay	sFqsnaaay	sVqsnaaay
GR4788	RUFY1	5	179016634	G	A	A0101,A2601,B3501,B3701,C0401,C0602	C0602	163	30	ersKksvei	ersKksvei	ersEksvei
GR4788	PTK7	6	43109465	G	A	A0101,A2601,B3501,B3701,C0401,C0602	A2601	39	3153	Mrrdtdagny	Mrrdtdagny	Vrrdtdagny
GR4788	C7orf26	7	6631307	C	A	A0101,A2601,B3501,B3701,C0401,C0602	A2601	20	1479	qlteimcny	qlteimcny	qlLeimcny
GR4788	TRIM50	7	727385 10	G	T	A0101,A2601,B3501,B3701,C0401,C0602	C0602	83	30	vhOrnpksl	vhOrnpksl	vhHrnpksl
GR4788	CLIP2	7	73790362	G	A	A0101,A2601,B3501,B3701,C0401,C0602	B3501	406	1096	hpdaaeilQ	hpdaaeilQ	hpdaaeilR
GR4788	PLXNA4	7	131866208	G	T	A0101,A2601,B3501,B3701,C0401,C0602	B3501	279	290	ftyypnTvf	ftyypnTvf	ftypnPvf
GR4788	PLXNA4	7	131866208	G	T	A0101,A2601,B3501,B3701,C0401,C0602	B3501	3	3	ypnTvfeaf	ypnTvfeaf	ypnPvfeaf
GR4788	CTAGE4	7	143964066	C	A	A0101,A2601,B3501,B3701,C0401,C0602	B3501	6	8	ypprGlppy	ypprGlppy	yppnGlppy
GR4788	EGR3	8	22546525	G	A	A0101,A2601,B3501,B3701,C0401,C0602	B3501	427	11636	ndmgsipeY	ndmgsipeY	ndmgsipeH
GR4788	COL14A1	8	121292197	G	T	A0101,A2601,B3501,B3701,C0401,C0602	B3501	189	1057	Ladadyset	Ladadyset	Vadadyset
GR4788	CXCR3	X	70836684	G	A	A0101,A2601,B3501,B3701,C0401,C0602	B3501	24	16	fpqvgrTal	fpqvgrTal	fpqvgrTal
GR4788	CXCR3	X	70836684	G	A	A0101,A2601,B3501,B3701,C0401,C0602	C0602	265	8087	ynfpqvgrM	ynfpqvgrM	ynfpqvgrT
HE3202	SDF4	1	1159233	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	76	336	Maehfqeam	Maehfqeam	Taehfqeam
HE3202	ESPN	1	6508764	T	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	260	2981	dssrkprai	dssrkprai	dssrkprai
HE3202	CASP9	1	15823417	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	426	1399	ssihfmveL	ssihfmveL	ssihfmveV
HE3202	CASP9	1	15833417	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	457	133	ssihfmveL	ssihfmveL	ssihfmveV
HE3202	HTR1D	1	23519907	C	G	A2403,A3201,B3801,B4101,C1203,C1701	B3801	150	98	shsaAspff	shsaAspff	shsaGspff
HE3202	YARS	1	33272090	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	328	7787	lksglkypV	lksglkypV	lksgikypG
HE3202	YARS	1	33272090	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	74	46	ikypVkpal	ikypVkpal	ikypGkpal
HE3202	CSMD2	1	34042986	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	36	321	Cyrlvghsm	Cyrlvghsm	Gyrlvghsm
HE3202	NRD1	1	52299696	G	C	A2403,A3201,B3801,B4101,C1203,C1701	A2403	51	31	yfkeaVdrw	yfkeaVdrw	yfkeaLdrw
HE3202	NRD1	1	52299696	G	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	115	67	eaVdrwaqf	eaVdrwaqf	eaLdrwaqf
HE3202	JAK1	1	65349061	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	276	25122	vnteapepV	vnteapepV	vntaapepG
HE3202	JAK1	1	65349061	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	25	32	eapepVvev	eapepVvev	eapepGvev
HE3202	JAK1	1	65349061	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	285	151	apepVvevl	apepVvevl	apepGvevl
HE3202	WDR78	1	67292521	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	343	2104	lLdhlstl	lLdhlstl	lWdhlstl
HE3202	SRSF11	1	70703127	G	C	A2403,A3201,B3801,B4101,C1203,C1701	A3201	133	112	kinhvaaRl	kinhvaaRl	kinhvaaGl
HE3202	PTGER3	1	71513107	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	124	505	Mafpitmll	Mafpitmll	Vafpitmll
HE3202	PTGER3	1	71513107	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	230	415	gsvsMafpi	gsvsMafpi	gsvsVafpi
HE3202	PTGER3	1	71513107	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	240	1193	Mafpitmll	Mafpitmll	Vafpitmll
HE3202	PTGER3	1	71513107	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	37	112	vsMafpitm	vsMafpitm	vsVafpitm
HE3202	PTGER3	1	71513107	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	8	11	Mafpitmll	Mafpitmll	Vafpitmll
HE3202	SLC44A5	1	75677192	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	7	13	fyamcveti	fyamcveti	Vyamcveti
HE3202	SLC44A5	1	75677192	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	118	3742	iahgffsV	iahgffsV	iahgffsV
HE3202	SLC44A5	1	75677192	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	21	12	iahgffsFy	iahgffsFy	Vyamcveti
HE3202	SLC44A5	1	75677192	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	15	268	fyamcveti	fyamcveti	Vyamcveti
HE3202	SLC44A5	1	75683559	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	147	5189	ivleyldhL	ivleyldhL	ivleyldhR
HE3202	HFM1	1	91841101	G	C	A2403,A3201,B3801,B4101,C1203,C1701	A2403	15	11	mysdEkptl	mysdEkptl	mysdQkptl
HE3202	HFM1	1	91841101	G	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	8	18	ysdEkptlv	ysdEkptlv	ysdQkptlv
HE3202	BRDT	1	92442922	A	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	14	96	yydvvtnpm	yydvvtnpm	yydvvKnpm
HE3202	BRDT	1	92442922	A	T	A2403,A3201,B3801,B4101,C1203,C1701	B3801	137	5555	lhnyydvvt	lhnyydvvt	lhnyydvvK
HE3202	BRDT	1	92442922	A	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	117	491	yydvvtnpm	yydvvtnpm	yydvvKnpm
HE3202	ABCA4	1	94574166	C	G	A2403,A3201,B3801,B4101,C1203,C1701	A3201	472	2404	iksqfmHti	iksqfmHti	iksqfmDti
HE3202	ABCA4	1	94574166	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	206	321	iksqfmHti	iksqfmHti	iksqfmDti
HE3202	NOTCH2	1	120590099	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	78	1308	kcidhpnVy	kcidhpnVy	kcidhpnGy

Figure 21 (Cont.)

HE3202	DENND4B	1	153905348	A	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	206	198	qtlEsrpsv	qtlDsrpsv	qtlDsrpsv
HE3202	FGFS	1	155279585	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	314	2243	tSrwlrsv	Plsrwlrsv	Plsrwlrsv
HE3202	ATP1A2	1	160100328	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	13	52	miVppraav	miDppraav	miDppraav
HE3202	FMO4	1	171310772	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	250	1419	qwNrtlkpl	qwDrtlkpl	qwDrtlkpl
HE3202	AXDND1	1	179414169	A	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	143	86	skydtlMli	skydtlKli	skydtlKli
HE3202	AXDND1	1	179414169	A	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	332	199	dtlMlikhl	dtlKlikhl	dtlKlikhl
HE3202	RGS5	1	182636094	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	232	10091	mprrnkgrnM	mprrnkgrnK	mprrnkgrnK
HE3202	ASPM	1	197070788	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	107	22	rqChsavvi	rqWhsavvi	rqWhsavvi
HE3202	ASPM	1	197070788	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	39	25	yirqChsav	yirqWhsav	yirqWhsav
HE3202	ASPM	1	197070788	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	139	132	rqChsavvi	rqWhsavvi	rqWhsavvi
HE3202	ASPM	1	197070789	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	40	22	rqthsavvi	rqWhsavvi	rqWhsavvi
HE3202	ASPM	1	197070789	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	99	25	yirqthsav	yirqWhsav	yirqWhsav
HE3202	ASPM	1	197070789	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	94	132	rqthsavvi	rqWhsavvi	rqWhsavvi
HE3202	IGFN1	1	201895591	A	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	452	366	kpVppqgpm	kpDppqgpm	kpDppqgpm
HE3202	IGFN1	1	201187709	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	487	226	cqyefRvta	cqyefRvta	cqyefRvta
HE3202	IGFN1	1	201187709	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	304	238	yefQvtava	yefRvtava	yefRvtava
HE3202	TAF1A	1	222737428	C	G	A2403,A3201,B3801,B4101,C1203,C1701	A3201	12	43	klmlQfhtl	klmlEfhtl	klmlEfhtl
HE3202	TAF1A	1	222737428	C	G	A2403,A3201,B3801,B4101,C1203,C1701	A3201	365	381	lmlQfhtll	lmlEfhtll	lmlEfhtll
HE3202	TAF1A	1	222737428	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	468	129	lmlQfhtll	lmlEfhtll	lmlEfhtll
HE3202	RAB4A	1	229433362	T	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	311	1530	vtfleaSrf	vtfleaSrf	vtfleaSrf
HE3202	TTC13	1	231064818	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	57	2438	reysrythV	reysrythA	reysrythA
HE3202	TTC13	1	231064818	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	121	134	ysrythVhl	ysrythAhl	ysrythAhl
HE3202	RYR2	1	237780733	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	81	93	qalnmsSal	qalnmsAal	qalnmsAal
HE3202	RYR2	1	237947415	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	4	5	yfqpflgSi	yfqpflgRi	yfqpflgRi
HE3202	RYR2	1	237947415	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	28	62	yfqpflgSi	yfqpflgRi	yfqpflgRi
HE3202	RYR2	1	237947415	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	232	176	qpflgSiei	qpflgRiei	qpflgRiei
HE3202	OR2W3	1	248059315	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	383	274	rlcrGlvsv	rlcrGlvsv	rlcrGlvsv
HE3202	OR2W3	1	248059315	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	333	391	rlcrGlvsv	rlcrGlvsv	rlcrGlvsv
HE3202	OR2M2	1	248243719	G	C	A2403,A3201,B3801,B4101,C1203,C1701	A3201	11	12	klcgltatf	klcgltAtf	klcgltAtf
HE3202	OR2T12	1	248458342	G	C	A2403,A3201,B3801,B4101,C1203,C1701	A2403	307	122	hffceaRvl	hffceaPvl	hffceaPvl
HE3202	OR2T12	1	248458342	G	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	50	40	ffceaRvlv	ffceaPvlv	ffceaPvlv
HE3202	OR2T34	1	248737725	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	115	35	lqmffhltM	lqmffhltL	lqmffhltL
HE3202	OR2T34	1	248737725	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	159	459	ltMagaevf	ltLagaevf	ltLagaevf
HE3202	OR2T34	1	248737725	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	231	258	iqmffhltM	iqmffhltL	iqmffhltL
HE3202	OR2T34	1	248737725	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	300	517	ltMagaevf	ltLagaevf	ltLagaevf
HE3202	OR2T27	1	248814155	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	114	1347	snysvyaYf	snysvyaDf	snysvyaDf
HE3202	OR2T27	1	248814155	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	10	22	nysvyaYfi	nysvyaDfi	nysvyaDfi
HE3202	OR2T27	1	248814155	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	5	9680	aYfillglf	aDfillglf	aDfillglf
HE3202	OR2T27	1	248814155	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	171	10321	qsnysvyaY	qsnysvyaD	qsnysvyaD
HE3202	OR2T27	1	248814155	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	492	1134	ysvyaYfil	ysvyaDfil	ysvyaDfil
HE3202	OR2T27	1	248814155	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	427	373	svyaYfill	svyaDfill	svyaDfill
HE3202	OR2T27	1	248814155	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	14	158	yaYfillgl	yaDfillgl	yaDfillgl
HE3202	AKR1C4	10	5255064	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	28	165	rvqlqlgvv	rvqlqRgvv	rvqlqRgvv
HE3202	AKR1C4	10	5255064	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	359	13420	iairvqlqL	iairvqlqR	iairvqlqR
HE3202	AKR1C4	10	5255064	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	14	10	yqlqlgvvv	yqlqRgvvv	yqlqRgvvv
HE3202	ALDH5	10	459360007	C	G	A2403,A3201,B3801,B4101,C1203,C1701	A3201	452	16	Gthlvsevf	Rthlvsevf	Rthlvsevf
HE3202	MMS1C	10	64967381	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	161	30	eagltlgrii	eaglQlgrii	eaglQlgrii
HE3202	CTNNA3	10	68280419	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	117	13	eVvddltsi	eAvddltsi	eAvddltsi
HE3202	CDH23	10	73498312	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	329	1835	ftsYsavsi	ftsDsavsi	ftsDsavsi

Figure 21 (Cont.)

HE3202	CDH23	10	73499312	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	104	257	fdftsYsav	fdftsYsav	fdftsDsav	fdftsDsav
HE3202	CDH23	10	73498312	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	40	8	ftsYsavsi	ftsYsavsi	ftsDsavsi	ftsDsavsi
HE3202	DUPD1	10	76818104	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	13	10	qythvnKvw	qythvnKvw	qythvnKvw	qythvnKvw
HE3202	DUPD1	10	76818104	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	92	103	pqythvnKv	pqythvnKv	pqythvnEv	pqythvnEv
HE3202	GRID1	10	87482802	A	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	4	3	sytanHaaf	sytanHaaf	sytanLaaf	sytanLaaf
HE3202	GRID1	10	87482802	A	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	19	43	ytanHaafi	ytanHaafi	ytanLaafi	ytanLaafi
HE3202	C10orf12	10	98742071	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	358	1716	tasshvCpi	tasshvCpi	tasshvWpi	tasshvWpi
HE3202	C10orf12	10	98742071	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	179	170	hQpipahi	hQpipahi	hWpipahi	hWpipahi
HE3202	ELOVL3	10	103986396	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	122	161	dmrpffKey	dmrpffKey	dmrpffEey	dmrpffEey
HE3202	SORCS1	10	108389069	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	19	47	vsyvnlssI	vsyvnlssI	vsyvnlssM	vsyvnlssM
HE3202	SORCS1	10	108393069	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	97	43	sledgikhv	sledgikhv	sMedgikhv	sMedgikhv
HE3202	SORCS1	10	108389070	A	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	355	43	sKedgikhv	sKedgikhv	VKqenmvff	VKqenmvff
HE3202	FAM160B1	10	116606002	T	G	A2403,A3201,B3801,B4101,C1203,C1701	A2403	324	201	GHqenmvff	GHqenmvff	sfpygPct	sfpygQct
HE3202	ATRNL1	10	117061521	A	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	167	85	isfpygPct	isfpygPct	fpygQctew	fpygQctew
HE3202	ATRNL1	10	117061521	A	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	115	361	fpygPctew	fpygPctew	rhYtainfi	rhYtainfi
HE3202	ATRNL1	10	117221510	C	T	A2403,A3201,B3801,B4101,C1203,C1701	B3801	240	704	rhYtainfi	rhYtainfi	rhYtainfi	rhYtainfi
HE3202	ATRNL1	10	117221510	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	86	1086	rhYtainfi	rhYtainfi	hvmhKslv	hvmhKslv
HE3202	RAB11FIP2	10	119803410	T	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	426	661	hvmhSplv	hvmhSplv	HadEqihI	HadEqihI
HE3202	MCM8P	10	1215956409	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	456	166	HadEqihI	HadEqihI	rhffNlapi	rhffNlapi
HE3202	TCERG1L	10	133058566	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	200	242	rhffNlapi	rhffNlapi	rhfflapi	rhfflapi
HE3202	TCERG1L	10	133058566	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	218	877	rhffNlapi	rhffNlapi	ffHapiki	ffHapiki
HE3202	TCERG1L	10	133058566	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	140	332	ffNlapiki	ffNlapiki	fArkpiki	fArkpiki
HE3202	KCNQ1	11	2591961	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	65	3	fDrkpiki	fDrkpiki	vytnssntf	vytnssntf
HE3202	ART5	11	3661341	C	G	A2403,A3201,B3801,B4101,C1203,C1701	A2403	5	10	vytnssntf	vytnssntf	fywelnqav	fywelnqav
HE3202	ART5	11	3661341	C	G	A2403,A3201,B3801,B4101,C1203,C1701	A2403	184	597	fywelnqav	fywelnqav	ytnsntfY	ytnsntfY
HE3202	ART5	11	3661341	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	107	103	ytnsntfY	ytnsntfY	fywelnqav	fywelnqav
HE3202	ART5	11	3661341	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	52	733	fywelnqav	fywelnqav	yeNksteel	yeNksteel
HE3202	NUP98	11	3794875	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	402	705	yeNksteel	yeNksteel	yeSksteel	yeSksteel
HE3202	OR51A7	11	4928760	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	338	153	lhepmyyf	lhepmyyf	lhepmyyf	lhepmyyf
HE3202	HBD	11	5254280	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	93	39	larnfGkef	larnfGkef	larnfGkef	larnfGkef
HE3202	HBD	11	5254280	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	110	282	fGkeftpqm	fGkeftpqm	fGkeftpqm	fGkeftpqm
HE3202	OR10A6	11	7949445	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	105	32	fygtDsmty	fygtDsmty	fygtAsmty	fygtAsmty
HE3202	OR10A6	11	7949446	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	149	967	ygtDsmtyI	ygtDsmtyI	ygtAsmtyI	ygtAsmtyI
HE3202	WT1	11	32456321	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	375	469	qassCqarm	qassCqarm	qassGqarm	qassGqarm
HE3202	DGKZ	11	46396582	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	4	383	gylevigfI	gylevigfI	gylevigfT	gylevigfT
HE3202	DGKZ	11	46396582	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	141	79	flmtslaal	flmtslaal	flmtslaal	flmtslaal
HE3202	ARFGAP2	11	47188135	G	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	491	357	earsRlqql	earsRlqql	earsRlqql	earsRlqql
HE3202	TRIM51	11	55658821	T	G	A2403,A3201,B3801,B4101,C1203,C1701	A2403	64	36	sfgvGnnyw	sfgvGnnyw	sfgvGnnyw	sfgvGnnyw
HE3202	TRIM51	11	55658821	T	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	16	24	wafgvGnny	wafgvGnny	wafgvGnny	wafgvGnny
HE3202	OR5AS1	11	55798567	G	C	A2403,A3201,B3801,B4101,C1203,C1701	A2403	5	41	syfcIitL	syfcIitL	syfcIitV	syfcIitV
HE3202	OR5AS1	11	55798567	G	C	A2403,A3201,B3801,B4101,C1203,C1701	A2403	142	118	yfcIitLI	yfcIitLI	yfcIitVI	yfcIitVI
HE3202	OR8H1	11	56058376	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	336	134	lqlhtpmyf	lqlhtpmyf	lqlhtpmyf	lqlhtpmyf
HE3202	OR8H1	11	56059376	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	387	344	qlhtpmyff	qlhtpmyff	qlhtpmyff	qlhtpmyff
HE3202	OR8H1	11	56058376	G	T	A2403,A3201,B3801,B4101,C1203,C1701	B3801	34	39	lhtpmyffI	lhtpmyffI	lhtpmyffI	lhtpmyffI
HE3202	OR5M1	11	56380101	C	G	A2403,A3201,B3801,B4101,C1203,C1701	A2403	44	280	ysIPntdvI	ysIPntdvI	ysIPntdvI	ysIPntdvI
HE3202	OR5M1	11	56380101	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	5	7	ysIPntdvI	ysIPntdvI	ysIRntdvI	ysIRntdvI
HE3202	OR5B3	11	58169991	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	435	2059	vksPfkkvv	vksPfkkvv	vksAfkkvv	vksAfkkvv
HE3202	MS4A7	11	60152536	T	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	145	14	vfapypshI	vfapypshI	vfapypshF	vfapypshF
HE3202	MS4A7	11	60152536	T	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	66	32	ypshFrpai	ypshFrpai	ypshFrpai	ypshFrpai

Figure 21 (Cont.)

HE3202	RPS6KA4	11	64129169	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	433	1136	elttgaLpf	elttgaSpf		
HE3202	RPS6KA4	11	64137062	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	12	11	fnheeaGvv	fnheeaCvv		
HE3202	ANO1	11	69950126	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	110	341	kmyhinetC	kmyhinetR		
HE3202	ANO1	11	69950126	C	T	A2403,A3201,B3801,B4101,C1203,C1701	B3801	451	2142	yhinetGgi	yhinetRgi		
HE3202	INT34	11	77629897	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	183	4520	qVaqeiiel	qGaqeiiel		
HE3202	GRM5	11	88780896	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	31	12	fsvthhqptM	fsvthhqptV		
HE3202	FAT3	11	92568036	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	139	349	kinpktEgi	kinpktGgi		
HE3202	FAT3	11	92568036	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	281	287	ktEgisvse	ktGgisvse		
HE3202	DYNC2H1	11	102986476	A	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	309	266	pyFlvkesi	pyYlvkesi		
HE3202	CUL5	11	107923458	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	315	493	lqdsamNlv	lqdsamKlv		
HE3202	SIK3	11	116744228	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	397	615	rpLggspiv	rpRggspiv		
HE3202	TMPRSS13	11	117776413	T	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	420	5201	qAfsinetc	qTfsinetc		
HE3202	RCBTB2	11	124766519	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	119	35	qprdmvavl	qprdmvavV		
HE3202	GLB1L2	11	134217265	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	375	195	tykGfteav	tykGfteav		
HE3202	CACNA2D4	12	1919749	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	113	185	aatrqcNtv	aatrqcStv		
HE3202	KCNA1	12	5021635	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	260	678	daiCwavvs	daiVwavvs		
HE3202	USP5	12	6971714	A	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	364	803	vpMkldvsi	vpKkldvsi		
HE3202	PPP6R3	12	27832494	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	471	1492	kdsqMnspf	kdsqRnspf		
HE3202	ERGIC2	12	29519869	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	162	435	cqvvgaDvl	cqvvgaDvl		
HE3202	ERGIC2	12	29519869	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	439	1194	vvgaDvlql	vvgaDvlql		
HE3202	ERGIC2	12	29519869	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	40	51	Mvldaetm	Dvldaetm		
HE3202	H3F3C	12	31944741	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	303	1060	ihakrvtiM	ihakrvtiM		
HE3202	ABCD2	12	39947815	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	480	1998	sqlPggpkm	sqlAglpkm		
HE3202	KRT80	12	52579169	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	389	538	kveelPiry	kveelRiry		
HE3202	KRT80	12	52579169	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	82	722	fPiryedei	fRiryedei		
HE3202	ITGB7	12	53591298	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	49	110	rlqeVthsv	rlqeVthsv		
HE3202	ITGB7	12	53591298	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	205	298	tthsvrlgf	Vthsvrlgf		
HE3202	ITGB7	12	53591298	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	244	316	rlqeVthsv	rlqeVthsv		
HE3202	NCKAP1L	12	54925983	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	39	115	fsshcpflM	fsshcpflM		
HE3202	NCKAP1L	12	54925983	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	100	64	flgpiecl	flMgpiecl		
HE3202	OR6C6	12	55688560	T	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	25	56	swvtgflli	swvtgflli		
HE3202	OR6C6	12	55688560	T	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	105	224	wvtgflFil	wvtgflFil		
HE3202	OR6C6	12	55688560	T	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	37	93	gflilfppl	gflilfppl		
HE3202	OR6C6	12	55688560	T	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	152	602	sswvtgflf	sswvtgflf		
HE3202	OR6C6	12	55688560	T	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	31	128	flilfppiv	flilfppiv		
HE3202	OR6C6	12	55688560	T	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	296	2742	Flfppilvmg	lilfppilvmg		
HE3202	MMP19	12	56231721	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	387	761	irfrtgplv	irfrtgplv		
HE3202	MMP19	12	56231721	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	325	490	rtgplvpsv	rtgplvpsv		
HE3202	PMEL	12	56350811	T	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	211	3595	eAtarslpi	eTtarslpi		
HE3202	CCT2	12	69983338	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	39	886	vhkdthfkl	Hhkdthfkl		
HE3202	PTPRB	12	70983957	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	9	6	rmrsilvsw	rmrsNvsw		
HE3202	LGR5	12	71978171	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	495	69	lRfispevi	lTfispevi		
HE3202	GNPTAB	12	102160028	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	297	4783	ylagggglW	ylagggglG		
HE3202	KIAA1033	12	105538614	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	395	617	rygivMtea	rygivMtea		
HE3202	KIAA1033	12	105538614	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	496	6178	atqrygIvl	atqrygIvM		
HE3202	DNAH10	12	124349233	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	122	135	ltlanWeri	ltlanGeri		
HE3202	IL17D	13	21295803	A	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	9	2349	sydparypW	sydparypR		
HE3202	IL17D	13	21295803	A	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	74	66	rypWylpea	rypRylpea		
HE3202	IL17D	13	21295803	A	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	5	4	Wylpeayci	Rylpeayci		

Figure 21 (Cont.)

HE3202	IL17D	13	21295803	A	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	216	212	ypWypeay	ypWypeay	ypWypeay	ypWypeay
HE3202	GTF3A	13	27998033	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	68	176	sstiTdaf	sstiTdaf	sstiAdaf	sstiAdaf
HE3202	CCDC70	13	52439569	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	15	60	afHeemkif	afHeemkif	afHeemkif	afHeemkif
HE3202	CCDC70	13	52439569	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	18	19	kafHeemki	kafHeemki	kafHeemki	kafHeemki
HE3202	DZIP1	13	96237023	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	171	116	hvhnawCaf	hvhnawCaf	hvhnawCaf	hvhnawCaf
HE3202	DZIP1	13	96237023	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	177	934	hvhnawCaf	hvhnawCaf	hvhnawCaf	hvhnawCaf
HE3202	IPO5	13	98642687	A	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	185	199	qehpsVrtl	qehpsVrtl	qehpsIrtl	qehpsIrtl
HE3202	NAALCN	13	1018990156	T	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	383	202	lvigtSlhv	lvigtSlhv	lvigtTlhv	lvigtTlhv
HE3202	FAM155A	13	1085181104	C	G	A2403,A3201,B3801,B4101,C1203,C1701	A2403	433	279	haqekyeQf	haqekyeQf	haqekyaEf	haqekyaEf
HE3202	FAM155A	13	1085181104	C	G	A2403,A3201,B3801,B4101,C1203,C1701	A2403	33	71	kyeQfesvl	kyeQfesvl	kyeEfesvl	kyeEfesvl
HE3202	FAM155A	13	1085181104	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	193	108	haqekyeQf	haqekyeQf	haqekyeEf	haqekyeEf
HE3202	FAM155A	13	1085181104	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	136	102	ekyeQfesv	ekyeQfesv	ekyeEfesv	ekyeEfesv
HE3202	ORAL1	14	20528255	T	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	260	1023	flgrweIqi	flgrweIqi	flgrweIqi	flgrweIqi
HE3202	SIX4	14	61180343	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	52	17	fvqQhrlvl	fvqQhrlvl	fvqEhrlvl	fvqEhrlvl
HE3202	KCNH5	14	63269158	A	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	349	1345	hSapgdliy	hSapgdliy	hCapgdliy	hCapgdliy
HE3202	EXD2	14	69707693	G	C	A2403,A3201,B3801,B4101,C1203,C1701	A3201	43	704	slmqlesPw	slmqlesPw	slmqlesRw	slmqlesRw
HE3202	EXD2	14	69707693	G	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	407	1543	lesPwrqhf	lesPwrqhf	lesRwrqhf	lesRwrqhf
HE3202	ADAM21	14	70924572	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	235	71	yveaaHesl	yveaaHesl	yveaaPesl	yveaaPesl
HE3202	ADAM21	14	70924572	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	65	22	eaaHeslvv	eaaHeslvv	eaaPeslvv	eaaPeslvv
HE3202	ADAM21	14	70924572	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	99	374	aaHeslvvf	aaHeslvvf	aaPeslvvf	aaPeslvvf
HE3202	GALC	14	88429804	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	3	4	yylktvVhl	yylktvVhl	yylktvGhl	yylktvGhl
HE3202	GALC	14	88429804	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	82	137	yylktvVhl	yylktvVhl	yylktvGhl	yylktvGhl
HE3202	TCL1A	14	96178119	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	486	1693	ikdgvedtl	ikdgvedtl	ikdgvedtM	ikdgvedtM
HE3202	BEGAIN	14	1010004911	T	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	123	24	lLppnlwsl	lLppnlwsl	lMppnlwsl	lMppnlwsl
HE3202	POTEB2	15	21071328	T	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	30	22	Wyhvrredl	Wyhvrredl	Ryhvrredl	Ryhvrredl
HE3202	OR4M2	15	22369155	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	108	18	tfPeelvml	tfPeelvml	tfPeelvml	tfPeelvml
HE3202	OR4M2	15	22369155	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	381	445	cantfPeel	cantfPeel	cantfPeel	cantfPeel
HE3202	SNRPN	15	25223057	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	66	28	ratpTpgim	ratpTpgim	ratpPpgim	ratpPpgim
HE3202	UBE3A	15	25620900	C	G	A2403,A3201,B3801,B4101,C1203,C1701	B3801	421	1312	kraPaskhl	kraPaskhl	kraAaskhl	kraAaskhl
HE3202	GABRB3	15	26793154	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	304	1779	qyMkqsmpr	qyMkqsmpr	qyRkqsmpr	qyRkqsmpr
HE3202	GABRB3	15	26793154	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	213	9969	fdnsgiqyM	fdnsgiqyM	fdnsgiqyR	fdnsgiqyR
HE3202	GATM	15	45658597	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	215	3021	daadfiraA	daadfiraA	daadfiraG	daadfiraG
HE3202	GATM	15	45658597	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	420	220	firaArdif	firaArdif	firaGrdif	firaGrdif
HE3202	VPS13C	15	62176399	T	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	177	181	fsqkqiifl	fsqkqiifl	fsqkqiiLl	fsqkqiiLl
HE3202	VPS13C	15	62234260	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	3	5	ffmslnaff	ffmslnaff	ffmslmfL	ffmslmfL
HE3202	VPS13C	15	62234260	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	58	187	slnsfLnnf	slnsfLnnf	slnfLnnf	slnfLnnf
HE3202	VPS13C	15	62234260	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	18	24	slnsfLnnf	slnsfLnnf	slnfLnnf	slnfLnnf
HE3202	VPS13C	15	62234260	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	448	223	ffmslnaff	ffmslnaff	ffmslmfL	ffmslmfL
HE3202	SIN3A	15	75684759	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	4	3	fyvnnnLyi	fyvnnnLyi	fyvnnnWyi	fyvnnnWyi
HE3202	SIN3A	15	75684759	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	14	13	ynnnnLyif	ynnnnLyif	ynnnnWyif	ynnnnWyif
HE3202	SIN3A	15	75684759	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	75	248	ynnnnLyif	ynnnnLyif	ynnnnWyif	ynnnnWyif
HE3202	SIN3A	15	75684759	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	472	2116	ifynnnnLy	ifynnnnLy	ifynnnnWy	ifynnnnWy
HE3202	SIN3A	15	75684759	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	66	275	fyvnnnLyi	fyvnnnLyi	fyvnnnWyi	fyvnnnWyi
HE3202	SIN3A	15	75684759	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	43	36	ynnnnLyif	ynnnnLyif	ynnnnWyif	ynnnnWyif
HE3202	SLCO3A1	15	92459325	T	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	243	231	lalltlvsy	lalltlvsy	lalffvsy	lalffvsy
HE3202	C16orf13	16	6853337	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	269	15034	gtfraaghl	gtfraaghl	gtfraaghl	gtfraaghl
HE3202	C16orf13	16	6853337	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	92	392	tfraaghll	tfraaghll	tfraaghll	tfraaghll
HE3202	BAIAP3	16	1391300	A	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	327	124	gfCdpycmi	gfCdpycmi	gfSdpycmi	gfSdpycmi
HE3202	MGRN1	16	4738802	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	170	158	ylpgrAtsm	ylpgrAtsm	ylpgrPtsm	ylpgrPtsm

Figure 21 (Cont.)

HE3202	C16orf54	16	29755993	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	338	5241	Nwygsavpl	Dwygsavpl
HE3202	FAM57B	16	30038030	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	239	176	ralgstwai	raPgstwai
HE3202	FAM57B	16	30038030	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	31	244	ralgstwai	raPgstwai
HE3202	FAM57B	16	30038030	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	117	614	ralgstwai	raPgstwai
HE3202	PKD1L2	16	81213294	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	98	19	stlhnslf	stlhnslf
HE3202	GAN	16	81388140	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	216	6420	aaencigIL	aaencigIR
HE3202	FANCA	16	89836653	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	250	427	rqgpwVaif	rqgpwAaif
HE3202	FANCA	16	89836653	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	203	298	rqgpwVaif	rqgpwAaif
HE3202	FANCA	16	89836653	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	436	788	rqgpwVaif	rqgpwAaif
HE3202	FANCA	16	89836653	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	127	16	wVaifvrtm	wAaifvrtm
HE3202	RAP1GAP2	17	2921384	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	475	742	rshsMetmw	rshsMetmw
HE3202	ATP2A3	17	3839634	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	109	340	fnppdldW	fnppdldW
HE3202	PMP22	17	15163987	A	G	A2403,A3201,B3801,B4101,C1203,C1701	A3201	467	228	lvlLvsti	lvlFvsti
HE3202	PMP22	17	15163987	A	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	316	312	vavlvlLv	vavlvlFv
HE3202	PMP22	17	15163987	A	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	104	34	lvlLvsti	lvlFvsti
HE3202	IGF2BP1	17	47121332	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	296	152	tmqTpeqem	tmqApeqem
HE3202	IGF2BP1	17	47121332	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	248	140	mqTpeqemv	mqApeqemv
HE3202	SMG8	17	57292205	G	C	A2403,A3201,B3801,B4101,C1203,C1701	A2403	19	28	vfypEkqei	vfypEkqei
HE3202	SMG8	17	57292205	G	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	270	198	vfypDkqei	vfypEkqei
HE3202	SMG8	17	57292205	G	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	114	141	ypDkqeiti	ypEkqeiti
HE3202	CLTC	17	57759778	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	55	4166	fingpnnaY	fingpnnaH
HE3202	MAP2K6	17	67515522	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	78	316	smStvdcpf	smRtvdcpf
HE3202	MAP2K6	17	67515522	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	101	34	Stvdcpftv	Rtvdcpftv
HE3202	KCNJ16	17	68129039	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	456	5034	iyaldrkaL	iyaldrkaV
HE3202	KCNJ16	17	68129039	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	24	15	yaldrkaLa	yaldrkaVa
HE3202	KCNJ16	17	68129039	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	10	12	Lakdnfeii	Vakdnfeii
HE3202	EVPL	17	74406293	T	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	426	12386	qadlevaaL	qadlevaaQ
HE3202	SEC14L1	17	75209484	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	393	549	caassipLv	caassipRv
HE3202	SEC14L1	17	75209484	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	253	299	Lvtdvlasl	Rvtdvlasl
HE3202	HGS	17	79663655	A	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	8	51	eykevqWql	eykevqRql
HE3202	HGS	17	79663655	A	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	25	15252	qWqlaiqrl	qRqlaiqrl
HE3202	HGS	17	79663655	A	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	222	34953	kqeykevqW	kqeykevqR
HE3202	OCRL	17	79995337	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	407	1501	rtqadldsl	rtqadldsl
HE3202	C17orf62	17	80405468	A	G	A2403,A3201,B3801,B4101,C1203,C1701	A2403	16	6	Hysgdslgw	Yysgdslgw
HE3202	EPB41L3	18	5396220	T	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	142	126	vvhtetktV	vvhtetktI
HE3202	EPB41L3	18	5396220	T	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	477	720	htetktVty	htetktIty
HE3202	ALPK2	18	56203371	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	84	377	kadDvvpel	kadAvvpel
HE3202	ADNP2	18	77895757	C	A	A2403,A3201,B3801,B4101,C1203,C1701	B3801	31	393	Thldftiti	Phldftiti
HE3202	ADNP2	18	77895757	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	195	36	lffThldfi	lffPhldfi
HE3202	ADNP2	18	77895757	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	28	27	fThldftii	fPhldftii
HE3202	ADNP2	18	77895757	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	282	1392	Thldftii	Phldftii
HE3202	AP3D1	19	2111328	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	414	558	eqlppKssy	eqlppEssy
HE3202	KEAP1	19	10610126	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	46	16210	ianfaeqiV	ianfaeqiG
HE3202	CD97	19	14515319	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	81	5913	fqcshlssf	Cqcshlssf
HE3202	MAST3	19	18255471	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	6	9252	aYvsalsli	aSvsalsli
HE3202	MAST3	19	18255471	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	46	831	saYvsalsl	saSvsalsl
HE3202	MAST3	19	18255471	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	39	2056	Yvsalsli	Svsalsli
HE3202	PIK3R2	19	18266889	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	158	1023	qQgdfpgty	qRgdfpgty
HE3202	ZNF729	19	22497358	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	41	145	kafnsssti	kafnsssti

Figure 21 (Cont.)

HE3202	ZNF729	19	22497558	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	3	5	kafmsstl	kafmsstl	
HE3202	ZNF728	19	23170197	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	19	12	iafpskpdli	iafpskpdli	
HE3202	OPY1913	19	32902208	G	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	346	1377	lSiglfsv	lSiglfsv	
HE3202	LSM14A	19	34685466	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	124	96	yiifrWsdi	yiifrGsdi	
HE3202	LSM14A	19	34685467	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	76	96	yiifrVsdi	yiifrGsdi	
HE3202	GRAMD1A	19	35501077	A	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	58	75	nwicfysli	nwicfysNi	
HE3202	GRAMD1A	19	35501077	A	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	12	7	cfysNifrw	cfysNifrw	
HE3202	GRAMD1A	19	35501077	A	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	16	64	lifrweeti	Nifrweeti	
HE3202	GRAMD1A	19	35501077	A	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	13	13	lifrweeti	Nifrweeti	
HE3202	NPAS1	19	36339394	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	44	30	qavaPsvlv	qavaRsvlv	
HE3202	ZNF45	19	44417720	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	56	33	kvfsWssyl	kvfsWssyl	
HE3202	ZNF45	19	44417720	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	269	66	kvfsLssyl	kvfsWssyl	
HE3202	TSKS	19	50266391	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	110	206	lvpeapnSv	lvpeapnRv	
HE3202	POLD1	19	50919066	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	12	8	Tymksedpl	Aymksedpl	
HE3202	POLD1	19	50919066	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	20	94	saakgvaTy	saakgvaAy	
HE3202	ZNF534	19	52941209	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	54	76	ifnnyrnNf	ifnnyrnDf	
HE3202	NLRP12	19	55501457	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	490	11886	Fvnlsdnel	Cvnlsdnel	
HE3202	NLRP13	19	56416366	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	221	104	lqddGikll	lqddGikll	
HE3202	ZFP28	19	57066594	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	456	800	ftsnpvdlf	Stsnpvdlf	
HE3202	ZFP28	19	57066594	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	44	2400	Ftsnpvdlf	Stsnpvdlf	
HE3202	USP29	19	57640780	A	G	A2403,A3201,B3801,B4101,C1203,C1701	A3201	421	3682	Rtfraknsl	Qtfraknsl	
HE3202	ZNF274	19	58724230	A	G	A2403,A3201,B3801,B4101,C1203,C1701	A2403	349	579	rvhsgeGpf	rvhsgeRpf	
HE3202	ZNF274	19	58724230	A	G	A2403,A3201,B3801,B4101,C1203,C1701	A3201	150	38	rvhsgeGpf	rvhsgeRpf	
HE3202	NOL10	2	10811780	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	440	2090	ryiefYsqs	ryiefHsqs	
HE3202	NOL10	2	10811780	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	59	13522	fVsqsgfyy	fHsqsgfyy	
HE3202	MDH1	2	63831928	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	55	33	ypdvrnaNv	ypdvrnaKv	
HE3202	ATP6V1B1	2	71190741	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	19	39	fiegqiyv	fiTegqiyv	
HE3202	EXOC6B	2	72411292	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	139	875	iqwtwstyl	iqwtDwstyl	
HE3202	EXOC6B	2	72411292	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	43	115	fiqwNwsty	fiqwDwsty	
HE3202	EXOC6B	2	72411292	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	188	85	iqwNwstyl	iqwDwstyl	
HE3202	GLI2	2	121554948	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	32	16060	sWiieaagf	sGiieaagf	
HE3202	MYO7B	2	128381586	G	A	A2403,A3201,B3801,B4101,C1203,C1701	B3801	469	1430	Rrdhrnmdai	Grdhrnmdai	
HE3202	POTEE	2	132010557	A	T	A2403,A3201,B3801,B4101,C1203,C1701	B3801	420	799	tlvgfpeVl	tlvgfpeNl	
HE3202	DARS	2	136678081	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	4	4	hyhKvrneei	hyhEvrneei	
HE3202	DARS	2	136678081	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	449	809	rnafnyhyhK	rnafnyhyhE	
HE3202	DARS	2	136678081	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	45	49	fnyhyhKvm	fnyhyhEvm	
HE3202	TNFAIP6	2	152222584	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	209	1274	gfhvcTapw	gfhvcAapw	
HE3202	NEB	2	152500514	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	23	46	eykkYfqkw	eykkDfqkw	
HE3202	NEB	2	152500514	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	84	10914	Yfekwktkf	Dfekwktkf	
HE3202	GAB1A	3	165358787	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	196	1588	rsgcfsqsi	rsgcSsqsi	
HE3202	SCN7A	2	167313540	A	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	130	66	iffvvEsfl	iffvvVsfl	
HE3202	SCN7A	2	167313540	A	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	24	15	ffvvEsfff	ffvvVsfff	
HE3202	SCN7A	2	167313540	A	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	7	4	miffvvEsf	miffvvVsf	
HE3202	SCN7A	2	167313540	A	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	93	74	vvEsfffsf	vvVsfffsf	
HE3202	SCN7A	2	167313540	A	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	275	214	rniffvvEsf	rniffvvVsf	
HE3202	FASTKD1	2	170417062	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	336	283	ldttsiTki	idttsiSki	
HE3202	FASTKD1	2	170417062	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	462	228	dsiTkifsv	dsiSkifsv	
HE3202	TTN	2	179616197	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	243	155	dymydKeyl	dymydEeyl	
HE3202	FN1	2	216237060	G	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	356	620	hpnVhgpei	hpnLhgpei	

Figure 21 (Cont.)

HE3202	VIL1	2	219299357	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	416	432	fevparSnf	fevparSnf	fevparSnf
HE3202	SIRPB1	20	1592320	T	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	52	308	qvigpVksi	qvigpVksi	qvigpEksi
HE3202	CST2	20	23807183	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	292	228	dadlnderv	dadlnderv	dadlnderv
HE3202	RALGAPB	20	37194116	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	168	21631	fvvpspvef	fvvpspvef	fvvpspveS
HE3202	RALGAPB	20	37194116	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	54	3195	fvvpspvef	fvvpspvef	fvvpspveS
HE3202	PTPRT	20	41306677	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	64	53	eyCatgtw	eyRttgtw	eyRttgtw
HE3202	L3MBTL1	20	41162385	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	10	484	eavdtrnpV	eavdtrnpV	eavdtrnpA
HE3202	GDAP1L1	20	42887136	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	432	16568	qharvkqyW	qharvkqyW	qharvkqyR
HE3202	GDAP1L1	20	42887136	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	11	15	qyWeiidai	qyReiidai	qyReiidai
HE3202	PIGT	20	44050034	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	179	212	tpfthsqry	tpfthsqry	Vpfthsqry
HE3202	ZNF335	20	44578921	T	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	421	653	pTqtptqti	pTqtptqti	pTqtptqti
HE3202	CYP24A1	20	52773783	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	224	378	Qmihsgtfv	Qmihsgtfv	Emihsgtfv
HE3202	CASS4	20	55033503	C	G	A2403,A3201,B3801,B4101,C1203,C1701	A2403	64	8	yfgalfkaM	yfgalfkaM	yfgalfkaI
HE3202	CASS4	20	55033503	C	G	A2403,A3201,B3801,B4101,C1203,C1701	A3201	119	92	alfkaMsaf	alfkaMsaf	alfkaIsaf
HE3202	BMP7	20	55748344	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	39	29	iapeAvaay	iapeAvaay	iapeGyaay
HE3202	SCIN	21	34923641	A	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	431	80	lvgetsvAv	lvgetsvAv	lvgetsvTv
HE3202	C2CD2	21	43373717	T	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	15	11	swlgeaLwl	swlgeaLwl	swlgeaQwl
HE3202	C2CD2	21	43373717	T	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	7	5	Lwlalvslf	Lwlalvslf	Qwlalvslf
HE3202	C2CD2	21	43373717	T	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	82	148	alwlalvsl	alwlalvsl	aQwlalvsl
HE3202	UBASH3A	21	43852239	G	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	40	19	varksvtLv	varksvtLv	varksvtVv
HE3202	U2AF1	21	44524456	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	224	6649	Fthnkpxf	Fthnkpxf	Sfhnkpxf
HE3202	DIP2A	21	47937410	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	10	8	yalmkSnpl	yalmkSnpl	yalmkAnpl
HE3202	TRIM71	3	32933205	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	39	27	kfgaggsCf	kfgaggsCf	kfgaggsGf
HE3202	PTH1R	3	46935431	A	T	A2403,A3201,B3801,B4101,C1203,C1701	B3801	361	378	tkeeQifl	tkeeQifl	tkeeQifl
HE3202	PTH1R	3	46935431	A	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	308	851	mtkeeLifl	mtkeeLifl	mtkeeQifl
HE3202	PRKAR2A	3	48884842	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	200	1226	Qpergspdrv	Qpergspdrv	Ppergspdrv
HE3202	USP4	3	49316276	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	26	653	wyyfddsnL	wyyfddsnL	wyyfddsnV
HE3202	USP4	3	49316276	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	197	113	yfddsnLsl	yfddsnLsl	yfddsnVsl
HE3202	SPCS3	3	52740182	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	357	245	daqcqtlAl	daqcqtlAl	daqcqtlPl
HE3202	ITIH1	3	52817103	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	78	5141	qaseanlqV	qaseanlqV	qaseanlqA
HE3202	ITIH1	3	52817103	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	160	834	Vaqdfvrgf	Aaqdfvrgf	Aaqdfvrgf
HE3202	IL17RD	3	57136567	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	292	68	ravaitvpM	ravaitvpM	ravaitvpL
HE3202	IL17RD	3	57136567	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	56	65	ravaitvpM	ravaitvpM	ravaitvpL
HE3202	IL17RD	3	57136567	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	39	32	vaitvpMvv	vaitvpMvv	vaitvpLvv
HE3202	ZNF654	3	88188515	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	66	836	qaYqakkgsf	qaHqakkgsf	qaHqakkgsf
HE3202	EPHA6	3	97202843	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	162	178	avMefakei	avMefakei	avMefakei
HE3202	GPR128	3	100368550	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	179	268	mtfkNdyqy	mtfkNdyqy	mtfkKdyqy
HE3202	GPR128	3	100368550	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	452	1047	mtfkNdyqy	mtfkNdyqy	mtfkKdyqy
HE3202	KALRN	3	124418854	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	110	162	slpsepLef	slpsepLef	slpsepSef
HE3202	KALRN	3	124418854	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	66	80	lpsepLefv	lpsepLefv	lpsepSefv
HE3202	PLXNA1	3	126741099	G	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	341	29	yPtgvdkq	yPtgvdkq	yAtgvdkq
HE3202	CLSTN2	3	140167415	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	280	512	gsmplfHsi	gsmplfHsi	gsmplfPsi
HE3202	CLSTN2	3	140167415	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	253	799	gsmplfHsi	gsmplfHsi	gsmplfPsi
HE3202	CLSTN2	3	140167415	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	402	718	gsmplfHsi	gsmplfHsi	gsmplfPsi
HE3202	CLSTN2	3	140167415	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	183	212	mplfHsiml	mplfHsiml	mplfPsiml
HE3202	BCHE	3	165547444	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	382	3367	kwrngvmhgy	kwrngvmhgy	kwrngvmhgy
HE3202	SAMD7	3	169639052	T	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	108	106	Dpsqfgssv	Dpsqfgssv	Vpsqfgssv
HE3202	AP2M1	3	183898769	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	191	249	lnspEgqvl	lnspEgqvl	lnspQgqvl
HE3202	DGKG	3	186015981	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	196	105	ifmrEylev	ifmrEylev	ifmrAylev

Figure 21 (Cont.)

HE3202	MFSD7	4	679985	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	185	143	aflmggqll	aflmggqSl
HE3202	MFSD7	4	679985	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	8	1046	faflmggql	faflmggqS
HE3202	SLC26A1	4	983388	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	136	118	svlacviMv	svlacviVv
HE3202	SLC26A1	4	983388	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	117	80	lacviMvsl	lacviVvsl
HE3202	TLR6	4	38829068	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	246	380	iclheTnfv	iclheRnfv
HE3202	TLR6	4	38829068	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	311	146	Tnfvpgksi	Rnfvpgksi
HE3202	YIPF7	4	44638038	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	316	2314	Cyagqffqp	Gyagqffqp
HE3202	COX7B2	4	46737056	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	9	6	afcvStwvf	afcvAtwvf
HE3202	COX7B2	4	46737056	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	312	371	Stwvftatq	Atwvftatq
HE3202	COX7B2	4	46737056	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	164	119	tafcvStwv	tafcvAtwv
HE3202	SPATA18	4	52938279	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	244	320	nlkeKiavl	nlkeEiavl
HE3202	UGT2B17	4	69434100	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	6	16	vwpteysYw	vwpteysHw
HE3202	UGT2B17	4	69434100	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	11	6449	sYwinmkti	sHwinmkti
HE3202	UGT2B17	4	69434100	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	52	373	Ywinmktil	Hwinmktil
HE3202	UGT2B17	4	69434100	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	293	7865	lvwpteysY	lvwpteysH
HE3202	UGT2B17	4	69434100	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	459	6732	ysYwinmkt	ysHwinmkt
HE3202	UGT2A3	4	69796271	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	432	13883	ralrtvitY	ralrtvitD
HE3202	UGT2A3	4	69796271	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	14	4140	ralrtvitY	ralrtvitD
HE3202	UGT2A3	4	69796271	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	245	5948	Yssykenam	Dssykenam
HE3202	GRID2	4	94343958	G	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	445	728	nvlRkpkky	nvlGkpkky
HE3202	SLC9B1	4	103826692	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	69	74	Cmpkatvqi	Wmpkatvqi
HE3202	SLC9B1	4	103826692	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	15	14	laCmpkatv	laWmpkatv
HE3202	CENPE	4	104062009	C	A	A2403,A3201,B3801,B4101,C1203,C1701	B3801	348	135	erYqlkesl	erDqlkesl
HE3202	TACR3	4	104577358	T	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	488	991	qlkaRrkvv	qlkaKrkvv
HE3202	TACR3	4	104577358	T	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	42	51	kaRrkvvkm	kaKrkvvkm
HE3202	AIMP1	4	107246239	C	G	A2403,A3201,B3801,B4101,C1203,C1701	A2403	159	30	eyVkqqvsl	eyLkqqvsl
HE3202	AIMP1	4	107246239	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	47	162	eadqiieyV	eadqiieyL
HE3202	AIMP1	4	107246239	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	65	169	yVkqqvsll	yLkqqvsll
HE3202	NDST4	4	115997651	G	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	321	57	fRlnlfnnl	fPlnlfnnl
HE3202	NDST4	4	115997984	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	141	213	melktvkHi	melktvkPi
HE3202	NDST4	4	115998158	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	30	242	sfLtlivll	sfRtlivll
HE3202	NDST4	4	115998158	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	414	1156	klrrsfLtl	klrrsfRtl
HE3202	NDST4	4	115998158	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	89	52	rsfLtlivl	rsfRtlivl
HE3202	BBS7	4	122765084	C	T	A2403,A3201,B3801,B4101,C1203,C1701	B3801	105	380	sKsndnfll	sEsndnfll
HE3202	TRPC3	4	122828520	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	7	7	ffaflgmf	ffafMigmf
HE3202	TRPC3	4	122828520	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	237	84	afligmfil	afMigmfil
HE3202	TRPC3	4	122828520	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	92	98	imvffafli	imvffafMi
HE3202	TRPC3	4	122828520	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	17	41	fimvffafl	fimvffafM
HE3202	TRPC3	4	122828520	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	421	402	imvffafli	imvffafMi
HE3202	TRPC3	4	122828520	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	6	5	fafligmfi	fafMigmfi
HE3202	TRPC3	4	122828520	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	240	97	fligmfily	fMigmfily
HE3202	KIAA1109	4	123188029	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	4	4	myfgehlLf	myfgehlSf
HE3202	KIAA1109	4	123188029	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	54	10117	rmyfgehlL	rmyfgehlS
HE3202	KIAA1109	4	123188029	C	T	A2403,A3201,B3801,B4101,C1203,C1701	B3801	368	176	ehlLfsgtl	ehlSfsgtl
HE3202	KIAA1109	4	123188029	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	260	11059	rmyfgehlL	rmyfgehlS
HE3202	DDX60	4	169205994	T	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	262	897	dyVrsrcqf	dyDrsrcqf
HE3202	SH3RF1	4	170190248	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	86	420	fckrcllEi	fckrcllGi
HE3202	WDR17	4	177056323	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	12	35	Vsfdgtikv	Asfdgtikv
HE3202	TERT	5	1279563	A	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	101	1160	rAkalfsvl	rVkalfsvl

Figure 21 (Cont.)

HE3202	ADAMTS16	5	5187932	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	160	73	iaiigiit	iaiVgiii	iaiVgiii	iaiVgiii
HE3202	DNAH5	5	13708315	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	217	1478	kiaiNgtii	kiaiDgtii	kiaiDgtii	kiaiDgtii
HE3202	DNAH5	5	13708315	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	14	9	iaiNgtiim	iaiDgtiim	iaiDgtiim	iaiDgtiim
HE3202	C6	5	41149516	T	G	A2403,A3201,B3801,B4101,C1203,C1701	A2403	5	6	yftspacTf	yftspackf	yftspackf	yftspackf
HE3202	C6	5	41149516	T	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	239	1168	yftspacTf	yftspackf	yftspackf	yftspackf
HE3202	C6	5	41149516	T	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	54	47	ftspacTfi	ftspackfi	ftspackfi	ftspackfi
HE3202	ADAMTS6	5	64521984	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	65	49	fyterSpav	fyterApav	fyterApav	fyterApav
HE3202	ADAMTS6	5	64521984	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	14	13	yterSpavi	yterApavi	yterApavi	yterApavi
HE3202	MAP1B	5	71495226	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	424	1141	Rsfpesegy	Tsfpesegy	Tsfpesegy	Tsfpesegy
HE3202	YTHDC2	5	112899815	T	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	294	194	aiirafqaw	aiirafqaw	aiirafqaw	aiirafqaw
HE3202	HSPA4	5	132432907	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	99	91	dakrSveey	dakrSveey	dakrSveey	dakrSveey
HE3202	PCDHGB3	5	140751565	G	A	A2403,A3201,B3801,B4101,C1203,C1701	B3801	84	570	aHddggpti	aRddggpti	aRddggpti	aRddggpti
HE3202	PCDHGB3	5	140751565	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	383	580	qaHddggpti	qaRddggpti	qaRddggpti	qaRddggpti
HE3202	NOS1	5	149900856	G	C	A2403,A3201,B3801,B4101,C1203,C1701	A2403	364	151	hlspqavif	hlspqavif	hlspqavif	hlspqavif
HE3202	NAALAD2	5	151784173	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	213	119	riiCivwgf	riiCivwgf	riiCivwgf	riiCivwgf
HE3202	NAALAD2	5	151784173	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	11	5	riiCivwgf	riiCivwgf	riiCivwgf	riiCivwgf
HE3202	NAALAD2	5	151784173	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	21	18	ratriiCiv	ratriiCiv	ratriiCiv	ratriiCiv
HE3202	MAT2B	5	162940662	A	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	275	4365	Fakeaaavg	Fakeaaavg	Fakeaaavg	Fakeaaavg
HE3202	ORSV1	6	29322257	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	419	689	affttcashi	affttcashi	affttcashi	affttcashi
HE3202	ORSV1	6	29322257	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	91	3391	Fttcashiai	Fttcashiai	Fttcashiai	Fttcashiai
HE3202	SRPK1	6	35836878	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	238	3990	ksMagnflv	ksTagnflv	ksTagnflv	ksTagnflv
HE3202	NFKBIE	6	44233281	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	92	169	rlptvtAgw	rlptvtTgw	rlptvtTgw	rlptvtTgw
HE3202	BAI3	6	70049281	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	191	18969	plkaltwmF	plkaltwmF	plkaltwmF	plkaltwmF
HE3202	BAI3	6	70049281	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	247	22286	plkaltwmF	plkaltwmF	plkaltwmF	plkaltwmF
HE3202	BAI3	6	70049281	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	67	19	laltwmFav	laltwmFav	laltwmSav	laltwmSav
HE3202	KHDC3L	6	74072827	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	291	818	rgVeriphv	rgVeriphv	rgGeriphv	rgGeriphv
HE3202	MYO6	6	76550358	A	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	97	125	nsCrfgkfv	nsCrfgkfv	nsSrfgkfv	nsSrfgkfv
HE3202	MRAP2	6	84772677	A	G	A2403,A3201,B3801,B4101,C1203,C1701	A2403	107	41	ifmffvlAi	ifmffvlAi	ifmffvlAi	ifmffvlAi
HE3202	MRAP2	6	84772677	A	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	37	36	fmffvlAii	fmffvlAii	fmffvlTii	fmffvlTii
HE3202	MYCT1	6	153042915	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	62	17415	iWrlggfi	iGrlggfi	iGrlggfi	iGrlggfi
HE3202	MYCT1	6	153042915	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	362	318	vsrnaiWvl	vsrnaiWvl	vsrnaiGvl	vsrnaiGvl
HE3202	FRMD1	6	168457910	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	386	1675	lshNfhrai	lshNfhrai	lshTfhrai	lshTfhrai
HE3202	SDK1	7	4091415	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	109	2588	svlcfttpV	svlcfttpV	svlcfttpG	svlcfttpG
HE3202	SDK1	7	4091415	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	117	20055	svlcfttpV	svlcfttpV	svlcfttpG	svlcfttpG
HE3202	FBXL18	7	5548069	T	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	88	62	kslihSvll	kslihTvll	kslihTvll	kslihTvll
HE3202	TMSD7A	7	11676273	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	282	10268	iqkdkdipV	iqkdkdipV	iqkdkdipA	iqkdkdipA
HE3202	DNAH11	7	21603848	A	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	17	19	yhrpiRrhi	yhrpiRrhi	yhrpiRrhi	yhrpiRrhi
HE3202	DNAH11	7	21657374	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	39	39	hwQqlmkai	hwQqlmkai	hwHqlmkai	hwHqlmkai
HE3202	DNAH11	7	21657375	C	G	A2403,A3201,B3801,B4101,C1203,C1701	A2403	95	39	hwHElmkai	hwHElmkai	hwHQlmkai	hwHQlmkai
HE3202	OSBPL3	7	24874137	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	89	777	kSaqipspl	kSaqipspl	kAaqipspl	kAaqipspl
HE3202	OSBPL3	7	24874138	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	311	676	eldMaaqi	eldMaaqi	eldKaaqi	eldKaaqi
HE3202	OSBPL3	7	24874138	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	64	76	Naaqipspl	Naaqipspl	Kaaqipspl	Kaaqipspl
HE3202	LSM5	7	32527311	T	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	174	1465	qillngYni	qillngYni	qillngRni	qillngRni
HE3202	LSM5	7	32527312	T	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	122	2148	ngYnitmlv	ngYnitmlv	ngRnitmlv	ngRnitmlv
HE3202	HECW1	7	43400557	C	G	A2403,A3201,B3801,B4101,C1203,C1701	A3201	40	1861	Rvknsaapi	Rvknsaapi	Tvknsaapi	Tvknsaapi
HE3202	HECW1	7	43400557	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	88	16	rattpsvRv	rattpsvRv	rattpsvTv	rattpsvTv
HE3202	HECW1	7	43400557	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	127	295	Rvknsaapi	Rvknsaapi	Tvknsaapi	Tvknsaapi
HE3202	IGFBP1	7	45928465	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	341	1629	iplgaacSv	iplgaacSv	iplgaacGv	iplgaacGv
HE3202	VSTM2A	7	54617773	A	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	431	272	vsaaipCsi	vsaaipCsi	vsaaipSsi	vsaaipSsi

Figure 21 (Cont.)

HE3202	CCL24	7	75441156	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	121	151	ravavNgpv	ravavNgpv	ravavKgpv
HE3202	MDH2	7	75677504	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	489	219	Vsaairrsf	Vsaairrsf	Asaairrsf
HE3202	MDH2	7	75677504	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	42	35	larpVsaal	larpVsaal	larpAsaal
HE3202	SEMA3D	7	84636246	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	337	12424	Khadekvif	Khadekvif	Ekadekvif
HE3202	SLC25A40	7	87477254	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	6	6	iyftFydql	iyftFydql	iyftCydql
HE3202	SLC25A40	7	87477254	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	304	16920	tFydqlsal	tFydqlsal	tCydqlsal
HE3202	SLC25A40	7	87477254	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	21	15	fydqlsall	fydqlsall	Cydqlsall
HE3202	SLC25A40	7	87477254	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	338	195	tFydqlsal	tFydqlsal	tCydqlsal
HE3202	TECPR1	7	97872785	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	132	182	wavslHgkv	wavslHgkv	wavslQgkv
HE3202	NPTX2	7	98254267	A	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	410	250	fkspdafKv	fkspdafKv	fkspdafKv
HE3202	NPTX2	7	98254267	A	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	36	44	dafKvslpl	dafKvslpl	dafKvslpl
HE3202	TRRAP	7	98528379	C	G	A2403,A3201,B3801,B4101,C1203,C1701	A3201	149	446	lmeripVtw	lmeripVtw	lmeripLtw
HE3202	TRRAP	7	98528379	C	G	A2403,A3201,B3801,B4101,C1203,C1701	B3801	482	439	erlpLtwvl	erlpLtwvl	erlpLtwvl
HE3202	TRRAP	7	98528379	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	252	581	flmeripVt	flmeripVt	flmeripLt
HE3202	PLOD3	7	100856465	C	G	A2403,A3201,B3801,B4101,C1203,C1701	A2403	184	2238	kfHrrrvri	kfHrrrvri	kfDrrrvri
HE3202	LRRN3	7	110763362	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	246	134	rlqlmskw	rlqlmskw	rlqMmskw
HE3202	LRRN3	7	110763362	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	381	366	lnsnrlqli	lnsnrlqli	lnsnrlqMi
HE3202	SMO	7	128845133	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	127	692	npkswyeYv	npkswyeYv	npkswyeDv
HE3202	SMO	7	128845133	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	85	1369	yeYvegcgi	yeYvegcgi	yeDvegcgi
HE3202	LONRF1	8	12586418	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	338	413	ieykelDvkv	ieykelDvkv	ieykelDvkv
HE3202	SCARA5	8	27779276	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	245	6665	sydvalhrM	sydvalhrM	sydvalhrT
HE3202	DUSP4	8	29195301	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	55	62	vssdcTrhf	vssdcTrhf	vssdcPrhf
HE3202	PXDNL	8	52321060	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	108	145	rqnwnIgpi	rqnwnIgpi	rqnwnAgpi
HE3202	CHD7	8	61712990	A	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	291	20014	qvkrkrytV	qvkrkrytV	qvkrkrytE
HE3202	CHD7	8	61712990	A	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	57	80	yfVdiefki	yfVdiefki	yfEdiefki
HE3202	PPP1R42	8	67922950	C	A	A2403,A3201,B3801,B4101,C1203,C1701	B3801	418	357	lhvNdlefl	lhvNdlefl	lhvKdlefl
HE3202	ZFHX4	8	77775792	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	106	25	ftpqlpgKv	ftpqlpgKv	ftpqfpgTv
HE3202	FABP4	8	82395348	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	216	2349	vssenfdYy	vssenfdYy	vssenfdDy
HE3202	RALYL	8	85774568	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	157	92	rvpppgKav	rvpppgKav	rvpppgRav
HE3202	RALYL	8	85774568	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	40	46	vpppgKavl	vpppgKavl	vpppgRavl
HE3202	MMP16	8	89209450	A	C	A2403,A3201,B3801,B4101,C1203,C1701	A2403	401	46	saKaamqqf	saKaamqqf	saLaamqqf
HE3202	MATN2	8	99045870	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	13	14	laneevKkl	laneevKkl	laneevRkl
HE3202	C8orf47	8	99101951	T	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	205	215	eiiegsqlv	eiiegsqlv	eiiegsqfv
HE3202	CSMD3	8	113249419	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	483	23386	snmellisW	snmellisW	snmellisG
HE3202	TRPS1	8	116426736	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	12	3245	fwskykksf	fwskykksf	fwskykksV
HE3202	TRPS1	8	116426736	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	8	235	sFpgnphyl	sFpgnphyl	sVpgnphyl
HE3202	TRPS1	8	116426736	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	26	257	lsFpgnphy	lsFpgnphy	lsVpgnphy
HE3202	SAMD12	8	119452186	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	379	173	takstwKi	takstwKi	takstvKi
HE3202	MTBP	8	121500555	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	193	95	kteeaklsf	kteeaklsf	kTeeaklsf
HE3202	FAM135B	8	139189631	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	5	20	rlseaffyl	rlseaffyl	rlseaffyM
HE3202	FAM135B	8	139189631	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	126	97	ffylehqkl	ffylehqkl	ffyMehqkl
HE3202	FAM135B	8	139189631	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	296	153	ffylehqkl	ffylehqkl	ffyMehqkl
HE3202	FAM135B	8	139189631	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	226	111	yiehqklav	yiehqklav	yMehqklav
HE3202	DENND3	8	142185347	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	44	505	tfkdfynfw	tfkdfynfw	tfkdfyncw
HE3202	DENND3	8	142185347	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	142	17650	etfkdfynf	etfkdfynf	etfkdfynC
HE3202	GLI4	8	144356879	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	405	2322	sAgsspkvl	sAgsspkvl	sPgsspkvl
HE3202	FAM83H	8	144812314	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	226	137	rsSqqpvav	rsSqqpvav	rsAqqpvav
HE3202	FAM83H	8	144812314	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	494	351	rmirsSqqv	rmirsSqqv	rmirsAqqv
HE3202	FAM83H	8	144812314	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	444	339	rsSqqvav	rsSqqvav	rsAqqvav

Figure 21 (Cont.)

HE3202	EPPK1	8	144940693	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	491	224	ksiyqamw	kMsiyqamw
HE3202	PLEC	8	144993046	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	79	1060	ydyvrrrM	ydyvrrrM
HE3202	CDKN2A	9	21971111	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	36	11042	vYdaaregf	vHdaaregf
HE3202	PLAA	9	269060015	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	229	136	khpsvnEnf	khpsvnEnf
HE3202	NFX1	9	33344171	G	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	322	77	rvhEcdhpv	rvhEcdhpv
HE3202	CCL27	9	34662576	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	304	384	lsTkptaaf	lsPdptaaf
HE3202	TLN1	9	35700005	T	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	496	319	ygrecaSgy	ygrecaNgy
HE3202	SPATA31D3	9	84552337	G	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	219	514	Dshggpini	Eshggpini
HE3202	C9orf170	9	99763770	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	181	261	larpgrEgl	larpgrGgl
HE3202	SPATA31C1	9	90533807	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	48	19	daapivYpl	daapivSpl
HE3202	SPATA31C1	9	90537077	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	216	543	qfqrapLgi	qfqrapRgi
HE3202	WNK2	9	96021292	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	222	76	lpdlEtatv	lpdlPtatv
HE3202	WNK2	9	96062359	G	C	A2403,A3201,B3801,B4101,C1203,C1701	A2403	59	153	vyhptsEqv	vyhptsRqv
HE3202	C9orf3	9	97823061	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	78	273	qslqMtyhl	qslqRtyhl
HE3202	TMEM246	9	104238619	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	46	44	yhperfHhy	yhperfQhy
HE3202	TMEM246	9	104238619	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	384	571	Rhyhrpepm	Qhyhrpepm
HE3202	OR1I2	9	125273802	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	80	19114	tYgshlsvv	tCgshlsvv
HE3202	OR1I2	9	125273802	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	276	1552	stYgshlsv	stCgshlsv
HE3202	OR1I2	9	125273802	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	245	3159	stYgshlsv	stCgshlsv
HE3202	CRB2	9	126339312	A	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	136	97	lemdsvlEv	lemdsvlKv
HE3202	SPTAN1	9	131340462	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	377	257	kalinaYel	kalinaDel
HE3202	SPTAN1	9	131340462	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	11	94	naYelasdv	naDelasdv
HE3202	USP20	9	132637920	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	9	11	vwehlynlf	vwehlynlf
HE3202	USP20	9	132637920	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	82	12666	nvwehlynR	nvwehlynR
HE3202	USP20	9	132637920	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	123	16344	nvwehlynR	nvwehlynR
HE3202	USP20	9	132637920	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	95	489	nlfggppav	nkfggppav
HE3202	SURF4	9	136230530	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	335	175	wlfainVyf	wtfainVyf
HE3202	SURF4	9	136230530	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	3	3	lyfnafwti	Vyfnafwti
HE3202	SURF4	9	136230530	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	123	1548	vvwlfainl	vvwtfainV
HE3202	SURF4	9	136230530	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	247	92	wltainVyf	wtfainVyf
HE3202	SURF4	9	136230530	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	90	65	ainVyfnaf	ainVyfnaf
HE3202	SURF4	9	136230530	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	57	84	lyfnafwti	Vyfnafwti
HE3202	SURF4	9	136230530	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	102	195	lyfnafwti	Vyfnafwti
HE3202	CACNA1B	9	141016027	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	334	568	tpltprPsi	tpltprPsi
HE3202	CACNA1B	9	141016027	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	268	312	ltprPsity	ltprPsity
HE3202	P2RY8	X	1585160	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	449	9261	vfgvllcnL	vfgvllcnV
HE3202	P2RY8	X	1585160	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	191	202	lcnLvtvaf	lcnVvtvaf
HE3202	P2RY8	X	1585160	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	82	47	vllcnLvtv	vllcnVvtv
HE3202	PPEF1	X	18748380	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	69	385	rqhyalTif	rqhyalTif
HE3202	PPEF1	X	18748380	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	67	233	yalTifqsi	yalTifqsi
HE3202	PPEF1	X	18748380	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	48	28	rqhyalNif	rqhyalTif
HE3202	PPEF1	X	18748380	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	3	5	yalNifqsi	yalTifqsi
HE3202	POLA1	X	24757502	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	183	17105	mpkkggrsG	mpkkggrsG
HE3202	ILIRAPL1	X	29417405	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	32	40	fvvrrltei	fvvrrTtei
HE3202	DMD	X	32430284	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	138	547	liffpayfl	liffpayfL
HE3202	DMD	X	32430284	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	147	640	liffpayfl	liffpayfL
HE3202	DMD	X	32430284	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	18	26	fpayfLnav	fpayfLnav
HE3202	SRPX	X	38016207	A	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	16	37	yekrrlIlv	yekrrlIlv
HE3202	PPP1R3F	X	49142743	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	9	17108	tYrdlikw	tDrdlikw

Figure 21 (Cont.)

HE3202	DGKK	X	50127751	G	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	151	126	flieddAedi	fleddPedi
HE3202	USP51	X	55514268	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	378	2200	linlWntcf	linlGntcf
HE3202	EDA2R	X	65824963	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	196	180	itcSvinrv	itcAvinrv
HE3202	EDA2R	X	65824963	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	89	222	Svinrvqkv	Avinrvqkv
HE3202	OTUD6A	X	69282423	C	A	A2403,A3201,B3801,B4101,C1203,C1701	B3801	489	963	rhqSerqel	rhqRerqel
HE3202	RAB41	X	69503166	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	405	287	rfhslipsy	rfhsLipsy
HE3202	RAB41	X	69503166	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	360	281	fhslipsyi	fhsLipsyi
HE3202	ATRX	X	76814270	T	C	A2403,A3201,B3801,B4101,C1203,C1701	C1203	230	1699	iSivaanrv	iNivaanrv
HE3202	ATP7A	X	77298204	C	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	497	217	Vlamanvgi	Alamanvgi
HE3202	PABPC5	X	90690727	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	139	92	ftricCdpv	ftricRdpv
HE3202	PCDH11X	X	91090714	G	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	89	187	vyktgNvpl	vyktgDvpl
HE3202	PCDH11X	X	91090714	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	134	452	yktgNvpli	yktgDvpli
HE3202	NXF5	X	101096032	A	T	A2403,A3201,B3801,B4101,C1203,C1701	B3801	464	642	rrnSmaatl	rrnCmaatl
HE3202	NXF5	X	101096032	A	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	148	401	iilnrrnSm	iilnrrnCm
HE3202	NXF5	X	101096032	A	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	95	477	nSmaatlki	nCmaatlki
HE3202	NXF5	X	101096065	G	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	423	355	lmgCdidii	lmgRdidii
HE3202	COL4A6	X	107403760	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	23	151	Rqlwvgysl	Sqlwvgysl
HE3202	COL4A6	X	107403760	G	T	A2403,A3201,B3801,B4101,C1203,C1701	B3801	247	235	Rqlwvgysl	Sqlwvgysl
HE3202	ALG13	X	110931130	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	45	10319	ylqhaswaF	ylqhaswaV
HE3202	ALG13	X	110931130	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	256	361	swaFtvngl	swaVtvngl
HE3202	ALG13	X	110931130	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	108	2326	ylqhaswaF	ylqhaswaV
HE3202	ALG13	X	110931130	G	T	A2403,A3201,B3801,B4101,C1203,C1701	B3801	268	591	qhaswaFtv	qhaswaVtv
HE3202	ALG13	X	110931130	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	22	176	waFtvngli	waVtvngli
HE3202	KIAA1210	X	118219423	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	159	84	ksfkShisv	ksfkAhisv
HE3202	KIAA1210	X	118219423	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	209	224	kqksfkShi	kqksfkAhi
HE3202	KIAA1210	X	118219423	C	A	A2403,A3201,B3801,B4101,C1203,C1701	C1203	214	179	ksfkShisv	ksfkAhisv
HE3202	CT47B1	X	120009053	C	G	A2403,A3201,B3801,B4101,C1203,C1701	C1203	325	406	lmvgphaPv	lmvgphaAv
HE3202	DCAF12L1	X	125686435	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A2403	7	7	tyrsmaNyl	tyrsmaHyl
HE3202	DCAF12L1	X	125686435	G	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	111	96	rsmaNylkv	rsmaHylkv
HE3202	OCRL	X	128695159	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	23	12	iycigLqel	iycigFqel
HE3202	ZNF449	X	134494173	G	T	A2403,A3201,B3801,B4101,C1203,C1701	A3201	36	15	kkmDtmypf	kkmEtmypf
HE3202	CDR1	X	139865968	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	439	142	ifwktCifw	ifwktWifw
HE3202	CDR1	X	139865968	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A2403	123	110	Cifwktwif	Wifwktwif
HE3202	CDR1	X	139865968	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	338	79	wifwktCif	wifwktWif
HE3202	CDR1	X	139865968	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	53	8	ktCifwktw	ktWifwktw
HE3202	CDR1	X	139865968	C	A	A2403,A3201,B3801,B4101,C1203,C1701	A3201	98	79	Cifwktwif	Wifwktwif
HE3202	SLITRK4	X	142718819	C	T	A2403,A3201,B3801,B4101,C1203,C1701	C1203	144	29	vsvKnvlyv	vsvEnvlyv
HE3202	MAGEA6	X	151869339	G	A	A2403,A3201,B3801,B4101,C1203,C1701	B3801	175	411	qhYkpeegl	qhCkpeegl
JB112852	ZBTB8B	1	32946599	C	T	A1101,A0201,B3512,B4402,C0401,C0704	A1101	473	5645	rshtgeWpy	rshtgeRpy
JB112852	SH3D21	1	36786529	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	65	15	kltNiweel	kltDiweel
JB112852	SH3D21	1	36786529	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A1101	56	180	ltNiweelk	ltDiweelk
JB112852	SH3D21	1	36786529	G	A	A1101,A0201,B3512,B4402,C0401,C0704	B4402	244	402	lerkltNiw	lerkltDiw
JB112852	CHRNB2	1	154544452	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A1101	395	3514	Nsctcfvnr	Dsctcfvnr
JB112852	SLC30A1	1	211749485	A	C	A1101,A0201,B3512,B4402,C0401,C0704	A0201	74	267	flhvlgdaV	flhvlgdaL
JB112852	SLC30A1	1	211749485	A	C	A1101,A0201,B3512,B4402,C0401,C0704	A0201	33	27	vlgdaVgsv	vlgdaLgsv
JB112852	SLC30A1	1	211749485	A	C	A1101,A0201,B3512,B4402,C0401,C0704	A0201	354	32	aVgsvivvv	aLgsvivvv
JB112852	OR2T1	1	248569328	C	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	23	38	yflnvLfpl	yflnvFfpl
JB112852	OR2T1	1	248569328	C	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	10	7	flnvLfpli	flnvFfpli
JB112852	TAF3	10	7860791	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	42	92	vlqHylqql	vlqRylqql

Figure 21 (Cont.)

