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(54) Title: STEM-PROGENITOR CELL SPECIFIC MICRO-RIBONUCLEIC ACIDS AND USES THEREOF

(57) Abstract: Provided herein are methods and compositions for modulating the differentiation of incompletely differentiated cells, such as stem-progenitor cells, e.g., hematopoietic stem- progenitor cells. A method may comprise contacting a cell with an agononist or an antagonist of a miRNA comprising a nucleotide sequence from SEQ ID NO: 1-34.

STEM-PROGENITOR CELL SPECIFIC MICRO-RIBONUCLEIC ACIDS AND USES THEREOF

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Patent Application No. 60/872,764, filed on December 4, 2006, the content of which is specifically incorporated by reference herein in its entirety.

GOVERNMENTAL SUPPORT

This invention was made with governmental support under grant numbers CA70970 and CA60441, awarded by the U.S. National Institutes of Health. The government has certain rights in this invention.

BACKGROUND

MicroRNAs (miRNAs) consist of a class of epigenetic elements that inhibit translation of mRNA to protein and also may result in gene silencing through chromatin remodeling (1). miRNAs have been identified in many organisms, including plants, *Drosophila*, rats, mice, and humans, where they have been shown to control major cellular processes, including metabolism, differentiation, and development (2). miRNAs have been implicated in the differentiation of mammalian blood cell lineages. *miRNA-181* seems to bias mouse lymphoid progenitors toward B lymphoid development, and *miRNA-146* and *-223* bias toward T lymphopoiesis (3). *miRNA-221* and *-222* are critically involved in the negative control of human erythropoiesis (4) and *miRNA-223* in the down-regulation of mouse granulopoiesis (5). Given that miRNAs regulate normal cellular functions, it is not surprising that miRNAs also are involved in carcinogenesis. miRNAs have been identified at deleted or amplified genomic regions or translocation breakpoints in human cancers (6); e.g., *miRNA-15* and *-16* are the critical genetic elements deleted from 13q14 chromosomal region in a subset of chronic lymphocytic leukemia cases (7).

SUMMARY OF THE INVENTION

Provided herein are methods of modulating the differentiation or proliferation of an incompletely differentiated cell, e.g., a stem-progenitor cell, such as a hematopoietic cell. A method may comprise contacting a cell with a miRNA of one or more of SEQ ID NOS: 1 to 34 (Table 1). Contacting may comprise providing an miRNA to said cell, or providing an expression construct encoding said miRNA to said cell. The cell may be located in an

animal subject, such as a human, or the cell may be contacted in vitro, wherein the method may comprise further culturing of said cell with or without reintroduction into an animal.

In yet another embodiment, there is provided a method of modulating the proliferation or differentiation of a cell, e.g., a hematopoietic cell, comprising contacting said cell with an agent that is an antagonist of the function or expression of the miRNAs of SEQ ID NOS: 1-34 (Tables 1 and 6). The cell may be contacted in vitro, wherein the method may comprise further culturing of said cell, with or without reintroduction into an animal. The agent may be a peptide, protein, DNA, RNA, antisense DNA, antisense RNA or small molecule.

In a further embodiment, there is provided a method of modulating differentiation of a cell, e.g., a hematopoietic cell, comprising inhibiting the function of one or more of the miRNAs of SEQ ID NOS: 1-34 (Tables 1 and 6). Inhibiting the function may comprise contacting the cell with one or more modified or unmodified antisense constructs directed to one or more of the miRNAs of SEQ ID NOS: 1-34. The cell may be located in an animal subject, such as a human, or the cell may be contacted in vitro, followed by culturing said cell in vitro, with or without reintroduction into an animal.

In still a further embodiment, there is provided a method of modulating differentiation of a cell, e.g., a hematopoietic cell, comprising providing to said cell an agonist of one or more of the miRNAs of SEQ ID NOS: 1-34 (Tables 1 and 6). The agonist may be one or more of the miRNAs of SEQ ID NOS: 1-34. The agonist may also be an expression cassette encoding one or more of the miRNAs of SEQ ID NOS: 1-34. The agonist may be a peptide, protein, nucleic acid, or small molecule that stimulates the expression of one or more of the miRNAs of SEQ ID NOS: 1-34. The cell may be located in an animal subject, such as a human, or the cell may be contacted in vitro, and may be followed by culturing said cell in vitro, with or without reintroduction into the animal.

Provided herein are method for modulating the differentiation of a cell, e.g., a stem-progenitor cell (SPC). A method may comprise contacting a stem-progenitor cell with one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of SEQ ID NOs: 1-34 or the complement thereof. Modulating the differentiation of a stem-progenitor cell may be inhibiting the differentiation of a stem-progenitor cell, in which case, the stem-progenitor cell is contacted with one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of SEQ ID NOs: 1-34. Modulating the

differentiation of a stem-progenitor cell may be stimulating the differentiation of a stem-progenitor cell, in which case, the stem-progenitor cell is contacted with one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of the complements of SEQ ID NOs: 1-34. In one embodiment, the stem-progenitor cell is a hematopoietic stem-progenitor cell and the SEQ ID NOs are selected from the group consisting of the sequences of mir-128a, mir-181a, mir-146, mir-155, mir-24a, mir-17, mir-16, mir-103, mir-107, mir-223, mir-221 and mir-222 or the complement thereof. The hematopoietic stem-progenitor cell may be a CD34+ cell.

In one embodiment, the differentiation of a hematopoietic stem-progenitor cell beyond the stage of multipotent progenitor cell (MPP) and/or before the stage of common lymphoid progenitor (CLP) or common myeloid progenitor (CMP) is inhibited, and the SEQ ID NOs are selected from the group consisting of mir-128a, mir-181a, mir-146, mir-155, mir-24a, and mir-17. In one embodiment, the differentiation of a hematopoietic stem-progenitor cell beyond the stage of MPP andor before the stage of CLP is inhibited, and the SEQ ID NO is that of mir-146. In one embodiment, the differentiation of a hematopoietic stem-progenitor cell beyond the stage of MPP and/or before the stage of CMP is inhibited, and the SEQ ID NOs are selected from the group consisting of mir-155, mir-24a or mir-17. In one embodiment, the differentiation of a hematopoietic stem-progenitor cell beyond the stage of CMP and/or before the stage of B/Mac bi-potential is inhibited, and the SEQ ID NOs are those of mir-103 or mir-107. In one embodiment, the differentiation of the hematopoietic stem-progenitor cell beyond the stage of CMP and/or before the stage of megakaryocyte-erythrocyte progenitor (MEP) is inhibited, and the SEQ ID NO is that of mir-16. In one embodiment, the differentiation of a hematopoietic stem-progenitor cell beyond the stage of granulocyte-macrophage progenitor cell (GMP) and/or before the stage of granulocytes is inhibited, and the SEQ ID NO is that of mir-223. In one embodiment, the differentiation of a hematopoietic stem-progenitor cell beyond the stage of MEP and/or before the stage of erythrocyte is inhibited, and the SEQ ID NO is that of mir-221 and/or mir-222.

In one embodiment, the differentiation of a hematopoietic stem-progenitor cell towards the stage of CLP and CMP is stimulated, and the SEQ ID NOs are selected from the group consisting of mir-128a, mir-181a, mir-146, mir-155, mir-24a, and mir-17. In one embodiment, the differentiation of a hematopoietic stem-progenitor cell towards the stage

of CLP is stimulated, and the SEQ ID NO is that of mir-146. In one embodiment, the differentiation of a hematopoietic stem-progenitor cell towards the stage of CMP is stimulated, and the SEQ ID NOs are selected from the group consisting of mir-155, mir-24a or mir-17. In one embodiment, the differentiation of a hematopoietic stem-progenitor cell towards the stage of B/Mac bi-potential and GMP is stimulated, and the SEQ ID NOs are those of mir-103 or mir-107. In one embodiment, the differentiation of a hematopoietic stem-progenitor cell towards the stage of CMP and/or before the stage of MEP is stimulated, and the SEQ ID NO is that of mir-16. In one embodiment, the differentiation of a hematopoietic stem-progenitor cell towards the stage of granulocyte is stimulated, and the SEQ ID NO is that of mir-223. In one embodiment, the differentiation of a hematopoietic stem-progenitor cell towards the stage of erythrocyte is stimulated, and the SEQ ID NO is that of mir-221 and/or mir-222.

In one embodiment, a stem-progenitor cell is a human embryonic stem cell (ESC), a neural stem cell or a mesenchymal stem cell, and the SEQ ID NOs are selected from the group consisting of the sequences of let-7b, mir-17, mir-92-1, mir-92-2-p, mir-130a, mir-193, mir-197, mir-212 and mir-222 or the complement thereof.

Also provided herein are methods for stimulating the differentiation of a human embryonic stem cell into an embryonic type (primitive) hematopoietic stem cell. A method may comprise contacting a human embryonic stem cell with a nucleic acid comprising a nucleotide sequence that is at least about 90% identical to that of mir-155. Also provided herein are methods for preventing the differentiation of a human embryonic stem cell into an embryonic type (primitive) hematopoietic stem cell. A method may comprise contacting a human embryonic stem cell with a nucleic acid that is at least about 90% identical to that of the complement of mir-155.

In any of the methods described herein, a stem-progenitor cell may be *in vitro*, *in vivo*, *ex vivo*, isolated from a subject, isolated from the peripheral blood or from the bone marrow. When a cell is *in vivo*, a method for modulating the differentiation of a stem-progenitor cell that is in a subject may comprise administering to a subject or to a stem-progenitor cell that is in a subject in need thereof one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of SEQ ID NOs: 1-34 or the complement thereof. The subject may have a disease that is associated with excessive cell differentiation of a stem-progenitor cell and the

method may comprise administering to the subject or to the stem-progenitor cell one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of SEQ ID NOs: 1-34. SEQ ID NOs may be selected from the group consisting of those of mir-128a, mir-181a, mir-146, mir-155, mir-24a, mir-17, mir-16, mir-103, mir-107, mir-223, mir-221 and mir-222 or the complement thereof. The subject may have a disease that is associated with an excessive number of insufficiently differentiated cells and the method may comprise administering to the stem-progenitor cell one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of the complement of SEQ ID NOs: 1-34. The disease may be cancer, such as a solid tumor cancer or a blood cancer; the stem-progenitor cell may be a cancer stem cell and the SEQ ID NOs may be selected from the group consisting of the complements of the sequences of mir-128a, mir-181a, mir-146, mir-155, mir-24a, mir-17, mir-16, mir-103, mir-107, mir-223, mir-221 and mir-222 or the complement thereof. A subject in need of treatment may also have low levels of differentiated hematopoietic cells and the method may comprise administering to the stem-progenitor cell one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of the complement of SEQ ID NOs: 1-34. The subject may be having or having received chemotherapy or radiation therapy or other therapy destroying one or more types of differentiated cells or the subject may have a disease selected from the group consisting of thrombocytopenia, an immunodeficiency disease, an anemia, leukopenia, granulocytosis or neutropenia.

Also provided herein are methods for increasing the number of red blood cells in a subject, comprising administering to a subject in need thereof, an effective amount a nucleic acid comprising the complement of the nucleotide sequence of mir-16. Other methods provided herein include aA method for treating or preventing leukopenia in a subject, comprising administering to a subject in need thereof, an effective amount of a nucleic acid comprising the complement of mi-146. A subject in need of more differentiated cells may also be a subject infected with human immunodeficiency virus.

Further provided are methods for repopulating a hematopoietic cell population in a subject. A method may comprise obtaining a hematopoietic stem-progenitor cell from a subject, contacting *ex vivo* the stem-progenitor cell with one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to

one or more of the complements of SEQ ID NOs: 1-33 to thereby obtain differentiated hematopoietic cells; and administering all or a portion of the differentiated hematopoietic cells to the subject. A hematopoietic stem-progenitor cells may be contacted with a nucleic acid comprising the complement of the nucleotide sequence of mir-16.

Also provided are methods for expanding a population of stem-progenitor cells. A method may comprise contacting the stem-progenitor cell with one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of SEQ ID NOs: 1-34.

Other embodiments include methods for modulating the expression of a gene that is a target of a miRNA set forth herein, e.g., a gene selected from the group consisting of CXCR4, FOS, FOXP1, GATA3, MYB, RUNX-1, RUNX-3, Spi-8, MED, PU.1, CBPβ, CREBBP, HoxA5, HoxB7, Jun, Meis-1, WWP2, ETS, Evi-1, MYB, AGTR1, AGTR2, GATA2, c-kit, MYB,, ETS or PPRγin a cell. A method may comprise administering to the cell one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of the SEQ ID NOs: 1-33 or the complement thereof that interacts with the gene, as set forth in Table 1.

Isolated cells and populations of cells are also described herein. In one embodiment, an isolated stem-progenitor cell comprises a heterologous (or recombinant) nucleic acid that is at least about 90% identical to one or more of the SEQ ID NOs: 1-34 or the complement thereof. The stem-progenitor cell may be a stem cell. The isolated stem-progenitor cell may be a hematopoietic cell.

Also provided are compositions and kits, e.g., therapeutic or diagnostic compositions and kits. A composition may comprise one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of the SEQ ID NOs: 1-34 or the complement thereof and wherein the nucleic acid is linked to a promoter.

Also provided are methods for determining whether a cell is a stem-progenitor cell. A method may comprise determining the level of one or more miRNAs having one of SEQ ID NOs: 1-34, wherein a level of one or more of these miRNAs that is statistically significantly similar to that of Table 1 or Table 6 indicates that the cell is a stem-progenitor cell. A method for detecting a stem-progenitor cell in a population of cells, may comprise

determining the level of one or more miRNAs having one of SEQ ID NOs: 1-34 in a cell in the population of cells, wherein a level of one or more of these miRNAs that is statistically significantly similar to that of Table 1 or 6 indicates the presence of a stem-progenitor cell in the population of cells. A method for determining the proportion of stem-progenitor cells in a population of cells, may comprise determining in a small portion of the population of cells the level of one or more miRNAs having one of SEQ ID NOs: 1-34, and comparing the proportion of cells having one or more of these miRNAs to the total number of cells of the small portion of the population, to thereby derive the proportion of stem-progenitor cells in the population of cells. A method for determining the type of stem-progenitor cell of a hematopoietic stem-progenitor cell may comprise determining the presence of one or more miRNAs that are associated with a particular stage of differentiation, wherein the presence of mir-128a and/or mir-181a indicates that the stem-progenitor cell is a LT-HSC, ST-HSC or an MPP; the presence of mir-146 indicates that the stem-progenitor cell is an MPP that will differentiate into a CLP; the presence of mir-155, mir-24a or mir-17 indicates that the stem-progenitor cell is an MPP that will differentiate into a CMP; the presence of mir-16 indicates that the stem-progenitor cell is a CMP that will differentiate into a MEP; the presence of mir-103 or mir-107 indicates that the stem-progenitor cell with differentiate into a B/Mac or GMP; the presence of mir-223 indicates that the stem-progenitor cell is a GMP that will differentiate into a granulocyte; the presence of mir-221 or mir-222 indicates that the stem-progenitor cell is an MEP that will differentiate into an erythrocyte. A method may further comprise determining the presence of mRNA that is specific for a particular stage of differentiation. For example, the presence of mRNA of one or more of CXCR4, FOS, FOXP1, GATA3, MYB, RUNX-1, RUNX-3, Spi-8, MED or PU.1 indicates that the stem-progenitor cell is a lymphoid stem-progenitor cell; wherein the presence of mRNA of one or more of CBPβ, CREBBP, CXCR4, HoxA5, HoxB7, Jun, Meis-1, RUNX-1, RUNX-3, WWP2, ETS, Evi-1, MYB or PU.1 indicates that the stem-progenitor cell is a myeloid stem-progenitor cell; and wherein the presence of mRNA of one or more of AGTR1, AGTR2, CREBB, FOS, GATA2, GATA3, Jun, c-kit, MYB, RUNX-1, ETS or PPRγ indicates that the stem-progenitor cell is an erythroid stem-progenitor cell. Also provided are methods for determining the stemness of a cell. A method may comprise determining the level of one or more miRNAs having a nucleotide sequence of one of let-7b, mir-17, mir-92-1, mir-92-2-p, mir-130a, mir-193, mir-197, mir-212, and mir-222,

wherein a level of one or more of these miRNAs that is statistically significantly similar to that of Table 6 indicates that the cell is a stem or stem-progenitor cell.

In still yet a further embodiment, there is provided a method of screening a candidate substance for an effect on cell, e.g., hematopoietic cell, differentiation or proliferation comprising (a) providing a cell that expresses one or more of the miRNAs of SEQ ID NOS: 1-34; (b) contacting said cell with said candidate substance; and (c) assessing the effect of said candidate substance on the expression or stability of one or more of the miRNAs of SEQ ID NOS: 1-34, wherein a candidate substance that modulates the expression or stability of one or more of the miRNAs of SEQ ID NOS: 1-34 is a modulator of cell, e.g., hematopoietic cell, differentiation or proliferation. Assessing may comprise measuring the cellular level or turnover of one or more of the miRNAs of SEQ ID NOS: 1-34.

In another embodiment, there is provided a method of screening a candidate substance for an effect on miRNA-mediated reduction in mRNA or protein translation, comprising (a) providing a cell with a vector encoding a reporter gene fused to a 3' untranslated region (UTR) sequence, wherein the 3'UTR sequence comprises a nucleotide sequence identical or complimentary to that of an miRNA; (b) contacting the cell with said candidate substance; and (c) assessing the effect of the candidate substance on the expression of the reporter gene. The candidate substance may be one ore more of the miRNAs of SEQ ID NOS: 1-34, or a peptide, protein, nucleic acid, or small molecule. The 3' UTR may comprise a nucleotide sequence identical or complimentary to that of any miRNA. The 3' UTR may also comprise a nucleotide sequence from the 3' UTR of any mRNA. The reporter gene may comprise any known reporter, including luciferase, fluorescent proteins, beta galactosidase, or others.

A method for identifying a gene whose expression modulates the differentiation of a stem-progenitor cell may comprise identifying a gene having a sequence from SEQ ID NO: 1-34 in the 3' or 5' UTR, wherein the presence of such as sequence indicates that the gene modulates the differentiation of a stem-progenitor cell. A method for identifying the function of a miRNA may comprise comparing an expression profile of mRNA of a specific cell with that of miRNA of the same cell; comparing the sequences of mRNA and miRNA that are expressed in the cell, wherein the identification of a miRNA having the same as a sequence present in the gene encoding the mRNA indicates that the miRNA is

likely to regulate the expression of the gene. A method of screening a candidate substance for an effect on cell differentiation or proliferation, e.g., hematopoietic cell differentiation or proliferation may comprise providing a cell, e.g., a hematopoietic cell, that expresses one or more nucleic acids of SEQ ID NOS: 1-34; contacting said cell with a candidate substance; and assessing the effect of the candidate substance on the expression or stability of one or more nucleic acids of SEQ ID NOS: 1-34. A method for determining whether a miRNA inhibits the expression of a gene may comprise contacting a cell comprising a reporter construct linked to the 3' or 5' UTR of the gene with the miRNA, and determining the level of expression of the reporter construct, wherein a lower level of reporter construct in the presence of the miRNA relative to its absence indicates that the miRNA inhibits the expression of the gene.

These and other embodiments of the invention will be better appreciated and understood when considered in conjunction with the following description, exemplification and accompanying drawings. It should be understood, however, that the following description, while indicating various embodiments of the invention and numerous specific details thereof, is given by way of illustration and not of limitation. Many substitutions, modifications, additions and/or rearrangements may be made within the scope of the invention without departing from the spirit thereof, and the invention includes all such substitutions, modifications, additions and/or rearrangements.