JB112852	ERCC6	10	50678912	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A1101	447	178	tgsdvqtSk	tgsdvqtPk
JB112852	ERCC6	10	50678912	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A1101	101	84	vqtSkchlk	vqtPkchlk
JB112852	ERCC6	10	50678912	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A1101	310	2978	qtSkchlkr	qtPkchlkr
JB112852	ODF3	11	199391	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A1101	274	77	Hqtdvrvtk	Rqtdvrvtk
JB112852	NLRP6	11	280085	G	C	A1101,A0201,B3512,B4402,C0401,C0704	A1101	18	19	tllsvsDyk	tllsvsEyk
JB112852	TRPM5	11	2436427	C	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	142	507	fslhevsLv	fslhevsRv
JB112852	TRPM5	11	2436427	C	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	39	290	slhevsLvl	slhevsRvl
JB112852	SLC35C1	11	45827396	C	T	A1101,A0201,B3512,B4402,C0401,C0704	A0201	294	339	ilhmVltga	ilhmAltga
JB112852	TRIM64C	11	49080565	A	C	A1101,A0201,B3512,B4402,C0401,C0704	A0201	56	13884	vttdcvhsV	vttdcvhsF
JB112852	RAB3IL1	11	61672238	G	C	A1101,A0201,B3512,B4402,C0401,C0704	A0201	436	180	cldLtmqel	cldFtmqel
JB112852	NRXN2	11	64480312	A	G	A1101,A0201,B3512,B4402,C0401,C0704	A0201	108	153	llvdgrPrl	llvdgrLrl
JB112852	ARHGEF17	11	73074256	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A1101	30	16484	isssfgneK	isssfgneE
JB112852	MYO7A	11	76901072	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	412	4509	ylQnfihgg	ylRnfihgg
JB112852	BCL9L	11	118773963	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	32	38	fvyvfIthl	fvyvfTthl
JB112852	GRAMD1B	11	123485512	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	83	1759	sMskillvi	sVskillvi
JB112852	ATP5G2	12	54066400	T	C	A1101,A0201,B3512,B4402,C0401,C0704	A0201	12	7	Rmfacskfv	Kmfacskfv
JB112852	NDUFA4L2	12	57630395	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	221	1428	yllrlaFrs	yllrlaLrs
JB112852	NDUFA4L2	12	57630395	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	131	331	rlaFrspdv	rlaLrspdv
JB112852	TRPV4	12	110230174	C	T	A1101,A0201,B3512,B4402,C0401,C0704	A0201	51	13	yllfmigyT	yllfmigyA
JB112852	TRPV4	12	110230174	C	T	A1101,A0201,B3512,B4402,C0401,C0704	A0201	3	4	fmigyTsal	fmigyAsal
JB112852	TRPV4	12	110230174	C	T	A1101,A0201,B3512,B4402,C0401,C0704	A0201	65	49	migyTsalv	migyAsalv
JB112852	TRPV4	12	110230174	C	T	A1101,A0201,B3512,B4402,C0401,C0704	A0201	93	335	yTsalvsll	yAsalvsll
JB112852	TBX3	12	115110013	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	54	14128	sLvhrhpfl	sSvhrhpfl
JB112852	NOS1	12	117725904	C	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	22	44	fiYqyyssi	fiDqyyssi
JB112852	NOS1	12	117725904	C	A	A1101,A0201,B3512,B4402,C0401,C0704	A1101	204	6430	Yqyyssikr	Dqyyssikr
JB112852	HHIPL1	14	100111738	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	290	216	alaNrvdaa	alaSrvdaa
JB112852	CHST14	15	40763553	T	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	13	1446	lllpsmlmL	lllpsmlmF
JB112852	CHST14	15	40763553	T	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	62	26	llpsmlmLa	llpsmlmFa
JB112852	CHST14	15	40763553	T	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	35	21	smlmLaviv	smlmFaviv
JB112852	CHST14	15	40763553	T	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	29	14	mlmLaviva	mlmFaviva
JB112852	CHST14	15	40763553	T	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	458	293	lmLavivas	lmFavivas
JB112852	AP3B2	15	83346857	C	G	A1101,A0201,B3512,B4402,C0401,C0704	A0201	164	80	vlrefHtyi	vlrefQtyi
JB112852	AP3B2	15	83346857	C	G	A1101,A0201,B3512,B4402,C0401,C0704	A1101	88	1023	tvlrefHty	tvlrefQty
JB112852	AP3B2	15	83346857	C	G	A1101,A0201,B3512,B4402,C0401,C0704	A1101	22	30	Htyirsmdk	Qtyirsmdk
JB112852	SOCS1	16	11349236	C	A	A1101,A0201,B3512,B4402,C0401,C0704	A1101	85	164	ssspSapar	ssspAapar
JB112852	UMOD	16	20360253	C	T	A1101,A0201,B3512,B4402,C0401,C0704	A0201	59	21	alTtcvnvv	alAtcvnvv
JB112852	SLC12A3	16	56912993	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A1101	42	105	atigscMvr	atigscVvr
JB112852	OR1G1	17	3030733	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	3	3	flfmylvMv	flfmylvTv
JB112852	OR1G1	17	3030733	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	271	192	ylvMvagnl	ylvTvagnl
JB112852	OR1G1	17	3030733	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	55	2732	vMvagnlli	vTvagnlli
JB112852	OR1G1	17	3030733	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	446	3439	Mvagnllli	Tvagnllli
JB112852	TRPV3	17	3421931	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	94	966	vlllnmliV	vlllnmliA
JB112852	TRPV3	17	3421931	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	20	11	lllnmliVl	lllnmliAl
JB112852	TRPV3	17	3421931	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	350	252	llnmliVlm	llnmliAlm
JB112852	TRPV2	17	16326159	G	T	A1101,A0201,B3512,B4402,C0401,C0704	A1101	11	15	raFgrffqk	raCgrffqk
JB112852	C17orf47	17	56621460	C	T	A1101,A0201,B3512,B4402,C0401,C0704	A1101	217	19075	ttntspqqR	ttntspqqG
JB112852	UNC13D	17	73826499	T	C	A1101,A0201,B3512,B4402,C0401,C0704	A1101	22	20	asyraseRk	asyraseQk
JB112852	ZNF407	18	72776371	G	T	A1101,A0201,B3512,B4402,C0401,C0704	A1101	401	741	Saaaiqsqr	Aaaaiqsqr
JB112852	MED16	19	884942	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	144	750	slrkegFpv	slrkegLpv

Figure 21 (Cont.)

JB112852	ABCA7	19	1064153	G	T	A1101,A0201,B3512,B4402,C0403,C0704	A0201	235	1399	svmtkhsl	svmtkhsM
JB112852	ADAT3	19	1912212	G	A	A1101,A0201,B3512,B4402,C0403,C0704	A0201	181	132	kqsgdVelv	kqsgdVelv
JB112852	ADAT3	19	1912212	G	A	A1101,A0201,B3512,B4402,C0401,C0704	B4402	89	1039	gdVelvlay	gdVelvlay
JB112852	ADAT3	19	1912212	G	A	A1101,A0201,B3512,B4402,C0403,C0704	B4402	224	1591	Melvlayaa	Velvlayaa
JB112852	HDGFRP2	19	4497995	T	C	A1101,A0201,B3512,B4402,C0403,C0704	A1101	33	44	Lsmdrkvek	Lsmdrkvek
JB112852	PTPRS	19	5246012	C	T	A1101,A0201,B3512,B4402,C0403,C0704	A0201	202	44	slipmshKl	slipmshSl
JB112852	PTPRS	19	5246012	C	T	A1101,A0201,B3512,B4402,C0403,C0704	A1101	63	19232	fslpmshK	fslpmshE
JB112852	RDH8	19	10127735	G	A	A1101,A0201,B3512,B4402,C0403,C0704	A1101	486	712	Matmrdlgk	Vatmrdlgk
JB112852	AP1M1	19	16344308	G	A	A1101,A0201,B3512,B4402,C0403,C0704	A1101	197	77	sksfpgDk	sksfpgGk
JB112852	LSM4	19	18428311	G	A	A1101,A0201,B3512,B4402,C0403,C0704	A1101	44	101	gtgrgpLek	gtgrgpPek
JB112852	CRLF1	19	18710626	G	A	A1101,A0201,B3512,B4402,C0403,C0704	A0201	39	221	Mflgrssll	Tflgrssll
JB112852	UPK1A	19	36168911	C	A	A1101,A0201,B3512,B4402,C0403,C0704	A0201	180	156	lamyfyYm	lamyfyYm
JB112852	DLL3	19	39993479	G	A	A1101,A0201,B3512,B4402,C0403,C0704	A1101	468	626	slaHvagr	slaHvagr
JB112852	CIC	19	42734935	T	A	A1101,A0201,B3512,B4402,C0403,C0704	A1101	29	49	atmDtnvr	atmVtnvr
JB112852	NKPD1	19	45656184	C	T	A1101,A0201,B3512,B4402,C0403,C0704	A0201	47	30	ikaclelNa	ikaclelSa
JB112852	LIN7B	19	49618551	C	T	A1101,A0201,B3512,B4402,C0401,C0704	A0201	65	1023	qlydtdlT	qlydtdlT
JB112852	P2R12	19	50123709	G	A	A1101,A0201,B3512,B4402,C0403,C0704	A0201	72	146	aldpdNqa	aldpdMqa
JB112852	COL4A4	2	227872063	C	A	A1101,A0201,B3512,B4402,C0403,C0704	A0201	66	454	klsrcqYcv	klsrcqYcv
JB112852	COL20A1	20	61926535	G	A	A1101,A0201,B3512,B4402,C0403,C0704	A0201	367	482	kqasgllrl	Vqasgllrl
JB112852	COL20A1	20	61926535	G	A	A1101,A0201,B3512,B4402,C0403,C0704	A1101	197	125	qlqasgllr	qVqasgllr
JB112852	COL20A1	20	61942781	G	A	A1101,A0201,B3512,B4402,C0403,C0704	A1101	137	174	ltaTvtpr	ltaVvtpr
JB112852	PAPPB	20	62626344	C	T	A1101,A0201,B3512,B4402,C0403,C0704	A1101	34	387	rqWnpryek	rqRnpryek
JB112852	SIM2	21	38114151	C	T	A1101,A0201,B3512,B4402,C0403,C0704	A1101	16	24	yvfteievk	yvlteievk
JB112852	AIFM3	22	21327616	G	A	A1101,A0201,B3512,B4402,C0403,C0704	A1101	245	170	kievMipek	kievVipek
JB112852	CLASP2	3	33618756	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A1101	66	87	rsfqplVsr	rsfqplAsr
JB112852	SCN10A	3	38770388	C	T	A1101,A0201,B3512,B4402,C0401,C0704	A1101	145	2257	lHvfklak	lRvfklak
JB112852	GORASP1	3	39149996	C	T	A1101,A0201,B3512,B4402,C0401,C0704	A1101	494	11831	gSaegfhln	gGaegfhln
JB112852	PKS542	3	46875157	C	T	A1101,A0201,B3512,B4402,C0401,C0704	A0201	11	50	skegQtpl	skegRtpl
JB112852	EGYT3	3	138153891	C	T	A1101,A0201,B3512,B4402,C0401,C0704	A0201	55	36	rNaafefl	rMaafefl
JB112852	C4orf21	4	113469330	C	T	A1101,A0201,B3512,B4402,C0401,C0704	A0201	396	392	tlkqvrlv	tlkqvrVv
JB112852	ANK2	4	114186090	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	288	1482	hmaaraGqv	hmaaraSqv
JB112852	ANK2	4	114279562	G	T	A1101,A0201,B3512,B4402,C0401,C0704	A1101	96	8401	ltMsvysdr	ltRsvysdr
JB112852	SLC9A3	5	491998	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	58	199	fmpnCiffg	fmpnRiffg
JB112852	APC	5	112179224	T	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	42	66	tlNqmapa	tlYqmapa
JB112852	APC	5	112179224	T	A	A1101,A0201,B3512,B4402,C0401,C0704	A0201	445	40	lNqmapav	lYqmapav
JB112852	APC	5	112179224	T	A	A1101,A0201,B3512,B4402,C0401,C0704	A1101	67	29	Nqmapavsk	Yqmapavsk
JB112852	GLRA1	5	151202385	G	C	A1101,A0201,B3512,B4402,C0401,C0704	A0201	11	16	lifrnrLywi	lifrnrFywi
JB112852	GLRA1	5	151202385	G	C	A1101,A0201,B3512,B4402,C0401,C0704	A0201	6	293	rnLywiiyKl	rnFywiiyKl
JB112852	GLRA1	5	151202285	G	C	A1101,A0201,B3512,B4402,C0401,C0704	A1101	18	13	rnnLywiiyk	rnnFywiiyk
JB112852	MAP7	6	136686965	T	C	A1101,A0201,B3512,B4402,C0401,C0704	A1101	24	21	kvaSepslk	kvaNepslk
JB112852	ZDHHC14	6	158093963	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A1101	21	24	atIadMmpr	atIadVmpr
JB112852	ZDHHC14	6	158093963	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A1101	29	24	tIadMmprk	tIadVmprk
JB112852	ZDHHC14	6	158093963	G	A	A1101,A0201,B3512,B4402,C0401,C0704	B4402	70	317	aeatIadMm	aeatIadVm
JB112852	ZNF316	7	6683477	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A1101	366	274	vtfedvTvy	vtfedvAvy
JB112852	ZNF316	7	6683477	G	A	A1101,A0201,B3512,B4402,C0401,C0704	C0401	268	122	tfedvTvyf	tfedvAvyf
JB112852	CLIP2	7	73752970	C	T	A1101,A0201,B3512,B4402,C0401,C0704	A0201	6	1034	ylgetqfaI	ylgetqfaP
JB112852	CLIP2	7	73752970	C	T	A1101,A0201,B3512,B4402,C0401,C0704	A0201	60	525	falqpvaqv	faPqpvaqv
JB112852	DLGAP2	8	1497796	C	T	A1101,A0201,B3512,B4402,C0401,C0704	A1101	65	12870	kSlhqdak	kPlhqdak
JB112852	TRIM35	8	27168703	T	C	A1101,A0201,B3512,B4402,C0401,C0704	B4402	28	34	Gelkavcy	Gelkavcy

Figure 21 (Cont.)

JB112852	DDHD2	8	380931984	G	A	A1101,A0201,B3512,B4402,C0403,C0704	A0201	194	1046	hlgermRya	hlgermRyavy
JB112852	DDHD2	8	380931984	G	A	A1101,A0201,B3512,B4402,C0403,C0704	B4402	389	681	germRyavy	germRyavy
JB112852	PLEC	8	145007245	G	A	A1101,A0201,B3512,B4402,C0401,C0704	A1101	131	3329	alRteynlr	alRteynlr
JB112852	PLEC	8	145007272	G	A	A1101,A0201,B3512,B4402,C0403,C0704	A0201	58	56	qlmyrrvvCl	qlmyrrvvfl
JB112852	PLEC	8	145007272	G	A	A1101,A0201,B3512,B4402,C0403,C0704	A0201	94	38	Clherlvai	Rlherlvai
JB112852	FREM1	9	14801746	C	T	A1101,A0201,B3512,B4402,C0403,C0704	A1101	25	30	llidrRfsk	llidrGfsk
JB112852	GTF3C4	9	1355461167	A	C	A1101,A0201,B3512,B4402,C0401,C0704	A0201	100	59	klPyavsgl	klDyavsgl
JB112852	COL5A1	9	1377083884	G	A	A1101,A0201,B3512,B4402,C0403,C0704	A1101	75	100	gnqglfEqk	gqqglfEqk
JB112852	PLCXD1	X	207339	G	T	A1101,A0201,B3512,B4402,C0403,C0704	A0201	65	222	qlYagvryl	qlDagvryl
KA3947	NPHP4	1	5927930	C	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	401	495	frasggNpi	frasggKpi
KA3947	DLGAP3	1	35333203	C	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	399	428	saLgstqll	saVgstqll
KA3947	CYP4A11	1	47406916	G	T	A2301,A2402,B4101,B4901,C0701,C1701	C0701	221	69	wlfghiKel	wlfghiQel
KA3947	WIS	1	68614279	G	C	A2301,A2402,B4101,B4901,C0701,C1701	A2301	246	528	iavgSfclf	iavgSfclf
KA3947	WIS	1	68614279	G	C	A2301,A2402,B4101,B4901,C0701,C1701	A2301	203	282	vgCfclff	vgSfclff
KA3947	WDR63	1	85587453	C	A	A2301,A2402,B4101,B4901,C0701,C1701	A2301	239	176	iyKdwkrnek	iyTdwkrnek
KA3947	COL11A1	1	103243609	C	A	A2301,A2402,B4101,B4901,C0701,C1701	A2301	209	1208	Vfevgpwcf	Gfevgpwcf
KA3947	ORGK2	1	158670417	A	G	A2301,A2402,B4101,B4901,C0701,C1701	C0701	289	589	nrtiTqefi	nrtiQefi
KA3947	FMO3	1	171073017	C	A	A2301,A2402,B4101,B4901,C0701,C1701	A2301	179	345	pfPddfpnf	pfPddfpnf
KA3947	FMO3	1	171073017	C	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	12	2304	fNddfpnfm	fNddfpnfm
KA3947	KCNT2	1	196435886	C	A	A2301,A2402,B4101,B4901,C0701,C1701	A2402	332	3658	ffpvflncw	fVpvflncw
KA3947	TMEM81	1	205053222	G	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	88	159	rrkcqfrl	rrkcqTrl
KA3947	ASCC1	10	73892845	T	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	203	286	lhatvLrtl	lhatvMrtl
KA3947	ASCC1	10	73912678	C	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	228	613	ymnddpvmv	ymnddpGmv
KA3947	OR52B2	11	6193319	C	G	A2301,A2402,B4101,B4901,C0701,C1701	A2402	253	280	tlpkalalf	tVpkalalf
KA3947	HIPK3	11	33370213	A	T	A2301,A2402,B4101,B4901,C0701,C1701	C0701	400	468	arncceTsi	arncceTsi
KA3947	OR4C16	11	55340399	G	C	A2301,A2402,B4101,B4901,C0701,C1701	C0701	302	735	tvfpmHkmi	tvfpmQkmi
KA3947	OR4P4	11	55406135	C	G	A2301,A2402,B4101,B4901,C0701,C1701	A2301	45	34	iqlfShff	iqlfThff
KA3947	OR4P4	11	55406135	C	G	A2301,A2402,B4101,B4901,C0701,C1701	A2402	199	163	iqlfShff	iqlfTnff
KA3947	OR5F1	11	55761334	G	C	A2301,A2402,B4101,B4901,C0701,C1701	A2301	198	114	fyatcMyty	fyatcQyty
KA3947	OR5F1	11	55761334	G	C	A2301,A2402,B4101,B4901,C0701,C1701	A2402	186	134	fyatcMyty	fyatcIyty
KA3947	OR5AS1	11	55798309	A	G	A2301,A2402,B4101,B4901,C0701,C1701	C0701	354	128	srGvcvcfi	srNvcvcfi
KA3947	CCDC81	11	86133744	G	A	A2301,A2402,B4101,B4901,C0701,C1701	A2301	285	1113	kflpgsRll	kflpgsRll
KA3947	CCDC81	11	86133744	G	A	A2301,A2402,B4101,B4901,C0701,C1701	A2402	329	1104	kflpgsQll	kflpgsRll
KA3947	PANX1	11	93886698	C	T	A2301,A2402,B4101,B4901,C0701,C1701	A2402	234	257	sfswRqaaf	sfswTqaaf
KA3947	CASP4	11	104821791	C	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	178	83	ernnrtlla	ernnrtRla
KA3947	LRTM2	12	1943775	T	A	A2301,A2402,B4101,B4901,C0701,C1701	A2301	230	194	aygcNyasl	aygcHyasl
KA3947	LRTM2	12	1943775	T	A	A2301,A2402,B4101,B4901,C0701,C1701	A2402	149	81	avgcNyasl	avgcHyasl
KA3947	CNTN1	12	41323633	C	T	A2301,A2402,B4101,B4901,C0701,C1701	A2301	79	95	wlfnefSvf	wlfnefPvf
KA3947	OR6C2	12	55846379	C	A	A2301,A2402,B4101,B4901,C0701,C1701	A2301	39	61	ryvaickpl	ryvaickpL
KA3947	OR6C2	12	55846379	C	A	A2301,A2402,B4101,B4901,C0701,C1701	A2402	44	150	ryvaickpl	ryvaickpL
KA3947	POC1B	12	89860694	T	G	A2301,A2402,B4101,B4901,C0701,C1701	A2301	380	360	qvFlwrtnf	qvLlwrtnf
KA3947	SUPT20H	13	37602382	G	C	A2301,A2402,B4101,B4901,C0701,C1701	A2301	82	52	qvqktkVfl	qvqktkLfl
KA3947	SUPT20H	13	37602382	G	C	A2301,A2402,B4101,B4901,C0701,C1701	A2402	156	77	qvqktkVfl	qvqktkLfl
KA3947	NALCN	13	101944624	G	T	A2301,A2402,B4101,B4901,C0701,C1701	A2301	30	99	sfprwrYyf	sfprwrSyf
KA3947	NALCN	13	101944624	G	T	A2301,A2402,B4101,B4901,C0701,C1701	A2301	445	369	prwrYyfyf	prwrSyfyf
KA3947	NALCN	13	101944624	G	T	A2301,A2402,B4101,B4901,C0701,C1701	A2301	49	36	rwrYyfyfi	rwrSyfyfi
KA3947	NALCN	13	101944624	G	T	A2301,A2402,B4101,B4901,C0701,C1701	A2301	21	1245	rYyfyfil	rSyfyfil
KA3947	NALCN	13	101944624	G	T	A2301,A2402,B4101,B4901,C0701,C1701	A2301	24	72	Yyfyfill	Syfyfill
KA3947	NALCN	13	101944624	G	T	A2301,A2402,B4101,B4901,C0701,C1701	A2402	32	90	sfprwrYyf	sfprwrSyf

Figure 21 (Cont.)

KA3947	NALCN	13	101944624	G	T	A2301,A2402,B4101,B4901,C0701,C1701	A2402	34	17	rwrYfyfi	rwrSyfyfi	rwrSyfyfi	rwrSyfyfi
KA3947	NALCN	13	101944624	G	T	A2301,A2402,B4101,B4901,C0701,C1701	A2402	13	1720	rYyfyfitl	rSyfyfitl	rSyfyfitl	rSyfyfitl
KA3947	NALCN	13	101944624	G	T	A2301,A2402,B4101,B4901,C0701,C1701	A2402	34	60	Yyfyfitli	Syfyfitli	Syfyfitli	Syfyfitli
KA3947	NALCN	13	101944624	G	T	A2301,A2402,B4101,B4901,C0703,C1701	C0701	146	339	Yyfyfitli	Syfyfitli	Syfyfitli	Syfyfitli
KA3947	FAM181A	14	94394767	A	G	A2301,A2402,B4101,B4901,C0703,C1701	A2301	409	669	ylqkqlErf	yhqkqlKrf	yhqkqlKrf	yhqkqlKrf
KA3947	ZNF500	16	48025504	C	T	A2301,A2402,B4101,B4901,C0703,C1701	A2301	399	15586	tYpacgrgf	tCpacgrgf	tCpacgrgf	tCpacgrgf
KA3947	ZNF500	16	48025504	C	T	A2301,A2402,B4101,B4901,C0703,C1701	A2402	79	12749	tYpacgrgf	tCpacgrgf	tCpacgrgf	tCpacgrgf
KA3947	MINK1	17	4788900	G	T	A2301,A2402,B4101,B4901,C0703,C1701	A2301	65	1665	tyYyrsdiw	tyDyrsdiw	tyDyrsdiw	tyDyrsdiw
KA3947	MINK1	17	4788900	G	T	A2301,A2402,B4101,B4901,C0703,C1701	A2303	34	780	YyrsdiwsI	DyrsdiwsI	DyrsdiwsI	DyrsdiwsI
KA3947	MINK1	17	4788900	G	T	A2301,A2402,B4101,B4901,C0703,C1701	A2402	145	1190	tyYyrsdiw	tyDyrsdiw	tyDyrsdiw	tyDyrsdiw
KA3947	MINK1	17	4788900	G	T	A2301,A2402,B4101,B4901,C0703,C1701	A2402	83	1250	YyrsdiwsI	DyrsdiwsI	DyrsdiwsI	DyrsdiwsI
KA3947	MINK1	17	4788900	G	T	A2301,A2402,B4101,B4901,C0703,C1701	C0701	237	2322	YyrsdiwsI	DyrsdiwsI	DyrsdiwsI	DyrsdiwsI
KA3947	MYH1	17	10411211	G	A	A2301,A2402,B4101,B4901,C0703,C1701	A2301	252	167	sfqtwsaFf	sfqtwsaFf	sfqtwsaFf	sfqtwsaFf
KA3947	MYH1	17	10411211	G	A	A2301,A2402,B4101,B4901,C0703,C1701	A2402	68	44	sfqtwsaFf	sfqtwsaLf	sfqtwsaLf	sfqtwsaLf
KA3947	MYH1	17	10411211	G	A	A2301,A2402,B4101,B4901,C0703,C1701	C0701	344	2052	tYrenihKl	tYrenihKl	tYrenihKl	tYrenihKl
KA3947	COPZ2	17	46111290	G	T	A2301,A2402,B4101,B4901,C0701,C1701	C0701	230	801	yydtHpsm	yydtHpsm	yydtHpsm	yydtHpsm
KA3947	COPZ2	17	46111290	G	T	A2301,A2402,B4101,B4901,C0703,C1701	C0701	34	4362	tHpsmkeqm	tHpsmkeqm	tHpsmkeqm	tHpsmkeqm
KA3947	AKAP1	17	55184131	G	A	A2301,A2402,B4101,B4901,C0703,C1701	A2303	22	27	tyMsckkl	tyVsckkl	tyVsckkl	tyVsckkl
KA3947	AKAP1	17	55184131	G	A	A2301,A2402,B4101,B4901,C0703,C1701	A2402	62	332	tyMsckkl	tyVsckkl	tyVsckkl	tyVsckkl
KA3947	AKAP1	17	55184131	G	A	A2301,A2402,B4101,B4901,C0703,C1701	C0701	109	789	tyMsckkl	tyVsckkl	tyVsckkl	tyVsckkl
KA3947	INTS2	17	59947130	C	G	A2301,A2402,B4101,B4901,C0703,C1701	C0701	173	15601	aHpniakiv	aDpniakiv	aDpniakiv	aDpniakiv
KA3947	CD300C	17	72541910	C	A	A2301,A2402,B4101,B4901,C0701,C1701	A2402	399	285	mtaSawasw	mtaRawasw	mtaRawasw	mtaRawasw
KA3947	SETBP1	18	42532291	G	T	A2301,A2402,B4101,B4901,C0703,C1701	C0701	302	126	dhyypLpyi	dhyypVpyi	dhyypVpyi	dhyypVpyi
KA3947	SERPINB7	18	61449677	G	T	A2301,A2402,B4101,B4901,C0703,C1701	C0701	343	17199	fremddnqV	fremddnqG	fremddnqG	fremddnqG
KA3947	AP3B2	19	3751222	G	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	396	156	phaCiiell	phaRiiell	phaRiiell	phaRiiell
KA3947	CACNG7	19	54485445	C	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	407	2117	rrgrKpsdi	rrgrSpsdi	rrgrSpsdi	rrgrSpsdi
KA3947	DYSF	2	71838722	C	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	200	2410	irknHnfdi	irknPnfdi	irknPnfdi	irknPnfdi
KA3947	DYSF	2	71838722	C	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	222	17099	nHnfdictl	nPnfdictl	nPnfdictl	nPnfdictl
KA3947	GTDC1	2	144764942	G	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	453	2933	Fdsarqeyl	Ldsarqeyl	Ldsarqeyl	Ldsarqeyl
KA3947	KIF1A	2	241702476	T	C	A2301,A2402,B4101,B4901,C0701,C1701	C0701	343	164	yrrEreeat	yrrEreeat	yrrEreeat	yrrEreeat
KA3947	KIF1A	2	241702476	T	C	A2301,A2402,B4101,B4901,C0701,C1701	C0701	53	34	Greeatyll	Greeatyll	Greeatyll	Greeatyll
KA3947	PLCB4	20	9343590	C	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	139	103	ihrtfraKnv	ihrtfraRnv	ihrtfraRnv	ihrtfraRnv
KA3947	PLCB4	20	9343590	C	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	51	26	fraKnvspn	fraRnvspn	fraRnvspn	fraRnvspn
KA3947	SEC23B	20	18526643	T	C	A2301,A2402,B4101,B4901,C0701,C1701	C0701	162	76	Srfsdsfsl	Irfsdsfsl	Irfsdsfsl	Irfsdsfsl
KA3947	MMP24	20	33851618	T	G	A2301,A2402,B4101,B4901,C0701,C1701	A2303	269	179	ffkvsGhel	ffkvsVhel	ffkvsVhel	ffkvsVhel
KA3947	KIAA1755	20	36869946	G	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	453	1904	drpqvvnVl	drpqvvnAl	drpqvvnAl	drpqvvnAl
KA3947	DOCK3	3	51264792	C	T	A2301,A2402,B4101,B4901,C0701,C1701	A2303	200	84	lyhsnspCw	lyhsnspRw	lyhsnspRw	lyhsnspRw
KA3947	DOCK3	3	51264792	C	T	A2301,A2402,B4101,B4901,C0701,C1701	A2402	85	80	lyhsnspCw	lyhsnspRw	lyhsnspRw	lyhsnspRw
KA3947	IQCB1	3	121515965	C	A	A2301,A2402,B4101,B4901,C0701,C1701	A2303	472	1106	vygeveeeHk	vygeveeeQk	vygeveeeQk	vygeveeeQk
KA3947	PLXNA1	3	126746836	G	T	A2301,A2402,B4101,B4901,C0701,C1701	A2303	184	1967	lycaikqqi	lycaikqqM	lycaikqqM	lycaikqqM
KA3947	PLXNA1	3	126746836	G	T	A2301,A2402,B4101,B4901,C0701,C1701	A2402	155	1800	lycaikqqi	lycaikqqM	lycaikqqM	lycaikqqM
KA3947	ZNF721	4	436550	G	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	41	8	frqFasiyv	frqSasiyv	frqSasiyv	frqSasiyv
KA3947	OTOP1	4	4228425	T	C	A2301,A2402,B4101,B4901,C0701,C1701	C0701	42	43	vrasvpqKl	vrasvpqKl	vrasvpqKl	vrasvpqKl
KA3947	UGT2B10	4	69683800	C	G	A2301,A2402,B4101,B4901,C0701,C1701	A2303	72	48	wlmRnswnf	wlmRnswnf	wlmRnswnf	wlmRnswnf
KA3947	UGT2B10	4	69683800	C	G	A2301,A2402,B4101,B4901,C0701,C1701	A2301	102	87	nGnswnfKf	nGnswnfKf	nGnswnfKf	nGnswnfKf
KA3947	UGT2B10	4	69683800	C	G	A2301,A2402,B4101,B4901,C0701,C1701	A2402	95	49	wlmGnswnf	wlmRnswnf	wlmRnswnf	wlmRnswnf
KA3947	ANK2	4	114280354	C	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	70	77	tKsereqei	tQsereqei	tQsereqei	tQsereqei
KA3947	CDH6	5	31294096	G	C	A2301,A2402,B4101,B4901,C0701,C1701	C0701	223	1593	drgdRsiky	drgdGsiky	drgdGsiky	drgdGsiky
KA3947	SHROOM3	5	132159924	C	T	A2301,A2402,B4101,B4901,C0701,C1701	C0701	197	86	tanRnipti	tanDnipti	tanDnipti	tanDnipti

Figure 21 (Cont.)

KA3947	DND1	5	140052407	G	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	299	21314	dvyehqiP	dvyehqiP	dvyehqiP	dvyehqiP
KA3947	PCDHGA1	5	140711185	T	C	A2301,A2402,B4101,B4901,C0701,C1701	C0701	55	1993	eYkrnysmev	eYkrnysmev	eYkrnysmev	eYkrnysmev
KA3947	GPR151	5	145895564	A	G	A2301,A2402,B4101,B4901,C0701,C1701	C0701	365	1812	wrtTipaii	wrtTipaii	wrtTipaii	wrtTipaii
KA3947	SLIT3	5	168201261	G	T	A2301,A2402,B4101,B4901,C0701,C1701	C0701	21	5687	aHlqsiqti	aHlqsiqti	aHlqsiqti	aHlqsiqti
KA3947	F13A1	6	6251139	C	T	A2301,A2402,B4101,B4901,C0701,C1701	C0701	438	523	nKkereeyv	nKkereeyv	nKkereeyv	nKkereeyv
KA3947	TNXB	6	32065869	G	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	467	8755	srsnvtlpA	srsnvtlpA	srsnvtlpA	srsnvtlpA
KA3947	DST	6	56484355	C	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	135	177	dritrAhav	dritrAhav	dritrAhav	dritrAhav
KA3947	MMS22L	6	97720747	C	A	A2301,A2402,B4101,B4901,C0701,C1701	A2301	68	300	vfifryikV	vfifryikV	vfifryikV	vfifryikV
KA3947	MMS22L	6	97720747	C	A	A2301,A2402,B4101,B4901,C0701,C1701	A2402	267	1046	vfifryikV	vfifryikV	vfifryikV	vfifryikV
KA3947	GRIK2	6	102247837	G	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	71	11912	fGrfmsii	fGrfmsii	fGrfmsii	fGrfmsii
KA3947	ADCYAP1R1	7	31144501	T	A	A2301,A2402,B4101,B4901,C0701,C1701	A2301	107	73	fvwavHycf	fvwavHycf	fvwavLycf	fvwavLycf
KA3947	PCLO	7	82764062	C	A	A2301,A2402,B4101,B4901,C0701,C1701	A2301	135	269	lfgfVasif	lfgfVasif	lfgfGasif	lfgfGasif
KA3947	PCLO	7	82764062	C	A	A2301,A2402,B4101,B4901,C0701,C1701	A2402	382	569	lfgfVasif	lfgfVasif	lfgfGasif	lfgfGasif
KA3947	PTPRZ1	7	121652320	A	T	A2301,A2402,B4101,B4901,C0701,C1701	C0701	121	94	nLvdnvnkl	nLvdnvnkl	nMvdnvnkl	nMvdnvnkl
KA3947	GRM8	7	126746744	G	T	A2301,A2402,B4101,B4901,C0701,C1701	A2402	463	308	syaYtapel	syaYtapel	syaStapel	syaStapel
KA3947	DPP6	7	154561281	G	T	A2301,A2402,B4101,B4901,C0701,C1701	C0701	436	776	yhypNagse	yhypNagse	yhypKagse	yhypKagse
KA3947	VPS13B	8	100147871	C	G	A2301,A2402,B4101,B4901,C0701,C1701	A2301	472	290	tLyltnslf	tLyltnslf	fryltnslf	fryltnslf
KA3947	DCSTAMP	8	105367202	C	T	A2301,A2402,B4101,B4901,C0701,C1701	A2301	406	504	lwvplsvil	lwvplsvil	lwvplsvil	lwvplsvil
KA3947	EGFN	9	27284936	G	A	A2301,A2402,B4101,B4901,C0701,C1701	C0701	305	454	sqysvnSel	sqysvnSel	sqysvnPel	sqysvnPel
KA3947	TGFBR1	9	101908834	G	C	A2301,A2402,B4101,B4901,C0701,C1701	A2301	298	3013	Hyamgtvf	Hyamgtvf	Dyamgtvf	Dyamgtvf
KA3947	TGFBR1	9	101908834	G	C	A2301,A2402,B4101,B4901,C0701,C1701	C0701	407	2364	RraHyam	RraHyam	RraDyam	RraDyam
KA3947	SCAI	9	127733725	C	G	A2301,A2402,B4101,B4901,C0701,C1701	A2301	130	211	ffAdefiri	ffAdefiri	ffGdefiri	ffGdefiri
KA3947	SCAI	9	127733725	C	G	A2301,A2402,B4101,B4901,C0701,C1701	C0701	230	1396	fAdefirll	fAdefirll	fGdefirll	fGdefirll
KA3947	ZCCHC5	X	77912546	A	T	A2301,A2402,B4101,B4901,C0701,C1701	C0701	393	1291	ghfardSpv	ghfardSpv	ghfardCpv	ghfardCpv
KA3947	F8	X	154221251	C	G	A2301,A2402,B4101,B4901,C0701,C1701	C0701	439	57	shvdivkdf	shvdivkdf	shvdivkdL	shvdivkdL
LO3793	EPHA2	1	16482387	C	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	200	45	allgcaia	allgcaia	allWgcaia	allWgcaia
LO3793	EPHA2	1	16482387	C	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	47	25	llLgcaiaa	llLgcaiaa	llWgcaiaa	llWgcaiaa
LO3793	EPHA2	1	16482387	C	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	134	13417	llgcalaaa	llgcalaaa	llWgcalaaa	llWgcalaaa
LO3793	EPHA2	1	16482387	C	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	B2705	32	458	aractalll	aractalll	aractalll	aractalll
LO3793	EPHA2	1	16482387	C	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	C0701	413	13555	araclalll	araclalll	araclalll	araclalll
LO3793	RNPEP	1	201952182	T	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	C0701	94	462	Craaerlqv	Craaerlqv	Craaerlqv	Craaerlqv
LO3793	TRIM17	1	228596323	G	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	264	22183	ytLavggta	ytLavggta	yPLavggta	yPLavggta
LO3793	ZSWIM8	10	75560799	G	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0301	57	70	hqfYvgaak	hqfYvgaak	hqfCvgaak	hqfCvgaak
LO3793	ZSWIM8	10	75560799	G	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	B2705	324	485	hqfYvgaak	hqfYvgaak	hqfCvgaak	hqfCvgaak
LO3793	CPEB3	10	93851668	C	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	202	487	nlsdsNfvm	nlsdsNfvm	nlsdsDfvm	nlsdsDfvm
LO3793	PTPMT1	11	47587286	T	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	C0701	9	17	ahrdwNhri	ahrdwNhri	ahrdwYhri	ahrdwYhri
LO3793	PTPMT1	11	47587286	T	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	C0701	122	35	Nhridpwi	Nhridpwi	Yhridpwi	Yhridpwi
LO3793	LRFN4	11	66626173	C	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	238	8199	wvggddWlv	wvggddWlv	wvggddRlv	wvggddRlv
LO3793	PTPRM1	11	67265144	C	G	A0321,A0201,A0301,B2705,B4901,C0102,C0701	B2705	176	240	rtgsmnnQl	rtgsmnnQl	rtgsmnnEl	rtgsmnnEl
LO3793	PTPRM1	11	67265144	C	G	A0321,A0201,A0301,B2705,B4901,C0102,C0701	C0701	125	68	rtgsmnnQl	rtgsmnnQl	rtgsmnnEl	rtgsmnnEl
LO3793	TMEM126A	11	85365201	A	C	A0321,A0201,A0301,B2705,B4901,C0102,C0701	B2705	84	126	frrilnvPk	frrilnvPk	frrilnvTk	frrilnvTk
LO3793	TMEM126A	11	85365201	A	C	A0321,A0201,A0301,B2705,B4901,C0102,C0701	B2705	75	68	rrilnvPka	rrilnvPka	rrilnvTka	rrilnvTka
LO3793	OTOGL	12	80730229	C	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	11	99	mlselsii	mlselsii	mlselsiiT	mlselsiiT
LO3793	OTOGL	12	80730229	C	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	293	1586	iffdgnnaa	iffdgnnaa	iffdgnnaa	iffdgnnaa
LO3793	TBX3	12	115112106	G	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	24	22	gmggplaMv	gmggplaMv	gmggplaTv	gmggplaTv
LO3793	TBX3	12	115112106	G	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	153	1622	Mvsgastgv	Mvsgastgv	Tvsgastgv	Tvsgastgv
LO3793	FRY	13	32802623	C	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	C0701	236	155	lredqtspv	lredqtspv	lredqSspv	lredqSspv
LO3793	DNAAF2	14	50101660	C	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	57	1284	fMhpepghv	fMhpepghv	fMhpepghv	fMhpepghv
LO3793	DNAAF2	14	50101660	C	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	C0701	19	32	Mhpepghvl	Mhpepghvl	Vhpepghvl	Vhpepghvl

Figure 21 (Cont.)

LO3793	GALC	14	88450794	C	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	199	28	lqltayyvL	lqltayyvV	lqltayyvV	
LO3793	GALC	14	88450794	C	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	15	51	yvLtwivga	yvVtwivga	yvVtwivga	
LO3793	GALC	14	88450794	C	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0301	46	156	vLtwivgak	vVtwivgak	vVtwivgak	
LO3793	FURIN	15	91419010	A	G	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	28	101	wlhvvaaA	wlhvvaaA	wlhvvaaf	
LO3793	TSC2	16	2108843	C	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	161	295	slnLptsv	slnSptsv	slnSptsv	
LO3793	TSC2	16	2108843	C	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	B2705	112	3827	hrlysfnL	hrlysfnL	hrlysfnS	
LO3793	TSC2	16	2108843	C	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	C0701	375	70	lnLptsvl	lnLptsvl	lnSptsvl	
LO3793	TBC1D10B	16	30371148	T	C	A0321,A0201,A0301,B2705,B4901,C0102,C0701	B2705	285	46	Crlkayti	Crlkayti	Yrlkayti	
LO3793	ARMC5	16	31477459	C	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	433	166	lValtrpa	lValtrpa	lIAaltrpa	
LO3793	ARMC5	16	31477459	C	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0301	87	203	rllValtr	rllValtr	rllAaltr	
LO3793	SLC9A5	16	67283051	A	G	A0321,A0201,A0301,B2705,B4901,C0102,C0701	B2705	447	630	frwqwhevG	frwqwhevG	frwqwhevE	
LO3793	SLC9A5	16	67283051	A	G	A0321,A0201,A0301,B2705,B4901,C0102,C0701	C0701	216	249	whevGapyl	whevGapyl	whevEapyl	
LO3793	RLTPR	16	67682112	C	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	B2705	466	883	grgglgppV	grgglgppV	grgglgppA	
LO3793	NF1	17	29533379	G	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0301	34	21	Qmapsltfk	Qmapsltfk	Rmapsltfk	
LO3793	MPP3	17	41903192	C	G	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0301	163	1050	glvlvgHel	glvlvgHel	glvlvgDel	
LO3793	NF1C	19	3456589	G	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0301	327	365	rsflglgpr	rsflglgpr	rsfVglgpr	
LO3793	KCNJ14	19	48965488	G	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	487	406	vlHclagcv	vlHclagcv	vlQclagcv	
LO3793	RFFL4AL1	19	56284080	G	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	C0701	18	22	erfdtflcv	erfdtflcv	erfdtflcv	
LO3793	AUP1	2	74755972	C	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	119	17577	klfcastrl	klfcastrl	klRcastrl	
LO3793	MRPL19	2	75873993	A	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	C0701	488	15358	flHaarllp	flHaarllp	fQaarllp	
LO3793	CHD6	20	40033762	G	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	230	917	glhsPpmat	glhsPpmat	glhsPpmat	
LO3793	THOC5	22	29916996	T	G	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	257	83	yqfAkvgll	yqfAkvgll	yqfDkvgll	
LO3793	THOC5	22	29916996	T	G	A0321,A0201,A0301,B2705,B4901,C0102,C0701	C0701	362	78	yqfAkvgll	yqfAkvgll	yqfDkvgll	
LO3793	TIMP3	22	33198006	C	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0301	285	1346	mtpwlglLv	mtpwlglFv	mtpwlglLv	
LO3793	OXNAD1	3	16343351	A	C	A0321,A0201,A0301,B2705,B4901,C0102,C0701	C0701	87	216	ysaNntsel	ysaNntsel	ysaKntsel	
LO3793	OXNAD1	3	16343351	A	C	A0321,A0201,A0301,B2705,B4901,C0102,C0701	C0701	274	652	saNntsell	saNntsell	saKntsell	
LO3793	CEP70	3	138256148	T	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	C0701	112	77	krteqDeti	krteqDeti	krteqEeti	
LO3793	TBL1XR1	3	176744214	C	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	14	20	gifeFcvna	gifeFcvna	gifeVcvna	
LO3793	PIK3CA	3	178915876	G	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	B2705	254	24	rQkdlrlf	rQkdlrlf	rRkdlrlf	
LO3793	PIK3CA	3	178915876	G	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	C0701	396	436	effdetrQl	effdetrQl	effdetrRl	
LO3793	PIK3CA	3	178916876	G	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	C0701	178	136	trQldlrl	trQldlrl	trRldlrl	
LO3793	CKMT2	5	80546986	G	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	95	227	lfgHnasl	lfgHnasl	lfgRnasl	
LO3793	PCDHB6	5	140532003	G	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	B2705	187	286	sraasvgHy	sraasvgHy	sraasvgRy	
LO3793	HIST1H3I	6	27840080	T	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	B2705	428	439	artMqtark	artMqtark	artKqtark	
LO3793	SCUBE3	6	35182254	C	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	451	4659	lvlvharV	lvlvharV	lvlvharA	
LO3793	FANCE	6	35426164	G	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	8	28	wllalspNl	wllalspNl	wllalspDl	
LO3793	FANCE	6	35426164	G	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0301	144	5165	Nlslnatv	Nlslnatv	Dlslnatv	
LO3793	ETV7	6	36329119	C	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	C0701	225	373	Crladcrll	Crladcrll	Crladcrll	
LO3793	MAP3K4	6	161505534	G	C	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	19	26	klfcHlagm	klfcHlagm	klfcElagm	
LO3793	FAM120B	6	170839565	G	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0301	22	23	clavNewfv	clavNewfv	clavKewfv	
LO3793	GPER1	7	1131828	G	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	356	818	msfdHyiai	msfdHyiai	msfdRyiai	
LO3793	GPER1	7	1131828	G	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	C0701	246	251	msfdHyisi	msfdHyisi	msfdRyisi	
LO3793	GRRHR	7	31010781	C	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	302	151	Risivalfv	Risivalfv	Sisivalfv	
LO3793	GRRHR	7	31010781	C	A	A0321,A0201,A0301,B2705,B4901,C0102,C0701	B2705	34	10052	hRisivaH	hRisivaH	hSisivaH	
LO3793	SHB	9	38068108	T	C	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0301	192	147	Vspkhrflk	Vspkhrflk	lspkhrflk	
LO3793	SHB	9	38068108	T	C	A0321,A0201,A0301,B2705,B4901,C0102,C0701	B2705	357	581	vryVspkfhr	vryVspkfhr	vryIspkfhr	
LO3793	SHB	9	38068108	T	C	A0321,A0201,A0301,B2705,B4901,C0102,C0701	C0701	69	127	yVspkhrfl	yVspkhrfl	yIspkhrfl	
LO3793	CLCN4	X	101623963	G	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	10	4503	glIagtlaV	glIagtlaV	glIagtlaG	
LO3793	CLCN4	X	101623963	G	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	A0201	24	14	llagtlaVv	llagtlaVv	llagtlaGv	

Figure 21 (Cont.)

LO3793	TMEM255A	X	119445152	G	T	A0321,A0201,A0301,B2705,B4901,C0102,C0701	C0701	456	861	mhqsMtqqr	mhqsLtqqr
LO5004	TMEM53	1	45125913	A	G	A0201,A2601,B3801,B5501,C0303,C1203	B3801	212	483	trqpvvTll	trqpvvIll
LO5004	TMEM53	1	45125913	A	G	A0201,A2601,B3801,B5501,C0303,C1203	C1203	174	639	etrqpvvTl	etrqpvvIl
LO5004	PDE4DIP	1	144852477	G	A	A0201,A2601,B3801,B5501,C0303,C1203	C0303	14	6	ralLctpal	ralPctpal
LO5004	PDE4DIP	1	144852477	G	A	A0201,A2601,B3801,B5501,C0303,C1203	C1203	223	20	ralLctpal	ralPctpal
LO5004	KDM5B	1	202718159	C	G	A0201,A2601,B3801,B5501,C0303,C1203	C1203	147	176	kadvlHvvv	kadvlDvvv
LO5004	OBSCN	1	228404201	G	T	A0201,A2601,B3801,B5501,C0303,C1203	A0201	58	207	rlheeaHll	rlheeaQll
LO5004	FAM89A	1	231175815	C	T	A0201,A2601,B3801,B5501,C0303,C1203	C0303	13	12	gasggwQhl	gasggwRhl
LO5004	FAM89A	1	231175815	C	T	A0201,A2601,B3801,B5501,C0303,C1203	C1203	286	343	gasggwQhl	gasggwRhl
LO5004	FBXO18	10	5948524	C	T	A0201,A2601,B3801,B5501,C0303,C1203	C0303	2	2	faflSvedl	fafIPvedl
LO5004	FBXO18	10	5948524	C	T	A0201,A2601,B3801,B5501,C0303,C1203	C1203	27	25	faflSvedl	fafIPvedl
LO5004	CACNB2	10	18429712	C	T	A0201,A2601,B3801,B5501,C0303,C1203	C0303	67	31	aaaVvaqei	aaaAvaqei
LO5004	CACNB2	10	18429712	C	T	A0201,A2601,B3801,B5501,C0303,C1203	C0303	384	12	aVvaqeiqm	aAvaqeiqm
LO5004	CACNB2	10	18429712	C	T	A0201,A2601,B3801,B5501,C0303,C1203	C1203	381	14710	kspptaaaV	kspptaaaA
LO5004	TOLLIP	11	1307307	T	C	A0201,A2601,B3801,B5501,C0303,C1203	A0201	385	296	allpaaVvm	allpaaMvm
LO5004	TOLLIP	11	1307307	T	C	A0201,A2601,B3801,B5501,C0303,C1203	A0201	260	57	Vvmppqpvv	Mvmppqpvv
LO5004	TOLLIP	11	1307307	T	C	A0201,A2601,B3801,B5501,C0303,C1203	C0303	4	5	yallpaaVv	yallpaaMv
LO5004	TOLLIP	11	1307307	T	C	A0201,A2601,B3801,B5501,C0303,C1203	C0303	78	78	allpaaVvm	allpaaMvm
LO5004	TOLLIP	11	1307307	T	C	A0201,A2601,B3801,B5501,C0303,C1203	C0303	291	1257	aVvmppqpv	aMvmppqpv
LO5004	TOLLIP	11	1307307	T	C	A0201,A2601,B3801,B5501,C0303,C1203	C0303	99	108	Vvmppqpvv	Mvmppqpvv
LO5004	TOLLIP	11	1307307	T	C	A0201,A2601,B3801,B5501,C0303,C1203	C1203	4	5	yallpaaVv	yallpaaMv
LO5004	TOLLIP	11	1307307	T	C	A0201,A2601,B3801,B5501,C0303,C1203	C1203	71	30	Vvmppqpvv	Mvmppqpvv
LO5004	OR51F2	11	4843274	C	A	A0201,A2601,B3801,B5501,C0303,C1203	A0201	209	204	glfallsNt	glfallsTt
LO5004	OR51F2	11	4843274	C	A	A0201,A2601,B3801,B5501,C0303,C1203	C0303	4	4	fallsNtgf	fallsTtgf
LO5004	OR51F2	11	4843274	C	A	A0201,A2601,B3801,B5501,C0303,C1203	C1203	420	179	fallsNtgf	fallsTtgf
LO5004	USH1C	11	17546009	C	A	A0201,A2601,B3801,B5501,C0303,C1203	C0303	412	334	gslsaeLgl	gslsaeVgl
LO5004	USH1C	11	17546009	C	A	A0201,A2601,B3801,B5501,C0303,C1203	C1203	117	102	lsaeLglei	lsaeVglei
LO5004	KRAS	12	25398285	C	A	A0201,A2601,B3801,B5501,C0303,C1203	C0303	399	1328	lvvvgaCgv	lvvvgaGgv
LO5004	RACGAP1	12	50388220	T	C	A0201,A2601,B3801,B5501,C0303,C1203	A0201	99	764	ivvhcvneV	ivvhcvnel
LO5004	RACGAP1	12	50388220	T	C	A0201,A2601,B3801,B5501,C0303,C1203	C1203	41	40	ivvhcvneV	ivvhcvnel
LO5004	ITGB7	12	53591674	G	T	A0201,A2601,B3801,B5501,C0303,C1203	C0303	23	92	ellDrgcpl	ellArgcpl
LO5004	MYO5A	15	52638577	C	T	A0201,A2601,B3801,B5501,C0303,C1203	A2601	303	232	eiaqayiSl	eiaqayiGl
LO5004	MYO5A	15	52638577	C	T	A0201,A2601,B3801,B5501,C0303,C1203	C0303	478	1287	eiaqayiSl	eiaqayiGl
LO5004	MYO5A	15	52638577	C	T	A0201,A2601,B3801,B5501,C0303,C1203	C0303	106	638	iSlketnrl	iGlketnrl
LO5004	MYO5A	15	52638577	C	T	A0201,A2601,B3801,B5501,C0303,C1203	C1203	476	3359	iSlketnrl	iGlketnrl
LO5004	CCDC33	15	74588221	G	T	A0201,A2601,B3801,B5501,C0303,C1203	A2601	345	2316	dtvsstmYl	dtvsstmDl
LO5004	UNKL	16	1417098	C	T	A0201,A2601,B3801,B5501,C0303,C1203	A0201	156	73	avNgvifql	avDgvifql
LO5004	EARS2	16	23568654	A	G	A0201,A2601,B3801,B5501,C0303,C1203	C0303	5	14	maaPlrrll	maaLlrrll
LO5004	EARS2	16	23568654	A	G	A0201,A2601,B3801,B5501,C0303,C1203	C1203	19	229	maaPlrrll	maaLlrrll
LO5004	HIC1	17	1961887	C	A	A0201,A2601,B3801,B5501,C0303,C1203	A0201	95	185	Sltaeqlsl	Rltaeqlsl
LO5004	HIC1	17	1961887	C	A	A0201,A2601,B3801,B5501,C0303,C1203	C0303	484	1095	egvfavaSl	egvfavaRl
LO5004	HIC1	17	1961887	C	A	A0201,A2601,B3801,B5501,C0303,C1203	C0303	27	43	favaSltae	favaRltae
LO5004	HIC1	17	1961887	C	A	A0201,A2601,B3801,B5501,C0303,C1203	C0303	10	110	vaSltaeql	vaRltaeql
LO5004	ERN1	17	62207346	G	A	A0201,A2601,B3801,B5501,C0303,C1203	A0201	99	7774	lllitlllL	lllitlllP
LO5004	ERN1	17	62207346	G	A	A0201,A2601,B3801,B5501,C0303,C1203	A0201	147	45	lltlllLgl	lltlllPgl
LO5004	TBC1D16	17	77918856	G	A	A0201,A2601,B3801,B5501,C0303,C1203	A0201	159	4467	Yvrfyqhlv	Hvrfyqhlv
LO5004	TBC1D16	17	77918856	G	A	A0201,A2601,B3801,B5501,C0303,C1203	C1203	173	3226	Yvrfyqhlv	Hvrfyqhlv
LO5004	FCER2	19	7761759	G	T	A0201,A2601,B3801,B5501,C0303,C1203	C1203	40	182	easdllerl	easdllerL
LO5004	FBN3	19	8150297	G	A	A0201,A2601,B3801,B5501,C0303,C1203	C1203	115	286	cplpgtsVy	cplpgtsAy

Figure 21 (Cont.)

LO5004	ULRA6	19	54745546	A	T	A0201,A2601,B3801,B5501,C0303,C1203	C0303	287	270	kgyhQfvim	kgyhtRfvim	kgyhtRfvim
LO5004	MZT2A	2	132249862	T	C	A0201,A2601,B3801,B5501,C0303,C1203	C0303	6	5	lairrKkvl	lairrKkvl	lairrKkvl
LO5004	MZT2A	2	132249862	T	C	A0201,A2601,B3801,B5501,C0303,C1203	C1203	36	32	lairrKkvl	lairrKkvl	lairrKkvl
LO5004	SPEG	2	220300049	C	A	A0201,A2601,B3801,B5501,C0303,C1203	B3801	320	1323	grDsceavl	grDsceavl	grAsceavl
LO5004	SPEG	2	220300049	C	A	A0201,A2601,B3801,B5501,C0303,C1203	C1203	16	106	Dsceavltv	Dsceavltv	Asceavltv
LO5004	BLCAP	20	36147433	C	A	A0201,A2601,B3801,B5501,C0303,C1203	A0201	211	384	ticaFvfia	ticaFvfia	ticaLvfia
LO5004	BLCAP	20	36147433	C	A	A0201,A2601,B3801,B5501,C0303,C1203	A0201	66	476	Fvflaalfl	Fvflaalfl	Lvflaalfl
LO5004	BLCAP	20	36147433	C	A	A0201,A2601,B3801,B5501,C0303,C1203	C0303	149	645	cticaFvfl	cticaFvfl	cticaLvfl
LO5004	BLCAP	20	36147433	C	A	A0201,A2601,B3801,B5501,C0303,C1203	C0303	39	55	caFvflaai	caFvflaai	caLvflaai
LO5004	BLCAP	20	36147433	C	A	A0201,A2601,B3801,B5501,C0303,C1203	C0303	7	56	Fvflaalfl	Fvflaalfl	Lvflaalfl
LO5004	BLCAP	20	36147433	C	A	A0201,A2601,B3801,B5501,C0303,C1203	C1203	67	262	caFvflaai	caFvflaai	caLvflaai
LO5004	BLCAP	20	36147433	C	A	A0201,A2601,B3801,B5501,C0303,C1203	C1203	52	667	Fvflaalfl	Fvflaalfl	Lvflaalfl
LO5004	ABHD16B	20	62493887	C	T	A0201,A2601,B3801,B5501,C0303,C1203	C0303	154	248	stsgrlCpl	stsgrlCpl	stsgrlRpl
LO5004	DENL3	22	24180796	A	G	A0201,A2601,B3801,B5501,C0303,C1203	C0303	264	1081	tnflSfgpl	tnflSfgpl	tnflFfgpl
LO5004	SGSM1	22	25282618	C	A	A0201,A2601,B3801,B5501,C0303,C1203	C1203	170	222	iqTeirKav	iqTeirKav	iqPeirKav
LO5004	USP19	3	49146542	C	A	A0201,A2601,B3801,B5501,C0303,C1203	C1203	131	639	Vpqdwvgpl	Vpqdwvgpl	Gpqdwvgpl
LO5004	DGKQ	4	960816	C	A	A0201,A2601,B3801,B5501,C0303,C1203	A0201	115	259	gvayvsvLv	gvayvsvLv	gvayvsvRv
LO5004	DGKQ	4	960816	C	A	A0201,A2601,B3801,B5501,C0303,C1203	C0303	45	22817	vgvayvsvL	vgvayvsvL	vgvayvsvR
LO5004	DGKQ	4	960815	C	A	A0201,A2601,B3801,B5501,C0303,C1203	C0303	195	74	vayvsvLve	vayvsvLve	vayvsvRve
LO5004	DGKQ	4	960815	C	A	A0201,A2601,B3801,B5501,C0303,C1203	C1203	112	84	vayvsvLvt	vayvsvLvt	vayvsvRvt
LO5004	LRPAP1	4	3517916	T	C	A0201,A2601,B3801,B5501,C0303,C1203	C0303	142	130	teGprvidl	teGprvidl	teEprvidl
LO5004	LRPAP1	4	3517916	T	C	A0201,A2601,B3801,B5501,C0303,C1203	C1203	56	125	aefeGprvi	aefeGprvi	aefeEprvi
LO5004	WDFY3	4	85654578	T	C	A0201,A2601,B3801,B5501,C0303,C1203	A0201	222	81	mfynRypyv	mfynRypyv	mfynHypyv
LO5004	WDFY3	4	85654578	T	C	A0201,A2601,B3801,B5501,C0303,C1203	C1203	251	502	dmfynRypy	dmfynRypy	dmfynHypy
LO5004	WDFY3	4	85654578	T	C	A0201,A2601,B3801,B5501,C0303,C1203	C1203	61	47	mfynRypyv	mfynRypyv	mfynHypyv
LO5004	WWC2	4	184161411	C	A	A0201,A2601,B3801,B5501,C0303,C1203	C1203	466	437	qgietRqi	qgietRqi	qgietHqi
LO5004	KIAA0947	5	5443315	A	G	A0201,A2601,B3801,B5501,C0303,C1203	A2601	299	414	dthqGyarv	dthqGyarv	dthqEyarv
LO5004	KIAA0947	5	5443315	A	G	A0201,A2601,B3801,B5501,C0303,C1203	C1203	371	863	dthqGyarv	dthqGyarv	dthqEyarv
LO5004	F8XL7	5	15928056	C	T	A0201,A2601,B3801,B5501,C0303,C1203	C0303	491	344	paRcpLnl	paRcpLnl	paHcpPnl
LO5004	DOCK2	5	169446111	A	G	A0201,A2601,B3801,B5501,C0303,C1203	C1203	390	312	kRfeneIll	kRfeneIll	kEfeneIll
LO5004	KIAA1244	6	138642316	G	A	A0201,A2601,B3801,B5501,C0303,C1203	C1203	312	176	cvRkptet	cvRkptet	cvEkptet
LO5004	CAMK2B	7	44269098	G	T	A0201,A2601,B3801,B5501,C0303,C1203	C1203	204	358	kaTrvpdll	kaTrvpdll	kaPrvpdll
LO5004	PTPRN2	7	157903551	T	C	A0201,A2601,B3801,B5501,C0303,C1203	A0201	300	205	rlRvpssa	rlRvpssa	rlQvpssa
LO5004	KBTBD11	8	1950710	A	G	A0201,A2601,B3801,B5501,C0303,C1203	C0303	5	18	favahEatt	favahEatt	favahEatt
LO5004	KBTBD11	8	1950710	A	G	A0201,A2601,B3801,B5501,C0303,C1203	C1203	19	38	favahGatt	favahGatt	favahEatt
LO5004	GPSM1	9	139235352	C	T	A0201,A2601,B3801,B5501,C0303,C1203	C0303	35	60	Marnmvaql	Marnmvaql	Tarnmvaql
LO5004	GPSM1	9	139235352	C	T	A0201,A2601,B3801,B5501,C0303,C1203	C1203	41	213	Marnmvaql	Marnmvaql	Tarnmvaql
LO5004	SEC16A	9	139354519	G	T	A0201,A2601,B3801,B5501,C0303,C1203	A0201	248	131	qlnYgrmpa	qlnYgrmpa	qlnSgrmpa
LO5004	SEC16A	9	139354519	G	T	A0201,A2601,B3801,B5501,C0303,C1203	A0201	19	113	lnYgrmpaa	lnYgrmpaa	lnSgrmpaa
M4945	DRAXIN	1	11766544	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	377	2584	sqaqYgavv	sqaqYgavv	sqaqDgavv
M4945	DRAXIN	1	11766544	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	479	2139	aqYgavvta	aqYgavvta	aqDgavvta
M4945	SYTL1	1	27679820	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	6	31	asrqrtrfv	asrqrtrfv	asrqrtrVv
M4945	SYTL1	1	27679820	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	58	131	rqrtrfvrr	rqrtrfvrr	rqrtrVvrr
M4945	SYTL1	1	27679820	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	3	3	rtrfvrrsl	rtrfvrrsl	rtrVvrrsl
M4945	SYTL1	1	27679820	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	221	22	fvrrslspv	fvrrslspv	Vvrrslspv
M4945	SYTL1	1	27679820	G	T	A0201,A3001,B1302,B4403,C0602,C1602	C0602	260	251	asrqrtrfv	asrqrtrfv	asrqrtrVv
M4945	SYTL1	1	27679820	G	T	A0201,A3001,B1302,B4403,C0602,C1602	C0602	338	4725	trfvrrsls	trfvrrsls	trVvrrsls
M4945	PPP1R8	1	28157381	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	8	466	Lfdcptwa	Lfdcptwa	Pfdcptwa
M4945	LCK	1	32741252	C	G	A0201,A3001,B1302,B4403,C0602,C1602	A0201	139	450	fliGesest	fliGesest	fliGesest

Figure 21 (Cont.)

M4945	KIAA0319L	1	35919190	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	209	560	gskssddrfk	gskssddrfk	gskssddrQk
M4945	HECTD3	1	45476222	G	A	A0201,A3001,B1302,B4403,C0602,C1602	C0602	8	36	frweqvvdf	frweqvvdf	lrweqvvdf
M4945	FAAH	1	46860037	T	C	A0201,A3001,B1302,B4403,C0602,C1602	A0201	251	61	vqvsPwasl	vqvsPwasl	vqvsLwasf
M4945	ACOT11	1	55050466	A	T	A0201,A3001,B1302,B4403,C0602,C1602	C0602	136	194	chTnqrgel	chTnqrgel	chTnqrgel
M4945	DOCK7	1	63005260	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	10	2247	mYrglvfsl	mYrglvfsl	mDrglvfsl
M4945	DOCK7	1	63005263	T	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	6	14	flndlfsvl	flndlfsvl	flndlfsvM
M4945	ACADM	1	76211503	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	18	57	kanwyflFa	kanwyflFa	kanwyflLa
M4945	FAM69A	1	93332753	T	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	32	40	kfkemvYsl	kfkemvYsl	kfkemvYsl
M4945	FAM69A	1	93332753	T	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	89	197	kemvFsifk	kemvFsifk	kemvYsifk
M4945	FAM69A	1	93332753	T	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	72	112	mvFsifkak	mvFsifkak	mvYsifkak
M4945	HSD3B2	1	119958098	T	C	A0201,A3001,B1302,B4403,C0602,C1602	A0201	204	193	lfgqrlArl	lfgqrlArl	lfgqrlVrl
M4945	HSD3B2	1	119958098	T	C	A0201,A3001,B1302,B4403,C0602,C1602	A3001	28	71	gqrlArlfw	gqrlArlfw	gqrlVrlfw
M4945	CGN	1	151503159	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	41	325	fldrlvdfl	fldrlvdfl	ldrlvdfl
M4945	CGN	1	151503189	G	T	A0201,A3001,B1302,B4403,C0602,C1602	B4403	42	251	aeleeqqrF	aeleeqqrF	aeleeqqrL
M4945	FAM69A	1	154318891	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	68	40	qlVdyqsfa	qlVdyqsfa	qlAdyqsfa
M4945	ATP8B2	1	154318891	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	44	349	lVdyqsfav	lVdyqsfav	lAdyqsfav
M4945	ATP8B2	1	154319891	C	T	A0201,A3001,B1302,B4403,C0602,C1602	C0602	15	431	trddgtqfv	trddgtqfv	trddgtqlA
M4945	SCYL3	1	169847812	T	C	A0201,A3001,B1302,B4403,C0602,C1602	A0201	145	19	gtCdilkal	gtCdilkal	gtYdilkal
M4945	PPFIA4	1	203020989	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	114	4892	vhrrysalR	vhrrysalR	vhrrysalR
M4945	ZP4	1	238050159	C	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	381	2049	trrqtgHr	trrqtgHr	ttrqtgDr
M4945	ZP4	1	238050189	C	G	A0201,A3001,B1302,B4403,C0602,C1602	C0602	328	1385	Hravyenel	Hravyenel	Dravyenel
M4945	PLD5	1	242287930	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	185	1150	vlfyncsFl	vlfyncsFl	vlfyncsCl
M4945	PLD5	1	242287930	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	216	1672	ifyncsFlv	ifyncsFlv	ifyncsClv
M4945	PLD5	1	242287930	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	60	2064	FlvEdlqrl	FlvEdlqrl	ClvEdlqrl
M4945	VN1R5	1	247419636	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	5	23	mlishlYli	mlishlYli	mlishlSli
M4945	VN1R5	1	247419636	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	119	374	hlYlhlill	hlYlhlill	hlSlhlill
M4945	VN1R5	1	247419636	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	124	902	Ylhlillf	Ylhlillf	Slhlillf
M4945	VN1R5	1	247419636	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	190	164	ishlYlhli	ishlYlhli	ishlSlhli
M4945	VN1R5	1	247419636	C	A	A0201,A3001,B1302,B4403,C0602,C1602	C0602	348	139	shlYlhlil	shlYlhlil	shlSlhlil
M4945	ORGF1	1	247875186	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	6	5	vlnpflyMl	vlnpflyMl	vlnpflyTl
M4945	TRIM58	1	248039510	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	3	4	ymrFlaspsv	ymrFlaspsv	ymVlaspsv
M4945	TRIM58	1	248039510	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	6	35	Flaspsvpl	Flaspsvpl	Vlaspsvpl
M4945	CAMK1D	10	12856257	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	7	9	klfeqilKa	klfeqilKa	klfeqilKa
M4945	CAMK1D	10	12856257	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	181	543	klfeqilNa	klfeqilNa	klfeqilKa
M4945	CAMK1D	10	12856257	G	T	A0201,A3001,B1302,B4403,C0602,C1602	B4403	124	200	feqilNaey	feqilNaey	feqilKaey
M4945	CUBN	10	16852480	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	220	24206	slnssdpdv	slnssdpdv	sPnssdpdv
M4945	GPR158	10	25888174	G	A	A0201,A3001,B1302,B4403,C0602,C1602	B4403	329	151	Kelwdsfkv	Kelwdsfkv	Eelwdsfkv
M4945	NCOA4	10	515792257	A	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	84	92	vlraelqik	vlraelqik	vlraeQqik
M4945	NCOA4	10	515792257	A	T	A0201,A3001,B1302,B4403,C0602,C1602	B4403	247	817	aeLqikdnl	aeLqikdnl	aeQqikdnl
M4945	UNC5B	10	72972770	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	34	18	gargflla	gargflla	gargAlla
M4945	UNC5B	10	72972770	G	A	A0201,A3001,B1302,B4403,C0602,C1602	C0602	183	618	arsgargfl	arsgargfl	arsgargAl
M4945	KCNMA1	10	78647061	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	432	151	ksresldkq	ksresldkq	ksresRdkq
M4945	KCNMA1	10	78647061	C	A	A0201,A3001,B1302,B4403,C0602,C1602	C0602	354	17666	nrpksresl	nrpksresl	nrpksresR
M4945	BLNK	10	97990569	T	C	A0201,A3001,B1302,B4403,C0602,C1602	B4403	142	246	eeEqwsddf	eeEqwsddf	eeEqwsddf
M4945	PNLIPRP2	10	118385573	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	7	1266	lmrckkmfev	lmrckkmfev	Dmrckkmfev
M4945	PNLIPRP2	10	118385573	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	486	5143	kaedswpsl	kaedswpsl	kaedswpsD
M4945	FAM24A	10	124671166	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	147	31	kmfNlrtkl	kmfNlrtkl	kmfDlrtkl
M4945	FAM24A	10	124671166	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	436	2835	nakmfNlrt	nakmfNlrt	nakmfDlrt
M4945	CHST15	10	125804293	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	46	55	rfrstfdTl	rfrstfdTl	rfrstfdAl

Figure 21 (Cont.)

M4945	CHST15	10	125804291	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	115	282	rstfdTlrk	rstfdAlrk
M4945	TCERG1L	10	132915093	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	267	1178	rvNhfrdml	rvThfrdml
M4945	TCERG1L	10	132915093	G	T	A0201,A3001,B1302,B4403,C0602,C1602	C0602	227	618	ervNhfrdm	ervThfrdm
M4945	TUBGCP2	10	135107198	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	119	25936	gMyvsaqpl	gRyvsaqpl
M4945	TUBGCP2	10	135107198	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	242	43	Myvsaqpla	Ryvsaqpla
M4945	CTSD	11	1782696	A	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	312	371	alvrTplhk	alvrIplhk
M4945	PRKCDBP	11	6341559	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	238	89	larrKggla	larrQggla
M4945	DCHS1	11	6645605	T	C	A0201,A3001,B1302,B4403,C0602,C1602	A0301	44	38	tlftMvgtv	tlftIvgtv
M4945	DCHS1	11	6645605	T	C	A0201,A3001,B1302,B4403,C0602,C1602	A0201	30	139	ftMvgtval	ftIvgtval
M4945	OR10A2	11	6891025	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	58	54	sllfitflt	slLfitflt
M4945	OR10A2	11	6891025	C	A	A0201,A3001,B1302,B4403,C0602,C1602	B4403	125	62	teiqsllfl	teiqslLfl
M4945	RBMXL2	11	7110583	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	17	39	sldgkTikv	sldgkAikv
M4945	RBMXL2	11	7110583	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	162	65	ksldgkTik	ksldgkAik
M4945	RBMXL2	11	7110583	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	39	9	Tikvaqatk	Aikvaqatk
M4945	OR10A3	11	7960556	G	T	A0201,A3001,B1302,B4403,C0602,C1602	C0602	179	17361	gHneinhlf	gPneinhlf
M4945	PARVA	11	12495317	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	276	22	gInainlpl	gMnainlpl
M4945	TPH1	11	18042599	T	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	28	145	amnelLhdl	amnelQhdl
M4945	F2	11	46741289	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	425	620	rsllHrvrr	rsllQrvrr
M4945	MYBPC3	11	47357495	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	411	1598	slkCrpper	slkWrpper
M4945	OR152	11	57970897	T	C	A0201,A3001,B1302,B4403,C0602,C1602	A3001	95	221	kwkafsAcg	kwkafsTcg
M4945	MTL5	11	68517702	A	G	A0201,A3001,B1302,B4403,C0602,C1602	A0201	327	144	avlplgaRv	avlplgaWv
M4945	MRGPRF	11	68772877	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	17	26	Wiweplrvv	Rlweplrvv
M4945	SLC36A4	11	92895942	T	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	119	205	tlyvtlaSl	tlyvtlaTl
M4945	MFRP	11	119215467	C	T	A0201,A3001,B1302,B4403,C0602,C1602	B4403	328	40741	rEscahdef	rGscahdef
M4945	CHD4	12	6711546	T	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	14	112	kskrqkMer	kskrqkKer
M4945	CHD4	12	6711546	T	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	20	27	rqkMermll	rqkKermll
M4945	CHD4	12	6711546	T	A	A0201,A3001,B1302,B4403,C0602,C1602	C0602	306	206	krqkMerml	krqkKerml
M4945	FAM222A	12	110206690	G	T	A0201,A3001,B1302,B4403,C0602,C1602	B4403	187	282	peacggLay	peacggRay
M4945	MPHOSPH9	12	123661241	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	21	66	rihvrpsHa	rihvrpsRa
M4945	MPHOSPH9	12	123661241	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	19	17	hvrpsHant	hvrpsRant
M4945	MPHOSPH9	12	123661241	C	T	A0201,A3001,B1302,B4403,C0602,C1602	C0602	20	45	vrpsHantl	vrpsRantl
M4945	ZNF268	12	133779594	A	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	7	6	hqrthtgGk	hqrthtgEk
M4945	ZNF268	12	133779594	A	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	22	104	rthtgGkpy	rthtgEkpy
M4945	ZNF268	12	133779594	A	G	A0201,A3001,B1302,B4403,C0602,C1602	C0602	234	209	thtgGkpyv	thtgEkpyv
M4945	PSPC1	13	20277431	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	204	332	rtgsKtpqa	rtgsEtpqa
M4945	PSPC1	13	20277431	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	243	10951	gsKtpqapm	gsEtpqapm
M4945	PCCA	13	100807336	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	152	61	aikktMaqa	aikktRaqa
M4945	MYO16	13	109859068	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	63	67	ilhNaeprv	ilhHaeprv
M4945	ACOT1	14	74004385	A	G	A0201,A3001,B1302,B4403,C0602,C1602	A0201	338	668	alepGkplv	alepEkplv
M4945	LDHAL6B	15	59499231	G	C	A0201,A3001,B1302,B4403,C0602,C1602	A0301	187	2937	gmalcpPqa	gmalcpRqa
M4945	SCAPER	15	77021077	T	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	154	8449	qArkralea	qErkralea
M4945	SLC28A1	15	85461805	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	27	21	cvisvlyQv	cvisvlyHv
M4945	SLC28A1	15	85461805	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	12	6057	yQvglmqwv	yHvglmqwv
M4945	GFER	16	2034898	T	C	A0201,A3001,B1302,B4403,C0602,C1602	A0201	270	247	hlfPkfypc	hlfSkfypc
M4945	GFER	16	2034898	T	C	A0201,A3001,B1302,B4403,C0602,C1602	A3001	46	97	aqfihlfPk	aqfihlfSk
M4945	SMG1	16	18875348	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	7	13	agrnsSspk	agrnsAspk
M4945	EARS2	16	23568528	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	3	10	rvrfapspl	rvrfapspT
M4945	CBLN1	16	49315370	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	174	138	mlCvlelll	mlGvlelll
M4945	TAT	16	71607468	A	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	22	127	asyyhRpea	asyyhCpea

Figure 21 (Cont.)

M4945	TAT	16	71607468	A	G	A0201,A3001,B1302,B4403,C0602,C1602	B4403	453	719	eaiasyyhR	eaiasyyhC
M4945	GSG2	17	36274G1	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	25	84	rWrrrrpgg	rRrrrrpgg
M4945	OLG4	17	7099591	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	26	48	slSsgtasl	slSsgtasl
M4945	KRBA2	17	8273015	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	10	53	kqahevfsv	kqahevfsv
M4945	TRIM16	17	15539387	C	G	A0201,A3001,B1302,B4403,C0602,C1602	A0201	18	17	Tmaaisnty	Rmaaisnty
M4945	C17orf75	17	30661839	A	G	A0201,A3001,B1302,B4403,C0602,C1602	A0201	28	22	aisytpAev	aisytpVev
M4945	PLEKHM1	17	43553058	C	T	A0201,A3001,B1302,B4403,C0602,C1602	B4403	205	435	selehltfi	selehltfV
M4945	RTBDN	17	72353182	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	9	129	aSrrrtvwnv	aGrrrtvwnv
M4945	FASN	17	80043541	C	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	162	384	ltrAdlssi	krGdlssi
M4945	FASN	17	80043708	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	16	10	hlysripCl	hlysripGl
M4945	FASN	17	80043708	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	146	65	Clsphpll	Glsphpll
M4945	PIGN	18	59751795	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	25	17	ftvfkHfm	ftvfpPfm
M4945	PIGN	18	59751795	G	T	A0201,A3001,B1302,B4403,C0602,C1602	C0602	113	12596	sHimmgdm	sPimmgdm
M4945	SALL3	18	76754149	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	426	1315	raftttkGnl	raftttkGml
M4945	TPGS1	19	507657	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	88	75	mlraTlkv	mlraAlkv
M4945	TPGS1	19	507657	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	62	29	mlraTlkv	mlraAlkv
M4945	HMHA1	19	1083824	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	109	98	rkkGlyrvn	rkkGlyrvn
M4945	SBNO2	19	1122195	C	A	A0201,A3001,B1302,B4403,C0602,C1602	C0602	84	88	Hhrtrlrgl	Qhrsrlrai
M4945	APC2	19	1456130	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	444	465	elleaqdQv	elleaqdRv
M4945	PTPRS	19	5240231	A	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	302	1204	itlsRqppr	itlsWsppr
M4945	PTPRS	19	5240281	A	T	A0201,A3001,B1302,B4403,C0602,C1602	B4403	470	5	setsitksR	setsitkW
M4945	MLLT1	19	6222269	A	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	353	207	rtsssssft	rtsssssfS
M4945	DENND1C	19	6471495	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	192	1606	fieaWlekl	fieaRlekl
M4945	SMARCA4	19	11144072	C	G	A0201,A3001,B1302,B4403,C0602,C1602	A0201	51	51	ilaaAkykl	ilaaGkykl
M4945	SMARCA4	19	11144072	C	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	12	13	klaaAkyk	klaaGkyk
M4945	BRD4	19	15355236	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	165	341	ksLpppfia	ksSpppfia
M4945	MAST3	19	18246536	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	109	1635	rlrqspll	rlrqspID
M4945	GRAMD1A	19	35504236	A	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	99	1021	itsedtdyv	itsedEdyv
M4945	LGI4	19	35624949	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	417	532	flripFlhl	flripSlhl
M4945	LGI4	19	35624949	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	458	2336	Flhllfts	Slhllfts
M4945	LGI4	19	35624949	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	115	470	gsflripll	gsflripSl
M4945	LGI4	19	35624949	G	A	A0201,A3001,B1302,B4403,C0602,C1602	C0602	37	32	lripFlhll	lripSlhl
M4945	NUMBL	19	41183182	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	454	1324	sfrlsRggr	sfrlsGggr
M4945	NUMBL	19	41183182	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	480	1218	rlsRgprpa	rlsGgprpa
M4945	ZC3H4	19	47575370	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	79	108	gvrfpVpgg	gvrfpSpgg
M4945	PPFIA3	19	49637375	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	82	78	lisesneCl	lisesneRl
M4945	PPFIA3	19	49637375	C	T	A0201,A3001,B1302,B4403,C0602,C1602	B4403	494	825	sesneCdl	sesneRlql
M4945	POLD1	19	50919042	A	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	482	215	rvpywlsa	rvpywlSa
M4945	VN1R2	19	53762460	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	19	25	lmlFwasssl	lmlLwasssl
M4945	ZNF813	19	53994247	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	148	127	kvfnQkrnl	kvfnRkrnl
M4945	NLRP12	19	54310777	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	384	504	glrYpnckl	glrHpnckl
M4945	TMEM86B	19	55739559	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	322	392	fvpGmaafa	fvpGmaafa
M4945	CCDC106	19	56162828	T	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	242	266	gasrrrVgk	gasrrrFgk
M4945	CCDC106	19	56162838	T	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	85	33	srrrVgkpk	srrrFgkpk
M4945	CCDC106	19	56162828	T	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	191	190	rrrVgkpka	rrrFgkpka
M4945	TPO	2	1500454	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	496	4647	ysFrhgyel	ysCrhgyel
M4945	TPO	2	1500454	G	T	A0201,A3001,B1302,B4403,C0602,C1602	C0602	64	387	ysFrhgyel	ysCrhgyel
M4945	MYCN	2	16082407	C	G	A0201,A3001,B1302,B4403,C0602,C1602	C0602	35	10653	eRpswvtem	ePpswvtem
M4945	MPVI7	2	27534810	C	G	A0201,A3001,B1302,B4403,C0602,C1602	A0201	11	6	ylvrpPvqla	ylvrpAvqla

Figure 21 (Cont.)

M4945	REG3A	2	79385817	T	C	A0201,A3001,B1302,B4403,C0602,C1602	A3001	47	13	kaygshcCa	kaygshcYa
M4945	REG3A	2	79385817	T	C	A0201,A3001,B1302,B4403,C0602,C1602	A3001	86	25	gshcCalll	gshcYalll
M4945	SFT2D3	2	128459121	C	A	A0201,A3001,B1302,B4403,C0602,C1602	C0602	351	225	lhrKlqeyl	lhrQlqeyl
M4945	LRP1B	2	141751663	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	82	11321	Kfrcknrhc	Efrcknrhc
M4945	EVX2	2	176945475	A	G	A0201,A3001,B1302,B4403,C0602,C1602	A0201	85	122	ytyTmthaa	ytyMmthaa
M4945	FAM171B	2	187605158	C	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	226	712	yvltAlpwk	yvltPlpwk
M4945	PRR21	2	240982003	C	A	A0201,A3001,B1302,B4403,C0602,C1602	C0602	137	232	vhassptSl	vhassptAl
M4945	TGM3	20	2320540	A	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	17	41	rvrkpvnvR	rvrkpvnvQ
M4945	TGM3	20	2320540	A	G	A0201,A3001,B1302,B4403,C0602,C1602	C0602	241	181	vrkpvnvRm	vrkpvnvQm
M4945	INSM1	20	20348928	T	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	249	133	rgfQvkrsk	rgfLvkrsk
M4945	LAMA5	20	60905664	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	45	735	atMvftthv	atVvftthv
M4945	LAMA5	20	60905664	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	117	582	atMvftthv	atVvftthv
M4945	LAMA5	20	60905664	C	T	A0201,A3001,B1302,B4403,C0602,C1602	C0602	91	110	lrepqatMv	lrepqatVv
M4945	RBBP8NL	20	60991911	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	394	3816	glYdrcmvt	glCdrcmvt
M4945	RBBP8NL	20	60991911	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	312	147	rlraglYdr	rlraglCdr
M4945	NPBWR2	20	62737553	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	426	2000	qvwfkVsrv	qvwfkAsrv
M4945	NPBWR2	20	62737553	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	315	2318	kVsrvytlv	kAsrvytlv
M4945	NPBWR2	20	62737553	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	107	443	kVsrvytlv	kAsrvytlv
M4945	NPBWR2	20	62737553	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	55	11	Vsrvytlvl	Asrvytlvl
M4945	NPBWR2	20	62737553	G	A	A0201,A3001,B1302,B4403,C0602,C1602	C0602	274	215	fkVsrvytl	fkAsrvytl
M4945	XKR3	22	17288812	C	G	A0201,A3001,B1302,B4403,C0602,C1602	B4403	28	34	gevafAlym	gevafGlym
M4945	SMTN	22	31487823	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	5	13	ssrggFsik	ssrggCsik
M4945	SH3BP1	22	38044382	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	14	69	kmIpsniai	kmTpsniai
M4945	SH3BP1	22	38044382	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	85	403	mIpsniaiv	mTpsniaiv
M4945	SH3BP1	22	38044382	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	269	399	kmIpsniai	kmTpsniai
M4945	FANCD2	3	10122824	A	G	A0201,A3001,B1302,B4403,C0602,C1602	C0602	175	8806	qRrsaqeiv	qQrsaqeiv
M4945	XPC	3	14199948	C	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	4	4	rtkaRsksa	rtkaGsksa
M4945	XPC	3	14199948	C	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	19	5121	kaRsksasr	kaGsksasr
M4945	XPC	3	14199948	C	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	66	1305	Rsksasrth	Gsksasrth
M4945	DNAH1	3	52415830	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	11	14	Itrlashma	Ltrlashma
M4945	APPL1	3	57294666	C	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	14	172	vtrltfplR	vtrltfplP
M4945	APPL1	3	57294666	C	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	141	12559	plRcvvlya	plPcvvlya
M4945	C3orf58	3	143691263	T	C	A0201,A3001,B1302,B4403,C0602,C1602	A0201	16	35	lmvPhspsl	lmvLhspsl
M4945	CCDC39	3	180370000	T	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	55	5605	alWkniski	alRkniski
M4945	TMEM129	4	1719912	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	201	135	rvaNtnpav	rvaStnpav
M4945	TMEM129	4	1719912	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	87	101	rvaNtnpav	rvaStnpav
M4945	ACOX3	4	8417530	T	C	A0201,A3001,B1302,B4403,C0602,C1602	A0201	65	23	gmyGsslaa	gmyDsslaa
M4945	EPHA5	4	66535423	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	298	138	agrrLppsg	agrrRppsg
M4945	WDFY3	4	85707132	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	488	987	kaiakHlgi	kaiakQlgi
M4945	SLC9B2	4	103970081	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A0301	14	9	llahyllCl	llahyllGl
M4945	TACR3	4	104511020	A	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	226	4838	ssmytvtrK	ssmytvtrM
M4945	TACR3	4	104511020	A	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	26	19	vtrKesmtv	vtrMesmtv
M4945	TACR3	4	104511020	A	T	A0201,A3001,B1302,B4403,C0602,C1602	C0602	38	12	trKesmtvv	trMesmtvv
M4945	GALNT7	4	174242777	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	251	24606	dLsevlhqv	dRsevlhqv
M4945	KIAA0947	5	5464173	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	402	2312	ktsassrFe	ktsassrVe
M4945	KIAA0947	5	5464173	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	353	400	ssrFethqs	ssrVethqs
M4945	SEMA5A	5	9224935	T	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	9	33	marcpyspL	marcpyspQ
M4945	TRIO	5	14461158	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	20	18	ssndaNppa	ssndaSppa
M4945	CDH9	5	26881369	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	40	76	siadLlssl	siadSlssl

Figure 21 (Cont.)

M4945	SLC45A2	5	33954500	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	6	4	qtrrSmtlk	qtrrAmtlk
M4945	FCHO2	5	72351896	G	T	A0201,A3001,B1302,B4403,C0602,C1602	C0602	477	133	nrnlsnDel	nrnlsnEel
M4945	RASA1	5	86672224	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	160	159	fmrcKlsrl	fmrcQlsrl
M4945	RASA1	5	86672224	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	8	195	rcKlsrlqk	rcQlsrlqk
M4945	APC	5	112162827	A	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	271	202	glqaiaDll	glqaiaEll
M4945	MCC	5	112363016	T	A	A0201,A3001,B1302,B4403,C0602,C1602	B4403	50	6685	eensrphtY	eensrphtN
M4945	HSPA9	5	137910934	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	469	57	asrgptaaH	asrgptaaR
M4945	ADRA1B	5	159399008	G	C	A0201,A3001,B1302,B4403,C0602,C1602	C0602	121	262	fkrPfvril	fkrAfvril
M4945	CCNG1	5	162868280	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	7	7	kvkattVfq	kvkattAfq
M4945	CCNG1	5	162868280	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	315	105	kattVfqfl	kattAfqfl
M4945	PRSS16	6	27215551	T	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	435	181	aqwlgpQll	aqwlgpLll
M4945	PRSS16	6	27215551	T	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	20	7	Qllvslwgl	Lllvslwgl
M4945	SCAND3	6	28543358	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	62	49	ssrYqvdll	ssrCqvdll
M4945	TNXB	6	32029492	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	491	15123	saigvtaaK	saigvtaaE
M4945	PBX2	6	32157652	C	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	349	1731	gArgglglv	gGrgglglv
M4945	SLC29A1	6	44198335	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	172	577	safDyfita	safGyfita
M4945	SLC29A1	6	44198335	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	323	278	safDyfita	safGyfita
M4945	SLC29A1	6	44198335	G	A	A0201,A3001,B1302,B4403,C0602,C1602	B4403	94	34	sesafDyfi	sesafGyfi
M4945	DST	6	56481250	T	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	83	235	kthrFsvvd	kthrIsvvd
M4945	REV3L	6	111695347	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	19	46	klseyHnsl	klseyRnsl
M4945	REV3L	6	111695347	C	T	A0201,A3001,B1302,B4403,C0602,C1602	C0602	80	42	yHnsleskl	yRnsleskl
M4945	VGLL2	6	117591812	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	252	16079	aQselpfaa	aHselpfaa
M4945	CEP85L	6	118886705	T	A	A0201,A3001,B1302,B4403,C0602,C1602	C0602	82	446	frqgsVtpm	frqgsEtpm
M4945	GINM1	6	149887573	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	84	10224	gLlalrlll	gSlalrlll
M4945	SYNE1	6	152716775	A	G	A0201,A3001,B1302,B4403,C0602,C1602	A0201	220	29	klnlRihem	klnlWihem
M4945	MAS1	6	160328063	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	12	4564	svRnahrqi	svGnahrqi
M4945	MAS1	6	160328063	G	A	A0201,A3001,B1302,B4403,C0602,C1602	C0602	498	27741	vRnahrqip	vGnahrqip
M4945	CARD11	7	2984070	C	A	A0201,A3001,B1302,B4403,C0602,C1602	C0602	134	416	qrcellSrl	qrcellArl
M4945	CDK13	7	39991265	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	183	1104	slrsrkspl	slrsrkspS
M4945	CDK13	7	39991265	G	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	2	3	rsrksplpa	rsrkspSpa
M4945	NPC1L1	7	44556456	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	7	1854	fmlslclvL	fmlslclvP
M4945	NPC1L1	7	44556456	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	266	89	mlslclvLt	mlslclvPt
M4945	NPC1L1	7	44556456	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	260	455	slclvLtfa	slclvPtfa
M4945	NPC1L1	7	44556456	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	270	23832	vLtfavscl	vPtfavscl
M4945	NPC1L1	7	44556456	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	250	7624	Ltfavscll	Ptfavscll
M4945	NPC1L1	7	44556456	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	451	1958	Ltfavscll	Ptfavscll
M4945	LIMK1	7	73500134	C	T	A0201,A3001,B1302,B4403,C0602,C1602	C0602	239	47	qriydgqyF	qriydgqyL
M4945	POR	7	75615330	A	T	A0201,A3001,B1302,B4403,C0602,C1602	B4403	142	13978	reelaqfhW	reelaqfhR
M4945	POR	7	75615330	A	T	A0201,A3001,B1302,B4403,C0602,C1602	B4403	402	1091	eelaqfhWd	eelaqfhRd
M4945	POR	7	75615330	A	T	A0201,A3001,B1302,B4403,C0602,C1602	C0602	482	429	fhWdgaltq	fhRdgaltq
M4945	SEMA3A	7	83590897	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	111	1159	Cyrdfmqli	Wyrdfmqli
M4945	DOCK4	7	111398729	T	C	A0201,A3001,B1302,B4403,C0602,C1602	A3001	11	14	kfrCdrpfh	kfrYdrpfh
M4945	ATP6V0A4	7	138424302	G	T	A0201,A3001,B1302,B4403,C0602,C1602	C0602	303	4780	vyfgnpyTf	vyfgnpyPf
M4945	NOBOX	7	144101773	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	230	271	kaqeVppla	kaqeGppla
M4945	GIMAP8	7	150174233	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	42	6939	atRnsligs	atGnsligs
M4945	GIMAP8	7	150174233	G	A	A0201,A3001,B1302,B4403,C0602,C1602	C0602	154	20522	tRnsligsl	tGnsligsl
M4945	AGAP3	7	150839305	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	130	108	avrtvHgns	avrtvRgns
M4945	AGAP3	7	150839305	G	A	A0201,A3001,B1302,B4403,C0602,C1602	C0602	134	327	vrtvHgnsf	vrtvRgnsf
M4945	CSMD1	8	3015437	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	479	248	tvrrwnySs	tvrrwnyPs

Figure 21 (Cont.)

M4945	CSMD1	8	30154437	G	A	A0201,A3001,B1302,B4403,C0602,C1602	C0602	119	134	rrwnySspl	rrwnySspl	rrwnySspl
M4945	PCM1	8	17872255	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	494	7444	lvHrvkevk	lvHrvkevk	lvHrvkevk
M4945	UBR5	8	103341409	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	17	5678	hLratfgl	hLratfgl	hLratfgl
M4945	UBR5	8	103341409	G	A	A0201,A3001,B1302,B4403,C0602,C1602	C0602	161	40	ihhLratfl	ihhLratfl	ihhLratfl
M4945	PHF20L1	8	133806763	G	C	A0201,A3001,B1302,B4403,C0602,C1602	A0201	210	498	wiywdtsrTl	wiywdtsrTl	wiywdtsrTl
M4945	KCNK9	8	140630643	T	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	257	409	klspnyfLs	klspnyfLs	klspnyfLs
M4945	KCNK9	8	140630643	T	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	290	3413	yfLsisyki	yfLsisyki	yfLsisyki
M4945	KCNK9	8	140630643	T	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	15	12	hyfLsisyk	hyfLsisyk	hyfLsisyk
M4945	ZC3H3	8	144523122	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	8	14	rsrvsAshg	rsrvsAshg	rsrvsAshg
M4945	ZC3H3	8	144523122	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	381	194	rvsAshgpr	rvsAshgpr	rvsAshgpr
M4945	ZC3H3	8	144523122	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	424	671	vsAshgprk	vsAshgprk	vsAshgprk
M4945	ZNF707	8	144773874	C	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	29	82	vqrgArpga	vqrgArpga	vqrgArpga
M4945	PLEC	8	145000099	G	C	A0201,A3001,B1302,B4403,C0602,C1602	A0201	82	26	rGevesaal	rGevesaal	rGevesaal
M4945	FOCAD	9	20885197	T	C	A0201,A3001,B1302,B4403,C0602,C1602	A3001	101	28	masrgrslk	masrgrslk	masrgrslk
M4945	FOCAD	9	20885197	T	C	A0201,A3001,B1302,B4403,C0602,C1602	A3001	125	222	asrgrslkq	asrgrslkq	asrgrslkq
M4945	FOCAD	9	20885197	T	C	A0201,A3001,B1302,B4403,C0602,C1602	A3001	54	25	rslkqtsia	rslkqtsia	rslkqtsia
M4945	FOXB2	9	79634574	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	49	9436	mSrpgkssy	mSrpgkssy	mPrpgkssy
M4945	KIF27	9	86530349	T	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	3	856	ftfdfvfgl	ftfdfvfgl	ftfdfvfgl
M4945	KIF27	9	86530349	T	A	A0201,A3001,B1302,B4403,C0602,C1602	C0602	471	13124	ftfdfvfgl	ftfdfvfgl	ftfdfvfgK
M4945	GAS1	9	89561177	C	T	A0201,A3001,B1302,B4403,C0602,C1602	C0602	163	843	rrYdrdrsrc	rrYdrdrsrc	rrCdrdsrc
M4945	GOLGA1	9	127644196	T	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	335	10368	rAkpgpems	rAkpgpems	rEkpgpems
M4945	GOLGA1	9	127644196	T	G	A0201,A3001,B1302,B4403,C0602,C1602	C0602	381	430	vrAkpgpem	vrAkpgpem	vrEkpgpem
M4945	C9orf50	9	132377837	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	165	1821	gsrprqrY	gsrprqrY	gsrprqrC
M4945	C9orf50	9	132377837	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	39	31	rqrYpfrvr	rqrYpfrvr	rqrCpfrvr
M4945	C9orf50	9	132377837	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	125	1042	rYpfrvrfa	rYpfrvrfa	rCpfrvrfa
M4945	C9orf50	9	132377837	C	T	A0201,A3001,B1302,B4403,C0602,C1602	C0602	117	657	qrYpfrvrf	qrYpfrvrf	qrCpfrvrf
M4945	USP20	9	132625609	G	A	A0201,A3001,B1302,B4403,C0602,C1602	C0602	138	72	vHtdkkpal	vHtdkkpal	vRtdkkpal
M4945	MOSPD2	X	14910994	G	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	98	16	fqwrkeisl	fqwrkeisl	fqwrkeisV
M4945	CTPS2	X	16627721	A	G	A0201,A3001,B1302,B4403,C0602,C1602	A0201	382	234	ylgllaat	ylgllaat	ylgllaat
M4945	CTPS2	X	16711499	G	C	A0201,A3001,B1302,B4403,C0602,C1602	C0602	451	394	ihvslvAql	ihvslvAql	ihvslvPql
M4945	CCDC120	X	48923328	T	C	A0201,A3001,B1302,B4403,C0602,C1602	A3001	92	94	rsApatpvl	rsApatpvl	rsVpatpvl
M4945	AR	X	66766214	G	A	A0201,A3001,B1302,B4403,C0602,C1602	C0602	63	215	cryEdlasl	cryEdlasl	cryGdlasl
M4945	MED12	X	70345918	C	T	A0201,A3001,B1302,B4403,C0602,C1602	A3001	9	11	krrrnWpea	krrrnWpea	krrrnRpea
M4945	MED12	X	70345918	C	T	A0201,A3001,B1302,B4403,C0602,C1602	C0602	78	89	rrrnWpeaf	rrrnWpeaf	rrrnRpeaf
M4945	PABPC5	X	90630940	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	39	140	raMfyltsa	raMfyltsa	ralfyltsa
M4945	PABPC5	X	90630940	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A3001	83	139	raMfyltsa	raMfyltsa	ralfyltsa
M4945	BHLHB9	X	102004593	C	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	111	43	tiwpnaTav	tiwpnaTav	tiwpnaPav
M4945	MORC4	X	106242929	G	C	A0201,A3001,B1302,B4403,C0602,C1602	A3001	30	50	sshtrpLsa	sshtrpLsa	sshtrpFsa
M4945	MORC4	X	106242929	G	C	A0201,A3001,B1302,B4403,C0602,C1602	A3001	4	3	htrpLsaa	htrpLsaa	htrpFsaa
M4945	ATG4A	X	107381409	A	T	A0201,A3001,B1302,B4403,C0602,C1602	A0201	98	974	flgHgdel	flgHgdel	flgFgdel
M4945	DCX	X	110574261	C	G	A0201,A3001,B1302,B4403,C0602,C1602	A0201	88	32	sldenecrt	sldenecrt	sldenecrV
M4945	DCX	X	110574261	C	G	A0201,A3001,B1302,B4403,C0602,C1602	A0201	22	814	rLnkgnpsa	rLnkgnpsa	rVnkgnpsa
M4945	DCX	X	110574261	C	G	A0201,A3001,B1302,B4403,C0602,C1602	A3001	55	10	rLnkgnpsa	rLnkgnpsa	rVnkgnpsa
M4945	TRPC5	X	111155699	C	A	A0201,A3001,B1302,B4403,C0602,C1602	B4403	45	36	venefkaDy	venefkaDy	venefkaEy
M4945	ZCCHC12	X	117953993	T	A	A0201,A3001,B1302,B4403,C0602,C1602	A0201	275	2494	Kvieidtti	Kvieidtti	Kvieidtti
MA7027	CROCC	1	17264920	C	T	A2402,A,B0702,B5108,C0702,C1602	C0702	288	410	lriqeqYal	lriqeqYal	lriqeqAal
MA7027	IFI6	1	27992956	T	C	A2402,A,B0702,B5108,C0702,C1602	B0702	490	415	vvigSlgal	vvigSlgal	vvigNlgal
MA7027	MPC2	1	167904989	A	T	A2402,A,B0702,B5108,C0702,C1602	B0702	125	1635	rpMynhpag	rpMynhpag	rpIynhpag
MA7027	RFWD2	1	176054816	G	C	A2402,A,B0702,B5108,C0702,C1602	C0702	96	361	yfstrmsrM	yfstrmsrM	yfstrmsrI

Figure 21 (Cont.)

MA7027	TRIM58	1	248039577	A	T	A2402,A,B0702,B5108,C0702,C1602	C0702	389	3233	Vytaqeisf	Dyeageisf
MA7027	ZNF239	10	44052488	T	A	A2402,A,B0702,B5108,C0702,C1602	B0702	228	9320	rvftgerpf	rvftgerpY
MA7027	EXOC5	10	94693927	A	T	A2402,A,B0702,B5108,C0702,C1602	A2402	404	334	gyrSyftqi	gyrRyftqi
MA7027	EXOC5	10	94693927	A	T	A2402,A,B0702,B5108,C0702,C1602	A2402	453	202	Syftqivgf	Ryftqivgf
MA7027	EXOC6	10	94693927	A	T	A2402,A,B0702,B5108,C0702,C1602	C0702	68	82	Syftqivgf	Ryftqivgf
MA7027	PKD2L1	10	102052826	C	A	A2402,A,B0702,B5108,C0702,C1602	A2402	139	940	Cynktlkt	Cynktlkt
MA7027	EIF1AD5	11	299453	G	T	A2402,A,B0702,B5108,C0702,C1602	B0702	15	89	ypredtraH	ypredtraP
MA7027	AP2A2	11	986856	G	A	A2402,A,B0702,B5108,C0702,C1602	C0702	227	160	hretnRyt	hretnRyt
MA7027	OR9G4	11	56511070	G	T	A2402,A,B0702,B5108,C0702,C1602	A2402	355	157	IhtPmyffi	IhtPmyffi
MA7027	O89G4	11	56511070	G	T	A2402,A,B0702,B5108,C0702,C1602	C0702	169	146	hlhtPmyff	hlhtPmyff
MA7027	CDC42BPG	11	64594247	C	T	A2402,A,B0702,B5108,C0702,C1602	B0702	231	95	apeeikgQva	apeeikgRva
MA7027	MAP3K11	11	65380582	C	G	A2402,A,B0702,B5108,C0702,C1602	C0702	48	334	rvppphvlV	rvppphvlV
MA7027	AP5B1	11	65545931	G	A	A2402,A,B0702,B5108,C0702,C1602	B0702	31	87	rvkgpilvl	rvkgpilPvl
MA7027	OR3D51	11	123847606	A	G	A2402,A,B0702,B5108,C0702,C1602	C0702	23	22	Yvyppvcciy	Yvyppvciy
MA7027	DDX25	11	125792721	G	T	A2402,A,B0702,B5108,C0702,C1602	C0702	130	108	hfnsSikqi	hfnsSikqi
MA7027	TENC1	12	53453182	C	A	A2402,A,B0702,B5108,C0702,C1602	C0702	287	340	vypghvHgl	vypghvPgl
MA7027	GDF11	12	56142390	G	A	A2402,A,B0702,B5108,C0702,C1602	B0702	33	118	avqtNgspl	avqtDgspl
MA7027	MDM1	12	68708905	C	A	A2402,A,B0702,B5108,C0702,C1602	B0702	32	18258	aptipvrrL	aptipvrrR
MA7027	MDM1	12	68708905	C	A	A2402,A,B0702,B5108,C0702,C1602	B0702	40	12	ipvrrKlaw	ipvrrRlaw
MA7027	NAV3	12	78583958	G	T	A2402,A,B0702,B5108,C0702,C1602	A2402	478	33186	eYaiatfnv	eDaiatfnv
MA7027	NR1H4	12	100957170	G	T	A2402,A,B0702,B5108,C0702,C1602	C0702	423	316	gnteiitl	gnteiitl
MA7027	OR11H2	14	20181379	A	G	A2402,A,B0702,B5108,C0702,C1602	A2402	456	356	lfligsYti	lfligsYti
MA7027	PPP1R36	14	65054980	A	T	A2402,A,B0702,B5108,C0702,C1602	C0702	451	14121	rfpaemqkl	rfpaemqkH
MA7027	KIF26A	14	104639772	G	A	A2402,A,B0702,B5108,C0702,C1602	B0702	210	8464	Narrsshmi	Darrsshmi
MA7027	TPSG1	16	1275245	A	G	A2402,A,B0702,B5108,C0702,C1602	B0702	22	6311	afgasqlli	algasqlli
MA7027	MAPK8IP3	16	1756465	G	T	A2402,A,B0702,B5108,C0702,C1602	A2402	153	330	iyrefeSli	iyrefeRli
MA7027	SPIRE2	16	89927187	C	T	A2402,A,B0702,B5108,C0702,C1602	C0702	209	405	smtpdVkhl	smtpdAkhl
MA7027	MYH8	17	10315724	A	T	A2402,A,B0702,B5108,C0702,C1602	A2402	299	233	qyfNgvldi	qyflgvldi
MA7027	MYH8	17	10315724	A	T	A2402,A,B0702,B5108,C0702,C1602	B0702	70	99	qprqyfNgv	qprqyflgv
MA7027	KRT32	17	39623495	C	A	A2402,A,B0702,B5108,C0702,C1602	B0702	12	1204	rpasvcssV	rpasvcssG
MA7027	KIF2B	17	51901192	C	A	A2402,A,B0702,B5108,C0702,C1602	C0702	403	262	ylqnqtfcl	ylqnqtfcF
MA7027	AATK	17	79104922	G	T	A2402,A,B0702,B5108,C0702,C1602	B0702	49	60	gpEvyvlpl	gpDvyvlpl
MA7027	ENTHD2	17	79207488	G	A	A2402,A,B0702,B5108,C0702,C1602	C0702	171	222	ifsdlvlpl	ifsdTvlpl
MA7027	ZNF491	19	11917051	A	T	A2402,A,B0702,B5108,C0702,C1602	B0702	29	11	Wphtrekpf	Rphtrekpf
MA7027	SSBP4	19	18542194	A	G	A2402,A,B0702,B5108,C0702,C1602	B0702	7	8	sphNpnapm	sphNpnapm
MA7027	ATP13A1	19	19770777	G	A	A2402,A,B0702,B5108,C0702,C1602	C0702	226	328	eydpskVtf	eydpskAtf
MA7027	ALKBH6	19	36500443	G	T	A2402,A,B0702,B5108,C0702,C1602	B0702	10	19	qprppTrpt	qprppPrpt
MA7027	ALKBH6	19	36500443	G	T	A2402,A,B0702,B5108,C0702,C1602	B0702	36	91	ppTrpttsl	ppPrpttsl
MA7027	CD177	19	43866447	G	T	A2402,A,B0702,B5108,C0702,C1602	B0702	20	14	apahvtgvv	apahvWgvv
MA7027	ZNF468	19	53345307	A	G	A2402,A,B0702,B5108,C0702,C1602	C0702	232	972	skePnvrii	skeSnvrii
MA7027	LILRA2	19	55087309	C	A	A2402,A,B0702,B5108,C0702,C1602	B0702	30	15	rpsivqTv	rpsivqPv
MA7027	NAT14	19	55997928	G	C	A2402,A,B0702,B5108,C0702,C1602	B0702	115	12988	aPvklgira	aAvklgira
MA7027	ZNF530	19	58117933	G	T	A2402,A,B0702,B5108,C0702,C1602	C0702	347	7966	yrhrsahtS	yrhrsahtS
MA7027	RTN4	2	55276934	G	A	A2402,A,B0702,B5108,C0702,C1602	B0702	344	1352	tppapapaV	tppapapaA
MA7027	IL18R1	2	102864437	A	T	A2402,A,B0702,B5108,C0702,C1602	B0702	158	21	npWsssria	npAsssria
MA7027	NEB	2	152487791	C	A	A2402,A,B0702,B5108,C0702,C1602	B0702	98	114	vpigsmdvF	vpigsmdvV
MA7027	CASP10	2	202093792	A	G	A2402,A,B0702,B5108,C0702,C1602	B0702	23	23	ppmrrwGsv	ppmrrwSsv
MA7027	MARCH4	2	217334671	G	T	A2402,A,B0702,B5108,C0702,C1602	B0702	212	84	ppvTpppsi	ppvTpppsi
MA7027	TGM6	20	2397917	A	T	A2402,A,B0702,B5108,C0702,C1602	A2402	108	40	vyskavkl	vyskavkl

Figure 21 (Cont.)

MA7027	TGM6	20	2397917	A	T	A2402,A,B0702,B5108,C0702,C1602	C0702	367	677	vyskavktl	vyskavktl	vyskavktl
MA7027	GRAMD4	22	47059938	C	T	A2402,A,B0702,B5108,C0702,C1602	C0702	310	28772	rtlkrgakL	rtlkrgakP	rtlkrgakP
MA7027	SRGAP3	3	9827306	T	A	A2402,A,B0702,B5108,C0702,C1602	B0702	15	495	rpvrpvvqL	rpvrpvvqH	rpvrpvvqH
MA7027	LEPREL1	3	1896930812	G	T	A2402,A,B0702,B5108,C0702,C1602	C0702	463	1283	Ygyvegtvpl	Ygyvegtvpl	Ygyvegtvpl
MA7027	PCDH10	4	134072946	C	A	A2402,A,B0702,B5108,C0702,C1602	B0702	389	3107	rdagsTqal	rdagsPqal	rdagsPqal
MA7027	ADAM29	4	1758956824	G	T	A2402,A,B0702,B5108,C0702,C1602	A2402	39	162	CwlsyilpL	CwlsyilpF	CwlsyilpF
MA7027	ADAM29	4	1758956824	G	T	A2402,A,B0702,B5108,C0702,C1602	C0702	199	252	CwlsyilpL	CwlsyilpF	CwlsyilpF
MA7027	ATG10	5	81450299	G	T	A2402,A,B0702,B5108,C0702,C1602	C0702	438	1340	yhFtyscsy	yhVtyscsy	yhVtyscsy
MA7027	PCDHGA2	5	140720048	T	A	A2402,A,B0702,B5108,C0702,C1602	B0702	28	46	apksNisi	apksVisi	apksVisi
MA7027	TINAG	6	54244537	C	A	A2402,A,B0702,B5108,C0702,C1602	A2402	83	154	vshacyQlf	vshacyPlf	vshacyPlf
MA7027	COL10A1	6	116441979	C	T	A2402,A,B0702,B5108,C0702,C1602	B0702	274	10174	mpRhngeag	mpGhngeag	mpGhngeag
MA7027	DNAH11	7	21737798	G	T	A2402,A,B0702,B5108,C0702,C1602	A2402	381	4643	ahsrkfitL	ahsrkfitF	ahsrkfitF
MA7027	DNAH11	7	21737798	G	T	A2402,A,B0702,B5108,C0702,C1602	A2402	478	303	fytkckell	fytkckell	fytkckell
MA7027	DNAH11	7	21737798	G	T	A2402,A,B0702,B5108,C0702,C1602	C0702	60	529	fytickell	fytickell	fytickell
MA7027	DNAH11	7	21737803	C	T	A2402,A,B0702,B5108,C0702,C1602	A2402	54	303	lyMickell	lyMickell	lyTickell
MA7027	DNAH11	7	21737803	C	T	A2402,A,B0702,B5108,C0702,C1602	C0702	164	529	lyMickell	lyMickell	lyTickell
MA7027	CYP3A43	7	99434081	G	A	A2402,A,B0702,B5108,C0702,C1602	A2402	381	99	iyGthshkl	iyGthshkl	iyGthshkl
MA7027	CYP3A43	7	99434081	G	A	A2402,A,B0702,B5108,C0702,C1602	C0702	455	575	iyGthshkl	iyGthshkl	iyGthshkl
MA7027	MUC17	7	100682318	G	A	A2402,A,B0702,B5108,C0702,C1602	B0702	36	72	tpvMsnspv	tpvDsnspv	tpvDsnspv
MA7027	OR6B1	7	143701160	G	T	A2402,A,B0702,B5108,C0702,C1602	A2402	109	990	smLaamfli	smRaamfli	smRaamfli
MA7027	OR6B1	7	143701160	G	T	A2402,A,B0702,B5108,C0702,C1602	A2402	230	851	mLaamfli	mRaamfli	mRaamfli
MA7027	NOBOX	7	144098336	G	T	A2402,A,B0702,B5108,C0702,C1602	B0702	83	418	kpnamgIaQ	kpnamgIaP	kpnamgIaP
MA7027	RBM33	7	155538207	A	C	A2402,A,B0702,B5108,C0702,C1602	B0702	175	137	kpgvQrtvt	kpgvKrtvt	kpgvKrtvt
MA7027	SLC7A13	8	87229865	G	A	A2402,A,B0702,B5108,C0702,C1602	B0702	191	168	spHavlll	spTavlll	spTavlll
MA7027	SLC7A13	8	87229865	G	A	A2402,A,B0702,B5108,C0702,C1602	C0702	282	413	hsspHavl	hsspTavl	hsspTavl
MA7027	CSMD3	8	113421190	G	C	A2402,A,B0702,B5108,C0702,C1602	B0702	352	91	gpiEqssll	gpiTqssll	gpiTqssll
MA7027	FAM135B	8	139209861	G	A	A2402,A,B0702,B5108,C0702,C1602	C0702	349	548	hahkwYrdl	hahkwYrdl	hahkwYrdl
MA7027	FAM135B	8	139209861	G	A	A2402,A,B0702,B5108,C0702,C1602	C0702	59	571	wYrdtdll	wYrdTdll	wYrdTdll
MA7027	PUF60	8	144899886	C	A	A2402,A,B0702,B5108,C0702,C1602	A2402	440	1460	kfgavnLvl	kfgavnRvl	kfgavnRvl
MA7027	EXOSC4	8	145133696	T	C	A2402,A,B0702,B5108,C0702,C1602	B0702	95	15499	eFrkkqarm	eFrkkqarm	eFrkkqarm
MA7027	SLC39A4	8	145641370	C	T	A2402,A,B0702,B5108,C0702,C1602	C0702	486	513	arlsaaTvl	arlsaaAvl	arlsaaAvl
MA7027	C8orf66	9	215047	G	A	A2402,A,B0702,B5108,C0702,C1602	B0702	138	42	nlrVaggvl	nlrAaggvl	nlrAaggvl
MA7027	C8orf66	9	215047	G	A	A2402,A,B0702,B5108,C0702,C1602	B0702	30	53	rVaggvlpv	rAaggvlpv	rAaggvlpv
MA7027	OR13C9	9	107380103	G	C	A2402,A,B0702,B5108,C0702,C1602	A2402	73	38	ryvaicnAl	ryvaicnPl	ryvaicnPl
MA7027	PCLA1	X	24906190	G	C	A2402,A,B0702,B5108,C0702,C1602	B0702	72	21232	sPtgpkcpa	sRtgpkcpa	sRtgpkcpa
MA7027	PCDH11X	X	91134013	C	A	A2402,A,B0702,B5108,C0702,C1602	A2402	123	76	nwvttHttf	nwvttPttf	nwvttPttf
MA7027	ESX1	X	103498983	C	G	A2402,A,B0702,B5108,C0702,C1602	B0702	221	7208	Rpppaesgpq	Qpppaesgpq	Qpppaesgpq
MI9507	ZMYND11	10	267187	G	C	A0201,A1101,B0702,C0702	A0201	428	10330	ycfechtpL	ycfechtpA	ycfechtpG
MI9507	EXOSC1	10	99200940	C	T	A0201,A1101,B0702,C0702	A1101	41	24	nsRQgthrk	nsRQgthrk	nsRQgthrk
MI9507	SERPINA4	14	95035838	C	T	A0201,A1101,B0702,C0702	A1101	202	309	aqtnChlr	aqtnRhlr	aqtnRhlr
MI9507	HIC1	17	1960255	G	A	A0201,A1101,B0702,C0702	A0201	50	177	rladgfeaa	rladgAeaa	rladgAeaa
MI9507	CPD	17	28776501	T	G	A0201,A1101,B0702,C0702	C0702	163	196	yrhMwshel	yrhIwshel	yrhIwshel
MI9507	VEZF1	17	56052103	C	T	A0201,A1101,B0702,C0702	B0702	47	15	spvrvssTv	spvrvssAv	spvrvssAv
MI9507	ADAMTS10	19	8670187	G	T	A0201,A1101,B0702,C0702	B0702	444	505	rvdNngall	rvdHngall	rvdHngall
MI9507	ADAMTS10	19	8670187	G	T	A0201,A1101,B0702,C0702	C0702	195	161	trvdNngal	trvdHngal	trvdHngal
MI9507	OPRL1	20	62729760	C	T	A0201,A1101,B0702,C0702	A0201	16	116	lmirRtgv	lmirRtgv	lmirRtgv
MI9507	OPRL1	20	62729760	C	T	A0201,A1101,B0702,C0702	A1101	83	1141	ysimrRlr	ysimrRlr	ysimrRlr
MI9507	OPRL1	20	62729760	C	T	A0201,A1101,B0702,C0702	C0702	105	193	irWtgvrl	irRtgvrl	irRtgvrl
MI9507	MAATS1	3	119453516	C	T	A0201,A1101,B0702,C0702	A1101	66	865	vtlalqWqr	vtlalqRqr	vtlalqRqr

Figure 21 (Cont.)

NI9507	BTNL9	5	180474968	G	A	A0201,A1101,B0702,C0702	A0201	68	77	ilallgeev	ilalVgeev
NI9507	CCM2	7	45113873	G	A	A0201,A1101,B0702,C0702	A0201	12	29	ymltlHtkl	ymltiRtkl
NI9507	EGFR	7	55241672	T	G	A0201,A1101,B0702,C0702	A1101	28	26	riWketefk	riLketefk
NI9507	EGFR	7	55241708	G	C	A0201,A1101,B0702,C0702	A0201	175	900	vlAsgafgt	vlGsgafgt
NI9507	MAGED2	X	54841736	C	T	A0201,A1101,B0702,C0702	A0201	296	4763	aqyreameV	aqyreameA
NI9507	MAGED2	X	54841736	C	T	A0201,A1101,B0702,C0702	C0702	277	429	yreameVdl	yreameAdl
R7495_2	AJAP1	1	4834512	A	G	A1101,,B3801,B35132,C1203,C0401	C1203	256	387	ssdrhlVpv	ssdrhlIpv
R7495_2	DIRAS3	1	68512803	C	T	A1101,,B3801,B35132,C1203,C0401	A1101	48	145	asSnfrhey	asGnfrhey
R7495_2	IFI16	1	159021555	C	A	A1101,,B3801,B35132,C1203,C0401	C1203	462	195	mvlKatesf	mvlNatesf
R7495_2	MPZ	1	161279663	G	T	A1101,,B3801,B35132,C1203,C0401	C1203	388	477	spRpilavl	spSpilavl
R7495_2	ZP4	1	238048479	C	A	A1101,,B3801,B35132,C1203,C0401	C1203	125	15	qSlrgpvhl	qAlrgpvhl
R7495_2	ZP4	1	238048480	C	A	A1101,,B3801,B35132,C1203,C0401	C1203	13	15	Halrgpvhl	Qalrgpvhl
R7495_2	OR2C3	1	247695077	A	T	A1101,,B3801,B35132,C1203,C0401	C1203	217	1863	sshEavvsl	sshVavvsl
R7495_2	SLIT1	10	98806812	T	A	A1101,,B3801,B35132,C1203,C0401	A1101	36	6110	staelrlnY	staelrlnN
R7495_2	SLIT1	10	98806812	T	A	A1101,,B3801,B35132,C1203,C0401	C1203	115	1341	lnYneisll	lnNneisll
R7495_2	GPR123	10	134942233	T	C	A1101,,B3801,B35132,C1203,C0401	A1101	94	138	Lvlihhcak	Fvlihhcak
R7495_2	GPR123	10	134942233	T	C	A1101,,B3801,B35132,C1203,C0401	C1203	411	412	fcvtlglLv	fcvtlglFv
R7495_2	GPR123	10	134942233	T	C	A1101,,B3801,B35132,C1203,C0401	C1203	435	442	vtlglLvli	vtlglFvli
R7495_2	FRG2B	10	135440224	G	T	A1101,,B3801,B35132,C1203,C0401	B3801	132	8009	dHdlhcssi	dPdlhcssi
R7495_2	ANO5	11	22279281	G	A	A1101,,B3801,B35132,C1203,C0401	C1203	194	67	wyflsEatv	wyflsGatv
R7495_2	ANO5	11	22279281	G	A	A1101,,B3801,B35132,C1203,C0401	C1203	16	50	flsEatvtl	flsGatvtl
R7495_2	INTS5	11	62416374	T	A	A1101,,B3801,B35132,C1203,C0401	C1203	359	189	nmlnlavLl	nmlnlavHl
R7495_2	LRFN4	11	66625925	A	G	A1101,,B3801,B35132,C1203,C0401	A1101	129	1742	lsfsgnplR	lsfsgnplH
R7495_2	WNK1	12	977098	A	G	A1101,,B3801,B35132,C1203,C0401	C1203	79	145	fpAiherpv	fpTiherpv
R7495_2	NAV3	12	78513337	G	T	A1101,,B3801,B35132,C1203,C0401	B3801	209	271	sqnqYdvvl	sqnqDdvvl
R7495_2	NAV3	12	78513337	G	T	A1101,,B3801,B35132,C1203,C0401	C1203	10	45	nqYdvvlhv	nqDdvvlhv
R7495_2	TRPV4	12	110231799	T	C	A1101,,B3801,B35132,C1203,C0401	C1203	30	30	ypyrttvGy	ypyrttvDy
R7495_2	CDK2AP1	12	123751805	G	C	A1101,,B3801,B35132,C1203,C0401	A1101	27	39	Ssmatssqy	Tsmatssqy
R7495_2	CMA1	14	24975288	G	T	A1101,,B3801,B35132,C1203,C0401	C1203	395	1192	fEhnlqlcv	lDhnlqlcv
R7495_2	AKAP6	14	33015129	A	G	A1101,,B3801,B35132,C1203,C0401	C1203	229	217	msrGtpslv	msrStpslv
R7495_2	HERC2	15	28518046	G	A	A1101,,B3801,B35132,C1203,C0401	C1203	441	2433	Mlsqmlsai	Tlsqmlsai
R7495_2	SPTBN5	15	42158373	G	A	A1101,,B3801,B35132,C1203,C0401	A1101	333	1024	vsqWlqglr	vsqRlqglr
R7495_2	SPTBN5	15	42158373	G	A	A1101,,B3801,B35132,C1203,C0401	A1101	54	957	sqWlqglrk	sqRlqglrk
R7495_2	SLC24A1	15	65937992	C	T	A1101,,B3801,B35132,C1203,C0401	C1203	315	9155	lpavtvtpV	lpavtvtpA
R7495_2	DOC2A	16	30020555	C	A	A1101,,B3801,B35132,C1203,C0401	C1203	210	194	dpyFklhll	dpyVklhll
R7495_2	CES1	16	55862883	C	A	A1101,,B3801,B35132,C1203,C0401	C1203	93	873	wVhpssppv	wGhpssppv
R7495_2	TMEM95	17	7258938	C	T	A1101,,B3801,B35132,C1203,C0401	C1203	262	332	kvtekIhrv	kvtekThrv
R7495_2	CDR2L	17	72999783	C	A	A1101,,B3801,B35132,C1203,C0401	C1203	356	1297	pasrhagnI	pasrhagnL
R7495_2	TRIM65	17	73886888	A	G	A1101,,B3801,B35132,C1203,C0401	C1203	87	51	fpPgpqeev	fpLgpqeev
R7495_2	L3MBTL4	18	6138263	C	A	A1101,,B3801,B35132,C1203,C0401	A1101	294	548	Svcptpgcr	Avcptpgcr
R7495_2	LDLR	19	11213371	C	G	A1101,,B3801,B35132,C1203,C0401	A1101	135	14645	vtcksgdfR	vtcksgdfS
R7495_2	RGL3	19	11508168	G	A	A1101,,B3801,B35132,C1203,C0401	C1203	188	117	earviCvsi	earviRvsi
R7495_2	RASAL3	19	15568258	C	T	A1101,,B3801,B35132,C1203,C0401	A1101	33	22	rMlpseryk	rVlpseryk
R7495_2	UNC13A	19	17750278	G	T	A1101,,B3801,B35132,C1203,C0401	C1203	401	350	stvElitsi	stvDlitsi
R7495_2	ZNF540	19	38091932	A	T	A1101,,B3801,B35132,C1203,C0401	C1203	126	21929	lgysgskpV	lgysgskpD
R7495_2	ZNF540	19	38091932	A	T	A1101,,B3801,B35132,C1203,C0401	C1203	18	33	ysgskpVvi	ysgskpDvi
R7495_2	SCAF1	19	50154782	T	C	A1101,,B3801,B35132,C1203,C0401	C1203	331	2576	gaaPpppll	gaaLpppll
R7495_2	OTOF	2	26700700	G	A	A1101,,B3801,B35132,C1203,C0401	A1101	41	45	rsltLlinr	rsltPlinr
R7495_2	OTOF	2	26700700	G	A	A1101,,B3801,B35132,C1203,C0401	C1203	299	471	imrsltLli	imrsltPli

Figure 21 (Cont.)

R7495_3	TCF23	2	27372174	C	T	A1101,,B3801,B35132,C1203,C0401	C1203	105	6562	wsrngrwsrV	wsrngrwsrA
R7495_2	TET3	2	74329273	G	T	A1101,,B3801,B35132,C1203,C0401	C1203	200	607	yeytNvigp	yeytKvigp
R7495_2	POTEF	2	130832430	G	T	A1101,,B3801,B35132,C1203,C0401	B3801	381	4781	Rhatirldt	Rhatirldt
R7495_3	KCNH7	2	163223425	G	C	A1101,,B3801,B35132,C1203,C0401	C1203	415	1902	hAslpdssi	hFslpdssi
R7495_2	MIS18A	21	33651054	G	A	A1101,,B3801,B35132,C1203,C0401	C1203	401	17782	flcsgcrrL	flcsgcrrP
R7495_2	MB	22	36013259	C	G	A1101,,B3801,B35132,C1203,C0401	C1203	110	175	lvlnvwfkv	lvlnvwfKv
R7495_2	CCDC54	3	107096960	C	G	A1101,,B3801,B35132,C1203,C0401	A1101	67	51	klqAatlk	klqPatlk
R7495_2	CCDC54	3	107096960	C	G	A1101,,B3801,B35132,C1203,C0401	C1203	371	350	yklqAatl	yklqPatl
R7495_2	CCDC54	3	107096960	C	G	A1101,,B3801,B35132,C1203,C0401	C1203	102	880	qAatlknti	qPatlknti
R7495_2	ZKDC	3	126194384	C	T	A1101,,B3801,B35132,C1203,C0401	A1101	32	16171	rvnlasrpK	rvnlasrpE
R7495_2	TMEM44	3	194337848	G	A	A1101,,B3801,B35132,C1203,C0401	C1203	319	62	Caaldlaii	Raaldlaii
R7495_2	PDE8B	4	655992	G	A	A1101,,B3801,B35132,C1203,C0401	C0401	251	734	Sfnvaqtmf	Gfnvaqtmf
R7495_2	PDE8B	4	655992	G	A	A1101,,B3801,B35132,C1203,C0401	C1203	18	100	hSfnvaqtm	hGfnvaqtm
R7495_2	JAKMIP1	4	6107618	A	C	A1101,,B3801,B35132,C1203,C0401	A1101	26	26	htaySselk	htaySselk
R7495_2	JAKMIP1	4	6107618	A	C	A1101,,B3801,B35132,C1203,C0401	B3801	212	217	rhtaySsel	rhtaySsel
R7495_2	JAKMIP1	4	6107618	A	C	A1101,,B3801,B35132,C1203,C0401	C1203	40	91	ySselkakt	ySselkakt
R7495_2	PPP3CA	4	102004389	T	A	A1101,,B3801,B35132,C1203,C0401	A1101	455	15345	avceflqhN	avceflqhN
R7495_2	PPP3CA	4	102004389	T	A	A1101,,B3801,B35132,C1203,C0401	B3801	49	85	qhNrnlsli	qhNnlsli
R7495_2	PPP3CA	4	102004389	T	A	A1101,,B3801,B35132,C1203,C0401	C1203	304	14714	avceflqhY	avceflqhN
R7495_2	PPP3CA	4	102004389	T	A	A1101,,B3801,B35132,C1203,C0401	C1203	357	72	lqhYnlsli	lqhNnlsli
R7495_2	PPP3CA	4	102004389	T	A	A1101,,B3801,B35132,C1203,C0401	C1203	250	3691	qhYnlsli	qhNnlsli
R7495_2	ADCY2	5	7804771	G	T	A1101,,B3801,B35132,C1203,C0401	C1203	186	2625	stymaatVl	stymaatGl
R7495_2	ADCY2	5	7804771	G	T	A1101,,B3801,B35132,C1203,C0401	C1203	40	26	rmaatVlsav	rmaatGlsav
R7495_2	MAST4	5	66451564	A	T	A1101,,B3801,B35132,C1203,C0401	A1101	59	8564	alsesssnk	aHsesssnk
R7495_2	GPR98	5	90136692	C	A	A1101,,B3801,B35132,C1203,C0401	C1203	82	79	ladqihkgv	ladqihKgv
R7495_2	TRIM15	6	30136302	C	G	A1101,,B3801,B35132,C1203,C0401	C1203	333	609	paselVqdv	paselLqdv
R7495_2	KIF6	6	39311508	C	G	A1101,,B3801,B35132,C1203,C0401	A1101	53	265	kaTqsilqk	kaRqsilqk
R7495_2	KIF6	6	39311508	C	G	A1101,,B3801,B35132,C1203,C0401	C1203	467	152	fikaTqsil	fikaRqsil
R7495_2	LRP11	6	150185029	G	A	A1101,,B3801,B35132,C1203,C0401	C1203	38	43	aalppaVpl	aalppaApl
R7495_2	CHN2	7	29440161	T	C	A1101,,B3801,B35132,C1203,C0401	A1101	352	8969	rSgnqtlny	rFgnqtlny
R7495_2	ZNF716	7	57528983	A	T	A1101,,B3801,B35132,C1203,C0401	C1203	17	16	ytcDergkv	ytcEergkv
R7495_2	FLNC	7	128496864	G	A	A1101,,B3801,B35132,C1203,C0401	C1203	190	122	dvkfnSahi	dvkfnEahi
R7495_2	FLNC	7	128496864	G	A	A1101,,B3801,B35132,C1203,C0401	C1203	459	1573	Sahipgspf	Eahipgspf
R7495_2	PTPRN2	7	157959917	G	A	A1101,,B3801,B35132,C1203,C0401	C1203	173	282	ypSgsrtql	ypPgsrtql
R7495_2	CNBD1	8	88265945	C	A	A1101,,B3801,B35132,C1203,C0401	C1203	80	18	lqvTftct	lqvPftct	
R7495_2	CSMD3	8	113678527	G	T	A1101,,B3801,B35132,C1203,C0401	C1203	59	65	ieaepghVi	ieaepghSi
R7495_2	GBGT1	9	136037742	G	A	A1101,,B3801,B35132,C1203,C0401	A1101	32	112	tsFswlwvy	tsLswlwvy
R7495_2	GBGT1	9	136037742	G	A	A1101,,B3801,B35132,C1203,C0401	C1203	344	323	lagtsFsvl	lagtsLsvl
R7495_2	CHIC1	X	72899493	C	T	A1101,,B3801,B35132,C1203,C0401	A1101	52	293	lVlhwktlk	lAlhwktlk
R7495_2	PAIP2C5	X	90690988	G	A	A1101,,B3801,B35132,C1203,C0401	A1101	140	76	vlrddngsk	vVrddngsk
RH090935	MMELL1	1	2543638	G	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	6	9	yadrrgkKl	yadrrgkQl
RH090935	SLC2A7	1	9074861	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	418	262	Qaeraeghl	Raeraeghl
RH090935	SPEN	1	16174642	A	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	A2601	413	824	kiehfkry	kiehfKry
RH090935	SPEN	1	16174642	A	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	327	316	kiehfkry	kiehfKry
RH090935	SPEN	1	16174642	A	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	60	80	Rrygrvesv	Krygrvesv
RH090935	MTF1	1	38323315	G	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	A2601	269	1327	hsAdnniiy	hsPdnniiy
RH090935	MTF1	1	38323315	G	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	9	112	hsAdnniiy	hsPdnniiy
RH090935	MTF1	1	38323315	G	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	220	79	sAdnniiyf	sPdnniiyf
RH090935	MTF1	1	38323315	G	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	70	32	ehsAdnnii	ehsPdnnii

Figure 21 (Cont.)

RH0909935	MTF1	1	38323315	G	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	114	229	hsAdmniy	hsPdmniy	
RH0909935	MTF1	1	38323315	G	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	65	624	sAdmniyf	sPdmniyf	
RH0909935	INPP5B	1	38328030	T	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	242	1818	Tagefihqf	Kagefihqf	
RH0909935	INPP5B	1	38328030	T	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	95	57	Taagefihqf	Kagefihqf	
RH0909935	INPP5B	1	38328031	T	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	A2601	99	20490	Eagefihqf	Kagefihqf	
RH0909935	INPP5B	1	38328031	T	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	217	1818	Eagefihqf	Kagefihqf	
RH0909935	INPP5B	1	38328031	T	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	115	57	Eagefihqf	Kagefihqf	
RH0909935	SZT2	1	43892460	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	207	90	tqatgMsaf	tqatgDsaf	
RH0909935	FAF1	1	51050450	C	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	A2601	110	20417	dvhmvsdsY	dvhmvsdsD	
RH0909935	FAF1	1	51050450	C	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	29	23273	dvhmvsdsY	dvhmvsdsD	
RH0909935	ARHGAP29	1	94668279	C	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	A3201	32	49	kmleaEnai	kmleaEnai	
RH0909935	ARHGAP29	1	94668279	C	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	344	358	kmleaEnai	kmleaEnai	
RH0909935	MPC2	1	167905002	C	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	23	30	lpEkirply	lpEkirply	
RH0909935	MPC2	1	167905002	C	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	478	527	mlpEkirpl	mlpEkirpl	
RH0909935	NMNAT2	1	183253866	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	123	1152	rplverfif	rpPverfif	
RH0909935	C1orf65	1	223567517	G	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	80	33	qplasskQm	qplasskEm	
RH0909935	ZE81	10	31810808	G	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	A3201	141	3681	vaytystfV	vaytystfV	
RH0909935	ZE81	10	31810808	G	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	19	2630	vaytystfV	vaytystfV	
RH0909935	ZE81	10	31810808	G	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	19	6	vaytystfV	vaytystfV	
RH0909935	ZE81	10	31810808	G	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	90	332	ystfVspav	ystfVspav	
RH0909935	IPMK	10	59955902	C	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	A2601	261	47	ntiHegyvy	ntiDegyvy	
RH0909935	IPMK	10	59955902	C	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	148	6592	hvfpsntiH	hvfpsntiD	
RH0909935	IPMK	10	59955902	C	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	238	303	fpsntiHeg	fpsntiDeg	
RH0909935	IPMK	10	59955902	C	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	233	119	ntiHegyvy	ntiDegyvy	
RH0909935	MPEG1	11	59979562	C	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	331	530	ytsHnvktk	ytsQnvftk	
RH0909935	ANO1	11	70034082	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3801	499	616	Nhayhggvi	Shayhggvi	
RH0909935	PDE2A	11	72292476	T	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3801	464	1943	yrdppyhSw	yrdppyhNw	
RH0909935	ROBO3	11	124743283	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	A3201	254	3239	atwsgwikl	atwsgwikM	
RH0909935	DIP2B	12	51122402	G	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	35	157	Hiaikdpy	Qiaikdpy	
RH0909935	DIP2B	12	51122402	G	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	278	1444	yssrHaic	yssrQiaic	
RH0909935	ACVR1B	12	52370231	A	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	162	476	iwnYhqrv	iwnQhqrv	
RH0909935	HNRNPA1	12	54676417	A	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	475	3525	dSfgrggnf	dMfgrggnf	
RH0909935	NR2C1	12	95456330	T	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	A2601	127	251	daagvSqlf	daagvNqlf	
RH0909935	NR2C1	12	95456330	T	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	46	119	daagvSqlf	daagvNqlf	
RH0909935	NR2C1	12	95456330	T	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	493	694	daagvSqlf	daagvNqlf	
RH0909935	MYO1H	12	109826635	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	308	58	fsKnlvty	fsEnlvty	
RH0909935	MYO1H	12	109826635	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	15	21	fsKnlvty	fsEnlvty	
RH0909935	CABP1	12	121079138	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	31	136	safDqdrsi	safGqdrsi	
RH0909935	PTPNM2	12	123473363	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	29	14	yahycpdTi	yahycpdAi	
RH0909935	PTPNM2	12	123473363	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	464	247	ycpdTktaf	ycpdAktaf	
RH0909935	PTPNM2	12	123473363	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	5	14	yahycpdTi	yahycpdAi	
RH0909935	PTPNM2	12	123473363	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	439	245	ycpdTktaf	ycpdAktaf	
RH0909935	PTPNM2	12	123473363	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	286	25	dTktafptv	dAktafptv	
RH0909935	MZT1	13	73301634	G	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	15	65	aaaEnlnav	aaaAnlnav	
RH0909935	CDK17	14	20586233	T	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	364	112	dKyfvqvvi	dIyfvqvvi	
RH0909935	CDK17	14	20586233	T	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	247	142	Kyfvqvvlv	Iyfvqvvlv	
RH0909935	METTL3	14	21971952	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	17	867	spvptaptS	spvptaptF	
RH0909935	INSM2	14	36003885	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	32	56	fpggaTava	tpggaAava	
RH0909935	INSM2	14	36003885	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	234	1083	esfpggaTa	esfpggaAa	

Figure 21 (Cont.)

RH090935	FANCM	14	45669080	C	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	A2601	375	1217	sslEeismy	sslQeismy
RH090935	FANCM	14	45669080	C	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	23	16	manssIEei	manssIQei
RH090935	FANCM	14	45669080	C	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	141	759	sslEeismy	sslQeismy
RH090935	PCNXL4	14	60591845	G	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	69	96	fslfgiHnm	fslfgiDnm
RH090935	HERC2	15	28362220	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	A3201	304	414	qmcaklssf	qmcakMssf
RH090935	SECISBP2L	15	49288602	A	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	360	195	fcsvTsepi	fcsvIsepi
RH090935	SECISBP2L	15	49288602	A	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	57	85	vTsepisev	vIsepisev
RH090935	LINS	15	101109571	A	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	78	676	ifyrivkcl	ifyrivkcF
RH090935	HAGHL	16	778317	T	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	17	54	lahgeelrY	lahgeelrF
RH090935	TRAP1	16	3713560	G	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	A2601	317	5868	evVfcfeqf	evLfcfeqf
RH090935	BCAR1	16	75269391	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	47	275	lqqDvsatv	lqqGvsatv
RH090935	RAI1	17	17699425	A	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	160	88	lprVctrsl	lprMctrsl
RH090935	RAI1	17	17699425	A	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	199	567	gaseglprV	gaseglprM
RH090935	PSMD3	17	38151457	C	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	A3201	192	6825	kLnqvldqf	kFnqvidqf
RH090935	SIGLEC15	18	43417810	G	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	15	9	fagHvhdry	fagDvhdry
RH090935	SIGLEC15	18	43417810	G	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	77	23	fagHvhdry	fagDvhdry
RH090935	DOK6	18	67068518	A	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	208	146	ivkqgCvki	ivkqgYvki
RH090935	ADAT3	19	1912759	C	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	112	99	npllhavmv	npLlhavmv
RH090935	MAP2K2	19	4101275	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	17	25	iavFrglay	iavLrglay
RH090935	MAP2K2	19	4101275	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	91	131	iavFrglay	iavLrglay
RH090935	MAP2K2	19	4101275	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	379	1963	avFrglayl	avLrglayl
RH090935	ANGPTL4	19	8429480	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	441	287	lplVpesrv	lplApesrv
RH090935	ATG4D	19	10659651	C	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	A3201	159	110	ksvviMvpv	ksvviLvpv
RH090935	CACNA1A	19	13566011	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	222	624	wppfeylil	wppfeyMil
RH090935	CACNA1A	19	13566011	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	291	914	tewppfeyl	tewppfeyM
RH090935	CACNA1A	19	13566011	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	10	7	feylilati	feyMilati
RH090935	ZNF599	19	35250052	G	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	449	330	dnfaltEhm	dnfaltQhm
RH090935	ZNF382	19	37117436	G	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3801	136	447	Hhneceksf	Dhneceksf
RH090935	TRPM4	19	49669407	A	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	314	612	tSekptday	tTekptday
RH090935	PRR21	2	240982356	A	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	31	80	hprpfThgf	hprpfIhgf
RH090935	PRR21	2	240982356	A	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	22	23	rpfThgfsf	rpfIhgfsf
RH090935	CRNKL1	20	20024270	C	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	34	14	yalHriskq	yalDriskq
RH090935	E2F1	20	32264590	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	359	4791	hvWedfsgl	hvRedfsgl
RH090935	RBM12	20	34242679	G	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	99	98	vpppRippi	vpppPippi
RH090935	GMEB2	20	62221980	A	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	315	137	tpvsQpppv	tpvsLpppv
RH090935	C2CD2	21	43373688	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	40	289	Talatvgly	Aalatvgly
RH090935	C2CD2	21	43373688	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	208	890	Talatvgly	Aalatvgly
RH090935	CARD10	22	37900275	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	481	681	keinWisil	keinRisil
RH090935	SGSM3	22	40803052	C	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	A3201	23	287	rtqrrkYti	rtqrrkSti
RH090935	SGSM3	22	40803052	C	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	228	91	rtqrrkYti	rtqrrkSti
RH090935	PLXNB2	22	50719808	C	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	14	120	vpmvvviaL	vpmvvviaV
RH090935	PLXNB2	22	50719808	C	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	152	93	vvviaLsvy	vvviaVsvy
RH090935	PLXNB2	22	50719808	C	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	494	267	mvvviaLsv	mvvviaVsv
RH090935	BOC	3	112987184	G	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	127	248	Qvdegntav	Evdegntav
RH090935	GSX2	4	54967035	C	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	8	9	apvctDtty	apvctAtty
RH090935	PCDH10	4	134072416	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	261	1747	aapDtvval	aapGtvval
RH090935	FAM198B	4	159091863	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	180	213	lskddiQrm	lskddiRrm
RH090935	NIPBL	5	37064915	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	89	1527	iiykkialM	iiykkialT
RH090935	NIPBL	5	37064915	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	41	46	ialMsankl	ialTsankl

Figure 21 (Cont.)