The contents of all cited references (including literature references, issued patents, published patent applications, and GenBank accession numbers as cited throughout this application) are hereby expressly incorporated by reference. In case of conflict, the definitions herein dominate.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1. A model for HE-miRNA-mediated control of human hematopoiesis. Determination and electronic annotation of the predicted target HSPC-expressed mRNAs for the HE-miRNAs yielded predictions of the differentiation stages where HE-miRNAs might block hematopoietic differentiation. mir-221, mir-222, and mir-223 are predicted to regulate hematopoiesis by the study and supported by other reports; the other miRNAs are new predictions of the present invention. The hierarchy of hematopoietic differentiation is that proposed by Kondo *et al.* (17). LT-HSC, long-term-repopulating HSC; ST-SHC, short-term-repopulating HSC; MPP, multipotent progenitor cell; CLP, common lymphoid

progenitor; CMP, common myeloid progenitor; GMP, granulocyte-macrophage progenitor; MEP, megakaryocyte-erythrocyte progenitor.

Fig. 2. Translation of 16 of 18 tested hematopoietic differentiation-associated mRNAs is controlled by HE-miRNAs. Chimeric mRNAs, consisting of a luc reporter followed by the 3' UTR from the mRNAs shown, were expressed in K562 cells from a CMV-driven plasmid construct. All values are the percent of luc expression as compared with the control plasmid construct containing luc only. Results are combined from four separate replicate experiments.

Fig. 3. Deletion of specific predicted miRNA-binding sites restored translation of hematopoietic differentiation-associated mRNAs. Individual miRNA-binding sites were deleted from the luc-CXCR4 and luc-KLF2 chimeric mRNA constructs and then transfected into K562 cells. Labels show the mRNA name followed by the miRNA-binding site deleted from that 3' UTR. All values are the percent of luc expression as compared with the plasmid construct containing luc only. Results are combined from four separate replicate experiments.

Fig. 4. mir-155 inhibited generation of myeloid and erythroid colonies by normal primary human CD34+ cells. Normal PBSC CD34+ cells were transduced with FUGW (empty) or mir-155 lentivector. (*A* and *B*) Myeloid (*A*) and erythroid (*B*) colonies per 1,000 cells plated. (*C*) Representative colonies generated by control and mir-155-transduced cells. Results are representative of three separate experiments.

Fig. 5. Production of Luc-3' UTR reporter constructs and assay for miRNA mediated reduction in mRNA. (*A*) The luciferase (luc) reporter construct consists of a strong CMV promoter that drives luc expression. 3' UTR sequences, produced by PCR, were cloned into the 3' MCS after the luc coding sequence to produce chimeric genes, where luc is under the control of the 3' UTR from the mRNA predicted to be controlled by a miRNA. (*B*) If no miRNA binds to the 3' UTR, luciferase protein is expressed normally. (*C*) If a miRNA(s), represented as small bars, bind to the 3' UTR sequence and also inhibit translation, translation will be inhibited resulting in decreased amounts of luciferase protein production.

Fig. 6. Base plasmids used for construction of Luciferase(luc)-3' UTR Reporter Plasmids. **(A)** PSP-luc+NF fusion vector. **(B)** pcDNA-3.1.

Fig. 7. PBSC and BM miRNA expression data. Listed are the probe names for the microRNA chips and the intensity of signal for both PBSC and BM CD34+ cell samples after normalization and merging in GeneSpring.

Fig. 8. miRNAs expressed by PBSC and BM CD34+ cells. Listed are the miRNAs whose expression is shared between both PBSC and BM CD34+ cells, expressed only by PBSC, and expressed only by BM.

Fig. 9. MiR-16 expression changed dramatically during hemin-induced erythroid differentiation of K562 cells, but not during chemically-induced HL60 cell differentiation. **(A)** MiR levels during hemin-induced erythroid differentiation of K562 cells. **(B)** HL60 cells were induced to differentiate toward monocytes (1x10-8M 1,25 vitamin D), macrophages (50 ng/ml TPA), eosinophils (5x10-7M butyric acid), or granulocytes (1x10-7M all-trans retinoic acid). Results are a composite of 2 separate experiments containing both biologic and technical duplicates of each sample. **(C)** Erythroid proteins expressed in control or hemin-induced K562 cells, with our without mir-16 transduction, as measured by SILAC proteomics.

Fig. 10. Enforced miR-16 expression suppressed erythroid differentiation of primary human CD34+ HSPCs. Two days post-transduction of normal CD34+ cells with miR-16-containing or control (FUGW) lentivirus, GFP+ cells were isolated by FACS and assayed by **(A)** CFC assay or **(B)** suspension culture. Results in A are means (+/- standard error) of three experiments, and in B are representative plots from three experiments.

Fig. 11 provides the nucleotide sequences of the miRNAs described herein and depicts that some of the miRNAs are encoded by more than one gene.

Figure 12. miRNA to mRNA compiled interaction chart. This table is a matrix representation of the data outlined in Table 3. Each mRNA transcript is shown in the column direction with each miRNA in the row direction. The mRNA name has been placed under each miRNA that has been predicted to control its translation.

Figure 13. Cell line miRNA expression data Listed are the probe names for the microRNA chips and the intensity of signal for HAL-01, HL60, K562, KG-1, MV-4-1. REH, TF-1, and TF-1a cell line samples after normalization and merging in GeneSpring.

DETAILED DESCRIPTION

In certain embodiments, the present invention relates to the role of miRNAs in normal or pathological human cell differentiation, e.g., hematopoiesis. The present inventors have determined the miRNA expression profile of human hematopoietic stem-progenitor cells (HSPCs). The inventors then bioinformaticly combined (*i*) these miRNA expression data, (*ii*) mRNA expression data obtained for human CD34+ cells from a previous study by the inventors (8), and (*iii*) the predicted mRNA targets of all known miRNAs (9–11). Combining these five data sets into one database enabled the *in silico* examination of the interactions between HSPC-expressed miRNAs (HE-miRNAs) and mRNAs. Based on pairing HE-miRNAs with their putative HSPC-expressed mRNA targets, along with annotation implicating certain of these targets as associated with hematopoietic differentiation, the inventors have preicted which HE-miRNAs control hematopoietic differentiation.

The inventors found that 33 miRNAs (Table 1) are expressed in CD34+ HSPCs obtained from both bone marrow (BM) and mobilized blood peripheral blood stem cell (PBSC) harvests, and demonstrated that translation of several mRNAs associated with hematopoietic differentiation is controlled by these HE-miRNAs. Each of these HE-miRNAs targets multiple hematopoietic differentiation-associated mRNAs, suggesting that a relatively small subset of HE-miRNAs negatively regulates hematopoiesis. Taken together, these observations lea to a proposed model in which many of the protein-coding genes that specify hematopoietic differentiation are expressed at an early time point by undifferentiated HSPCs; yet, these factors appear to be held in check by HE-miRNA-mediated repression of protein translation.

Table 1. Levels of the HE-miRNAs expressed in CD34+ cells from PBSC and BM

miRNA*	PBSC RFU	BM, RFU
hsa-let-7b (SEQ ID NO:1)	163,441	202,826
hsa-mir-10a (SEQ ID NO:2)	123,147	104,124
hsa-mir-16a (SEQ ID NO:3)	123,486	86,828

hsa-mir-17 (SEQ ID NO:4)	169,601	839,361
hsa-mir-20 (SEQ ID NO:5)	168,040	657,934
hsa-mir-23a (SEQ ID NO:6)	445,017	896,002
hsa-mir-23b (SEQ ID NO:7)	450,110	947,757
hsa-mir-24-1 (SEQ ID NO:8)	96,912	105,926
hsa-mir-25 (SEQ ID NO:9)	211,423	3,574,408
hsa-mir-26a (SEQ ID NO:10)	364,607	867,620
hsa-mir-26b (SEQ ID NO:11)	368,293	2,851,706
hsa-mir-30b (SEQ ID NO:12)	136,572	91,862
hsa-mir-30d (SEQ ID NO:13)	225,309	241,004
hsa-mir-92-1 (SEQ ID NO:14)	4,115,379	5,793,765
hsa-mir-92-2-p (SEQ ID NO:15)	3,477,367	4,760,875
hsa-mir-93-1 (SEQ ID NO:16)	127,149	483,003
hsa-mir-103-2 (SEQ ID NO:17)	103,209	686,012
hsa-mir-103-1 (SEQ ID NO:18)	158,154	885,352
hsa-mir-106a (SEQ ID NO:19)	160,635	729,776
hsa-mir-107 (SEQ ID NO:20)	136,376	832,992
hsa-mir-128a (SEQ ID NO:21)	319,848	183,657
hsa-mir-130a (SEQ ID NO:22)	186,958	420,271
hsa-mir-146 (SEQ ID NO:23)	626,547	444,647
hsa-mir-155 (SEQ ID NO:24)	355,623	639,819
hsa-mir-181a (SEQ ID NO:25)	110,744	598,830
hsa-mir-191 (SEQ ID NO:26)	247,692	3,563,677
hsa-mir-193 (SEQ ID NO:27)	104,803	481,103
hsa-mir-197 (SEQ ID NO:28)	182,695	231,027
hsa-mir-213 (SEQ ID NO:29)	272,646	1,088,714
hsa-mir-221 (SEQ ID NO:30)	354,047	549,559
hsa-mir-222 (SEQ ID NO:31)	354,343	200,347
hsa-mir-222-p (SEQ ID NO:32)	186,393	138,190
hsa-mir-223 (SEQ ID NO:33)	2,038,358	504,773

RFU, relative florescence units.

**All miRNAs listed are the mature form, except those suffixed with "-p" which are the precursor forms (RFU values shown in italics).*

The inventors also identified a set of 9 miRNAs that are specifically expressed in any early stem-progenitor cell, e.g., human embryonic stem cells, neurological stem cells and mesenchymal stem cells (see Table 6).

Other examples are further described in the Examplary section.

Nucleic acids are provided related to miRNAs, precursors thereto, and targets thereof. Such nucleic acids may be useful for diagnostic, therapeutic and prognostic purposes, and also for modifying target gene expression and stem cell differentiation. Also provided are methods and compositions that may be useful, among other things, for diagnostic, therapeutic and prognostic purposes. Other aspects of the invention will become apparent to the skilled artisan by the following description of the invention.

Definitions

Before the present compounds, products and compositions and methods are disclosed and described, it is to be understood that the terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting. It must be noted that, as used in the specification and the appended claims, the singular forms "a," "an" and "the" include plural referents unless the context clearly dictates otherwise.

"Animal" as used herein may mean fish, amphibians, reptiles, birds, and mammals, such as mice, rats, rabbits, goats, cats, dogs, cows, apes and humans.

"Biological sample" as used herein may mean a sample of biological tissue or fluid that comprises nucleic acids. Such samples include, but are not limited to, tissue or fluid isolated from animals. Biological samples may also include sections of tissues such as biopsy and autopsy samples, frozen sections taken for histologic purposes, blood, plasma, serum, sputum, stool, tears, mucus, hair, and skin. Biological samples also include explants and primary and/or transformed cell cultures derived from animal or patient tissues. A biological sample may be provided by removing a sample of cells from an animal, but can also be accomplished by using previously isolated cells (e.g., isolated by another person, at another time, and/or for another purpose), or by performing the methods described herein in vivo. Archival tissues, such as those having treatment or outcome history, may also be used.

"Cell" used herein may be a naturally occurring cell or a transformed cell that may contain a vector and may support replication of the vector. Cells may be cultured cells,

explants, cells in vivo, and the like. Cells may be prokaryotic cells such as E. coli, or eukaryotic cells such as yeast, insect, amphibian, or mammalian cells, such as CHO and HeLa.

In certain embodiments, a host cell is a hematopoietic cell, for examle, a hematopoietic stem-progenitor cell, a long-term repopulating hematopoietic stem cell, a short-term repopulating hematopoietic stem cell, a multipotent progenitor cell, a common lymphoid progenitor cell, a pro-T cell, a T cell, an NK progenitor cell, an NK cell, a pro-B cell, a B cell, a common myeloid progenitor cell, a B-cell / macrophage bi-potential cell, a granulocyte-macrophage progenitor cell, a megakaryocyte-ertythrocyte progenitor cell, a macrophage, a granulocyte, a megakaryocyte progenitor cell, a megakaryocyte, or an erythrocyte. It is contemplated that the miRNAs described here may play a role in the differentiation pathways of other cells. The cell may also be a bacterial, fungal, plant, insect or other type of animal cell.

"Identical" or "identity" as used herein in the context of two or more nucleic acids or polypeptide sequences, may mean that the sequences have a specified percentage of residues that are the same over a specified region. The percentage may be calculated by optimally aligning the two sequences, comparing the two sequences over the specified region, determining the number of positions at which the identical residue occurs in both sequences to yield the number of matched positions, dividing the number of matched positions by the total number of positions in the specified region, and multiplying the result by 100 to yield the percentage of sequence identity. In cases where the two sequences are of different lengths or the alignment produces one or more staggered ends and the specified region of comparison includes only a single sequence, the residues of single sequence are included in the denominator but not the numerator of the calculation. When comparing DNA and RNA, thymine (T) and uracil (U) may be considered equivalent. Identity may be performed manually or by using a computer sequence algorithm such as BLAST or BLAST 2.0.

"Nucleic acid" or "oligonucleotide" or "polynucleotide" used herein may mean at least two nucleotides covalently linked together. The depiction of a single strand also defines the sequence of the complementary strand. Thus, a nucleic acid also encompasses the complementary strand of a depicted single strand, unless the nucleic acid isa single stranded nucleic acid. Many variants of a nucleic acid may be used for the same purpose as a given nucleic acid. A single strand provides a probe that may hybridize to a target

sequence under stringent hybridization conditions. Thus, a nucleic acid may also be a probe that hybridizes under stringent hybridization conditions.

Nucleic acids may be single stranded or double stranded, or may contain portions of both double stranded and single stranded sequence. The nucleic acid may be DNA, both genomic and cDNA, RNA, or a hybrid, where the nucleic acid may contain combinations of deoxyribo- and ribo-nucleotides, and combinations of bases including uracil, adenine, thymine, cytosine, guanine, inosine, xanthine hypoxanthine, isocytosine and isoguanine. Nucleic acids may be obtained by chemical synthesis methods or by recombinant methods.

A nucleic acid will generally contain phosphodiester bonds, although nucleic acid analogs may be included that may have at least one different linkage, e.g., phosphoramidate, phosphorothioate, phosphorodithioate, or O-methylphosphoroamidite linkages and peptide nucleic acid backbones and linkages. Other analog nucleic acids include those with positive backbones; non-ionic backbones, and non-ribose backbones, including those described in U.S. Pat. Nos. 5,235,033 and 5,034,506, which are incorporated by reference. Nucleic acids containing one or more non-naturally occurring or modified nucleotides are also included within one definition of nucleic acids. The modified nucleotide analog may be located for example at the 5'-end and/or the 3'-end of the nucleic acid molecule. Representative examples of nucleotide analogs may be selected from sugar- or backbone-modified ribonucleotides. It should be noted, however, that also nucleobase-modified ribonucleotides, i.e. ribonucleotides, containing a non-naturally occurring nucleobase instead of a naturally occurring nucleobase such as uridines or cytidines modified at the 5-position, e.g. 5-(2-amino)propyl uridine, 5-bromo uridine; adenosines and guanosines modified at the 8-position, e.g. 8-bromo guanosine; deaza nucleotides, e.g. 7-deaza-adenosine; O- and N-alkylated nucleotides, e.g. N6-methyl adenosine are suitable. The 2'-OH-group may be replaced by a group selected from H, OR, R, halo, SH, SR, NH_2, NHR, NR_2 or CN, wherein R is C_1-C_6 alkyl, alkenyl or alkynyl and halo is F, Cl, Br or I. Modified nucleotides also include nucleotides conjugated with cholesterol through, e.g., a hydroxyprolinol linkage as described in Krutzfeldt et al., Nature (Oct. 30, 2005), Soutschek et al., Nature 432:173-178 (2004), and U.S. Patent Publication No. 20050107325, which are incorporated herein by reference. Modified nucleotides and nucleic acids may also include locked nucleic acids (LNA), as described in U.S. Patent No. 20020115080, which is incorporated herein by reference. Additional modified nucleotides and nucleic acids are described in U.S. Patent Publication No. 20050182005, which is incorporated herein by

reference. Modifications of the ribose-phosphate backbone may be done for a variety of reasons, e.g., to increase the stability and half-life of such molecules in physiological environments, to enhance diffusion across cell membranes, or as probes on a biochip. Mixtures of naturally occurring nucleic acids and analogs may be made; alternatively, mixtures of different nucleic acid analogs, and mixtures of naturally occurring nucleic acids and analogs may be made.

"Operably linked" used herein may mean that expression of a gene is under the control of a promoter with which it is spatially connected. A promoter may be positioned 5' (upstream) or 3' (downstream) of a gene under its control. The distance between the promoter and a gene may be approximately the same as the distance between that promoter and the gene it controls in the gene from which the promoter is derived. As is known in the art, variation in this distance may be accommodated without loss of promoter function.

"Probe" as used herein may mean an oligonucleotide capable of binding to a target nucleic acid of complementary sequence through one or more types of chemical bonds, usually through complementary base pairing, usually through hydrogen bond formation. Probes may bind target sequences lacking complete complementarity with the probe sequence depending upon the stringency of the hybridization conditions. There may be any number of base pair mismatches which will interfere with hybridization between the target sequence and the single stranded nucleic acids described herein. However, if the number of mutations is so great that no hybridization can occur under even the least stringent of hybridization conditions, the sequence is not a complementary target sequence. A probe may be single stranded or partially single and partially double stranded. The strandedness of the probe is dictated by the structure, composition, and properties of the target sequence. Probes may be directly labeled or indirectly labeled such as with biotin to which a streptavidin complex may later bind.

"Promoter" as used herein may mean a synthetic or naturally-derived molecule which is capable of conferring, activating or enhancing expression of a nucleic acid in a cell. A promoter may comprise one or more specific transcriptional regulatory sequences to further enhance expression and/or to alter the spatial expression and/or temporal expression of same. A promoter may also comprise distal enhancer or repressor elements, which can be located as much as several thousand base pairs from the start site of transcription. A promoter may be derived from sources including viral, bacterial, fungal, plants, insects, and animals. A promoter may regulate the expression of a gene component constitutively, or

differentially with respect to cell, the tissue or organ in which expression occurs or, with respect to the developmental stage at which expression occurs, or in response to external stimuli such as physiological stresses, pathogens, metal ions, or inducing agents. Representative examples of promoters include the bacteriophage T7 promoter, bacteriophage T3 promoter, SP6 promoter, lac operator-promoter, tac promoter, SV40 late promoter, SV40 early promoter, RSV-LTR promoter, CMV IE promoter, SV40 early promoter or SV40 late promoter and the CMV IE promoter.

"Selectable marker" used herein may mean any gene which confers a phenotype on a host cell in which it is expressed to facilitate the identification and/or selection of cells which are transfected or transformed with a genetic construct. Representative examples of selectable markers include the ampicillin-resistance gene (Amp^r), tetracycline-resistance gene (Tc^r), bacterial kanamycin-resistance gene (Kan^r), zeocin resistance gene, the AURI-C gene which confers resistance to the antibiotic aureobasidin A, phosphinothricin-resistance gene, neomycin phosphotransferase gene (nptII), hygromycin-resistance gene, beta-glucuronidase (GUS) gene, chloramphenicol acetyltransferase (CAT) gene, green fluorescent protein (GFP)-encoding gene and luciferase gene.

"Stringent hybridization conditions" used herein may mean conditions under which a first nucleic acid sequence (e.g., probe) will hybridize to a second nucleic acid sequence (e.g., target), such as in a complex mixture of nucleic acids. Stringent conditions are sequence-dependent and will be different in different circumstances. Stringent conditions may be selected to be about 5-10° C. lower than the thermal melting point (T_m) for the specific sequence at a defined ionic strength pH. The T_m may be the temperature (under defined ionic strength, pH, and nucleic concentration) at which 50% of the probes complementary to the target hybridize to the target sequence at equilibrium (as the target sequences are present in excess, at T_m, 50% of the probes are occupied at equilibrium). Stringent conditions may be those in which the salt concentration is less than about 1.0 M sodium ion, such as about 0.01-1.0 M sodium ion concentration (or other salts) at pH 7.0 to 8.3 and the temperature is at least about 30.degree. C. for short probes (e.g., about 10-50 nucleotides) and at least about 60° C. for long probes (e.g., greater than about 50 nucleotides). Stringent conditions may also be achieved with the addition of destabilizing agents such as formamide. For selective or specific hybridization, a positive signal may be at least 2 to 10 times background hybridization. Exemplary stringent hybridization conditions include the following: 50% formamide, 5.times.SSC, and 1% SDS, incubating at

42° C., or, 5X SSC, 1% SDS, incubating at 65° C., with wash in 0.2X SSC, and 0.1% SDS at 65° C.