RH090935	CSF1R	5	149460527	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	87	38	lvvkpgaNv	lvvkpgaNv	lvvkpgaNv	lvvkpgaNv
RH090935	MDC1	6	30681071	C	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	51	141	fafnfnsdt	fafnfnsdt	fafnfnsdt	fafnfnsdt
RH090935	MDC1	6	30681071	C	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	224	866	fnfnsdtdv	fnfnsdtdv	fnfnsdtdv	fnfnsdtdv
RH090935	EHMT2	6	31864751	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	A2601	136	156	eapaKmgal	eapaKmgal	eapaKmgal	eapaKmgal
RH090935	KCNK17	6	39281916	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	A3101	140	9808	klkpnftcl	klkpnftcl	klkpnftcl	klkpnftcl
RH090935	KCNK17	6	39281916	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	27	30	fqrdkwKll	fqrdkwKll	fqrdkwKll	fqrdkwKll
RH090935	PPP1R35	7	100033677	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	44	55	fkltppspv	fkltppspv	fkltppspv	fkltppspv
RH090935	STRIP2	7	129095093	C	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	85	22	fCnnlneepf	fCnnlneepf	fCnnlneepf	fCnnlneepf
RH090935	STRIP2	7	129095093	C	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	162	46	fCnthneepf	fCnthneepf	fCnthneepf	fCnthneepf
RH090935	CBH	8	67089585	G	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	44	71	qapaphpqPl	qapaphpqPl	qapaphpqPl	qapaphpqPl
RH090935	C8orf34	8	69445363	G	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	57	945	neYdamell	neYdamell	neYdamell	neYdamell
RH090935	CA2	8	86377620	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	A3201	198	922	vsyNqatsl	vsyNqatsl	vsyNqatsl	vsyDqatsl
RH090935	CA2	8	86377620	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	68	39	vsyNqatsl	vsyNqatsl	vsyNqatsl	vsyDqatsl
RH090935	PKHD1L1	8	110465084	G	C	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	450	505	qstpsfkml	qstpsfkml	qstpsfkml	qstpilkml
RH090935	ADCY8	8	132052326	C	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	227	2699	sVdsalply	sVdsalply	sVdsalply	sGdsalply
RH090935	ADCY8	8	132052326	C	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	338	949	lsVdsalpl	lsVdsalpl	lsVdsalpl	lsGdsalpl
RH090935	ADCK5	8	145613222	C	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	154	135	talIDralv	talIDralv	talIDralv	talIAralv
RH090935	SLC25A25	9	130868043	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	184	92	lggftqmi	lggftqmi	lggftqmi	lVggftqmi
RH090935	NACC2	9	138903739	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	A2601	135	819	mlpegMemy	mlpegMemy	mlpegMemy	mlpegVemy
RH090935	NACC2	9	138903739	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	172	116	mlpegMemy	mlpegMemy	mlpegMemy	mlpegVemy
RH090935	NACC2	9	138903739	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	313	999	egMemytv	egMemytv	egMemytv	egVemytv
RH090935	KLHL34	X	21674301	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	295	53	Kpfseiery	Kpfseiery	Kpfseiery	Epfseiery
RH090935	KLHL34	X	21674301	C	T	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	180	419	Kpfseiery	Kpfseiery	Kpfseiery	Epfseiery
RH090935	TEX11	X	69773212	C	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	6	19	ypIaIkaI	ypIaIkaI	ypIaIkaI	ypIaIkaI
RH090935	TEX11	X	69773212	C	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	355	204	ypIaIkaF	ypIaIkaF	ypIaIkaF	ypIaIkaI
RH090935	TEX11	X	69773212	C	G	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	27	132	kaFkkaIl	kaFkkaIl	kaFkkaIl	kaIkkaIl
RH090935	PLXNB3	X	153031003	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	B3501	256	108	haTqetpll	haTqetpll	haTqetpll	haAqetpll
RH090935	PLXNB3	X	153031003	G	A	A3201,A2601,B3501,B3801,B3540,C0401,C1203	C1203	461	246	haTqetpll	haTqetpll	haTqetpll	haAqetpll
R1933	SCNN1D	1	1222288	T	A	A2601,A3101,B1302,B5701,C0602	C0602	44	54	fhQdreirl	fhQdreirl	fhQdreirl	fhLdreirl
R1933	CHD5	1	6189065	C	A	A2601,A3101,B1302,B5701,C0602	A3101	124	58	vtlasveer	vtlasveer	vtlasveer	vtKasveer
R1933	CHD5	1	6189065	C	A	A2601,A3101,B1302,B5701,C0602	C0602	45	27	yrfvtlasv	yrfvtlasv	yrfvtlasv	yrfvtRasv
R1933	KIAA2013	1	115985999	G	A	A2601,A3101,B1302,B5701,C0602	A3101	132	211	lVdvaanr	lVdvaanr	lVdvaanr	lAdvaanr
R1933	MARVELD1	1	12907356	C	G	A2601,A3101,B1302,B5701,C0602	C0602	48	10984	qRddqleli	qRddqleli	qRddqleli	qGddqleli
R1933	ALDH4A1	1	19215936	G	T	A2601,A3101,B1302,B5701,C0602	A3101	375	467	kaIkdMkgr	kaIkdMkgr	kaIkdMkgr	kaIkdIkgr
R1933	RAP1GAP	1	21930377	C	T	A2601,A3101,B1302,B5701,C0602	A3101	425	283	gksaNrfgr	gksaNrfgr	gksaNrfgr	gksaSrfgr
R1933	RAP1GAP	1	21930377	C	T	A2601,A3101,B1302,B5701,C0602	A3101	9	11	ksaNrfgrr	ksaNrfgrr	ksaNrfgrr	ksaSrfgrr
R1933	RUNX3	1	25228662	G	T	A2601,A3101,B1302,B5701,C0602	C0602	126	87	shsnspID	shsnspID	shsnspID	shsnspAI
R1933	USP24	1	55563271	C	A	A2601,A3101,B1302,B5701,C0602	B5701	27	13573	rSfpwmhlm	rSfpwmhlm	rSfpwmhlm	rRfpwmhlm
R1933	LRRD1	1	62676908	C	A	A2601,A3101,B1302,B5701,C0602	A3101	332	240	lIekgfnPr	lIekgfnPr	lIekgfnPr	lIekgfnPr
R1933	EPHX4	1	92515892	C	A	A2601,A3101,B1302,B5701,C0602	C0602	331	2809	ilrnPaql	ilrnPaql	ilrnPaql	ilrnPaql
R1933	ETV3L	1	157068937	G	T	A2601,A3101,B1302,B5701,C0602	A3101	108	149	lsralryyy	lsralryyy	lsralryyy	lsraLryyy
R1933	ETV3L	1	157068937	G	T	A2601,A3101,B1302,B5701,C0602	A3101	8	7	ralryyynk	ralryyynk	ralryyynk	ralryyynk
R1933	ETV3L	1	157068937	G	T	A2601,A3101,B1302,B5701,C0602	A3101	14	13	alryyynkr	alryyynkr	alryyynkr	alryyynkr
R1933	ETV3L	1	157068937	G	T	A2601,A3101,B1302,B5701,C0602	B5701	36	41	lsralryyy	lsralryyy	lsralryyy	lsraLryyy
R1933	ETV3L	1	157068937	G	T	A2601,A3101,B1302,B5701,C0602	C0602	46	65	lryyynkri	lryyynkri	lryyynkri	lryyynkri
R1933	FAM71A	1	112799394	G	T	A2601,A3101,B1302,B5701,C0602	A3101	145	205	aaVppvstr	aaVppvstr	aaVppvstr	aaGppvstr
R1933	OBSCN	1	228493067	C	T	A2601,A3101,B1302,B5701,C0602	A3101	65	134	ktLatitvk	ktLatitvk	ktLatitvk	ktSatitvk
R1933	ACTN2	1	236908039	C	T	A2601,A3101,B1302,B5701,C0602	C0602	63	54	ahqdCveqi	ahqdCveqi	ahqdCveqi	ahqdRveqi
R1933	GREM2	1	240655453	C	A	A2601,A3101,B1302,B5701,C0602	A3101	120	54	sfyipRwk	sfyipRwk	sfyipRwk	sfyipRwk

Figure 21 (Cont.)

RI1933	GREM2	1	240655453	C	A	A2601,A3101,B1302,B5701,C0602	A3101	317	157	fyipLhvkk	fyipRhykk	fyipRhykk
RI1933	C1orf101	1	244715632	G	T	A2601,A3101,B1302,B5701,C0602	C0602	105	51	rnrrgtwLiw	rnrrgtwRiw	rnrrgtwRiw
RI1933	C1orf101	1	244715632	G	T	A2601,A3101,B1302,B5701,C0602	C0602	261	123	rngtwLivv	rngtwRivv	rngtwRivv
RI1933	OR2C3	1	247695009	G	T	A2601,A3101,B1302,B5701,C0602	C0602	447	333	tsNeqgkfi	tsNeqgkfi	tsHeqgkfi
RI1933	USP6NL	10	11505670	C	A	A2601,A3101,B1302,B5701,C0602	A3101	129	495	Hsrtgtper	Hsrtgtper	Qsrtgtper
RI1933	GPR158	10	25701401	A	T	A2601,A3101,B1302,B5701,C0602	A3101	40	35	hfrkaMsir	hfrkaMsir	hfrkaKsir
RI1933	GPR158	10	25701401	A	T	A2601,A3101,B1302,B5701,C0602	C0602	22	43	yhfrkaMsi	yhfrkaMsi	yhfrkaKsi
RI1933	PTCHD3	10	27702594	G	T	A2601,A3101,B1302,B5701,C0602	A2601	491	954	ttrndsySf	ttrndsySf	ttrndsyRf
RI1933	PTCHD3	10	27702594	G	T	A2601,A3101,B1302,B5701,C0602	A3101	301	262	dsySfsasr	dsySfsasr	dsyRfsasr
RI1933	PTCHD3	10	27702594	G	T	A2601,A3101,B1302,B5701,C0602	A3101	167	40	sySfsasrr	sySfsasrr	syRfsasrr
RI1933	ALOX5	10	45920459	T	A	A2601,A3101,B1302,B5701,C0602	C0602	123	247	RLrgcrnpvl	RLrgcrnpvl	RLrgcrnpvl
RI1933	DNMBP	10	101640956	C	T	A2601,A3101,B1302,B5701,C0602	C0602	448	2006	rrshsNasv	rrshsNasv	rrshsDasv
RI1933	ORS2A1	11	5173466	G	T	A2601,A3101,B1302,B5701,C0602	A2601	15	10850	yliamigrsY	yliamigrsY	yliamigrsS
RI1933	MRGPRX3	11	18159579	C	A	A2601,A3101,B1302,B5701,C0602	A3101	3	5	iyftvgYfr	iyftvgYfr	iyftvgSfr
RI1933	MRGPRX3	11	18159579	C	A	A2601,A3101,B1302,B5701,C0602	A3101	96	254	ffvgYfrqr	ffvgYfrqr	ffvgSfrqr
RI1933	MRGPRX3	11	18159579	C	A	A2601,A3101,B1302,B5701,C0602	A3101	13	19	gYfrqlqnr	gYfrqlqnr	gSfrqlqnr
RI1933	SLC6A5	11	20628357	G	T	A2601,A3101,B1302,B5701,C0602	B5701	51	70	asggpvsLw	asggpvsLw	asggpvsVw
RI1933	NELL1	11	21556012	G	A	A2601,A3101,B1302,B5701,C0602	C0602	14	25	yhcecrsSf	yhcecrsSf	yhcecrsGf
RI1933	OR5I1	11	55762097	G	T	A2601,A3101,B1302,B5701,C0602	C0602	368	139	RrknytsIt	RrknytsIt	TrknytsIt
RI1933	OR6K1	11	56113719	C	T	A2601,A3101,B1302,B5701,C0602	A3101	4	6	hipmyffFr	hipmyffFr	htpmyffFr
RI1933	OR6K1	11	56113719	C	T	A2601,A3101,B1302,B5701,C0602	A3101	407	739	myffFrhls	myffFrhls	myfLFrhls
RI1933	OR6K1	11	56113719	C	T	A2601,A3101,B1302,B5701,C0602	C0602	38	407	FrhlsitdI	FrhlsitdI	LrhlsitdI
RI1933	RTN4RL2	11	57243728	G	A	A2601,A3101,B1302,B5701,C0602	A2601	465	243	hvfrgISsI	hvfrgISsI	hvfrgKSsI
RI1933	OR4I5	11	59234629	A	G	A2601,A3101,B1302,B5701,C0602	C0602	30	143	lrnKSvldI	lrnKSvldI	lrnKSvldI
RI1933	SLC22A12	11	64367294	G	A	A2601,A3101,B1302,B5701,C0602	C0602	98	45	shlgrRptI	shlgrRptI	shlgrRptI
RI1933	VPS51	11	64875275	G	T	A2601,A3101,B1302,B5701,C0602	A3101	446	628	laVvhaIIr	laVvhaIIr	laGvhaIIr
RI1933	GALNT3	11	65810970	C	T	A2601,A3101,B1302,B5701,C0602	A3101	141	263	cKhqfcypr	cKhqfcypr	cKhqfcypr
RI1933	SSH3	11	67075168	G	T	A2601,A3101,B1302,B5701,C0602	A3101	24	56	amaYlesIr	amaYlesIr	amaTlesIr
RI1933	UNC93B1	11	67759287	C	A	A2601,A3101,B1302,B5701,C0602	A3101	44	35	vaaLvsyIr	vaaLvsyIr	vaaAvsyIr
RI1933	FGF3	11	69631153	C	A	A2601,A3101,B1302,B5701,C0602	A3101	20	17	SirgIfsgr	SirgIfsgr	AirgIfsgr
RI1933	MYO7A	11	76909587	G	C	A2601,A3101,B1302,B5701,C0602	A3101	40	17853	vlvavnwtR	vlvavnwtR	vlvavnwtG
RI1933	DRD2	11	113283517	G	T	A2601,A3101,B1302,B5701,C0602	A3101	234	5753	rtryspipH	rtryspipH	rtryspipP
RI1933	DRD2	11	113283517	G	T	A2601,A3101,B1302,B5701,C0602	C0602	128	19148	pHshthqIt	pHshthqIt	pRshthqIt
RI1933	DRD2	11	113287702	G	A	A2601,A3101,B1302,B5701,C0602	A2601	95	395	ytavamSrtI	ytavamSrtI	ytavamPmI
RI1933	DRD2	11	113287702	G	A	A2601,A3101,B1302,B5701,C0602	A2601	421	5141	tavamSmIy	tavamSmIy	tavamPmIy
RI1933	DRD2	11	113287702	G	A	A2601,A3101,B1302,B5701,C0602	A3101	16	54	amSmIyntr	amSmIyntr	ampmIyntr
RI1933	DRD2	11	113287702	G	A	A2601,A3101,B1302,B5701,C0602	B5701	425	426	tavamSmIy	tavamSmIy	tavamPmIy
RI1933	DRD2	11	113287702	G	A	A2601,A3101,B1302,B5701,C0602	B5701	159	16382	mSmIyntry	mSmIyntry	mPmIyntry
RI1933	KIRREL3	11	126318918	G	T	A2601,A3101,B1302,B5701,C0602	A3101	20	105	KvdvyfgpI	KvdvyfgpI	TvdvyfgpI
RI1933	KIRREL3	11	126318918	G	T	A2601,A3101,B1302,B5701,C0602	B5701	58	66	IsrKvdvyf	IsrKvdvyf	IsrTvdvyf
RI1933	ADCY6	12	49177133	G	A	A2601,A3101,B1302,B5701,C0602	A3101	77	97	rngqkrsWr	rngqkrsWr	rngqkrsRr
RI1933	ADCY6	12	49177133	G	A	A2601,A3101,B1302,B5701,C0602	A3101	423	639	krsWrrgtr	krsWrrgtr	krsRrrgtr
RI1933	OR6C74	12	55641850	C	T	A2601,A3101,B1302,B5701,C0602	A3101	96	170	tmyvkLsak	tmyvkLsak	tmyvkPsak
RI1933	MMP19	12	56234663	C	G	A2601,A3101,B1302,B5701,C0602	A3101	30	34	kyIlgPwr	kyIlgPwr	kyIlgRwr
RI1933	OGKA	12	56334115	G	T	A2601,A3101,B1302,B5701,C0602	A3101	37	18	gvqshvCvr	gvqshvCvr	gvqshvWvr
RI1933	PLXNC1	12	94580227	G	T	A2601,A3101,B1302,B5701,C0602	B5701	280	87	tatdphcCw	tatdphcCw	tatdphcGw
RI1933	CUX2	12	111758431	C	A	A2601,A3101,B1302,B5701,C0602	A3101	46	20	pyypayvQr	pyypayvQr	pyypayvPr
RI1933	RPH3A	12	113314486	G	A	A2601,A3101,B1302,B5701,C0602	A3101	371	116	ttappQeer	ttappQeer	ttappReer
RI1933	SOS	12	113853058	G	T	A2601,A3101,B1302,B5701,C0602	B5701	110	14578	vTviametf	vTviametf	vPviametf

Figure 21 (Cont.)

R11933	CCNA1	13	37036330	C	A	A2601,A3101,B1302,B5701,C0602	A2601	21	10	edaafKgy	edaafTgy
R11933	PCDH8	13	53418849	T	C	A2601,A3101,B1302,B5701,C0602	A3101	395	5027	vgfqsvyeR	vgfqsvyeK
R11933	PCDH8	13	53418849	T	C	A2601,A3101,B1302,B5701,C0602	A3101	14	19	svyeRvdhr	svyeKvdhr
R11933	PCDH8	13	53418849	T	C	A2601,A3101,B1302,B5701,C0602	A3101	10	15	RvlhrdydR	KvlhrdydR
R11933	PCDH9	13	67799709	G	A	A2601,A3101,B1302,B5701,C0602	C0602	185	3074	fhlkpdtLv	fhlkpdtPv
R11933	SLITRK1	13	84453964	G	A	A2601,A3101,B1302,B5701,C0602	A3101	52	186	ceMpvnffr	ceTpvnffr
R11933	GPR180	13	95275450	G	T	A2601,A3101,B1302,B5701,C0602	A3101	74	250	agiiiFlr	agiiiVlr
R11933	GPR18	13	99907202	T	G	A2601,A3101,B1302,B5701,C0602	A3101	18	9282	mlyrnylrR	mlyrnylrS
R11933	GPR18	13	99907202	T	G	A2601,A3101,B1302,B5701,C0602	A3101	7	17	rnylrRmrr	rnylrSmrr
R11933	GPR18	13	99907202	T	G	A2601,A3101,B1302,B5701,C0602	A3101	18	3	rRmrrksfr	rSmrrksfr
R11933	GPR18	13	99907202	T	G	A2601,A3101,B1302,B5701,C0602	A3101	280	2533	Rmrrksfrs	SmrrksfrS
R11933	GPR18	13	99907202	T	G	A2601,A3101,B1302,B5701,C0602	C0602	252	194	lyrnylrRm	lyrnylrSm
R11933	GPR18	13	99907202	T	G	A2601,A3101,B1302,B5701,C0602	C0602	291	275	lrRmrrksl	lrSmrrksl
R11933	F7	13	113773164	A	C	A2601,A3101,B1302,B5701,C0602	B5701	92	34	hathygPw	hathygTw
R11933	F7	13	113773164	A	C	A2601,A3101,B1302,B5701,C0602	C0602	51	46	thygPwyl	thygTwyl
R11933	METTL17	14	21464875	G	T	A2601,A3101,B1302,B5701,C0602	B5701	17	12920	tarrhgryW	tarrhgryG
R11933	FOXG1	14	29237140	C	A	A2601,A3101,B1302,B5701,C0602	A3101	138	2	imknfpyyR	imknfpyyS
R11933	SYNE3	14	65899689	C	A	A2601,A3101,B1302,B5701,C0602	A3101	117	478	nlhrWpar	nlhrGpar
R11933	RYR3	15	33795898	C	A	A2601,A3101,B1302,B5701,C0602	A3101	209	3995	qslsvraiK	qslsvraiQ
R11933	RYR3	15	33795898	C	A	A2601,A3101,B1302,B5701,C0602	B5701	289	307	lsvraiKem	lsvraiQem
R11933	PGBD4	15	34396483	A	G	A2601,A3101,B1302,B5701,C0602	A2601	288	817	elyhtkkSy	elyhtdkNy
R11933	AGBL1	15	87088941	A	C	A2601,A3101,B1302,B5701,C0602	A3101	152	161	tkeevnyr	tkeevnyr
R11933	C16orf11	16	613440	A	T	A2601,A3101,B1302,B5701,C0602	A3101	95	45	MsHiyhtmk	KsHiyhtmk
R11933	HYDIN	16	71103193	G	A	A2601,A3101,B1302,B5701,C0602	A3101	15	480	rSqgfaair	rPqgfaair
R11933	CLEC3A	16	78064682	G	T	A2601,A3101,B1302,B5701,C0602	A3101	473	2280	gkwsYeacr	gkwsDeacr
R11933	CLEC3A	16	78064682	G	T	A2601,A3101,B1302,B5701,C0602	A3101	450	12377	sYeacrssk	sDeacrssk
R11933	ITGAE	17	3664377	C	A	A2601,A3101,B1302,B5701,C0602	A3101	415	1458	dvntarHrr	dvntarQrr
R11933	POLR2A	17	7400270	A	G	A2601,A3101,B1302,B5701,C0602	A3101	140	38	lgmeprCar	lgmeprYar
R11933	TP53	17	7577535	C	A	A2601,A3101,B1302,B5701,C0602	C0602	85	307	rrMpiiii	rrRpiiii
R11933	ALDH3A1	17	19642342	T	A	A2601,A3101,B1302,B5701,C0602	A2601	290	132	dvvhHtth	dvvhYtth
R11933	SEZ6	17	27283247	C	G	A2601,A3101,B1302,B5701,C0602	A3101	100	154	sslqlpPpr	sslqlpRpr
R11933	SEZ6	17	27283247	C	G	A2601,A3101,B1302,B5701,C0602	A3101	152	51	lqlpPprpr	lqlpRprpr
R11933	BCAS3	17	59139200	C	A	A2601,A3101,B1302,B5701,C0602	C0602	154	61	fnanhPiii	fnanhRiii
R11933	MGAT5B	17	74934124	G	A	A2601,A3101,B1302,B5701,C0602	A3101	18	60	gtWyyesqr	gtWyyesqr
R11933	SLC35G4	18	11610589	T	G	A2601,A3101,B1302,B5701,C0602	A3101	70	31	tarnlSrer	tarnlKer
R11933	CBLN2	18	70205428	A	T	A2601,A3101,B1302,B5701,C0602	A2601	180	414	stfsgfMvf	stfsgflvf
R11933	CBLN2	18	70205438	A	T	A2601,A3101,B1302,B5701,C0602	B5701	300	551	stfsgfMwf	stfsgflvf
R11933	SNAPC2	19	7987377	C	T	A2601,A3101,B1302,B5701,C0602	B5701	124	365	rnslpeelSl	rnslpeelPl
R11933	MUC16	19	9057715	T	A	A2601,A3101,B1302,B5701,C0602	A3101	323	71	Lteimssnr	Mteimssnr
R11933	RAB3D	19	11447880	G	A	A2601,A3101,B1302,B5701,C0602	A3101	17	15	ktvyChdkr	ktvyRhdkr
R11933	USE1	19	17327087	G	T	A2601,A3101,B1302,B5701,C0602	A3101	494	599	tvhlqsLar	tvhlqsRar
R11933	USE1	19	17327087	G	T	A2601,A3101,B1302,B5701,C0602	A3101	160	17	Larytsemr	Rarytsemr
R11933	PSMD8	19	38867075	T	C	A2601,A3101,B1302,B5701,C0602	B5701	246	842	maqikRyyf	maqikCyyf
R11933	CRX	19	48337791	C	T	A2601,A3101,B1302,B5701,C0602	A3101	33	129	avSypssapr	avPypssapr
R11933	PTPRH	19	55707979	G	A	A2601,A3101,B1302,B5701,C0602	A3101	159	122	svlglgLar	svlglgPar
R11933	ZNF304	19	57868887	G	C	A2601,A3101,B1302,B5701,C0602	A3101	71	116	nssiihHr	nssiihQr
R11933	ZNF304	19	57868887	G	C	A2601,A3101,B1302,B5701,C0602	A3101	485	23	hHrvhtgar	hQrvhtgar
R11933	GALNT14	2	31135136	C	A	A2601,A3101,B1302,B5701,C0602	C0602	440	2758	tlipCapvv	tlipGapvv
R11933	FSHR	2	49210069	G	T	A2601,A3101,B1302,B5701,C0602	C0602	41	184	fhgDsgpvi	fhgAsgpvi

Figure 21 (Cont.)

R11933	MOGS	2	74692191	C	T	A2601,A3101,B1302,B5701,C0602	A3101	212	223	grwMlawyr	grwMlawyr	grwMlawyr	grwMlawyr
R11933	MOGS	2	74692191	C	T	A2601,A3101,B1302,B5701,C0602	A3101	24	66	wMlawyrar	wMlawyrar	wMlawyrar	wMlawyrar
R11933	MOGS	2	74692191	C	T	A2601,A3101,B1302,B5701,C0602	A3101	8	14	Mlawyrarr	MlawyrarrMlaw	MlawyrarrMlaw	MlawyrarrMlaw
R11933	MOGS	2	74692191	C	T	A2601,A3101,B1302,B5701,C0602	B5701	11	17	msgrwMlaw	msgrwMlaw	msgrwMlaw	msgrwMlaw
R11933	CTNNA2	2	80874842	G	T	A2601,A3101,B1302,B5701,C0602	B5701	468	369	avnspPvsw	avnspPvsw	avnspPvsw	avnspPvsw
R11933	COX5B	2	98262590	C	T	A2601,A3101,B1302,B5701,C0602	A3101	22	43	gtlaVqair	gtlaVqair	gtlaVqair	gtlaVqair
R11933	CNTNAP5	2	124783246	C	A	A2601,A3101,B1302,B5701,C0602	A3101	401	1378	rMtsvttll	rMtsvttll	rMtsvttll	rMtsvttll
R11933	CNTNAP5	2	124783246	C	A	A2601,A3101,B1302,B5701,C0602	B5701	91	212	ltsvttlM	ltsvttlM	ltsvttlM	ltsvttlM
R11933	CNTNAP5	2	124783246	C	A	A2601,A3101,B1302,B5701,C0602	C0602	53	290	prltsvtti	prltsvtti	prltsvtti	prltsvtti
R11933	DCAF17	2	172337503	A	T	A2601,A3101,B1302,B5701,C0602	A3101	30	41	yshevYfdr	yshevYfdr	yshevYfdr	yshevYfdr
R11933	DCAF17	2	172337503	A	T	A2601,A3101,B1302,B5701,C0602	B5701	211	137	vtyshevYf	vtyshevYf	vtyshevYf	vtyshevYf
R11933	DCAF17	2	172337503	A	T	A2601,A3101,B1302,B5701,C0602	C0602	323	79	vfYdrdlvl	vfYdrdlvl	vfYdrdlvl	vfYdrdlvl
R11933	CHRNA1	2	175618469	C	A	A2601,A3101,B1302,B5701,C0602	B5701	293	202	wvskDsrgw	wvskDsrgw	wvskDsrgw	wvskDsrgw
R11933	HOXD3	2	177034310	C	G	A2601,A3101,B1302,B5701,C0602	B5701	245	378	tMskqifpw	tMskqifpw	tMskqifpw	tMskqifpw
R11933	SNAP25	20	10277686	G	A	A2601,A3101,B1302,B5701,C0602	A3101	38	34	maisgDfir	maisgDfir	maisgDfir	maisgDfir
R11933	SNAP25	20	10277686	G	A	A2601,A3101,B1302,B5701,C0602	A3101	319	136	aisgDfirr	aisgDfirr	aisgDfirr	aisgDfirr
R11933	FAM209A	20	55100033	G	A	A2601,A3101,B1302,B5701,C0602	B5701	80	1285	RskvlwIlf	RskvlwIlf	RskvlwIlf	RskvlwIlf
R11933	FAM209A	20	55100033	G	A	A2601,A3101,B1302,B5701,C0602	C0602	31	7184	lRskvlwIl	lRskvlwIl	lRskvlwIl	lRskvlwIl
R11933	DIDO1	20	61510920	C	A	A2601,A3101,B1302,B5701,C0602	A3101	20	717	wsrerdwDr	wsrerdwDr	wsrerdwDr	wsrerdwDr
R11933	DIDO1	20	61510920	C	A	A2601,A3101,B1302,B5701,C0602	A3101	32	166	rerdwYrpr	rerdwYrpr	rerdwYrpr	rerdwYrpr
R11933	DIDO1	20	61510920	C	A	A2601,A3101,B1302,B5701,C0602	A3101	269	7580	wYrprewdr	wYrprewdr	wYrprewdr	wYrprewdr
R11933	SMIM11	21	35757791	C	A	A2601,A3101,B1302,B5701,C0602	C0602	235	368	kvlehvTii	kvlehvTii	kvlehvTii	kvlehvTii
R11933	SSTR3	22	37602905	T	C	A2601,A3101,B1302,B5701,C0602	A3101	8	5	iiLgflsyr	iiLgflsyr	iiLgflsyr	iiLgflsyr
R11933	PAAN2	22	50618499	A	T	A2601,A3101,B1302,B5701,C0602	A3101	90	243	rvVnskaek	rvVnskaek	rvVnskaek	rvVnskaek
R11933	TMPPE	3	33135150	C	T	A2601,A3101,B1302,B5701,C0602	A3101	29	18832	vtavlsvaR	vtavlsvaR	vtavlsvaR	vtavlsvaR
R11933	ZIC1	3	147128205	C	A	A2601,A3101,B1302,B5701,C0602	A3101	474	158	nstrdflLr	nstrdflLr	nstrdflLr	nstrdflLr
R11933	MED12L	3	151112519	G	T	A2601,A3101,B1302,B5701,C0602	A3101	75	123	alsnmlqLr	alsnmlqLr	alsnmlqLr	alsnmlqLr
R11933	GMPS	3	155621704	A	G	A2601,A3101,B1302,B5701,C0602	B5701	127	163	ksvreDgyf	ksvreDgyf	ksvreDgyf	ksvreDgyf
R11933	WDR49	3	167272480	C	G	A2601,A3101,B1302,B5701,C0602	A3101	34	23	klvtAvwr	klvtAvwr	klvtAvwr	klvtAvwr
R11933	TNIK	3	170784514	T	A	A2601,A3101,B1302,B5701,C0602	C0602	397	17193	ylpshiqgl	ylpshiqgl	ylpshiqgl	ylpshiqgl
R11933	HAUS3	4	2242001	C	A	A2601,A3101,B1302,B5701,C0602	C0602	233	1629	qffqGihev	qffqGihev	qffqGihev	qffqGihev
R11933	FBXL5	4	79364606	G	T	A2601,A3101,B1302,B5701,C0602	A2601	194	456	dvnlWlry	dvnlWlry	dvnlWlry	dvnlWlry
R11933	FBXL5	4	79364606	G	T	A2601,A3101,B1302,B5701,C0602	B5701	124	24305	ttqedvnlW	ttqedvnlW	ttqedvnlW	ttqedvnlG
R11933	B3GL7	4	122774188	G	A	A2601,A3101,B1302,B5701,C0602	A3101	10	23	gvkdlFvgr	gvkdlFvgr	gvkdlLvgr	gvkdlLvgr
R11933	FBXL7	5	15928322	C	T	A2601,A3101,B1302,B5701,C0602	A3101	81	83	lawdSrlwr	lawdSrlwr	lawdPrlwr	lawdPrlwr
R11933	FBXL7	5	15928322	C	T	A2601,A3101,B1302,B5701,C0602	A3101	292	4529	dSrlwrtir	dSrlwrtir	dPrlwrtir	dPrlwrtir
R11933	FBXL7	5	15928322	C	T	A2601,A3101,B1302,B5701,C0602	C0602	124	1058	SrlwrtirI	SrlwrtirI	PrlwrtirI	PrlwrtirI
R11933	SPZ1	5	79617071	A	G	A2601,A3101,B1302,B5701,C0602	C0602	90	258	lhfrqkRgtl	lhfrqkRgtl	lhfrqkRgtl	lhfrqkRgtl
R11933	CMSY3	5	129521153	G	C	A2601,A3101,B1302,B5701,C0602	A3101	29	22	fskktAfwr	fskktAfwr	fskktGfwr	fskktGfwr
R11933	SCAMAHA	5	132150418	G	A	A2601,A3101,B1302,B5701,C0602	A3101	160	127	alqlvevTr	alqlvevTr	alqlvevTr	alqlvevTr
R11933	SCAMAHA	5	132150418	G	A	A2601,A3101,B1302,B5701,C0602	A3101	264	232	lqlvevTrr	lqlvevTrr	lqlvevArr	lqlvevArr
R11933	PCDHA7	5	140216091	C	A	A2601,A3101,B1302,B5701,C0602	A2601	291	15787	liiaicavY	liiaicavY	liiaicavS	liiaicavS
R11933	SLIT3	5	168135054	G	C	A2601,A3101,B1302,B5701,C0602	A3101	29	16027	kcnaclssR	kcnaclssR	kcnaclssP	kcnaclssP
R11933	DOCK2	5	169101425	C	A	A2601,A3101,B1302,B5701,C0602	A3101	350	2654	Kskidygnk	Kskidygnk	Tskidygnk	Tskidygnk
R11933	PFN3	5	176827552	C	A	A2601,A3101,B1302,B5701,C0602	A3101	7	10	kvyiIavlr	kvyiIavlr	kvyiSavlr	kvyiSavlr
R11933	PFN3	5	176827552	C	A	A2601,A3101,B1302,B5701,C0602	A3101	105	59	ilavlrdqr	ilavlrdqr	iSavlrdqr	iSavlrdqr
R11933	RUFY1	5	178996370	G	A	A2601,A3101,B1302,B5701,C0602	A3101	106	18458	mvivgdlvR	mvivgdlvR	mvivgdlvG	mvivgdlvG
R11933	BTNL8	5	180374525	G	T	A2601,A3101,B1302,B5701,C0602	B5701	94	82	dtffEpisw	dtffEpisw	dtffEpisw	dtffEpisw
R11933	TRIM47	5	180622539	G	A	A2601,A3101,B1302,B5701,C0602	A3101	62	42	Vscgfssgr	Vscgfssgr	Asrgfssgr	Asrgfssgr

Figure 21 (Cont.)

RI1933	SLC17A4	6	25779352	A	G	A2601,A3101,B1302,B5701,C0602	A3101	10	8	lvfCifgr	lvfYifgr
RI1933	ITPR3	6	33632933	G	A	A2601,A3101,B1302,B5701,C0602	C0602	102	94	fandTssml	fandAssml
RI1933	TNNAG	6	54212199	G	T	A2601,A3101,B1302,B5701,C0602	A3101	84	211	riaiqsNgr	naiqsNgr
RI1933	FAM83B	6	54735436	A	T	A2601,A3101,B1302,B5701,C0602	C0602	10	9	fhpprafil	fhpprafil
RI1933	COL19A1	6	70852685	G	A	A2601,A3101,B1302,B5701,C0602	A3101	177	201	gsagsNgpr	gsagsMgpr
RI1933	TBX18	6	85473758	C	T	A2601,A3101,B1302,B5701,C0602	A3101	273	24141	klgaeeaaR	klgaeeaaG
RI1933	EPHA7	6	93979378	C	A	A2601,A3101,B1302,B5701,C0602	A3101	109	3026	ikyyekYqr	ikyyekDqr
RI1933	PTPRK	6	128303877	T	A	A2601,A3101,B1302,B5701,C0602	A3101	17	22	tthnvtpr	Qthnvtpr
RI1933	SHPRH	6	146271573	C	A	A2601,A3101,B1302,B5701,C0602	A2601	17	10509	eVqqdidely	eSqqdidely
RI1933	STXBP5	6	147631223	G	T	A2601,A3101,B1302,B5701,C0602	B5701	423	168	ktrsgDpf	ktrsgEpf
RI1933	STXBP5	6	147631223	G	T	A2601,A3101,B1302,B5701,C0602	C0602	179	240	trsgDpfii	trsgEpfii
RI1933	IGF2R	6	160511111	G	T	A2601,A3101,B1302,B5701,C0602	A3101	284	7421	tsYktkyyl	tsDktkyyl
RI1933	IGF2R	6	160511111	G	T	A2601,A3101,B1302,B5701,C0602	A3101	307	13213	sYktkyylq	sDktkyylq
RI1933	PLG	6	161332220	C	A	A2601,A3101,B1302,B5701,C0602	A3101	53	41	sstspbrHr	sstspbrFr
RI1933	ZNF736	7	63809296	G	T	A2601,A3101,B1302,B5701,C0602	A3101	451	25	tsstfnhk	Rsstfnhk
RI1933	ZNF736	7	63809296	G	T	A2601,A3101,B1302,B5701,C0602	B5701	133	311	kafiRsst	kafiRsst
RI1933	COL1A2	7	94037510	C	A	A2601,A3101,B1302,B5701,C0602	A3101	457	542	gargfTger	gargfPger
RI1933	PAX4	7	127253515	C	T	A2601,A3101,B1302,B5701,C0602	A3101	236	547	tslpaNtvr	tslpaDtvr
RI1933	FLNC	7	128470788	C	A	A2601,A3101,B1302,B5701,C0602	B5701	107	375	kdlaedaTw	kdlaedaPw
RI1933	FLNC	7	128470789	C	A	A2601,A3101,B1302,B5701,C0602	B5701	105	375	kdlaedaQw	kdlaedaPw
RI1933	FLNC	7	128486103	G	A	A2601,A3101,B1302,B5701,C0602	A3101	30	247	tGgnhvtar	tGgnhvtar
RI1933	FAM131B	7	143057161	C	T	A2601,A3101,B1302,B5701,C0602	A3101	266	269	slhEsslhr	slhGsslhr
RI1933	PDIA4	7	148713060	A	G	A2601,A3101,B1302,B5701,C0602	A3101	11	9252	vlefyapR	vlefyapW
RI1933	DOCK5	8	25222165	A	G	A2601,A3101,B1302,B5701,C0602	A3101	7	1745	rvfiraaR	rvfiraaQ
RI1933	SLMN4	8	27097511	T	C	A2601,A3101,B1302,B5701,C0602	C0602	456	431	nreahtaaV	nreahtaaM
RI1933	PENK	8	57354091	C	A	A2601,A3101,B1302,B5701,C0602	A2601	46	5	eLskrygqf	eVskrygqf
RI1933	ZFHX4	8	77764807	G	T	A2601,A3101,B1302,B5701,C0602	A3101	206	4220	gikegkYtk	gikegkDtk
RI1933	DEPTOR	8	121013833	G	T	A2601,A3101,B1302,B5701,C0602	A3101	3	4	rmnfrrrLr	rmnfrrrRr
RI1933	DEPTOR	8	121013833	G	T	A2601,A3101,B1302,B5701,C0602	C0602	5	125	frmnfrrrL	frmnfrrrR
RI1933	DEPTOR	8	121013833	G	T	A2601,A3101,B1302,B5701,C0602	C0602	219	65	mnfrrrLri	mnfrrrRri
RI1933	DEPTOR	8	121013833	G	T	A2601,A3101,B1302,B5701,C0602	C0602	62	30	rrrLrlmei	rrrRrlmei
RI1933	DEPTOR	8	121013833	G	T	A2601,A3101,B1302,B5701,C0602	C0602	434	170	rrLrlmeil	rrRrlmeil
RI1933	MTBP	8	121471560	C	T	A2601,A3101,B1302,B5701,C0602	A3101	381	790	lakkilPsk	lakkilPsk
RI1933	TG	8	134128912	G	T	A2601,A3101,B1302,B5701,C0602	B5701	103	108	raLgnvfmy	raRgnvfmy
RI1933	RFX3	9	3248156	C	G	A2601,A3101,B1302,B5701,C0602	B5701	25	28	ltPsaasf	ltRsaasf
RI1933	TAF1L	9	32635291	T	A	A2601,A3101,B1302,B5701,C0602	A3101	148	293	lvnVegwir	lvnDegwir
RI1933	TAF1L	9	32635291	T	A	A2601,A3101,B1302,B5701,C0602	B5701	40	35	gahvnVegw	gahvnDegw
RI1933	TAF1L	9	32635292	C	A	A2601,A3101,B1302,B5701,C0602	A3101	114	293	lvnYegwir	lvnDegwir
RI1933	TAF1L	9	32635292	C	A	A2601,A3101,B1302,B5701,C0602	B5701	42	35	gahvnYegw	gahvnDegw
RI1933	NTRK2	9	87342772	C	T	A2601,A3101,B1302,B5701,C0602	C0602	380	1319	lqltnptYm	lqldnptHm
RI1933	GLRA2	X	147088956	G	A	A2601,A3101,B1302,B5701,C0602	A3101	236	307	kefrfQrr	kefrfRrr
RI1933	DUSP21	X	44703682	A	T	A2601,A3101,B1302,B5701,C0602	C0602	326	286	mrqgrSth	mrqgrTth
RI1933	GAGE2A	X	49208335	A	G	A2601,A3101,B1302,B5701,C0602	A2601	41	102	eppeViggm	eppeMiggm
RI1933	GAGE2A	X	49208335	A	G	A2601,A3101,B1302,B5701,C0602	A2603	449	9165	eViggmrpe	eMiggmrpe
RI1933	GAGE2A	X	49208335	A	G	A2601,A3101,B1302,B5701,C0602	C0602	117	113	rryveppeV	rryveppeM
RI1933	GDPD2	X	69652182	G	T	A2601,A3101,B1302,B5701,C0602	A3101	178	98	slnffvrnk	slnffvrnk
RI1933	TAF1	X	70612785	C	T	A2601,A3101,B1302,B5701,C0602	A3101	439	2634	rGslknak	rRslknak
RI1933	ABCB7	X	74288958	C	A	A2601,A3101,B1302,B5701,C0602	A3101	293	525	gsgkstlr	gsgkstVr
RI1933	ABCB7	X	74288958	C	A	A2601,A3101,B1302,B5701,C0602	A3101	14	10	stlrlfr	stVrlfr

Figure 21 (Cont.)

RI1933	ABCB7	X	74288958	C	A	A2601,A3101,B1302,B5701,C0602	B5701	85	66	kstlvrdf	kstlvrdf
RI1933	MAGEE1	X	75649053	C	A	A2601,A3101,B1302,B5701,C0602	A3101	142	267	lstpvppstr	lstpvppstr
RI1933	RHOXF1	X	119246821	C	A	A2601,A3101,B1302,B5701,C0602	C0602	60	68	trkelaenl	trkelaenl
RI1933	MAGEC3	X	140983290	G	T	A2601,A3101,B1302,B5701,C0602	C0602	173	6004	rkedgrrgi	rQedgrrgi
RI1933	AFF2	X	148048551	C	G	A2601,A3101,B1302,B5701,C0602	B5701	180	497	tswaaiAli	tswaaiPli
RI1933	MAGEA6	X	149013326	G	T	A2601,A3101,B1302,B5701,C0602	B5701	93	23614	gsssneeeW	gsssneeeG
RI1933	GABRA3	X	151376506	C	A	A2601,A3101,B1302,B5701,C0602	A3101	363	556	hfvgteiir	hVvgteiir
RI1933	DUSP9	X	152915557	G	T	A2601,A3101,B1302,B5701,C0602	A3101	347	7025	ayDivkrkk	ayDivkrkk
RI1933	MPP1	X	154014673	C	G	A2601,A3101,B1302,B5701,C0602	C0602	180	102	srlpalqlf	srlpalqMf
RI1933	FUNDC2	X	154253247	G	T	A2601,A3101,B1302,B5701,C0602	A3101	74	156	sqlvattar	sqVvattar
RI1933	IL9R	X	155234971	G	T	A2601,A3101,B1302,B5701,C0602	C0602	10	21	qhrdhivVv	qhrdhivGv
RO3338	VAMP3	1	7839691	G	T	A0201,A3002,B0801,B3801,C0701,C1203	A0201	8	26	iiiivvvFv	iiiivvvVv
RO3338	TMEM54	1	333666829	C	A	A0201,A3002,B0801,B3801,C0701,C1203	A0201	137	4050	dlkggisv	dlRggisv
RO3338	ZSCAN20	1	339611034	C	G	A0201,A3002,B0801,B3801,C0701,C1203	C1203	302	594	kdfmnssnL	kdfmnssnF
RO3338	DLGAP3	1	353709840	C	T	A0201,A3002,B0801,B3801,C0701,C1203	C1203	240	619	Tprsglgfii	Aprsglgfii
RO3338	HRNR	1	152186028	C	T	A0201,A3002,B0801,B3801,C0701,C1203	C0701	58	41	srlgnssit	srlgnssVf
RO3338	IQGAP3	1	156510675	C	T	A0201,A3002,B0801,B3801,C0701,C1203	B0801	195	44	svvRrfahl	svvRrfahli
RO3338	IQGAP3	1	156510675	C	T	A0201,A3002,B0801,B3801,C0701,C1203	C1203	382	625	vvRrfahli	vvRrfahli
RO3338	SLC19A2	1	169435129	C	G	A0201,A3002,B0801,B3801,C0701,C1203	B0801	72	70	svnnkkcrKl	svnnkkcrKl
RO3338	COMTD1	10	76995082	C	T	A0201,A3002,B0801,B3801,C0701,C1203	A0201	127	87	rnmtceqTql	rnmtceqAql
RO3338	COMTD1	10	76995082	C	T	A0201,A3002,B0801,B3801,C0701,C1203	C0701	50	67	mtceqTqll	mtceqAqll
RO3338	COMTD1	10	76995082	C	T	A0201,A3002,B0801,B3801,C0701,C1203	C1203	151	201	mtceqTqll	mtceqAqll
RO3338	SLC1A2	11	35333930	A	G	A0201,A3002,B0801,B3801,C0701,C1203	A0201	110	668	amvyymPtt	amvyymStt
RO3338	SLC1A2	11	35333930	A	G	A0201,A3002,B0801,B3801,C0701,C1203	A0201	192	161	mvyymPtti	mvyymStti
RO3338	SLC1A2	11	35333930	A	G	A0201,A3002,B0801,B3801,C0701,C1203	A0201	15	9	ymPttiisa	ymStttisa
RO3338	SLC1A2	11	35333930	A	G	A0201,A3002,B0801,B3801,C0701,C1203	C1203	16	19	mvyymPtti	mvyymStti
RO3338	SLC1A2	11	35333930	A	G	A0201,A3002,B0801,B3801,C0701,C1203	C1203	52	123	vyymPttii	vyymStti
RO3338	SLC1A2	11	35333930	A	G	A0201,A3002,B0801,B3801,C0701,C1203	C1203	315	491	mPttiisav	mStttisav
RO3338	ARAP1	11	72425235	T	A	A0201,A3002,B0801,B3801,C0701,C1203	C1203	177	386	sppppppVi	sppppppEi
RO3338	ACSM4	12	7459274	G	A	A0201,A3002,B0801,B3801,C0701,C1203	A0201	77	52	Rlavdpri	Rlavdpri
RO3338	ACSM4	12	7459274	G	A	A0201,A3002,B0801,B3801,C0701,C1203	C0701	37	39	qrgdRlavi	qrgdRlavi
RO3338	ACSM4	12	7459274	G	A	A0201,A3002,B0801,B3801,C0701,C1203	C1203	479	671	qrgdRlavi	qrgdRlavi
RO3338	LRRK2	12	40668439	G	A	A0201,A3002,B0801,B3801,C0701,C1203	A0201	440	1294	slhfpdai	slVhfpdai
RO3338	LRRK2	12	40668439	G	A	A0201,A3002,B0801,B3801,C0701,C1203	C0701	9	10	thfpdaiem	Vhfpdaiem
RO3338	LRRK2	12	40668439	G	A	A0201,A3002,B0801,B3801,C0701,C1203	C1203	303	574	thfpdaiem	Vhfpdaiem
RO3338	MFSD5	12	53647471	C	G	A0201,A3002,B0801,B3801,C0701,C1203	A0201	83	393	giMfssfma	giIfssfma
RO3338	MFSD5	12	53647471	C	G	A0201,A3002,B0801,B3801,C0701,C1203	A0201	12	132	iMfssfmaa	iIfssfmaa
RO3338	TMEM132C	12	128899882	A	G	A0201,A3002,B0801,B3801,C0701,C1203	C1203	462	102	tpvelyyAv	tpvelyyTv
RO3338	TMEM132C	12	128899882	A	G	A0201,A3002,B0801,B3801,C0701,C1203	C1203	123	1160	yAvthpgner	yTvthpgner
RO3338	SLC7A1	13	30110205	C	A	A0201,A3002,B0801,B3801,C0701,C1203	C1203	286	6373	ntfdlvalW	ntfdlvalG
RO3338	SLC7A1	13	30110205	C	A	A0201,A3002,B0801,B3801,C0701,C1203	C1203	43	23	valWvgstl	valGvgstl
RO3338	CHD8	14	21824391	G	C	A0201,A3002,B0801,B3801,C0701,C1203	A0201	21	9	klntitAvv	klntitPvv
RO3338	ESRRB	14	76957991	G	T	A0201,A3002,B0801,B3801,C0701,C1203	A3002	247	350	aiiqlvrRy	aiiqlvrRy
RO3338	ESRRB	14	76957991	G	T	A0201,A3002,B0801,B3801,C0701,C1203	C0701	65	166	vrRykkIkv	vrRykkIkv
RO3338	ESRRB	14	76957991	G	T	A0201,A3002,B0801,B3801,C0701,C1203	C1203	397	12884	raiiqlvrM	raiiqlvrR
RO3338	HCN4	15	73615421	A	G	A0201,A3002,B0801,B3801,C0701,C1203	A0201	372	1202	rqpeppPlv	rqpeppSlv
RO3338	HCN4	15	73615421	A	G	A0201,A3002,B0801,B3801,C0701,C1203	C1203	342	114	rqpeppPlv	rqpeppSlv
RO3338	C15orf26	15	81426714	G	C	A0201,A3002,B0801,B3801,C0701,C1203	A3002	115	77	igrSnedvy	igrWnedvy
RO3338	PKD1	16	2163401	G	A	A0201,A3002,B0801,B3801,C0701,C1203	A0201	33	148	vlsgLeatv	vlsgPeatv

Figure 21 (Cont.)

RO3338	PKD1	16	2161401	G	A	A0201,A3002,B0801,B3801,C0701,C1203	A0201	257	26933	gLeatvehv	gPeatvehv
RO3338	PKD1	16	2161401	G	A	A0201,A3002,B0801,B3801,C0701,C1203	A3002	127	662	Leatvehvy	Peatvehvy
RO3338	ABCA3	16	2338192	A	T	A0201,A3002,B0801,B3801,C0701,C1203	A0201	251	204	allainyTs	allainySs
RO3338	ABCA3	16	2338192	A	T	A0201,A3002,B0801,B3801,C0701,C1203	C1203	34	64	lainyTsel	lainySsel
RO3338	SEC14L5	16	5046388	G	C	A0201,A3002,B0801,B3801,C0701,C1203	A0201	419	3036	yiercIAhl	yiercIGhl
RO3338	SEC14L5	16	5046388	G	C	A0201,A3002,B0801,B3801,C0701,C1203	C1203	41	67	yiercIAhl	yiercIGhl
RO3338	RMI2	16	11439537	G	A	A0201,A3002,B0801,B3801,C0701,C1203	C1203	145	79	madrDearl	madrGearl
RO3338	RRAD	16	66958811	A	C	A0201,A3002,B0801,B3801,C0701,C1203	A3002	136	123	gsdsdesGy	gsdsdesVy
RO3338	RRAD	16	66958811	A	C	A0201,A3002,B0801,B3801,C0701,C1203	C1203	256	183	dsdesGykv	dsdesVykv
RO3338	VAT1L	16	77850892	G	A	A0201,A3002,B0801,B3801,C0701,C1203	C1203	311	708	pEfecsgiv	pGfecsgiv
RO3338	FBXO39	17	6684076	C	T	A0201,A3002,B0801,B3801,C0701,C1203	C0701	221	149	mkyeClari	mkyeRlari
RO3338	FBXO39	17	6684076	C	T	A0201,A3002,B0801,B3801,C0701,C1203	C1203	20	25	mkyeClari	mkyeRlari
RO3338	CTDP1	18	77475031	C	A	A0201,A3002,B0801,B3801,C0701,C1203	C1203	296	466	haQdkepel	haPdkepel
RO3338	PPP1R14A	19	38746876	G	T	A0201,A3002,B0801,B3801,C0701,C1203	C0701	394	1630	krhErvtvk	krhArvtvk
RO3338	ZNF230	19	44515376	G	T	A0201,A3002,B0801,B3801,C0701,C1203	C1203	468	806	ncNecgksf	ncKecgksf
RO3338	FOSB	19	45974528	G	T	A0201,A3002,B0801,B3801,C0701,C1203	C0701	229	169	Lrreltdrl	Rrreltdrl
RO3338	FOSB	19	45974528	G	T	A0201,A3002,B0801,B3801,C0701,C1203	C1203	453	13633	laaakcrnL	laaakcrnR
RO3338	GAD1	2	171709240	T	A	A0201,A3002,B0801,B3801,C0701,C1203	C1203	423	370	vtRnphkmm	vtWnphkmm
RO3338	PNKD	2	219135299	G	T	A0201,A3002,B0801,B3801,C0701,C1203	C1203	243	2456	rVarnarvl	rGarnarvl
RO3338	DLGAP4	20	35061009	C	G	A0201,A3002,B0801,B3801,C0701,C1203	A0201	57	50	Vtlshahev	Ltlshahev
RO3338	DLGAP4	20	35061009	C	G	A0201,A3002,B0801,B3801,C0701,C1203	C0701	327	526	Vtlshahev	Ltlshahev
RO3338	DLGAP4	20	35061009	C	G	A0201,A3002,B0801,B3801,C0701,C1203	C1203	167	129	Vtlshahev	Ltlshahev
RO3338	MORC3	21	37692567	C	T	A0201,A3002,B0801,B3801,C0701,C1203	C1203	426	56	mVaqpprgi	mAaqpprgi
RO3338	EBLN2	3	73111281	T	A	A0201,A3002,B0801,B3801,C0701,C1203	A0201	72	10	yvnshsllv	yvnshslFv
RO3338	EBLN2	3	73111281	T	A	A0201,A3002,B0801,B3801,C0701,C1203	A3002	44	150	Ivwvcdrsy	Fvwvcdrsy
RO3338	EBLN2	3	73111281	T	A	A0201,A3002,B0801,B3801,C0701,C1203	C0701	109	128	yvnshsllv	yvnshslFv
RO3338	EBLN2	3	73111281	T	A	A0201,A3002,B0801,B3801,C0701,C1203	C1203	17	22	yvnshsllv	yvnshslFv
RO3338	PAICS	4	57316827	A	G	A0201,A3002,B0801,B3801,C0701,C1203	C1203	75	82	vtpegIqVv	vtpegIqMv
RO3338	TLR2	4	154624362	T	G	A0201,A3002,B0801,B3801,C0701,C1203	A3002	371	658	Rlehldlsy	Slehldlsy
RO3338	TLR2	4	154624362	T	G	A0201,A3002,B0801,B3801,C0701,C1203	C1203	486	320	dsfssigRl	dsfsslgSl
RO3338	CDH10	5	24491715	C	T	A0201,A3002,B0801,B3801,C0701,C1203	A0201	37	31	aliTillci	aliAillci
RO3338	CDH10	5	24491715	C	T	A0201,A3002,B0801,B3801,C0701,C1203	C1203	170	945	lstgaliTi	lstgaliAi
RO3338	NUP155	5	37329301	C	A	A0201,A3002,B0801,B3801,C0701,C1203	C1203	206	1285	spFyssspv	spVyssspv
RO3338	KIF2A	5	61673528	C	T	A0201,A3002,B0801,B3801,C0701,C1203	A0201	103	43	qlftfheVv	qlftfheAv
RO3338	KIF2A	5	61673528	C	T	A0201,A3002,B0801,B3801,C0701,C1203	C0701	20	11	fheVvsqmv	fheAvsqmv
RO3338	KIF2A	5	61673528	C	T	A0201,A3002,B0801,B3801,C0701,C1203	C1203	198	449	qlftfheVv	qlftfheAv
RO3338	KIF2A	5	61673528	C	T	A0201,A3002,B0801,B3801,C0701,C1203	C1203	204	377	ftfheVvsq	ftfheAvsq
RO3338	KIF2A	5	61673528	C	T	A0201,A3002,B0801,B3801,C0701,C1203	C1203	474	219	fheVvsqmv	fheAvsqmv
RO3338	ARHGEF28	5	73181743	G	C	A0201,A3002,B0801,B3801,C0701,C1203	A0201	92	86	miatvHlkv	miatvDlkv
RO3338	KDM3B	5	137766038	A	T	A0201,A3002,B0801,B3801,C0701,C1203	A0201	93	26670	tlrkrlyeV	tlrkrlyeE
RO3338	KDM3B	5	137766038	A	T	A0201,A3002,B0801,B3801,C0701,C1203	B0801	14	180	tlrkrlyeV	tlrkrlyeE
RO3338	TNXB	6	32064500	C	T	A0201,A3002,B0801,B3801,C0701,C1203	A3002	337	19202	strtcprdY	strtcprdC
RO3338	TAPBP	6	33271707	G	C	A0201,A3002,B0801,B3801,C0701,C1203	A0201	164	1095	vqcstslyV	vqcstslyL
RO3338	TAPBP	6	33271707	G	C	A0201,A3002,B0801,B3801,C0701,C1203	A0201	185	156	stslyVslv	stslyLslv
RO3338	TAPBP	6	33271707	G	C	A0201,A3002,B0801,B3801,C0701,C1203	A0201	63	66	slyVslvtl	slyLslvtl
RO3338	TAPBP	6	33271707	G	C	A0201,A3002,B0801,B3801,C0701,C1203	C1203	203	291	slyVslvtl	slyLslvtl
RO3338	ANKS1A	6	35047683	C	A	A0201,A3002,B0801,B3801,C0701,C1203	B0801	100	2019	qkHprfsql	qkPprfsql
RO3338	ZNF76	6	35259389	C	T	A0201,A3002,B0801,B3801,C0701,C1203	C0701	453	63	fttFnirkv	fttSnirkv
RO3338	ZNF76	6	35259389	C	T	A0201,A3002,B0801,B3801,C0701,C1203	C1203	26	15	fttFnirkv	fttSnirkv

Figure 21 (Cont.)

RO3338	ROS1	6	117700313	G	C	A0201,A3002,B0801,B3801,C0701,C1203	A0201	486	535	kviaVtldl	kviaLtldl	
RO3338	ROS1	6	117700313	G	C	A0201,A3002,B0801,B3801,C0701,C1203	B0801	470	88	fsgkkviaV	fsgkkviaL	
RO3338	ROS1	6	117700313	G	C	A0201,A3002,B0801,B3801,C0701,C1203	C1203	51	189	fsgkkviaV	fsgkkviaL	
RO3338	TAAR1	6	132663823	C	A	A0201,A3002,B0801,B3801,C0701,C1203	A0201	34	3349	lksasifhi	lSsasifhi	
RO3338	GRM1	6	146755487	A	T	A0201,A3002,B0801,B3801,C0701,C1203	A0201	472	999	taipVfhav	taipDfhav	
RO3338	GRM1	6	146755487	A	T	A0201,A3002,B0801,B3801,C0701,C1203	C1203	20	18	taipVfhav	taipDfhav	
RO3338	EGFR	7	55224306	A	G	A0201,A3002,B0801,B3801,C0701,C1203	B3801	186	122	khfkncAsi	khfkncTsi	
RO3338	EGFR	7	55224306	A	G	A0201,A3002,B0801,B3801,C0701,C1203	C0701	316	122	khfkncAsi	khfkncTsi	
RO3338	EGFR	7	55224306	A	G	A0201,A3002,B0801,B3801,C0701,C1203	C1203	200	204	khfkncAsi	khfkncTsi	
RO3338	LAMB1	7	107601063	T	A	A0201,A3002,B0801,B3801,C0701,C1203	A0201	102	27699	lmpyckslV	lmpyckslD	
RO3338	LAMB1	7	107601063	T	A	A0201,A3002,B0801,B3801,C0701,C1203	B0801	15	27	mpyckslVi	mpyckslDi	
RO3338	LAMB1	7	107601063	T	A	A0201,A3002,B0801,B3801,C0701,C1203	C1203	18	120	mpyckslVi	mpyckslDi	
RO3338	HTR5A	7	154862649	A	T	A0201,A3002,B0801,B3801,C0701,C1203	C1203	34	46	fslsSpspi	fslsTpspi	
RO3338	CSMD1	8	3047569	A	T	A0201,A3002,B0801,B3801,C0701,C1203	C0701	412	356	Tefsagsiv	Sefsagsiv	
RO3338	CSMD1	8	3047569	A	T	A0201,A3002,B0801,B3801,C0701,C1203	C1203	163	237	Tefsagsiv	Sefsagsiv	
RO3338	PPP2CB	8	30643777	G	A	A0201,A3002,B0801,B3801,C0701,C1203	A3002	105	601	hvtWrtpdy	hvtRrtpdy	
RO3338	LYPLA1	8	55014370	T	A	A0201,A3002,B0801,B3801,C0701,C1203	A0201	249	16812	nlmstplpa	nNmstplpa	
RO3338	LYPLA1	8	55014370	T	A	A0201,A3002,B0801,B3801,C0701,C1203	A0201	51	234	lmstplpai	Nmstplpai	
RO3338	VPS13B	8	100831686	C	T	A0201,A3002,B0801,B3801,C0701,C1203	C1203	330	157	savpistsF	savpistsL	
RO3338	VPS13B	8	100831686	C	T	A0201,A3002,B0801,B3801,C0701,C1203	C1203	219	887	istsFikqi	istsLikqi	
RO3338	VPS13B	8	100831686	C	T	A0201,A3002,B0801,B3801,C0701,C1203	C1203	46	960	Fikqiatkv	Likqiatkv	
RO3338	MAN1B1	9	140001724	C	T	A0201,A3002,B0801,B3801,C0701,C1203	A0201	353	1564	flgtlslg	llgtlslg	
RO3338	MAN1B1	9	140001724	C	T	A0201,A3002,B0801,B3801,C0701,C1203	A0201	55	20150	llgtlslgv	lPgtlslgv	
RO3338	MAN1B1	9	140001724	C	T	A0201,A3002,B0801,B3801,C0701,C1203	A3002	121	671	lgtlslgvy	Pgtlslgvy	
RO3338	ZBED1	X	24038229	C	A	A0201,A3002,B0801,B3801,C0701,C1203	A0201	32	1999	aipekyKav	aipekyGav	
SA9755	PANK4	1	2450035	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	255	214	rhKgyfgai	rhEgyfgai	
SA9755	PRDM16	1	3350252	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	277	193	qakmqsyal	qakmqsyaM	
SA9755	TAS1R2	1	19181067	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B0801	393	1601	wWaseswai	wIaseswai	
SA9755	PTPRJ	1	29644366	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	10	42	lppdlclpl	lppdRclpl	
SA9755	TMAGL1	1	32049168	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	24	1713	mnmhKiytv	mnmhEiytv	
SA9755	TMAGL1	1	32049168	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	72	337	nmhKiytvl	nmhEiytvl	
SA9755	TMAGL1	1	32049168	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	338	128	svnnmhKiy	svnnmhEiy	
SA9755	TMAGL1	1	32049168	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	405	1109	nnmhKiytv	nnmhEiytv	
SA9755	MAP7D1	1	36644124	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	74	491	lakkrrqa	laKkrrqa	
SA9755	MAP7D1	1	36644124	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	171	3107	laKkrrqar	laEkrrqar	
SA9755	DIO1	1	54371839	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	175	96	drlqaaNli	drlqaaHli	
SA9755	TTC4	1	55183294	A	G	A0101,A11126,B3501,B0801,C0701,C0401	A0101	70	31	Ctnaaaqy	Ytnaaaqy	
SA9755	EPHX4	1	92526691	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	222	179	Qmaevtkiy	Emaevtkiy	
SA9755	CELSR2	1	109794382	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	231	8545	ftnngtgpl	ftnngtgpW	
SA9755	AMPD1	1	115216313	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	15	18758	qvfktstcY	qvfktstcD	
SA9755	CELF3	1	151681509	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	58	100	thaeaqaSi	thaeaqaAi	
SA9755	RPTN	1	152128100	C	G	A0101,A11126,B3501,B0801,C0701,C0401	A0101	235	371	kidTqdqsy	kidRqdqsy	
SA9755	RPTN	1	152128100	C	G	A0101,A11126,B3501,B0801,C0701,C0401	A0101	162	19489	dTqdqsyhy	dRqdqsyhy	
SA9755	RPTN	1	152128100	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	183	395	shygkidTq	shygkidRq	
SA9755	RPTN	1	152128419	C	G	A0101,A11126,B3501,B0801,C0701,C0401	A0101	380	312	dtqNqsshy	dtqPqsshy	
SA9755	RPTN	1	152128648	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	103	237	yhygHtdtq	yhygQtdtq	
SA9755	FLG2	1	152325014	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	311	300	thghthCq	thghthSq	
SA9755	FLG2	1	152327611	A	T	A0101,A11126,B3501,B0801,C0701,C0401	A0101	330	15059	ssgqyqgY	ssgqyqgF	
SA9755	LCE3A	1	152995507	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	71	114	spaqcVppa	spaqcLppa	

Figure 21 (Cont.)

SA9755	ASH1L	1	155451315	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	474	16516	stnimqeS	stnimqeS	stnimqeS	stnimqeS
SA9755	ASH1L	1	155451315	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	447	748	imqeSqel	imqeSqel	imqeSqel	imqeSqel
SA9755	OR10D1	1	158577042	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	327	92	ysierdQi	ysierdQi	ysierdQi	ysierdQi
SA9755	OR10D1	1	159410123	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	72	158	Rpvmkisci	Rpvmkisci	Rpvmkisci	Rpvmkisci
SA9755	PIGM	1	160000517	C	G	A0101,A11126,B3501,B0801,C0701,C0401	A0101	7	7	ctsqyflSy	ctsqyflSy	ctsqyflSy	ctsqyflSy
SA9755	PIGM	1	160000517	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	273	1819	ctsqyflSy	ctsqyflSy	ctsqyflSy	ctsqyflSy
SA9755	LRRC52	1	165513676	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	495	24800	yHldiplnt	yHldiplnt	yHldiplnt	yHldiplnt
SA9755	MRPL39	1	170965653	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	243	114	yDqdaivl	yDqdaivl	yAqdaivl	yAqdaivl
SA9755	TNN	1	175086341	G	T	A0101,A11126,B3501,B0801,C0701,C0401	A0103	375	21394	kadtkaqtD	kadtkaqtD	kadtkaqtY	kadtkaqtD
SA9755	TNN	1	175086341	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	90	926	tDidspqnt	tDidspqnt	tVidspqnt	tDidspqnt
SA9755	RNF2	1	185062227	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B0801	414	1916	cptcrkkiL	cptcrkkiL	cptcrkkiL	cptcrkkiV
SA9755	KDM5B	1	202702699	G	C	A0101,A11126,B3501,B0801,C0701,C0401	A0103	62	10495	lAegdalry	lAegdalry	lAegdalry	lPegdalry
SA9755	KDM5B	1	202702699	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	19	8	lAegdalry	lAegdalry	lAegdalry	lPegdalry
SA9755	ZNF678	1	227842802	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	52	19	shtrnKri	shtrnKri	shtrnKri	shtrnKri
SA9755	ZNF678	1	227842802	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	466	832	trhKrihtg	trhKrihtg	trhKrihtg	trhRrihtg
SA9755	AGT	1	230838946	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	52	101	favydDsat	favydDsat	favydEsat	favydQsat
SA9755	GNPAT	1	231401814	A	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	11	12	Fvpisisy	Fvpisisy	Fvpisisy	Yvpisisy
SA9755	ZP4	1	238049077	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	236	183	qpgpitLei	qpgpitLei	qpgpitVei	qpgpitLei
SA9755	ZNF695	1	247159954	T	C	A0101,A11126,B3501,B0801,C0701,C0401	B0801	348	494	svtkhkKi	svtkhkKi	svtkhkKi	svtkhkKi
SA9755	UPF2	10	12041973	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	420	3221	hVkilvdaf	hVkilvdaf	hVkilvdaf	hLkilvdaf
SA9755	UPF2	10	12041973	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	260	517	stgshlKli	stgshlKli	stgshlKli	stgshlKli
SA9755	CDC123	10	12238300	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	29	131	ypftlgvti	ypftlgvti	ypftlgvti	ypftlgvti
SA9755	PAM21B	10	51852617	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	353	751	ttkpksLsa	ttkpksLsa	ttkpksRsa	ttkpksRsa
SA9755	PCDH15	10	55719555	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	369	1782	sssDtvkli	sssDtvkli	sssAtvkli	sssAtvkli
SA9755	TET1	10	70406055	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	311	120	tiaskfqnf	tiaskfqnf	tiaskfqnf	Wiaskfqnf
SA9755	HK1	10	71142485	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	11	14	Mhnnavykm	Mhnnavykm	Mhnnavykm	Thnnavykm
SA9755	ADAMTS14	10	72511269	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	47	2444	sKlaykyvi	sKlaykyvi	sKlaykyvi	sSlaykyvi
SA9755	ZSWIM8	10	75558113	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	264	1167	snmMraaae	snmMraaae	snmMraaae	snmVraaae
SA9755	ZSWIM8	10	75558113	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	416	8697	nmMraaael	nmMraaael	nmMraaael	nmVraaael
SA9755	ZSWIM8	10	75558113	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	109	141	srardsnmM	srardsnmM	srardsnmM	srardsnmV
SA9755	ZSWIM8	10	75558113	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	143	436	Mraaaelai	Mraaaelai	Mraaaelai	Vraaaelai
SA9755	TLL2	10	98170145	A	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	222	63	ypsyshcvG	ypsyshcvG	ypsyshcvG	ypsyshcvW
SA9755	TLL2	10	98170145	A	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	457	92	shcvGnisv	shcvGnisv	shcvGnisv	shcvWnisv
SA9755	TDRD1	10	115964493	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	85	34	fppcaikYf	fppcaikYf	fppcaikYf	fppcaikCf
SA9755	MMP21	10	127456116	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	73	54	yLfkeslvf	yLfkeslvf	yLfkeslvf	yFfkeslvf
SA9755	MMP21	10	127456116	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	109	902	drrqklyL	drrqklyL	drrqklyL	drrqklyF
SA9755	GPR123	10	134942851	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	34	7449	lRqqhlerni	lRqqhlerni	lRqqhlerni	lKqqhlerni
SA9755	KNDC1	10	135012177	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	176	97	eahaSpsil	eahaSpsil	eahaSpsil	eahaGspsi
SA9755	PHRF1	11	5815611	G	T	A0101,A11126,B3501,B0801,C0701,C0401	A0101	477	21785	lvarspgpY	lvarspgpY	lvarspgpY	lvarspgpD
SA9755	PHRF1	11	5815611	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	19	25045	lvarspgpY	lvarspgpY	lvarspgpY	lvarspgpD
SA9755	TRPM5	11	2434193	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	229	154	drgpRavfl	drgpRavfl	drgpCavfl	drgpRavfl
SA9755	OR52N1	11	5809503	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	5	10690	nvlphtycY	nvlphtycY	nvlphtycY	nvlphtycD
SA9755	OR52N1	11	5809503	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	171	568	iphtycYtm	iphtycYtm	iphtycYtm	iphtycDtm
SA9755	EHF	11	34678517	A	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	9	16	khYrgthi	khYrgthi	khNrgthi	khNprgthi
SA9755	LDLRAD3	11	36250922	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	100	13659	eRsqgteev	eRsqgteev	eRsqgteev	ePsqgteev
SA9755	OR5L2	11	55595185	T	C	A0101,A11126,B3501,B0801,C0701,C0401	A0101	371	265	slaPrlfy	slaPrlfy	slaPrlfy	slaLrlfy
SA9755	OR5L2	11	55595185	T	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	70	46	ihssiaPri	ihssiaPri	ihssiaPri	ihssiaLri
SA9755	OR5M9	11	56230620	C	A	A0101,A11126,B3501,B0801,C0701,C0401	A0103	7	13	lsDktlsy	lsDktlsy	lsDktlsy	lsEktlsy
SA9755	OR5M9	11	56230620	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	492	962	lsDktlsy	lsDktlsy	lsDktlsy	lsEktlsy

Figure 21 (Cont.)

SA9755	MS4A2	11	59861449	A	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	441	304	vimlfltil	vMmlfltil
SA9755	MS4A2	11	59861449	A	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	162	100	fsteivvLm	fsteivvMm
SA9755	MS4A2	11	59861449	A	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	405	643	fsteivvLm	fsteivvMm
SA9755	MS4A4A	11	60070164	T	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	40	140	Shgtmsilm	Chgtmsilm
SA9755	BBS1	11	66291310	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	9	23	langevHiy	langevRiy
SA9755	BBS1	11	66291310	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	299	480	vHiyrdkai	vRiyrdkai
SA9755	TPCN2	11	68830458	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	343	58	lpemaIvgl	lpemaSvgl
SA9755	P2RY2	11	72945917	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B0801	76	9	lpTakrksv	lpRakrksv
SA9755	UVRAG	11	75852332	A	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	13	20	ipvdCavav	ipvdSavav
SA9755	UBTFL1	11	89819499	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	13	13	ypgmrsKel	ypgmrsQel
SA9755	UBTFL1	11	89819499	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	449	177	ypgmrsKel	ypgmrsQel
SA9755	UBTFL1	11	89819499	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	100	71	mrsKeltki	mrsQeltki
SA9755	SLC36A4	11	92918924	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	294	217	sdKeheqel	sdEeheqel
SA9755	EXPH5	11	108409826	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	303	295	srmsfrLsf	srmsfrSsf
SA9755	EXPH5	11	108409826	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	67	91	sfrLsfasl	sfrSsfasl
SA9755	EXPH5	11	108409826	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	74	189	Lsfaslfsf	Ssfaslfsf
SA9755	EXPH5	11	108409826	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	70	75	srmsfrLsf	srmsfrSsf
SA9755	EXPH5	11	108409826	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	77	31	frLsfaslf	frSsfaslf
SA9755	CADM1	11	115375043	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	98	3290	aaaaappgF	aaaaappgL
SA9755	CADM1	11	115375043	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	57	357	FrlrIIII	LrlrIIII
SA9755	APOA4	11	116693900	A	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	26	2593	fRkavvltl	fLkavvltl
SA9755	OR8B8	11	124310108	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	318	108	mlnpliysM	mlnpliysL
SA9755	OR8B8	11	124310108	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	131	162	sMrnkdvkv	sLrnkdvkv
SA9755	OR8B8	11	124310108	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	279	3806	mlnpliysM	mlnpliysL
SA9755	TAS2R30	12	11286472	T	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	236	499	flrikrSvk	flrikrRvk
SA9755	TAS2R30	12	11286472	T	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	247	11	rikrSvksv	rikrRvksv
SA9755	TAS2R30	12	11286472	T	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	147	188	krSvksvvl	krRvksvvl
SA9755	NCKAP5L	12	50192144	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	34	190	ghcaRqrev	ghcaGqrev
SA9755	LIMA1	12	50599813	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	59	37	srsasgrNi	srsasgrKi
SA9755	PDE1B	12	54962974	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	210	275	vyidetrqM	vyidetrqI
SA9755	PDE1B	12	54962974	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	195	273	yidetrqMl	yidetrqIl
SA9755	PAN2	12	56713165	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	224	75	ylklHflid	ylklRflid
SA9755	AGAP2	12	58124597	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	261	203	thgkemdlM	thgkemdlL
SA9755	FAM19A2	12	62148692	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	141	154	fpgqLagtt	fpgqVagtt
SA9755	PTPRB	12	71029513	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	31	4431	karkylhsL	karkylhsW
SA9755	PTPRB	12	71029513	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	423	3744	arkylhsLm	arkylhsWm
SA9755	ZFC3H1	12	72013143	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	98	17	flrkflaYf	flrkflaSf
SA9755	TPH2	12	72425425	A	T	A0101,A11126,B3501,B0801,C0701,C0401	A0101	162	20131	vqdlrsdlY	vqdlrsdlN
SA9755	KCNC2	12	75444401	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	13	10	lagLltiam	lagVltiam
SA9755	APAF1	12	99056328	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B0801	35	122	lttrdkst	lttrdksV
SA9755	SLC17A8	12	100787200	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	12	17	ipFaarvhy	ipSaarvhy
SA9755	STAB2	12	104155096	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	137	7574	qptetrfvH	qptetrfvD
SA9755	STAB2	12	104155096	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	16	65	trfvHgrai	trfvDgrai
SA9755	WSCD2	12	108600131	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	452	3860	ffNykkmti	ffDykkmti
SA9755	PPP1CC	12	111169662	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	41	1512	enKirgld	enEirgld
SA9755	PTPN11	12	112892407	T	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	37	39	erfdAltdl	erfdSltdl
SA9755	FBXO21	12	117603295	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	130	112	wpQkvldil	wpEkvldil
SA9755	CIT	12	120263147	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	9	11	ipigIpdym	ipigTpdym
SA9755	NCOR2	12	124870336	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	81	159	fnykNrqnl	fnykKrqnl

Figure 21 (Cont.)

SA9755	NCOR2	12	124870326	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	178	565	Nrqnldeil	Krqnldeil
SA9755	SLC15A4	12	129283810	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	52	23879	igwnsshtY	igwnsshtD
SA9755	GLTD1	12	129431897	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	63	72	kraagvQli	kraagvRli
SA9755	TMEM132D	12	129558525	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	5	3	yptrnsNvm	yptrnsNvm
SA9755	PIWIL1	12	130847333	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	93	94	ifQdrgqel	ifQdrgqel
SA9755	ZNF891	12	133697237	T	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	55	431	kMrhtgekl	Krhtgekl
SA9755	ZNF268	12	133779761	A	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	225	178	vhqrshtgV	vhqrshtgM
SA9755	ZNF268	12	133779761	A	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	33	17	shtgVkpyv	shtgMkpyv
SA9755	ZNF268	12	133780674	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	140	112	iihmrfhsg	iihmrfhsg
SA9755	ZNF268	12	133780879	T	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	407	112	iihmrthTg	iihmrthSg
SA9755	HSPH1	13	31722586	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	77	299	spafkvTef	spafkvRef
SA9755	UFM1	13	38924334	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	12	28	laraipVaf	laraipGaf
SA9755	UFM1	13	38924334	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	163	2371	lpVafptga	lpGafptga
SA9755	KCNRG	13	305899816	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	146	1437	lNffrthql	lDfrthql
SA9755	GPC6	13	95055415	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	38	22	saaqrghsM	saaqrghsL
SA9755	GPC6	13	95055415	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	226	3824	saaqrghsM	saaqrghsL
SA9755	GPC6	13	95055415	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	445	378	saaqrghsM	saaqrghsL
SA9755	GPC6	13	95055415	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	431	727	ghsMiswsl	ghsLiswsl
SA9755	ABCC4	13	95696575	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	21	32	Vrkrqilli	Lrkrqilli
SA9755	AKAP6	14	33201735	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	294	780	eaikkCgyl	eaikkSgyl
SA9755	DACT1	14	59113323	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	495	803	ahghAreav	ahghGreav
SA9755	SIX6	14	60976393	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B0801	185	472	wlQahyqea	wlEahyqea
SA9755	SIX6	14	60976393	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	111	69	qalwlQahy	qalwlEahy
SA9755	LTBP2	14	74995765	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	377	4732	ggqtCtlpl	ggqtStlpl
SA9755	VASH1	14	77229439	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	91	1788	ihpdgekvV	ihpdgekvA
SA9755	GALC	14	88434799	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	212	116	thsakdGkl	thsakdAkl
SA9755	ZC3H14	14	89939050	A	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	217	1079	dlktedlSf	dlktedlNf
SA9755	CYP46A1	14	100166393	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	488	9951	ivseenyeH	kseenyeR
SA9755	CYP46A1	14	100166393	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	76	121	eHwhkqrrv	eRwhkqrrv
SA9755	KLC1	14	101223947	A	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	56	8791	sekqklral	sekqklraQ
SA9755	CYFIP1	15	22940799	A	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	290	2145	miqireVhm	miqireDhm
SA9755	CYFIP1	15	22940799	A	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	285	2996	eVhmrfise	eDhmrfise
SA9755	CYFIP1	15	22940799	A	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	72	11	ireVhmrfi	ireDhmrfi
SA9755	CYFIP1	15	22940799	A	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	15	45	Vhmrfiset	Dhmrfiset
SA9755	GABBR2	15	26812742	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	381	257	dasaDrvel	dasaArvel
SA9755	HERC2	15	28538098	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	255	30498	gpgsipkqY	gpgsipkqD
SA9755	C15orf56	15	40544592	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	386	453	pLahlral	pPahlral
SA9755	C15orf56	15	40544592	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	136	1422	fpLahlra	fpPahlra
SA9755	INO80	15	41313290	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	52	23333	vpldsycnY	vpldsycnD
SA9755	INO80	15	41313290	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	68	43	ycnYrsaey	ycnDrsaey
SA9755	DUOX2	15	45403686	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	19	6	lVsgpdpaf	lAsgpdpaf
SA9755	DUOX2	15	45403686	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	254	6483	rsfsggqlV	rsfsggqlA
SA9755	DUOXA1	15	45409786	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	33	50	yrHdaraff	yrRdaraff
SA9755	RASL12	15	65347240	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B0801	282	1397	tlkgfkil	tlkgfkif
SA9755	CLN6	15	68506678	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	336	980	vgNythmay	vgDythmay
SA9755	PAQR5	15	69682011	C	G	A0101,A11126,B3501,B0801,C0701,C0401	A0101	253	706	gsaiayCay	gsaiaySay
SA9755	PAQR5	15	69682011	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	217	372	Cayrfpdal	Sayrfpdal
SA9755	ULK3	15	75134449	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	30	28	lpQkvarvf	lpEkvarvf
SA9755	ULK3	15	75134449	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	181	427	trrlpQkv	trrlpEkv

Figure 21 (Cont.)

SA9755	SNUPN	15	75901958	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	17	20	yFvnrfssl	yCvnrfssl
SA9755	C15orf40	15	83677244	T	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	246	7732	pRlecsgvv	pKlecsgvv
SA9755	SEC11A	15	85213242	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B0801	127	103	fivskkpPl	fivskkpAl
SA9755	MESP2	15	90320211	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	374	521	rrLglvsav	rrPglvsav
SA9755	LUC7L	16	249072	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B0801	58	1155	qireklHql	qireklDql
SA9755	CREBBP	16	3788632	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	35	54	Lprclrtav	Rprclrtav
SA9755	CREBBP	16	3788632	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	337	7711	Lprclrtav	Rprclrtav
SA9755	CREBBP	16	3788632	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	41	11	ihffLprcl	ihffRprcl
SA9755	PPL	16	4945366	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B0801	176	1070	Rlqkrgqqv	Glqkrgqqv
SA9755	RBFOX1	16	7637292	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	295	25722	ePgskgfgf	eRgskgfgf
SA9755	UBFD1	16	23569480	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	390	23542	gRgagrelv	gGgagrelv
SA9755	SLC5A11	16	24902283	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	130	17175	lHredafhi	lPredafhi
SA9755	SLC5A11	16	24902283	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	359	1638	Hredafhif	Predafhif
SA9755	ARMC5	16	31474130	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	227	12502	vpllagqlF	vpllagqlC
SA9755	ABCC12	16	48134867	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	64	467	Lpwfthits	Spwfthits
SA9755	ABCC12	16	48134867	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	83	35	srLpwfthi	srSpwfthi
SA9755	CAPNS2	16	55601312	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	336	4185	Hldamfraf	Rldamfraf
SA9755	GNAO1	16	56377754	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B0801	192	766	eMythvtca	elythvtca
SA9755	GNAO1	16	56377754	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	106	330	ahkeMythv	ahkelythv
SA9755	AMFR	16	56401433	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B0801	14	110	fptqrsHsi	fptqrsDsi
SA9755	AMFR	16	56401433	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	60	82	fptqrsHsi	fptqrsDsi
SA9755	SLC12A3	16	56938316	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	168	3026	lrKvrinei	lrQvrinei
SA9755	SLC12A3	16	56938316	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	295	255	nrvkslrKv	nrvkslrQv
SA9755	SLC12A3	16	56938316	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	93	70	lrKvrinei	lrQvrinei
SA9755	CCL17	16	57449702	A	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	92	7735	fvtvqgraF	fvtvqgral
SA9755	DHX38	16	72134377	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	237	326	nrmltsgLv	nrmltsgVv
SA9755	BCAR1	16	75270735	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	88	64	rarlrlCgv	rarlrlWgv
SA9755	IRF8	16	85954883	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	15	14	frenqqitI	frenqqitV
SA9755	POLR2A	17	7416703	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	109	328	syWptspsy	sySptspsy
SA9755	FXR2	17	7507196	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	258	10742	yvleyaacH	yvleyaacD
SA9755	FXR2	17	7507196	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	223	63	eyaacHaty	eyaacDaty
SA9755	FXR2	17	7507196	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	39	8039	cHatyneiv	cDatyneiv
SA9755	DNAH2	17	7636510	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	59	81	vrgpyiTal	vrgpyiPal
SA9755	AURKB	17	8108330	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	33	87	fpasvplga	fpasvpMga
SA9755	MYH8	17	10310096	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	421	680	ehelvlQql	ehelvlHql
SA9755	ZNF207	17	30689354	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	139	143	mpmgglmpp	mpmggMmpp
SA9755	SLFN11	17	33690301	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	113	53	ihkgvyqKl	ihkgvyqEl
SA9755	GPR179	17	36486762	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	151	113	lerprgVpl	lerprgApl
SA9755	GPR179	17	36486762	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	15	337	rrlerprgV	rrlerprgA
SA9755	PCGF2	17	36892399	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	168	4451	Slkeyytlm	Plkeyytlm
SA9755	KRT13	17	39661780	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	28	41	slrlqsYsa	slrlqsSsa
SA9755	FZD2	17	42635078	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	75	71	prsalSrll	prsalPrll
SA9755	FZD2	17	42635078	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	119	1311	Srlllplll	Prlllplll
SA9755	PLCD3	17	43194034	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	104	861	lYspnpeel	lDspnpeel
SA9755	SCRN2	17	45915354	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	390	430	Hlqqkqqdl	Qlqqkqqdl
SA9755	SCRN2	17	45915354	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	368	387	rdqdrgqHl	rdqdrgqQl
SA9755	MED13	17	60140467	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	9	100	Ypsfadlih	Dpsfadlih
SA9755	MED13	17	60140467	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0401	407	1051	fwwgeYpsf	fwwgeDpsf
SA9755	MRC2	17	60743461	A	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	89	22	calpyhevF	calpyhevY

Figure 21 (Cont.)

SA9755	MRC2	17	60743461	A	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	46	61	lpyhevYti	lpyhevYti	lpyhevYti
SA9755	BPTF	17	65888068	A	G	A0101,A11126,B3501,B0801,C0701,C0401	B0801	75	1368	npDskksql	npDskksql	npDskksql
SA9755	ABCA6	17	67102211	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	10	16	famarIMfl	famarIMfl	famarIMfl
SA9755	ABCA6	17	67102211	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	7	6	marIMfkl	marIMfkl	marIMfkl
SA9755	ABCA6	17	67102211	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	103	87	famarIMfl	famarIMfl	famarIMfl
SA9755	IL6ST	17	73566559	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	43	91	ssrkmTag	ssrkmTag	ssrkmTag
SA9755	BIRC5	17	76212066	T	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	59	1984	aHacntstl	aHacntstl	aYacntstl
SA9755	RNF213	17	78341912	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	66	37	lpsKfspav	lpsKfspav	lpdFfspav
SA9755	ANKRD12	18	9257045	A	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	493	1067	spaihDrel	spaihDrel	spaihDrel
SA9755	ROCK1	18	18534861	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	20	10	fpanrdaeS	fpanrdaeS	fpanrdaeA
SA9755	CDH7	18	63481814	C	T	A0101,A11126,B3501,B0801,C0701,C0401	A0101	96	165	ysihggtly	ysihggtly	ysihggtPy
SA9755	CDH7	18	63481814	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	451	46	ysihggtly	ysihggtly	ysihggtPy
SA9755	NETO1	18	70451119	T	C	A0101,A11126,B3501,B0801,C0701,C0401	B0801	386	263	yirfidCem	yirfidYem	yirfidYem
SA9755	MKNK2	19	2042511	A	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	52	103	hpnqvspAk	hpnqvspAk	hpnqvspVk
SA9755	AP3D1	19	2129098	A	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	4	103	nPihstsam	nPihstsam	nLihstsam
SA9755	NCLN	19	3204745	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	240	617	simdMrsrv	simdMrsrv	simdVrsrv
SA9755	ANGPTL4	19	8435957	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	169	375	rRhdgsvdf	rRhdgsvdf	rRhdgsvdf
SA9755	OR7G2	19	9213880	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	143	242	taiskfIfl	taiskfIfl	taiskfIfl
SA9755	SMARCA4	19	11123685	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	496	6884	Yemglgkti	Yemglgkti	Demglgkti
SA9755	KANK2	19	11304671	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	46	22202	pafpskdpY	pafpskdpY	pafpskdpD
SA9755	KANK2	19	11304671	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	74	156	fpskdpYpp	fpskdpYpp	fpskdpDpp
SA9755	ZNF844	19	12187589	A	G	A0101,A11126,B3501,B0801,C0701,C0401	B0801	125	24	fkfmkGhti	fkfmkGhti	fkfmkRhti
SA9755	ZNF844	19	12187589	A	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	99	76	fkfmkGhti	fkfmkGhti	fkfmkRhti
SA9755	ZNF844	19	12187618	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B0801	58	114	Snmekhsti	Snmekhsti	Rnmekhsti
SA9755	ZNF844	19	12187618	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	140	386	Snmekhsti	Snmekhsti	Rnmekhsti
SA9755	ZNF844	19	12187632	A	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	14	8120	kPstslpf	kPstslpf	kHstslpf
SA9755	ZNF844	19	12187632	A	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	229	386	rnmekPsti	rnmekPsti	rnmekHsti
SA9755	MAN2B1	19	12775786	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	186	624	vrqgrfeLa	vrqgrfeLa	vrqgrfeFa
SA9755	RASAL3	19	15565012	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	4	4	qpvlvsvpm	qpvlvsvpm	qpvLvsvpm
SA9755	CHERP	19	16640672	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	228	275	vvqpMqlaf	vvqpMqlaf	vvqpVqlaf
SA9755	CHERP	19	16640672	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	391	334	qpMqlafqq	qpMqlafqq	qpVqlafqq
SA9755	ZNF253	19	20002885	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	413	101	iihtgekpy	iihtgekpy	iVhtgekpy
SA9755	ZNF90	19	20229964	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	413	322	iihtgEkpy	iihtgEkpy	iihtgAkpy
SA9755	ZNF737	19	20728254	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	413	237	iihTgekpy	iihTgekpy	iihSgekpy
SA9755	ZNF626	19	20807208	T	C	A0101,A11126,B3501,B0801,C0701,C0401	B0801	382	6160	kafnRssii	kafnRssii	kafnQssii
SA9755	ZNF626	19	20807208	T	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	229	490	kafnRssii	kafnRssii	kafnQssii
SA9755	ZNF430	19	21240385	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	469	121	Kafnrsshi	Kafnrsshi	Rafnrsshi
SA9755	ZNF430	19	21240385	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	267	139	Kafnrsshi	Kafnrsshi	Rafnrsshi
SA9755	ZNF430	19	21240216	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	413	165	iihTgekpy	iihTgekpy	iihAgekpy
SA9755	ZNF431	19	21356217	T	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	413	1528	iihtgekPy	iihtgekPy	iihtgekSy
SA9755	ZNF708	19	21476951	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	286	389	snikkhkiv	snikkhkiv	snRkkhkiv
SA9755	ZNF708	19	21476951	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	413	101	iihtgekpy	iihtgekpy	iVhtgekpy
SA9755	ZNF708	19	21477016	A	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	413	2480	iihtgekPy	iihtgekPy	iihtgekLy
SA9755	ZNF429	19	21719781	A	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	413	752	iihtGekpy	iihtGekpy	iihtEekpy
SA9755	ZNF208	19	22156983	T	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	413	26173	iihtgekpY	iihtgekpY	iihtgekpN
SA9755	ZNF257	19	22271475	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	413	1400	iihtgekpy	iihtgekpy	Rihtgekpy
SA9755	ZNF676	19	22363008	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	413	4155	iihtgekPy	iihtgekPy	iihtgeKRy
SA9755	ZNF729	19	22497504	A	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	413	1291	iihtgEkpy	iihtgEkpy	iihtgKkpy
SA9755	ZNF729	19	22497756	A	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	413	1291	iihtgEkpy	iihtgEkpy	iihtgKkpy

Figure 21 (Cont.)

SA9755	ZNF99	19	22940265	A	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	413	1528	iihtgekPy	iihtgekSy	
SA9755	ZNF99	19	22940859	T	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	413	1291	iihtgEkpy	iihtgKkpy	
SA9755	ZNF536	19	31039533	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	32	61	krkdntNVv	krkdntfGv	
SA9755	PEPD	19	33879338	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	98	101	Chlqpgpmvl	Rhlqpgpmvl	
SA9755	PRODH2	19	36293922	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	233	6373	varhgpmcY	varhgpmcH	
SA9755	PRODH2	19	36293922	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	349	923	arhgpmcYl	arhgpmcHl	
SA9755	PRODH2	19	36293922	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	213	91	rhgpmcYlm	rhgpmcHlm	
SA9755	ZNF850	19	37239591	A	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	420	2320	qihtgekPy	qihtgekLy	
SA9755	PSG8	19	43258694	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	476	1704	yyHsgevly	yyRsgevly	
SA9755	PSG8	19	43258694	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	220	219	tyyHsgev	tyyRsgev	
SA9755	PSG8	19	43258694	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	184	248	tyyHsgevl	tyyRsgevl	
SA9755	PSG8	19	43258694	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	6	8	yHsgevlyl	yRsgevlyl	
SA9755	PSG11	19	43519510	A	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	305	356	lhgpdlpri	lhgpdLpri	
SA9755	PSG11	19	43519511	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	159	356	lhgpdlpri	lhgpdLpri	
SA9755	HSD17B14	19	49335955	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	257	324	etirflgRl	etirflgKl	
SA9755	HSD17B14	19	49335955	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	24	24	rifgRldcv	rifgRldcv	
SA9755	GYS1	19	49473867	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	275	837	cqqsrrqRl	cqqsrrqKl	
SA9755	SNRNP70	19	49607965	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	481	1495	Mkgwrparrl	Vkgwrparrl	
SA9755	NR1H2	19	50883827	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	125	2249	lpVlksiw	lpPlksiw	
SA9755	KLK14	19	51584367	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	21	25	Dprrrflcg	Gprrrflcg	
SA9755	ZNF677	19	53747041	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	256	211	rnlenyTnR	rnlenyRnR	
SA9755	OSCAR	19	54599172	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	108	464	vlLqrsevl	vlSqrsevl	
SA9755	TSEN34	19	54697065	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	224	196	ffnahyiaKc	fhahyiaQc	
SA9755	LILRB4	19	55175834	G	T	A0101,A11126,B3501,B0801,C0701,C0401	A0101	30	44	ltsvhggty	Vtsvhggty	
SA9755	LILRB4	19	55175834	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	129	90	fpmspltsv	fpmspVtsv	
SA9755	LILRB4	19	55175834	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	262	854	ltsvhggty	Vtsvhggty	
SA9755	ZNF805	19	57765995	T	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	8	446	nPqeeasy	nLqeeasy	
SA9755	ZNF530	19	58118605	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	64	50	tvhtVerpy	tvhtGerpy	
SA9755	PPP1CB	2	29011673	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	23	35	Evvedgyef	Qvvedgyef	
SA9755	SULT6B1	2	37410590	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	116	759	lhydklpgC	lhydklpgS	
SA9755	ATL2	2	38604377	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	286	1087	eaaQgqqph	eaaRgqqph	
SA9755	ADD2	2	70903875	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	39	65	lpsgCsvpg	lpsgSsvpg	
SA9755	ADD2	2	70919548	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	5	45	Cataavsam	Pataavsam	
SA9755	ADD2	2	70919548	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	455	266	lhtCataav	lhtPataav	
SA9755	ADD2	2	70919549	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	4	45	Ttataavsam	Ptataavsam	
SA9755	EMX1	2	73161007	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	19	38	Fhhmrwri	Shhmrwri	
SA9755	LRRTM4	2	77746284	T	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	9	515	lkwnrirsi	lQwnrirsi	
SA9755	RPIA	2	88991274	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	483	639	lpRraggaa	lpGraggaa	
SA9755	BCL2L11	2	111907692	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	410	20398	iRdefnayy	iGdefnayy	
SA9755	AMER3	2	131519784	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	269	1965	Fhsekgnqa	Phsekgnqa	
SA9755	MAP3K19	2	135757571	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	94	149	egveitltf	egveiVtf	
SA9755	NXPH2	2	139537784	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	171	159	lplvtvpgl	lplvVvpgl	
SA9755	ZEB2	2	145155992	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	33	78	tsipgiQpy	tsipgiRpy	
SA9755	ZEB2	2	145155992	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	50	163	Qpvpgpldqm	Rpvpgpldqm	
SA9755	TTN	2	179466084	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	465	1527	frvGaenrf	trvRaenrf	
SA9755	FSIP2	2	186678561	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	64	1702	sRssikkfl	sTssikkfl	
SA9755	ADAM23	2	207459498	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	315	1308	ldddtdvCy	lddddtdvCy	
SA9755	PIKFYVE	2	209190443	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	11	5	cpagipcSf	cpagipcAf	
SA9755	PIKFYVE	2	209190443	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	368	237	ipcSffapv	ipcAffapv	

Figure 21 (Cont.)

SA9755	IRS1	2	227661886	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B0801	31	17	rfrNrthsa	rfrKrthsa
SA9755	GIGYF2	2	233684667	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	137	9340	rrreeeerL	rrreeeerR
SA9755	GIGYF2	2	233684667	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	92	54	erLkqeeil	erRkqeeil
SA9755	RNPEPL1	2	241512671	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B0801	76	299	Rprsrvwae	Gprsrvwae
SA9755	AQP12A	2	241631740	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	26	29	waweVsdlh	waweLsdlh
SA9755	AQP12A	2	241631740	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	83	60	mrlcwaweV	mrlcwaweL
SA9755	SIGLEC1	20	3672025	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	266	130	lptVaaasa	lptGaaasa
SA9755	SIGLEC1	20	3672025	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	12	138	Vaaasapvm	Gaaasapvm
SA9755	CHGB	20	5904594	G	T	A0101,A11126,B3501,B0801,C0701,C0401	A0101	222	21348	kldlkrqyY	kldlkrqyD
SA9755	CHGB	20	5904594	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	128	3161	dlkrqyYrv	dlkrqyDrv
SA9755	CHGB	20	5904594	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	57	1235	Yrvaqldql	Drvaqldql
SA9755	LRRN4	20	6033289	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	5	3	lpTadatal	lpAadatal
SA9755	LRRN4	20	6033289	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	325	1993	Tadatalll	Aadatalll
SA9755	ISM1	20	13279927	A	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	17	12	tpnlFstef	tpnllstef
SA9755	ISM1	20	13279927	A	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	236	2808	Fstefsael	lstefsael
SA9755	TRPC4AP	20	33595408	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	154	549	sflQgttsy	sflRgttsy
SA9755	CEP250	20	34091436	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	375	188	cqqehihQl	cqqehihEl
SA9755	CEP250	20	34091436	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	27	75	ehihQlqel	ehihElqel
SA9755	KIAA1755	20	36868064	T	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	67	12236	apspiteeM	apspiteeK
SA9755	RALGAPB	20	37168527	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	329	6686	aplhsrdlY	aplhsrdlH
SA9755	RALGAPB	20	37168527	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	434	146	lhsrdlYsm	lhsrdlHsm
SA9755	RALGAPB	20	37168527	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	113	89	srdlYsmiv	srdlHsmiv
SA9755	EYA2	20	45725785	C	A	A0101,A11126,B3501,B0801,C0701,C0401	A0101	62	32	ltgKfasry	ltgTfasry
SA9755	PREX1	20	47262401	C	T	A0101,A11126,B3501,B0801,C0701,C0401	A0101	410	1354	dtmsyHdsy	dtmsyRdsy
SA9755	PREX1	20	47262401	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	198	710	dtmsyHdsy	dtmsyRdsy
SA9755	NPEPL1	20	57273798	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	131	20145	aarivdtpF	aarivdtpC
SA9755	CHRNA4	20	61991022	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	442	169	trahPeerl	trahAeerl
SA9755	KCNQ2	20	62038671	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	170	1035	niymqrmCi	niymqrmGi
SA9755	ABHD16B	20	62494191	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	377	187	lssQrrrl	lssRrrrl
SA9755	ABHD16B	20	62494191	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	9	8	sQrrrlal	sRrrrlal
SA9755	ABHD16B	20	62494191	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	326	269	Qrrrlalf	Rrrrlalf
SA9755	ABHD16B	20	62494191	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	481	1173	lssQrrrl	lssRrrrl
SA9755	ABHD16B	20	62494191	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	451	397	Qrrrlalf	Rrrrlalf
SA9755	CLDN17	21	31538719	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	249	1270	Fppaletar	Lppaletar
SA9755	DOPEY2	21	37650378	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	15	12	fpylrnNsa	fpylrnHsa
SA9755	DOPEY2	21	37650378	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	121	32	Nsaynapsf	Hsaynapsf
SA9755	DYRK1A	21	38884727	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	143	144	santgpShy	santgpAhy
SA9755	DYRK1A	21	38884727	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	127	403	Shymteghl	Ahymteghl
SA9755	PLAC4	21	42551311	A	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	255	123	hphspwTps	hphspwlps
SA9755	PLAC4	21	42551311	A	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	43	27	phspwTpsl	phspwlpsl
SA9755	TRAPPC10	21	45511859	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	142	126	ldfqlsHsy	ldfqlsDsy
SA9755	TRAPPC10	21	45511859	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	153	1151	fqlsHsylv	fqlsDsylv
SA9755	TRPM2	21	45845667	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	290	11259	ypncHvtrf	ypncPvtrf
SA9755	TRPM2	21	45845667	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	8	19	ypncHvtrf	ypncPvtrf
SA9755	KRTAP10-6	21	46011461	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	126	425	crpsCsvsl	crpsSsvsl
SA9755	PCNT	21	47786839	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	8	8	irQehrqal	irEehrqal
SA9755	BCL2L13	22	18138583	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	56	45	qhVsspqgv	qhLsspqgv
SA9755	PRODH	22	18900795	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	292	119	lpylsrraM	lpylsrraL
SA9755	PRODH	22	18900795	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	10	62	lpylsrraM	lpylsrraL

Figure 21 (Cont.)

SA9755	PRODH	22	18900795	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	30	82	raMenssim	raLenssim
SA9755	PRODH	22	18900795	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	463	780	reMenssl	rraLenssl
SA9755	PRODH	22	18900795	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	84	335	raMenssim	raLenssim
SA9755	CRYBB2	22	25620943	G	A	A0101,A11126,B3501,B0801,C0701,C0401	A0101	90	19631	hsheingpY	hsheingpC
SA9755	CRYBB2	22	25620943	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	12	11281	hsheingpY	hsheingpC
SA9755	OSBP2	22	31284273	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	114	4	dDmedstsf	dAmedstsf
SA9755	IL2RB	22	37538646	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	63	62	rrCrqtcel	rrWrqtcel
SA9755	BAIAP2L2	22	38506519	A	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	11	11	mapeTdqfy	mapeMdqfy
SA9755	APOBEC3B	22	39385577	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	489	5184	Fmdqhmgf	Vmdqhmgf
SA9755	APOBEC3B	22	39385577	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	471	105	erldngtwF	erldngtwV
SA9755	APOBEC3B	22	39389075	A	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	45	58	fvyrLgcpf	fvyrQgcaf
SA9755	APOBEC3B	22	39388075	A	T	A0101,A11126,B3501,B0801,C0701,C0401	C0401	299	3780	cwdtfvyrL	cwdtfvyrQ
SA9755	MCHR1	22	41077742	A	G	A0101,A11126,B3501,B0801,C0701,C0401	A0101	254	352	ptltfvCly	ptltfvVly
SA9755	ACVR2B	3	38518844	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	210	11161	ynanweieL	ynanweieR
SA9755	SCN10A	3	38797385	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	31	683	shngspltY	shngspltS
SA9755	BSN	3	49688111	A	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	434	549	epSpipppt	epTpipppt
SA9755	ADAMTS9	3	64599095	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B0801	304	842	dpDpkptsm	dpEpkptsm
SA9755	NXPE3	3	101523615	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B0801	160	2349	ylksltsg	yfksltsg
SA9755	DZIP3	3	108403129	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	69	206	rpltvpEm	rpltvpQm
SA9755	UMPS	3	124461043	T	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	263	409	fMsgsrvsm	fMggsrvsm
SA9755	TF	3	133467420	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	35	58	sytdcrAi	sytdcrSi
SA9755	PIK3CB	3	138461514	C	G	A0101,A11126,B3501,B0801,C0701,C0401	A0101	52	19	wldwlkqty	wMdwlkqty
SA9755	PIK3CB	3	138461514	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	71	46	wldwlkqty	wMdwlkqty
SA9755	IGSF10	3	151164737	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	7	9	rrfErqrki	rrfGrqrki
SA9755	MUC4	3	195507925	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	101	109	lpvtDassa	lpvtGassa
SA9755	MUC4	3	195509941	A	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	218	146	lpvtSpssa	lpvtIpssa
SA9755	MUC4	3	195509941	A	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	275	119	lpssassgh	lpssassgh
SA9755	MUC4	3	195513545	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	485	885	lstghTtpl	lstghAtpl
SA9755	MUC4	3	195515401	A	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	218	217	lpvtspssA	lpvtspssV
SA9755	MUC4	3	195515401	A	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	209	359	spssAstgh	spssVstgh
SA9755	MFSD7	4	680440	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	490	198	apvadvlaK	apvadvlaE
SA9755	MFSD7	4	680440	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	386	94	iaKdlvlsm	iaEdlvlsm
SA9755	FGFRL1	4	10190976	T	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	84	46	thThthshv	thShthshv
SA9755	FGFRL1	4	10190988	T	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	51	46	thshthThv	thshthShv
SA9755	ADD1	4	2877795	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	375	647	dlrqdfnlm	dlrqdfnMm
SA9755	GPR78	4	8583358	T	G	A0101,A11126,B3501,B0801,C0701,C0401	B0801	114	7045	lladLhpsv	lladLhpsv
SA9755	SLC30A9	4	42068596	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	77	46	Cmarakgm	Rmarakgm
SA9755	CABS1	4	71201902	C	G	A0101,A11126,B3501,B0801,C0701,C0401	A0101	117	313	etdlMelik	etdlMelik
SA9755	NPFFR2	4	73013298	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	224	225	frrgLqeaf	frrgFqeaf
SA9755	LRRA	4	151727470	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	267	579	fapfkCtl	fapflsRt
SA9755	GLRB	4	158091866	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B0801	226	7630	rlHyarsl	rlDyarsl
SA9755	GLRB	4	158091896	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	258	261	taakriHy	taakriDy
SA9755	PLEKHG4B	5	169497	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	52	198	emiatDrey	emiatErey
SA9755	PLEKHG4B	5	169497	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	389	140	tDreyirl	tEreyirl
SA9755	ADAMTS16	5	5238838	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	383	70	arsiSlyem	arsiRlyem
SA9755	CDH9	5	26906860	C	A	A0101,A11126,B3501,B0801,C0701,C0401	A0101	218	165	ysiqGqpy	ysiqSqpy
SA9755	CDH9	5	26906860	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	33	46	ysiqVqpy	ysiqGqpy
SA9755	AGXT2	5	35037123	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	220	174	grlwhTstv	grlwhKstv
SA9755	EGFLAM	5	38427339	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	15	24	frfdggsVt	frfdggsGt

Figure 21 (Cont.)

SA9755	C7	5	409798857	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	217	67	Drskrilpl	Drskrilpl	Erskrilpl	
SA9755	C7	5	409798857	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	297	133	Drskrilpl	Erskrilpl		
SA9755	MSH3	5	79950745	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	28	111	ppapAapaf	ppapPapaf		
SA9755	KCNN2	5	113698635	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	293	71	spsaaaaTa	spsaaaaAa		
SA9755	KCNN2	5	113698635	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	78	174	saaaaTaaa	saaaaAaaa		
SA9755	SEC24A	5	134050782	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	50	88	mcgykKqpl	nxgykNqpl		
SA9755	PCDHB1	5	140432961	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	25	386	tmmqkiil	tmmqkiil		
SA9755	PCDHB1	5	140432961	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	243	101	erdTnmqkl	erdPnmqkl		
SA9755	PCYOX1L	5	148748113	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	419	3870	aLaakrwal	aVaakrwal		
SA9755	FOXI1	5	169533200	A	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	13	11	lpgpNaspf	lpgpNaspf		
SA9755	UCP2	5	169673472	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	202	491	trQeaeaai	trPeaeaai		
SA9755	RNF44	5	175956764	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	314	764	dlYvddvem	dlDvddvem		
SA9755	OR2V2	5	180582392	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	229	115	qligssCaf	qligssWaf		
SA9755	OR11A1	6	29394613	T	C	A0101,A11126,B3501,B0801,C0701,C0401	B0801	45	49	Rlskvfsi	Qlskvfsi		
SA9755	OR11A1	6	29394613	T	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	234	87	vhsRlskv	vhsQlskv		
SA9755	LRFN2	6	40399506	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B0801	34	53	apvvklyql	aprvklyql		
SA9755	YIPF3	6	43481330	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	122	8886	ipkmvnfL	ipkmvnfP		
SA9755	CAPN11	6	44148671	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B0801	70	16	rmaikLksf	rmaikFksf		
SA9755	TDRD6	6	46659772	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	144	384	fpqktilpg	fpqktMlpg		
SA9755	TDRD6	6	46659771	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	20	5	lpgfktlvy	Mpgfktlvy		
SA9755	DST	6	56376177	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	21	25	Qhkphidkm	Ehkphidkm		
SA9755	LGSN	6	63989995	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	133	43	fvalkkyei	fvaMkkyei		
SA9755	LGSN	6	63990075	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	21	22	ipkkeHal	ipkkeDai		
SA9755	MMS22L	6	97599709	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	262	218	iateniqyM	iateniqyM		
SA9755	LAMA4	6	112462669	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	398	151	iknNnlvyv	iknDnlvyv		
SA9755	ROS1	6	117662440	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	232	5757	chseemvel	chseemvel		
SA9755	LAMA2	6	129485743	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	60	137	ypvtQcqpch	ypvtPcqpch		
SA9755	SASH1	6	148865634	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	179	85	vprngpsgPl	vprngpsgAl		
SA9755	FNDC1	6	159655244	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	135	1191	alaprfgsl	alaprfgsl		
SA9755	RNASET2	6	167366000	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	87	971	iimvHhwpe	iimvQhwpe		
SA9755	RNASET2	6	167366000	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	193	400	mvHhwpetv	mvQhwpetv		
SA9755	MLLT4	6	168319609	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	146	6973	cHrgfcrh	cQrgfcrh		
SA9755	SDK1	7	4172043	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	11	8	epnCilgy	epnGilgy		
SA9755	FOXK1	7	4801831	G	T	A0101,A11126,B3501,B0801,C0701,C0401	A0103	255	353	ltspfqtla	ltspLqtla		
SA9755	FOXK1	7	4801831	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	4	29	nayaltspf	nayaltspL		
SA9755	FOXK1	7	4801831	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	146	253	yaltspfql	yaltspLql		
SA9755	TNRC18	7	5360030	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	51	172	dvrpastCf	dvrpastRf		
SA9755	DAGLB	7	6449833	G	C	A0101,A11126,B3501,B0801,C0701,C0401	A0103	308	1262	Cspkyppiy	Lspkyppiy		
SA9755	DAGLB	7	6449833	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	9	16	spidCspky	spidLspky		
SA9755	PHF14	7	11014501	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	294	7702	krrqvkpiV	krrqvkpiA		
SA9755	TWIST1	7	19156384	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	73	264	erisyaLsv	erisyaFsv		
SA9755	TWIST1	7	19156583	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	37	23	rerqrNqsl	rerqrTqsl		
SA9755	TWIST1	7	19156583	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	421	439	rerqrNqsl	rerqrTqsl		
SA9755	MACC1	7	20199042	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	331	902	hsfgkesgpf	hsfgkesgpf		
SA9755	DNAH11	7	21641137	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	42	90	srNratdel	srQratdel		
SA9755	DNAH11	7	21641137	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	378	15373	rNratdelf	rQratdelf		
SA9755	STK31	7	23808743	A	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	205	197	vrseSdasl	vrseTdasl		
SA9755	CHN2	7	29519961	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	41	708	nhlnyektV	nhfnyektH		
SA9755	PDE1C	7	32209408	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B0801	377	3032	Ntsfrirsl	Ktsfrirsl		

Figure 21 (Cont.)

SA9755	ANLN	7	36447505	G	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	340	1059	skKelsrei	skGelsrei	skGelsrei	skGelsrei
SA9755	ABCA13	7	48315793	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	14	64	kagnfdvaf	Ragnfdvaf	Ragnfdvaf	Ragnfdvaf
SA9755	ODC	7	50605670	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	385	1003	kpactelet	Spactelet	Spactelet	Spactelet
SA9755	ZNF727	7	63538173	A	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	95	9959	salkkhkri	salkkhkrN	salkkhkrN	salkkhkrN
SA9755	ZNF727	7	63538173	A	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	251	2367	rNhtgdrpy	rNhtgdrpy	rNhtgdrpy	rNhtgdrpy
SA9755	ZNF727	7	63538872	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	388	8393	htgdrptsA	htgdrptsA	htgdrptsA	htgdrptsA
SA9755	ZNF679	7	63726633	A	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	332	1912	iihtGensy	iihtGensy	iihtGensy	iihtGensy
SA9755	ZNF92	7	64864618	T	C	A0101,A11126,B3501,B0801,C0701,C0401	A0101	113	27	Htgekpyky	Htgekpyky	Htgekpyky	Htgekpyky
SA9755	ZNF92	7	64864618	T	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	413	361	iiHtgekpy	iiHtgekpy	iiHtgekpy	iiHtgekpy
SA9755	GTF2IRD1	7	73944178	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	5	16	ipfkrpFty	ipfkrpFty	ipfkrpFty	ipfkrpFty
SA9755	TRIM73	7	75029408	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	362	547	qvvdgssi	qvvdgssi	qvvdgssi	qvvdgssi
SA9755	DLX5	7	96651632	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	432	515	mvngkpNkv	mvngkpNkv	mvngkpNkv	mvngkpNkv
SA9755	PTCD1	7	99026792	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	24	46	vvteEtfsf	vvteEtfsf	vvteEtfsf	vvteEtfsf
SA9755	TRIM44	7	99490052	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	130	1195	drskmspDv	drskmspDv	drskmspDv	drskmspDv
SA9755	ZAN	7	100334483	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	13	23	fhrggvVrl	fhrggvVrl	fhrggvVrl	fhrggvVrl
SA9755	ZAN	7	100334483	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	45	77	hrggvArt	hrggvArt	hrggvArt	hrggvArt
SA9755	SPDYE6	7	101988845	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	79	58	rrfqlyKsm	rrfqlyKsm	rrfqlyKsm	rrfqlyKsm
SA9755	SPDYE6	7	101988849	A	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	63	58	rrfqlDrsm	rrfqlYrsm	rrfqlYrsm	rrfqlYrsm
SA9755	SPDYE6	7	101988861	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	12	9	llrkrWfql	llrkrKfql	llrkrKfql	llrkrKfql
SA9755	CTTNBP2	7	117451028	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	31	40	alrarrkel	alrarrkeV	alrarrkeV	alrarrkeV
SA9755	CTTNBP2	7	117451028	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	446	292	hsrrkelf	hsrrkeVf	hsrrkeVf	hsrrkeVf
SA9755	CPED1	7	120782148	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	145	122	yredrPslp	yredrPslp	yredrPslp	yredrPslp
SA9755	TRPV5	7	142626553	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	25	51	Srsprnlly	Rrsprnlly	Rrsprnlly	Rrsprnlly
SA9755	TRPV5	7	142626554	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	493	2064	sarafgtaf	sarafgtaF	sarafgtaF	sarafgtaF
SA9755	TRPV5	7	142626554	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	100	17	trsprnli	trsprnli	trsprnli	trsprnli
SA9755	GIMAP1	7	150417568	G	A	A0101,A11126,B3501,B0801,C0701,C0401	A0101	262	5374	laEgslhdy	laEgslhdy	laEgslhdy	laEgslhdy
SA9755	GIMAP1	7	150417568	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	103	116	laEgslhdy	laEgslhdy	laEgslhdy	laEgslhdy
SA9755	IMMP2L	7	155093337	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	71	67	fNrewasvm	fNrewasvm	fNrewasvm	fNrewasvm
SA9755	CSMD1	8	3165926	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	40	377	ysFrqgyam	ysFrqgyam	ysFrqgyam	ysFrqgyam
SA9755	MSR1	8	15967707	T	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	134	265	gpiwlYevf	gpiwlYevf	gpiwlYevf	gpiwlYevf
SA9755	EBF2	8	25708241	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	170	348	ssfssilpf	ssfssilpf	ssfssilpf	ssfssilpf
SA9755	TEX15	8	30701232	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	90	44	tyhdqlvKl	tyhdqlvKl	tyhdqlvKl	tyhdqlvKl
SA9755	TEX15	8	30701232	C	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	14	10	yhdqlvKll	yhdqlvKll	yhdqlvKll	yhdqlvKll
SA9755	DOHH2	8	38110321	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B0801	36	394	hkGrkrmhl	hkGrkrmhl	hkGrkrmhl	hkGrkrmhl
SA9755	DOHH2	8	38110321	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B0801	290	1652	Rrkrmhlel	Rrkrmhlel	Rrkrmhlel	Rrkrmhlel
SA9755	DOHH2	8	38110321	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	54	319	phhkGrkrm	phhkGrkrm	phhkGrkrm	phhkGrkrm
SA9755	DOHH2	8	38110321	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	123	257	Rrkrmhlel	Rrkrmhlel	Rrkrmhlel	Rrkrmhlel
SA9755	YWHAZ	8	101936423	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	9	7	laimlsvfy	laimlsvfy	laimlsvfy	laimlsvfy
SA9755	YWHAZ	8	101936423	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	383	1604	irhglaihl	irhglaihl	irhglaihl	irhglaihl
SA9755	KLF10	8	103663766	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	477	190	vsaVgvppm	vsaVgvppm	vsaVgvppm	vsaVgvppm
SA9755	CSMD3	8	113303843	G	T	A0101,A11126,B3501,B0801,C0701,C0401	A0101	35	45	ftygNvvfy	ftygNvvfy	ftygNvvfy	ftygNvvfy
SA9755	CSMD3	8	113303843	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	51	99	ftygNvvfy	ftygNvvfy	ftygNvvfy	ftygNvvfy
SA9755	CSMD3	8	113303843	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	332	1185	ftygNvvfy	ftygNvvfy	ftygNvvfy	ftygNvvfy
SA9755	CSMD3	8	113349779	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	28	116	hpipSteal	hpipSteal	hpipSteal	hpipSteal
SA9755	CSMD3	8	113349779	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	490	1701	ipSteatcg	ipSteatcg	ipSteatcg	ipSteatcg
SA9755	FAM135B	8	139149456	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	385	368	lvaspqdGy	lvaspqdGy	lvaspqdGy	lvaspqdGy
SA9755	FAM135B	8	139149456	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	11	55	spqdGyypf	spqdGyypf	spqdGyypf	spqdGyypf
SA9755	FAM135B	8	139278044	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	193	1905	tihsrvfqi	tihsrvfqi	tihsrvfqi	tihsrvfqi
SA9755	FAM135B	8	139278044	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	306	184	Lhsrvfqil	Lhsrvfqil	Lhsrvfqil	Lhsrvfqil

Figure 21 (Cont.)

SA9755	SCRIB	8	144897475	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	63	2508	epenavtiV	epenavtiT	epenavtiT
SA9755	SCRIB	8	144887475	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	17	267	Mpirpeddy	Tpirpeddy	Tpirpeddy
SA9755	MLANA	9	5892501	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	6	362	mpredahfM	mpredahfM	mpredahfM
SA9755	TMEM261	9	7796625	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	247	24	iatWgivvm	iatWgivvm	iatWgivvm
SA9755	CDKN2A	9	21970972	T	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	52	15	ghrdvarYl	ghrdvarCl	ghrdvarYl
SA9755	TLN1	9	35714624	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	469	1376	qpYspsaql	qpYspsaql	qpYspsaql
SA9755	NMRK1	9	77683978	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	30	72	yfWgfvvwpm	yfWgfvvwpm	yfWgfvvwpm
SA9755	SLC44A1	9	108097935	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B0801	46	218	cprqEikti	cprqEikti	cprqEikti
SA9755	KIF12	9	116855540	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	282	184	vplahwVcl	vplahwVcl	vplahwVcl
SA9755	KIF12	9	116855840	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	48	58	vplahwVcl	vplahwVcl	vplahwVcl
SA9755	PAPPA	9	119106856	C	G	A0101,A11126,B3501,B0801,C0701,C0401	A0101	334	1087	ktdcAelav	ktdcPelav	ktdcPelav
SA9755	ASTN2	9	119770442	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	309	20718	lyyqinatS	lyyqinatS	lyyqinatS
SA9755	ASTN2	9	119770442	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	169	3287	Ypwvrdkg	Ypwvrdkg	Spwvrdkg
SA9755	ASTN2	9	119770442	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	265	721	atYpwvrdl	atYpwvrdl	atSpwvrdl
SA9755	TLR4	9	120475630	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	37	126	slkydlkL	slkydlkL	slkydlkF
SA9755	TLR4	9	120475638	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	284	99	lsLngvitm	lsLngvitm	kFngvitm
SA9755	TLR4	9	120476850	T	C	A0101,A11126,B3501,B0801,C0701,C0401	B0801	12	54	wrrtkaPi	wrrtkaPi	wrrtkaIi
SA9755	GSN	9	124081070	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	22	74	ianvePvpf	ianvePvpf	ianveRvpf
SA9755	GSN	9	124081070	G	C	A0101,A11126,B3501,B0801,C0701,C0401	B3501	91	16927	ePvpfdaat	ePvpfdaat	eRvpfdaat
SA9755	GSN	9	124081078	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	108	16	shianvePv	shianvePv	shianveRv
SA9755	LHX2	9	126777622	A	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	312	261	ypahfitad	ypahfitad	ypahfNtad
SA9755	SPTAN1	9	131337019	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B0801	226	1153	kmrekgMkl	kmrekgMkl	kmrekgNkl
SA9755	SPTAN1	9	131337019	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	104	36	mrekgMkll	mrekgMkll	mrekgNkll
SA9755	PPP1R26	9	138379035	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	16	13	trsHrargv	trsHrargv	trsQrargv
SA9755	PPP1R26	9	138379035	G	C	A0101,A11126,B3501,B0801,C0701,C0401	C0701	377	407	Hrargvphl	Hrargvphl	Qrargvphl
SA9755	UAP1L1	9	139975295	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0401	354	342	fldAhgawl	fldAhgawl	fldAhgawl
SA9755	UAP1L1	9	139975295	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	25	59	Shgawlpel	Shgawlpel	Ahgawlpel
SA9755	SLC25A6	X	1508533	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	35	38	vripkeqgL	vripkeqgL	vripkeqgV
SA9755	ASMT	X	1742131	G	T	A0101,A11126,B3501,B0801,C0701,C0401	C0701	332	657	rasShgtel	rasShgtel	rasAhgtel
SA9755	GYG2	X	2778025	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	97	85	fIhiCwtvy	fIhiCwtvy	fIhiWwtvy
SA9755	MAGEB5	X	26236114	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	59	69	apgaLssqy	apgaLssqy	apgaFssqy
SA9755	DCAF8L2	X	27766585	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	258	358	ephpyLpwl	ephpyLpwl	ephpyVpwl
SA9755	GK	X	30709248	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	80	2328	wlYirtqst	wlYirtqst	wlDirtqst
SA9755	DMD	X	31792151	C	T	A0101,A11126,B3501,B0801,C0701,C0401	A0101	198	505	itdwlslN	itdwlslN	itdwlslD
SA9755	DMD	X	32536202	C	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	261	38	Eavlqspef	Eavlqspef	Eavlqspef
SA9755	FAM47C	X	37029003	T	C	A0101,A11126,B3501,B0801,C0701,C0401	B0801	234	137	ppktrAshl	ppktrAshl	ppktrVshl
SA9755	XK	X	37553712	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B0801	155	345	safsraWvl	safsraWvl	safsraSvl
SA9755	XK	X	37553712	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	91	61	safsraWyl	safsraWyl	safsraSvl
SA9755	ZNF674	X	46360114	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	408	112	thtRekpfv	thtRekpfv	thtGekpfv
SA9755	MAGED1	X	51644746	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	139	58	Draeartrm	Draeartrm	Araeartrm
SA9755	HSD17B10	X	53461277	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	288	1565	maaacWsvk	maaacWsvk	maaacRsvk
SA9755	GNL3L	X	54566614	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	164	173	vpsEphfvh	vpsEphfvh	vpsAphfvh
SA9755	EDA	X	69253278	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	322	106	Crtrmnpkv	Crtrmnpkv	Srtrmnpkv
SA9755	MED12	X	70357445	A	T	A0101,A11126,B3501,B0801,C0701,C0401	B3501	104	139	hLmtpssty	hLmtpssty	hQmtpssty
SA9755	FLJ44635	X	71379966	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	124	1008	fIkdymksi	fIkdymksi	Ckdymksi
SA9755	ARMCX1	X	100808814	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	41	1131	tmvcrtYsa	tmvcrtYsa	tmvcrtDsa
SA9755	RBM41	X	106332039	G	A	A0101,A11126,B3501,B0801,C0701,C0401	A0101	222	884	Lmmlesfy	Lmmlesfy	Pmmlesfy
SA9755	GUCY2F	X	108695796	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	362	4095	fpVgrppra	fpVgrppra	tpGgrppra
SA9755	CT47B1	X	120089260	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	394	285	eaamfdlAv	eaamfdlAv	eaamfdlAv

Figure 21 (Cont.)

SA9755	STAG2	X	123184090	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	32	15	wlkmysdaf	wlkmysdaf	wMkmysdaf
SA9755	STAG2	X	123184090	G	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	228	163	wlkmysdaf	wlkmysdaf	wAkmysdaf
SA9755	DCAF12L2	X	125299320	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	93	244	drhgpkdCi	drhgpkdCi	drhgphkdWi
SA9755	DCAF12L2	X	125299320	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	57	49	ghkdCfav	ghkdCfav	ghkdWfav
SA9755	DCAF12L2	X	125299871	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B0801	327	149	gsrkrkPpa	gsrkrkPpa	gsrkrkApa
SA9755	DCAF12L2	X	125299871	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B0801	77	88	srkrkPpav	srkrkPpav	srkrkApav
SA9755	DCAF12L2	X	125299871	C	G	A0101,A11126,B3501,B0801,C0701,C0401	C0701	174	273	srkrkPpav	srkrkPpav	srkrkApav
SA9755	MAP7D3	X	135303038	A	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	87	15814	fPedgtsqv	fPedgtsqv	fledgtsqv
SA9755	GPR112	X	135427919	C	G	A0101,A11126,B3501,B0801,C0701,C0401	B3501	199	8	sGfhentty	sGfhentty	sAfhentty
SA9755	ARHGEF6	X	135758840	G	T	A0101,A11126,B3501,B0801,C0701,C0401	B0801	373	112	spktmkkfi	spktmkkfi	spktmkkfL
SA9755	AFF2	X	148033030	C	A	A0101,A11126,B3501,B0801,C0701,C0401	C0701	146	116	srvpghssi	srvpghssi	srvpghssi
SA9755	FLNA	X	153582391	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B3501	9	12	spiqfyYdy	spiqfyYdy	spiqfyYdy
SA9755	F8	X	154153241	C	A	A0101,A11126,B3501,B0801,C0701,C0401	B0801	271	61	lfCkkspi	lfCkkspi	lfGkkspi
SB010944	CROCC	1	17285085	T	C	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	33	66	elrqmkTi	elrqmkTi	elrqmkkTi
SB010944	STIL	1	47726073	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	120	4147	rlMdkdcvl	rlMdkdcvl	rlVdkdcvl
SB010944	DMRTA2	1	50884447	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	127	1524	sNimrdrsa	sNimrdrsa	sDimrdrsa
SB010944	DMRTA2	1	50884447	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	43	225	Nimrdrsae	Nimrdrsae	Dimrdrsae
SB010944	ZNF496	1	247464566	G	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	184	201	nLrslensi	nLrslensi	nPrslensi
SB010944	HECTD4	12	112623279	G	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	52	2688	fiwtTdmaa	fiwtTdmaa	fiwtTdmaa
SB010944	KCNH5	14	63447900	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	75	108	hiihyYaf	hiihyYaf	hiihyCaf
SB010944	KCNH5	14	63447900	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0702	154	359	hiihyYaf	hiihyYaf	hiihyCaf
SB010944	KCNH5	14	63447900	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0702	141	665	hyYafktrw	hyYafktrw	hyCafktrw
SB010944	VASH1	14	77229439	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	91	1788	ihpdgekvV	ihpdgekvV	ihpdgekvA
SB010944	TRAF3	14	103371853	G	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	21	39	mrEeydall	mrEeydall	mrGeydall
SB010944	SPTBN5	15	42163688	G	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	353	340	akfqhqvem	akfqhqvem	akfqHqvem
SB010944	HERC1	15	63972870	A	G	A0104,A0326,A0101,B0702,B0801,C0702,C0701	A0101	48	64	tsdmwlHra	tsdmwlHra	tsdmwlYra
SB010944	HERC1	15	63972870	A	G	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	168	4242	lHraysgni	lHraysgni	lYraysgni
SB010944	DAPK2	15	64200766	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	331	539	ediTrrkai	ediTrrkai	ediArrkai
SB010944	HIC1	17	1960934	C	G	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0702	427	915	rwnkheRgl	rwnkheRgl	rwnkheFgl
SB010944	KIF1C	17	4918106	G	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	96	7113	ireqhcfR	ireqhcfR	ireqhcfR
SB010944	ZNF624	17	16526275	C	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0702	111	3035	kfydkgksf	kfydkgksf	kCydkgksf
SB010944	TBC1D29	17	28890301	G	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	309	352	sesNrgpsi	sesNrgpsi	sesSrgpsi
SB010944	CNN2	19	1037648	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	494	338	WrhaydtKi	WrhaydtKi	RrhaydtKi
SB010944	CNN2	19	1037648	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0702	308	303	WrhaydtKi	WrhaydtKi	RrhaydtKi
SB010944	AP3D1	19	2108687	T	C	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	108	4288	kRgenswsv	kRgenswsv	kKgenswsv
SB010944	GPR108	19	6734304	T	C	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	43	1631	rKygeqkti	rKygeqkti	rKygeqkti
SB010944	GPR108	19	6734304	T	C	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0702	118	1041	rKygeqkti	rKygeqkti	rKygeqkti
SB010944	GPR108	19	6734304	T	C	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0702	246	374	KygeqktiF	KygeqktiF	KygeqktiF
SB010944	CC2D1A	19	14024105	G	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	202	734	sakmrrydQ	sakmrrydQ	sakmrrydR
SB010944	CC2D1A	19	14024105	G	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	219	429	kmrrydQgi	kmrrydQgi	kmrrydRgi
SB010944	CC2D1A	19	14024105	G	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	140	61	rrydQgikt	rrydQgikt	rrydRgikt
SB010944	ZNF737	19	20727459	C	G	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	441	2765	kARcpsti	kARcpsti	kGRcpsti
SB010944	ZNF737	19	20727799	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0702	418	10181	kafkyssi	kafkyssi	kafkyssi
SB010944	ZNF737	19	20727799	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	305	81	kafkyssi	kafkyssi	kafkyssi
SB010944	ZNF626	19	20807199	A	G	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	319	480	kafnqsTi	kafnqsTi	kafnqssTi
SB010944	ZNF714	19	21300550	G	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	121	115	shkthimi	shkthimi	shkthkmi
SB010944	ZNF429	19	21720301	A	G	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	466	297	trhkrihtG	trhkrihtG	trhkrihtE
SB010944	ZNF730	19	23328424	A	G	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	106	97	shlaqfkR8	shlaqfkR8	shlaqhkKi
SB010944	NPAS1	19	36317454	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0702	316	291	tlepNslpf	tlepNslpf	tlepDslpf

Figure 21 (Cont.)

SB010944	SIPA1L3	19	38684274	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0702	313	20846	faspaglel	faspaglel	faspaglel
SB010944	SIPA1L3	19	38684274	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0702	27	65	spaglelFgl	spaglelFgl	spaglelFgl
SB010944	SIPA1L3	19	38684274	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	255	16116	faspaglel	faspaglel	faspaglel
SB010944	RASIF1	19	49232822	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	165	97	ywmtQeqhv	ywmtQeqhv	ywmtQeqhv
SB010944	ZNF534	19	52942533	A	G	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	177	6665	yKcneesky	yKcneesky	yKcneesky
SB010944	NTSR2	2	11810051	G	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	294	11	rKthvisl	rKthvisl	rKthvisl
SB010944	NTSR2	2	11810051	G	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	274	130	Chhvisiel	Chhvisiel	Chhvisiel
SB010944	APOB	2	21224813	T	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	384	1109	tfrykkpdf	tfrykkpdf	tfrykkpdf
SB010944	APOB	2	21224813	T	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	424	1094	iisdyhqLf	iisdyhqLf	iisdyhqLf
SB010944	APOB	2	21224813	T	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	79	22	yhqLfrykl	yhqLfrykl	yhqLfrykl
SB010944	APOB	2	21224813	T	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0702	254	320	yhqLfrykl	yhqLfrykl	yhqLfrykl
SB010944	C2orf73	2	54587647	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	13	16	Vlftrhkpl	Vlftrhkpl	Alftrhkpl
SB010944	C2orf73	2	54587647	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0702	480	1140	Vlftrhkpl	Vlftrhkpl	Alftrhkpl
SB010944	RTN4	2	55277007	G	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0702	223	2922	rpSpppppas	rpSpppppas	rpPpppppas
SB010944	SP3	2	1748291441	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0702	403	55	aaTaqpspl	aaTaqpspl	aaAaqpspl
SB010944	REM1	20	30072156	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0702	142	43	rarrflaCl	rarrflaCl	rarrflaRl
SB010944	REM1	20	30072156	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	330	3810	qrarrflaC	qrarrflaC	qrarrflaR
SB010944	REM1	20	30072156	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	103	358	rarrflaCl	rarrflaCl	rarrflaRl
SB010944	PLAC4	21	42551149	A	G	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0702	216	31	spwtpsltl	spwtpsltl	spwtpsltl
SB010944	PLAC4	21	42551245	A	G	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0702	9	11	spwtPsltl	spwtLsltl	spwtLsltl
SB010944	PLAC4	21	42551245	A	G	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0702	227	179	hsspwtLsl	hsspwtLsl	hsspwtLsl
SB010944	PLAC4	21	42551270	A	G	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0702	25	21	Hphsspwtl	Hphsspwtl	Yphsspwtl
SB010944	GCAT	22	38203999	G	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0702	124	22	wggmawrTa	wggmawrTa	wggmawrAa
SB010944	KLHDC7B	22	50987760	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0702	62	17	Wpmqqaraq	Wpmqqaraq	Rpmqqaraq
SB010944	KLHDC7B	22	50987760	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0702	417	391	nwsqvWpm	nwsqvWpm	nwsqvRpm
SB010944	CRTAP	3	33155792	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	73	198	eislrhCl	eislrhCl	eislrhRl
SB010944	SCAP	3	47459858	G	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0702	99	5641	Spetelvpl	Ppetelvpl	Ppetelvpl
SB010944	EEFSEC	3	127872582	G	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0702	246	8276	Kpepgepll	Kpepgepll	Epepgepll
SB010944	IRX4	5	1883023	A	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	A0101	87	243	rlTaasigvy	rlTaasigvy	nSaaalgvy
SB010944	PCDHB12	5	140590124	G	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	84	49	eakrMlvl	eakrMlvl	eakrVlvl
SB010944	LRP11	6	150185018	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0702	130	60	ppaapisKl	ppaapisKl	ppaapisEl
SB010944	ZNF316	7	6693603	G	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	A0101	32	17642	htgerpypY	htgerpypY	htgerpypC
SB010944	ZNF273	7	64389889	G	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	167	230	stlrrhkil	stlrrhkil	stlrrhkiV
SB010944	USP1712	8	11995474	T	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0702	10	9	apaskSltl	apaskSltl	apaskTltl
SB010944	USP1712	8	11995474	T	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	284	313	apaskSltl	apaskSltl	apaskTltl
SB010944	USP1712	8	11995474	T	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	132	70	qrapaskSl	qrapaskSl	qrapaskTl
SB010944	TNFRSF10A	8	23082340	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0702	319	214	gprpTreas	gprpTreas	gsrpAreas
SB010944	E2F5	8	86115381	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	416	73	ewdrlryl	ewdrlryl	ewdrlryK
SB010944	E2F5	8	86115381	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0702	167	1159	yfkaeedl	yfkaeedl	ylkaeedl
SB010944	WNK2	9	96010074	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0702	325	2102	hflpptlpt	hflpptlpt	hllpptlpt
SB010944	SAPCD2	9	139964779	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	C0701	140	401	rrrGcvhlr	rrrGcvhlr	rrrGcvhlr
SB010944	SLC38A5	X	48320104	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0702	109	11	Qpskrrmqa	Qpskrrmqa	Rpskrrmqa
SB010944	SLC38A5	X	48320104	C	T	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	59	47	Qpskrrmqa	Qpskrrmqa	Rpskrrmqa
SB010944	DRP2	X	100513519	G	A	A0104,A0326,A0101,B0702,B0801,C0702,C0701	B0801	268	454	sqlqrlKel	sqlqrlKel	sqlqrlKel
SC0899	PLCH2	1	2421200	G	C	A2402,A2601,B3502,B3801,C0401,C1203	C1203	94	6169	kAkklpani	kAkklpani	kGkklpani
SC0899	FBXO44	1	11721272	G	T	A2402,A2601,B3502,B3801,C0401,C1203	A2601	22	5	dthywaVwy	dthywaVwy	dthywaGwy
SC0899	FBXO44	1	11721272	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	211	515	waVwygpnv	waVwygpnv	waGwygpnv
SC0899	OR10K1	1	158436004	A	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	167	330	ihsCirfi	ihsCirfi	ihsYirfi
SC0899	OR10Z1	1	158576424	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	171	603	pmylflsfl	pmylflsfl	pmylflsfL

Figure 21 (Cont.)

SC0899	OR3U1	1	158576424	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	137	150	yffisfsf	yffisfsf	yffisfsf	yffisfsf
SC0899	KCSD1	1	167854704	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	357	2493	Hfppskvdl	Hfppskvdl	Hfppskvdl	Pfppskvdl
SC0899	PAPPA2	1	176671853	G	C	A2402,A2601,B3502,B3801,C0401,C1203	C1203	442	285	apycGdgkv	apycAdgkv	apycGdgkv	apycGdgkv
SC0899	BRINP3	1	190067657	G	A	A2402,A2601,B3502,B3801,C0401,C1203	C0401	171	366	fpdweRtkl	fpdweRtkl	fpdweRtkl	fpdweRtkl
SC0899	BRINP3	1	190067657	G	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	228	255	fpdweRtkl	fpdweWtkl	fpdweRtkl	fpdweRtkl
SC0899	CFH	1	196642186	C	A	A2402,A2601,B3502,B3801,C0401,C1203	A2402	247	145	typegNqai	typegNqai	typegTqai	typegTqai
SC0899	CFH	1	196642186	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	71	273	ypegNqaiy	ypegNqaiy	ypegTqaiy	ypegTqaiy
SC0899	CR81	1	197390517	T	C	A2402,A2601,B3502,B3801,C0401,C1203	A2402	34	36	vtqpTaiitf	vtqpTaiitf	vtqpNaiitf	vtqpNaiitf
SC0899	PTPRC	1	198682177	A	T	A2402,A2601,B3502,B3801,C0401,C1203	B3801	46	42	qrsfhnfSi	qrsfhnfSi	qrsfhnfTi	qrsfhnfTi
SC0899	PTPRC	1	198682177	A	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	334	493	ftmfSicyi	ftmfSicyi	ftmfTicyi	ftmfTicyi
SC0899	KIF21B	1	200965377	C	G	A2402,A2601,B3502,B3801,C0401,C1203	A2402	311	1847	ryCrelkki	ryCrelkki	ryCreikki	ryCreikki
SC0899	HS01101	1	209880347	G	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	319	155	lfhEkdihhv	lfhNdihhv	lfhEkdihhv	lfhEkdihhv
SC0899	RYR2	1	237972269	C	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	96	213	ytvvahnff	ytvvahnfL	ytvvahnff	ytvvahnff
SC0899	RYR2	1	237972269	C	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	9	9	vafnfLrkf	vafnfLrkf	vafnfFrkf	vafnfFrkf
SC0899	NLRP3	1	247588679	G	C	A2402,A2601,B3502,B3801,C0401,C1203	A2601	485	597	fvqTamdyf	fvqTamdyf	fvqRamdyf	fvqRamdyf
SC0899	NLRP3	1	247588679	G	C	A2402,A2601,B3502,B3801,C0401,C1203	C1203	14	10	Tamdyfpki	Tamdyfpki	Ramdyfpki	Ramdyfpki
SC0899	OR1C1	1	247921182	T	A	A2402,A2601,B3502,B3801,C0401,C1203	A2402	484	1967	casniihLf	casniihLf	casniihHf	casniihHf
SC0899	OR1C1	1	247921182	T	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	66	2751	fcasniihL	fcasniihL	fcasniihH	fcasniihH
SC0899	OR2M2	1	248344134	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	311	800	vfytiitTm	vfytiitTm	vfytiitPm	vfytiitPm
SC0899	OR2T11	1	248789612	G	C	A2402,A2601,B3502,B3801,C0401,C1203	A2402	255	125	kvvsGfyti	kvvsGfyti	kvvsAfyti	kvvsAfyti
SC0899	OR2T11	1	248789612	G	C	A2402,A2601,B3502,B3801,C0401,C1203	C1203	156	296	kvvsGlyti	kvvsGlyti	kvvsAfyti	kvvsAfyti
SC0899	OR2T11	1	248789612	G	C	A2402,A2601,B3502,B3801,C0401,C1203	C1203	224	196	vvsGfytiv	vvsGfytiv	vvsAfytiv	vvsAfytiv
SC0899	RHOBTB1	10	62645901	C	A	A2402,A2601,B3502,B3801,C0401,C1203	A2601	260	1259	maamfVgsf	maamfVgsf	maamfGgsf	maamfGgsf
SC0899	RHOBTB1	10	62645901	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	53	76	maamfVgsf	maamfVgsf	maamfGgsf	maamfGgsf
SC0899	RHOBTB1	10	62645901	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	177	78	aamfVgsfv	aamfVgsfv	aamfGgsfv	aamfGgsfv
SC0899	ABCC2	10	101551997	G	T	A2402,A2601,B3502,B3801,C0401,C1203	A2402	83	576	iylakqyfv	iylakqyfv	iylakqyfv	iylakqyfv
SC0899	ABCC2	10	101551997	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	98	91	qvffgflli	qvffgflli	qvfVgflli	qvfVgflli
SC0899	FAM204A	10	120070825	G	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	140	562	atrefgvki	atrefgvki	atrefgvki	atrefgvki
SC0899	FAM204A	10	120070825	G	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	327	4187	fgvkiakav	fgvkiakav	fgvkiakav	fgvkiakav
SC0899	MOB1	11	1491503	C	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	72	82	imddltkvl	imddltkvl	imddltkvl	imddltkvl
SC0899	OR51B4	11	5322318	T	A	A2402,A2601,B3502,B3801,C0401,C1203	A2402	36	152	lfppfvnpf	lfppfvnpf	lfppfvnpf	lfppfvnpf
SC0899	OR51B4	11	5322318	T	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	341	212	fppfvnpFl	fppfvnpFl	fppfvnpFl	fppfvnpFl
SC0899	OR51B4	11	5322318	T	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	6	10	fvnpfiysi	fvnpfiysi	fvnpfiysi	fvnpfiysi
SC0899	FBXO3	11	33772161	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	251	65	vattgditL	vattgditL	vattgditV	vattgditV
SC0899	FBXO3	11	33772161	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	490	287	ttgditLsv	ttgditLsv	ttgditVsv	ttgditVsv
SC0899	EXT2	11	44129393	A	T	A2402,A2601,B3502,B3801,C0401,C1203	A2402	366	911	liatgmfLf	liatgmfLf	liatgmfQf	liatgmfQf
SC0899	EXT2	11	44129393	A	T	A2402,A2601,B3502,B3801,C0401,C1203	A2402	34	31	mfLfwpihi	mfLfwpihi	mfQfwphsi	mfQfwphsi
SC0899	EXT2	11	44129393	A	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	236	863	mfLfwpihi	mfLfwphsi	mfQfwphsi	mfQfwphsi
SC0899	TRIM51	11	55659052	C	G	A2402,A2601,B3502,B3801,C0401,C1203	A2402	135	206	iytiAncsf	iytiAncsf	iytiPncsf	iytiPncsf
SC0899	OR4D9	11	59282793	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	80	246	kphlymtii	kphlymtii	kphymmiM	kphymmiM
SC0899	MOGAT2	11	75438547	T	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	61	97	fhphgvCav	fhphgvCav	fhphgvLav	fhphgvLav
SC0899	MOGAT2	11	75438547	T	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	499	331	Cavgafanl	Cavgafanl	Lavgafanl	Lavgafanl
SC0899	FAM131B	11	126126688	C	T	A2402,A2601,B3502,B3801,C0401,C1203	A2402	281	118	dyAdlpeyf	dyAdlpeyf	dyVdlpeyf	dyAdlpeyf
SC0899	DYRK4	12	4702206	G	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	246	52	spvKqaeil	spvKqaeil	spvEqaeil	spvEqaeil
SC0899	KRT6B	12	52844205	T	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	451	646	lvVdlknky	lvVdlknky	lvEdlknky	lvEdlknky
SC0899	BEST3	12	70087531	G	T	A2402,A2601,B3502,B3801,C0401,C1203	A2402	166	109	rywnlNsll	rywnlNsll	rywnlTsll	rywnlTsll
SC0899	BEST3	12	70087531	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	109	174	mrywnlNsl	mrywnlNsl	mrywnlTsl	mrywnlTsl
SC0899	BEST3	12	70087531	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	47	137	ywnlNsIli	ywnlNsIli	ywnlTsIli	ywnlTsIli
SC0899	E2F7	12	77423855	A	T	A2402,A2601,B3502,B3801,C0401,C1203	A2402	219	39	Evvpsasll	Evvpsasll	Vvvpsasll	Vvvpsasll

Figure 21 (Cont.)

SC0899	E2F7	12	77423855	A	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	48	35	lagqpifyv	lagqpifyv	lagqpIVyv
SC0899	E2F7	12	77423855	A	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	211	75	iEyvpsasl	iEyvpsasl	iVyvpsasl
SC0899	APAF1	12	99042235	G	T	A2402,A2601,B3502,B3801,C0401,C1203	B3801	110	196	dhmisdVfi	dhmisdVfi	dhmisdGfi
SC0899	APAF1	12	99042235	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	32	17	misdVfti	misdVfti	misdGfti
SC0899	RXFP2	13	32360742	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	152	105	kqfeskql	kqfeskql	kqfeskql
SC0899	LCP1	13	46701733	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	202	576	lmgkgmkMv	lmgkgmkMv	lmgkgmkMv
SC0899	MDGA2	14	47389309	T	A	A2402,A2601,B3502,B3801,C0401,C1203	A2402	432	924	tynpvwqfr	tynpvwqfr	tynpvwqfr
SC0899	MDGA2	14	47389309	T	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	68	8182	dtynpvwqI	dtynpvwqI	dtynpvwqV
SC0899	RHOJ	14	63749899	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	172	551	ihymkekpl	ihymkekpl	ihymkekpL
SC0899	RHOJ	14	63749899	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	11	11	ymkekplty	ymkekplty	ymkekpLty
SC0899	RHOJ	14	63749899	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	16	19	tkyehgvki	tkyehgvki	tkyehgVki
SC0899	KCNK10	14	88729890	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	5	11	vafpaaaspv	vafpaaaspv	vaYpaaaspv
SC0899	BCL11B	14	99641992	G	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	334	13418	npmhrtlnl.	npmhrtlnl.	npmhrtlnP
SC0899	AHNAK2	14	105408025	T	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	225	606	evmapdvVv	evmapdvVv	evmapdvEv
SC0899	AHNAK2	14	105408025	T	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	14	47	mapdvvvsl	mapdvvvsl	mapdvEvsl
SC0899	AHNAK2	14	105408026	C	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	48	47	mapdvQvsl	mapdvQvsl	mapdvEvsl
SC0899	ACTC1	15	35084412	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	6	12	valdfenel	valdfenel	valdfeneM
SC0899	SLC12A3	15	48595038	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	115	168	knlppvtlv	knlppvtlv	knlppvtLv
SC0899	CLN3	16	28499034	G	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	480	13655	vliadllpl	vliadllpl	vliadllpT
SC0899	CLN3	16	28499034	G	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	213	164	ladllptlv	ladllptlv	ladllpTlv
SC0899	ACD	16	67694101	A	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	151	74	magsgrlAl	magsgrlAl	magsgrlVl
SC0899	FOXF1	16	86544412	G	T	A2402,A2601,B3502,B3801,C0401,C1203	A2402	10	17	iyqflHsrf	iyqflHsrf	iyqflQsrf
SC0899	FOXF1	16	86544412	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	475	1035	flHsrfpff	flHsrfpff	flQsrfpff
SC0899	ORJA1	17	31139711	G	C	A2402,A2601,B3502,B3801,C0401,C1203	C1203	81	119	Tlkdavitv	Tlkdavitv	Slkdavitv
SC0899	SLC13A2	17	26817813	G	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	40	41	mrnvpaahal	mrnvpaahal	mrnvpaahaV
SC0899	SLC13A2	17	26817813	G	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	236	261	iahalldql	iahalldql	iahalVdql
SC0899	NF1	17	29667577	G	C	A2402,A2601,B3502,B3801,C0401,C1203	C1203	341	633	vavlqlHev	vavlqlHev	vavlqlDev
SC0899	NF1	17	29667577	G	C	A2402,A2601,B3502,B3801,C0401,C1203	C1203	310	105	lqlHevnly	lqlHevnly	lqlDevnly
SC0899	UNC45B	17	33481660	G	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	38	17	fqnnfvalt	fqnnfvalt	fqnnGvalt
SC0899	ACACA	17	35601543	C	T	A2402,A2601,B3502,B3801,C0401,C1203	A2601	119	46	nlvnvktgy	nlvnvktgy	nlvnvMtgy
SC0899	ACACA	17	35601543	C	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	136	482	vldnlvnvt	vldnlvnvt	vldnlvnvM
SC0899	KRT16	17	39768468	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	30	16	yqrqrHsei	yqrqrHsei	yqrqrPsei
SC0899	KRT16	17	39768469	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	13	16	yqrqrTsei	yqrqrTsei	yqrqrPsei
SC0899	C17orf104	17	42745474	C	A	A2402,A2601,B3502,B3801,C0401,C1203	A2402	158	134	sfYglmptf	sfYglmptf	sfSglmptf
SC0899	C17orf104	17	42745474	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	97	4777	mnygdnsfY	mnygdnsfY	mnygdnsfS
SC0899	C17orf67	17	54832240	T	C	A2402,A2601,B3502,B3801,C0401,C1203	C1203	47	17	fpdEpmrey	fpdEpmrey	fpdEpmrey
SC0899	ACE	17	61562422	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	139	19159	tahqtsaql	tahqtsaql	tahqtsaqS
SC0899	ACE	17	61562422	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	484	518	tsaqlpnlv	tsaqlpnlv	tsaqSpnlv
SC0899	CACNA1A	19	13341018	C	G	A2402,A2601,B3502,B3801,C0401,C1203	A2402	443	281	ifcsflQl	ifcsflQl	ifcsfMQl
SC0899	CACNA1A	19	13341018	C	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	158	104	lQnlfvav	lQnlfvav	lMnlfvav
SC0899	CACNA1A	19	13341018	C	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	345	82	Qnlfvavl	Qnlfvavl	Mnlfvavl
SC0899	ZNF257	19	22271111	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	218	573	ksfcmlsQl	ksfcmlsQl	ksfcmlsQl
SC0899	ZNF726	19	24116390	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	23	10	kafRqsstl	kafRqsstl	kafSqsstl
SC0899	PSG6	19	43415001	G	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	344	104	ysetLkpsi	ysetLkpsi	ysetPkpsi
SC0899	SHANK1	19	51207757	C	A	A2402,A2601,B3502,B3801,C0401,C1203	A2601	17	13	etcaSlly	etcaSlly	etcaRlly
SC0899	SHANK1	19	51207757	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	54	120	ynketcaSl	ynketcaSl	ynketcaRl
SC0899	SUV420H2	19	55855182	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	248	1188	lUgpaafi	lUgpaafi	lWgpaafi
SC0899	ZNF418	19	58437573	C	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	71	61	ksthrNssi	ksthrNssi	ksfhrSssi
SC0899	GALNT14	2	31215720	C	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	7	11	raipDtrhl	raipDtrhl	raipDtrhl

Figure 21 (Cont.)