"Substantially complementary" used herein may mean that a first sequence is at least about 60%, 65%, 70%, 75%, 80%, 85%, 90%, 95%, 97%, 98% or 99% identical to the complement of a second sequence over a region of 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100 or more nucleotides, or that the two sequences hybridize under stringent hybridization conditions.

"Substantially identical" used herein may mean that a first and second sequence are at least about 60%, 65%, 70%, 75%, 80%, 85%, 90%, 95%, 97%, 98% or 99% identical over a region of 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100 or more nucleotides or amino acids, or with respect to nucleic acids, if the first sequence is substantially complementary to the complement of the second sequence.

"Variant" used herein to refer to a nucleic acid may mean (i) a portion of a referenced nucleotide sequence; (ii) the complement of a referenced nucleotide sequence or portion thereof; (iii) a nucleic acid that is substantially identical to a referenced nucleic acid or the complement thereof; or (iv) a nucleic acid that hybridizes under stringent conditions to the referenced nucleic acid, complement thereof, or a sequences substantially identical thereto.

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

"Expression vector" refers to any type of genetic construct comprising a nucleic acid coding for an RNA capable of being transcribed. Expression vectors can contain a variety of "control sequences," which refer to nucleic acid sequences necessary for the transcription

and possibly translation of an operably linked coding sequence in a particular host cell. In addition to control sequences that govern transcription and translation, vectors and expression vectors may contain nucleic acid sequences that serve other functions as well and are described infra.

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

In certain embodiments, it may be useful to employ a promoter and/or enhancer that effectively directs the expression of the DNA segment in the organelle, cell type, tissue, organ, or organism chosen for expression. Those of skill in the art of molecular biology generally know the use of promoters, enhancers, and cell type combinations for protein expression, (see, for example Sambrook et al. (2001), incorporated herein by reference). The promoters employed may be constitutive, tissue-specific, inducible, and/or useful under the appropriate conditions to direct high level expression of the introduced DNA segment.

The promoter may be heterologous or endogenous.

Additionally any promoter/enhancer combination (as per, for example, the Eukaryotic Promoter Data Base EPDB, www.epd.isb-sib.ch) could also be used to drive expression. Use of a T3, T7 or SP6 cytoplasmic expression system is another possible embodiment. Eukaryotic cells can support cytoplasmic transcription from certain bacterial promoters if the appropriate bacterial polymerase is provided, either as part of the delivery complex or as an additional genetic expression construct.

A specific initiation signal also may be required for efficient translation of coding sequences. These signals include the ATG initiation codon or adjacent sequences. Exogenous translational control signals, including the ATG initiation codon, may need to be provided. One of ordinary skill in the art would readily be capable of determining this and providing the necessary signals. It is well known that the initiation codon must be "in-frame" with the reading frame of the desired coding sequence to ensure translation of the entire insert. The exogenous translational control signals and initiation codons can be either natural or synthetic. The efficiency of expression may be enhanced by the inclusion of appropriate transcription enhancer elements.

In certain embodiments of the invention, the use of internal ribosome entry sites (IRES) elements are used to create multigene, or polycistronic, messages. IRES elements are able to bypass the ribosome scanning model of 5' methylated Cap dependent translation and begin translation at internal sites (Pelletier and Sonenberg, 1988). IRES elements from two members of the picornavirus family (polio and encephalomyocarditis) have been described (Pelletier and Sonenberg, 1988), as well an IRES from a mammalian message (Macejak and Sarnow, 1991). IRES elements can be linked to heterologous open reading frames. Multiple open reading frames can be transcribed together, each separated by an IRES, creating polycistronic messages. By virtue of the IRES element, each open reading frame is accessible to ribosomes for efficient translation. Multiple genes can be efficiently expressed using a single promoter/enhancer to transcribe a single message (see U.S. Pat. Nos. 5,925,565 and 5,935,819, each herein incorporated by reference).

Surface markers of hematopoietic cells are as follows: HSCs (CD34+/CD38-/CD90+/Lin-), CMPs (CD34+/CD38+/CD123+/CD45RA-), and MEPs (CD34+/CD38+/CD123-/CD45RA-). HSPCs may be CD34+; HSC-enriched cells (CD34+/[CD38/Lin]lo); HPC-enriched cells (CD34+/[CD38/Lin]hi); Erythroid progenitor-

enriched cells (CD34+/[CD71/CD235A]+); and (e) Erythroid precursor/mature cells (CD34-/[CD71/CD235A]+).

MicroRNA

While not being bound by theory, a gene coding for an miRNA may be transcribed leading to production of an miRNA precursor known as the pri-miRNA. The pri-miRNA may be part of a polycistronic RNA comprising multiple pri-miRNAs. The pri-miRNA may form a hairpin with a stem and loop. The stem may comprise mismatched bases.

The hairpin structure of the pri-miRNA may be recognized by Drosha, which is an RNase III endonuclease. Drosha may recognize terminal loops in the pri-miRNA and cleave approximately two helical turns into the stem to produce a 60-70 nt precursor known as the pre-miRNA. Drosha may cleave the pri-miRNA with a staggered cut typical of RNase III endonucleases yielding a pre-miRNA stem loop with a 5' phosphate and about a 2 nucleotide 3' overhang. Approximately one helical turn of the stem (about 10 nucleotides) extending beyond the Drosha cleavage site may be essential for efficient processing. The pre-miRNA may then be actively transported from the nucleus to the cytoplasm by Ran-GTP and the export receptor Ex-portin-5.

The pre-miRNA may be recognized by Dicer, which is also an RNase III endonuclease. Dicer may recognize the double-stranded stem of the pre-miRNA. Dicer may also recognize the 5' phosphate and 3' overhang at the base of the stem loop. Dicer may cleave off the terminal loop two helical turns away from the base of the stem loop leaving an additional 5' phosphate and about a 2 nucleotide 3' overhang. The resulting siRNA-like duplex, which may comprise mismatches, comprises the mature miRNA and a similar-sized fragment known as the miRNA*. The miRNA and miRNA* may be derived from opposing arms of the pri-miRNA and pre-miRNA. miRNA* sequences may be found in libraries of cloned miRNAs but typically at lower frequency than the miRNAs.

Although initially present as a double-stranded species with miRNA*, the miRNA may eventually become incorporated as a single-stranded RNA into a ribonucleoprotein complex known as the RNA-induced silencing complex (RISC). Various proteins can form the RISC, which can lead to variability in specifity for miRNA/miRNA* duplexes, binding site of the target gene, activity of miRNA (repress or activate), and which strand of the miRNA/miRNA* duplex is loaded in to the RISC.

When the miRNA strand of the miRNA:miRNA* duplex is loaded into the RISC, the miRNA* may be removed and degraded. The strand of the miRNA:miRNA* duplex

that is loaded into the RISC may be the strand whose 5' end is less tightly paired. In cases where both ends of the miRNA:miRNA* have roughly equivalent 5' pairing, both miRNA and miRNA* may have gene silencing activity.

The RISC may identify target nucleic acids based on high levels of complementarity between the miRNA and the mRNA, especially by nucleotides 2-8 of the miRNA. A case has been reported in animals where the interaction between the miRNA and its target was along the entire length of the miRNA. This was shown for mir-196 and Hox B8 and it was further shown that mir-196 mediates the cleavage of the Hox B8 mRNA (Yekta et al., 2004, Science 304-594). Such interactions are also known only in plants (Bartel & Bartel, 2003, Plant Physiol 132-709).

A number of studies have examined the base-pairing requirement between miRNA and its mRNA target for achieving efficient inhibition of translation (reviewed by Bartel, 2004, Cell, 116-281). In mammalian cells, the first 8 nucleotides of the miRNA may be important (Doench & Sharp, 2004, GenesDev, 2004-504). However, other parts of the miRNA may also participate in mRNA binding. Moreover, sufficient base pairing at the 3' can compensate for insufficient pairing at the 5' (Brennecke et al., 2005, PLoS 3-e85). Computational studies analyzing miRNA binding on whole genomes have suggested a specific role for bases 2-7 at the 5' of the miRNA in target binding but a role for the first nucleotide, usually "A", was also recognized (Lewis et al., 2005, Cell, 120-15). Similarly, nucleotides 1-7 or 2-8 were used to identify and validate targets by Krek et al. (2005, Nat Genet, 37-495).

The target sites in the mRNA may be in the 5' UTR, the 3' UTR or within the coding region. Multiple miRNAs may regulate the same mRNA target by recognizing the same or multiple sites. The presence of multiple miRNA binding sites in most genetically identified targets may indicate that the cooperative action of multiple RISCs provides the most efficient translational inhibition. Similarly, a single miRNA may regulate multiple mRNA targets by recognizing the same or similar sites on the different targets.

Without being bound by theory, miRNAs may direct the RISC to downregulate gene expression by several mechanisms: mRNA cleavage, translational repression, or chromatin remodeling. The miRNA may specify cleavage of the mRNA if the miRNA has a certain degree of complementarity to the mRNA. When an miRNA guides cleavage, the cut may be between the nucleotides pairing to residues 10 and 11 of the miRNA. Alternatively, the miRNA may repress translation if the miRNA does not have the requisite

degree of complementarity to the miRNA. Translational repression may be more prevalent in animals since animals may have a lower degree of complementarity between the miRNA and binding site.

It should be noted that there may be variability in the 5' and 3' ends of any pair of miRNA and miRNA*. This variability may be due to variability in the enzymatic processing of Drosha and Dicer with respect to the site of cleavage. Variability at the 5' and 3' ends of miRNA and miRNA* may also be due to mismatches in the stem structures of the pri-miRNA and pre-miRNA. The mismatches of the stem strands may lead to a population of different hairpin structures. Variability in the stem structures may also lead to variability in the products of cleavage by Drosha and Dicer.

Methods for modulating differentiation of stem-progenitor cells

Provided herein are methods for modulating the differentiation of an incompletely differentiated cell, i.e., a cell that is capable of further differentiation, e.g., a stem-progenitor cell (SPC). A "stem-progenitor cell" is any cell that is capable of further differentiation and/or is capable of proliferation, i.e., undergoing cell division (i.e. renew itself). An SPC may be a eukaryotic cell, e.g., a mammalian cell, a vertebrate cell, a human cell or a non-human cell, e.g., a non-human animal cell. A SPC may be an embryonic SPC, e.g., a human embryonic stem cell, an adult stem cell, as well as a cancer stem cell. It may be also be an adult SPC, and may be of any cell lineage, e.g., a cell lineage specific stem cell, e.g., a neural, mesenchymal, hematopoietic, muscle, stromal cells (e.g., bone marrow stromal cells), skin, liver, brain, and blood vessel specific stem cells.

The potency of a cell is sometimes used to specify the differentiation potential (the potential to differentiate into different cell types) of a stem or stem-progenitor cell. Totipotent stem cells are sometimes referred to as cells that are produced from the fusion of an egg and sperm cell. Cells produced by the first few divisions of the fertilized egg may also be totipotent. These cells can differentiate into embryonic and extraembryonic cell types. Pluripotent stem are sometimes referred to as cells that are the descendants of totipotent cells and can differentiate into cells derived from any of the three germ layers. Multipotent stem cells are cells that can produce only cells of a closely related family of cells (e.g. hematopoietic stem cells differentiate into red blood cells, white blood cells, platelets, etc.). Unipotent cells can produce only one cell type, but have the property of self-renewal which distinguishes them from non-stem cells (e.g. muscle stem cells).

Hematopoietic stem cells may give rise to all the types of blood cells: red blood cells, B lymphocytes, T lymphocytes, natural killer cells, neutrophils, basophils, eosinophils, monocytes, macrophages, and platelets. Bone marrow stromal cells (mesenchymal stem cells) may give rise to a variety of cell types: bone cells (osteocytes), cartilage cells (chondrocytes), fat cells (adipocytes), and other kinds of connective tissue cells such as those in tendons. Neural stem cells in the brain may give rise to its three major cell types: nerve cells (neurons) and two categories of non-neuronal cells—astrocytes and oligodendrocytes. Epithelial stem cells in the lining of the digestive tract occur in deep crypts and give rise to several cell types: absorptive cells, goblet cells, Paneth cells, and enteroendocrine cells. Skin stem cells occur in the basal layer of the epidermis and at the base of hair follicles. The epidermal stem cells amy give rise to keratinocytes, which migrate to the surface of the skin and form a protective layer. The follicular stem cells can give rise to both the hair follicle and to the epidermis (see, e.g., stemcells.nih.gov.).

Certain adult stem cell types are pluripotent. This ability to differentiate into multiple cell types is called plasticity or transdifferentiation. The following list offers examples of adult stem cell plasticity. Hematopoietic stem cells may differentiate into: three major types of brain cells (neurons, oligodendrocytes, and astrocytes); skeletal muscle cells; cardiac muscle cells; and liver cells. Bone marrow stromal cells may differentiate into: cardiac muscle cells and skeletal muscle cells. Brain stem cells may differentiate into: blood cells and skeletal muscle cells (see, e.g., stemcells.nih.gov.).

In one embodiment, a stem-progenitor cell is a hematopoietic stem-progenitor cell (HSPC). An HSPC is any cell that is not fully differentiated, i.e., that is capable of further differentiation and/or is capable of further proliferation (or cell division). An HSPC may be any cell that is set forth in Figure 1, provided that it is not a fully differentiated cell.

A method may comprise contacting a hematopoietic stem-progenitor cell with one or more agents that modulate the level or activity of exactly or about 1, 2, 3, 5, 10, 15, 20, 25, 30, 32, or 33 miRNAs having one of SEQ ID NOs: 1-33 (see Table 1). In one embodiment, an agent that modulates the level or activity of a miRNA is a nucleic acid, e.g., a natural, synthetic or recombinant nucleic acid, comprising a nucleotide sequence that is at least about 50%, 60%, 70%, 80%, 85%, 90%, 95%, 96%, 97%, 98%, 99% or 100% to that of the miRNA, pre-miRNA or pri-miRNA or the complement thereof. When referring to "comprising a sequence" herein, it is understood that in certain embodiments, "consisting essentially of" or "consisting of" are also included. For example, in certain embodiments, a

nucleic acid comprises, consists essentially of or consists of a nucleotide sequence that is at least about 50%, 60%, 70%, 80%, 85%, 90%, 95%, 96%, 97%, 98%, 99% or 100% to that of the miRNA, pre-miRNA or pri-miRNA or the complement thereof. In certain embodiments, a nucleic acid comprises a nucleotide sequence that differs (by substitution, addition or deletion) from that of a miRNA, pre-miRNA or pri-miRNA in about 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 or more nucleotides. In embodiments in which it is desired to inhibit the differentiation of a stem-progenitor cell, a nucleic acid comprising a nucleotide sequence that is identical to or homologous to that of all or a portion of the miRNA, pre-miRNA or pri-miRNA may be used. In embodiments in which it is desired to stimulate the differentiation of a stem-progenitor cell, a nucleic acid comprising a nucleotide sequence that is identical to or homologous to that of the complement of all or a portion of the miRNA, pre-miRNA or pri-miRNA may be used. Generally, when referring to targeting, modulating, inhibiting or stimulating a "miRNA," it is understood that this may include affecting related or derivative molecules of the miRNA, such as pre- and pri-miRNAs. A difference in nucleotide sequence is permitted provided that i) if the nucleic acid is an antagonist of the miRNA, the nucleic acid binds (or hybridizes) sufficiently strongly and/or specifically to the miRNA, pre-miRNA or pri-miRNA to thereby inhibit or reduce its activity and ii) if the nucleic acid is an agonist of the miRNA, the nucleic acid mimics or has the biological activity or a significant portion thereof, of the wild-type miRNA.

Nucleic acids for modulating the level or activity of miRNAs may, in addition to a sequence that is identical or homologous to that of the miRNA or complement thereof, also comprise additional, unrelated nucleotides, provided that they do not interfere with the mimicking or inhibition, respectively, of the miRNA. They may comprise, e.g., about 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 or more nucleotides that are located either 5' and/or 3' (or internal) to the sequence for modulating the level or activity of the miRNA.

An agonist of a miRNA (understood herein to also include agonists of the related molecules, e.g., pre- or pri-miRNA) is any agent, e.g., a nucleic acid comprising a nucleotide sequence that is identical or homologous to that of the miRNA, that mimics the action of the miRNA. An antagonist of a miRNA (understood herein to also include agonists of the related molecules, e.g., pre- or pri-miRNA) is any agent, e.g., a nucleic acid comprising a nucleotide sequence that is identical or homologous to that of the complement of the miRNA, that inhibits the action of the miRNA.

In certain embodiments, a nucleic acid comprises at least about 2, 3, 5, 10, 15, 20, 25, 30, or more nucleotide sequences that are identical or homologous to that of a miRNA or the complement thereof. The nucleotide sequences may be mimicking or inhibiting the level or activity of one miRNA or alternatively of at least about 2, 3, 5, 10, 15, 20, 25, 30, 32, 33, or more different miRNAs, e.g., those having SEQ ID NOs: 1-33.

Exemplary steps of hematopoiesis that may be modulated by specific miRNAs are set forth in Figure 1. Generally, agonists of specific miRNAs will inhibit (or block) the differentiation of a hematopoietic stem-progenitor cell past a certain stage of differentiation and/or maintain the cell at a certain stage of differentiation, while antagonists of specific miRNAs will stimulate the differentiation of the cell towards or past (or beyond) a specific stage of differentiation. Thus, the methods described herein allow one to block a cell early in differentiation or later in differentiation, depending on which miRNA agonist is used. The methods described herein also allow one to stimulate the differentiation of an early progenitor or stem cell or a cell at a later stage of diffentiation.

In certain embodiments, a hematopoietic stem-progenitor cell is a pluripotent stem-progenitor cell, a totipotent stem-progenitor cell, a long-term repopulating hematopoietic stem-progenitor cell (HSPC), a short term repopulating HSPC, or a multipotent stem-progenitor cell and its differentiation is modulated with one or more nucleic acids comprising one or more SEQ ID NOs selected from the group consisting of those of mir-128a, mir-181a, mir-146, mir-155, mir-24a, and mir-17 or the complement thereof. In certain embodiments, the differentiation of a hematopoietic stem-progenitor cell into a common lymphoid stem-progenitor is modulated with one or more nucleic acids comprising one or more SEQ ID NOs of mir-146 or the complement thereof. In certain embodiments, the differentiation of a hematopoietic stem-progenitor cell into a common myeloid stem-progenitor is modulated with one or more nucleic acids comprising one or more SEQ ID NOs selected from the group consisting of those of mir-155, mir-24a or mir-17 or the complement thereof. In certain embodiments, the differentiation of a hematopoietic stem-progenitor cell that is a common myeloid stem-progenitor cell into macrophages and granulocytes is modulated with one or more nucleic acids comprising one or more SEQ ID NOs of those of mir-103 or mir-107 or the complement thereof. In certain embodiments, the differentiation of a hematopoietic stem-progenitor cell that is a common myeloid stem-progenitor cell into megakaryocyte-erythrocyte stem-progenitor is modulated with one or more nucleic acids comprising one or more SEQ ID NOs of mir-16 or the

complement thereof. In certain embodiments, the differentiation of a hematopoietic stem-progenitor cell that is a granulocyte-macrophage stem-progenitor into a granulocyte is modulated with one or more nucleic acids comprising one or more of the SEQ ID NO of mir-223 or the complement thereof. In certain embodiments, the differentiation of a hematopoietic stem-progenitor cell that is a megakaryocyte-erythrocyte stem-progenitor cell into erythrocytes is modulated with one or more nucleic acids comprising one or more of the SEQ ID NOs of mir-221 and/or mir-222 or the complement thereof.

Also provided are methods for stimulating the differentiation of human embryonic stem cells into embryonic type (primitive) hematopoietic stem cells. A method may comprise contacting the human embryonic stem cells with an agonist of mir-155, e.g., a nucleic acid comprising a nucleotide sequence that is at least about 90% identical to that of mir-155. Another method prevents the differentiation of human embryonic stem cells into embryonic type (primitive) hematopoietic stem cells, e.g., by contacting the human embryonic stem cells with an antagonist of mir-155, e.g., a nucleic acid that is at least about 90% identical to that of the complement of mir-155.

In certain embodiments, the differentiation of a HSPC is modulated with the use of more than one agent. For example, the differentiation of a HSPC may be modulated with the use of one or more agents that target the level or activity of at least about 2, 3, 4, 5, 10, 15, 20, 25, 30, 31, 32 or 33 different miRNAs having one of SEQ ID NOs: 1-33. In one embodiment, the differentiation of a HSPC is modulated by contacting or introducing into the HSPC an agonist or antagonist of any one of the miRNAs having one of SEQ ID NOs: 1-33. In one embodiment, the differentiation of a HSPC is stimulated by contacting or introducing into the HSPC an agonist or antagonist of any one of the miRNAs set forth in Figure 1, i.e., mir-128a, mir-181a, mir-146, mir-155, mir-24a, mir-17, mir-16, mir-103, mir-107, mir-223, mir-221 and mir-222. In situations in which one may wish to differentiate an HSPC into a cell at a certain stage of differentiation (or lineage), one may include a combination of agonists of certain miRNAs and antagonists of other miRNAs. For example, to obtain a population of cells enriched in CMPs, one may contact or administer into a HSPC an agonist of mir-103 and/or mir-107, an agonist of mir-16, an agonist of mir-146 and an antagonist of mir-128a, mir-181a, mir-155, mir-24a and/or mir-17. Other combinations of agonists and antagonists will be evident from Figure 1.

Other methods provided herein modulate the differentiation of non-hematopoietic stem-progenitor cells, e.g., neuronal, mesenchymal and embryonic stem cell (see Table 6).

Modulating the differentiation of such cells may be made with agonists and/or antagonists of miRNAs of Table 6, as described in the context of hematopoietic stem cells.

In certain embodiments (which may relate to methods of differentiation or other methods described herein, miRNAs are not specific miRNAs. For example, in certain embodiments, a miRNA is not mi-146, 181, 221, 222 or 223.

Methods for enriching or expanding a population of stem-progenitor cells

Methods of modulating the differentiation of SPCs may be used to enrich populations of cells in one or more specific types of cells or cells of particular lineages or for expanding populations of cells. For example, a method may be used to expand a population of undifferentiated cells, e.g., stem or progenitor or stem-progenitor cells, such as by blocking differentiation, e.g., by using agonists of miRNAs described herein. In one embodiment, the initial population of cell is a population of cells comprising undifferentiated cells and the method comprises contacting the initial population of cells with one or more agonist of a miRNA set forth in Table 1. In one embodiment, the initial population of cells comprises hematopoietic cells, e.g., from the peripheral blood or bone marrow, and the initial population of cells is contacted with one or more agonists having a sequence from SEQ ID NO: 1-33, such as to enrich the population of cells in hematopoietic stem-progenitor cells that are undifferentiated or at an early stage of differentiation. In other embodiments, a population of cells may be enriched in specific types of hematopoietic cells by using agonists, antagonists of miRNAs of Table 1, e.g., having one or SEQ ID NO: 33 or a combination of agonists and antagonists. A method may be used for enriching a population of cells into differentiated cells, partially differentiated cells or undifferentiated cells.

Enriching or expanding a population of cells may be conducted *in vitro*, *ex vivo* or *in vivo*. When expanding a population of cells in vitro, the initial population of cells may be from a cell line, including embryonic or cancer stem cell lines, or from a subject. An initial population of cells may comprise multiple cell types, or alternatively, it may consist essentially of only one cell type. Where an initial population of cells comprises different types of cells, it may first be enriched in certain types of cells by using techniques known in the art, by immunoaffinity. Accordingly, an initial population of cells may be population of cells that is enriched in certain types of cells. In one example, an initial population of cells are cells obtained from the peripheral blood or bone marrow of a subject and the population of cells has been enriched in CD34+ cells.

In one embodiment, an initial population of cells is obtained from a subject; the initial population of cells is enriched or expanded into one or more particular cell types to obtain an enriched or expanded population of cells; and the enriched or expanded population of cells is administered to a subject, which may be the same subject from whom the initial population of cells was obtained or a different subject. The cells may also be additionally purified, enriched or expanded by other methods, e.g., based on the presence of certain surface markers or by FACS.

In one embodiment, a population of cells is enriched or expanded *in vivo*. A method may comprise administering to a subject in need thereof a therapeutically effective amount of one or more agonists or antagonists of one or more miRNAs set forth in Table 1, e.g., those having a sequence of SEQ ID NOs: 1-33, to thereby enrich or expand a population of cells in the subject. An agent may be administered locally of systemically. In one embodiment, for expanding or enriching hematopoietic cells in certain types of cells, an agent is administered into the bone marrow. For enriching or expanding a population of cells in the blood, an agent may be administered directly into the blood. An agent may comprise or be comprised in a delivery vehicle that allows targeting to particular cell types. Such targeting may be based on cell surface molecules of the target population of cells.

As it has been shown herein, mir-155 prevents further differentiation of a very early hematopoietic stem cell (HSC), e.g., when differentiated from an embryonic stem cell. In one embodiment, a method for expanding a population of HSC or produce HSC from embryonic stem cells, comprises contacting the cells with an agonist of mir-155. Also provided are methods for stimulating the differentiation of embryonic stem cells past HSCs, comprising contacting the cells with an antagonist of mir-155.

Based at least on the identification of 9 miRNAs that are expressed in several types of stem cells, also encompassed are methods for expanding a population of stem cells, e.g., embryonic stem cells, e.g., human embryonic stem cells. A method may comprise contacting a stem cell with one or more agonists of one or more miRNAs selected from the group consisting of let-7b, mir-17, mir-92-1, mir-92-2p, mir-130a, mir-193, mir-197, mir-212 and mir-222 ("stem cell miRNAs"; Table 6), to thereby prevent the differentiation of the stem cells. Also provided are methods for stimulating the differentiation of a population of stem cells. A method may comprise contacting a stem cell with one or more antagonists of one or more miRNAs selected from the group consisting of let-7b, mir-17,

mir-92-1, mir-92-2p, mir-130a, mir-193, mir-197, mir-212 and mir-222, to thereby stimulate the differentiation of the stem cells.

Also provided herein are isolated, purified, expanded and/or enriched populations of cells that are obtained using one or more of the methods described herein for modulating the differentiation of cells. A population of cells may at least about 50%, 60%, 70%, 80%, 90%, 95%, 97%, 98%, 99% or 100% enriched in one or more type or lineage of cells. Populations of cells may also comprise cells comprising one or more heterologous nucleic acid encoding or identical to one or more miRNAs, such as those further described herein. Populations of cells may also be comprised in a pharmaceutical composition, e.g., for administration of the cells to a subject, e.g., in stem cell therapy. Populations of cells and compositions comprising such may also be present in a delivery vehicle, such as a liposome, a viral particle or a nanoparticle, e.g., as further described herein.

Expanded populations of early stem progenitor cells may be used for the production of cells oe one or more lineage, which may then be transplanted into a subject. Alternatively, expanded populations of cells, e.g., undifferentiated cells, are administered to a subject, e.g., for stem cell therapy.

Nucleic Acids Controlling Stem-Progenitor Cell Differentiation

Nucleic acids controlling stem progenitor cell, e.g., hematopoietic stem-progenitor, cell differentiation are provided herein. The nucleic acid may comprise the sequence of SEQ ID NOS: 1-34 or variants thereof. The variant may be a complement of the referenced nucleotide sequence. The variant may also be a nucleotide sequence that is substantially identical to the referenced nucleotide sequence or the complement thereof. The variant may also be a nucleotide sequence that hybridizes under stringent conditions to the referenced nucleotide sequence, complements thereof, or nucleotide sequences substantially identical thereto.

The nucleic acid may have a length of from 10 to 250 nucleotides. The nucleic acid may have a length of at least 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 125, 150, 175, 200 or 250 nucleotides. The nucleic acid may be synthesized or expressed in a cell (in vitro or in vivo) using a synthetic gene described herein. The nucleic acid may be synthesized as a single stranded molecule and hybridized to a substantially complementary nucleic acid to form a duplex. The nucleic acid may be introduced to a cell, tissue or organ in a single- or double-stranded

form or capable of being expressed by a synthetic gene using methods well known to those skilled in the art, including as described in U.S. Pat. No. 6,506,559 which is incorporated by reference. In certain embodiments, it may be useful to incorporate the nucleic acids into a vector, as described supra.

Pri-miRNA

The nucleic acid may comprise a sequence of a pri-miRNA or a variant thereof. The pri-miRNA sequence may comprise from 45-250, 55-200, 70-150 or 80-100 nucleotides. The sequence of the pri-miRNA may comprise a pre-miRNA, miRNA and miRNA*, as set forth herein, and variants thereof. The sequence of the pri-miRNA may comprise the sequence of SEQ ID NOS:1-34, the complement of an miRNA binding site referred to on an mRNA in Figure 13, or variants thereof.

The pri-miRNA may form a hairpin structure. The hairpin may comprise a first and second nucleic acid sequence that are substantially complementary. The first and second nucleic acid sequence may be from 37-50 nucleotides. The first and second nucleic acid sequence may be separated by a third sequence of from 8-12 nucleotides. The hairpin structure may have a free energy less than -25 Kcal/mole as calculated by the Vienna algorithm with default parameters, as described in Hofacker et al., Monatshefte f. Chemie 125: 167-188 (1994), the contents of which are incorporated herein. The hairpin may comprise a terminal loop of 4-20, 8-12 or 10 nucleotides. The pri-miRNA may comprise at least 19% adenosine nucleotides, at least 16% cytosine nucleotides, at least 23% thymine nucleotides and at least 19% guanine nucleotides.

Pre-miRNA

The nucleic acid may also comprise a sequence of a pre-miRNA or a variant thereof. The pre-miRNA sequence may comprise from 45-90, 60-80 or 60-70 nucleotides. The sequence of the pre-miRNA may comprise a miRNA and a miRNA* as set forth herein, The sequence of the pre-miRNA may also be that of a pri-miRNA excluding from 0-160 nucleotides from the 5' and 3' ends of the pri-miRNA. The sequence of the pre-miRNA may comprise the sequence of SEQ ID NOS: 1-34, the complement of an miRNA binding site on an mRNA referred to in Figure 13, or variants thereof.

miRNA

The nucleic acid may also comprise a sequence of an miRNA (including miRNA*) or a variant thereof. The miRNA sequence may comprise from 13-33, 18-24 or 21-23 nucleotides. The miRNA may also comprise a total of at least 5, 6, 7, 8, 9, 10, 11, 12, 13,

14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39 or 40 nucleotides. The sequence of the miRNA may be the first 13-33 nucleotides of the pre-miRNA. The sequence of the miRNA may also be the last 13-33 nucleotides of the pre-miRNA. The sequence of the miRNA may comprise the sequence of SEQ ID NOS: 1-34, the complement of an miRNA binding site on an mRNA referred to in Figure 13, or variants thereof.

Anti-miRNA

The nucleic acid may also comprise a sequence of an anti-miRNA that is capable of blocking the activity of a miRNA or miRNA*, such as by binding to the pri-miRNA, pre-miRNA, miRNA or miRNA* (e.g. antisense or RNA silencing), or by binding to the target binding site. The anti-miRNA may comprise a total of 5-100 or 10-60 nucleotides. The anti-miRNA may also comprise a total of at least 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39 or 40 nucleotides. The sequence of the anti-miRNA may comprise (a) at least 5 nucleotides that are substantially complementary to the 5' of a miRNA and at least 5-12 nucleotides that are substantially identical to the flanking regions of the target site from the 5' end of the miRNA, for the purposes of binding to a miRNA and repressing its activity; or (b) at least 5-12 nucleotides that are substantially identical to the 3' of a miRNA and at least 5 nucleotide that are substantially complementary to the flanking region of the target site from the 3' end of the miRNA, for the purposes of inhibiting the ability of a miRNA to bind to its target. The sequence of the anti-miRNA may comprise the complement of SEQ ID NOS:1-34, the miRNA binding site on an mRNA referred to in Figure 13, or variants thereof.

In some embodiments, morpholino-based oligonucleotides may be used to block the activity of an miRNA. Morpholinos comprise standard nucleic acid bases bound to morpholine rings, instead of deoxyribose rings, and linked through phosphorodiamidate groups, instead of phosphates (Summerton and Weller, 1997, Antisense & Nucleic Acid Drug Development, 7: 187-195). In other embodiments, "multi-blocking morpholinos," which may inhibit the activity of a targeted miRNA by blocking several steps of its maturation, may be used.

Vectors

Vectors can include a multiple cloning site (MCS), which is a nucleic acid region that contains multiple restriction enzyme sites, any of which can be used in conjunction with standard recombinant technology to digest the vector (see, for example, Carbonelli et al., 1999, Levenson et al., 1998, and Cocea, 1997, incorporated herein by reference.) "Restriction enzyme digestion" refers to catalytic cleavage of a nucleic acid molecule with an enzyme that functions only at specific locations in a nucleic acid molecule. Many of these restriction enzymes are commercially available. Use of such enzymes is widely understood by those of skill in the art. Frequently, a vector is linearized or fragmented using a restriction enzyme that cuts within the MCS to enable exogenous sequences to be ligated to the vector. "Ligation" refers to the process of forming phosphodiester bonds between two nucleic acid fragments, which may or may not be contiguous with each other. Techniques involving restriction enzymes and ligation reactions are well known to those of skill in the art of recombinant technology.

The vectors or constructs of the present invention will generally comprise at least one termination signal. A "termination signal" or "terminator" is comprised of the DNA sequences involved in specific termination of an RNA transcript by an RNA polymerase. Thus, in certain embodiments a termination signal that ends the production of an RNA transcript is contemplated. A terminator may be necessary in vivo to achieve desirable message levels.

In eukaryotic systems, the terminator region may also comprise specific DNA sequences that permit site-specific cleavage of the new transcript so as to expose a polyadenylation site. This signals a specialized endogenous polymerase to add a stretch of about 200 A residues (polyA) to the 3' end of the transcript. RNA molecules modified with this polyA tail appear to more stable and are translated more efficiently. Thus, in other embodiments involving eukaryotes, it is preferred that that terminator comprises a signal for the cleavage of the RNA, and it is more preferred that the terminator signal promotes polyadenylation of the message. The terminator and/or polyadenylation site elements can serve to enhance message levels and to minimize read through from the cassette into other sequences.

Terminators contemplated for use in the invention include any known terminator of transcription described herein or known to one of ordinary skill in the art, including but not limited to, for example, the termination sequences of genes, such as for example the bovine

growth hormone terminator or viral termination sequences, such as for example the SV40 terminator. In certain embodiments, the termination signal may be a lack of transcribable or translatable sequence, such as due to a sequence truncation.

In expression, particularly eukaryotic expression, one will typically include a polyadenylation signal to effect proper polyadenylation of the transcript. The nature of the polyadenylation signal is not believed to be crucial to the successful practice of the invention, and any such sequence may be employed. Preferred embodiments include the SV40 polyadenylation signal or the bovine growth hormone polyadenylation signal, convenient and known to function well in various target cells. Polyadenylation may increase the stability of the transcript or may facilitate cytoplasmic transport.

In order to propagate a vector in a host cell, it may contain one or more origins of replication sites (often termed "ori"), which is a specific nucleic acid sequence at which replication is initiated. Alternatively an autonomously replicating sequence (ARS) can be employed if the host cell is yeast.

In certain embodiments of the invention, cells containing a nucleic acid construct of the present invention may be identified in vitro or in vivo by including a marker in the expression vector. Such markers would confer an identifiable change to the cell permitting easy identification of cells containing the expression vector. Generally, a selectable marker is one that confers a property that allows for selection. A positive selectable marker is one in which the presence of the marker allows for its selection, while a negative selectable marker is one in which its presence prevents its selection. An example of a positive selectable marker is a drug resistance marker.

Usually the inclusion of a drug selection marker aids in the cloning and identification of transformants, for example, genes that confer resistance to neomycin, puromycin, hygromycin, DHFR, GPT, zeocin and histidinol are useful selectable markers. In addition to markers conferring a phenotype that allows for the discrimination of transformants based on the implementation of conditions, other types of markers including screenable markers such as GFP, whose basis is colorimetric analysis, are also contemplated. Alternatively, screenable enzymes such as herpes simplex virus thymidine kinase (tk) or chloramphenicol acetyltransferase (CAT) may be utilized. One of skill in the art would also know how to employ immunologic markers, possibly in conjunction with FACS analysis. The marker used is not believed to be important, so long as it is capable of being expressed simultaneously with the nucleic acid encoding a gene product. Further

examples of selectable and screenable markers are well known to one of skill in the art.

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

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

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

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

Viral Vectors

The ability of certain viruses to infect cells or enter cells via receptor-mediated endocytosis, and to integrate into host cell genome and express viral genes stably and efficiently have made them attractive candidates for the transfer of foreign nucleic acids into cells (e.g., mammalian cells). Non-limiting examples of virus vectors that may be used to deliver a nucleic acid of the present invention are described below.

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

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

Retroviral Vectors. Retroviruses have promise as delivery vectors due to their ability to integrate their genes into the host genome, transferring a large amount of foreign genetic material, infecting a broad spectrum of species and cell types and of being packaged in special cell-lines (Miller, 1992).

In order to construct a retroviral vector, a nucleic acid is inserted into the viral genome in the place of certain viral sequences to produce a virus that is replication-defective. In order to produce virions, a packaging cell line containing the gag, pol, and env genes but without the LTR and packaging components is constructed (Mann et al., 1983). When a recombinant plasmid containing a cDNA, together with the retroviral LTR and packaging sequences is introduced into a special cell line (e.g., by calcium phosphate precipitation for example), the packaging sequence allows the RNA transcript of the recombinant plasmid to be packaged into viral particles, which are then secreted into the culture media (Nicolas and Rubenstein, 1988; Temin, 1986; Mann et al., 1983). The media containing the recombinant retroviruses is then collected, optionally concentrated, and used

for gene transfer. Retroviral vectors are able to infect a broad variety of cell types. However, integration and stable expression require the division of host cells (Paskind et al., 1975).

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

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

Other Viral Vectors. Other viral vectors may be employed as vaccine constructs in the present invention. Vectors derived from viruses such as vaccinia virus (Ridgeway, 1988; Baichwal and Sugden, 1986; Coupar et al., 1988), sindbis virus, cytomegalovirus and herpes simplex virus may be employed. They offer several attractive features for various mammalian cells (Friedmann, 1989; Ridgeway, 1988; Baichwal and Sugden, 1986; Coupar et al., 1988; Horwich et al., 1990).

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

specific infection of hepatocytes via sialoglycoprotein receptors.

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

Delivering Nucleic Acids to Cells

Suitable methods for nucleic acid delivery to cells for use with the current invention are believed to include virtually any method by which a nucleic acid (e.g., DNA), as known to one of ordinary skill in the art. Such methods include, but are not limited to, direct delivery of DNA such as by ex vivo transfection (Wilson et al., 1989, Nabel et al, 1989), by injection (U.S. Pat. Nos. 5,994,624, 5,981,274, 5,945,100, 5,780,448, 5,736,524, 5,702,932, 5,656,610, 5,589,466 and 5,580,859, each incorporated herein by reference), including microinjection (Harland and Weintraub, 1985; U.S. Pat. No. 5,789,215, incorporated herein by reference); by electroporation (U.S. Pat. No. 5,384,253, incorporated herein by reference; Tur-Kaspa et al., 1986; Potter et al., 1984); by calcium phosphate precipitation (Graham and Van Der Eb, 1973; Chen and Okayama, 1987; Rippe et al., 1990); by using DEAE-dextran followed by polyethylene glycol (Gopal, 1985); by direct sonic loading (Fechheimer et al, 1987); by liposome-mediated transfection (Nicolau and Sene, 1982; Fraley et al., 1979; Nicolau et al., 1987; Wong et al., 1980; Kaneda et al., 1989; Kato et al., 1991) and receptor-mediated transfection (Wu and Wu, 1987; Wu and Wu, 1988); by microprojectile bombardment (PCT Application Nos. WO 94/09699 and 95/06128; U.S. Pat. Nos. 5,610,042; 5,322,783 5,563,055, 5,550,318, 5,538,877 and 5,538,880, and each incorporated herein by reference); by agitation with silicon carbide fibers (Kaeppler et al., 1990; U.S. Pat. Nos. 5,302,523 and 5,464,765, each incorporated herein by reference); by desiccation/inhibition-mediated DNA uptake (Potrykus et al., 1985), and any combination of such methods.