SC0899	GALNT14	2	31215720	C	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	422	537	Ntnhrctt	Dtrhirctt		
SC0899	CIAO1	2	96933172	A	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	96	100	asfdatAci	asfdatTci		
SC0899	RANBP2	2	109284632	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	11	50	fvfsfnapi	fGfsfnapi		
SC0899	POTEE	2	132021517	C	T	A2402,A2601,B3502,B3801,C0401,C1203	A2601	2	8	etfntTamy	etfntPamy		
SC0899	POTEE	2	132021517	C	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	11	864	imfetfntL	imfetfntP		
SC0899	POTEE	2	132021517	C	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	176	143	etfntTamy	etfntPamy		
SC0899	POTEE	2	132021517	C	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	234	1241	ntTamyvai	ntPamyvai		
SC0899	LCT	2	136566905	G	C	A2402,A2601,B3502,B3801,C0401,C1203	A2402	342	284	yynnMngl	yynnMngl		
SC0899	DAPL1	2	159672269	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	279	602	mahqkptHa	mahqkptPa		
SC0899	DAPL1	2	159672269	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	11	41	Halekvvpl	Palekvvpl		
SC0899	SCN1A	2	166848638	C	A	A2402,A2601,B3502,B3801,C0401,C1203	A2601	8	2365	etfgnsmiC	etfgnsmiC		
SC0899	SCN1A	2	166848638	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	384	13162	fffqitsa	Cfqitsa		
SC0899	EVA2	2	176945532	C	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	430	573	rnkdfkPqpI	rnkdfkRqpI		
SC0899	SF3B1	2	198267359	C	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	94	42	qarntgiKi	qarntgiKi		
SC0899	SIRPA	20	1902125	G	C	A2402,A2601,B3502,B3801,C0401,C1203	C1203	159	9871	hAfsprdit	hGfsprdit		
SC0899	ATRN	20	3515928	G	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	128	54	fvtNgpgny	fvtDgpgny		
SC0899	PLCB1	20	8698454	G	T	A2402,A2601,B3502,B3801,C0401,C1203	A2402	101	170	tyldssmf	tySdssmf		
SC0899	PLCB1	20	8698454	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	272	81	ntyldssm	ntySdssm		
SC0899	BFSP1	20	17474787	C	A	A2402,A2601,B3502,B3801,C0401,C1203	A2601	55	45	etaIvetm	etaVvetm		
SC0899	BFSP1	20	17474787	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	17	11	qtyeetaIi	qtyeetaVi		
SC0899	BFSP1	20	17474787	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	229	609	taIvvetmi	taVvvetmi		
SC0899	PREX1	20	47307566	A	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	488	2603	ntakmkRfv	ntakmkWfv		
SC0899	BCAS1	20	52674630	C	G	A2402,A2601,B3502,B3801,C0401,C1203	A2601	133	334	htvqhiQev	htvqhiEev		
SC0899	BCAS1	20	52674630	C	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	214	303	htvqhiQev	htvqhiEev		
SC0899	DIP2A	21	47910627	G	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	446	302	Qsdvhteav	Rsdvhteav		
SC0899	SLC6A1	3	11070466	T	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	426	1576	vtqfkpispl	vtqRpispl		
SC0899	KCNH8	3	19436692	C	A	A2402,A2601,B3502,B3801,C0401,C1203	B3801	98	114	qhstivMfl	qfstivMfl		
SC0899	KCNH8	3	19436692	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	28	32	ysqhstivM	ysqfstivM		
SC0899	KCNH8	3	19575272	A	C	A2402,A2601,B3502,B3801,C0401,C1203	C1203	180	601	yqvvPeqfI	yqvvDeqfI		
SC0899	ADAMTS9	3	64527039	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	178	55	hpkeyvtIL	hpkeyvtIV		
SC0899	CD96	3	111261127	A	G	A2402,A2601,B3502,B3801,C0401,C1203	A2402	19	9	kycavCyii	kycavVyii		
SC0899	CD96	3	111261127	A	G	A2402,A2601,B3502,B3801,C0401,C1203	A2402	215	86	Cyiqgihiv	Yyiqgihiv		
SC0899	CD96	3	111261127	A	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	92	94	wkycavCyi	wkycavVyi		
SC0899	CD96	3	111261127	A	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	377	824	cavCyiiqi	cavVyiiqi		
SC0899	INPP4B	4	143226677	C	A	A2402,A2601,B3502,B3801,C0401,C1203	A2402	210	509	rsfiCyasf	rsfiVyasf		
SC0899	DDX60L	4	169393038	C	A	A2402,A2601,B3502,B3801,C0401,C1203	A2601	173	49	fviYgdsli	fviDgdsli		
SC0899	DDX60L	4	169393038	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	191	26	fviYgdsli	fviDgdsli		
SC0899	DDX60L	4	169393038	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	203	3070	viYgd4lv	viDgdslv		
SC0899	EXOC3	5	465834	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	12	4723	fffrklasV	fffrklasG		
SC0899	EXOC3	5	465834	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	218	141	lasVfgedv	lasGfgedv		
SC0899	CDH18	5	19483509	C	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	82	140	caIerdRrv	caVerdGrv		
SC0899	AR115	5	531182509	C	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	481	754	laHgkrwii	laRgkrwii		
SC0899	SV2C	5	754590923	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	473	3921	Wiggaiptv	Giggaiptv		
SC0899	PCDHA1	5	140167728	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	285	246	qpaaggEfi	qpaaggAfi		
SC0899	PCDHA6	5	140208447	C	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	273	120	enadkgttv	enatkgttv		
SC0899	PCDHA6	5	140208447	C	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	10	6	natkgttvI	natNgttvI		
SC0899	PCDHA13	5	140263556	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	22	294	Wagsaggtv	Gagsaggtv		
SC0899	PCDHGA10	5	140794720	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	258	209	kSfvtftv	kAfvtftv		
SC0899	JAKMIP2	5	147011044	G	C	A2402,A2601,B3502,B3801,C0401,C1203	C1203	210	385	rsppfnVqi	rsppfnLqi		

Figure 21 (Cont.)

SCO899	SOX30	5	157078764	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	323	439	lqfrpdkl	lqfrpdkl	lqfrpdkl
SCO899	EBF1	5	158250240	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	8	2019	fvhrnskhV	fvhrnskhV	fvhrnskhG
SCO899	F13A1	6	6182342	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	21	38	taMkdgthv	taMkdgthv	taKkdgthv
SCO899	TNXB	6	32029942	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	272	22777	rvgpvsaiV	rvgpvsaiV	rvgpvsaiG
SCO899	TFAP2D	6	50712883	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	114	471	pakEvgeHl	pakEvgeHl	pakAvgeHl
SCO899	BAI3	6	70034812	T	A	A2402,A2601,B3502,B3801,C0401,C1203	A2402	432	306	fffiaTfCw	fffiaTfCw	ffffaSfCw
SCO899	BAI3	6	70034812	T	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	222	1060	ihfffiaTf	ihfffiaTf	ihfffiaSf
SCO899	GPR31	6	167571355	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	280	3661	tavgvdVi	tavgvdVi	tavgvdIGi
SCO899	NFE2L3	7	26225102	G	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	118	6319	Yrkrkldii	Yrkrkldii	Crkrkldii
SCO899	ABCA13	7	486219855	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	88	1930	lssagtaVv	lssagtaVv	lssagtaGv
SCO899	ABCA13	7	486219855	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	246	351	sagtaVvli	sagtaVvli	sagtaGvli
SCO899	KIAA1147	7	141385414	A	T	A2402,A2601,B3502,B3801,C0401,C1203	A2402	41	38	iyfrkgpfl	iyfrkgpfl	iyfrkgpfF
SCO899	KIAA1147	7	141385414	A	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	204	1424	iyfrkgpfl	iyfrkgpfl	iyfrkgpfF
SCO899	PXDNL	8	323210167	G	C	A2402,A2601,B3502,B3801,C0401,C1203	C1203	215	145	npkvmagli	npkvmagli	npNvmagli
SCO899	ZFHX4	8	77768099	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C0401	473	696	wfqnaMake	wfqnaMake	wfqnaRake
SCO899	ZFHX4	8	77768099	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	147	519	naKakekkf	naKakekkf	naRakekkf
SCO899	ZFHX4	8	77768099	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	29	56	Makekkfki	Makekkfki	Rakekkfki
SCO899	MMP16	8	89179940	C	A	A2402,A2601,B3502,B3801,C0401,C1203	A2402	34	12532	fYsdepwtl	fYsdepwtl	fDsdepwtl
SCO899	MMP16	8	89179940	C	A	A2402,A2601,B3502,B3801,C0401,C1203	B3801	452	227	thfYsdepw	thfYsdepw	thfDsdepw
SCO899	MMP16	8	89179940	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	170	620	fYsdepwtl	fYsdepwtl	fDsdepwtl
SCO899	FER1L6	8	125072911	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	180	101	ykNrnpnfsi	ykNrnpnfsi	ykNrnpnfsi
SCO899	SPATA31A6	9	43627729	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	27	36	lssdgqrnv	lssdgqrnv	lssdgqrnv
SCO899	IKBKAP	9	111642394	C	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	98	121	fsHhkkrii	fsHhkkrii	fsKhkkrii
SCO899	C5	9	123768218	G	C	A2402,A2601,B3502,B3801,C0401,C1203	A2402	204	499	Kyrtsgmqf	Kyrtsgmqf	Nyrtsgmqf
SCO899	REXO4	9	136277597	T	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	94	490	rafaldcem	rafaldcem	ralaldcem
SCO899	REXO4	9	136277597	T	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	343	3516	faldcemvg	faldcemvg	laldcemvg
SCO899	MAGED1	X	51640346	A	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	377	297	lmlkdytEv	lmlkdytEv	lmlkdytKv
SCO899	SPIN4	X	62570670	C	A	A2402,A2601,B3502,B3801,C0401,C1203	A2601	3	1315	mVvdgvsay	mVvdgvsay	mGvdgvsay
SCO899	SPIN4	X	62570670	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C1203	36	343	mVvdgvsay	mVvdgvsay	mGvdgvsay
SCO899	SPIN4	X	62570671	C	A	A2402,A2601,B3502,B3801,C0401,C1203	C0401	136	1043	Wvdgvsayl	Wvdgvsayl	Gvdgvsayl
SCO899	DLG3	X	69712022	A	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	63	160	lsfsCgdil	lsfsCgdil	lsfsYgdil
SCO899	DLG3	X	69712022	A	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	13	5	fsCgdilhv	fsCgdilhv	lsYgdilhv
SCO899	NLGN3	X	70389502	C	A	A2402,A2601,B3502,B3801,C0401,C1203	B3801	239	13919	nHrdysted	nHrdysted	nPrdysted
SCO899	GPR174	X	78426833	T	C	A2402,A2601,B3502,B3801,C0401,C1203	A2402	79	13	myasiyflA	myasiyflA	myasiyflV
SCO899	GPR174	X	78426833	T	C	A2402,A2601,B3502,B3801,C0401,C1203	A2402	314	313	iyflAcisv	iyflAcisv	iyflVcisv
SCO899	CHM	X	85211182	C	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	272	433	fpiygqAel	fpiygqAel	fpiygqGel
SCO899	DCAF12L2	X	125299165	C	G	A2402,A2601,B3502,B3801,C0401,C1203	C1203	17	19	yahirpTdv	yahirpTdv	yahirpRdv
SCO899	MCF2	X	138701884	A	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	16	41	feqdfqqHv	feqdfqqHv	feqdfqqLv
SCO899	MAGEA4	X	151092550	G	T	A2402,A2601,B3502,B3801,C0401,C1203	C1203	243	230	kaemiErvi	kaemiErvi	kaemiErvi
SC6470	NBPF9	1	144816504	C	G	A3002,A3101,B1801,B3502,C0401,C0501	A3101	371	22533	mqkaeekeB	mqkaeekeB	mqkaeekeV
SC6470	FLG	1	152285803	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	208	2949	hQgssrggr	hQgssrggr	hPgssrggr
SC6470	SPTA1	1	158644392	C	A	A3002,A3101,B1801,B3502,C0401,C0501	A3101	373	7371	ktaainaYe	ktaainaYe	ktaainaDe
SC6470	PIGR	1	207110547	G	C	A3002,A3101,B1801,B3502,C0401,C0501	A3101	106	349	fsvvlRgr	fsvvlRgr	fsvvlTgr
SC6470	PLXNA2	1	208217896	C	G	A3002,A3101,B1801,B3502,C0401,C0501	C0501	168	187	Hrndniesrv	Hrndniesrv	Qrndniesrv
SC6470	HMIP2	1	222717161	C	A	A3002,A3101,B1801,B3502,C0401,C0501	C0501	356	898	agdgthLff	agdgthLff	agdgthKff
SC6470	WNT9A	1	228111890	G	C	A3002,A3101,B1801,B3502,C0401,C0501	A3101	32	120	rsKkdlrar	rsKkdlrar	rsSkdlrar
SC6470	ZNF248	10	38121275	C	A	A3002,A3101,B1801,B3502,C0401,C0501	B1801	73	316	weNsaiikh	weNsaiikh	weKsaiikh
SC6470	CTNNA3	10	68940230	G	T	A3002,A3101,B1801,B3502,C0401,C0501	B1801	103	51	teeerPsl	teeerPsl	teeerPsl
SC6470	SLC17A6	11	22396404	C	A	A3002,A3101,B1801,B3502,C0401,C0501	A3101	29	4899	rskqlskl	rskqlskl	rskqlskT

Figure 21 (Cont.)

SC6470	SLC17A6	11	22396404	C	A	A3002,A3101,B1801,B3502,C0401,C0501	A3101	121	245	qilstKtvr	qilstTtvr
SC6470	ATM	11	108205736	A	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	98	73	iLsfkaefr	iQsfkaefr
SC6470	NALCN	13	101910811	C	G	A3002,A3101,B1801,B3502,C0401,C0501	A3101	359	971	rqydQfyla	rqydEfyla
SC6470	CLEC14A	14	38724241	C	A	A3002,A3101,B1801,B3502,C0401,C0501	B1801	84	111	deklgDtpl	deklgEtpl
SC6470	DDHD1	14	53513592	G	A	A3002,A3101,B1801,B3502,C0401,C0501	A3101	94	168	rywsavtLh	rywsavtSh
SC6470	RTN1	14	60212641	A	T	A3002,A3101,B1801,B3502,C0401,C0501	C0501	139	278	yiddHseeq	yiddLseeq
SC6470	KIAA0247	14	70175433	G	T	A3002,A3101,B1801,B3502,C0401,C0501	C0501	21	8	Ivdgvqval	Mvdgvqval
SC6470	YLPM1	14	75295987	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3002	38	129	aiasrmeYy	aiasrmeDy
SC6470	YLPM1	14	75295987	G	T	A3002,A3101,B1801,B3502,C0401,C0501	B1801	54	2048	meYylqlpd	meDylqlpd
SC6470	EIF2AK4	15	40259896	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3002	204	19420	rladickeY	rladickeD
SC6470	EIF2AK4	15	40259896	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	383	5343	keYvfeqtr	keDvfeqtr
SC6470	EIF2AK4	15	40259896	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	446	4799	Yvfeqtrvr	Dvfeqtrvr
SC6470	EIF2AK4	15	40259896	G	T	A3002,A3101,B1801,B3502,C0401,C0501	C0501	7	122	ladickeYv	ladickeDv
SC6470	TGM7	15	43585770	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	285	50	Ntqemgvkr	Htqemgvkr
SC6470	FBN1	15	48712954	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3002	239	107	gcqKiiggy	gcqNiiggy
SC6470	FBN1	15	48712954	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	19	22	cqKiiggyr	cqNiiggyr
SC6470	PEMT	17	17409560	C	T	A3002,A3101,B1801,B3502,C0401,C0501	A3002	84	60	ltyiMally	ltyiVally
SC6470	GRAP	17	18925411	T	A	A3002,A3101,B1801,B3502,C0401,C0501	C0501	10	363	aLdpsqlsf	aQdpsqlsf
SC6470	TBC1D3C	17	36339597	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	434	11547	smkkltrkK	smkkltrkQ
SC6470	RALBP1	18	9535817	C	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	92	80	rggVvqppr	rggAvqppr
SC6470	WDR7	18	54363499	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	22	70	rtlrChrnk	rtlrGhrnk
SC6470	MFSD12	19	3550983	T	A	A3002,A3101,B1801,B3502,C0401,C0501	B1801	168	2450	veltalWya	veltalRya
SC6470	ZNF536	19	30934536	G	A	A3002,A3101,B1801,B3502,C0401,C0501	A3002	99	436	sSpvlngqy	sGpvlngqy
SC6470	LRP3	19	33698018	C	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	9	10	lfhrprVpr	lfhrprApr
SC6470	ATP4A	19	36044635	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3002	46	65	lvnepMaay	lvnepLaay
SC6470	ATP4A	19	36044635	G	T	A3002,A3101,B1801,B3502,C0401,C0501	B1801	6	6	nepMaaysy	nepLaaysy
SC6470	ZNF569	19	37904959	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	97	145	tldlirhlr	tldLirhlr
SC6470	PSG6	19	43411094	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3002	93	12838	atgkeiskY	atgkeiskS
SC6470	ZNF230	19	44515389	A	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	179	223	kecgkCfsr	kecgkSfsr
SC6470	SPACA4	19	49110490	C	A	A3002,A3101,B1801,B3502,C0401,C0501	A3101	6	5141	vsyrgvtyR	vsyrgvtyS
SC6470	ZNF154	19	58213656	C	T	A3002,A3101,B1801,B3502,C0401,C0501	C0501	217	56	ecdKcgklf	ecdEcgklf
SC6470	RRM2	2	10262920	T	G	A3002,A3101,B1801,B3502,C0401,C0501	A3101	139	158	caAtmlslr	caStmlslr
SC6470	FAM161A	2	62069257	C	A	A3002,A3101,B1801,B3502,C0401,C0501	A3002	59	40	Isvseknsy	Rsvseknsy
SC6470	FAM161A	2	62069257	C	A	A3002,A3101,B1801,B3502,C0401,C0501	C0501	369	489	lsdsslsvs	lsdssRsvs
SC6470	IL1R2	2	102644772	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	350	344	giwmhrLck	giwmhrRck
SC6470	IL1R2	2	102644772	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	109	64	wmhrLckhr	wmhrRckhr
SC6470	IL1R2	2	102644772	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	28	1700	rLckhrtgk	rRckhrtgk
SC6470	RANBP2	2	109368093	A	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	399	704	vckLlcter	vckQlcter
SC6470	DYTN	2	207530641	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	43	2161	rihklktnK	rihklktnQ
SC6470	D2HGDH	2	242695312	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3002	17	28	alsrdCyvy	alsrdGyvy
SC6470	D2HGDH	2	242695312	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	19	57	lsrdCyvyk	lsrdGyvyk
SC6470	D2HGDH	2	242695312	G	T	A3002,A3101,B1801,B3502,C0401,C0501	B1801	334	401	tealsrdCy	tealsrdGy
SC6470	CHGB	20	5903391	G	A	A3002,A3101,B1801,B3502,C0401,C0501	A3101	19	19	tqnaflnKr	tqnaflnEr
SC6470	EMILIN3	20	39991683	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	238	1109	kgTglfger	kgPglfger
SC6470	CDH22	20	44869868	C	T	A3002,A3101,B1801,B3502,C0401,C0501	B1801	17	8	degdEaiky	degdGaiky
SC6470	CDH22	20	44869868	C	T	A3002,A3101,B1801,B3502,C0401,C0501	C0501	19	11	dsdegdEai	dsdegdGai
SC6470	MYT1	20	62839656	G	A	A3002,A3101,B1801,B3502,C0401,C0501	B1801	55	47	deselqdmm	deseMqdmm
SC6470	MYT1	20	62839656	G	A	A3002,A3101,B1801,B3502,C0401,C0501	C0501	442	379	vtdeselqd	vtdeseMqd
SC6470	SCN10A	3	38739105	C	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	123	759	rsyvlhHsm	rsyvlhRsm

Figure 21 (Cont.)

SC6470	PRCC1	3	93593123	C	A	A3002,A3101,B1801,B3502,C0401,C0501	A3101	78	279	hsFpsvwkk	hsCpsvwkk
SC6470	EPHA6	3	96963032	G	A	A3002,A3101,B1801,B3502,C0401,C0501	C0501	288	161	fvshMnytf	fvshVnytf
SC6470	LPHN3	4	62849284	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3002	469	300	vavsSavdy	vavsAavdy
SC6470	LPHN3	4	62849284	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3002	36	101	sSavdyrsy	sAavdyrsy
SC6470	LPHN3	4	62849284	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	66	58	avsSavdyr	avsAavdyr
SC6470	CDH9	5	76915972	C	G	A3002,A3101,B1801,B3502,C0401,C0501	C0501	98	225	tgdgPgsll	tgdgAgsll
SC6470	ITGA1	5	52235469	C	A	A3002,A3101,B1801,B3502,C0401,C0501	B1801	49	8630	fedpfsinY	fedpfsinS
SC6470	ITGA1	5	52235469	C	A	A3002,A3101,B1801,B3502,C0401,C0501	C0501	403	13055	fedpfsinY	fedpfsinS
SC6470	PCDHB13	5	140594221	A	T	A3002,A3101,B1801,B3502,C0401,C0501	A3002	362	19599	ienyiispY	ienyiispN
SC6470	PCDHB13	5	140594221	A	T	A3002,A3101,B1801,B3502,C0401,C0501	A3002	159	408	nyiispYsy	nyiispNsy
SC6470	PCDHB13	5	140594221	A	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	8	17	iispYsyfr	iispNsyfr
SC6470	PCDHB13	5	140594221	A	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	29	49	Ysyfrvkr	Nsyfrvkr
SC6470	PCDHB13	5	140594221	A	T	A3002,A3101,B1801,B3502,C0401,C0501	B1801	5	1049	ienyiispY	ienyiispN
SC6470	PCDHB13	5	140594221	A	T	A3002,A3101,B1801,B3502,C0401,C0501	C0501	362	94	yiispYsyf	yiispNsyf
SC6470	PCDHGB3	5	140750682	G	C	A3002,A3101,B1801,B3502,C0401,C0501	A3101	176	133	pLftqdlmyr	pVftqdlmyr
SC6470	PCDHGB6	5	140789355	C	A	A3002,A3101,B1801,B3502,C0401,C0501	A3101	395	129	afEHqar	afAHqar
SC6470	FAM73B	5	156592647	G	C	A3002,A3101,B1801,B3502,C0401,C0501	A3101	21	14177	klvyllrpR	klvyllrpP
SC6470	MDGA1	6	37612360	C	A	A3002,A3101,B1801,B3502,C0401,C0501	A3101	25	126	ltdnfYwtr	ltdnfDwtr
SC6470	PTCHD4	6	47847267	G	A	A3002,A3101,B1801,B3502,C0401,C0501	A3002	297	577	tshheMnpy	tshheTnpy
SC6470	FRMD1	6	1684615 69	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3002	83	10059	ytsgikanY	ytsgikanS
SC6470	FRMD1	6	1684615 69	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	11	25	gikanYwk	gikanSwk
SC6470	FRMD1	6	1684615 69	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	45	205	anYwiresr	anSwiresr
SC6470	SDK1	7	4285348	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3002	204	1987	sYedicnky	sDedicnky
SC6470	SDK1	7	4285348	G	T	A3002,A3101,B1801,B3502,C0401,C0501	B1801	233	17763	spggihysY	spggihysD
SC6470	RSPH10B2	7	5966067	G	T	A3002,A3101,B1801,B3502,C0401,C0501	C0501	424	82	ildPpkedv	ildPpkedw
SC6470	Hip1	7	75228508	C	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	426	296	vavkekhTr	vavkekhAr
SC6470	SEMA3D	7	84636171	G	T	A3002,A3101,B1801,B3502,C0401,C0501	A3002	422	264	sqKatikwy	sqCatikwy
SC6470	MBLAC1	7	99725088	C	G	A3002,A3101,B1801,B3502,C0401,C0501	A3002	158	373	svvvVlqgy	svvvLlqgy
SC6470	PPP1R3A	7	1135187 04	C	G	A3002,A3101,B1801,B3502,C0401,C0501	B1801	163	23	Hernekeetm	Dernekeetm
SC6470	NUP205	7	1352636 07	A	T	A3002,A3101,B1801,B3502,C0401,C0501	C0501	292	11	eadEamael	eadEamael
SC6470	CSMD1	8	2807790	C	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	243	366	gqadifvNk	gqadifvSk
SC6470	CSMD1	8	2807790	C	T	A3002,A3101,B1801,B3502,C0401,C0501	C0501	52	13	qadifvNkf	qadifvSkf
SC6470	PRUNE2	9	79323154	C	T	A3002,A3101,B1801,B3502,C0401,C0501	B1801	338	262	deeevifsg	deeevifsg
SC6470	PRUNE2	9	79323154	C	T	A3002,A3101,B1801,B3502,C0401,C0501	C0501	316	530	hldeeevif	hldeeevif
SC6470	COL27A1	9	1169310 19	C	T	A3002,A3101,B1801,B3502,C0401,C0501	A3101	21	38	ktapsIftk	ktapsSftk
SC6470	TLR4	9	1204738 88	G	T	A3002,A3101,B1801,B3502,C0401,C0501	C0501	2	17	ftDkntkf	ftElntkf
SC6470	P2RY8	X	15850 19	C	A	A3002,A3101,B1801,B3502,C0401,C0501	C0501	319	417	vaacSgtwl	vaacAgtwl
SC6470	ARHGAP6	X	11157289	A	C	A3002,A3101,B1801,B3502,C0401,C0501	A3101	139	52	carphgRgr	carphgSgr
SC6470	MAGEB3	X	30254946	C	A	A3002,A3101,B1801,B3502,C0401,C0501	B1801	278	20784	sRfqfwyee	sAfqfwyee
SC6470	TRO	X	54956263	A	T	A3002,A3101,B1801,B3502,C0401,C0501	A3002	150	13037	gvggawvsN	gvggawvsN
SC6470	TRO	X	54956263	A	T	A3002,A3101,B1801,B3502,C0401,C0501	C0501	4	212	YtdfggtIs	Ntdfggtls
SI9946_2	KAZN	1	15430679	C	T	A2601,A0206,B3502,B4801,C0401,C0803	A0206	145	46	emsavfhLa	emsavfhPa
SI9946_2	CEP85	1	26601486	G	C	A2601,A0206,B3502,B4801,C0401,C0803	A0206	198	177	aqeeGtsqa	aqeeAtsqa
SI9946_2	CLDN19	1	43201701	C	A	A2601,A0206,B3502,B4801,C0401,C0803	A0206	133	2608	aSyefgpai	aKyefgpai
SI9946_2	IPO9	1	2017983 78	C	T	A2601,A0206,B3502,B4801,C0401,C0803	A0206	82	2471	aasglGgpv	aasglPgpv
SI9946_2	IPO9	1	2017983 78	C	T	A2601,A0206,B3502,B4801,C0401,C0803	A0206	201	17853	lGgpvaqgl	lPgpvaqgl
SI9946_2	OBSCN	1	2285282 21	G	T	A2601,A0206,B3502,B4801,C0401,C0803	B4801	405	261	kkyaeDail	kkyaeEail
SI9946_2	ANKRD2	10	99332530	G	T	A2601,A0206,B3502,B4801,C0401,C0803	A0206	32	8	kapeslCpa	kapeslVpa
SI9946_2	KNDC1	10	1350126 75	C	T	A2601,A0206,B3502,B4801,C0401,C0803	A0206	212	1910	Maepslqea	Tapslqea

Figure 21 (Cont.)

SI9946_2	CDC42BPG	11	64611888	T	C	A2601,A0206,B3502,B4801,C0401,C0803	A0206	288	125	svaqfSwa	svaqfSwa	svaqfSwa
SI9946_2	CDC42BPG	11	64611888	T	C	A2601,A0206,B3502,B4801,C0401,C0803	A0206	421	944	aqfiSwasp	aqfiSwasp	aqfiSwasp
SI9946_2	CDC42BPG	11	64611889	T	C	A2601,A0206,B3502,B4801,C0401,C0803	A0206	4	2	fiGwaspV	fiGwaspV	fiGwaspV
SI9946_2	VPS51	11	64877237	C	T	A2601,A0206,B3502,B4801,C0401,C0803	A0206	14	20	WlthyvkV	WlthyvkV	WlthyvkV
SI9946_2	VPS51	11	64877237	C	T	A2601,A0206,B3502,B4801,C0401,C0803	A2601	192	405	etarWlth	etarWlth	etarWlth
SI9946_2	CAB52	13	111356235	T	C	A2601,A0206,B3502,B4801,C0401,C0803	A0206	156	46	ilvaNaeaa	ilvaNaeaa	ilvaNaeaa
SI9946_2	PRKD1	14	30396595	C	T	A2601,A0206,B3502,B4801,C0401,C0803	A0206	2	2	flapVaapv	flapVaapv	flapVaapv
SI9946_2	GGT6	17	4461972	G	T	A2601,A0206,B3502,B4801,C0401,C0803	A0206	442	192	iagdaltsi	iagdaltsi	iagdaltsi
SI9946_2	NME1	17	49238564	T	C	A2601,A0206,B3502,B4801,C0401,C0803	A0206	126	26	vmPgetnpa	vmLgetnpa	vmLgetnpa
SI9946_2	NPLOC4	17	79575820	A	G	A2601,A0206,B3502,B4801,C0401,C0803	A0206	22	10	ylnhPeppv	ylnhLeppv	ylnhLeppv
SI9946_2	TMEM239	19	1020868	C	A	A2601,A0206,B3502,B4801,C0401,C0803	A0206	97	196	nvrdRtfha	nvrdRtfha	nvrdRtfha
SI9946_2	RFX2	19	6044235	G	T	A2601,A0206,B3502,B4801,C0401,C0803	A0206	5	11	mqpiYtprv	mqpiSlprv	mqpiSlprv
SI9946_2	FBN3	19	8212358	G	T	A2601,A0206,B3502,B4801,C0401,C0803	A0206	3	3	mtbAegtyk	mtLegtyk	mtLegtyk
SI9946_2	CCDC135	19	49899040	A	T	A2601,A0206,B3502,B4801,C0401,C0803	A0206	30	8149	qihggleiE	qihggleiE	qihggleiE
SI9946_2	POLD1	19	50919027	G	A	A2601,A0206,B3502,B4801,C0401,C0803	A0206	8	12	slgdrtpyv	slgdrtpyv	slgdrtpyv
SI9946_2	POLD1	19	50919027	G	A	A2601,A0206,B3502,B4801,C0401,C0803	A0206	424	328	rtpyvlsa	rtpyvlsa	rtpyvlsa
SI9946_2	CNOT3	19	54651935	C	T	A2601,A0206,B3502,B4801,C0401,C0803	A0206	8	32	nqhpqSpav	nqhpqSpav	nqhpqSpav
SI9946_2	SPATS2L	2	201281127	A	T	A2601,A0206,B3502,B4801,C0401,C0803	A0206	249	498	iqvlkDwnm	iqvlkDwnm	iqvlkDwnm
SI9946_2	AIFM3	22	21333577	A	T	A2601,A0206,B3502,B4801,C0401,C0803	A0206	265	667	rvaaqYmia	rvaaqYmia	rvaaqYmia
SI9946_2	AIFM3	22	21333577	A	T	A2601,A0206,B3502,B4801,C0401,C0803	A0206	25	161	aqYmiaqea	aqYmiaqea	aqYmiaqea
SI9946_2	AIFM3	22	21333577	A	T	A2601,A0206,B3502,B4801,C0401,C0803	A0206	46	1288	Ymiaqeaem	Ymiaqeaem	Ymiaqeaem
SI9946_2	UCN2	3	48600338	G	T	A2601,A0206,B3502,B4801,C0401,C0803	A0206	35	40	ivtsldvpi	ivtsldvpi	ivtsldvpi
SI9946_2	NELFA	4	2010566	T	C	A2601,A0206,B3502,B4801,C0401,C0803	A0206	33	177	ltawidnV	ltawidnV	ltawidnV
SI9946_2	NELFA	4	2010566	T	C	A2601,A0206,B3502,B4801,C0401,C0803	A0206	434	568	nVrlcfhgl	nVrlcfhgl	nVrlcfhgl
SI9946_2	SIDX2	4	184938423	G	C	A2601,A0206,B3502,B4801,C0401,C0803	A0206	42	159	dqasltsv	dqasVtsv	dqasVtsv
SI9946_2	MSH3	5	79950715	G	C	A2601,A0206,B3502,B4801,C0401,C0803	A0206	300	320	aaaaaaPaa	aaaaaaPaa	aaaaaaAaa
SI9946_2	MSH3	5	79950715	G	C	A2601,A0206,B3502,B4801,C0401,C0803	A0206	247	320	aaaPaaaaa	aaaPaaaaa	aaaAaaaaa
SI9946_2	CYFIP2	5	156712400	C	T	A2601,A0206,B3502,B4801,C0401,C0803	A0206	52	50	tledVlsnv	tledVlsnv	tledAlsnv
SI9946_2	GIP1R	6	39016678	C	T	A2601,A0206,B3502,B4801,C0401,C0803	A0206	59	709	lllgrnvgrV	lllgrnvgrV	lllgrnvgrA
SI9946_2	DGKI	7	137531323	C	T	A2601,A0206,B3502,B4801,C0401,C0803	A0206	75	206	aTaagaaal	aTaagaaal	aAaagaaal
SI9946_2	SOX17	8	55372181	A	G	A2601,A0206,B3502,B4801,C0401,C0803	A0206	80	139	lappSalfw	lappSalfw	lappSalfw
SI9946_2	SOX17	8	55372181	A	G	A2601,A0206,B3502,B4801,C0401,C0803	A0206	320	119	Salfwyygp	Salfwyygp	Salfwyygp
SRR070761	C5MD2	1	34498210	G	A	A0101,A6801,B5601,B3502,C0401,C0102	A6801	124	1120	yavsaqgfV	yavsaqgfV	yavsaqgfH
SRR070761	KIAA0754	1	39878645	C	A	A0101,A6801,B5601,B3502,C0401,C0102	A6801	125	117	aaawsDper	aaawsDper	aaawsAper
SRR070761	VANGL1	1	116206358	G	A	A0101,A6801,B5601,B3502,C0401,C0102	A6801	493	130	sisqedlaK	sisqedlaK	sisqedlaR
SRR070761	BRINP2	1	177249613	G	C	A0101,A6801,B5601,B3502,C0401,C0102	A6801	95	153	stfpAtfle	stfpGtfle	stfpGtfle
SRR070761	ZNF648	1	182025950	C	T	A0101,A6801,B5601,B3502,C0401,C0102	A6801	478	1847	dQefavasr	dRefavasr	dRefavasr
SRR070761	C1orf106	1	200870215	C	G	A0101,A6801,B5601,B3502,C0401,C0102	A6801	33	251	eVqrclver	eLqrclver	eLqrclver
SRR070761	ANKRD30A	10	37451585	G	A	A0101,A6801,B5601,B3502,C0401,C0102	A6801	11	11655	qtfkaeppR	qtfkaeppG	qtfkaeppG
SRR070761	ADAM12	10	128076654	C	T	A0101,A6801,B5601,B3502,C0401,C0102	A6801	238	2949	Tlapcrear	Allapcrear	Allapcrear
SRR070761	IFIT5	11	299472	G	A	A0101,A6801,B5601,B3502,C0401,C0102	A6801	15	21	tayrKedtr	tayrKedtr	tayrKedtr
SRR070761	RFC5	12	118462784	C	T	A0101,A6801,B5601,B3502,C0401,C0102	A6801	167	165	ltpelmvSr	ltpelmvPr	ltpelmvPr
SRR070761	MSI1	12	120796840	A	G	A0101,A6801,B5601,B3502,C0401,C0102	C0401	306	2243	kvddamPmf	kvddamLmf	kvddamLmf
SRR070761	ULK1	12	132392061	G	A	A0101,A6801,B5601,B3502,C0401,C0102	A6801	29	74	lTdylhamr	lAdylhamr	lAdylhamr
SRR070761	OTOG	14	31926584	G	A	A0101,A6801,B5601,B3502,C0401,C0102	A6801	204	975	egsWlpgar	egsRlpgar	egsRlpgar
SRR070761	SAMD4A	14	55215538	C	G	A0101,A6801,B5601,B3502,C0401,C0102	A6801	24	35	stnvPawlk	stnvPawlk	stnvPawlk
SRR070761	SAMD4A	14	55215538	C	G	A0101,A6801,B5601,B3502,C0401,C0102	A6801	19	312	vPawlksh	vAawlksh	vPawlksh
SRR070761	MAGEL2	15	23890294	C	T	A0101,A6801,B5601,B3502,C0401,C0102	A6801	19	61	tTttqeask	tTttqeask	tAttqeask
SRR070761	PDHB	16	20370715	C	G	A0101,A6801,B5601,B3502,C0401,C0102	A6801	241	619	Lvvvvakpk	Lvvvvakpk	Vvvvvakpk

Figure 21 (Cont.)

SRO70761	TP53	17	7579359	G	C	A0101,A6801,B5601,B3502,C0403,C0102	A6801	325	137	tyqgSygfr	tyqgSygfr	tyqgSygfr	tyqgSygfr
SRO70761	KRT23	17	39081650	C	A	A0101,A6801,B5601,B3502,C0403,C0102	A6801	206	434	leNeittyr	leNeittyr	leNeittyr	leKeittyr
SRO70761	KRT23	17	39081650	C	A	A0101,A6801,B5601,B3502,C0401,C0102	A6801	180	1358	eNeittyrr	eNeittyrr	eNeittyrr	eKeittyrr
SRO70761	TTC25	17	40113476	G	A	A0101,A6801,B5601,B3502,C0403,C0102	A6801	167	1535	Naqaqykir	Naqaqykir	Naqaqykir	Vaqaqykir
SRO70761	CACNA1G	17	48647132	T	C	A0101,A6801,B5601,B3502,C0401,C0102	A6801	442	196	avrtvrvFr	avrtvrvFr	avrtvrvFr	avrtvrvIr
SRO70761	CACNA1G	17	48647132	T	C	A0101,A6801,B5601,B3502,C0403,C0102	A6801	103	90	tvrvFrpir	tvrvFrpir	tvrvFrpir	tvrvIrpir
SRO70761	BTBD17	17	72353704	C	T	A0101,A6801,B5601,B3502,C0401,C0102	A6801	208	4496	Mgtgqdeair	Mgtgqdeair	Mgtgqdeair	Vgtgqdeair
SRO70761	SPHK1	17	74381684	C	T	A0101,A6801,B5601,B3502,C0403,C0102	A6801	56	154	tapgSpswqr	tapgSpswqr	tapgTpwqr	tapgTpwqr
SRO70761	ZNF626	19	20807265	T	C	A0101,A6801,B5601,B3502,C0403,C0102	A6801	52	147	ssnitthkR	ssnitthkR	ssnitthkR	ssnitthkK
SRO70761	RHPN2	19	33487079	G	A	A0101,A6801,B5601,B3502,C0401,C0102	A6801	481	929	svWeaslck	svWeaslck	svWeaslck	svReaslck
SRO70761	ZNF850	19	37239363	T	C	A0101,A6801,B5601,B3502,C0401,C0102	A6801	110	68	rstlizhRr	rstlizhRr	rstlizhRr	rstlizhQr
SRO70761	KLC3	19	45849880	G	A	A0101,A6801,B5601,B3502,C0401,C0102	A6801	30	67	lYqenvwkr	lYqenvwkr	lYqenvwkr	lAqenvwkr
SRO70761	SYT3	19	51126526	C	T	A0101,A6801,B5601,B3502,C0403,C0102	A6801	373	600	tnnevigKRx	tnnevigKRx	tnnevigKRx	tnnevigVcr
SRO70761	SYT3	19	51128535	C	T	A0101,A6801,B5601,B3502,C0403,C0102	A6801	356	600	tnneMigvcr	tnneMigvcr	tnneMigvcr	tnneVigvcr
SRO70761	ZNF841	19	52569098	G	T	A0101,A6801,B5601,B3502,C0403,C0102	A6801	438	23620	hlvhtqgeN	hlvhtqgeN	hlvhtqgeN	hlvhtqgeN
SRO70761	TTC31	2	74717152	G	A	A0101,A6801,B5601,B3502,C0401,C0102	A6801	36	217	eeRivdflr	eeRivdflr	eeRivdflr	eeDivdflr
SRO70761	TTC31	2	74717152	G	A	A0101,A6801,B5601,B3502,C0403,C0102	A6801	170	811	eNivdflrr	eNivdflrr	eNivdflrr	eDivdflrr
SRO70761	TACR1	2	75425690	G	A	A0101,A6801,B5601,B3502,C0403,C0102	A0101	397	23	mMavafdry	mMavafdry	mMavafdry	mTavafdry
SRO70761	TACR1	2	75425690	G	A	A0101,A6801,B5601,B3502,C0401,C0102	A6801	31	60	smMavafdr	smMavafdr	smMavafdr	smTavafdr
SRO70761	HELZ2	20	62194256	C	A	A0101,A6801,B5601,B3502,C0403,C0102	A6801	52	52	lsvsCeasr	lsvsCeasr	lsvsWeasr	lsvsWeasr
SRO70761	POTEH	22	16269934	A	G	A0101,A6801,B5601,B3502,C0403,C0102	A6801	456	225	nsnpeqdSk	nsnpeqdSk	nsnpeqdSk	nsnpeqdIk
SRO70761	MUC1	22	30508988	G	A	A0101,A6801,B5601,B3502,C0403,C0102	A6801	20	28	YvaaecpsK	YvaaecpsK	YvaaecpsK	Hvaaecpsk
SRO70761	ZNF860	3	32031859	A	G	A0101,A6801,B5601,B3502,C0403,C0102	A6801	285	213	cnEcgkffr	cnEcgkffr	cnEcgkffr	cnKcgkffr
SRO70761	GATA2	3	128205724	G	A	A0101,A6801,B5601,B3502,C0403,C0102	A0101	8	14	Yldsqgnpy	Yldsqgnpy	Yldsqgnpy	Hldsqgnpy
SRO70761	CCDC82	4	155293275	A	G	A0101,A6801,B5601,B3502,C0401,C0102	A6801	74	106	HGkkqair	HGkkqair	HGkkqair	HDkkqair
SRO70761	CDH22	5	176004484	G	A	A0101,A6801,B5601,B3502,C0401,C0102	A6801	58	166	sTsvqvlvr	sTsvqvlvr	sTsvqvlvr	sAsvqvlvr
SRO70761	MYO1G	7	45005395	C	T	A0101,A6801,B5601,B3502,C0403,C0102	A6801	45	49	iytimRwfr	iytimRwfr	iytimRwfr	iytimKwfr
SRO70761	MYO1G	7	45005395	C	T	A0101,A6801,B5601,B3502,C0403,C0102	A6801	5	7	ytimRwfrr	ytimRwfrr	ytimRwfrr	ytimKwfrr
SRO70761	ZNF716	7	57528987	C	T	A0101,A6801,B5601,B3502,C0401,C0102	A6801	495	1929	eeKgkvfsr	eeKgkvfsr	eeRgkvfsr	eeRgkvfsr
SRO70761	ARHGEF5	7	1440776952	G	C	A0101,A6801,B5601,B3502,C0403,C0102	A0101	369	547	ssdAwlegv	ssdAwlegv	ssdAwlegv	ssdSwlegv
SRO70761	FRMPD1	9	37745978	G	C	A0101,A6801,B5601,B3502,C0403,C0102	A6801	330	31615	slrvatsIR	slrvatsIR	slrvatsIR	slrvatsIG
SRO70761	TNFSF8	9	117692426	G	A	A0101,A6801,B5601,B3502,C0401,C0102	A6801	487	1322	Mvatimvfv	Mvatimvfv	Mvatimvfv	Tvatimvfv
SRO70761	PATE1	X	150884659	G	A	A0101,A6801,B5601,B3502,C0403,C0102	A6801	103	128	laeelnhEr	laeelnhEr	laeelnhEr	laeelnhGr
TUD428	PLEKHN1	1	908929	C	T	A0101,A0301,B0702,B3501,C0403,C0702	B0702	31	13507	spdapdhtS	spdapdhtS	spdapdhtS	spdapdhtS
TUD428	PLEKHN1	1	908929	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	311	989	Letshspiy	Letshspiy	Letshspiy	Setshspiy
TUD428	TMCO4	1	20072082	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	195	80	ipIteSrql	ipIteSrql	ipIteSrql	ipIteSrql
TUD428	TMCO4	1	20072082	C	T	A0101,A0301,B0702,B3501,C0403,C0702	B3501	249	728	ipIteSrql	ipIteSrql	ipIteSrql	ipIteGrql
TUD428	E2F2	1	23836589	A	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	73	36	Epkeardsl	Epkeardsl	Epkeardsl	Vpkeardsl
TUD428	MYOM3	1	24419457	C	T	A0101,A0301,B0702,B3501,C0403,C0702	B0702	124	84	gpreqStyv	gpreqNtyv	gpreqStyv	gpreqStyv
TUD428	MAMLC1	1	26107502	A	G	A0101,A0301,B0702,B3501,C0403,C0702	A0101	59	74	atqlseGyy	atqlseGyy	atqlseGyy	atqlseSyy
TUD428	MAMLC1	1	26107502	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	93	23	vatqlseGy	vatqlseGy	vatqlseGy	vatqlseSy
TUD428	EPB41	1	29320013	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	102	189	Vsikdtvy	Vsikdtvy	Vsikdtvy	Vsikdtvy
TUD428	KLF17	1	44595047	T	A	A0101,A0301,B0702,B3501,C0403,C0702	B0702	448	652	apNlnmsss	apNlnmsss	apNlnmsss	apIlnmsss
TUD428	CYP4B1	1	47264905	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	38	13	fpgpplhwl	fpgpplhwl	fpgpplhwl	fpgpplTwl
TUD428	INADL	1	62614029	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	471	3371	Lptaenihpe	Lptaenihpe	Lptaenihpe	Sptaenihpe
TUD428	GBP5	1	89735081	T	A	A0101,A0301,B0702,B3501,C0403,C0702	A0301	394	427	tgksYimnk	tgksYimnk	tgksYimnk	tgksYimnk
TUD428	GBP5	1	89735081	T	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	48	38	YimnkIagk	YimnkIagk	YimnkIagk	YimnkIagk
TUD428	GBP5	1	89735081	T	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	201	228	yrtgksYim	yrtgksYim	yrtgksYim	yrtgksYim
TUD428	ECM1	1	150483365	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	77	4640	hpneqkegM	hpneqkegM	hpneqkegM	hpneqkegT

Figure 21 (Cont.)

TUO428	ECM1	1	150493355	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	369	4011	Mpapfgdqs	Tpapfgdqs	
TUO428	FLG2	1	152329852	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0101	9	15	wseGeehgy	wseGeehgy	
TUO428	FLG2	1	152329852	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	471	1165	wseGeehgy	wseGeehgy	
TUO428	FCRL3	1	157648543	T	C	A0101,A0301,B0702,B3501,C0403,C0702	C0702	145	282	Syenvprvl	Nyenvprvl	
TUO428	LY9	1	160784526	G	T	A0101,A0301,B0702,B3501,C0403,C0702	A0101	126	40	ithvtiiy	Mthvtiiy	
TUO428	SLC9C2	1	173499050	T	C	A0101,A0301,B0702,B3501,C0403,C0702	A0301	316	334	avcesMyqk	avcesIyqk	
TUO428	SLC9C2	1	173499050	T	C	A0101,A0301,B0702,B3501,C0403,C0702	B3501	342	310	qiavcesMy	qiavcesIy	
TUO428	SLC9C2	1	173499050	T	C	A0101,A0301,B0702,B3501,C0403,C0702	C0702	403	393	Myqkiceil	Iyqkiceil	
TUO428	SWT1	1	185240471	A	C	A0101,A0301,B0702,B3501,C0403,C0702	A0301	272	69	rilapnRny	rilapnSny	
TUO428	SWT1	1	185240471	A	C	A0101,A0301,B0702,B3501,C0403,C0702	B0702	188	267	apnRnyqdv	apnSnyqdv	
TUO428	PTPRC	1	198671653	A	G	A0101,A0301,B0702,B3501,C0403,C0702	A0101	59	33	itanAsday	ianTsday	
TUO428	PTPRC	1	198671653	A	G	A0101,A0301,B0702,B3501,C0403,C0702	B3501	11	19	itanAsday	ianTsday	
TUO428	PTPRC	1	198671653	A	G	A0101,A0301,B0702,B3501,C0403,C0702	B3501	403	959	tanAsdayl	tanTsdayl	
TUO428	NFASC	1	204937982	C	T	A0101,A0301,B0702,B3501,C0403,C0702	A0301	88	288	kVktenfnk	kAktenfnk	
TUO428	NFASC	1	204944441	G	A	A0101,A0301,B0702,B3501,C0403,C0702	A0301	414	6177	rnpedqvaK	rnpedqvaK	
TUO428	NFASC	1	204944536	A	G	A0101,A0301,B0702,B3501,C0401,C0702	A0301	428	449	plylgnrmk	plylgnrmk	
TUO428	NFASC	1	204944536	A	G	A0101,A0301,B0702,B3501,C0403,C0702	B3501	103	88	epiylgnrm	epiylgnrm	
TUO428	SERTAD4	1	210411315	G	T	A0101,A0301,B0702,B3501,C0403,C0702	A0301	93	240	mtMIsmnr	mtMIsmnr	
TUO428	ITPKB	1	226923938	A	C	A0101,A0301,B0702,B3501,C0401,C0702	A0301	123	131	Alswrlpr	Slswrlpr	
TUO428	ITPKB	1	226923938	A	C	A0101,A0301,B0702,B3501,C0403,C0702	B3501	312	1721	qsaessdAl	qsaessdSl	
TUO428	OBSCN	1	228506912	T	C	A0101,A0301,B0702,B3501,C0403,C0702	A0301	396	844	vtyPtkkagr	vtylkkagr	
TUO428	OBSCN	1	228506912	T	C	A0101,A0301,B0702,B3501,C0403,C0702	B0702	496	18764	yPtkkagrpg	ylkkagrpg	
TUO428	RYR2	1	237791148	G	T	A0101,A0301,B0702,B3501,C0403,C0702	B0702	490	424	rnvrwSqesv	rnvrwAqesv	
TUO428	RYR2	1	237791148	G	T	A0101,A0301,B0702,B3501,C0403,C0702	C0702	303	662	vrwSqesvi	vrwAqesvi	
TUO428	OR2T33	1	248436738	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	35	103	aavchTiry	aavchPiry	
TUO428	OR2T6	1	248551672	G	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	57	85	tlygaSky	tlygaAly	
TUO428	OR2T6	1	248551672	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	333	410	tlygaSly	tlygaAly	
TUO428	OR2T6	1	248551672	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	303	211	fygaSlyty	fygaAlyty	
TUO428	OR2T6	1	248551672	G	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	165	225	fygaSlyty	fygaAlyty	
TUO428	OR2G6	1	248685363	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	36	19	hpMfcasla	hpRfcasla	
TUO428	OR2G6	1	248685363	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	197	379	ylaimhpMf	ylaimhpRf	
TUO428	OR2G6	1	248685363	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	102	852	hpMfcasla	hpRfcasla	
TUO428	OR2G6	1	248685363	G	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	241	10977	ryiaimhpM	ryiaimhpR	
TUO428	MCM10	10	13239551	A	G	A0101,A0301,B0702,B3501,C0401,C0702	A0301	113	217	raKgqvltk	raKgqvltk	
TUO428	MCM10	10	13239551	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B0702	16	27	kraKgqvl	kraKgqvl	
TUO428	SEPHS1	10	13364302	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	128	44	ipvlaklaa	ipvlakMaa	
TUO428	SEPHS1	10	13364302	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	31	78	ipvlaklaa	ipvlakMaa	
TUO428	BAMBI	10	28966693	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	68	54	camavdTtk	camavdTtk	
TUO428	ZNF485	10	44112428	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	431	8033	kafksstF	kafksstL	
TUO428	ARHGAP22	10	49658943	G	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	50	19526	avksrtapK	avksrtapT	
TUO428	ARHGAP22	10	49658943	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	333	275	apTgpgsrc	apTgpgsrc	
TUO428	PCDH15	10	55780070	C	G	A0101,A0301,B0702,B3501,C0401,C0702	A0101	240	450	isRTsldy	isRAsldy	
TUO428	POLR3A	10	79769647	C	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	49	45	Lipptlik	Rippttik	
TUO428	POLR3A	10	79769647	C	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	172	33	vRippttl	vRipptRl	
TUO428	LRIT3	10	85992115	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	366	142	qpgMtrvtl	qpgRtrvtl	
TUO428	ACTA2	10	90701577	G	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	366	578	myvaiqVvl	myvaiqAvl	
TUO428	SORCS3	10	106974363	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	66	18	aprglhvLt	aprglhvVt	
TUO428	DOCK1	10	129172340	G	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	121	117	kiiehc5k	kiiehc8k	
TUO428	DOCK1	10	129172340	G	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	176	16920	cSkhkylak	cRkhkylak	

Figure 21 (Cont.)

TU0428	IFITM2	11	308314	T	C	A0101,A0301,B0702,B3501,C0401,C0702	B0702	54	12	vphnpappT	vphnpappM
TU0428	IFITM2	11	308314	T	C	A0101,A0301,B0702,B3501,C0401,C0702	B0702	11	14	npappTstv	npappMstv
TU0428	MUC5B	11	1260222	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	184	466	yaqachdaV	yaqachdaG
TU0428	ASCL2	11	2291369	A	C	A0101,A0301,B0702,B3501,C0401,C0702	B0702	27	196	Rvnlgfqal	Lvnlgfqal
TU0428	KCNQ1	11	2869102	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	135	108	ppreCgahi	ppreGgahi
TU0428	OR52A5	11	5153082	G	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	16	10294	llaffsffK	llaffsffT
TU0428	OR52A5	11	5153082	G	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	240	291	ffsffKhrf	ffsffThrf
TU0428	OR52E8	11	5878836	T	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	318	422	hiwFgvpff	hiwIgvpff
TU0428	OR52E8	11	5878836	T	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	19	174	Fgvpfffvy	Igvpfffvy
TU0428	PRKCDBP	11	6341514	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	94	107	riqsglSal	riqsglGal
TU0428	AMPD3	11	10503736	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	48	439	hpWadtapp	hpRadtapp
TU0428	LDLRAD3	11	36103230	C	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	323	356	Iffpcasgi	Tffpcasgi
TU0428	RAG1	11	36597879	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0101	159	16585	ylqkfmnaY	ylqkfmnaH
TU0428	RAG1	11	36597879	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	37	28	fmnaYnalk	fmnaHnalk
TU0428	RAG1	11	36597879	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	134	7202	ylqkfmnaY	ylqkfmnaH
TU0428	RAG1	11	36597879	C	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	435	632	kfmnaYnal	kfmnaHnal
TU0428	OR4C6	11	55433061	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	16	22	sprvcFlmv	sprvcClmv
TU0428	OR4C6	11	55433061	G	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	306	20936	iimsprvcF	iimsprvcC
TU0428	OR4C6	11	55433061	G	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	371	202	imsprvcFl	imsprvcCl
TU0428	OR8J1	11	56128081	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	17	15	lalmaCdry	lalmaYdry
TU0428	OR5M11	11	56310730	A	C	A0101,A0301,B0702,B3501,C0401,C0702	B0702	435	6767	mAntngsai	mSntngsai
TU0428	OR5M11	11	56310730	A	C	A0101,A0301,B0702,B3501,C0401,C0702	B3501	54	1268	mAntngsai	mSntngsai
TU0428	OR5B3	11	58170780	T	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	5	6	fpfiyiFtl	fpfiyiItl
TU0428	OR5B3	11	58170780	T	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	180	1530	itfpfiyiF	itfpfiyiI
TU0428	OR5B3	11	58170780	T	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	420	628	fpfiyiFtl	fpfiyiItl
TU0428	OR4D6	11	59225191	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	153	79	hfvHcvyiy	hfvPcvyiy
TU0428	OR4D6	11	59225191	C	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	77	22	hfvHcvyiy	hfvPcvyiy
TU0428	MS4A7	11	60152690	C	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	3	3	ypflgaVcf	ypflgaLcf
TU0428	MACROD1	11	63767022	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	216	5703	rlrsvafpF	rlrsvafpC
TU0428	MACROD1	11	63767022	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	37	115	fpFistgvf	fpCistgvf
TU0428	MACROD1	11	63767022	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	4	15	fpFistgvf	fpCistgvf
TU0428	MACROD1	11	63767022	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	69	722	Fistgvfgy	Cistgvlgy
TU0428	MACROD1	11	63767022	C	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	186	20259	rlrsvafpF	rlrsvafpC
TU0428	CCDC87	11	66360129	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	225	2564	Mllsseqlf	Vllsseqlf
TU0428	CCDC87	11	66360129	C	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	333	323	krleayMll	krleayVll
TU0428	SSH3	11	67076926	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	104	132	nfyperfAy	nfyperfTy
TU0428	SSH3	11	67076926	A	G	A0101,A0301,B0702,B3501,C0401,C0702	C0702	37	35	nfyperfAy	nfyperfTy
TU0428	ALDH3B1	11	67789138	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	293	2278	dMvlcspem	dYvlcspem
TU0428	TYR	11	88911696	C	A	A0101,A0301,B0702,B3501,C0401,C0702	A0101	21	15542	smdalggY	smdalggS
TU0428	ALKBH8	11	107422570	C	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	402	683	khkpYqmti	khkpDqmti
TU0428	FDXACB1	11	111745756	T	C	A0101,A0301,B0702,B3501,C0401,C0702	A0101	430	1065	vslcyGlty	vslcyRlty
TU0428	MCAM	11	119182355	G	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	51	49	ifgpHwmaf	ifgpPwmaf
TU0428	OR10G4	11	123887164	A	C	A0101,A0301,B0702,B3501,C0401,C0702	A0301	132	118	tlrnkevQk	tlrnkevKk
TU0428	OR8G2	11	124095986	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	375	4176	hyfcdlfpF	hyfcdlfpL
TU0428	OR8G2	11	124095986	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	201	387	fpFlglscs	fpLlglscs
TU0428	OR8G2	11	124095986	C	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	14	14	hyfcdlfpF	hyfcdlfpL
TU0428	OR8G2	11	124095986	C	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	142	105	yfcdlfpFl	yfcdlfpLl
TU0428	CACNA2D4	12	1992116	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0101	143	62	dtqenvmKy	dtqenvmEy
TU0428	CACNA2D4	12	1992116	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	311	1618	nvmKylhvl	nvmEylhvl

Figure 21 (Cont.)

TU0428	CACNA2D4	12	2027566	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B0702	16	145	mpatpnfPa	mpatpnfLa
TU0428	CACNA2D4	12	2027566	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B0702	125	15899	fPanpssss	flanpssss
TU0428	CACNA2D4	12	2027566	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	36	191	mpatpnfPa	mpatpnfLa
TU0428	CACNA2D4	12	2027566	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	143	15603	fPanpssss	flanpssss
TU0428	ANO2	12	5941684	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B0702	164	549	Apehsnnkm	Vpehsnnkm
TU0428	PLCZ1	12	18841115	G	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	240	200	plthslsnk	ptnsSsnk
TU0428	PLCZ1	12	18841115	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	318	560	lplthslsn	lplthSsn
TU0428	ADAMTS20	12	43833836	C	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	384	560	ffnfEnfll	ffnGnfll
TU0428	KMT2D	12	49433652	T	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	448	1046	ylshgasLr	ylshgasQr
TU0428	DIS3L	12	61127078	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	406	1099	taMlptvrm	taPlptvrm
TU0428	TRHDE	12	72668748	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	16	40	lavHslKf	lavHslRf
TU0428	MYF6	12	81101887	A	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	437	1130	npnqrlpMv	npnqrlpKv
TU0428	MYF6	12	81101887	A	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	37	50	qrlpMvesl	qrlpKvesl
TU0428	HSP90B1	12	104335468	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	334	1751	dmrnpkylSf	dmrnpkylNf
TU0428	HSP90B1	12	104335468	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	281	946	mpkylSfvk	mpkylNfvk
TU0428	ACACB	12	109692053	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	31	327	spvpiitpl	spvpiitpT
TU0428	ACACB	12	109692053	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	244	245	spvpiitpl	spvpiitpT
TU0428	DDX54	12	113596866	G	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	448	381	rvrLelktk	rvrPelktk
TU0428	C12orf43	12	121454148	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	424	719	rphvaGkpr	rphvaEkpr
TU0428	C12orf43	12	121454148	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	412	12006	vaGkprsgg	vaEkprsgg
TU0428	LRRC43	12	122684753	C	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	85	52	tvfsNshk	tvfsTshk
TU0428	MIPEP	13	24415590	A	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	244	490	slycpffSl	slycpffTl
TU0428	PARP4	13	25000617	C	G	A0101,A0301,B0702,B3501,C0401,C0702	A0301	395	1223	kmddPsisr	kmddAsisr
TU0428	PABPC3	13	25671786	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	31	5542	vantstqtM	vantstqtV
TU0428	GSX1	13	28367805	T	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	137	98	nnyQsrlrr	nnyLsrlrr
TU0428	GSX1	13	28367805	T	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	319	348	nnyQsrlrr	nnyLsrlrr
TU0428	MYO1G	13	109779779	T	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	71	110	ssslHpsprk	ssstpsprk
TU0428	MYO1G	13	109779779	T	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	101	62	fsrndddsssH	fsrndddsssL
TU0428	OR4K15	14	20444012	A	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	292	1555	lvvrktisf	lvErktisf
TU0428	OR4K17	14	20586152	A	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	131	48	ipfavHipf	ipfavKlpf
TU0428	OR4K17	14	20586152	A	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	3	4	ipfavHipf	ipfavKlpf
TU0428	OR4K17	14	20586152	A	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	159	360	fqipfavHl	fqipfavKl
TU0428	REM2	14	23352366	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	263	1683	cpsgsSras	cpsgsRras
TU0428	NYNRIN	14	24885139	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	59	51	lplwraLgf	lplwraRgf
TU0428	NYNRIN	14	24885139	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	16	91	lplwraLgf	lplwraRgf
TU0428	NID2	14	52485947	G	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	148	243	aqyayfgar	aqyayPgar
TU0428	SYNE2	14	64444631	G	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	117	57	tlfkslidr	tlfksiMdr
TU0428	SYNE2	14	64444631	G	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	465	460	lfkslldrf	lfksiMdrf
TU0428	DCAF4	14	73421186	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	47	1146	dvlaqqfaF	dvlaqqfaL
TU0428	DCAF4	14	73421186	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	6	13	faFrnapll	faLrnapll
TU0428	DCAF4	14	73421186	C	T	A0101,A0301,B0702,B3501,C0401,C0702	C0401	437	732	qfaFrnapli	qfaLrnapli
TU0428	NEK9	14	75570664	G	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	192	22392	kaiivavK	kaiivavQ
TU0428	SAMD15	14	77845121	A	G	A0101,A0301,B0702,B3501,C0401,C0702	A0101	27	62	lsdkfrkey	lsdEfrkey
TU0428	SAMD15	14	77845121	A	G	A0101,A0301,B0702,B3501,C0401,C0702	C0702	246	100	Efrkeyyal	Kfrkeyyal
TU0428	RLF12	14	86087875	C	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	396	456	lkwpshgaf	lkwpshgaf
TU0428	BCL11B	14	99641754	G	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	35	1079	rQrnkthrnhk	rHrnkthrnhk
TU0428	AHNAK2	14	105405599	G	C	A0101,A0301,B0702,B3501,C0401,C0702	B0702	240	934	vprfsfFap	vprfsfFap
TU0428	AHNAK2	14	105411781	G	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	330	731	asvdvsatk	asvdvsaPk
TU0428	AHNAK2	14	105411781	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	298	12078	qasvdvsaP	qasvdvsaP

Figure 21 (Cont.)

TUO428	GABRA5	15	27189418	C	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	53	54	isarnsTk	isarnsPk
TUO428	LCMT2	15	43622072	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	287	441	aliawTaqr	aliawAaqr
TUO428	LCMT2	15	43622072	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	253	163	iiswTaqrf	iiswAaqrf
TUO428	CLPX	15	65471352	G	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	87	142	ksgfgnsgk	ksgSgnsgk
TUO428	NOX5	15	69339813	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	142	171	faselhaEi	faselhaVi
TUO428	SCAPER	15	77067396	T	C	A0101,A0301,B0702,B3501,C0401,C0702	B0702	8	10	rpirsrsAa	rpirsrsTa
TUO428	SCAPER	15	77067396	T	C	A0101,A0301,B0702,B3501,C0401,C0702	B0702	190	2144	Aavmpkvsl	Tavmpkvsl
TUO428	RTBDN1	15	83686964	T	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	18	2832	slygtkgik	sHygtkgik
TUO428	ACAN	15	89415247	C	G	A0101,A0301,B0702,B3501,C0401,C0702	A0101	207	309	fvnnnaqEy	fvnnnaqDy
TUO428	ACAN	15	89415247	C	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	4	16	fvnnnaqEy	fvnnnaqDy
TUO428	WFIKKN1	16	683682	C	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	383	1060	crirKkkal	crirSkkal
TUO428	PKD1	16	2161704	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	12	2755	ypfplpspV	ypfplpspG
TUO428	PKD1	16	2161704	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	352	119	hpipspVgv	hpipspGgv
TUO428	PKD1	16	2161704	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	30	74	ypfplpspV	ypfplpspG
TUO428	PKD1	16	2161704	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	7	6	lpspVgvfy	lpspGgvfy
TUO428	PKD1	16	2161704	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	224	2227	spVgvfytw	spGgvfytw
TUO428	FLYWCH1	16	2979797	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	86	705	ipaapnkpS	ipaapnkpR
TUO428	RBM3	16	15166842	G	C	A0101,A0301,B0702,B3501,C0401,C0702	B3501	75	37	hasctvEff	hasctvQff
TUO428	DNAH3	16	20975329	C	A	A0101,A0301,B0702,B3501,C0401,C0702	A0101	52	50	qidetrmCy	qidetrmGy
TUO428	SLC5A11	16	24919354	C	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	168	22580	vvgasqggK	vvgasqggQ
TUO428	SLC5A11	16	24919354	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	431	93	qasqggKlf	qasqggQlf
TUO428	SPN	16	29675855	T	C	A0101,A0301,B0702,B3501,C0401,C0702	B3501	133	242	lavdVkal	lavdVkal
TUO428	LPCAT2	16	55562452	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	81	73	cvvaGlpsm	cvvaSlpsm
TUO428	CSNK2A2	16	58231621	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	363	1736	mpgpaaGsr	mpgpaaSsr
TUO428	CSNK2A2	16	58231621	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	363	2576	aaGsrarvy	aaSsrarvy
TUO428	FUK	16	70501344	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	329	1027	yaHnhgevyl	yaQnhgevyl
TUO428	FUK	16	70501344	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	64	587	lpgspavaH	lpgspavaQ
TUO428	FUK	16	70501344	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	145	639	yaHnhgevyl	yaQnhgevyl
TUO428	CHST5	16	75563447	G	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	304	22916	hvriaeaaK	hvriaeaaT
TUO428	CHST5	16	75563447	G	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	103	53	riaeaaKlk	riaeaaTlk
TUO428	CHST5	16	75563447	G	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	104	331	Klkppplfr	Tlkppplfr
TUO428	WWOX	16	78198149	G	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	19	167	ilacrnmaR	ilacrnmaR
TUO428	CDH13	16	83636135	C	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	455	23090	gldvgitgK	gldvgitgT
TUO428	KLHDC4	16	87782322	G	C	A0101,A0301,B0702,B3501,C0401,C0702	C0702	78	135	yhykdVwvl	yhykdLwvl
TUO428	FANCA	16	89866043	T	C	A0101,A0301,B0702,B3501,C0401,C0702	B0702	41	53	mpqvAvdvl	mpqvTvdvl
TUO428	FANCA	16	89866043	T	C	A0101,A0301,B0702,B3501,C0401,C0702	B3501	35	51	mpqvAvdvl	mpqvTvdvl
TUO428	FANCA	16	89866043	T	C	A0101,A0301,B0702,B3501,C0401,C0702	B3501	404	9052	vAvdvlqrm	vTvdvlqrm
TUO428	MYH13	17	10265727	G	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	170	94	hlheTavly	hlhePavly
TUO428	MYH13	17	10265727	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	150	436	hlheTavly	hlhePavly
TUO428	CCR10	17	40832380	T	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	157	230	iliaSkpf	iliaTkpf
TUO428	CCR10	17	40832380	T	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	268	614	ialSipfaa	ialTipfaa
TUO428	MARCH10	17	60813682	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B0702	10	9	spTrnrtpf	spSrnrtpf
TUO428	MARCH10	17	60813682	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	98	34	spTrnrtpf	spSrnrtpf
TUO428	APOH	17	64216725	T	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	486	616	hamfgnVti	hamfgnQti
TUO428	GRIN2C	17	72848279	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	25	58	kvrYgvail	kvrDgvail
TUO428	QRICH2	17	74287594	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	80	4672	istglgstY	istglgstH
TUO428	QRICH2	17	74287594	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	48	105	Ypdqqhvas	Hpdqqhvas
TUO428	BAHCC1	17	79423369	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	20	40	kvkaHrtsl	kvkaVrtsl
TUO428	EPG5	18	43462397	C	A	A0101,A0301,B0702,B3501,C0401,C0702	A0101	326	1738	isdrtNlle	isdrtNlle

Figure 21 (Cont.)