Methods for tranfecting cells and tissues removed from an organism in an ex vivo setting are known to those of skill in the art. For example, cannine endothelial cells have been genetically altered by retrovial gene tranfer in vitro and transplanted into a canine (Wilson et al., 1989). In another example, yucatan minipig endothelial cells were tranfected by retrovirus in vitro and transplated into an artery using a double-ballonw catheter (Nabel

et al., 1989). Thus, it is contemplated that cells or tissues may be removed and tranfected ex vivo using the nucleic acids of the present invention. In some embodiments, the transplanted cells or tissues may be placed into an organism. In some embodiments, a nucleic acid is expressed in the transplated cells or tissues.

Injection. In certain embodiments, a nucleic acid may be delivered to an organelle, a cell, a tissue or an organism via one or more injections (i.e., a needle injection), such as, for example, subcutaneously, intradermally, intramuscularly, intravenously, intraperitoneally, etc. Methods of injection of vaccines are well known to those of ordinary skill in the art (e.g., injection of a composition comprising a saline solution). Further embodiments of the present invention include the introduction of a nucleic acid by direct microinjection. Direct microinjection has been used to introduce nucleic acid constructs into Xenopus oocytes (Harland and Weintraub, 1985). The amount of nucleic acid used may vary upon the nature of the antigen as well as the organelle, cell, tissue or organism used

Electroporation. In certain embodiments of the present invention, a nucleic acid is introduced into an organelle, a cell, a tissue or an organism via electroporation. Electroporation involves the exposure of a suspension of cells and DNA to a high-voltage electric discharge. In some variants of this method, certain cell wall-degrading enzymes, such as pectin-degrading enzymes, are employed to render the target recipient cells more susceptible to transformation by electroporation than untreated cells (U.S. Pat. No. 5,384,253, incorporated herein by reference). Alternatively, recipient cells can be made more susceptible to transformation by mechanical wounding.

Transfection of eukaryotic cells using electroporation has been quite successful. Mouse pre-B lymphocytes have been transfected with human kappa-immunoglobulin genes (Potter et al., 1984), and rat hepatocytes have been transfected with the chloramphenicol acetyltransferase gene (Tur-Kaspa et al., 1986) in this manner.

To effect transformation by electroporation in cells such as, for example, plant cells, one may employ either friable tissues, such as a suspension culture of cells or embryogenic callus or alternatively one may transform immature embryos or other organized tissue directly. In this technique, one would partially degrade the cell walls of the chosen cells by exposing them to pectin-degrading enzymes (pectolyases) or mechanically wounding in a controlled manner. Examples of some species which have been transformed by electroporation of intact cells include maize (U.S. Pat. No. 5,384,253; Rhodes et al., 1995; D'Halluin et al., 1992), wheat (Zhou et al., 1993), tomato (Hou and Lin, 1996), soybean

(Christou et al., 1987) and tobacco (Lee et al., 1989).

Calcium Phosphate. In other embodiments of the present invention, a nucleic acid is introduced to the cells using calcium phosphate precipitation. Human KB cells have been transfected with adenovirus 5 DNA (Graham and Van Der Eb, 1973) using this technique. Also in this manner, mouse L(A9), mouse C127, CHO, CV-1, BHK, NIH3T3 and HeLa cells were transfected with a neomycin marker gene (Chen and Okayama, 1987), and rat hepatocytes were transfected with a variety of marker genes (Rippe et al., 1990).

DEAE-Dextran. In another embodiment, a nucleic acid is delivered into a cell using DEAE-dextran followed by polyethylene glycol. In this manner, reporter plasmids were introduced into mouse myeloma and erythroleukemia cells (Gopal, 1985).

Sonication Loading. Additional embodiments of the present invention include the introduction of a nucleic acid by direct sonic loading. LTK.sup.- fibroblasts have been transfected with the thymidine kinase gene by sonication loading (Fechheimer et al., 1987).

Liposome-Mediated Transfection. In a further embodiment of the invention, a nucleic acid may be entrapped in a lipid complex such as, for example, a liposome. Liposomes are vesicular structures characterized by a phospholipid bilayer membrane and an inner aqueous medium. Multilamellar liposomes have multiple lipid layers separated by aqueous medium. They form spontaneously when phospholipids are suspended in an excess of aqueous solution. The lipid components undergo self-rearrangement before the formation of closed structures and entrap water and dissolved solutes between the lipid bilayers (Ghosh and Bachhawat, 1991). Also contemplated is an nucleic acid complexed with Lipofectamine (Gibco BRL) or Superfect (Qiagen).

Liposome-mediated nucleic acid delivery and expression of foreign DNA in vitro has been very successful (Nicolau and Sene, 1982; Fraley et al., 1979; Nicolau et al., 1987). The feasibility of liposome-mediated delivery and expression of foreign DNA in cultured chick embryo, HeLa and hepatoma cells has also been demonstrated (Wong et al., 1980).

In certain embodiments of the invention, a liposome may be complexed with a hemagglutinating virus (HVJ). This has been shown to facilitate fusion with the cell membrane and promote cell entry of liposome-encapsulated DNA (Kaneda et al., 1989). In other embodiments, a liposome may be complexed or employed in conjunction with nuclear non-histone chromosomal proteins (HMG-1) (Kato et al., 1991). In yet further embodiments, a liposome may be complexed or employed in conjunction with both HVJ and HMG-1. In other embodiments, a delivery vehicle may comprise a ligand and a

liposome.

Receptor Mediated Transfection. Still further, a nucleic acid may be delivered to a target cell via receptor-mediated delivery vehicles. These take advantage of the selective uptake of macromolecules by receptor-mediated endocytosis that will be occurring in a target cell. In view of the cell type-specific distribution of various receptors, this delivery method adds another degree of specificity to the present invention.

Certain receptor-mediated gene targeting vehicles comprise a cell receptor-specific ligand and a nucleic acid-binding agent. Others comprise a cell receptor-specific ligand to which the nucleic acid to be delivered has been operatively attached. Several ligands have been used for receptor-mediated gene transfer (Wu and Wu, 1987; Wagner et al., 1990; Perales et al., 1994; Myers, EPO 0273085), which establishes the operability of the technique. Specific delivery in the context of another mammalian cell type has been described (Wu and Wu, 1993; incorporated herein by reference). In certain aspects of the present invention, a ligand will be chosen to correspond to a receptor specifically expressed on the target cell population.

In other embodiments, a nucleic acid delivery vehicle component of a cell-specific nucleic acid targeting vehicle may comprise a specific binding ligand in combination with a liposome. The nucleic acid(s) to be delivered are housed within the liposome and the specific binding ligand is functionally incorporated into the liposome membrane. The liposome will thus specifically bind to the receptor(s) of a target cell and deliver the contents to a cell. Such systems have been shown to be functional using systems in which, for example, epidermal growth factor (EGF) is used in the receptor-mediated delivery of a nucleic acid to cells that exhibit upregulation of the EGF receptor.

In still further embodiments, the nucleic acid delivery vehicle component of a targeted delivery vehicle may be a liposome itself, which will preferably comprise one or more lipids or glycoproteins that direct cell-specific binding. For example, lactosyl-ceramide, a galactose-terminal asialganglioside, have been incorporated into liposomes and observed an increase in the uptake of the insulin gene by hepatocytes (Nicolau et al., 1987). It is contemplated that the tissue-specific transforming constructs of the present invention can be specifically delivered into a target cell in a similar manner.

Synthetic Gene

A synthetic gene is also provided comprising a nucleic acid described herein operably linked to a transcriptional and/or translational regulatory sequence. The synthetic

gene may be capable of modifying the expression of a target gene with a binding site for a nucleic acid described herein. Expression of the target gene may be modified in a cell, tissue or organ. The synthetic gene may be synthesized or derived from naturally-occurring genes by standard recombinant techniques. The synthetic gene may also comprise terminators at the 3'-end of the transcriptional unit of the synthetic gene sequence. The synthetic gene may also comprise a selectable marker.

Biochip

A biochip is also provided. In some embodiments, the biochip may be specific for the determination of the state of a hematopoietic cell. The biochip may comprise a solid substrate comprising an attached probe or plurality of probes described herein. The probes may be capable of hybridizing to a target sequence under stringent hybridization conditions. The probes may be attached at spatially defined address on the substrate. More than one probe per target sequence may be used, with either overlapping probes or probes to different sections of a particular target sequence. The probes may be capable of hybridizing to target sequences associated with a single disorder.

The probes may be attached to the biochip in a wide variety of ways, as will be appreciated by those in the art. The probes may either be synthesized first, with subsequent attachment to the biochip, or may be directly synthesized on the biochip.

The solid substrate may be a material that may be modified to contain discrete individual sites appropriate for the attachment or association of the probes and is amenable to at least one detection method. Representative examples of substrates include glass and modified or functionalized glass, plastics (including acrylics, polystyrene and copolymers of styrene and other materials, polypropylene, polyethylene, polybutylene, polyurethanes, TeflonJ, etc.), polysaccharides, nylon or nitrocellulose, resins, silica or silica-based materials including silicon and modified silicon, carbon, metals, inorganic glasses and plastics. The substrates may allow optical detection without appreciably fluorescing.

The substrate may be planar, although other configurations of substrates may be used as well. For example, probes may be placed on the inside surface of a tube, for flow-through sample analysis to minimize sample volume. Similarly, the substrate may be flexible, such as a flexible foam, including closed cell foams made of particular plastics.

The biochip and the probe may be derivatized with chemical functional groups for subsequent attachment of the two. For example, the biochip may be derivatized with a chemical functional group including, but not limited to, amino groups, carboxyl groups, oxo

groups or thiol groups. Using these functional groups, the probes may be attached using functional groups on the probes either directly or indirectly using a linkers. The probes may be attached to the solid support by either the 5' terminus, 3' terminus, or via an internal nucleotide.

The probe may also be attached to the solid support non-covalently. For example, biotinylated oligonucleotides can be made, which may bind to surfaces covalently coated with streptavidin, resulting in attachment. Alternatively, probes may be synthesized on the surface using techniques such as photopolymerization and photolithography.

Expression Analysis/detecion of miRNAs

Also provided herein a methods of detecting and/or quantifying stem-progenitor cells. As further described in the Examples, the inventors have identified a "molecular signature" of all essentially undifferentiated stem cells and a "molecular signature" of hematopoietic stem-progenitor cells. As understood in the art, a "molecular signature" refers to expression levels of a certain number of biological molecules, in the instant case, of miRNAs. Thus, the finding of such a signature will be evidence of the presence of stem-progenitor cells. Accordingly, a method may comprise determining the level of one or more stem cell of HSPC miRNAs and comparing that level to that of the levels set forth in Table 1 for HSPCs and in Table 6 for essentially undifferentiated stem cells. Such methods may be used to detect or quantify the presence or number of undifferentiated stem cells or HSPCs. In one embodiment, a sample of cells is obtained from a subject and the level of miRNAs is determined. A sample may be a sample of blood cells or of bone marrow. A method may also comprise detecting one or more mRNA that is expressed specifically in hematopoietic stem-progenitor cells, e.g., those described in US application publication No. 22070036765.

A method of detection may comprise determining the level of 1, 2, 3, 4, 5, 10, 15, 20, 25, 30, 31, 32 or 33 miRNAs of Table 1 or 1, 2, 3, 4, 5, 6, 7, 8 or 9 miRNAs of Table 6.

A detection method described herein may also be used to determine the degree of enrichment of a population of cells that is being enriched in particular cell types.

Comparing a molecular fingerprint or signature where an insignificant, e.g., statistically insignificant difference between a miRNA expression profile of a population of cells and that of the molecular signature or portion thereof set forth in Table 1 or 6 or elsewhere herein indicates that the population of cells are significantly the same. A fingerprint may be the level of expression of all the miRNA of a Table set forth herein, e.g.,

Table 1 or Table 6, or it can be that of a portion of the miRNAs, e.g., at least about 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33 or 44 miRNAs.

A method may comprise obtaining a sample from a subject, isolating a population or subpopulation of cells therefrom; detecting the level of miRNAs of a table, e.g., Table 1 or 6; and comparing that or those levels of expression with the molecular signature or portion thereof set forth in the table. In one embodiment, blood cells, e.g., PBMCs or bone marrow cells are obtained from a subject. In one embodiment, CD34+ cells are isolated from the population of cells and the level of expression of one or more miRNAs set forth in Table 1 is determined and compared to that in Table 1. In one embodiment, the level of expression of the 33 mirNAs set forth in Table 1 is determined in CD34+cells and their level is compared with the molecular signature set forth in Table 1. A statistically significant difference in the level of one or more miRNAs may be indicative of an abormality of CD34+ cells or hematopoietic stem-progenitor cells in the subject. Abnormal may be an abnormal number of CD34+ cells or hematopoietic stem-progenitor cells, which may be indicative of a disease or condition.

Compositions and kits comprising one or more agents for detecting one or more miRNAs are also provided. An exemplary composition may comprise 1 or more agents, such as probes, that detect, e.g., specifically detect 1, 2, 3, 5, 10, 15, 20, 25, 30, 31, 32 or 33 miRNAs selected from the group consisting of SEQ ID NOs: 1-33 (Table 1) or one or more agents that detect 1, 2, 3, 4, 5, 6, 7, 8 or 9 stem cell miRNAs (Table 6).

Detection may be performed by contacting the sample with a probe or biochip described herein and detecting the amount of hybridization. PCR may be used to amplify nucleic acids in the sample, which may provide higher sensitivity.

The level of the nucleic acid in the sample may also be compared to a control cell (e.g., a normal cell) to determine whether the nucleic acid is differentially expressed (e.g., overexpressed or underexpressed). The ability to identify miRNAs that are differentially expressed in pathological or differentiated cells compared to a control can provide high-resolution, high-sensitivity datasets which may be used in the areas of diagnostics, prognostics, therapeutics, drug development, pharmacogenetics, biosensor development, and other related areas. An expression profile generated by the current methods may be a "fingerprint" of the state of the sample with respect to a number of miRNAs. While two states may have any particular miRNA similarly expressed, the evaluation of a number of

miRNAs simultaneously allows the generation of a gene expression profile that is characteristic of the state of the cell. That is, normal tissue may be distinguished from diseased tissue. By comparing expression profiles of tissue in known different disease states, information regarding which miRNAs are associated in each of these states may be obtained. Then, diagnosis may be performed or confirmed to determine whether a tissue sample has the expression profile of normal or disease tissue. This may provide for molecular diagnosis of related conditions.

The expression level of a disease- or differentiation-associated nucleic acid is information in a number of ways. For example, a differential expression of a disease- or differentiation-associated nucleic acid compared to a control may be used as a diagnostic that a patient suffers from the disease. Expression levels of a disease- or differentiation-associated nucleic acid may also be used to monitor the treatment and disease state of a patient. Furthermore, expression levels of a disease- or differentiation-associated miRNA may allow the screening of drug candidates for altering a particular expression profile or suppressing an expression profile associated with disease or state of differentiation.

A target nucleic acid may be detected and levels of the target nucleic acid measured by contacting a sample comprising the target nucleic acid with a biochip comprising an attached probe sufficiently complementary to the target nucleic acid and detecting hybridization to the probe above control levels.

The target nucleic acid may also be detected by immobilizing the nucleic acid to be examined on a solid support such as nylon membranes and hybridizing a labeled probe with the sample. Similarly, the target nucleic may also be detected by immobilizing the labeled probe to a solid support and hybridizing a sample comprising a labeled target nucleic acid. Following washing to remove the non-specific hybridization, the label may be detected.

The target nucleic acid may also be detected in situ by contacting permeabilized cells or tissue samples with a labeled probe to allow hybridization with the target nucleic acid. Following washing to remove the non-specifically bound probe, the label may be detected.

These assays can be direct hybridization assays or can comprise sandwich assays, which include the use of multiple probes, as is generally outlined in U.S. Pat. Nos. 5,681,702; 5,597,909; 5,545,730; 5,594,117; 5,591,584; 5,571,670; 5,580,731; 5,571,670; 5,591,584; 5,624,802; 5,635,352; 5,594,118; 5,359,100; 5,124,246; and 5,681,697, each of which is hereby incorporated by reference.

A variety of hybridization conditions may be used, including high, moderate and low stringency conditions as outlined above. The assays may be performed under stringency conditions which allow hybridization of the probe only to the target. Stringency can be controlled by altering a step parameter that is a thermodynamic variable, including, but not limited to, temperature, formamide concentration, salt concentration, chaotropic salt concentration pH, or organic solvent concentration.

Hybridization reactions may be accomplished in a variety of ways. Components of the reaction may be added simultaneously, or sequentially, in different orders. In addition, the reaction may include a variety of other reagents. These include salts, buffers, neutral proteins, e.g., albumin, detergents, etc. which may be used to facilitate optimal hybridization and detection, and/or reduce non-specific or background interactions. Reagents that otherwise improve the efficiency of the assay, such as protease inhibitors, nuclease inhibitors and anti-microbial agents may also be used as appropriate, depending on the sample preparation methods and purity of the target.

Diagnostic

A method of diagnosis is also provided. The method comprises detecting a differential expression level of a disease- or differentiation-associated nucleic acid in a biological sample. The sample may be derived from a patient. Diagnosis of a disease or state of differentiation in a patient may allow for prognosis and selection of therapeutic strategy.

In one embodiment, a method permits the diagnostic or prognosis of diseases that are characterized by or associated with an abnormal number or location of incompletely differentiated cells, e.g., stem-progenitor cells, e.g. HSPCs. Exemplary diseases include cancer, leukemia, and other diseases described herein. For example, the presence of an unsually or abnormally high number of stem or stem-progenitor cells may be indicative of the presence or likelihood of development of a disease. Monitoring the presence and/or number of stem-progenitor cells may also be used to monitor the progression of a diseas and/or the response to treatment.

In situ hybridization of labeled probes to tissue arrays may be performed. When comparing the fingerprints between an individual and a standard, the skilled artisan can make a diagnosis, a prognosis, or a prediction based on the findings. It is further understood that the genes which indicate the diagnosis may differ from those which indicate the prognosis and molecular profiling of the condition of the cells may lead to distinctions

between responsive or refractory conditions or may be predictive of outcomes. Such methods may be performed *in vitro* or *in vivo*.

In certain embodiments, the miRNAs presented herein are useful to determine the lineage of a cell and to classify a cell or pathological condition. The expression level of these miRNAs can also be correlated with clinical data.

Screening Assays

The present invention also contemplates the screening of compounds, e.g., peptides, polypeptides, nucleic acids or small molecules, for various abilities to mimic, or interfere with the function of the miRNAs described herein. In the screening assays of the present invention, the candidate substance may first be screened for basic biochemical activity--e.g., binding to a target RNA sequence, inhibition of miRNA binding thereto, alteration in gene expression--and then further tested for function in at the cellular or whole animal level.

The present invention provides methods of screening for agents that alter the activity or expression of miRNAs. As used herein, the term "candidate substance" refers to any molecule that may potentially modulate the function of one or more of the miRNAs in SEQ ID NOS: 1-34. The candidate substance may be a protein, peptide, or a small molecule inhibitor, or even a nucleic acid molecule.

One may acquire, from various commercial sources, small molecule libraries that are believed to meet the basic criteria for useful drugs in an effort to identify useful compounds. Screening of such libraries, including combinatorially generated libraries (e.g., peptide libraries), is a rapid and efficient way to screen large number of related (and unrelated) compounds for activity. Combinatorial approaches also lend themselves to rapid evolution of potential drugs by the creation of second, third and fourth generation compounds modeled of active, but otherwise undesirable compounds.

Candidate compounds may include fragments or parts of naturally-occurring compounds or may be found as active combinations of known compounds which are otherwise inactive. It is proposed that compounds isolated from natural sources, such as animals, bacteria, fungi, plant sources, including leaves and bark, and marine samples may be assayed as candidates for the presence of potentially useful pharmaceutical agents. It will be understood that the pharmaceutical agents to be screened could also be derived or synthesized from chemical compositions or man-made compounds. Thus, it is understood

that the candidate substance identified by the present invention may be a polypeptide, polynucleotide, small molecule or any other compounds that may be developed through random discovery or rational drug design starting from known compounds that affect these miRNAs.

It will, of course, be understood that all the screening methods of the present invention are useful in themselves notwithstanding the fact that effective candidates may not be found. The invention provides methods for screening for such candidates, not solely methods of finding them.

Various cells naturally express one or more of the miRNAs in SEQ ID NOS: 1-34 and can be utilized for screening of candidate substances. In one embodiment, hematopoetic cells are used, or progenitors thereof. Other cells may be engineered to express one or more of the miRNAs in SEQ ID NOS: 1-34, or may contain the control regions for these miRNAs linked to screenable marker genes, permitting one to assess the effects of a candidate substance on the expression of one or more of the miRNAs in SEQ ID NOS: 1-34.

Assays may be employed within the scope of the instant invention for determination of the relative efficiency of gene expression. Gene expression may be determined by measuring the production of miRNA in question, or by use of a reporter. The product may be isolated and/or detected by methods well known in the art. Following detection, one may compare the results seen in a given cell line or individual with a reference group of non-transformed control cells.

Significantly, RT-PCR (reverse transcription-polymerase chain reaction) is the most sensitive technique for mRNA quantitation currently available. Compared to the two other commonly used techniques for quantifying mRNA levels, Northern blot analysis and RNase protection assay, RT-PCR can be used to quantify mRNA levels from much smaller samples. In fact, this technique is sensitive enough to enable quantitation of RNA from a single cell.

Over the last several years, the development of novel chemistries and instrumentation platforms enabling detection of PCR products on a real-time basis has led to widespread adoption of real-time RT-PCR as the method of choice for quantitating changes in gene expression. At the start of any PCR reaction, the amplification proceeds at a constant, exponential rate, due to the excess of reagents. The reaction rate ceases to be exponential and enters a linear phase of amplification, after which the amplification rate

drops to near zero (plateaus), and little more product is made. In order to accurately assess nucleic acid quantiteis, it is necessary to collect data at a point in which every sample is in the exponential phase of amplification, since it is only in this phase that amplification is extremely reproducible. Unfortunately, the point at which this transition takes place is highly variable. Real-time PCR automates this otherwise laborious process by quantitating reaction products for each sample in every cycle. The result is an amazingly broad 10^7-fold dynamic range, with no user intervention or replicates required.

Another option for quantitating RNA species is relative quantitative RT-PCR, which uses primers for an internal control that are multiplexed in the same RT-PCR reaction with the gene specific primers. Internal control and gene-specific primers must be compatible, i.e., they must not produce additional bands or hybridize to each other. Common internal controls include .beta.-actin and GAPDH mRNAs and 18S rRNA. Unlike Northerns and nuclease protection assays, the selection and implementation of controls in relative quantitative RT-PCR requires substantial optimization.

Other assays provided herein allow for the identication of genes that are involved in stem cell differentation and proliferation or other characteristic of a stem or stem-progenitor cell. An assay may comprise identifying a gene that comprises, e.g., in an untranslated region, a nucleotide sequence that is signigicantly identical to or complementary to the sequence of a miRNA identified herein as involved in stem-progenitor cell differentiation, e.g., a miRNA set forth in Table 1 or 6.

Gene Silencing

A method of reducing expression of a target gene in a cell, tissue or organ is also provided. Expression of the target gene may be reduced by expressing a nucleic acid described herein that comprises a sequence substantially complementary to one or more binding sites of the target mRNA. The nucleic acid may be a miRNA comprising SEQ ID NOS: 1-33 or a variant thereof. The nucleic acid may also be pri-miRNA, pre-miRNA, or a variant thereof, which may be processed to yield a miRNA. The expressed miRNA may hybridize to a substantially complementary binding site on the target mRNA. An example for a study employing over-expression of miRNA is Yekta et al 2004, Science 304-594, which is incorporated herein by reference. One of ordinary skill in the art will recognize that the nucleic acids described herein may also be used to inhibit expression of target genes or inhibit activity of miRNAs using antisense methods well known in the art, as well as RNAi methods described in U.S. Pat. Nos. 6,506,559 and 6,573,099, which are

incorporated by reference.

The target of gene silencing may be a protein that causes the silencing of a second protein. By repressing expression of the target gene, expression of the second protein may be increased. Examples for efficient suppression of miRNA expression are the studies by Esau et al 2004 JBC 275-52361; and Cheng et al 2005 Nucleic Acids Res. 33-1290, which is incorporated herein by reference. Such methods may be performed *in vitro* or *in vivo*.

Enhancement of Gene Expression

A method of increasing expression of a target gene in a cell, tissue or organ is also provided. Expression of the target gene may be increased by expressing a nucleic acid described herein that comprises a sequence substantially complementary to a pri-miRNA, pre-miRNA, miRNA or a variant thereof, e.g., a complement of SEQ ID NOS: 1-34. The nucleic acid may be an anti-miRNA. The anti-miRNA may hybridize with a pri-miRNA, pre-miRNA or miRNA, thereby reducing its gene repression activity. Expression of the target gene may also be increased by expressing a nucleic acid that is substantially complementary to a portion of the binding site in the target gene, such that binding of the nucleic acid to the binding site may prevent miRNA binding. Such methods may be performed *in vitro* or *in vivo*.

Therapeutics

Modulating the differentiation of stem cells, e.g., hematopoietic stem cells, may be used for treating or preventing a disease or condition. For example, a subject may receive an agonist of one or more of the miRNAs having any one of SEQ ID NOs: 1-33 ("HSPC miRNAs) or of one of the stem cell miRNAs to block cell differentiation in situations in which an excessive cell differentiation is present and/or insufficient amounts of undifferentiated cells are present in the subject. Such conditions may include those in which a subject has been treated, e.g., by irradiation and has lost a considerable amount of undifferentiated cells or HSPCs. A subject may receive one or more agonists to thereby increase the number of stem progenitor cells.

In other embodiments, in which it is necessary to increase the number of differentiated cells in a subject, a treatment may comprise administering an agonist of one or more stem cell miRNA or HSPC miRNA. For example, a subject having cancer may be treated by receiving one or more antagonists of one or stem cell miRNA or HSPC miRNA, such as to stimulate the differentiation of an undifferentiated cancer cell to thereby reduce the number of cancer cells. Other conditions in which one may want to induce the

differentiation of a stem-progenitor cell include those associated with an insufficient number of a differentiated cell, e.g., a differentiated or partially differentiated hematopoietic cell. Exemplary conditions or diseases that may be treated with antagonists include those associated with insufficient leukocytes (leukopenia, e.g., graynulocytosis, neutropenia such as drug or chemotherapy induced neutropenia, and congenital neutropenia); insufficient lymphocytes, insufficient red blood cells (e.g., anemias, such as aplastic anemia, nutritional deficiency anemia, hemolytic anemia); or insufficient platelets (thrombocytopenia). Other diseases include immunodeficiency diseases, e.g., inherited immunodeficiency diseases, drug or therapy induced immunodeficiency diseases, HIV-immunodeficiency diseases. Yet other diseases in which differentiation of cells may be beneficial include blood cancers in which undifferentiated or partially differentiated cells accumulate, e.g., leukemias and lymphomas (e.g., Hodgkin's and non Hodgkin's lymphomas, acute leukemias, e.g., lymphoblastic (ALL) and myelogenous (AML) and chronic leukemias).

Other conditions that may benefit from methods of modulating stem-progenitor cell differentiation include stem cell transplantation, graft versus host disease, and transplantation, e.g., bone marrow transplantation.

Methods described herein may also be used for stem cell treatments. Diseases that would benefit from stem cell treatments include Parkinson's disease, spinal cord injuries (as well as other neuromuscular or neurological degenerative diseases), cancer, muscle damage, bone marrow transplants, leukemias and lymphomas. Generally, disorders that can be treated by infusion of stem cells include but are not limited to five broad categories. First are diseases resulting from a failure or dysfunction of normal blood cell production and maturation (i.e., aplastic anemia and hypoproliferative stem cell disorders). The second group are neoplastic, malignant diseases in the hematopoietic organs (e.g., leukemias, lymphomas, myelomas). The third group of disorders comprises those of patients with a broad spectrum of malignant solid tumors of non-hematopoietic origin. Stem cell infusion in these patients serves as a bone marrow rescue procedure, which is provided to a patient following otherwise lethal chemotherapy or irradiation of the patient, designed to eliminate malignant tumor cells. The fourth group of diseases consists of autoimmune conditions, where the stem cells serve as a source of replacement of an abnormal immune system. The fifth group of diseases comprises a number of genetic disorders which can be corrected by infusion of hematopoietic stem cells, preferably syngeneic, which prior to transplantation have undergone gene therapy. Particular diseases and disorders which can be treated by

hematopoietic reconstitution with substantially enriched population of hematopoietic stem cells include but are not limited to those listed here: Diseases resulting from a failure or dysfunction of normal blood (cell production and maturation, hyperproliferative stem cell disorders, aplastic anemia, pancytopenia, agranulocytosis, thrombocytopenia, red cell aplasia, Blackfan-Diamond syndrome, due to drugs, radiation, or infection, idiopathic); Hematopoietic malignancies (acute lymphoblastic (lymphocytic) leukemia, chronic lymphocytic leukemia, acute myelogenous leukemia, chronic myelogenous leukemia, acute malignant myelosclerosis, multiple myeloma, polycythemia vera, agnogenic myelometaplasia, Waldenstrom's macroglobulinemia, Hodgkin's lymphoma, non-Hodgkins's lymphoma); Malignant, solid tumors (malignant melanoma, carcinoma of the stomach, ovarian carcinoma, breast carcinoma, small cell lung carcinoma, retinoblastoma, testicular carcinoma, glioblastoma, rhabdomyosarcoma, neuroblastoma, Ewing's sarcoma, lymphoma); Autoimmune diseases (rheumatoid arthritis, diabetes type I, chronic hepatitis, multiple sclerosis, systemic lupus erythematosus); Genetic (congenital) disorders (anemias, familial aplastic, Fanconi's syndrome, Bloom's syndrome, pure red cell aplasia (PRCA), dyskeratosis congenita, Blackfan-Diamond syndrome, congenital dyserythropoietic syndromes I-IV, Schwachmann-Diamond syndrome, dihydrofolate reductase deficiencies, formamino transferase deficiency, Lesch-Nyhan syndrome, congenital spherocytosis, congenital elliptocytosis, congenital stomatocytosis, congenital Rh null disease, paroxysmal nocturnal hemoglobinuria, G6PD (glucose-6-phosphate dehydrogenase) variants 1, 2, 3, pyruvate kinase deficiency, congenital erythropoietin sensitivity deficiency, sickle cell disease and trait, thalassemia alpha, beta, gamma, met-hemoglobinemia, congenital disorders of immunity, severe combined immunodeficiency disease (SCID), bare lymphocyte syndrome, ionophore-responsive combined immunodeficiency, combined immunodeficiency with a capping abnormality, nucleoside phosphorylase deficiency, granulocyte actin deficiency, infantile agranulocytosis, Gaucher's disease, adenosine deaminase deficiency, Kostmann's syndrome, reticular dysgenesis, congenital leukocyte dysfunction syndromes) and Others (osteopetrosis, myelosclerosis, acquired hemolytic anemias, acquired immunodeficiencies, infectious disorders causing primary or secondary, immunodeficiencies, bacterial infections (e.g., Brucellosis, Listerosis, tuberculosis, leprosy), parasitic infections (e.g., malaria, Leishmaniasis), fungal infections, disorders involving disproportions in lymphoid cell sets and, impaired immune functions due to aging, phagocyte disorders, Kostmann's agranulocytosis, chronic granulomatous disease,

Chediak-Higachi syndrome, neutrophil actin deficiency, neutrophil membrane GP-180 deficiency, metabolic storage diseases, mucopolysaccharidoses, mucolipidoses, miscellaneous disorders involving immune mechanisms, Wiskott-Aldrich Syndrome, alpha 1-antitrypsin deficiency).

Any of the disorders set forth in the previous paragraph may also be diagnosed as further described herein.

Compositions, e.g., pharmaceutical compositions are also provided herein. A composition may comprise 1, 2, 3, 4, 5, 6, 7, 8, 9,10, 15, 20, 25, 30, 31, 32, 33 or 34 agonists or antagonists or combinations thereof of miRNAs described herein.

In some embodiments, therapeutic compositions and methods may include the use of modified miRNAs or miRNA antagonists, including 2-*O*-methyl oligoribonucleotides (2-*O*-Me-RNAs). Cell permeable forms of these 2-*O*-Me-RNAs, known as antagomirs, are also contemplated. Antagomirs have been successfully used to down-regulate mi-RNAs in mouse tissue, *in vivo*, after intravenous injection (Krutzfeldt et al., 2005, Nature, 438: 685-689). Other modifications may include the introduction of phosphorothioate linkages, the addition of 2-*0*-methoxyethyl groups, and the addition of a cholesteryl or cholesterol moiety. Locked nucleic acid molecules, wherein the 2'-*O*-oxygen of a 2'-*O*-modified RNA is bridged to the 4' position via a methylene linker, to form a rigid bicycle locked into a C3'-endo (RNA) sugar conformation are also contemplated.

The following publications are incorporated by reference in their entirety: Mack, 2007, Nature, 25: 631-638; Blenkiron, 2007, Human Molecular Genetics, 16: R106-R113; Hammond, 2006, Trends in Molecular Medicine, 12: 99-101; Krutzfeldt, 2006, Nature Genetics Supplment, 38: S14-S19; Wurdinger and Costa, 2007, The Pharmacogenomics Journal, 7: 297-304; Hunziker and Hall, 2006, Gene Therapy, 13: 496-502.

Compositions

A pharmaceutical composition is also provided. The composition may comprise a nucleic acid described herein and optionally a pharmaceutically acceptable carrier and/or excipient. The compositions may be used for diagnostic or therapeutic applications. The pharmaceutical composition may be administered by known methods, including wherein a nucleic acid is introduced into a desired target cell in vitro or in vivo. Commonly used gene transfer techniques include calcium phosphate, DEAE-dextran, electroporation, microinjection, viral methods and cationic liposomes. In some embodiments, the compositions may include the use of synthetic miRNAs, which are more potent than

naturally occurring miRNAs (Chang DZ, Clin Cancer Res, 2006, 12: 6557-6564).

Kits

A kit is also provided comprising a nucleic acid described herein together with any or all of the following: assay reagents, buffers, probes and/or primers, and sterile saline or another pharmaceutically acceptable emulsion and suspension base. In addition, the kits may include instructional materials containing directions (e.g., protocols) for the practice of the methods described herein.

Method of Synthesis

A method of synthesizing the reverse-complement of a target nucleic acid is also provided. The reverse complement may be synthesized according to methods outlined in U.S. Pat. No. 11/384,049, the contents of which are incorporated herein by reference.

Method of Detection

A method of detecting a target nucleic acid in a biological sample is also provided. The target nucleic acid may be detected according to methods outlined in U.S. Pat. No. 11/384,049, the contents of which are incorporated herein by reference.

EXAMPLES

Abbreviations: BM, bone marrow; HE-miRNA, hematopoietic-expressed microRNA; HSPCs, hematopoietic stem-progenitor cells; miRNAs, microRNAs; PBSC, peripheral blood stem cell; RFU, relative fluorescence units.

Example 1

Abstract

MicroRNAs (miRNAs) are a recently identified class of epigenetic elements consisting of small noncoding RNAs that bind to the 3' untranslated region of mRNAs and down-regulate their translation to protein. miRNAs play critical roles in many different cellular processes including metabolism, differentiation, and development. The present inventors have found 33 miRNAs expressed in CD34+ hematopoietic stem-progenitor cells (HSPCs) from normal human bone marrow and mobilized human peripheral blood stem cell harvests. The inventors then combined these data with human HSPC mRNA expression data and with miRNA-mRNA target predictions, into a previously undescribed miRNA:mRNA interaction database called the Transcriptome Interaction Database. The *in*

silico predictions from the Transcriptome Interaction Database pointed to miRNA control of hematopoietic differentiation through translational control of mRNAs critical to hematopoiesis. From these predictions, the inventors formulated a model for miRNA control of stages of hematopoiesis in which many of the genes specifying hematopoietic differentiation are expressed by HSPCs, but are held in check by miRNAs until differentiation occurs. The inventors validated miRNA control of several of these target mRNAs by demonstrating that their translation in fact is decreased by miRNAs. Finally, the inventors chose *miRNA-155* for functional characterization in hematopoiesis, because it was predicted that it would control both myelopoiesis and erythropoiesis. As predicted, *miRNA-155* transduction greatly reduced both myeloid and erythroid colony formation of normal human HSPCs.

miRNA Expression in CD34+ Cells.

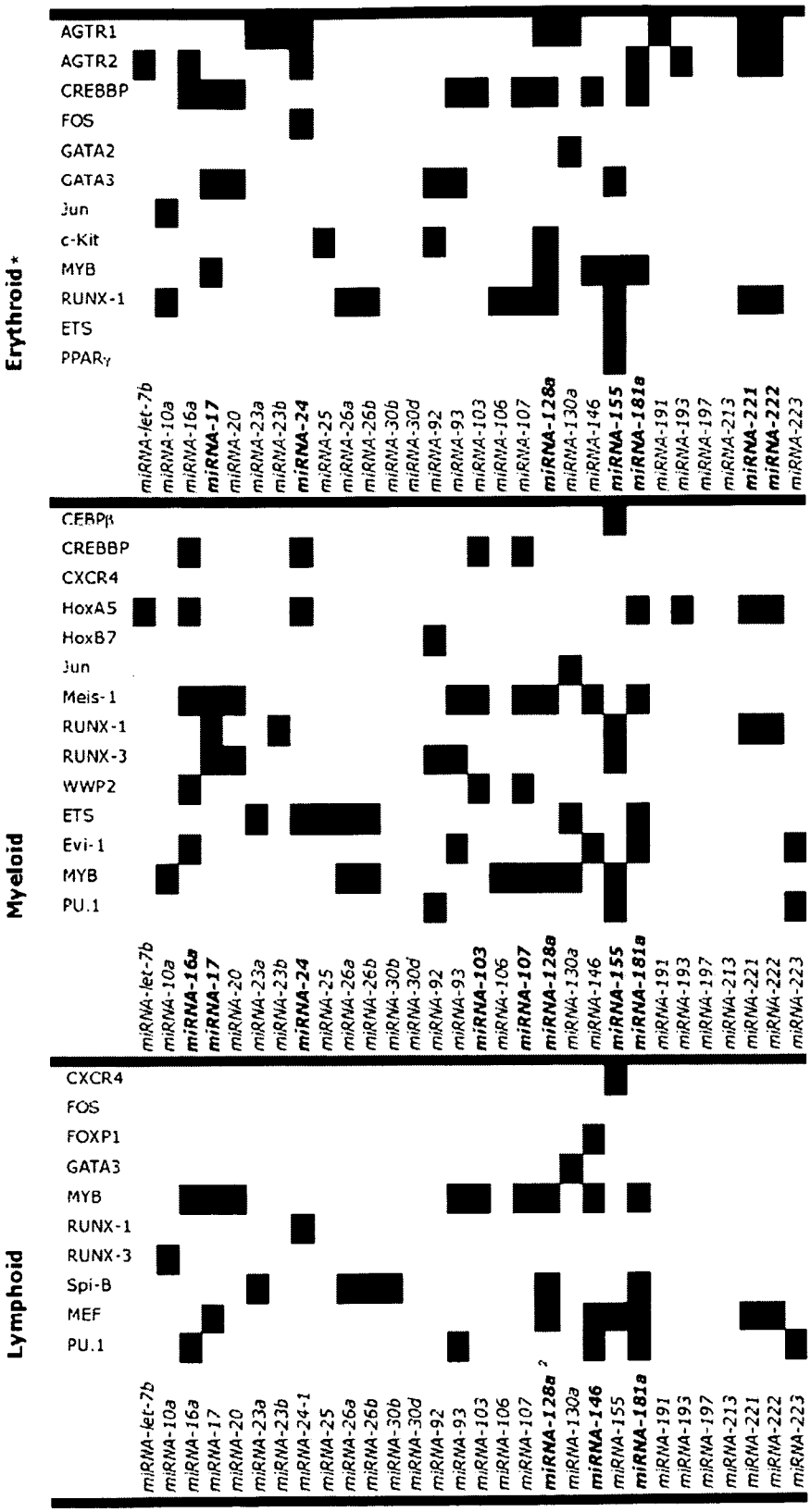
The expression of 228 human miRNAs in CD34+ HSPCs obtained from normal donor PBSC or BM harvests (Fig. 7) was measured. Mean background was 47,458 relative fluorescence units (RFU) for PBSC and 34,676 RFU for BM CD34+ cells. After normalization of the data with GeneSpring software, the minimum cutoff for an expressed miRNA was calculated to be 96,900 RFU for PBSC and 74,509 RFU for BM CD34+ cells. Filtering for expression, in combination with a Student's *t* test significance threshold of 0.05, yielded 35 miRNAs expressed in PBSC and 78 miRNAs in BM CD34+ cells (Fig. 8). Intersection analysis (8) of these data sets (Table 1) identified 31 mature miRNAs and 2 precursor miRNAs, 33 miRNAs in total, expressed by CD34+ cells from both PBSC and BM, which were designated hematopoietic-expressed-miRNAs.