TUO428	EPG5	18	43462397	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	133	22760	kpptdrtR	kpptdrtR	kpptdrtR
TUO428	EPG5	18	43462397	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	391	493	ppisdrtM	ppisdrtM	ppisdrtBi
TUO428	SERPINB11	18	61387277	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	412	740	skdpssvm	skdpssvm	sTdpssvm
TUO428	CDH19	18	64235895	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	327	11769	lVaggagsf	lVaggagsf	kGaggagsf
TUO428	CDH19	18	64235895	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	18	207	lVaggagsf	lVaggagsf	kGaggagsf
TUO428	MED16	19	968115	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	126	18836	rsldhhpK	rsldhhpK	rsldhhpE
TUO428	ZBTB7A	19	40546614	A	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	383	118	avaaaEaav	avaaaEaav	avaaaVaav
TUO428	ZBTB7A	19	40546614	A	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	417	108	eavaaaEaa	eavaaaEaa	eavaaaVaa
TUO428	CAMSAP3	19	7677541	C	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	334	826	rlMdqqqrl	rlMdqqqrl	rlTdqqqrl
TUO428	MUC16	19	9061111	T	C	A0101,A0301,B0702,B3501,C0401,C0702	B0702	92	140	tpltAtgsa	tpltAtgsa	tplTtgsa
TUO428	MUC16	19	9061111	T	C	A0101,A0301,B0702,B3501,C0401,C0702	B3501	206	543	ltAtgsaem	ltAtgsaem	lTtgsaem
TUO428	MUC16	19	9068670	A	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	254	77	svptptQak	svptptQak	svptptLak
TUO428	MUC16	19	9084401	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	9	9	rplrtfstm	rplrtfstm	rpVrtfstm
TUO428	MUC16	19	9084401	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	37	33	rplrtfstm	rplrtfstm	rpVrtfstm
TUO428	MUC16	19	9090784	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	69	9	rvkstlssl	rvkstlssl	rvkstlssl
TUO428	ORTG1	19	9225973	G	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	242	279	mfmstmdVl	mfmstmdVl	mfmstmdAl
TUO428	JUN8	19	12903437	G	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	34	35	rlaatNcrk	rlaatNcrk	rlaatKcrk
TUO428	IL27RA	19	14153272	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	176	9232	eaawtlleL	eaawtlleL	eaawtlleP
TUO428	PKN1	19	14578707	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	170	1052	Qpsgeltai	Qpsgeltai	Rpsgeltai
TUO428	PKN1	19	14578707	G	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	379	218	efQpsgelf	efQpsgelf	effpsgelf
TUO428	F2RL3	19	17001127	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B0702	142	176	ahtAavvl	ahtAavvl	ahTAavvl
TUO428	USHBP1	19	17361108	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	88	4465	Kataralgk	Kataralgk	Eataralgk
TUO428	KIAA1462	19	36349529	C	G	A0101,A0301,B0702,B3501,C0401,C0702	B0702	287	3504	vlggpsvsl	vlggpsvsl	vlggpsvsl
TUO428	SLC1A5	19	39949671	A	C	A0101,A0301,B0702,B3501,C0401,C0702	A0301	172	374	elgAyymkk	elgAyymkk	elgEyymkk
TUO428	PSG8	19	43258649	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	215	2404	Cpaqyswti	Cpaqyswti	Ppaqyswti
TUO428	PSG8	19	43258650	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	239	1666	Tpaqyswti	Tpaqyswti	Ppaqyswti
TUO428	PSG8	19	43258650	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	157	2404	Tpaqyswti	Tpaqyswti	Ppaqyswti
TUO428	MKRN1	19	45656425	G	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	320	1480	Mgfmcevkk	Mgfmcevkk	lgfmcevkk
TUO428	CCDC8	19	46915091	T	C	A0101,A0301,B0702,B3501,C0401,C0702	B0702	25	44	apaGqgaea	apaGqgaea	apaDqgaea
TUO428	SPIB	19	50926126	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	27	32	hlsqppLmk	hlsqppLmk	hlsqppPmk
TUO428	SPIB	19	50926126	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	12	9414	wphlsqppL	wphlsqppL	wphlsqppP
TUO428	SPIB	19	50936126	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	20	1708	wphlsqppL	wphlsqppL	wphlsqppP
TUO428	SIGLEC12	19	52000672	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	101	4973	kmrpisgvM	kmrpisgvM	kmrpisgvT
TUO428	SIGLEC12	19	52000672	G	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	496	15186	kmrpisgvM	kmrpisgvM	kmrpisgvT
TUO428	SIGLEC12	19	52004743	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	27	84	ipvatmpV	ipvatmpV	ipvatmpA
TUO428	SIGLEC12	19	52004743	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	135	137	ipvatmpV	ipvatmpV	ipvatmpA
TUO428	ZSCAN5A	19	56733435	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	307	2853	spVpaspvs	spVpaspvs	spGpaspvs
TUO428	SNTG2	2	1204796	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	10	9	apLspsspi	apLspsspi	apSspsspi
TUO428	NTSR2	2	118099819	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B0702	9	25	qplrarsPl	qplrarsPl	qplrarsLl
TUO428	NTSR2	2	118099819	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	224	2397	qplrarsPl	qplrarsPl	qplrarsLl
TUO428	SNX17	2	27596143	G	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	31	632	Ktfnsflrr	Ktfnsflrr	Etfnsflrr
TUO428	PLB1	2	28814033	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B0702	188	2955	sVqghgtwl	sVqghgtwl	sMqghgtwl
TUO428	USP34	2	61528586	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	30	18	fpgVimgpv	fpgVimgpv	fpgGimgpv
TUO428	USP34	2	61528586	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	392	219	fpgVimgpv	fpgVimgpv	fpgGimgpv
TUO428	FBXO48	2	68692035	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	134	63	kphcltvra	kphcltvra	kphcMtvra
TUO428	FABP1	2	88425806	C	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	60	154	ivHngkhfk	ivHngkhfk	ivQngkhfk
TUO428	PTPN4	2	120643390	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	10	8	spaeSetny	spaeSetny	spaeAetny
TUO428	CLASP1	2	122125239	C	G	A0101,A0301,B0702,B3501,C0401,C0702	B0702	17	50	npypysHai	npypysHai	npypysDai
TUO428	CLASP1	2	122125239	C	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	118	136	npypysHai	npypysHai	npypysDai

Figure 21 (Cont.)

TUO428	CLASP1	2	122125229	C	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	50	57	ypysDaint	ypysNaint	ypysDaint	
TUO428	MAP3K19	2	135743719	A	C	A0101,A0301,B0702,B3501,C0401,C0702	A0301	119	62	itnfsEqak	itnfsEqak	itnfsEqak	
TUO428	SCN9A	2	167141109	G	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	337	115	srspPmipv	srspTmipv	srspPmipv	
TUO428	DFNB59	2	179325735	C	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	35	179	dvisRsqly	dvisRsqly	dvisRsqly	
TUO428	TTN	2	179429959	A	G	A0101,A0301,B0702,B3501,C0401,C0702	A0301	122	309	nlsAvlek	nlsAvlek	nlsVvlek	
TUO428	ITGA4	2	182322476	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	41	162	lgvptgtpy	lgvptgtpy	lgvptgApy	
TUO428	ITGA4	2	182322476	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	165	2657	tpymsdtes	tpymsdtes	tpymsdtes	
TUO428	GLS	2	191745844	G	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	90	558	gmirYilr	gmirYilr	gmirDilr	
TUO428	HAUSP	2	234756409	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	203	1092	rtvlgaNsk	rtvlgaNsk	rtvlgaDsk	
TUO428	HDAC4	2	240033338	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	43	18	eaaVipvsf	eaaVipvsf	eaaGipvsf	
TUO428	CSF3L	20	23546639	T	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	15	12688	cPkpestel	cPkpestel	cHkpestel	
TUO428	CST9	20	23584316	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	194	174	qlrqtvcfk	qlrqtvcfk	qlrqtvcfk	
TUO428	MYH7B	20	33567193	G	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	457	467	htipwvdVkk	htipwvdVkk	htipwvdGkk	
TUO428	DLGAP4	20	35060850	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	6	9	qprylmnYay	qprylmnYay	qprylmnHay	
TUO428	FAM83D	20	37555479	G	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	381	2504	rvktihfqpr	rvktihfqpr	rvEtihfqpr	
TUO428	SGK2	20	42194989	T	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	349	215	kpTgggrct	kpTgggrct	kpSgggrct	
TUO428	SLC2A10	20	45353383	A	G	A0101,A0301,B0702,B3501,C0401,C0702	C0702	51	214	gRsppvlpl	gRsppvlpl	gHsppvlpl	
TUO428	CTCFL	20	56099114	C	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	61	66	eaGrtsgaf	eaGrtsgaf	eaErtsgaf	
TUO428	CDH4	20	60348116	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	269	594	sppphdtll	sppphdtll	sppphdtll	
TUO428	GATA5	20	61050516	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	7	4032	qaayadsgY	qaayadsgY	qaayadsgS	
TUO428	GATA5	20	61050516	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	141	53	aavadsgYf	aavadsgYf	aavadsgSf	
TUO428	GATA5	20	61050516	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	94	32	yadsgYflh	yadsgYflh	yadsgSflh	
TUO428	ZNF512B	20	62594747	T	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	50	4931	rVdtkvik	rVdtkvik	rEdtkvik	
TUO428	ZNF512B	20	62595547	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	27	51	kTrvhrskk	kTrvhrskk	kArvhrskk	
TUO428	SCN7A	21	34925750	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B0702	15	12	Vpvpvvsai	Vpvpvvsai	lpvpvvsai	
TUO428	SCN7A	21	34925750	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	128	85	epdyvtVpv	epdyvtVpv	epdyvtIpv	
TUO428	SCN7A	21	34925750	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	15	8	Vpvpvvsai	Vpvpvvsai	lpvpvvsai	
TUO428	DIP2A	21	47949092	A	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	340	475	kpgVrvalv	kpgVrvalv	kpgDrvalv	
TUO428	OR11H1	22	16449012	G	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	86	112	hlavvsMcy	hlavvsMcy	hlavvsLcy	
TUO428	OR11H1	22	16449012	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	500	803	vvsMcyssi	vvsMcyssi	vvsLcyssi	
TUO428	OR11H1	22	16449012	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	211	93	hlavvsMcy	hlavvsMcy	hlavvsLcy	
TUO428	OR11H1	22	16449012	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	391	1916	Mcysslnvm	Mcysslnvm	Lcysslnvm	
TUO428	SEZ6L	22	26747090	G	C	A0101,A0301,B0702,B3501,C0401,C0702	A0101	246	7700	isdpvlvA	isdpvlvA	isdpvlvG	
TUO428	SEZ6L	22	26747090	G	C	A0101,A0301,B0702,B3501,C0401,C0702	B3501	104	188	ihvAtiqy	ihvAtiqy	ihvGtiqy	
TUO428	TRIOBP	22	38121793	C	G	A0101,A0301,B0702,B3501,C0401,C0702	C0702	214	1512	Rrntqfdpf	Rrntqfdpf	Prntqfdpf	
TUO428	PNPLA3	22	44324727	C	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	296	9280	dalvcscfM	dalvcscfM	dalvcscfl	
TUO428	PNPLA3	22	44324727	C	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	135	41	ivcscfMpf	ivcscfMpf	ivcscflpl	
TUO428	PNPLA3	22	44324727	C	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	311	3693	lMpfysglip	lMpfysglip	lpfysglip	
TUO428	PNPLA3	22	44324727	C	G	A0101,A0301,B0702,B3501,C0401,C0702	C0702	85	198	cfMpfysgl	cfMpfysgl	cfIpfysgl	
TUO428	C22orf36	22	46469697	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	36	16	aarsrWraw	aarsrWraw	aarsrRraw	
TUO428	KLHDC7B	22	50988105	G	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	197	881	gMgpavrmry	gMgpavrmry	gVgpavrmry	
TUO428	KLHDC7B	22	50988105	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	90	156	lfrgMgpav	lfrgMgpav	lfrgVgpav	
TUO428	KLHDC7B	22	50988105	G	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	31	138	yrfdllrgM	yrfdllrgM	yrfdllrgV	
TUO428	CHL1	3	361508	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	435	887	vylmfflk	vylmfflk	vylmflik	
TUO428	CHL1	3	361508	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	219	1617	mfflktsk	mfflktsk	mflIktsk	
TUO428	CHL1	3	361508	C	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	485	504	ylmffiktf	ylmffiktf	ylmflIktf	
TUO428	SYN2	3	12046078	T	C	A0101,A0301,B0702,B3501,C0401,C0702	B0702	271	28	Ppngymtdl	Ppngymtdl	Lpngymtdl	
TUO428	SYN2	3	12046078	T	C	A0101,A0301,B0702,B3501,C0401,C0702	B3501	423	157	fianLpngy	fianLpngy	fianLpngy	
TUO428	EBLN2	3	13611896	T	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	452	720	laGglalal	laGglalal	laLglalal	

Figure 21 (Cont.)

TU0428	FBLN2	3	136311896	T	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	42	8	epagawdaQ	epagawdaL
TU0428	FBLN2	3	136311896	T	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	168	66	laQglalal	laQglalal
TU0428	OSBPL10	3	317110315	C	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	470	623	fyggkvhrl	fyggkvhrV
TU0428	ITGA9	3	37818949	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	326	103	ipqekemif	ipqeQemif
TU0428	SCN10A	3	38798272	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0101	430	379	ilalvtmay	ilaVvtmay
TU0428	SCN10A	3	38798272	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	82	71	ilalvtmay	ilaVvtmay
TU0428	SCN10A	3	38798272	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	358	276	ilalvtmay	ilaVvtmay
TU0428	MST1R	3	49924842	G	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	415	22551	ymnlgpstL	ymnlgpstS
TU0428	IFRD2	3	50326091	T	C	A0101,A0301,B0702,B3501,C0401,C0702	A0301	352	222	vlyVdswar	vlyAdswar
TU0428	B4GALT4	3	118943796	G	C	A0101,A0301,B0702,B3501,C0401,C0702	C0702	114	190	yrpEeckal	yrpEeckal
TU0428	HEG1	3	124723380	G	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	485	22486	asvnscavK	asvnscavN
TU0428	SNX4	3	125199163	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	93	47	npdKrftdl	npdKrftdl
TU0428	SI	3	164709226	T	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	65	866	Yasyttinl	Nasyttinl
TU0428	ZBBX	3	167023493	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	30	89	slKlsnlyk	slKlsnlyk
TU0428	ZBBX	3	167023493	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	464	123	esIKlsnly	esIKlsnly
TU0428	ATP13A4	3	193220394	A	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	64	18233	qiysvkkvK	qiysvkkvK
TU0428	GPS	3	194117882	G	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	57	256	rVlpraifr	rAlpraifr
TU0428	GPS	3	194117882	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	33	17	rlrVlpral	rlrAlpral
TU0428	GPS	3	194117882	G	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	123	118	lrrnrlrVl	lrrnrlrAl
TU0428	GPS	3	194117882	G	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	484	809	lrVlpraif	lrAlpraif
TU0428	HTT	4	3215835	T	C	A0101,A0301,B0702,B3501,C0401,C0702	B3501	161	144	vthacsHy	vthacsHy
TU0428	HTT	4	3215835	T	C	A0101,A0301,B0702,B3501,C0401,C0702	C0702	198	1894	Hycvthfl	Hycvthfl
TU0428	HTT	4	3234980	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	123	5509	lpsrvgall	lpsrvgalH
TU0428	HTT	4	3234980	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	335	101	rvgallgvl	rvgalHgvl
TU0428	EVC2	4	5630442	A	G	A0101,A0301,B0702,B3501,C0401,C0702	A0301	396	69	lfdffqask	lMdffqask
TU0428	EVC2	4	5630442	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	271	824	nveelfdff	nveelMdff
TU0428	EVC	4	5733236	C	G	A0101,A0301,B0702,B3501,C0401,C0702	B0702	347	9	sAsslglgsl	sPsslglgsl
TU0428	EVC	4	5733236	C	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	169	189	qpveasAss	qpveasPss
TU0428	EVC	4	5747005	G	T	A0101,A0301,B0702,B3501,C0401,C0702	A0101	468	320	msgagdsDy	msgagdsEy
TU0428	EVC	4	5747005	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	40	10	msgagdsDy	msgagdsEy
TU0428	GPR78	4	85889954	C	G	A0101,A0301,B0702,B3501,C0401,C0702	A0301	55	9995	rlkrtprR	rlkrtprP
TU0428	GPR78	4	85889954	C	G	A0101,A0301,B0702,B3501,C0401,C0702	B0702	102	10135	Rasthdss	Pasthdss
TU0428	ARAP2	4	361620398	T	G	A0101,A0301,B0702,B3501,C0401,C0702	A0301	484	187	sttQeelnk	sttKeelnk
TU0428	GABBR1	4	47427856	C	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	237	154	sreaygKal	sreaygKal
TU0428	KDR	4	55955136	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	217	748	tpemyKtml	tpemyQtml
TU0428	UBA6	4	68434811	T	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	63	1086	iLefkpsnk	iQefkpsnk
TU0428	UGT2B10	4	69870751	T	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	273	89	aMfwiefvm	aVfwiefvm
TU0428	UGT2A1	4	70505162	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	487	468	tvlassAtl	tvlassAtl
TU0428	CSN3	4	71144956	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	204	20	Lpnlhpsfl	Rpnlhpsfl
TU0428	CSN3	4	71144956	G	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	276	17020	shpptvvrL	shpptvvrR
TU0428	GC	4	72618334	A	C	A0101,A0301,B0702,B3501,C0401,C0702	B0702	102	112	lpEatptel	lpDatptel
TU0428	GC	4	72618334	A	C	A0101,A0301,B0702,B3501,C0401,C0702	B3501	59	41	lpEatptel	lpDatptel
TU0428	PPEF2	4	76817445	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	224	42	tstqhhfAf	tstqhhfAf
TU0428	PPEF2	4	76817445	C	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	169	515	Sfqnaeraf	Afqnaeraf
TU0428	ART3	4	77025119	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	209	536	epfqiTapg	epfqiPapg
TU0428	CDC2	4	84155440	A	G	A0101,A0301,B0702,B3501,C0401,C0702	C0702	334	327	nrtglitAf	nrtglitVf
TU0428	PPM1K	4	89198298	C	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	380	20488	sshariSaY	sshariSaD
TU0428	PPM1K	4	89198298	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	221	31615	sshariSaY	sshariSaD
TU0428	PPM1K	4	89198298	C	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	295	836	arlsaYatl	arlsaDatl

Figure 21 (Cont.)

TUO428	DCHS2	4	155219549	T	G	A0101,A0301,B0702,B3501,C0401,C0702	B0702	39	12467	lPdeasgaf	lPdeasgaf	lPdeasgaf
TUO428	DCHS2	4	155219549	T	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	5	62	iPdeasgaf	iPdeasgaf	iPdeasgaf
TUO428	DCHS2	4	155241735	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	278	255	rlrsltFqi	rlrsltFqi	rlrsltAqi
TUO428	NPY1R	4	164246890	C	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	81	79	kiyirlkSr	kiyirlkSr	kiyirlkRr
TUO428	NPY1R	4	164246890	C	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	51	9832	kSrnnnnmdk	kSrnnnnmdk	kRrnnnnmdk
TUO428	NPY1R	4	164246891	C	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	87	79	kiyirlkMr	kiyirlkMr	kiyirlkRr
TUO428	NPY1R	4	164246891	C	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	24	9832	kMrnnnnmdk	kMrnnnnmdk	kRrnnnnmdk
TUO428	TLR3	4	187004074	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	28	70	hiFntlcnk	hiFntlcnk	hiLntlcnk
TUO428	TLR3	4	187004074	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	73	3079	lahspihiF	lahspihiF	lahspihiL
TUO428	ADAMTS12	5	33588307	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	84	123	gprwvvSgew	gprwvvSgew	gprwvvAgew
TUO428	IL7R	5	35876274	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	114	209	cpsedvvVt	cpsedvvVt	cpsedyvVt
TUO428	PLCXD3	5	413821119	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	335	544	vpfiCpggm	vpfiCpggm	vpfiWpggm
TUO428	PLCXD3	5	413821119	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	97	224	vpfiCpggm	vpfiCpggm	vpfiWpggm
TUO428	DHX29	5	54563535	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	372	10644	amadsdhiM	amadsdhiM	amadsdhiT
TUO428	VCAN	5	82843868	G	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	471	429	frcfiFpsy	frcfiFpsy	frcfiCpsy
TUO428	VCAN	5	82843868	G	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	142	1882	Fpsyvgal	Fpsyvgal	Cpsyvgal
TUO428	TTC37	5	94860202	T	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	274	225	trNdktkai	trNdktkai	trKdktkai
TUO428	FNIP1	5	131039874	C	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	375	1433	igtlfslsk	igtlfslsk	igVfslsk
TUO428	AFF4	5	132270203	T	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	200	17729	rsssgpgkpL	rsssgpgkpL	rsssgpkpQ
TUO428	PCDHB10	5	140574284	G	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	123	2473	avrlcrrsR	avrlcrrsR	avrlcrrsR
TUO428	PCDHGA10	5	140795128	T	C	A0101,A0301,B0702,B3501,C0401,C0702	B3501	26	823	lPltldskf	lPltldskf	lSltldskf
TUO428	ARSI	5	149681864	G	A	A0101,A0301,B0702,B3501,C0401,C0702	C0401	234	148	swtdwakfsf	swtdwakfsf	swtdwakPsf
TUO428	NSD1	5	176721151	T	C	A0101,A0301,B0702,B3501,C0401,C0702	B0702	310	711	gpadtrqTl	gpadtrqTl	gpadtrqMl
TUO428	NSD1	5	176722005	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	82	183	qppakTfly	qppakTfly	qppakAfly
TUO428	OR2H2	6	29356436	T	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	402	933	kafgtSssh	kafgtSssh	kafgtCssh
TUO428	PCLH	6	43582136	T	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	9	27	falelqkAf	falelqkAf	falelqkSf
TUO428	RARS2	6	88240570	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	182	611	Mqafslwqk	Mqafslwqk	Vqafslwqk
TUO428	RPS6KA2	6	166918041	G	C	A0101,A0301,B0702,B3501,C0401,C0702	B3501	130	187	laifthhsi	laifthhsi	laiDhhsi
TUO428	ERMARD	6	170162535	T	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	232	741	fadSaiil	fadSaiil	fadCaiil
TUO428	ERMARD	6	170162535	T	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	58	56	hrfadSail	hrfadSail	hrfadCail
TUO428	IQCE	7	2645522	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	220	1396	lpdqssplvS	lpdqssplvS	lpdqssplvP
TUO428	SDK1	7	4304940	A	C	A0101,A0301,B0702,B3501,C0401,C0702	B0702	61	43	hpvittPsa	hpvittPsa	hpvittQsa
TUO428	SDK1	7	4304940	A	C	A0101,A0301,B0702,B3501,C0401,C0702	B3501	65	128	hpvittPsa	hpvittPsa	hpvittQsa
TUO428	FBXL18	7	5521551	T	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	178	15474	aVrpalnvv	aVrpalnvv	aErpalnvv
TUO428	FBXL18	7	5521551	T	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	364	237	sfqaErpal	sfqaErpal	sfqaErpal
TUO428	TWIST1	7	19156386	A	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	333	202	lsyalsvwr	lsyalsvwr	lsyaFsvwr
TUO428	TWIST1	7	19156386	A	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	429	623	syalsvwrm	syalsvwrm	syaFsvwrm
TUO428	GPRIN3	7	23300310	C	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	15	10502	vlngtfslK	vlngtfslK	vlngtfdlN
TUO428	GPR141	7	37780182	A	C	A0101,A0301,B0702,B3501,C0401,C0702	B3501	182	54	Rvfiitvpf	Rvfiitvpf	Svfiitvpf
TUO428	ABCA13	7	48285485	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	20	8414	clngrfsek	clngrfsek	cPngrfsek
TUO428	ABCA13	7	48285485	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	421	1328	navcLngrf	navcLngrf	navcPngrf
TUO428	ABCA13	7	48431666	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	62	24	Yllfasik	Yllfasik	Hllfasik
TUO428	PON1	7	94937446	T	C	A0101,A0301,B0702,B3501,C0401,C0702	B3501	71	27	dpylRswem	dpylRswem	dpylQswem
TUO428	PON1	7	94937446	T	C	A0101,A0301,B0702,B3501,C0401,C0702	C0702	104	165	ylfSwemyl	ylfSwemyl	ylQswemyl
TUO428	TECPR1	7	97847319	A	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	323	42	Npqgssweh	Npqgssweh	Ypqgssweh
TUO428	ZAN	7	100331837	C	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	113	151	lvgaalfrk	lvgaalfrk	lvgaaLfrk
TUO428	EPHB4	7	100417473	T	C	A0101,A0301,B0702,B3501,C0401,C0702	B0702	392	76	vsrlDgssl	vsrlDgssl	vsrlNgssl
TUO428	OR2A5	7	143748257	G	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	155	139	Tvrnsynapk	Tvrnsynapk	Alvrnsynapk
TUO428	OR2A5	7	143748257	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	159	307	lffgsAvrn	lffgsAvrn	lffgsAlvrn

Figure 21 (Cont.)

TUO428	OR2A5	7	143748257	G	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	291	254	ffgaTivny	ffgsAivny		
TUO428	ZBED6CL	7	150028087	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	257	156	wasivkNy	wasivkKy		
TUO428	GBX1	7	150864368	C	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	416	17681	rtnnfcaR	rtnnfcaG		
TUO428	MYOM2	8	2021539	G	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	261	15055	lytlrvsR	lytlrvsR		
TUO428	CSMD1	8	3000193	G	C	A0101,A0301,B0702,B3501,C0401,C0702	B0702	64	108	lpigygAli	lpigygGli		
TUO428	CSMD1	8	3253725	G	A	A0101,A0301,B0702,B3501,C0401,C0702	A0101	40	13358	rssigftiY	rssigftiH		
TUO428	CSMD1	8	3253725	G	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	444	1469	rssigftiY	rssigftiH		
TUO428	SLC7A2	8	17412140	G	C	A0101,A0301,B0702,B3501,C0401,C0702	A0301	42	630	kSlaqinsk	kClaqinsk		
TUO428	ZNF703	8	37554940	C	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	229	17505	srkdsgssS	srkdsgssS		
TUO428	RP1	8	55539057	G	A	A0101,A0301,B0702,B3501,C0401,C0702	A0301	480	417	tlksqkktk	tlksqkkRk		
TUO428	CYP7B1	8	65529568	G	A	A0101,A0301,B0702,B3501,C0401,C0702	A0101	286	530	tswdTaely	tswdTaely		
TUO428	CYP7B1	8	65528568	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	191	201	tswdMaely	tswdTaely		
TUO428	CYP7B1	8	65528568	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	106	292	wdNaelypf	wdTaelypf		
TUO428	INTS8	8	95869015	A	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	140	324	tvkdfsfLak	tvkdfsHak		
TUO428	DGAT1	8	145541766	G	T	A0101,A0301,B0702,B3501,C0401,C0702	A0101	201	1025	nlYrdlyy	nlTrdlyy		
TUO428	DGAT1	8	145541766	G	T	A0101,A0301,B0702,B3501,C0401,C0702	A0301	292	626	vsypdnlNy	vsypdnlTy		
TUO428	DGAT1	8	145541766	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	348	24	vsypdnlNy	vsypdnlTy		
TUO428	DGAT1	8	145541766	G	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	34	39	Nyrdlyyfl	Tyrdlyyfl		
TUO428	CD72	9	35618053	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	478	407	avlglpssi	avlglvpssi		
TUO428	CD72	9	35618053	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	39	35	lpsslassv	Vpsslassv		
TUO428	CD72	9	35618053	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	476	529	vpavlglps	vpavlglVps		
TUO428	CD72	9	35618053	C	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	103	876	tpsslassv	Vpsslassv		
TUO428	WNK2	9	96021312	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B0702	37	105	iptatvppM	iptatvppV		
TUO428	WNK2	9	96021312	G	A	A0101,A0301,B0702,B3501,C0401,C0702	B3501	4	73	iptatvppM	iptatvppV		
TUO428	C9orf156	9	100672338	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	464	2792	radgaprsM	radgaprsV		
TUO428	C9orf156	9	100672338	C	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	15	21	aprsMvpaw	aprsVvpaw		
TUO428	OR13D1	9	107456892	C	G	A0101,A0301,B0702,B3501,C0401,C0702	C0702	289	352	fffitcVim	fffitcLim		
TUO428	MXRA5	X	3240568	G	C	A0101,A0301,B0702,B3501,C0401,C0702	A0301	99	113	Slikkgrnk	Tlikkgrnk		
TUO428	CXorf22	X	36007614	T	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	153	134	elvgytlvy	eFvgytlvy		
TUO428	CCNB3	X	50094370	C	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	70	91	ykyshQvf	ykyshPvf		
TUO428	CCNB3	X	50094370	C	A	A0101,A0301,B0702,B3501,C0401,C0702	C0702	178	212	ykyshQvff	ykyshPvff		
TUO428	DGKK	X	50113438	G	T	A0101,A0301,B0702,B3501,C0401,C0702	C0702	137	3808	sYqsflgnl	sVqsflgnl		
TUO428	PAK3	X	110463619	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B0702	9	10	kplsGitpl	kplsSitpl		
TUO428	PAK3	X	110463619	A	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	312	417	kplsGitpl	kplsSitpl		
TUO428	MAGEC1	X	140994591	C	G	A0101,A0301,B0702,B3501,C0401,C0702	B0702	120	42	spertQstf	spertHstf		
TUO428	MAGEC1	X	140994591	C	G	A0101,A0301,B0702,B3501,C0401,C0702	B3501	439	289	spertQstf	spertHstf		
TUO428	MAGEA3	X	151935932	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B0702	76	16	iptlmnypl	iptlmnypL		
TUO428	MAGEA3	X	151935932	G	T	A0101,A0301,B0702,B3501,C0401,C0702	B3501	70	14	iptlmnypl	iptlmnypL		
VA1330	LPPR4	1	99764708	A	T	A0301,A2601,B3502,B4403,C0401	A0301	351	443	ytslvsck	ytsHvsck		
VA1330	NTNG1	1	156830779	G	A	A0301,A2601,B3502,B4403,C0401	B4403	29	25055	afpgsdiaw	afpgsHiaw		
VA1330	GXYLT1	12	42512967	A	T	A0301,A2601,B3502,B4403,C0401	A0301	131	372	flkiqpvek	flkiqpvek		
VA1330	TTN	2	179426788	T	C	A0301,A2601,B3502,B4403,C0401	A0301	91	168	slsiKEask	slsiKEask		
VA1330	NIPBL	5	37007486	A	G	A0301,A2601,B3502,B4403,C0401	A0301	151	208	kqrvkvmly	kqrvkVmly		
VA1330	NIPBL	5	37007486	A	G	A0301,A2601,B3502,B4403,C0401	A0301	42	89	rvkvmlynk	rvkVmlynk		
VA1330	SKAP2	7	26765561	C	G	A0301,A2601,B3502,B4403,C0401	B4403	39	61	eewvqfikf	eewvqFikf		
VA1330	SMU1	9	33056230	C	T	A0301,A2601,B3502,B4403,C0401	A0301	149	293	qtirihSlk	qtirihGlk		
VA1330	SMU1	9	33056230	C	T	A0301,A2601,B3502,B4403,C0401	A0301	53	63	rihSlksgk	rihGlksgk		
VA1330	SMU1	9	33056230	C	T	A0301,A2601,B3502,B4403,C0401	A0301	79	87	Slksgktlk	Glksgktlk		
VA1330	SVEP1	9	113275377	A	G	A0301,A2601,B3502,B4403,C0401	A0301	348	326	elvhKpalk	elvhCpalk		

Figure 21 (Cont.)

VA7859	UPF3A	13	115047496	G	C	A2301,A2902,B4403,B4901,C0701,C1601	C0701	388	591	krtaskkVv	krtaskkVv
VA7859	MEF2A	15	100211794	C	T	A2301,A2902,B4403,B4901,C0701,C1601	A2302	302	14877	dtsyvktpY	dtsyvktpH
VA7859	IL11	19	53879572	C	T	A2301,A2902,B4403,B4901,C0701,C1601	C0701	120	305	iHraggssI	iHraggssI
VA7859	ZNF814	19	58385748	G	A	A2301,A2902,B4403,B4901,C0701,C1601	A2301	199	293	ksfskyVsf	ksfskyAsf
VA7859	ZNF814	19	58385748	G	A	A2301,A2902,B4403,B4901,C0701,C1601	C0701	112	192	Vsfsnhqrv	Asfsnhqrv
VA7859	SERHL2	22	42951058	G	A	A2301,A2902,B4403,B4901,C0701,C1601	A2301	335	331	gwddnaNsf	gwddnaSsf
VA7859	CCNC	6	99959739	C	G	A2301,A2902,B4403,B4901,C0701,C1601	A2302	5	8	yafpkCfpy	yafpkEfpy
VA7859	PSIP1	9	15459280	A	G	A2301,A2902,B4403,B4901,C0701,C1601	B4403	41	17	aeiknsPki	aeiknsKki
WA7899	WARS2	1	1195756619	T	C	A0321,A2402,A0301,B3501,B3502,C0401,	A0303	48	46	Rvlqigsak	Kvlqigsak
WA7899	OR10D3	1	158577070	T	C	A0321,A2402,A0301,B3501,B3502,C0401,	A2402	131	106	tyvvAtpll	tytvVtpll
WA7899	OR13A1	10	45799438	A	G	A0321,A2402,A0301,B3501,B3502,C0401,	A2402	61	12	ryaaiRhpi	ryaaiChpi
WA7899	OR13A1	10	45799438	A	G	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	391	257	aaiRhplhy	aaiChplhy
WA7899	OR53F2	11	4842722	C	A	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	180	207	ipglkDtqy	ipglkAtqy
WA7899	OR5AI2	11	5474809	C	T	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	436	694	lsgpFcvmy	lsgpLcvmy
WA7899	NAV2	11	20066658	C	A	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	25	27	tptDnamsf	tptAnamsf
WA7899	OR4A5	11	51411591	T	C	A0321,A2402,A0301,B3501,B3502,C0401,	A2402	5	5	kfnAvfyti	kfnTvfyti
WA7899	OR4A5	11	51411591	T	C	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	35	158	fptdkfmAv	fptdkfmTv
WA7899	OR4A5	11	51411591	T	C	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	262	9133	mAvfyiik	mTvfyiik
WA7899	GRIK4	11	120856811	C	A	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	184	1275	epdqlaqrN	epdqlaqrL
WA7899	GRIK4	11	120856811	C	A	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	136	1067	Maqeaaiva	Laqeaaiva
WA7899	TBX3	12	115112188	G	A	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	292	3135	qqffnghpF	qqffnghpL
WA7899	PARP4	13	25009318	G	A	A0321,A2402,A0301,B3501,B3502,C0401,	A0303	235	296	iiaSavgsy	iiaPavgsy
WA7899	PARP4	13	25009318	G	A	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	31	66	fpiiaSavg	fpiiaPavg
WA7899	PARP4	13	25009318	G	A	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	330	251	iiaSavgsy	iiaPavgsy
WA7899	TEX2E	13	31548022	A	T	A0321,A2402,A0301,B3501,B3502,C0401,	A0303	72	284	rthcVtnkk	rthcDtnsk
WA7899	FITM1	14	24601871	G	A	A0321,A2402,A0301,B3501,B3502,C0401,	A0301	242	330	lfyfhqyth	Vfyfhqyth
WA7899	FITM1	14	24601871	G	A	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	120	192	fiktfiy	fiktVfy
WA7899	EXD1	15	41476650	T	C	A0321,A2402,A0301,B3501,B3502,C0401,	A0303	57	64	klvAetagk	klvTetagk
WA7899	WFIKKN1	16	6837789	A	G	A0321,A2402,A0301,B3501,B3502,C0401,	A0301	210	502	rvaiGdvlk	rvaiEdvlk
WA7899	DNASE1L2	16	2286997	T	A	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	69	333	taairgaY	taairgaF
WA7899	QPRT	16	29705506	G	A	A0321,A2402,A0301,B3501,B3502,C0401,	A0303	119	215	vvaaSgvek	vvaaGgvek
WA7899	FAM92B	16	85135861	A	G	A0321,A2402,A0301,B3501,B3502,C0401,	A0301	178	77	ssafqtlek	ssafqtlek
WA7899	FAM92B	16	85135861	A	G	A0321,A2402,A0301,B3501,B3502,C0401,	A2402	20	10	vyssafqti	vyssafqti
WA7899	FAM92B	16	85135861	A	G	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	264	99	safqtleky	safqtleky
WA7899	ANKRD11	16	89335057	C	T	A0321,A2402,A0301,B3501,B3502,C0401,	A0303	109	78	rnktcllkr	rnktcllMr
WA7899	SMCHD1	18	2703734	G	T	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	74	272	faiwlNdch	faiwlKdch
WA7899	SMCHD1	18	2703734	G	T	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	447	4257	wlKdcheky	wlKdcheky
WA7899	ASXL3	18	31726317	G	T	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	197	15824	nahgeengV	nahgeengV
WA7899	CELF4	18	34846502	C	T	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	215	87	qqyfggaay	qqyAggaay
WA7899	DCC	18	49867192	A	G	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	441	405	cvwvpKlaf	cvwvpKlaf
WA7899	DCC	18	49867192	A	G	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	131	495	vpKlafvlf	vpKlafvlf
WA7899	ZNF414	19	8576600	A	G	A0321,A2402,A0301,B3501,B3502,C0401,	A0303	305	221	rthrslSkh	rthrslFkh
WA7899	ZSWIM4	19	13929558	G	T	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	156	371	gpekrkvay	gpekrKvay
WA7899	HIPK4	19	40886552	G	T	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	384	510	cmEvsdmnm	ctnAvsdmnm
WA7899	PNMA11	19	46973386	A	T	A0321,A2402,A0301,B3501,B3502,C0401,	A0303	83	223	laMkkpmak	laLkkpmak
WA7899	PNMA11	19	46973386	A	T	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	72	1937	cvnkeelaM	cvnkeelaL
WA7899	NLRP5	19	56515393	C	T	A0321,A2402,A0301,B3501,B3502,C0401,	A2402	132	138	awaMsisif	awaTsisif
WA7899	NLRP5	19	56515393	C	T	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	44	6581	ygaslawaM	ygaslawaT
WA7899	NLRP5	19	56515393	C	T	A0321,A2402,A0301,B3501,B3502,C0401,	B3501	38	48	lawaMsisi	lawaTsisi

Figure 21 (Cont.)

WA7899	PDCD1	2	242793341	T	C	A0321,A2402,A0301,B3501,B3502,C0403,	B3501	178	344	vpaqAeyat	vpaqTeyat	vpaqTeyat	vpaqTeyat
WA7899	PDCD1	2	242793341	T	C	A0321,A2402,A0301,B3501,B3502,C0403,	B3501	12	821	qAevativf	qTevativf	qTevativf	qTevativf
WA7899	THRD	20	23029781	T	A	A0321,A2402,A0301,B3501,B3502,C0403,	A2402	442	1929	tsysRwarl	tsysRwarl	tsysRwarl	tsysRwarl
WA7899	USP13	3	179459323	G	C	A0321,A2402,A0301,B3501,B3502,C0403,	B3501	188	1071	nsCykssvm	nsCykssvm	nsCykssvm	nsCykssvm
WA7899	MUC4	3	195507241	G	A	A0321,A2402,A0301,B3501,B3502,C0403,	B3501	359	209	spssAstgh	spssAstgh	spssAstgh	spssAstgh
WA7899	FBN2	5	127599309	G	A	A0321,A2402,A0301,B3501,B3502,C0403,	B3501	295	92	npnacgsAs	npnacgsVs	npnacgsAs	npnacgsAs
WA7899	FBN2	5	127599309	G	A	A0321,A2402,A0301,B3501,B3502,C0403,	B3501	26	23	nacgsAscy	nacgsWscy	nacgsAscy	nacgsAscy
WA7899	OR5V1	6	29323186	T	G	A0321,A2402,A0301,B3501,B3502,C0403,	A0301	108	288	plstyskk	plstyskk	plstyskk	plstyskk
WA7899	EEF1A1	6	74229664	T	C	A0321,A2402,A0301,B3501,B3502,C0403,	A0301	120	58	ttghNiCk	ttghNiCk	ttghNiVk	ttghNiVk
WA7899	FIG4	6	110012688	T	C	A0321,A2402,A0301,B3501,B3502,C0403,	B3501	343	3526	ssvqkkvPy	ssvqkkvPy	ssvqkkvly	ssvqkkvly
WA7899	FIG4	6	110012688	T	C	A0321,A2402,A0301,B3501,B3502,C0403,	B3501	25	2924	vPyetrary	vPyetrary	vlyetrary	vlyetrary
WA7899	OPRM1	6	154412236	C	T	A0321,A2402,A0301,B3501,B3502,C0403,	A0301	208	86	svCmlsgsk	svCmlsgsk	svRmlsgsk	svRmlsgsk
WA7899	OPRM1	6	154412236	C	T	A0321,A2402,A0301,B3501,B3502,C0403,	A0301	177	66	Cmlsgskek	Cmlsgskek	Rmlsgskek	Rmlsgskek
WA7899	PARK2	6	162864386	C	A	A0321,A2402,A0301,B3501,B3502,C0403,	A0301	75	89	qlrLfagk	qlrLfagk	qlrVfagk	qlrVfagk
WA7899	THBS2	6	169633107	A	T	A0321,A2402,A0301,B3501,B3502,C0403,	B3501	110	412	tpvdgSlsn	tpvdgSlsn	tpvdgSlsn	tpvdgSlsn
WA7899	RPI	8	55540205	A	G	A0321,A2402,A0301,B3501,B3502,C0403,	B3501	349	913	evAcspcem	evTcspcem	evTcspcem	evTcspcem
WA7899	PKHD1L1	8	110453580	C	G	A0321,A2402,A0301,B3501,B3502,C0403,	A0301	167	9148	iLritmgk	iLritmgk	iRritmgk	iRritmgk
Y2087	AGRN	1	976729	G	A	A3101,A1101,B1302,B3501,C0403,C0602	A3101	70	121	qlkrTcar	qlkrTcar	qlkrAcar	qlkrAcar
Y2087	GABRD	1	1960694	G	T	A3101,A1101,B1302,B3501,C0403,C0602	B3501	201	20574	isqaavpaM	isqaavpaM	isqaavpaR	isqaavpaR
Y2087	PLCH2	1	2435676	G	A	A3101,A1101,B1302,B3501,C0403,C0602	A1101	465	8806	tlghlpvlK	tlghlpvlK	tlghlpvlR	tlghlpvlR
Y2087	ARHGEF16	1	3392580	A	T	A3101,A1101,B1302,B3501,C0403,C0602	C0602	13	11	hrmemVqm	hrmemVqm	hrmermfqm	hrmermfqm
Y2087	ARHGEF16	1	3392580	A	T	A3101,A1101,B1302,B3501,C0403,C0602	C0602	196	21	ermVqmytl	ermEqmytl	ermEqmytl	ermEqmytl
Y2087	ARHGEF16	1	3392583	A	T	A3101,A1101,B1302,B3501,C0403,C0602	C0602	236	10564	ahrmermeL	ahrmermeL	ahrmermeQ	ahrmermeQ
Y2087	ARHGEF16	1	3392583	A	T	A3101,A1101,B1302,B3501,C0403,C0602	C0602	7	11	hrmermeLm	hrmermeLm	hrmermeQm	hrmermeQm
Y2087	ARHGEF16	1	3392583	A	T	A3101,A1101,B1302,B3501,C0401,C0602	C0602	55	21	ermeLmytl	ermeLmytl	ermeQmytl	ermeQmytl
Y2087	CASZ1	1	10699808	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	121	125	vldMMkrfk	vldMMkrfk	vldDMkrfk	vldDMkrfk
Y2087	CRCCC	1	17282543	G	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	371	160	klaIieEar	klaIieEar	klaIieEar	klaIieEar
Y2087	ECE1	1	21534530	T	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	142	133	apnrdqwCm	apnrdqwCm	apnrdqwSm	apnrdqwSm
Y2087	ECE1	1	21534530	T	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	208	71	dqwCmtppm	dqwCmtppm	dqwSmtppm	dqwSmtppm
Y2087	EPHA8	1	22919857	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	497	27629	vvlrqeraG	vvlrqeraG	vvlrqeraG	vvlrqeraG
Y2087	EPHA8	1	22919857	G	A	A3101,A1101,B1302,B3501,C0401,C0602	C0602	206	1967	irqeraGqt	irqeraGqt	irqeraGqt	irqeraGqt
Y2087	EPHA8	1	22919857	G	A	A3101,A1101,B1302,B3501,C0401,C0602	C0602	60	13403	aRqtsvsll	aRqtsvsll	aGqtsvsll	aGqtsvsll
Y2087	ARID1A	1	27023360	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	303	1394	qpygWspsa	qpygWspsa	qpygKspsa	qpygKspsa
Y2087	C1orf94	1	34684295	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	41	645	fpqgysfgL	fpqgysfgL	fpqgysfgS	fpqgysfgS
Y2087	CCDC17	1	46088325	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	15	33	raIreAyir	raIreAyir	raIreAyir	raIreAyir
Y2087	CCDC17	1	46088325	G	A	A3101,A1101,B1302,B3501,C0401,C0602	C0602	489	935	iraIreVyi	iraIreVyi	iraIreAyi	iraIreAyi
Y2087	PTGER3	1	71512801	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	97	20094	tlasamavK	tlasamavK	tlasamavE	tlasamavE
Y2087	PTGER3	1	71512801	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	225	257	iasamavKr	iasamavKr	iasamavEr	iasamavEr
Y2087	PTGER3	1	71512801	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	22	253	avKralair	avKralair	avEralair	avEralair
Y2087	PTGER3	1	71512801	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	253	63	mavKraiai	mavKraiai	mavEralai	mavEralai
Y2087	NTRK1	1	156838330	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	40	1115	Mpmasvdvg	Mpmasvdvg	Vpmasvdvg	Vpmasvdvg
Y2087	ARHGAP30	1	161023192	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	56	986	ivMeflth	ivMeflth	ivVeflth	ivVeflth
Y2087	PRRC2C	1	171501728	C	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	290	1117	kqTspesir	kqTspesir	kqPspesir	kqPspesir
Y2087	KIF26B	1	245530423	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	334	2931	paScatsny	paScatsny	paPcatsny	paPcatsny
Y2087	C10orf71	10	50531278	C	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	10	10	macNgsssf	macNgsssf	macHgsssf	macHgsssf
Y2087	C10orf71	10	50531281	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	11	10	machSssif	machSssif	machSssif	machSssif
Y2087	CHST3	10	73768129	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	24	62	pVrnrifgyk	pVrnrifgyk	pAmrifgyk	pAmrifgyk
Y2087	CHST3	10	73768129	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	447	715	pVmrifgyk	pVmrifgyk	pAmrifgyk	pAmrifgyk
Y2087	CHST3	10	73768129	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	270	296	gpVmrifgy	gpVmrifgy	gpAmrifgy	gpAmrifgy

Figure 21 (Cont.)

Y2087	LCOR	10	98715674	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	446	21847	qsanesknK	qsanesknE
Y2087	TLX1NB	10	102849349	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	122	462	leksriHlr	leksriRlr
Y2087	TLX1NB	10	102849349	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	5	4	riHlrrtlr	riRlrrtlr
Y2087	TLX1NB	10	102849349	C	T	A3101,A1101,B1302,B3501,C0401,C0602	C0602	29	37	sriHlrrtl	sriRlrrtl
Y2087	TCERG1L	10	133058600	A	G	A3101,A1101,B1302,B3501,C0401,C0602	C0602	400	198	lrgpPpssv	lrgpSpssv
Y2087	PWWP2B	10	134218728	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	28	84	rTpaeqvpr	rApaeqvpr
Y2087	ADAM8	10	135080864	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	258	109	pvytrqaSk	pvytrqaPk
Y2087	PTDSS2	11	489597	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	301	263	Telntfylk	Aelntfylk
Y2087	PTDSS2	11	489597	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	495	209	llTelntfy	llAelntfy
Y2087	MUC5B	11	1265707	A	G	A3101,A1101,B1302,B3501,C0401,C0602	B3501	21	56	tpAatsfta	tpTatsfta
Y2087	MUC5B	11	1265708	C	G	A3101,A1101,B1302,B3501,C0401,C0602	B3501	128	56	tpRatsfta	tpTatsfta
Y2087	MUC5B	11	1265716	A	G	A3101,A1101,B1302,B3501,C0401,C0602	B3501	128	56	tptatGfta	tptatSfta
Y2087	MUC5B	11	1265717	G	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	149	56	tptatIfta	tptatSfta
Y2087	MUC5B	11	1265718	C	G	A3101,A1101,B1302,B3501,C0401,C0602	A3101	274	20106	tattptatR	tattptatS
Y2087	MUC5B	11	1265718	C	G	A3101,A1101,B1302,B3501,C0401,C0602	B3501	403	56	tptatRfta	tptatSfta
Y2087	MUC5B	11	1265720	T	C	A3101,A1101,B1302,B3501,C0401,C0602	B3501	290	56	tptatsSta	tptatsFta
Y2087	MUC5B	11	1265722	A	G	A3101,A1101,B1302,B3501,C0401,C0602	B3501	16	56	tptatsfAa	tptatsfTa
Y2087	MUC5B	11	1265722	A	G	A3101,A1101,B1302,B3501,C0401,C0602	B3501	57	5065	fAaipsssl	fTaipsssl
Y2087	MUC5B	11	1269489	C	G	A3101,A1101,B1302,B3501,C0401,C0602	A3101	274	20106	tattptatR	tattptatS
Y2087	MUC5B	11	1269489	C	G	A3101,A1101,B1302,B3501,C0401,C0602	B3501	403	56	tptatRfta	tptatSfta
Y2087	MUC5B	11	1269491	T	C	A3101,A1101,B1302,B3501,C0401,C0602	B3501	290	56	tptatsSta	tptatsFta
Y2087	DCHS1	11	6644476	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	144	11618	Svflapafh	Pvflapafh
Y2087	DCHS1	11	6644476	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	226	8	dSvflapaf	dPvflapaf
Y2087	RBMXL2	11	7110649	C	T	A3101,A1101,B1302,B3501,C0401,C0602	C0602	491	247	Csrgrprfl	Rsrgrprfl
Y2087	SF1	11	64533340	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	27	26	mgvagmSpf	mgvagmPpf
Y2087	BRMS1	11	66105162	C	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	342	350	ipssrpSql	ipssrpAql
Y2087	TCIRG1	11	67817247	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	6	14	rlrrrpaNr	rlrrrpaDr
Y2087	HEPHL1	11	93844072	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	37	156	esflfkiNk	esflfkiDk
Y2087	HEPHL1	11	93844072	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	7	13	lfkiNksyr	lfkiDksyr
Y2087	HEPHL1	11	93844072	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	276	102	flfkiNksy	flfkiDksy
Y2087	CNTN5	11	99942451	G	A	A3101,A1101,B1302,B3501,C0401,C0602	C0602	167	103	srvelvngv	srveMvngv
Y2087	NCAM1	11	113075013	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	6	5537	kfflcqvaR	kfflcqvaG
Y2087	PRDM10	11	129793146	A	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	101	47	stcgkqLkr	stcgkqFkr
Y2087	PRDM10	11	129793146	A	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	130	14	stcgkqLkr	stcgkqFkr
Y2087	PRDM10	11	129793146	A	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	202	100	qLkrkdklr	qFkrkdklr
Y2087	IGSF9B	11	133795666	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	20	28	gtKgeffak	gtEgeffak
Y2087	IGSF9B	11	133795666	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	38	669	gtKgeffak	gtEgeffak
Y2087	ANO2	12	5672593	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	136	131	klmNepalr	klmDepalr
Y2087	ANO2	12	5672593	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	23	55	klmNepalr	klmDepalr
Y2087	APOLD1	12	12940084	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	260	231	spvtlEtsl	spvtlGtsl
Y2087	WBP11	12	14942014	G	A	A3101,A1101,B1302,B3501,C0401,C0602	C0602	50	58	lrgplSrll	lrgplPrll
Y2087	KLHL42	12	27933900	C	G	A3101,A1101,B1302,B3501,C0401,C0602	B3501	46	44	hpyEgepps	hpyQgepps
Y2087	DHH	12	49483680	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	12	12	hwysWllyr	hwysRllyr
Y2087	DHH	12	49483680	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	218	1024	mhwysWlly	mhwysRlly
Y2087	ITGA5	12	54812942	T	G	A3101,A1101,B1302,B3501,C0401,C0602	A3101	96	19	avPlrwgpr	avQlrwgpr
Y2087	PA2G4	12	56501023	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	98	10249	ianvahtfM	ianvahtfV
Y2087	PA2G4	12	56501029	G	C	A3101,A1101,B1302,B3501,C0401,C0602	C0602	423	20851	vHvaqgtqv	vDvaqgtqv
Y2087	MSRB3	12	65672606	T	C	A3101,A1101,B1302,B3501,C0401,C0602	A1101	231	20977	slclslclR	slclslclC
Y2087	MSRB3	12	65672606	T	C	A3101,A1101,B1302,B3501,C0401,C0602	A3101	73	18901	slclslclR	slclslclC

Figure 21 (Cont.)

Y2087	NOS1	12	117703146	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	86	1145	yQltpsfey	yBltpsfey	yBltpsfey
Y2087	NOS1	12	117703146	C	T	A3101,A1101,B1302,B3501,C0401,C0602	C0602	408	816	fhqeminyQ	fhqeminyR	fhqeminyR
Y2087	DENR	12	123247430	A	C	A3101,A1101,B1302,B3501,C0401,C0602	A1101	18	7875	aTcrqwlek	aKcrqwlek	aKcrqwlek
Y2087	HIP1R	12	123340527	G	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	410	723	Sqryiaqlk	Aqryiaqlk	Aqryiaqlk
Y2087	KL	13	33590849	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	116	202	asiwDlfth	asiwDlfth	asiwDlfth
Y2087	KL	13	33590849	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	400	813	siwNtfthh	siwDtfthh	siwDtfthh
Y2087	CDH24	14	23518427	T	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	439	620	apYlypiel	apYlypiel	apYlypiel
Y2087	CDH24	14	23518482	C	T	A3101,A1101,B1302,B3501,C0401,C0602	C0602	97	117	nrdGsasll	nrdGsasll	nrdGsasll
Y2087	RAB6GTA	14	24728874	C	A	A3101,A1101,B1302,B3501,C0401,C0602	C0602	491	502	hcwdyrrfL	hcwdyrrfV	hcwdyrrfV
Y2087	GPR137C	14	53067051	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	14	7091	mssanvylK	mssanvylE	mssanvylE
Y2087	GPR137C	14	53067051	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	65	33	sanvylKsk	sanvylEsk	sanvylEsk
Y2087	GPR137C	14	53067051	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	99	5259	mssanvylK	mssanvylE	mssanvylE
Y2087	PTPN21	14	98946027	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	106	230	tpdlsHnly	tpdlsRnly	tpdlsRnly
Y2087	XRCC3	14	104165238	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	103	494	cpaQtlrvl	cpaRtlrvl	cpaRtlrvl
Y2087	C14orf80	14	105964990	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	230	169	rgpewsaTr	rgpewsaAr	rgpewsaAr
Y2087	C14orf80	14	105964990	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	75	61	wsaTrrasr	wsaArrasr	wsaArrasr
Y2087	C14orf80	14	105964990	G	A	A3101,A1101,B1302,B3501,C0401,C0602	C0602	111	338	Trrasreav	Arrasreav	Arrasreav
Y2087	ARHGAP11A	15	32917814	A	T	A3101,A1101,B1302,B3501,C0401,C0602	C0602	173	123	ykrMrrgsv	ykrKrrgsv	ykrKrrgsv
Y2087	ARHGAP11A	15	32917814	A	T	A3101,A1101,B1302,B3501,C0401,C0602	C0602	329	4433	Mrrqsvgdf	Krrqsvgdf	Krrqsvgdf
Y2087	SPTBN5	15	42144506	C	A	A3101,A1101,B1302,B3501,C0401,C0602	C0602	204	807	temeHelll	temeQelll	temeQelll
Y2087	MEGF11	15	66214799	C	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	274	1533	rkppWfys	rkppGfys	rkppGfys
Y2087	ITGA11	15	68619102	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	274	369	mderWyrpr	mderRyrpr	mderRyrpr
Y2087	ITGA11	15	68619102	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	352	268	natmderWy	natmderRy	natmderRy
Y2087	C15orf60	15	73735666	C	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	69	38	gtApcptwk	gtDpcptwk	gtDpcptwk
Y2087	LMAN1L	15	75111117	C	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	104	17485	hTfrarity	hPfrarity	hPfrarity
Y2087	LMAN1L	15	75111117	C	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	281	568	frnrphTfr	frnrphPfr	frnrphPfr
Y2087	LMAN1L	15	75111117	C	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	66	4	hTfrarity	hPfrarity	hPfrarity
Y2087	GOLGA6L4	15	84909434	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	83	33	rQeterlr	rKeterlr	rKeterlr
Y2087	RGS11	16	320644	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	37	30210	vyeqflapR	vyeqflapG	vyeqflapG
Y2087	TRAF7	16	2226371	G	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	464	2933	sgavYsvk	sgavDsvk	sgavDsvk
Y2087	TBC1D24	16	2550467	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	71	17327	ktesmfmaR	ktesmfmaS	ktesmfmaS
Y2087	TBC1D24	16	2550467	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	9	9881	ktesmlmaR	ktesmfmaS	ktesmfmaS
Y2087	ZNF629	16	30793763	G	A	A3101,A1101,B1302,B3501,C0401,C0602	C0602	311	9703	frgnsypgV	frgnsypgA	frgnsypgA
Y2087	SLC5A2	16	31501684	G	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	399	1131	lhwfcVmsr	lhwfcGmsr	lhwfcGmsr
Y2087	SLC5A2	16	31501684	G	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	29	44	lhwfcVmsr	lhwfcGmsr	lhwfcGmsr
Y2087	C16orf78	16	49411715	T	C	A3101,A1101,B1302,B3501,C0401,C0602	A3101	41	23	kgkgiMtar	kgkgiMtar	kgkgiMtar
Y2087	C16orf78	16	49411715	T	C	A3101,A1101,B1302,B3501,C0401,C0602	A3101	209	86	lMtarggnr	lMtarggnr	lMtarggnr
Y2087	C16orf78	16	49411715	T	C	A3101,A1101,B1302,B3501,C0401,C0602	A3101	376	75	ttarggnrr	ttarggnrr	ttarggnrr
Y2087	B3GNT9	16	67183523	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	209	496	ypayagtDgg	ypayagtGgg	ypayagtGgg
Y2087	B3GNT9	16	67183533	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	77	118	yagfggfvl	yagfggfvl	yagfggfvl
Y2087	NOL3	16	67208344	G	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	451	1534	tagapdpaL	tagapdpaW	tagapdpaW
Y2087	ZDHHC1	16	67429104	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	133	1978	astdptpgr	asPdptpgr	asPdptpgr
Y2087	ZDHHC1	16	67429104	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	302	2284	astdptpgr	asPdptpgr	asPdptpgr
Y2087	MTSS1L	16	70699401	G	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	160	20646	sseasetcK	sseasetcQ	sseasetcQ
Y2087	BANP	16	88105702	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	102	148	iaMassdpa	iaVassdpa	iaVassdpa
Y2087	BANP	16	88105703	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	42	1436	Massdpaaa	Vassdpaaa	Vassdpaaa
Y2087	GP1BA	17	4837139	A	G	A3101,A1101,B1302,B3501,C0401,C0602	B3501	389	951	epAsepaps	epTsepaps	epTsepaps
Y2087	GP1BA	17	4837140	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	389	951	episepaps	epTsepaps	epTsepaps
Y2087	POLR2A	17	7416703	C	G	A3101,A1101,B1302,B3501,C0401,C0602	B3501	109	328	syWptspsy	sySptspsy	sySptspsy

Figure 21 (Cont.)

Y2087	SOX15	17	74926506	C	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	350	1065	kssgaVpsr	kssgaVpsr	kssgaGpsr
Y2087	SOX15	17	74926606	C	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	158	284	kssgaVpsr	kssgaGpsr	kssgaGpsr
Y2087	NTN1	17	8926469	A	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	189	2671	dVneddsel	dEneddsel	dEneddsel
Y2087	DNAH9	17	11672529	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	316	91	fnyytMsam	fnyytTsam	fnyytTsam
Y2087	POLDIP2	17	26680758	T	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	175	130	yfqvidar	yYqvidar	yYqvidar
Y2087	PPM1D	17	58677983	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	218	13608	evsgkgpaM	evsgkgpaV	evsgkgpaV
Y2087	RAB37	17	72739292	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	63	1145	Vfrsvthay	Rfrsvthay	Rfrsvthay
Y2087	CASKIN2	17	73498293	C	G	A3101,A1101,B1302,B3501,C0401,C0602	B3501	177	293	tpfaDegnt	tpfaFegnt	tpfaFegnt
Y2087	CASKIN2	17	73498293	C	G	A3101,A1101,B1302,B3501,C0401,C0602	B3501	121	241	faDegnMi	faFegnMi	faFegnMi
Y2087	UNK	17	73809850	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	66	38	rssLcpnvk	rssPcpnvk	rssPcpnvk
Y2087	UNK	17	73809850	C	T	A3101,A1101,B1302,B3501,C0401,C0602	C0602	274	282	yrssLcpnv	yrssPcpnv	yrssPcpnv
Y2087	RPTOR	17	78581726	G	A	A3101,A1101,B1302,B3501,C0401,C0602	C0602	170	242	rmakeeQv	rmakeeRv	rmakeeRv
Y2087	BAHCC1	17	79409139	C	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	108	683	gscsrdRdr	gscsrdRdr	gscsrdRdr
Y2087	C17orf70	17	79534019	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	25	63	gpasWaey	gpasRaey	gpasRaey
Y2087	FASN	17	80041488	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	83	143	vlnsVeek	vlnsAeek	vlnsAeek
Y2087	B3GNTL1	17	80914529	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	45	1512	pQipihr	pRipihr	pRipihr
Y2087	ANKRD30B	18	14851390	A	G	A3101,A1101,B1302,B3501,C0401,C0602	C0602	343	759	vtsrRnqel	vtsrKnqel	vtsrKnqel
Y2087	ANKRD30B	18	14851890	A	G	A3101,A1101,B1302,B3501,C0401,C0602	C0602	231	528	srRnqelaf	srKnqelaf	srKnqelaf
Y2087	KLHL14	18	30321918	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	297	350	lvqyydKk	lvqyydEk	lvqyydEk
Y2087	EPG5	18	43460176	T	C	A3101,A1101,B1302,B3501,C0401,C0602	A1101	266	1705	Rlspecwk	Klspecwk	Klspecwk
Y2087	EPG5	18	43460176	T	C	A3101,A1101,B1302,B3501,C0401,C0602	A3101	342	19769	lmqssaeR	lmqssaeK	lmqssaeQ
Y2087	EPG5	18	43460176	T	C	A3101,A1101,B1302,B3501,C0401,C0602	A3101	396	4678	Rlspecwk	Klspecwk	Qlspecwk
Y2087	EPG5	18	43460176	T	C	A3101,A1101,B1302,B3501,C0401,C0602	C0602	458	497	mqssaeRl	mqssaeKl	mqssaeQl
Y2087	RNF165	18	44013244	C	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	38	90	qpqqlapEf	qpqqlapDf	qpqqlapDf
Y2087	RNF165	18	44013244	C	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	414	579	lapEfplah	lapDfplah	lapDfplah
Y2087	MYO5B	18	47462623	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	42	64	klpfYfdpk	klpfHfdpk	klpfHfdpk
Y2087	MYO5B	18	47462623	G	A	A3101,A1101,B1302,B3501,C0401,C0602	C0602	45	11	fYfdpkrav	fHfdpkrav	fHfdpkrav
Y2087	M6D1	18	47799969	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	189	551	spwtvpSpv	spwtvpSpv	spwtvpSpv
Y2087	M6D1	18	47799969	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	114	645	Spvaastea	Spvaastea	Spvaastea
Y2087	SALL3	18	76753019	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	45	3666	tpalapgsi	tpalapgsi	tpalapgsi
Y2087	GIPC3	19	3590153	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	478	477	vwTaigear	vwAaigear	vwAaigear
Y2087	GIPC3	19	3590153	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	88	110	fvvevwTai	ivvevwAai	ivvevwAai
Y2087	TIP3	19	3728609	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	31	64	atiskdpHr	atiskdpRr	atiskdpRr
Y2087	PLIN4	19	4511651	A	G	A3101,A1101,B1302,B3501,C0401,C0602	A1101	42	52	stgltgaVk	stgltgaAk	stgltgaVk
Y2087	PLIN4	19	4511651	A	G	A3101,A1101,B1302,B3501,C0401,C0602	A1101	98	49	ltgaVklak	ltgaAklak	ltgaVklak
Y2087	PLIN4	19	4511654	G	C	A3101,A1101,B1302,B3501,C0401,C0602	A1101	49	52	stgVtgavk	stgltgavk	stgltgavk
Y2087	PLIN4	19	4511664	G	C	A3101,A1101,B1302,B3501,C0401,C0602	A1101	28	49	Vtgavklak	Ltgavklak	Ltgavklak
Y2087	PLIN4	19	4511669	G	C	A3101,A1101,B1302,B3501,C0401,C0602	A1101	95	52	sTgltgavk	sTgltgavk	sTgltgavk
Y2087	MUC16	19	8962372	G	C	A3101,A1101,B1302,B3501,C0401,C0602	C0602	475	1878	yspnrmeAl	yspnrmePl	yspnrmePl
Y2087	STX10	19	13255297	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	165	344	vshmtsdHr	vshmtsdRr	vshmtsdRr
Y2087	STX10	19	13255297	C	T	A3101,A1101,B1302,B3501,C0401,C0602	C0602	410	875	mtsdHrqwe	mtsdRrqwe	mtsdRrqwe
Y2087	DCAF15	19	14071359	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	464	1001	ryhnrmtne	ryVnrmtne	ryVnrmtne
Y2087	IL27RA	19	14162694	G	C	A3101,A1101,B1302,B3501,C0401,C0602	A1101	64	73	tsgrSyhlr	tsgrCyhlr	tsgrCyhlr
Y2087	IL27RA	19	14162694	G	C	A3101,A1101,B1302,B3501,C0401,C0602	A3101	38	18	tsgrSyhlr	tsgrCyhlr	tsgrCyhlr
Y2087	IL27RA	19	14162694	G	C	A3101,A1101,B1302,B3501,C0401,C0602	A3101	179	2713	rSyhlrhkv	rCyhlrhkv	rCyhlrhkv
Y2087	HSH2D	19	16263983	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	144	41	hqqkpieSr	hqqkpieRr	hqqkpieRr
Y2087	HSH2D	19	16263983	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	78	161	qpkpieSrr	qpkpieRrr	qpkpieRrr
Y2087	ZNF90	19	20229097	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	47	49	ysstlahk	ysstTahk	ysstTahk
Y2087	ZNF90	19	20229097	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	284	489	sstlahkr	sstTahkr	sstTahkr

Figure 21 (Cont.)

Y2087	ZNF90	19	20229097	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	112	256	sstHahkr	sstHahkr	sstHahkr	sstHahkr
Y2087	ZNF737	19	20728254	C	G	A3101,A1101,B1302,B3501,C0401,C0602	B3501	413	237	iihTgekpy	iihTgekpy	iihSgekpy	iihSgekpy
Y2087	ZNF626	19	20807274	G	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	249	54	cssnktKhk	cssnktKhk	cssnktThk	cssnktThk
Y2087	ZNF626	19	20807274	G	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	27	16	ssntKhkk	ssntKhkk	ssntThkk	ssntThkk
Y2087	ZNF626	19	20807274	G	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	239	545	ssntKhkk	ssntKhkk	ssntThkk	ssntThkk
Y2087	ZNF429	19	21720861	A	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	343	852	itrsgVrdr	itrsgVrdr	itrsgDrdr	itrsgDrdr
Y2087	ZNF257	19	22271717	A	C	A3101,A1101,B1302,B3501,C0401,C0602	A1101	66	142	rsshttQhk	rsshttQhk	rsshttKhk	rsshttKhk
Y2087	ZNF257	19	22271717	A	C	A3101,A1101,B1302,B3501,C0401,C0602	A1101	306	600	sshttQhkr	sshttQhkr	sshttKhkr	sshttKhkr
Y2087	ZNF257	19	22271717	A	C	A3101,A1101,B1302,B3501,C0401,C0602	A3101	178	349	rsshttQhk	rsshttQhk	rsshttKhk	rsshttKhk
Y2087	ZNF257	19	22271717	A	C	A3101,A1101,B1302,B3501,C0401,C0602	A3101	56	28	sshtkQhkr	sshtkQhkr	sshttKhkr	sshttKhkr
Y2087	ZNF257	19	22271717	A	C	A3101,A1101,B1302,B3501,C0401,C0602	A3101	17	275	tQhkrihtr	tQhkrihtr	tKhkrihtr	tKhkrihtr
Y2087	ZNF729	19	22497138	T	C	A3101,A1101,B1302,B3501,C0401,C0602	A1101	40	22	gssntnahk	gssntnahk	gssnfnahk	gssnfnahk
Y2087	ZNF729	19	22497138	T	C	A3101,A1101,B1302,B3501,C0401,C0602	A3101	425	191	gssntnahk	gssntnahk	gssnfnahk	gssnfnahk
Y2087	ZNF729	19	22497142	A	C	A3101,A1101,B1302,B3501,C0401,C0602	A1101	18	22	gssnfTahk	gssnfTahk	gssnfNahk	gssnfNahk
Y2087	ZNF729	19	22497142	A	C	A3101,A1101,B1302,B3501,C0401,C0602	A3101	217	191	gssnfTahk	gssnfTahk	gssnfNahk	gssnfNahk
Y2087	ZNF729	19	22497145	C	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	33	22	gssnfnEhk	gssnfnEhk	gssnfnAhk	gssnfnAhk
Y2087	ZNF729	19	22497153	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	313	524	iihtaekpy	iihtaekpy	VihtaekpY	VihtaekpY
Y2087	ZNF492	19	22847582	A	G	A3101,A1101,B1302,B3501,C0401,C0602	A3101	463	259	evvGkafsr	evvGkafsr	evvSkafsr	evvSkafsr
Y2087	ZNF850	19	37240749	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	100	2055	eYgkafsr	eYgkafsr	eCgksftr	eCgksftr
Y2087	RYR1	19	38955336	C	G	A3101,A1101,B1302,B3501,C0401,C0602	A1101	153	2302	kkktkkpk	kkktkkpk	NkktkkpK	NkktkkpK
Y2087	RYR1	19	38955336	C	G	A3101,A1101,B1302,B3501,C0401,C0602	A3101	69	1742	kkktkkpk	kkktkkpk	NkktkkpK	NkktkkpK
Y2087	ZNF808	19	40542468	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	88	47	difeinl5k	difeinl5k	dIfeinPk	dIfeinPk
Y2087	PPM1N	19	46001986	T	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	16	12064	rmedahctR	rmedahctR	rmedahctW	rmedahctW
Y2087	PPM1N	19	46001986	T	A	A3101,A1101,B1302,B3501,C0401,C0602	C0401	171	555	medahctRl	medahctRl	medahctWl	medahctWl
Y2087	NOVA2	19	46443666	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	63	10887	aasgvlaaM	aasgvlaaM	aasgvlaaV	aasgvlaaV
Y2087	NOVA2	19	46443666	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	15	457	Maagampaa	Maagampaa	Vaagampaa	Vaagampaa
Y2087	SIGLEC14	19	52147240	C	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	123	242	vpiqegHsl	vpiqegHsl	vpiqegQsl	vpiqegQsl
Y2087	ZNF534	19	52942317	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	36	75	rnthhvrhr	rnthhvrhr	rnShhvrhr	rnShhvrhr
Y2087	ZNF784	19	56133485	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	5	5	rfcTkpfrr	rfcTkpfrr	rfcAkpfrr	rfcAkpfrr
Y2087	CPR113	2	26536249	G	A	A3101,A1101,B1302,B3501,C0401,C0602	C0602	486	421	alfrrlkll	alfrrlkll	alfrrTkll	alfrrTkll
Y2087	TEKT4	2	95540529	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	43	181	asipastrak	asipastrak	asTpastrak	asTpastrak
Y2087	TMEM131	2	98412820	C	T	A3101,A1101,B1302,B3501,C0401,C0602	C0602	228	667	fkienlggl	fkienlggl	fkVenlggl	fkVenlggl
Y2087	NCKAP5	2	1336180?0	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	32	59	ptsdflfqk	ptsdflfqk	ptsdflLqk	ptsdflLqk
Y2087	NCKAP5	2	1336180?0	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	46	128	llfqkihsr	llfqkihsr	llLqkihsr	llLqkihsr
Y2087	NCKAP5	2	1336180?0	G	A	A3101,A1101,B1302,B3501,C0401,C0602	C0602	98	855	fqklhsrll	fqklhsrll	fqkIhsrll	fqkIhsrll
Y2087	ZRANB3	2	1363483?7	C	G	A3101,A1101,B1302,B3501,C0401,C0602	A1101	112	203	vaHemglgk	vaHemglgk	vaDemglgk	vaDemglgk
Y2087	VPS16	20	2842540	T	C	A3101,A1101,B1302,B3501,C0401,C0602	B3501	135	43	Apaaseeif	Apaaseeif	Vpaaseeif	Vpaaseeif
Y2087	SPEF1	20	3759180	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	4	53	tpaprrpay	tpaprrpay	tpaprrpaY	tpaprrpaY
Y2087	KIAA1755	20	36841350	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	34	91	aahsvrper	aahsvrper	aahsVrper	aahsVrper
Y2087	MYBL2	20	42302453	C	A	A3101,A1101,B1302,B3501,C0401,C0602	C0603	222	187	srrtrcedM	srrtrcedM	srrtrcedM	srrtrcedM
Y2087	MYBL2	20	42302453	C	A	A3101,A1101,B1302,B3501,C0401,C0602	C0602	65	54	trcedMdel	trcedMdel	trcedMdel	trcedMdel
Y2087	EYA2	20	45618692	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	35	51	tvnsNcldk	tvnsNcldk	tvnsDcldk	tvnsDcldk
Y2087	TMEM189	20	48760075	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	73	56	laCwedtpl	laCwedtpl	laSwedtpl	laSwedtpl
Y2087	HRH3	20	60791162	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	370	223	avnpvhyPl	avnpvhyPl	avnpvhyPl	avnpvhyPl
Y2087	HRH3	20	60791162	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	10	141	ytkihsfr	ytkihsfr	yTkihsfr	yTkihsfr
Y2087	HRH3	20	60791162	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	17	175	tkihsfrr	tkihsfrr	tKihsfrr	tKihsfrr
Y2087	HRH3	20	60791162	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	314	246	npvhyPkh	npvhyPkh	npvhyPkh	npvhyPkh
Y2087	HRH3	20	60791383	C	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	247	126	kvqsftqr	kvqsftqr	kvqsftqr	kvqsftqr
Y2087	HRH3	20	60791383	C	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	58	24	kvqsftqr	kvqsftqr	kvqsftqr	kvqsftqr

Figure 21 (Cont.)