HE-miRNAs Are Predicted to Regulate Several mRNAs Expressed in CD34+ Cells.

Combining the prior HSPC mRNA expression data sets (8) with the miRNA expression data generated in the current study, along with the miRNA target predictions (9–11), the inventors mapped each of the 33 HE-miRNAs to its multiple predicted target mRNA transcripts expressed in CD34+ cells (from both PBSC and BM). mRNAs (16.7%) expressed by CD34+ HSPCs (HE-mRNAs) from both PBSC and BM are predicted to be regulated by at least one HE-miRNA (i.e., 1,230 of the 7354 mRNAs expressed by CD34+ cells potentially were HE-miRNA-regulated; Figs. 9 and 10), including several mRNAs thought to be associated with hematopoietic differentiation (Table 2). These *in silico* data allowed the inventors to formulate a bioinformatic model predicting which HE-miRNAs

may control hematopoietic differentiation and at which hematopoietic stages they may act (Fig. 1).

Table 2. HSPC-expressed mRNAs associated with hematopoietic differentiation and predicted to be regulated by HE-miRNAs


Erythroid *
AGTR1
AGTR2
CREBBP
FOS
GATA2
GATA3
Jun
c-Kit
MYB
RUNX-1
ETS
PPARγ
Myeloid
C/EBPβ
CREBBP
CXCR4
HoxA5
HoxB7
Jun
Meis-1
RUNX-1
RUNX-3
WWP2
ETS
Evi-1
MYB
PU.1
Lymphoid
CXCR4
FOS
FOXP1
GATA3
MYB
RUNX-1
RUNX-3
Spi-B
MEF
PU.1
miRNA-let-7b
miRNA-10a
miRNA-16a
miRNA-17
miRNA-20
miRNA-23a
miRNA-23b
miRNA-24
miRNA-24-1
miRNA-25
miRNA-26a
miRNA-26b
miRNA-30b
miRNA-30d
miRNA-92
miRNA-93
miRNA-103
miRNA-106
miRNA-107
miRNA-128a
miRNA-130a
miRNA-146
miRNA-155
miRNA-181a
miRNA-191
miRNA-193
miRNA-197
miRNA-213
miRNA-221
miRNA-222
miRNA-223

miRNAs in bold are those that, based on the number of predicted target mRNAs they hit as well as on the strength of association to each category based on the annotation, the inventors predict will be the major regulators of each particular category of differentiation. mRNAs are grouped into categories reflecting their roles in lymphoid, myeloid, and/or erythroid differentiation.

HE-miRNAs Regulate Hematopoietic Differentiation-Associated mRNAs in CD34+ cells. Of the HSPC-expressed mRNAs putatively targeted by HE-miRNAs, 18 mRNAs were selected, because they were either well established and/or annotated to have a role in regulation of hematopoietic differentiation. For each of these selected "hematopoietic differentiation-associated" mRNAs, the 3' UTR was cloned into the 3.1-Luc expression vector. K562 cells were transduced with each chimeric luc-3' UTR mRNA. Luc activity in the transduced K562 cells for the following mRNAs was reduced by 52–92% as compared with the luc-positive control: BCL2, C/EBP-beta, CXCR4, GATA2, GATA3, HES1, HOXA9, HOXA10, HOXB5, HOXB7, KLF2, MEIS1, MYB, AML1/RUNX1, and RUNX3 (Fig. 2). However, luc activity of the SOCS2 and WWP2 constructs was increased compared with the luc-positive control; these two activities were identical to that of a chimeric mRNA (Luc-nmiR) containing a 3'UTR devoid of predicted miRNA-binding sites, which (for unknown reasons) resulted in almost twice the control luc activity. Thus, the predictions of targets of the HE-miRNA data resulted in a false-positive rate of 10.5%, considerably lower than the 25–40% false-positive rate postulated by Bentwich (12).

The inventors further characterized HE-miRNA translational control of two of the hematopoietic differentiation-associated mRNAs, by deleting the 21- to 25-nt miRNA binding sites from the 3' UTRs in the chimeric luc reporter constructs (Fig. 3). Deletion of the *miRNA-92*-binding site from the KLF2 3' UTR restored luc expression, demonstrating that *miRNA-92* regulates KLF2 in hematopoietic cells. Similarly, deletion of the binding site for *miRNA-181* from the CXCR4 3' UTR resulted in restoration of luc activity, whereas deletion of the *miRNA-92*-binding site from the CXCR4 3'UTR did not significantly change luc activity, indicating that CXCR4 is specifically modulated by *miRNA-181*.

miRNA-155 Controls Myeloid and Erythroid Differentiation.

miRNA-155 was predicted to block hematopoietic differentiation along more than one lineage (Fig. 1), because it was predicted to block protein expression of CREBBP, CXCR4, JUN, MEIS1, PU.1, AGTRI, AGTRII, FOS, and GATA3. Consistent with this prediction, <1% of *miRNA-155*-transduced K562 cells, as compared with about 65% of

control cells, were treated with hemin differentiated toward erythrocytes (data not shown). In addition, 57% ± 3% of *miRNA-155*-transduced K562 cells expressed CD41 (mean fluorescence intensity (MFI) = 11.5 ± 1.2), in comparison with 78 ± 5% of control K562 cells (MFI = 32.8 ± 3.5) treated with IDB-expressed CD41 (data not shown). Both the decrease in percentage of cells positive for CD41, as well as the about 3-fold decrease in MFI, are indicative of a large decrease in K562 cell megakaryocytic differentiation (13–15). K562 cells transduced with *miRNA-155* proliferated at a similar rate to those transduced with control vector (data not shown), indicating that the observed lack of differentiation was not due to cell cycle arrest or decreased cell growth rate.

Normal human PBSC CD34+ cells were transduced with FUGW-*miRNA-155*, and assayed for hematopoietic colony formation. *miRNA-155*-transduced cells generated 5-fold fewer myeloid and 3-fold fewer erythroid colonies. Furthermore, the colonies generated by *miRNA-155*-transduced cells were much smaller than controls (Fig. 4). These data demonstrate that *miRNA-155* can control both myeloid and erythroid differentiation of human HSPCs.

Discussion

The present inventors used bioinformatic techniques to combine human HSPC miRNA expression with mRNA expression to begin to define the roles that HE-miRNAs play in human hematopoiesis. The bioinformatic and functional analyses of HE-miRNA action indicate that multiple miRNAs, including *miRNA-17*, *-24*, *-146*, *-155*, *-128*, and *-181*, may hold early hematopoietic cells at an early stem-progenitor stage, blocking their differentiation to more mature cells. *miRNA-16*, *-103*, and *-107* may block differentiation of later progenitor cells; *miRNA-221*, *-222*, and *-223* most likely act to control terminal stages of hematopoietic differentiation (Fig. 1). As an initial validation of the *in silico* predictions, the inventors demonstrate that *miRNA-155* is a potent inhibitor of HSPC differentiation.

In a prior mRNA expression study (8), the inventors demonstrated that many genes known to be associated with differentiation of HSPCs (including RUNX1, MEIS1, ETS1, and PU.1) are equivalently expressed at the mRNA level in both the HSC-enriched and the more differentiated HPC-enriched populations. The Transcriptome Interaction Database predicts that about 16.7% of the mRNAs expressed by HSPCs may be regulated at the translational level by the 33 HE-miRNAs. Taking into account the consensus that such predictions likely contains 25% false-positives (12), it is estimated that 10.5% of the HSPC-

expressed mRNAs are controlled by HE-miRNAs. This is in concordance with a recent study (16), which compared a limited proteome of HSPCs to various transcriptome studies (including the inventors' own study; ref. 8) and found that the expression of about 15% of proteins were underestimated by their mRNA expression levels.

Based on their predicted mRNA targets, it was found that the HE-miRNAs annotated as having hematopoietic function fall into three categories (Fig. 1): (*i*) those which might inhibit differentiation of all hematopoietic lineages (including B/T/NK lymphoid) by regulating molecules critical to very early steps in hematopoiesis (*miRNA-181* and *-128*); (*ii*) those that might act in differentiation of (*a*) lymphoid (*miRNA-146*); (*b*) granulocytic/monocytic/erythroid/megakaryocytic/B-lymphoid (*miRNA-155*, *-24*, and *-17*), or (*c*) granulocytic/monocytic/B-lymphoid (*miRNA-16*, *-103*, and *-107*); and (*iii*) in combination with other published studies (3–5), those that act only on one specific lineage of blood cells (*miRNA-221* and *-222* in erythroid development and *miRNA-223* in granulocytic development).

The model and specific *in silico* predictions were validated by testing HE-miRNA translational repression of selected predicted target mRNAs. Of the 18 hematopoietic differentiation-associated mRNAs tested in the model system, it was found that protein expression from 16 were down-regulated greatly in K562 cells expressing the implicated HE-miRNAs. The translational repression that was observed was generally quantitatively greater than that of other past miRNA functional studies, where a 40–60% miRNA-mediated decrease in protein expression has proven to be biologically relevant (4, 5). Other studies, although correct, may greatly underestimate the translational repression mediated by HE-miRNAs, because of several factors. First, the present inventors extensively optimized their assays to quantify differences in protein expression. Because the CMV promoters used in these plasmids are such strong initiators of transcription, the present inventors strove for a "low-level" transfection in an attempt to minimize the number of plasmids entering individual cells. Further, the present inventors added the additional control of a chimeric-mRNA containing a 3' UTR having no predicted miRNA-binding sites. This control vector resulted in twice the amount of luc expression compared with the control vector containing no 3'UTR sequence. It may be that using only a luc alone leads to a major underestimation of miRNA action, and the luc-nmiR may be a much more biologically relevant control, because it mimics the natural structure of mRNAs. To test

more directly which miRNAs mediate the observed decrease in protein expression, for two targeted mRNAs, the present inventors produced chimeric mRNAs with 3' UTRs that had specific deletions of only the predicted miRNA-binding site. In both cases, deletion of miRNA-binding sites completely restored protein expression.

To begin to confirm the biological effects of HE-miRNAs, *miRNA-155* was studied because it was predicted to target multiple hematopoietic differentiation-associated molecules, including C/EBP-beta, CREBBP, JUN MEIS1, PU.1, AGTR1, AGTR2, and FOS. In addition, it has been reported that *miRNA-155* is overexpressed in undifferentiated CD34+/CD38– acute myeloid leukemia (AML) stem cells and that ectopic over-expression of *miRNA-155* in AML cells blocks differentiation[11]. In the inventors' studies, transduction of cells with *miRNA-155* followed by treatment with each of two chemical inducers of differentiation showed that *miRNA-155* decreased both erythroid and megakaryocytic differentiation in K562 cell line models of human hematopoiesis. More important, *miRNA-155*-transduced normal human CD34+ cells generated far fewer (and smaller) myeloid and erythroid colonies than controls. Thus, *miRNA-155* negatively regulates normal myelopoiesis and erthryopoiesis.

Most of the cells within the CD34+ population that were studied have differing degrees of self-renewal capacity. In that light, perhaps it is not surprising that the present inventors did not identify any HE-miRNAs that targeted mRNAs and are thought to be involved in self-renewal, such as HOX-B4 (18) and BMI-1 (19, 20).

Three other studies have begun to examine the functional role of miRNAs in the differentiation of specific aspects of hematopoiesis. Fazi *et al.* (5) showed that murine *mmu-miRNA-223* up-regulates mouse granulopoiesis by blocking protein expression of NFI-A, a factor that represses granulopoiesis. The myeloid regulator C/EBP-alpha drives *miRNA-223* expression, thereby removing NFI-A mediated differentiation repression. The model of human HE-miRNA regulation of hematopoiesis agrees with this finding in that the Transcriptome Interaction Database predicts that human *hsa-mir-223* regulates human NFI-A translation.

Felli *et al.* (4) showed that human *miRNA-221* and *-222* block erythropoiesis via translational repression of c-KIT. The inventors' findings strongly support that *miRNA-221* and *-222* block erythropoiesis. Not only do the *in silico* studies predict that *miRNA-221* and *-222* block c-KIT translation, but they also predict that they may block CREBBP, FOS, and

PPAR-gamma (additional molecules highly associated with erythroid differentiation) (21–24). *miRNA-221* and *-222* also may be more generalized inhibitors of hematopoietic differentiation, because the data (Table 2) predict that they also may regulate myeloid differentiation-associated molecules (Fig. 2; MEIS1 and ETS1, both proteins shown to be involved in myeloid development (25, 26), and FOS, which has been implicated in lymphopoiesis; ref. 27 and unpublished data). Consistent with this, Felli *et al.* (4) found that overexpression of *miRNA-221* and *-222* inhibited engraftment of human CD34+ cells in NOD-*scid* mice, pointing to a more generalized role in differentiation.

Chen *et al.* (3) studied the role of *mmu-mir-142*, *-181*, and *-223* in mouse hematopoiesis and found that ectopic overexpression of *miRNA-181* in mouse HSPCs resulted in an increase in B-lymphopoiesis, and *miRNA-142* and *-223* resulted in small but significant increases in T-lymphopoiesis. Unfortunately, the relevant target mRNAs were not determined in that early study. It is important to note that although *miRNA-181* is strongly expressed in human CD34+ cells, in the murine system, it seems to be expressed selectively in B lymphocytes. In fact, in human BM, *miRNA-181* is expressed more weakly than *miRNA-146*, an miRNA that Chen *et al.* (3) finds expressed strongly in all mouse hematopoietic tissues. In addition, the present inventors found that *miRNA-142* is not expressed in human HSPCs. Thus, these HE-miRNAs may be expressed and act differently in human hematopoiesis than in mouse hematopoiesis; this interpretation is substantiated by the finding that the same types of human and mouse hematopoietic cells show large differences in miRNA expression (28). Although the predictive data are consistent with a possible outcome that *miRNA-181* may affect B lymphoid development, the *in silico* model indicates that *miRNA-181* and *miRNA-146* might block differentiation very early in human lymphopoiesis.

This *in silico* bioinformatic study combines global miRNA and mRNA expression data into a model for exploring the action of miRNAs within a cellular system. The present inventors validated the *in silico* predictions in two ways: (*i*) The present inventors showed that 16 of 18 "hematopoietic" mRNAs are controlled by HE-miRNAs and (*ii*) the inventors functionally validated *miRNA-155* as potent controller of normal human myelopoiesis and erythropoieis. A skilled artisan will recognize that these studies will serve to guide the work of other researchers examining the role of miRNAs in hematopoiesis. In certain emodiments, the present invention has utility in models in which many of the genetic

components associated with hematopoietic differentiation are expressed at an early time point by undifferentiated HSPCs but are controlled by HE-miRNA-mediated repression of protein translation until differentiation is initiated.

Methods

Cell Samples. ***Human CD34+ cells.*** Cryopreserved cadavaric BM and PBSC CD34+ cells from normal adult donors were obtained from the National Heart, Lung, and Blood Institute Program of Excellence in Gene Therapy, Hematopoietic Cell Processing Core (Fred Hutchison Cancer Center). Each BM sample was a pool of cells from two donors. Each PBSC sample was a pool from three to five donors. CD34+ cells were thawed and washed twice with PBS (8).

Cell lines. HEK 293T, Hal-01, HL60, K562, KG1, KG1a, MV-4-1, REH, TF1, and TF1a cell lines were purchased from the American Type Culture Collection (ATCC; Manassas, VA). A different K562 cell subline, used in the cellular differentiation studies, was provided by Michael McDevitt (The Johns Hopkins University) (29). All cells were cultured by following instructions provided by the ATCC.

miRNA Expression Microarrays. CD34+ cells were disrupted with TRIzol Reagent (15596-018; Invitrogen. Carlsbad, CA). Five micrograms of total RNA obtained from the TRIzol preparations were analyzed with miRNA chips (30). Standard microarray methods were used for normalization and statistical analysis of the miRNA expression data. Statistical analyses were carried out in GeneSpring 7.0 (Silicon Genetics/Agilent Technologies, Palo Alto, CA) to determine the RFU value for a 95% confidence cutoff for miRNA expression. Significantly expressed miRNAs were identified by using the GeneSpring Cross-Gene Error Model (8). Thus, for each set of samples (PBSC or BM,) values from individual samples were normalized and averaged, then expressed miRNAs were identified as those with a $P < 0.05$ of expression over background (i.e., the weighted averaged values of all chip measurements). Then, to perform intersection analysis, the inventors determined those microRNAs expressed by both PBSC and BM CD34+ samples at the $P < 0.05$ significance level (Student's t test).

Bioinformatic Integration of mRNA and miRNA Expression Data. miRNA expression data, mRNA expression data (determined in ref. 8), and miRNA target prediction data (from Lewis *et al.*, refs. 10 and 11; www.targetscan.org), Sloan–Kettering

Cancer Center Human MicroRNA Targets Database (www.microRNA.org; ref. 9) and miRBase Targets (microrna.sanger.ac.uk/targets/v3) were combined in a Filemaker Pro 7.0 (Filemaker Corp., Santa Clara, CA) relational database, which was called the "Transcriptome Interaction Database." Individual data tables consisted of miRNA expression from each individual sample, PBSC CD34+ cell mRNA expression data, BM CD34+ cell mRNA expression data, and miRNA targets predicted by each of the three databases. This integrated database allows the inventors to interrogate directly the predicted interactions of HE-miRNAs with HSPC-expressed mRNAs. Regulated mRNAs were annotated for possible hematopoietic function through both manual and electronic annotation. Manual annotation consisted of the authors scanning the lists of mRNA targets for those with known hematopoietic function. Electronic annotation consisted of querying the PubMed (www.ncbi.nlm.nih.gov/entrez/query.fcgi?holding = jhumlib_fft_ndi) and Gene Ontology (www.geneontology.org) databases with search terms of the "gene common name" and terms including "hematopoiesis," "myeloid," "erythroid," "blood," etc. After compiling the list of candidate hematopoietic differentiation-associated mRNAs, PubMed searches were performed, and peer-reviewed publications were reviewed to assure that these mRNAs actually had been implicated in hematopoietic differentiation. At least two articles, each directly demonstrating either that the mRNA of interest is involved in differentiation or critical to a molecular pathway of a known hematopoietic regulator, were required for the mRNA to be scored as hematopoietic differentiation-associated. In addition, the present inventors also classified certain genes expressed in the HSC-enriched population (8) as hematopoietic differentiation-associated.