Y2087	CHRNA4	20	61981376	C	A	A3101,A1101,B1302,B3501,C0401,C0602	C0602	57	134	Srslsvqhm	Arslsvqhm
Y2087	KCNQ2	20	62076073	C	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	69	30	iirmiLrndr	iirmiRrndr
Y2087	ZNF512B	20	62594056	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	27	19	rtpsgrvCr	rtpsgrvRr
Y2087	ZNF512B	20	62594061	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	16	19	rtpsgtvrr	rtpsgRvrr
Y2087	SLC19A1	21	46951704	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	18	28	rvsfStfny	rvsfStfny
Y2087	UFD1L	22	19444429	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	468	607	rnrvdfdTpl	rnrvdfdApl
Y2087	RIMBP3	22	20458276	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	234	126	tsVnitwvy	tsAnitwvy
Y2087	RIMBP3	22	20458276	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	111	80	tsVnitwvy	tsAnitwvy
Y2087	KLHL22	22	20800738	C	T	A3101,A1101,B1302,B3501,C0401,C0602	C0602	72	169	yrrdVhqwa	yrrdVhqwa
Y2087	LZTR1	22	21346026	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	290	1722	fgSaadntl	fgSaadntl
Y2087	SDF2L1	22	21956690	T	C	A3101,A1101,B1302,B3501,C0401,C0602	A1101	158	1971	Svpgggaak	Svpgggaak
Y2087	CBX6	22	39262527	T	C	A3101,A1101,B1302,B3501,C0401,C0602	C0602	485	376	wrGpevtdl	wrEpevtdl
Y2087	MCAT	22	43529477	G	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	73	20129	hqealrflK	hqealrflQ
Y2087	MCAT	22	43529477	G	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	101	3687	hqealrflK	hqealrflQ
Y2087	MCAT	22	43529477	G	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	73	167	rflKkrssk	rflQkrssk
Y2087	DENND6B	22	50753112	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	27	374	ltsckpslK	ltscfqplR
Y2087	DENND6B	22	50753112	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	219	405	plKfccdfr	plRfccdfr
Y2087	DENND6B	22	50753112	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	247	443	qpiKfccdf	qpiRfccdf
Y2087	BSN	3	496779825	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	98	315	lspahslak	lspahsPak
Y2087	BSN	3	496779825	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	74	9481	slakqplgk	sPakqplgk
Y2087	MST1R	3	49934212	C	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	196	820	pgswtfHyr	pgswtfQyr
Y2087	MST1R	3	49934212	C	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	24	10	vpgswtfHy	vpgswtfQy
Y2087	MST1R	3	49934212	C	A	A3101,A1101,B1302,B3501,C0401,C0602	C0602	93	3239	fHyredpvw	fQyredpvw
Y2087	MST1R	3	49934212	C	A	A3101,A1101,B1302,B3501,C0401,C0602	C0602	497	622	Hyredpvwl	Qyredpvwl
Y2087	ONAM1	3	52381845	G	A	A3101,A1101,B1302,B3501,C0401,C0602	C0602	39	93	yrpGknplf	yrpRknplf
Y2087	ITIH1	3	52820341	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	182	2977	dMdeeemk	dVdeeemk
Y2087	EBLN2	3	73111287	T	C	A3101,A1101,B1302,B3501,C0401,C0602	A1101	47	2082	Rvcdrsyk	Wvcdrsyk
Y2087	EBLN2	3	73111287	T	C	A3101,A1101,B1302,B3501,C0401,C0602	A3101	154	20194	vnshsfvR	vnshsfvW
Y2087	EBLN2	3	73111287	T	C	A3101,A1101,B1302,B3501,C0401,C0602	A3101	40	34	sfvRvcdr	sfvWvcdr
Y2087	EBLN2	3	73111287	T	C	A3101,A1101,B1302,B3501,C0401,C0602	A3101	8	103	Rvcdrsyk	Wvcdrsyk
Y2087	EBLN2	3	73111287	T	C	A3101,A1101,B1302,B3501,C0401,C0602	B3501	33	5	fvRvcdrsy	fvWvcdrsy
Y2087	CPOX	3	98312084	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	105	56	lvgiTtasf	lvgiAtasf
Y2087	COL6A5	3	130095440	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	224	3292	ppihvtal	ppihvtas
Y2087	A4GNT	3	137849984	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	226	8979	fclpsfksY	fclpsfksH
Y2087	PARP3C	3	138762721	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	129	254	harpelSer	harpelPer
Y2087	ABCC5	3	183695434	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	113	81	vqkiEaeer	vqkiRaeer
Y2087	TMEM41A	3	185214734	C	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	17	832	fpsdlaeiL	fpsdlaeiR
Y2087	MUC4	3	195511390	T	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	485	252	tpiLvtdas	tpiHvtdas
Y2087	MUC4	3	195511717	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	229	276	lpvtSlssa	lpvtNlssa
Y2087	MUC4	3	195512735	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	58	335	stgdttpiY	stgdttpiH
Y2087	MUC4	3	195512735	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	221	252	tpiHvtdas	tpiHvtdas
Y2087	MUC4	3	195513442	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	224	89	lpvtsTssa	lpvtsTssa
Y2087	MUC4	3	195515411	G	C	A3101,A1101,B1302,B3501,C0401,C0602	B3501	160	336	tpipvtsAs	tpipvtsPs
Y2087	MUC4	3	195515411	G	C	A3101,A1101,B1302,B3501,C0401,C0602	B3501	148	217	lpvtsAssv	lpvtsPssv
Y2087	ADRA2C	4	3769028	G	C	A3101,A1101,B1302,B3501,C0401,C0602	A3101	60	19	gtvyaPiyr	gtvyaRiyr
Y2087	ADRA2C	4	3769028	G	C	A3101,A1101,B1302,B3501,C0401,C0602	B3501	245	957	mgtvyaPiy	mgtvyaRiy
Y2087	USP17L10	4	9213194	A	C	A3101,A1101,B1302,B3501,C0401,C0602	A1101	144	298	tltihTsak	tltihNsak
Y2087	USP17L10	4	9213194	A	C	A3101,A1101,B1302,B3501,C0401,C0602	C0602	296	147	ihTsakvli	ihNsakvli
Y2087	NOA1	4	57843732	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	35	30	mlparlLfr	mlparlPfr

Figure 21 (Cont.)

Y2087	NOA1	4	57843732	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	73	42	lparlPfrl	lparlPfrl
Y2087	UGT2B10	4	69885837	A	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	50	40	evypTsltk	evypTsltk
Y2087	ANTXR2	4	80828786	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	26	13747	rvslmrpqK	rvslmrpqE
Y2087	ANTXR2	4	80859786	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	135	6622	rvslmrpqK	rvslmrpqE
Y2087	MTTP	4	100512886	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	282	20426	sfviavlaK	sfviavlaE
Y2087	C5orf42	5	371968939	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	373	7579	lqCvlflfr	lqRvlflfr
Y2087	C5orf42	5	371988939	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	32	20	lqCvlflfr	lqRvlflfr
Y2087	N4BP3	5	1775482222	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	115	90	ifrnTqqqeqr	ifrnAqqeqr
Y2087	N4BP3	5	1775482222	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	235	139	Tqqeqrrlr	Aqqeqrrlr
Y2087	F13A1	6	6266913	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	19	48	rlsiqsFpk	rlsiqsSpk
Y2087	F13A1	6	6268913	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	45	271	rlsiqsFpk	rlsiqsSpk
Y2087	F13A1	6	6266913	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	125	3832	Fpkclvgkf	Spkclvgkf
Y2087	MDFI	6	41606524	G	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	5	5	rpsgcYapy	rpsgcDapy
Y2087	TDRD6	6	46656631	A	G	A3101,A1101,B1302,B3501,C0401,C0602	A1101	462	621	Vtqvchphr	ltqvchphr
Y2087	TDRD6	6	46656631	A	G	A3101,A1101,B1302,B3501,C0401,C0602	A3101	12	10	Vtqwthphr	ltqwthphr
Y2087	TPBG	6	83074836	C	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	10	1520	apllasavY	apRasavS
Y2087	TPBG	6	83074836	C	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	152	129	savYaqppl	savSaqppl
Y2087	TPBG	6	83074838	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	257	129	savsTqppl	savsAqppl
Y2087	ZNF292	6	87965266	T	C	A3101,A1101,B1302,B3501,C0401,C0602	B3501	43	375	rpikknsFy	rpikknsLy
Y2087	ZNF292	6	87965266	T	C	A3101,A1101,B1302,B3501,C0401,C0602	B3501	356	9825	sFystdfiv	sLystdfiv
Y2087	CASP8AP2	6	90578686	T	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	25	22	vtkdpsTlk	vtkdpsSlk
Y2087	CASP8AP2	6	90578686	T	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	362	441	vtkdpsTlk	vtkdpsSlk
Y2087	PRDM13	6	100062207	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	314	252	gsggrsgTgk	gsggsqAgK
Y2087	MOXD1	6	132722364	C	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	43	89	tgfsptWam	tgfsptGam
Y2087	MOXD1	6	132722364	C	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	312	15315	Wamaaadiv	Gamaaadiv
Y2087	ARHGIB	6	157099481	T	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	11	44	hpismmsM	hpismmsL
Y2087	GPR146	7	1007767	G	A	A3101,A1101,B1302,B3501,C0401,C0602	A3101	262	220	lyTlvflsr	lyAlvlsr
Y2087	RADIL	7	4917679	G	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	143	21724	ltsmlsrK	ltsmlsrT
Y2087	RADIL	7	4917679	G	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	319	72	smlsrKlsy	smlsrTlsy
Y2087	RADIL	7	4917679	G	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	27	21	mlsrKlsyk	mlsrTlsyk
Y2087	RADIL	7	4917679	G	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	54	78	mlsrKlsyk	mlsrTlsyk
Y2087	RSPH10B2	7	6838144	G	C	A3101,A1101,B1302,B3501,C0401,C0602	A1101	14	38	ssNtrskk	ssKtrskk
Y2087	RSPH10B2	7	6838144	G	C	A3101,A1101,B1302,B3501,C0401,C0602	A3101	244	204	ssNtrskk	ssKtrskk
Y2087	RSPH10B2	7	6838144	G	C	A3101,A1101,B1302,B3501,C0401,C0602	B3501	196	1423	spssNtits	spssKtits
Y2087	HOXA4	7	27169173	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	129	18213	savnpsynG	savnpsynR
Y2087	HOXA4	7	27169173	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A1101	296	376	psynRgepk	psynGgepk
Y2087	HOXA4	7	27169173	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	51	21788	savnpsynR	savnpsynG
Y2087	HOXA4	7	27169173	C	T	A3101,A1101,B1302,B3501,C0401,C0602	A3101	148	324	synRgepkr	synGgepkr
Y2087	HOXA10	7	27233712	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	4	3	lppsadlPy	lppsadlSy
Y2087	PKD1L1	7	47959079	G	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	248	3415	Masqsgsei	Tasqsgsei
Y2087	DLX6	7	96635665	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	15	6	mshsqhsSy	mshsqhsPy
Y2087	DLX6	7	96635665	C	T	A3101,A1101,B1302,B3501,C0401,C0602	C0602	7	9	shsqhsSyl	shsqhsPyl
Y2087	DLX6	7	96635665	C	T	A3101,A1101,B1302,B3501,C0401,C0602	C0602	235	193	qhsPylqsy	qhsPylqsy
Y2087	TECPR1	7	97862838	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	7	5	lplglEepy	lplglEepy
Y2087	MEPCE	7	100028905	A	T	A3101,A1101,B1302,B3501,C0401,C0602	C0602	316	317	rggggSel	rggggTel
Y2087	WNT16	7	120969428	C	A	A3101,A1101,B1302,B3501,C0401,C0602	A1101	53	20061	lvlfpygaK	lvlfpygaQ
Y2087	WNT16	7	120969428	C	A	A3101,A1101,B1302,B3501,C0401,C0602	B3501	470	280	fpygaKgnw	fpygaQgnw
Y2087	EPHA1	7	143095972	G	A	A3101,A1101,B1302,B3501,C0401,C0602	C0602	433	161	fyqCcpeti	fyqRcpeti
Y2087	POU5F1B	8	128429115	C	T	A3101,A1101,B1302,B3501,C0401,C0602	B3501	17	5	talysLvpf	talysSvpf

Figure 21 (Cont.)

Y2087	AQP7	9	33386429	C	T	A3101,A1101,B1302,B3501,C0403,C0602	A1101	328	272	Tatlysify	Tatlysify	Aatlysify
Y2087	AQP7	9	33386429	C	T	A3101,A1101,B1302,B3501,C0403,C0602	B3501	390	200	sfiaTatiy	sfiaTatiy	sfiaAatiy
Y2087	AQP7	9	33386429	C	T	A3101,A1101,B1302,B3501,C0403,C0602	B3501	259	105	laTatiysi	laTatiysi	laAatiysi
Y2087	AQP7	9	33386429	C	T	A3101,A1101,B1302,B3501,C0403,C0602	B3501	33	204	Tatlysify	Tatlysify	Aatlysify
Y2087	ZNF658	9	40772910	C	G	A3101,A1101,B1302,B3501,C0403,C0602	A1101	44	63	ksylsghQr	ksylsghQr	ksylsghEr
Y2087	ZNF658	9	40772910	C	G	A3101,A1101,B1302,B3501,C0403,C0602	A3101	9	11	ksylsghQr	ksylsghQr	ksylsghEr
Y2087	ZNF658	9	40772993	C	T	A3101,A1101,B1302,B3501,C0403,C0602	A3101	9	11	ktrlsthQr	ktrlsthQr	ktrlsthRr
Y2087	ZNF658	9	40772993	C	T	A3101,A1101,B1302,B3501,C0403,C0602	C0602	146	120	trlsthQri	trlsthQri	trlsthRri
Y2087	TJP2	9	71825984	C	T	A3101,A1101,B1302,B3501,C0403,C0602	A1101	367	1312	rswedsLer	rswedsLer	rswedsPer
Y2087	TJP2	9	71825984	C	T	A3101,A1101,B1302,B3501,C0403,C0602	A3101	92	61	rswedsLer	rswedsLer	rswedsPer
Y2087	PRUNE2	9	79239372	C	T	A3101,A1101,B1302,B3501,C0403,C0602	B3501	42	18	eaTktscly	eaTktscly	eaAktscly
Y2087	LHX6	9	124989737	C	T	A3101,A1101,B1302,B3501,C0403,C0602	A1101	129	169	maqpgsDck	maqpgsDck	maqpgsGck
Y2087	CREZ	9	126439299	G	T	A3101,A1101,B1302,B3501,C0403,C0602	C0602	272	176	arlehdsvl	arlehdsvl	arlehdsyl
Y2087	FAM69B	9	139617957	G	A	A3101,A1101,B1302,B3501,C0403,C0602	A3101	27	29	hstdctyGr	hstdctyGr	hstdctyGr
Y2087	FAM69B	9	139617957	G	A	A3101,A1101,B1302,B3501,C0403,C0602	C0602	372	21648	yKrdcrapc	yKrdcrapc	yGrdcrapc
Y2087	ABCA2	9	139905956	G	A	A3101,A1101,B1302,B3501,C0403,C0602	B3501	61	123	wfevlssay	wfevlssay	wfevPssay
Y2087	ABCA2	9	139905956	G	A	A3101,A1101,B1302,B3501,C0403,C0602	B3501	54	333	evlssayvf	evlssayvf	evPssayvf
Y2087	CACNA1B	9	140919480	C	T	A3101,A1101,B1302,B3501,C0403,C0602	A1101	77	178	tlpstcFqk	tlpstcFqk	tlpstcLqk
Y2087	CACNA1B	9	141015238	C	T	A3101,A1101,B1302,B3501,C0403,C0602	A3101	100	83	yscdCfggr	yscdCfggr	yscdfkggr
Y2087	CLCN4	X	10176291	C	G	A3101,A1101,B1302,B3501,C0403,C0602	A1101	299	793	glwgtlfMr	glwgtlfMr	glwgtlfkr
Y2087	CLCN4	X	10176291	C	G	A3101,A1101,B1302,B3501,C0403,C0602	A3101	15	20	glwgtlfMr	glwgtlfMr	glwgtlfkr
Y2087	CXorf36	X	45011205	T	C	A3101,A1101,B1302,B3501,C0403,C0602	B3501	489	1643	ragenKdif	ragenKdif	ragenKdif
Y2087	SLC38A5	X	48326159	G	A	A3101,A1101,B1302,B3501,C0403,C0602	C0602	30	25	yrqeCegfl	yrqeCegfl	yrqeRegfl
Y2087	KCNP3	X	48826177	G	T	A3101,A1101,B1302,B3501,C0403,C0602	A1101	33	150	ssMrqriwr	ssMrqriwr	ssLrqriwr
Y2087	KCND1	X	48826177	G	T	A3101,A1101,B1302,B3501,C0403,C0602	A3101	27	48	ssMrqriwr	ssMrqriwr	ssLrqriwr
Y2087	KCND1	X	48826177	G	T	A3101,A1101,B1302,B3501,C0403,C0602	B3501	323	3409	palpagssM	palpagssM	palpagssL
Y2087	ARHGEF9	X	62898305	C	A	A3101,A1101,B1302,B3501,C0403,C0602	B3501	340	1416	mldiaidCf	mldiaidCf	mldiaidGf
Y2087	KIF4A	X	69606486	G	A	A3101,A1101,B1302,B3501,C0403,C0602	A3101	82	1024	qyKlkkler	qyKlkkler	qyElkkler
Y2087	NHSL2	X	71360262	C	T	A3101,A1101,B1302,B3501,C0403,C0602	B3501	281	18594	lvfqfasF	lvfqfasF	kftqfasS
Y2087	NHSL2	X	71360262	C	T	A3101,A1101,B1302,B3501,C0403,C0602	B3501	7	4	fasFsdaff	fasFsdaff	fasSsdaff
Y2087	NRK	X	105153269	C	T	A3101,A1101,B1302,B3501,C0403,C0602	C0602	303	534	qrfnqvSeq	qrfnqvSeq	qrfnqvPeq
Y2087	CTAG2	X	153881623	G	A	A3101,A1101,B1302,B3501,C0403,C0602	A3101	222	1971	sglrggaqr	sglrggaqr	sgPrggaqr
ZA6505	NPHP4	1	6029314	C	A	A2501,A2901,B1801,B0705,C1203,C1505	B1801	146	194	nepfyfhts	nepfyfhts	neplyfhts
ZA6505	NPHP4	1	6029314	C	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	392	178	ivfnepfyf	ivfnepfyf	ivfneplyf
ZA6505	NPHP4	1	6029314	C	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	413	1654	epfyfhtsl	epfyfhtsl	eplyfhtsl
ZA6505	PRAMEF2	1	12919064	T	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	222	108	ttcipGsl	ttcipGsl	ttcipNsl
ZA6505	ARHGEF19	1	16534646	C	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	116	85	vflepRqvv	vflepRqvv	vflepSqvv
ZA6505	ZNF683	1	26691030	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	250	702	ksfgqlsSl	ksfgqlsSl	ksfgqlsNl
ZA6505	FAAH	1	46860048	C	A	A2501,A2901,B1801,B0705,C1203,C1505	B1801	56	113	yelwaaMpg	yelwaaMpg	yelwaaLpg
ZA6505	FAAH	1	46860048	C	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	45	48	vqyelwaaM	vqyelwaaM	vqyelwaaL
ZA6505	FAAH	1	46860048	C	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	96	147	aaMvpgasgv	aaMvpgasgv	aaLvpgasgv
ZA6505	WDR63	1	85594466	G	A	A2501,A2901,B1801,B0705,C1203,C1505	B1801	398	1399	leipwtlsH	leipwtlsH	leipwtlsR
ZA6505	WDR63	1	85594466	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	79	125	lsHpstnem	lsHpstnem	lsRpstnem
ZA6505	EVI5	1	93142746	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	485	446	yttikMkem	yttikMkem	yttikTkem
ZA6505	DPYD	1	98165091	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	5	7	fatevfkaV	fatevfkaV	fatevfkaM
ZA6505	DENND2C	1	115168440	T	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	425	107	vrynchqel	vrynchqel	vrynchqel
ZA6505	CASQ2	1	116280896	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	15	16	qafeYedy	qafeYedy	qafeYedy
ZA6505	CASQ2	1	116280896	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	114	222	rVedykli	rVedykli	rtedykli
ZA6505	ABL2	1	179112145	C	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	172	846	tvlppnFy	tvlppnFy	tvlppnSy

Figure 21 (Cont.)

ZA6505	C1orf27	1	186375305	A	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	300	121	fdGesaeei	fdDesaeei	
ZA6505	SLC41A1	1	205764054	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	298	3378	Yttiiifi	Httiiifi	
ZA6505	RPS6KC1	1	213414543	A	G	A2501,A2901,B1801,B0705,C1203,C1505	B1801	174	1384	heikffpNd	heikffpNd	
ZA6505	RPS6KC1	1	213414543	A	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	15	12	fpNddpeav	fpNddpeav	
ZA6505	CAPN2	1	223900469	G	A	A2501,A2901,B1801,B0705,C1203,C1505	B1801	82	274	necleaRtl	necleaRtl	
ZA6505	ORZIT27	1	248813483	C	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	81	61	eaegrRtav	eaegrRtav	
ZA6505	DCLRE1C	10	14976727	G	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	188	63	fcdRrfyqi	fcdRrfyqi	
ZA6505	TACR2	10	71176012	A	G	A2501,A2901,B1801,B0705,C1203,C1505	A2501	258	3097	Trafsrnpsw	Ifafsrnpsw	
ZA6505	R3HCC1L	10	99969498	G	C	A2501,A2901,B1801,B0705,C1203,C1505	B1801	45	38	iefgtsfpd	iefgVsfpd	
ZA6505	CUZD1	10	124591832	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	172	386	Wadykyqkl	Radykyqkl	
ZA6505	ADAM12	10	128013025	C	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	299	1969	Rsgdiwipv	Gsgdiwipv	
ZA6505	MUC6	11	1013953	C	T	A2501,A2901,B1801,B0705,C1203,C1505	B1801	253	21783	qeeitfkgY	qeeitfkgC	
ZA6505	MUC6	11	1013953	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	149	2399	kgYmanvtv	kgCmanvtv	
ZA6505	MUC6	11	1013953	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	365	11081	Ymanvtvtr	Cmanvtvtr	
ZA6505	CWGA4	11	6262909	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	412	259	iiQesqlav	iiRegqlav	
ZA6505	NR1H3	11	47281345	C	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	156	316	ippdCavel	ippdSavel	
ZA6505	MYBPC3	11	47372097	G	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	317	467	eaPapaael	eaRapaael	
ZA6505	OR4D6	11	59224608	A	G	A2501,A2901,B1801,B0705,C1203,C1505	B1801	278	29	cesrfhtpV	cesrfhtpM	
ZA6505	PGM2L1	11	74047743	T	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	287	23506	klidaiieI	klidaiieN	
ZA6505	ARHGI	11	74958418	A	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	243	339	kasprngktt	kasprngktt	
ZA6505	MMP27	11	102576375	G	A	A2501,A2901,B1801,B0705,C1203,C1505	B1801	235	1024	Mereeemmqi	Tereeemmqi	
ZA6505	MMP27	11	102576375	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	7	73	safplvrmtM	safplvrmtT	
ZA6505	MMP27	11	102576375	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	305	1355	rmMereeemm	rmTereeemm	
ZA6505	KLRC4-KLRK1	12	10532326	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	462	91	irfiimvAi	irfiimvTi	
ZA6505	KLRC4-KLRK1	12	10532326	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	159	354	imvAiwsav	imvTiwsav	
ZA6505	KLRC4-KLRK1	12	10532326	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	202	3304	vAiwsavfl	vTiwsavfl	
ZA6505	KLRC4	12	10560957	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	445	2784	nSfslnrrm	nNfslnrrm	
ZA6505	OVCH1	12	29596365	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	8	9	fpmRqtfv	fpmKqtfv	
ZA6505	OVCH1	12	29598292	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	220	130	mtfmsPgpl	mtfmsSgpl	
ZA6505	OVCH1	12	29598292	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	154	292	msPgplvrv	msSgplvrv	
ZA6505	OVCH1	12	29617550	G	A	A2501,A2901,B1801,B0705,C1203,C1505	A2501	377	14672	dialiqlsF	dialiqlsS	
ZA6505	OVCH1	12	29617550	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	400	1365	iqlsFpley	iqlsSpley	
ZA6505	OVCH1	12	29617550	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	6	90	Fpleynsvv	Spleynsvv	
ZA6505	OR10AD1	12	48596241	A	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	21	35	kpfslitti	kpfslitvi	
ZA6505	ZFC3H1	12	72008421	T	C	A2501,A2901,B1801,B0705,C1203,C1505	B1801	467	141	qeiRffdtf	qeRffdtf	
ZA6505	APAF1	12	99061365	C	G	A2501,A2901,B1801,B0705,C1203,C1505	B1801	24	65	dqeEcmyvy	dqeDcmyvy	
ZA6505	APAF1	12	99061365	C	G	A2501,A2901,B1801,B0705,C1203,C1505	B1801	22	3768	eEcmyvynf	eDcmyvynf	
ZA6505	UTP20	12	101655524	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	349	12763	tffecIqeL	tffecIqeS	
ZA6505	UTP20	12	101655524	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	380	1208	LIdfitkv	SIdfitkv	
ZA6505	MYBPC1	12	102043091	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	187	199	iRvegkkhi	iRvegkkhi	
ZA6505	KIAA1033	12	105504953	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	56	140	fleeHtsql	fleeYtsql	
ZA6505	TPTE2	13	20038639	A	T	A2501,A2901,B1801,B0705,C1203,C1505	B1801	8	11	teriamsY	teriamsF	
ZA6505	TPTE2	13	20038639	A	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	71	95	Yrssgrqsf	Frssgrqsf	
ZA6505	PROSER1	13	39586979	G	T	A2501,A2901,B1801,B0705,C1203,C1505	A2501	480	852	svtpaiPsf	svtpaiPsf	
ZA6505	ORAL1	14	20528250	G	T	A2501,A2901,B1801,B0705,C1203,C1505	B1801	5	10	teRilVff	teRilVff	
ZA6505	ORAL1	14	20529250	G	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	57	15367	lvteRilV	lvteRilG	
ZA6505	PAPP2	14	20823052	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	92	110	rageqfigQal	ragqfigRal	
ZA6505	CMA1	14	24976574	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	151	92	aaRcagrsi	aaHcagrsi	
ZA6505	CMA1	14	24976574	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	452	395	Rcagrsitv	Hcagrsitv	

Figure 21 (Cont.)

ZA6505	FSCB	14	44976050	C	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	28	19	ysakayfsi	ysakayfsi	
ZA6505	FSCB	14	44976060	C	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	55	55	kayfsirvs	kayfsirvs	
ZA6505	LGMN	14	93176042	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	470	518	lMesiqrhi	lTesiqrhi	
ZA6505	TECPR2	14	102900798	T	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	364	787	ntdpetfkv	ntdpetfkv	
ZA6505	TECPR2	14	102900798	T	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	490	289	kvkevsgsm	kvkevsgsm	
ZA6505	CEP170B	14	105350892	A	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	156	367	earkmiVqv	earkmiDqv	
ZA6505	CDCA4	14	105477699	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	19	52	spyyNtdtv	spyyDtdtv	
ZA6505	OR4M2	15	22369436	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	29	20	iitpiRnpi	iitpiRnpi	
ZA6505	OR4M2	15	22369426	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	16	15	fpiHnpiiy	fpiRnpiiy	
ZA6505	OR4M2	15	22369426	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	393	496	iRnpiiytl	iRnpiiytl	
ZA6505	PGBD4	15	34395256	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	421	1280	vqkpeleMf	vqkpeleMf	
ZA6505	FSIP1	15	39910431	A	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	160	228	nvlestsKl	nvlestsCi	
ZA6505	CASC5	15	40920815	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	326	399	tstyRssqm	tstyRssqm	
ZA6505	PLA2G4E	15	42278176	T	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	456	783	Qltesanhl	Qltesanhl	
ZA6505	MYZAP	15	57925836	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	154	374	etnsfiKAi	etnsfiKAi	
ZA6505	SLC38A1	15	85438206	G	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	496	1498	fVfqratai	fDfqratai	
ZA6505	DNASE1L2	16	2287391	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	22	649	fvyrkdavL	fvyrkdavS	
ZA6505	DNASE1L2	16	2287391	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	18	12	yrkdavtvv	yrkdavSvv	
ZA6505	DNASE1L2	16	2287391	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	97	33	davtvvdfy	davSvvdfy	
ZA6505	UQCRC2	16	21976762	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	219	78	haaayQnai	haaayfnal	
ZA6505	UQCRC2	16	21976762	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	42	210	yQnaiarnpl	yfnaiarnpl	
ZA6505	CENPN	16	81060197	C	T	A2501,A2901,B1801,B0705,C1203,C1505	B1801	158	408	qeifgdypq	qeffgdypq	
ZA6505	CENPN	16	81060197	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	339	12341	rvqritqel	rvqritqeT	
ZA6505	CRISPLD2	16	84906098	C	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	425	480	kakifgSit	kakifgTif	
ZA6505	RNF166	16	88765393	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	139	184	Rpnrvvcpi	Dpnrvvcpi	
ZA6505	ZZEF1	17	3953102	A	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	422	1707	sFedqaipv	sLedqaipv	
ZA6505	ATAD5	17	29167653	A	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	17	79	kasntskMi	kasntskNi	
ZA6505	COASY	17	40714804	C	A	A2501,A2901,B1801,B0705,C1203,C1505	B1801	66	10992	legpaqpqY	legpaqpqS	
ZA6505	COASY	17	40714804	C	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	158	154	paqpqYspv	paqpqSspv	
ZA6505	NAGS	17	42083175	C	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	31	46	lakRckvlv	lakSckvlv	
ZA6505	CA10	17	49713256	C	A	A2501,A2901,B1801,B0705,C1203,C1505	B1801	21	85	yetasWim	yetasWim	
ZA6505	CA10	17	49713256	C	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	253	1604	pcyetasLi	pcyetasWi	
ZA6505	CA10	17	49713256	C	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	445	343	yetasWim	yetasWim	
ZA6505	RNF43	17	56492800	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	116	153	rsaeqkaVi	rsaeqkali	
ZA6505	RNF43	17	56492800	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	146	74	kaVirvipl	kairvipl	
ZA6505	ACE	17	61554619	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	67	841	ynFsaeqvl	ynSsaeqvl	
ZA6505	SLC16A5	17	73089923	C	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	245	170	Qmagpicsi	Rmagpicsi	
ZA6505	CIDEA	18	1224405	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	203	376	aardyVgal	aardyAgal	
ZA6505	CIDEA	18	1224405	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	107	18	yVgalirpl	yAgalirpl	
ZA6505	TAF4B	18	23866185	G	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	276	137	tskpltrsv	tskplVrsv	
ZA6505	TAF4B	18	23866185	G	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	275	99	ltsvantv	ltsvantv	
ZA6505	SETBP1	18	42532606	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	344	403	pqfhtnshi	pqfhtnshV	
ZA6505	CTDP1	18	77475447	C	A	A2501,A2901,B1801,B0705,C1203,C1505	B1801	317	978	rehyhatal	rehyhatal	
ZA6505	CTDP1	18	77475447	C	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	49	48	hatalgaki	hatalgaki	
ZA6505	SIRT6	19	41791173	T	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	31	39	maivqiVrv	maivqiErv	
ZA6505	KMSKP	19	6422423	C	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	326	320	iggdSattv	iggdAattv	
ZA6505	PNPLA6	19	7621349	C	T	A2501,A2901,B1801,B0705,C1203,C1505	B1801	475	3813	rewaksmtL	rewaksmtS	
ZA6505	PNPLA6	19	7621349	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	74	48	waksmtLvl	waksmtSvl	
ZA6505	PNPLA6	19	7623349	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	368	1126	lvlepvldi	lvlepvldi	

Figure 21 (Cont.)

ZA6505	MUC16	19	9048362	A	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	63	559	tAspgvsgv	tVspgvsgv
ZA6505	FARSA	19	13035722	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	485	1581	yriaRkkpf	yriaQkkpf
ZA6505	NOTCH3	19	15291638	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	93	37	ftgpqcqMl	ftgpqcqTl
ZA6505	USHBP1	19	17367435	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	242	656	rlqerrslV	rlqerrslM
ZA6505	ZNF681	19	23927555	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	4	5	kafnlLshi	kafnlSshi
ZA6505	ZNF681	19	23927555	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	190	688	Lshitthti	Sshitthti
ZA6505	PPP1R13L	19	45898900	C	A	A2501,A2901,B1801,B0705,C1203,C1505	B1801	29	8	Lehgasram	Wehgasram
ZA6505	DHDH	19	49439409	A	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	13	11	naaevrGmv	naaevrEmv
ZA6505	FPR1	19	52249947	C	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	34	19	flckfLfti	flckfVfti
ZA6505	KIR3DL1	19	55331308	C	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	43	54	iskdpsSlv	iskdpsRlv
ZA6505	NLRP4	19	56373462	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	95	120	lsHddirsl	lsRddirsl
ZA6505	LPIN1	2	11927238	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	101	224	qfMdnpaii	qfVdnpaii
ZA6505	APOB	2	21263900	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	133	8209	filktsqcl	filktsqcT
ZA6505	KHK	2	27315252	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	61	53	nasnsctll	nasnsctVl
ZA6505	DHX57	2	39088323	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	389	11025	etsepvvyF	etsepvvyS
ZA6505	DHX57	2	39088323	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	189	91	vvyFlitll	vvySlitll
ZA6505	PLEKHH2	2	43989525	C	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	26	40	leynCmrli	leynSmrli
ZA6505	ZNF638	2	71654175	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	178	191	qMpedpstl	qVpedpstl
ZA6505	ZNF638	2	71654175	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	47	105	Mpedpstlv	Vpedpstlv
ZA6505	REG1B	2	79313990	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	11	11	nayHsycyy	nayRsycyy
ZA6505	RMND5A	2	86947816	G	A	A2501,A2901,B1801,B0705,C1203,C1505	B1801	378	544	veHelekvl	veRelekvl
ZA6505	TMEM87B	2	112854816	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	37	48	favlasTvf	favlasIvf
ZA6505	NBEAL1	2	204073414	A	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	30	24	ilyghAnev	ilyghTnev
ZA6505	STK36	2	219562675	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	406	406	dadlliDvl	dadlliGvl
ZA6505	GGT7	20	33447807	A	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	447	185	Eaqdgfnvt	Vaqdgfnvt
ZA6505	SETD4	21	37416085	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	206	6537	nphacvyvL	nphacvyvS
ZA6505	SETD4	21	37416085	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	28	35	yvLrgwnql	yvSrgwnql
ZA6505	PRAME	22	22892449	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	46	20	Vpmqdikmi	Mpmqdikmi
ZA6505	RFPL3	22	32756703	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	154	115	saeeplCpf	saeeplRpf
ZA6505	SH3BP1	22	38051291	C	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	177	91	rpEparptm	rpAparptm
ZA6505	CAPN7	3	15259992	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	24	30	tsyetTdkv	tsyetAdkv
ZA6505	PDCD6IP	3	33879770	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	235	295	ynqrkadII	ynqrkadIV
ZA6505	PDCD6IP	3	33879770	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	178	217	kadIInrsi	kadIVnrsi
ZA6505	LZTFL1	3	45869972	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	277	910	latakhNll	latakhDll
ZA6505	LZTFL1	3	45869972	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	43	139	takhNllrv	takhDllrv
ZA6505	NBEAL2	3	47040352	A	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	114	1678	aAgddgqav	aTgddgqav
ZA6505	SETD2	3	47162683	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	184	90	ftqFsrkqi	ftqSsrkqi
ZA6505	DALRD3	3	49055483	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	172	157	vadRlaral	vadHlaral
ZA6505	PXK	3	58395863	A	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	329	193	nseehsaRy	nseehsaKy
ZA6505	FAM194A	3	150377770	A	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	233	515	ylssRslkl	ylssLslkl
ZA6505	FAM194A	3	150377770	A	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	362	1476	lssRslkli	lssLslkli
ZA6505	TACC3	4	1729953	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	467	201	ealgYpagv	ealgCpagv
ZA6505	TACC3	4	1729953	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	18	915	Ypagvgtpv	Cpagvgtpv
ZA6505	CC2D2A	4	15517557	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	49	2016	fledeglyI	fledeglyT
ZA6505	AASDH	4	57204777	A	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	358	161	fafhnDngs	fafhnYngs
ZA6505	ADH7	4	100349669	C	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	411	3348	ivesigeAv	ivesigeGv
ZA6505	ADH7	4	100349669	C	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	206	111	sigeAvttv	sigeGvttv
ZA6505	TET2	4	106158539	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	84	469	Dvypelanl	Gvypelanl
ZA6505	MAP9	4	156289917	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	79	82	kpspWprsm	kpspRprsm

Figure 21 (Cont.)

ZA6505	SDHA	5	256509	G	A	A2501,A2901,B1801,B0705,C1203,C1505	A2501	153	66	tippairsy	tYppairsy	
ZA6505	CDH10	5	24535931	C	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	485	24267	sypemsvvG	sypemsvvG	
ZA6505	CDH10	5	24535931	C	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	146	64	msvvGtsvv	msvvGtsvv	
ZA6505	AMACR	5	34008100	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	8	5	maiqgisvV	maiqgisvV	
ZA6505	RAI14	5	34823487	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	59	100	Ksmdnyshf	Esmdnyshf	
ZA6505	IL7R	5	35861068	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	132	459	fedpdvnIt	fedpdvnIt	
ZA6505	IL7R	5	35871190	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	213	273	eapfdlsvV	eapfdlsvV	
ZA6505	IL7R	5	35871190	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	163	147	apfdlsvVy	apfdlsvVy	
ZA6505	PTGER4	5	40691893	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	223	245	ipivvrvfI	ipivvrvfV	
ZA6505	FBXO4	5	41934413	A	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	274	106	naeahksKy	naeahksKy	
ZA6505	LARS	5	145493996	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	382	294	Rtgdnccdsi	Rtgdnccdsi	
ZA6505	LARS	5	145508636	T	C	A2501,A2901,B1801,B0705,C1203,C1505	B1801	14	29	Devlihssq	Nevlihssq	
ZA6505	LARS	5	145508636	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	205	107	vagpvDevI	vagpvNevI	
ZA6505	BTN3A3	6	26449862	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	165	2358	Fkwrkiqym	tkwrkiqym	
ZA6505	HIST1H2BM	6	27782940	T	C	A2501,A2901,B1801,B0705,C1203,C1505	B1801	30	13	kesysAyvy	kesysAyvy	
ZA6505	HIST1H2BM	6	27782940	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	75	93	ysAyvykd	ysAyvykd	
ZA6505	NUDCD3	7	44530039	G	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	243	182	fQpgaaqal	fPpgaaqal	
ZA6505	PLXNA4	7	1318883311	C	T	A2501,A2901,B1801,B0705,C1203,C1505	B1801	407	315	lefrdlTsh	lefrdlAsh	
ZA6505	PLXNA4	7	1318883311	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	465	623	efrdlTshv	efrdlAshv	
ZA6505	ORZAZ	7	1438007304	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	79	58	fvlvggPsl	fvlvggPsl	
ZA6505	ORZAZ	7	1438007304	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	417	624	vlvggPsli	vlvggPsli	
ZA6505	ORZAZ	7	1438007304	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	413	1194	lvggPsIii	lvggPsIii	
ZA6505	RP11	8	10466504	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	186	170	RaerKatrm	Raerkatrm	
ZA6505	LONRF1	8	12600720	T	A	A2501,A2901,B1801,B0705,C1203,C1505	B1801	192	209	tedlmavlf	tedlmavlf	
ZA6505	LONRF1	8	12600720	T	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	22	24	aaledlnav	aaledlnav	
ZA6505	MTUS1	8	17541943	T	G	A2501,A2901,B1801,B0705,C1203,C1505	A2501	380	18926	tfceqsgf	tKceqsgf	
ZA6505	LRRCC1	8	86021994	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	146	9510	Ytnlscnl	Ctnlscnl	
ZA6505	CA13	8	86180719	A	G	A2501,A2901,B1801,B0705,C1203,C1505	C1203	19	252	fAnfdlsl	fTnfdlsl	
ZA6505	DMRT3	9	990653	G	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	115	20984	nvvpsplaV	nvvpsplaG	
ZA6505	DMRT3	9	990653	G	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	363	699	vpsplaVpi	vpsplaGpl	
ZA6505	DMRT3	9	990653	G	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	448	1221	laVplqtpf	laGplqtpf	
ZA6505	NOL6	9	33464897	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	45	384	vSlnnelfv	vNlnnelfv	
ZA6505	UBAP2	9	33941759	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	496	194	sslSsaspv	sslNsaspv	
ZA6505	WNK2	9	960355065	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	20	18	ysappdAyl	ysappdVyl	
ZA6505	WDR34	9	1313997004	C	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	330	653	tfsphgVpi	tfsphgGpi	
ZA6505	WDR34	9	1313997004	C	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	52	58	fsphgVpiy	fsphgGpiy	
ZA6505	SETX	9	135202829	T	C	A2501,A2901,B1801,B0705,C1203,C1505	C1203	188	257	taqrsdVfv	taqrsdIfv	
ZA6505	CAMSAP1	9	138715080	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	327	7780	pasqptpfV	pasqptpfA	
ZA6505	CAMSAP1	9	138715080	G	A	A2501,A2901,B1801,B0705,C1203,C1505	C1203	420	45	fvlhhaasc	fAlhhaasc	
ZA6505	CKorf58	X	23928489	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	321	206	rslqkvCrv	rslqkvArv	
ZA6505	CENPI	X	100387411	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	94	112	ilfdhlVqi	ilfdhlAqi	
ZA6505	CENPI	X	100387411	C	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	36	197	Vqlftsti	Aqlftsti	
ZA6505	CNGA2	X	150909307	G	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	66	539	fvldpagdL	fvldpagdW	
ZA6505	CNGA2	X	150909307	G	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	85	530	dLyycwlfv	dWyycwlfv	
ZA6505	CNGA2	X	150909307	G	T	A2501,A2901,B1801,B0705,C1203,C1505	C1203	54	48	tyycwlfvi	Wyycwlfvi	
ZA6965	TNFRSF4	1	1149437	C	A	A0201,A3201,A0289,B4001102,B4501101,C0602,C031	A0201	308	7101	illglgll	illglgIS	
ZA6965	TNFRSF4	1	1149437	C	A	A0201,A3201,A0289,B4001102,B4501101,C0602,C031	A0201	33	51	llglgltv	llglgISv	
ZA6965	TNFRSF4	1	1149437	C	A	A0201,A3201,A0289,B4001102,B4501101,C0602,C031	A0201	241	228	tvlglhcv	tvlglhcv	
ZA6965	FAM132A	1	11788671	G	A	A0201,A3201,A0289,B4001102,B4501101,C0602,C031	A0201	88	83	slasgrfMa	slasgrfTa	

Figure 21 (Cont.)

ZA6965	ATAD3C	1	1398059	A	G	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A3201	137	5	Elaqlavsw	Kiaqlavsw
ZA6965	CSMD2	1	34099082	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	332	1496	Fhdghsqhs	Vhdghsqhs
ZA6965	CLDN19	1	43205676	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	6	4889	flaiggwvV	flaiggwvG
ZA6965	CLDN19	1	43205676	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	72	581	aiggwvVii	aiggwvGii
ZA6965	CLDN19	1	43205676	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A3201	134	2708	aiggwvVii	aiggwvGii
ZA6965	RUSC1	1	155295182	G	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	48	60	tlcpalhTl	tlcpalhAl
ZA6965	CD1C	1	158261944	G	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	340	458	kspegffHv	kspegffQv
ZA6965	CCSAP	1	229478067	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	34	12	wlLddwgpa	wlWddwgpa
ZA6965	OR2T33	1	248436275	G	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	236	555	fytmftHll	fytmftPll
ZA6965	SORCS1	10	108380233	G	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A3201	10	79	Kvgtltyvw	Qvgtltyvw
ZA6965	B4GALNT4	11	379558	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	330	54	yvflrlQga	yvflrlPga
ZA6965	OR4C12	11	50003420	T	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	29	66	ficFlnfli	ficLlnfli
ZA6965	OR4C12	11	50003420	T	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	8	31	Flnflilvv	Llnflilvv
ZA6965	CDC42BPG	11	64601934	G	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	169	29	glqerlKqv	glqerlTqv
ZA6965	OVOL1	11	65562807	C	G	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	7	14	sllqgsphV	sllqgsphL
ZA6965	ANKRD13D	11	67069775	T	C	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A3201	256	517	rTlqlslte	rIlqlslte
ZA6965	HOXC9	12	54394403	G	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	8	17	ymyDspgel	ymyGspgel
ZA6965	HOXC9	12	54394403	G	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	144	358	ymyDspgel	ymyGspgel
ZA6965	ZFC3H1	12	72008529	T	C	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	11	11	mrcdivRki	mrcdivQki
ZA6965	DRAM1	12	102271640	A	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	216	103	saafiFsyv	saafilsyv
ZA6965	DRAM1	12	102271640	A	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	233	421	aafiFsyvv	aafilsyvv
ZA6965	DRAM1	12	102271640	A	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	3	3	fiFsyvvav	filsyvvav
ZA6965	DRAM1	12	102271640	A	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A3201	217	515	ssaafiFsy	ssaafilsy
ZA6965	DRAM1	12	102271640	A	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	148	554	fiFsyvvav	filsyvvav
ZA6965	TAOK3	12	118673393	G	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	462	24252	sLansfvgt	sPansfvgt
ZA6965	TAOK3	12	118673393	G	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A3201	19	48	smasLansf	smasPansf
ZA6965	VPS36	13	52990023	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	56	20524	cLddsvegl	cRddsvegl
ZA6965	RNASE3	14	21360056	C	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	32	347	Frttfanvv	Lrttfanvv
ZA6965	C14orf178	14	78235797	C	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	497	98	llgssnSpa	llgssnPpa
ZA6965	TECPR2	14	102916036	C	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	36	34	tilhathLv	tilhathSv
ZA6965	CHP1	15	41562800	G	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	21	19662	sLdellqvl	sRdellqvl
ZA6965	TLE3	15	70349933	G	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	136	613	fammRhhem	fammShhem
ZA6965	TLE3	15	70349933	G	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	85	45	Rhhemngsl	Shhemngsl
ZA6965	AGBL1	15	86822961	G	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	133	105	vtfphsKdv	vtfphsEdv
ZA6965	NTRK3	15	88726573	G	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	463	2317	rafDknphl	rafAknphl
ZA6965	NTRK3	15	88726573	G	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	291	78	Dknphlryl	Aknphlryl
ZA6965	IGF1R	15	99442775	G	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	64	4801	kiLhshalv	kiRhshalv
ZA6965	FBXL16	16	745521	G	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	494	3555	lvaenlCkl	lvaenlRkl
ZA6965	KIF19	17	72348210	C	G	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	43	9	hrheavGrl	hrheavRrl
ZA6965	KIF19	17	72348210	C	G	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	81	27	Grleqhrsl	Rrleqhrsl
ZA6965	RNF213	17	78319855	A	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	11	14	alppClipl	alppSlipl
ZA6965	ENTHD2	17	79210780	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	292	2197	klNvikill	klKvikill
ZA6965	ENTHD2	17	79210780	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	148	34	Nvikillyl	Kvikillyl
ZA6965	ENTHD2	17	79210780	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A3201	470	3142	klNvikill	klKvikill
ZA6965	APC2	19	1467049	G	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	89	479	erYrlpsel	erCrlpsel
ZA6965	SEMA6B	19	4550159	G	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	114	56	slghaHwil	slghaPwil
ZA6965	MUC16	19	9067187	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A3201	9	45	stsqgtftF	stsqgtftL
ZA6965	PGLYRP2	19	15580579	G	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	116	981	Mlpscavra	Tlpscavra
ZA6965	C19orf60	19	18700363	C	G	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A3201	156	114	tvhgvSqaf	tvhgvTqaf

Figure 21 (Cont.)

ZA6965	ZNF536	19	31025865	G	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	15	18251	fLtshhikv	fRtshhikv
ZA6965	ZNF536	19	31025865	G	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A3201	28	28	ktfLtshhl	ktfRtshhl
ZA6965	CIC	19	42791731	C	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	42	88	irrpmnVfm	irrpmnAfm
ZA6965	CIC	19	42791731	C	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	308	956	rrpmnVfmi	rrpmnAfmi
ZA6965	SLC1A5	19	47290921	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	52	359	lllrllLmi	lllrllRmi
ZA6965	SLC1A5	19	47290921	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	11	149	llLmillpl	llRmillpl
ZA6965	SLC1A5	19	47290921	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	4	3491	lLmiilplv	lRmiilplv
ZA6965	SLC1A5	19	47290921	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	57	83	Lmiilplvv	Rmiilplvv
ZA6965	NLRP13	19	56424632	A	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	24	34	yrenKkael	yrenMkael
ZA6965	IFT172	2	27677239	G	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	202	22381	kHkeavimf	kPkeavimf
ZA6965	INHBB	2	121104199	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	357	12465	iRfaetdgl	iSfaetdgl
ZA6965	TTN	2	179485248	A	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	100	21520	kRtkngeev	kWtkngeev
ZA6965	PIKFYVE	2	209200043	C	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	43	3775	fsyspiWll	fsyspiRll
ZA6965	PIKFYVE	2	209200043	C	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	157	1491	yspiWllev	yspiRllev
ZA6965	PIKFYVE	2	209200043	C	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	4	5	Wllevcvpl	Rllevcvpl
ZA6965	PIKFYVE	2	209200043	C	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A3201	180	21126	asfsyspiW	asfsyspiR
ZA6965	PIKFYVE	2	209200043	C	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	162	39	fsyspiWll	fsyspiRll
ZA6965	DNPEP	2	220251410	G	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	344	6584	Ytdspclrv	Htdspclrv
ZA6965	SRXN1	20	633648	T	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A3201	112	25	Mvqslvdti	Kvqslvdti
ZA6965	GATA5	20	61050544	G	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	405	1833	alaaspSqa	alaaspRqa
ZA6965	TTLL12	22	43572360	T	C	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	22	16	klpldiDpv	klpldiNpv
ZA6965	SBF1	22	50903729	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	22	426	flLlfaqll	flRlfaqll
ZA6965	SEMA3G	3	52475856	G	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	452	1320	srSfastfi	srPfastfi
ZA6965	CHST13	3	126260690	G	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	9	26	Mlvddahgl	Vlvddahgl
ZA6965	SHROOM3	4	77662104	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	370	368	fsrayrKsi	fsrayrNsi
ZA6965	HERC6	4	89300251	G	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	332	356	rrgTqrgel	rrgAqrgel
ZA6965	PCDHGA6	5	140755875	G	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	129	236	shfvDvegv	shfvGvegv
ZA6965	LEMD2	6	33756262	G	C	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	274	127	wlCrlllwa	wlSrlllwa
ZA6965	LEMD2	6	33756262	G	C	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	63	184	erwlCrlll	erwlSrlll
ZA6965	PTCHD4	6	47976813	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	20	25	hqlgVvvev	hqlgGvvev
ZA6965	NPSR1	7	34884524	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	191	8048	cRsynrgli	cSsynrgli
ZA6965	GLI3	7	42005681	G	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	284	6774	rrhiqphdV	rrhiqphdA
ZA6965	VWC2	7	49815060	G	C	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	341	557	Aalsssllv	Galsssllv
ZA6965	VWC2	7	49815060	G	C	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A3201	431	2468	stamavAal	stamavGal
ZA6965	VWC2	7	49815111	G	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	67	115	mvalFspsi	mvalCspsi
ZA6965	VWC2	7	49815111	G	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	11	75	alFspsipl	alCspsipl
ZA6965	VWC2	7	49815111	G	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A3201	41	390	mvalFspsi	mvalCspsi
ZA6965	VWC2	7	49815111	G	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A3201	32	367	alFspsipl	alCspsipl
ZA6965	ZNF716	7	57529089	T	C	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	306	345	kafsrPstl	kafsrSstl
ZA6965	ERV3-1	7	64452197	T	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	31	39	slnhswFql	slnhswYql
ZA6965	WBSCR17	7	71177066	G	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	113	97	glaCidlll	glaGidlll
ZA6965	GPC2	7	99769282	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	349	21107	rlvwelreL	rlvwelreR
ZA6965	GPC2	7	99769282	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	234	638	lvwelreLl	lvwelreRl
ZA6965	LRWD1	7	102113000	C	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	119	1532	stvavvvlV	stvavvvlA
ZA6965	ZNF862	7	149545167	G	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	158	353	yhaNskahm	yhaKskahm
ZA6965	TMUB1	7	150778955	C	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	51	39	greqqvQli	greqqvRli
ZA6965	DMTN	8	21938352	A	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	27	24	grmdrgYsl	grmdrgNsl
ZA6965	CSMD3	8	113353849	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	453	16505	sVssetstv	sGssetstv
ZA6965	CSMD3	8	113697930	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	29	127	clsnftapl	clsnftapM

Figure 21 (Cont.)

ZA6965	CSMD3	8	113697930	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A3201	71	1850	clsnftapI	clsnftapM
ZA6965	ZNF517	8	146033463	C	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	169	150	sllllhlCl	sllllhlRl
ZA6965	ZNF517	8	146033463	C	T	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	380	2597	lllhlClht	lllhlRlht
ZA6965	DPH7	9	140473202	C	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	147	142	alqtLdtel	alqtVdtel
ZA6965	FAM155B	X	68749680	T	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A0201	172	419	rlSvlvlml	rlCvlvlml
ZA6965	FAM155B	X	68749680	T	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A3201	314	516	rlSvlvlml	rlCvlvlml
ZA6965	FAM155B	X	68749680	T	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	146	751	srlrlSvlv	srlrlCvlv
ZA6965	FAM155B	X	68749680	T	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	C0602	279	2682	irlSvlvlm	irlCvlvlm
ZA6965	ZFP92	X	152686788	G	A	A0201,A3201,A0289,B400102,B450101,C0602,C03(	A3201	72	70	rshsgeQpf	rshsgeRpf

Figure 21 (Cont.)

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(71) Applicant: **MEMORIAL SLOAN KETTERING CANCER CENTER** [US/US]; 1275 York Avenue, New York, New York 10065 (US).

(72) Inventors: **CHAN, Timothy A.**; 178 Watch Hill Road, Cortlandt Manor, New York 10567 (US). **RIZVI, Naiyer A.**; 108 East 82nd St, Apt. 4A, New York, New York 10028 (US). **HELLMAN, Matthew D.**; 253 West 72nd Street, New York, New York 10023 (US).

(74) Agents: **JARRELL, Brenda Herschbach** et al.; Choate, Hall & Stewart LLP, Two International Place, Boston, Massachusetts 02110 (US).

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

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

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7 July 2016

(54) Title: DETERMINANTS OF CANCER RESPONSE TO IMMUNOTHERAPY BY PD-1 BLOCKADE

(57) Abstract: Molecular determinants of cancer response to immunotherapy are described, as are systems and tools for identifying and/or characterizing cancers likely to respond to immunotherapy.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US15/62208

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - A61K 39/39; G01N 33/574; C07K 16/30 (2016.01)
CPC - A61K 39/39; G01N 33/57438; C07K 16/3038
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) Classification(s): A61K 39/39; G01N 33/574; C07K 16/28, 16/30 (2016.01)
CPC Classification(s): A61K 39/39; G01N 33/57423, 33/57438, 33/57415; C07K 16/2815, 16/3023, 16/3038

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PatSeer (US, EP, WO, JP, DE, GB, CN, FR, KR, ES, AU, IN, CA, INPADOC Data); Google Scholar; Pubmed; EBSCO
Keywords: Neoepitope, neoantigen, tumor, cancer, lung, kidney, bladder, small cell, head, neck, nonamer, peptide, MHC, non-self, immunotherapy, vaccine

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2014/052707 A2 (THE UNIVERSITY OF CONNECTICUT) 03 April 2014; paragraphs [0007], [0029]-[0031], [0042], [0046], [0062], [0064], [0067], [0069], [0073], [0080], [0082], [0084], [0089]-[0090], [0093], [0097]-[0099]; figures 1, 6; claims 1,13, 23	1-2, 4-6, 7/1, 7/6, 8/7/1, 8/7/6, 9/8/7/1, 9/8/7/6, 12-14
Y		3, 10/7/1, 10/7/6, 57-63
Y	(BEI, R et al.) TAA Polyepitope DNA-based vaccines: a potential tool for cancer therapy. J Biomed Biotechnol. 17 June 2010; Vol. 2010, No. 102758; pages 1-12; page 1, column 2, paragraph 1; page 2, column 2, paragraph 1; page 7, column 1, paragraph 1; DOI: 10.1155/2010/102758	3, 10/7/1, 10/7/6, 57-63
A	(BERZOFSKY, JA et al.) Progress on new vaccine strategies for the immunotherapy and prevention of cancer. J Clin Invest. June 2004; Vol. 113, No. 11; pages 1515-1525; whole document; DOI:10.1172/JCI200421926.	

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
09 March 2016 (09.03. 2016)	02 JUN 2016
Name and mailing address of the ISA/ Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-8300	Authorized officer Shane Thomas PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US15/62208

Box No. I Nucleotide and/or amino acid sequence(s) (Continuation of item 1.c of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of a sequence listing:

   a. ☒ forming part of the international application as filed:

      ☐ in the form of an Annex C/ST.25 text file.

      ☐ on paper or in the form of an image file.

   b. ☐ furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.

   c. ☒ furnished subsequent to the international filing date for the purposes of international search only:

      ☒ in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).

      ☐ on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).

2. ☒ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

3. Additional comments:

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US15/62208

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: 11, 24, 38, 53
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

These claims refer to amino acid sequences selected from those set forth in Table I. However, no Table I containing amino acids is present in this application.

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

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(72) Inventors: **CHAN, Timothy A.**; 178 Watch Hill Road, Cortlandt Manor, New York 10567 (US). **RIZVI, Naiyer A.**; 108 East 82nd St, Apt. 4A, New York, New York 10028 (US). **HELLMAN, Matthew D.**; 253 West 72nd Street, New York, New York 10023 (US).

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(54) Title: DETERMINANTS OF CANCER RESPONSE TO IMMUNOTHERAPY BY PD-1 BLOCKADE

(57) Abstract: Molecular determinants of cancer response to immunotherapy are described, as are systems and tools for identifying and/or characterizing cancers likely to respond to immunotherapy.

AMENDED CLAIMS
received by the International Bureau on 27 July 2016.

We claim:

1. A composition comprising an immunogenic agent that is or comprises a neoepitope recognizable by a human patient's immune system as non-self, wherein the patient is suffering from cancer characterized by one or more tumors expressing the neoepitope.

2. The composition of claim 1, wherein, the neoepitope shares a consensus sequence with an infectious agent.

3. The composition of claim 1, wherein the neoepitope is or comprises a nonamer neoepitope.

4. The composition of claim 1, wherein the neoepitope shows increased binding affinity to MHC class I molecules or improved recognition by cytotoxic T cells.

5. The composition of claim 1, wherein the neoepitope has greater binding affinity to a major histocompatibility complex (MHC) molecule compared to a corresponding wildtype epitope that is not a neoepitope specifically associated with the one or more tumors.

6. The composition of claim 1, wherein the immunogenic agent is or comprises a peptide.

7. The composition of claim 1 or claim 6, wherein the immunogenic agent has a length appropriate for MHC presentation.

8. The composition of claim 7, wherein the length is that appropriate for presentation by MHC Class I.

9. The composition of claim 8, wherein the length is that of 8-11 amino acids.

10. The composition of claim 7, wherein the length is that appropriate for presentation by MHC Class II.

11. The composition of claim 1, wherein the neoepitope has an amino acid sequence selected from those set forth in Figure 21.

12. The composition of claim 1, wherein the cancer is or comprises a cancer selected from the group comprising: carcinoma, sarcoma, myeloma, leukemia, or lymphoma.

13. The composition of claim 12, wherein the cancer is selected from a group comprising: lung carcinoma, melanoma, renal carcinoma, bladder carcinoma, small cell carcinoma, and head and neck cancer.

14. The composition of claim 13, wherein the cancer is or comprises lung carcinoma.

15. A composition comprising a nucleic acid whose sequence comprises coding sequence for a neoepitope recognizable by a human patient's immune system as non-self, wherein the patient is suffering from cancer characterized by one or more tumors expressing the neoepitope.

16. The composition of claim 15, wherein, the neoepitope shares a consensus sequence with an infectious agent.

17. The composition of claim 15, wherein the neoepitope is or comprises a nonamer neoepitope.

18. The composition of claim 15, wherein the neoepitope shows increased binding affinity to MHC class I molecules or improved recognition by cytotoxic T cells.

19. The composition of claim 15, wherein the neoepitope has greater binding affinity to a major histocompatibility complex (MHC) molecule compared to a corresponding wildtype epitope that is not a neoepitope specifically associated with the one or more tumors.

20. The composition of claim 15, wherein the neoepitope has a length appropriate for MHC presentation.

21. The composition of claim 20, wherein the length is that appropriate for presentation by MHC Class I.

22. The composition of claim 21, wherein the length is that of 8-11 amino acids.

23. The composition of claim 20, wherein the length is that appropriate for presentation by MHC Class II.

24. The composition of claim 15, wherein the neoepitope has an amino acid sequence selected from those set forth in Figure 21.

25. The composition of claim 15, wherein the cancer is or comprises a cancer selected from the group comprising: carcinoma, sarcoma, myeloma, leukemia, or lymphoma.

26. The composition of claim 25, wherein the cancer is selected from a group comprising: lung carcinoma, melanoma, renal carcinoma, bladder carcinoma, small cell carcinoma, and head and neck cancer.

27. The composition of claim 15, wherein the cancer is or comprises lung carcinoma.

28. A composition comprising a nucleic acid that hybridizes with a nucleic acid encoding a neoepitope recognizable by a human patient's immune system as non-self, wherein the patient is suffering from cancer characterized by one or more tumors expressing the neoepitope.

29. The composition of claim 15 or claim 28, wherein the nucleic acid is capable of detecting the neoepitope, or expression thereof, at the nucleic acid level.

30. The composition of claim 28, wherein, the neoepitope shares a consensus sequence with an infectious agent.

31. The composition of claim 28, wherein the neoepitope is or comprises a nonamer neoepitope.

32. The composition of claim 28, wherein the neoepitope shows increased binding affinity to MHC class I molecules or improved recognition by cytotoxic T cells.

33. The composition of claim 28, wherein the neoepitope has greater binding affinity to a major histocompatibility complex (MHC) molecule compared to a corresponding otherwise identical epitope that is not a neoepitope specifically associated with the one or more tumors.

34. The composition of claim 28, wherein the neoepitope has a length appropriate for MHC presentation.

35. The composition of claim 28, wherein the length is that appropriate for presentation by MHC Class I.

36. The composition of claim 35, wherein the length is that of 8-11 amino acids.

37. The composition of claim 28, wherein the length is that appropriate for presentation by MHC Class II.

38. The composition of claim 28, wherein the neoepitope has an amino acid sequence selected from those set forth in Figure 21.

39. The composition of claim 28, wherein the cancer is or comprises a cancer selected from the group comprising: carcinoma, sarcoma, myeloma, leukemia, or lymphoma.

40. The composition of claim 39, wherein the cancer is selected from a group comprising: lung carcinoma, melanoma, renal carcinoma, bladder carcinoma, small cell carcinoma, and head and neck cancer.

41. The composition of claim 28, wherein the cancer is or comprises lung carcinoma.

42. A composition comprising an agent that specifically detects a neoepitope recognizable by a human patient's immune system as non-self, wherein the patient is suffering from cancer characterized by one or more tumors expressing the neoepitope.

43. The composition of claim 42, wherein the agent specifically detects the neoepitope at the protein level.

44. The composition of claim 42, wherein the agent specifically detects the neoepitope at the nucleic acid level.

45. The composition of claim 42, wherein, the neoepitope shares a consensus sequence with an infectious agent.

46. The composition of claim 42, wherein the neoepitope is or comprises a nonamer neoepitope.

47. The composition of claim 42, wherein the neoepitope shows increased binding affinity to MHC class I molecules or improved recognition by cytotoxic T cells.

48. The composition of claim 42, wherein the neoepitope has greater binding affinity to a major histocompatibility complex (MHC) molecule compared to a corresponding otherwise identical epitope that is not a neoepitope specifically associated with the one or more tumors.

49. The composition of claim 42, wherein the neoepitope has a length appropriate for MHC presentation.

50. The composition of claim 49, wherein the length is that appropriate for presentation by MHC Class I.

51. The composition of claim 50, wherein the length is that of 8-11 amino acids.

52. The composition of claim 49, wherein the length is that appropriate for presentation by MHC Class II.

53. The composition of claim 42, wherein the neoepitope has an amino acid sequence selected from those set forth in Figure 21.

54. The composition of claim 42, wherein the cancer is or comprises a cancer selected from the group comprising: carcinoma, sarcoma, myeloma, leukemia, or lymphoma.

55. The composition of claim 54, wherein the cancer is selected from a group comprising: lung carcinoma, melanoma, renal carcinoma, bladder carcinoma, small cell carcinoma, and head and neck cancer.

56. The composition of claim 42, wherein the cancer is or comprises lung carcinoma.

57. A method of treating cancer comprising steps of:

administering to a subject determined to have cancer characterized by a tumor expressing one or more nonamer neoepitopes a therapy that enhances neoantigen-specific effector T-cell response.

58. The method of claim 57, wherein the subject is receiving or will receive therapy with an immune checkpoint modulator.

59. The method of claim 57, wherein the subject has established tumors.

60. The method of claim 57, wherein the cancer is or comprises a cancer selected from the group comprising: carcinoma, sarcoma, myeloma, leukemia, or lymphoma.

61. The method of claim 60, wherein the cancer is selected from a group comprising: lung carcinoma, melanoma, renal carcinoma, bladder carcinoma, small cell carcinoma, and head and neck cancer.

62. The method of claim 57, wherein the cancer is or comprises lung carcinoma.

63. The method of claim 57, wherein the therapy is or comprises an immune checkpoint modulator.

64. A method comprising steps of:

detecting a marker of high mutations in a cancer sample from a subject; and

identifying the subject as a candidate for treatment with an immune checkpoint modulator.

65. The method of claim 64, wherein the step of detecting comprises sequencing one or more exomes from the cancer sample.

66. The method of claim 64, wherein the number of mutations identifies the subject as a candidate for treatment with an immune checkpoint modulator.

67. The method of claim 66, wherein a high number of mutations identifies the subject as a candidate for treatment with an immune checkpoint modulator.

68. The method of claim 67, wherein a high number of nonsynonymous mutations identifies the subject as a candidate for treatment with an immune checkpoint modulator.

69. The method of claim 64, wherein the ratio of transition mutations to transversion mutations identifies the subject as a candidate for treatment with an immune checkpoint modulator.

70. The method of claim 69, wherein the ratio comprises the molecular smoking signature.

71. The method of claim 64, wherein the somatic mutation comprises a neoepitope recognized by a T cell.

72. The method of claim 71, wherein the number of neoepitopes identifies the subject as a candidate for treatment with an immune checkpoint modulator.

73. The method of claim 64 wherein the neoepitopes identifies the subject as a candidate for treatment with an immune checkpoint modulator.

74. The method of claim 73, wherein the neoepitopes are associated with high mutation rate.

75. The method of claim 74, wherein high mutations are present in genes encoding proteins involved in DNA repair.

76. The method of claim 74, wherein high mutations are present in genes encoding proteins involved in cell signal transduction.

77. The method of claim 64, wherein the neoepitope has greater binding affinity to a major histocompatibility complex (MHC) molecule compared to a corresponding epitope that does not have a mutation.

78. The method of claim 64,wherein the somatic mutation comprises a neoepitope comprising a nonamer that is not expressed in the same cell type that does not have a somatic mutation.

79. The method of claim 78, wherein the neoepitope shares a consensus sequence with an infectious agent.

80. The method of claim 64, wherein the cancer is or comprises a cancer selected from the group comprising: carcinoma, sarcoma, myeloma, leukemia, or lymphoma.

81. The method of claim 80, wherein the cancer is selected from a group comprising: lung carcinoma, melanoma, renal carcinoma, bladder carcinoma, small cell carcinoma, and head and neck cancer.

82. The method of claim 64, wherein the immune checkpoint modulator interacts with cytotoxic T-lymphocyte antigen 4 (CTLA4), programmed death 1 (PD-1) or its ligands, lymphocyte activation gene-3 (LAG3), B7 homolog 3 (B7-H3), B7 homolog 4 (B7-H4), indoleamine (2,3)-dioxygenase (IDO), adenosine A2a receptor, neuritin, B- and T-lymphocyte attenuator (BTLA), killer immunoglobulin-like receptors (KIR), T cell immunoglobulin and mucin domain-containing protein 3 (TIM-3), inducible T cell costimulator (ICOS), CD27, CD28, CD40, CD137, or combinations thereof.

83. The method of claim 64, wherein the immune checkpoint modulator is an antibody agent.

84. The method of claim 83, wherein the antibody agent is or comprises a monoclonal antibody or antigen binding fragment thereof.

85. The method of claim 84, wherein the antibody is pembrolizumab.

86. The method of claim 64,wherein the subject has not previously been treated with a cancer therapeutic.

87. The method of claim 64, wherein the subject has not previously been treated with a cancer immunotherapeutic.

88. The method of claim 85, further comprising a step of administering pembrolizumab to the subject.

89. A method comprising steps of:

detecting a low number of mutations in a cancer sample from a subject; and

identifying the subject as a poor candidate for treatment with an immune checkpoint modulator.

90. A method comprising steps of:

determining a subject has a cancer comprising a marker of high mutations, wherein the mutations comprises a neoepitope comprising a nonamer, and

selecting for the subject a cancer treatment comprising an immune checkpoint modulator.

91. The method of claim 90, wherein the cancer comprises lung carcinoma.

92. The method of claim 90, wherein the immune checkpoint modulator interacts with cytotoxic T-lymphocyte antigen 4 (CTLA4), programmed death 1 (PD-1) or its ligands, lymphocyte activation gene-3 (LAG3), B7 homolog 3 (B7-H3), B7 homolog 4 (B7-H4), indoleamine (2,3)-dioxygenase (IDO), adenosine A2a receptor, neuritin, B- and T-lymphocyte attenuator (BTLA), killer immunoglobulin-like receptors (KIR), T cell immunoglobulin and mucin domain-containing protein 3 (TIM-3), inducible T cell costimulator (ICOS), CD27, CD28, CD40, CD137, or combinations thereof.

93. The method of claim 92, wherein the immune checkpoint modulator is an antibody agent.

94. The method of claim 93, wherein the antibody agent is or comprises a monoclonal antibody or antigen binding fragment thereof.

95. The method of claim 94, wherein the antibody is pembrolizumab.

96. The method of claim 90, wherein the subject has not previously been treated with a cancer therapeutic.

97. The method of claim 90, wherein the subject has not previously been treated with a cancer immunotherapeutic.

98. A method of treating a subject with an immune checkpoint modulator wherein the subject has previously been identified to have a cancer with a high marker of mutations, wherein the one mutations comprise a neoepitope recognized by a T cell.

99. The method of claim 98, wherein the cancer comprises lung carcinoma.

100. The method of claim 98, wherein the immune checkpoint modulator interacts with cytotoxic T-lymphocyte antigen 4 (CTLA4), programmed death 1 (PD-1) or its ligands, lymphocyte activation gene-3 (LAG3), B7 homolog 3 (B7-H3), B7 homolog 4 (B7-H4), indoleamine (2,3)-dioxygenase (IDO), adenosine A2a receptor, neuritin, B- and T-lymphocyte attenuator (BTLA), killer immunoglobulin-like receptors (KIR), T cell immunoglobulin and mucin domain-containing protein 3 (TIM-3), inducible T cell costimulator (ICOS), CD27, CD28, CD40, CD137, or combinations thereof.

101. The method of claim 98, wherein the immune checkpoint modulator is an antibody agent.

102. The method of claim 101, wherein the antibody agent is or comprises a monoclonal antibody or antigen binding fragment thereof.

103. The method of claim 102, wherein the antibody is pembrolizumab.

104. The method of claim 98, wherein the subject has not previously been treated with a cancer therapeutic.

105. The method of claim 98, wherein the subject has not previously been treated with a cancer immunotherapeutic.

106. A method of improving efficacy of cancer therapy with an immune checkpoint modulator, the method comprising a step of:

selecting for receipt of the therapy a subject identified as having a cancer with markers of high mutation comprising a neoepitope recognized by a T cell.

107. In a method of treating cancer by administering immune checkpoint modulator therapy, the improvement that comprises:

administering the therapy to a subject identified as having a cancer with one or more markers of high mutation comprising a neoepitope recognized by a T cell.

108. A method of treating a cancer selected from the group consisting of carcinoma, sarcoma, myeloma, leukemia, or lymphoma, the method comprising a step of:

administering immune checkpoint modulator therapy to a subject identified as having a cancer with a marker of high mutations comprising a neoepitope recognized by a T cell.

109. The method of claim 108, wherein the cancer is or comprises lung carcinoma.

110. A method of defining a mutation signature that correlates with responsiveness to therapy with an immune checkpoint modulator, the method comprising:

determining one or more mutation characteristics in a plurality of samples of tumors sharing a response characteristic to immune checkpoint modulator therapy;

comparing the determined one or more mutation characteristics with those in a plurality of samples of tumors that do not share the response characteristic; and

identifying a set of mutation characteristics whose presence correlates with the response characteristic.

111. The method of claim 110, wherein the one or more mutation characteristics include a mutation characteristic selected from the group consisting of mutation burden, nonsynonymous mutation burden, neoantigen burden, transversion burden, transition burden, relative transversion vs transition burden, mutation burden in genes associated with DNA repair, presence of mutation in one or more particular genes associated with DNA repair, identity of mutation in one or more particular genes associated with DNA repair, and combinations thereof.

112. The method of claim 111, wherein the determined burden is or comprises rate or number.

113. The method of claim 111, wherein the genes associated with DNA repair are or include a genes selected from the group consisting of POLD1, PRKDC, DNA-PK, RAD17, POLE, and MSH2.

114. The method of any one of claims 111-113, wherein the response characteristic is or comprises a characteristic selected from the group consisting of partial or stable response lasting longer than 6 months ("durable clinical benefit"; "DCB"), a reduction in tumor size for more than 4 weeks ("objective response rate"; "ORR"); no disease progression for more than 9 weeks ("progression-free survival"; "PFS"), and combinations thereof.

115. A method of characterizing a tumor sample by determining presence of a set of mutation characteristics that correlates with a response characteristic to immune checkpoint modulator therapy.

116. The method of claim 115, wherein the set of mutation characteristics includes a mutation characteristic selected from the group consisting of mutation burden, nonsynonymous mutation burden, neoantigen burden, transversion burden, transition burden,

relative transversion vs transition burden, mutation burden in genes associated with DNA repair, presence of mutation in one or more particular genes associated with DNA repair, identity of mutation in one or more particular genes associated with DNA repair, and combinations thereof.

117. The method of claim 116, wherein the determined burden is or comprises rate or number.

118. The method of claim 116, wherein the genes associated with DNA repair are or include genes selected from the group consisting of POLD1, PRKDC, DNA-PK, RAD17, POLE, and MSH2.

119. The method of any one of claims 115-117, wherein the response characteristic is or comprises a characteristic selected from the group consisting of partial or stable response lasting longer than 6 months ("durable clinical benefit"; "DCB"), a reduction in tumor size for more than 4 weeks ("objective response rate"; "ORR"); no disease progression for more than 9 weeks ("progression-free survival"; "PFS"), and combinations thereof.

120. The method of any one of claims 115-118, wherein the setp of determining comprises detecting at least one of the mutation characteristics by nucleic acid sequencing.

121. The method of claim 119, wherein the nucleic acid sequencing is or comprises whole exome sequencing.

摘要

本發明描述了癌症對免疫療法響應的分子決定因素，以及用於鑑定和/或表徵可能響應免疫療法的癌症的系統和工具。