Functional Analysis of Expressed HE-miRNAs. ***Plasmids and constructs: Luciferase(luc)-3' UTR reporter plasmids.*** The luc-coding sequence and 3' multiple-cloning-site (MCS) from the promoterless pSP-luc+NF fusion vector (E4471; Promega, Madison, WI) were subcloned into the NheI and XhoI sites of the pcDNA 3.1(+) expression vector (V79020; Invitrogen). The resulting plasmid (Luc-3' UTR) construct contains a strong CMV promoter driving a luc-expression cassette, followed by a 3' MCS. The 3' UTR sequences from several hematopoietic differentiation-associated mRNAs were isolated by RT-PCR with primers containing restriction enzyme linkers. These 3' UTR PCR fragments were cloned into the 3' MCS of the Luc-3' UTR reporter construct. The resulting chimeric mRNAs, containing luc and the 3' UTR of the mRNA of interest, allowed for rapid functional analysis of miRNA translational control of mRNAs of interest (Fig. 6).

In addition, for certain of the luc-3' UTR reporter plasmids, the present inventors produced variant constructs, in which specific miRNA-binding sites were deleted from the 3' UTR (Luc-3' UTR-DL constructs). Approximately 60-mer PCR primers, consisting of the 20-nucleotide (nt) sequence on either side of the miRNA-binding sites plus an intervening 25-bp spacer containing a PacI site, were generated (http://www.pnas.org/cgi/content/full/0610983104/DC1) and then used in full plasmid PCR (QuikChange XL Kit 200516; Stratagene, La Jolla, CA). Briefly, these primers span the deletion site but replace the sequence to be deleted with a unique restriction enzyme site that allows for rapid screening of clones with the deletion. The entire mutant plasmid then is produced via PCR, lacking the miRNA-binding site, as described in the manufacturer's protocol.

miRNA expression constructs. The *hsa-mir-155* gene was cloned from K562 cell genomic DNA via PCR by using primers containing restriction enzyme linkers that would allow cloning into either the pcDNA3.1(+) expression vector (V79020; Invitrogen) or the FUGW lentiviral expression vector (31). The inventors used vectors containing strong PolII promoters, because miRNA expression and processing by Drosha, Exportin V, and Dicer seem to be much more reliable with longer 5'-capped-mRNA sequences produced by PolII, rather than shorter RNAs produced by PolIII promoters (32). The fragments produced by PCR contained the miRNA precursor (70–120 nt) flanked on both the 5' and 3' sides by 250 nt of genomic sequence, resulting in inserts of 570–620 nt.

Expression of miRNA precursor and mature sequences were tested by Lipofectamine (11668-019; Invitrogen) transfection of 293T cells with these expression constructs. Small RNAs were isolated from the transfected cells (MirVana miRNA Isolation Kit 1560; Ambion, Austin, TX). Precursor and mature miRNA expression was determined by miRNA RT-PCR (mirVana qRT-PCR miRNA Detection Kit 1158; Ambion; using specific mirVana qRT-PCR Primer Sets; Ambion) and/or by Northern blotting with ^{32}P-radiolabeled probes specific for the mature miRNA sequence (mirVana miRNA Probe Construction Kit 1550; Ambion).

HE-miRNA Translational Control of Hematopoietic Differentiation-Associated mRNAs Expressed in HSPCs. The inventors determined the miRNA expression of 10 hematopoietic cell lines and found that the K562 cell line expresses many HE-miRNAs (Figure 13). Luc-3' UTR and Luc-3' UTR-DL constructs were electroporated into K562

cells (Nucleofector V Kit VCA-1003; Amaxa, Cologne, Germany; Nucleofector II Device AAD-1001; Amaxa). Control plasmids of backbone Luc-3.1 and Luc-nmiR (containing a 3' UTR with no predicted miRNA-binding sites) controls also were used. Each electroporation included 100 ng of beta-galactosidase (beta-gal)-3.1 plasmid to allow normalization of luc activity. Three days after transfection, cells were lysed (Passive Lysis Buffer E194A; Promega), and luminescence was measured to quantify luc protein expression (Model 1500; Analytical Luminescence Laboratories, San Diego, CA; Luciferase Assay System E1501; Promega) and beta-gal expression (Galactolight Plus Kit; Tropix, Bedford, MA). Relative beta-gal units were used to generate individual normalization factors to standardize the Relative Luc Units for each sample to the Luc-nmiR-positive control.

Cellular Differentiation Assays. K562 cells were transduced with FUGW-*miRNA-155* or FUGW-parental control (i.e., empty vector) lentivirus at a multiplicity of infection of 5. Each of these vectors contains a GFP cassette driven from a second promoter (31). Cells were cultured for 2 days and then checked for GFP expression, indicating lentiviral transduction. Cells then were washed with PBS and cultured in complete growth media containing ingenol 3,20-dibenzoate (IDB, 1 μg/ml; Sigma) or hemin (50 μM; Sigma). On day 4, IDB-treated cells were assayed by monoclonal antibody staining and flow cytometry for CD41 (Becton Dickinson, Franklin Lake, NJ) expression, indicating megakaryocytic differentiation (13–15). Hemin-treated cells were assayed similarly on day 6 for benzidine staining, indicating erythroid differentiation (33). Human PBSC $CD34^+$ cells were transduced with *miRNA-155* or control lentivirus and assayed by standard colony-forming unit (cfu) assays for myeloid and erythroid differentiation (34).

Additional Methods

Luciferase(luc)-3' UTR Reporter Plasmids. The luc coding sequence and 3' multiple-cloning-site (MCS) from the promoterless pSP-luc+NF fusion vector (E4471; Promega, Madison, WI) were subcloned into the NheI and XhoI sites of the pcDNA 3.1(+) expression vector (V79020; Invitrogen, Carlsbad, CA). The resulting plasmid (Luc-3' UTR) construct contains a strong CMV promotor driving a luc expression cassette, followed by a 3' MCS. (Fig. 6) The 3' MSC contains the restriction sites XbaI-EcoRI-EcoRV-ClaI-XhoI. The 3' UTR sequences from several hematopoietic differentiation-associated mRNAs were isolated by RT-PCR with primers containing restriction enzyme linkers. These 3' UTR PCR fragments were cloned into the 3' MCS of the Luc-3' UTR reporter construct. The resulting

chimeric mRNAs, containing luc and the 3' UTR of the mRNA of interest, allowed for rapid functional analysis of miRNA translational control of mRNAs of interest (Fig. 6)

Primer sequences: The name of the mRNA is followed by the (size of the insert) in base pairs. L and R represent the forward (left) and reverse (right) primers used for PCR, each followed by the (restriction enzyme) used to clone the insert into the Luc-3' UTR reporter construct. Within the sequences the restriction site is shown in capital letters. Each prime also contains a 6-bp extension to act as a GC clamp and as a spacer for restriction enzyme binding.

BCL-2 3' UTR Primers (1,483 bp)

L: (EcoRI) gcattgGAATTCagtcaacatgcctgccccaaacaaatatgc

R: (XhoI) ccgatacCTCGAGgttttacatgtaattccatagacaggggt

CD164 3' UTR Primers (2,307 bp)

L: (ClaI) gcattgATCGATacagacccattgaattaataaggactggtgattc

R: (XhoI) cgatacCTCGAGgtcagtttggtacatgatacagattggttttgcag

C/EBP-b 3' UTR primers (5,96 bp)

L: (EcoRI) gcattgGAATTCcgcggcccccgcgcgcgtccccctgccggc

R: (XhoI) cgatacCTCGAGaaccattctcaaaaaaaagtttattaaaag

CXCR4 3' UTR primers (5,19 bp)

L: (EcoRI) gcattgGAATTCcacagatgtaaaagacttttttttatacga

R: (XhoI) cgatacCTCGAGaagtttaacatgtacttttattaacaactt

GATA-2 3' UTR primers (1,589 bp)

L: (EcoRI) gcattgGAATTCggaacagatggacgtcgaggaccgggcact

R: (XhoI) cgatacCTCGAGacaaaaagtattttattattcttaacagta

GATA-3 3' UTR primers (475 bp)

L: (EcoRI) gcattgGAATTCagccctgctcgatgctcacagggcccccag

R: (XhoI) cgatacCTCGAGaatgcatcaaacaactgtggccagtgaaag

Hes-1 3' UTR primers (295 bp)

L: (EcoRI) gcattgGAATTCctccggactctaaacaggaacttgaatact

R: (XhoI) cgatacCTCGAGctcaaataaacttccccaaaggaagatatt

Hox A5 3' UTR primers (284 bp)

L: (EcoRI) gcattgGAATTCgtatctgagcgtttaaagtactgagcagta

R: (XhoI) cgatacCTCGAGgttatagttacttcaagtaacacagcttgc

Hox A9 3' UTR primers (1,165 bp)

L: (ClaI) gcattgATCGATtgccatttgggcttatttagaaaaaagggt

R: (XhoI) cgatacCTCGAGagaaaagaatcaatatattttatttggcaa

Hox A10 3' UTR primers (1,298 bp)

L: (EcoRI) gcattgGAATTCtgaatctccaggcgacgcggttttttcact

R: (XhoI) cgatacCTCGAGgcttcattccacagcttttattctataaga

Hox B5 3' UTR primers (951 bp)

L: (EcoRI) gcattgGAATTCgcccgcccagaggagcccagcggcccaaga

R: (XhoI) cgatacCTCGAGtggaagtcaaataaatgtttcccccactcc

Hox B7 3' UTR primers (586 bp)

L: (EcoRI) gcattgGAATTCgggatggagaaagggcagaggaag

R: (XhoI) cgatacCTCGAGtccatcctttagatacacacagaatgtaaaaggg

KLF2 3' UTR primers (498 bp)

L: (EcoRI) gcatgcGAATTCaaccgggccgggcacagc

R: (XhoI) cgatgcCTCGAGtcttataaaaacgaaccaggtagccc

LMO2 3' UTR primers (778 bp)

L: (EcoRI) gcattgGAATTCgcccgagtccccgggcatctttggggaggt

R: (XhoI) cgatacCTCGAGcagtctgtcatttttattaagcctgcagag

MEIS-1 3' UTR primers (1,500 bp)

L: (EcoRI) gcattgGAATTCccttcatctagttaaccaatcgcaaagcaa

R: (XhoI) cgatacCTCGAGgacaaaaataatcttgtttttattttagat

Myb 3' UTR primers (1,157 bp)

L: (EcoRI) gcattgGAATTCccagaaaagcattatggttttcagaacac

R: (XhoI) cgatacCTCGAGtgctacaaggcagtaagtacaccgtc

RUNX-1 3' UTR primers (4,331 bp)

L: (EcoRI) gcattgGAATTCggcgccaggcctggcccggctgggccccgc

R: (ClaI) gcattgATCGATatggtgtatgtacttgtcaaactgtttatttgcc

RUNX-3 3' UTR primers (1,062 bp)

L: (EcoRI) gcattgGAATTCccgccctggtggactcctcccgctggaggc

R: (ClaI) gcattgATCGATactatttgctttcagagcacaaaacaggtt

SOCS-2 3' UTR primers (1,000 bp)

L: (EcoRI) gcattgGAATTCatgtctcacatagagtatctccgaatgcag

R: (XhoI) cgatacCTCGAGcagtagaagggagacaactgtttatgtcca

WWP-2 3' UTR primers (1,800 bp)

L: (EcoRI) gcattgGAATTCccgaggccgcccctcccacgcccccagcg

R: (XhoI) cgatacCTCGAGacagctgctgattgtttattgcacaagaaa

miRNA Knockout Luciferase(luc)-3' UTR Reporter Plasmids. In addition, for certain of the luc-3'UTR reporter plasmids, the inventors produced variant constructs, in which specific miRNA-binding sites were deleted from the 3' UTR (Luc-3' UTR-DL constructs). Approximately 60-mer PCR primers, consisting of the 20-nucleotide (nt) sequence on either side of the miRNA-binding sites plus an intervening 20-bp spacer containing a PacI site, were generated and then used in full-plasmid PCR (QuikChange XL Kit 200516; Stratagene, La Jolla, CA). Briefly, these primers span the deletion site but replace the sequence to be deleted with a unique restriction enzyme site that allows for rapid screening of clones with the deletion. The entire mutant plasmid is then produced via PCR, lacking the miRNA binding site, as described in the manufacturer's protocol.

Primer sequences: The name of the primer consists of the mRNA 3' UTR name and the predicted miRNA binding site deleted from the 3' UTR sequence. Only the forward primer

sequence is shown, because the reverse is the antiparallel sequence of the forward primer. The PacI spacer is shown in blue.

CXCR4 3' UTR mir-92 deletion primers

ttcctgttcttaagacgtgaacagtaTTAATTAAagctgtaaccaaagcccaaagtggta

CXCR4 3' UTR mir-181 deletion primers

gactgtagaaaagggaactgacagtaTTAATTAAagctgtgtaaagctagaaatgatccc

KLF2-82 3' UTR mir-92 deletion primers

CGAGTTTTGTTTTTCAAAATacagtaTTAATTAAagctgtATTTAAGTGGCATCTTCTCT

Cloning of the hsa-mir-155 Gene. The hsa-mir-155 gene was cloned from K562 cell genomic DNA, via PCR by using primers containing restriction enzyme linkers that would allow cloning into either the pcDNA3.1(+) expression vector (V79020; Invitrogen, Carlsbad, CA) or the FUGW lentiviral expression vector (1). The inventors used vectors containing strong Pol II promotors, since miRNA expression and processing by Drosha, Exportin V, and Dicer seem to be much more reliable using longer 5'-capped-mRNA sequences produced by Pol II, rather than shorter RNAs produced by Pol III promotors (2). The fragments produced by PCR contained the miRNA precursor (70-120 nt) flanked on both the 5' and 3' sides by 250 nt of genomic sequence, resulting in inserts of 570 to 620 nt.

Primer sequences:

L: (EcoRI) cgatcgGAATTCaaatggactattttcctttcagatttacta

R: (NheI) gctatgGCTAGCtaaataaccttactttcaaaacttagttta

1. Yu X, Zhan X, D'Costa J, Tanavde VM, Ye Z, Peng T, Malehorn MT, Yang X, Civin CI, Cheng L (2003) *Mol Ther* 7:827-838.

2. Bartel DP (2004) *Cell* 116:281-297.

Example 2 - Abstracts

CD34+ Hematopoietic Stem-Progenitor Cell MicroRNA Expression and Function: The miR Circuit Diagram of Differentiation Control.

Since lin-4, the founding member of the class, was described, microRNAs (miRs) have become a recently realized class of epigenetic elements which modify translation of

mRNA to protein, and which also may result in gene silencing through chromatin remodeling. First discovered in C. elegans, miRs have been identified in numerous other organisms including drosophila, rat, mouse, and humans. To date, they have been shown to control cellular metabolism, differentiation and development. Even more importantly aberrant expression of miRs and deletion of miRs are highly associated with the development of various cancers. To better understand the role of miRs in normal hematopoiesis the inventors have determined the microRNA expression profile of primary normal human PBSC and bone marrow CD34+ cells. The inventors have combined this data with the extensive mRNA expression data obtained from CD34+ HSPC, CD34+/CD38- ILin- HSC-enriched, and CD34+/CD38+/Lin+ HPC-enriched populations in a previous study. (Cancer Research 644344) Combining these two datasets into one integrated database has allowed the inventors to intricately examine the global interaction of HSPC mRNAs and microRNAs, and to also predict which miRs are involved with differentiation of the hematopoietic system. These findings offer promising new targets for the study of stem cell differentiation and targets for genetic therapies of hematopoietic stem cells.

CD34+ HSPC MicroRNA Expression and Regulation of Hematopoiesis: A Bioinformatic Circuit Diagram of the Hematopoietic Differentiation Control.

MicroRNAs (miRs) are a recently realized class of epigenetic elements which block translation of mRNA to protein, and which also may result in gene silencing through chromatin remodeling. MicroRNAs have been shown to control cellular metabolism, differentiation and development in numerous organisms including drosophila, rat, mouse, and humans. Recently, miRs have been implicated in the control of hematopoiesis. Even more importantly, both aberrant expression and deletion are highly associated with the development of various cancers. To better understand the role of miRs in normal hematopoiesis, the inventors have determined the microRNA expression profile of primary normal human PBSC and bone marrow CD34+ hematopoietic stem-progenitor cells (HSPC). The inventors have combined this data with the extensive mRNA expression data obtained from CD34+ HSPC, CD34+/CD38-ILin- HSC-enriched, and CD34+/CD38+/Lin+ HPC-enriched populations in a previous study. (Cancer Research 64:4344) Combining these two datasets into one integrated database has allowed the inventors to intricately examine the global interaction of HSPC mRNAs and microRNAs, and to also predict which

miRs are involved with differentiation of the hematopoietic system through their control of expression of hematopoieticly important proteins. The inventors have confirmed that expression of a number of these hematopoieticly important proteins are in fact controlled by microRNAs. Based on the bioinformatic and protein expression studies, the inventors present a global model by which microRNAs control hematopoietic differentiation. These findings offer promising new targets for the study of stem cell differentiation and targets for genetic therapies of hematopoietic stem cells.

MicroRNA hsa-mir-155 blocks myeloid and erythroid differentiation of human CD34+ HSPC.

In a previous study, the inventors determined all of the microRNAs expressed by human CD34+ hematopoietic stem progenitor cells from bone marrow and GM-CSF mobilized periferal blood. When the inventors combined microRNA expression with mRNA expression data from a previous study (Georgantas et al, Cancer Research 64:4434), the inventors were able to bioinformatically predict the actions of microRNAs within the hematopoietic system. MicroRNA hsa-mir-155 was highly expressed in CD34+ HSPC, and was immediately identified to be a possible generalized inhibitor of hematopoietic differentiation. MicroRNA-155 was predicted to interact with HSPC expressed mRNAs proteins previously shown to be highly involved myeloid and erythroid differentiation. K562 cells were transduced with hsa-mir-155 lentivirus, and were then differentiated with TPA to megakaryocytes or with hemin to erythrocytes. Compared to controls mir-155 reduced megakaryocyte differentiation by approximately 70%, and erythropoiesis by over 90%. Cell growth was not effected by mir-155, indicating this was a block in differentiation, and not simply a block in cell growth. Transduction of human PBSC CD34+ cells, followed by colony forming assay, revealed that mir-155 reduces both myeloid and erythroid colony formation by greater than 70%. The inventors are currently further testing the effect of mir-155 on PBSC in suspension cultures and transplant into NOG mice. These data strongly indicate that mir-155 acts in control of myeloid and erythroid differentiation.

MicroRNA hsa-mir-16 contributes to control of myeloid differentiation of human CD34+ HSPC.

In a previous study, the inventors determined all of the microRNAs expressed by human CD34+ hematopoietic stem-progenitor cells from bone marrow and GM-CSF mobilized peripheral blood. When the inventors combined microRNA expression with mRNA expression data from a previous study (Georgantas et al, Cancer Research 64:4434), the inventors were able to bio-informaticly predict the actions of microRNAs within the hematopoietic system. MicroRNA hsa-mir-16 was highly expressed in CD34+ HSPC, and based on it predicted target mRNAs was identified as a possible regulator of myeloid differentiation. The inventors first confirmed that protein expression from these putative target mRNAs were in fact regulated by mir-16. The 3'UTR sequences from these mRNAs were cloned behind a luciferase reporter construct, which were then transfected into K562 cells, which highly express mir-16. In all cases protein expression was reduced.

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Example 3

Table 3. miRNA to mRNA mappings. Predicted mRNA targets (expressed in PBSC and BM) for each individual miRNA (noted above sub-tables) as identified by the Transcriptome Interaction Database. Included are the Ensemble Gene ID, the HUGO systematic gene symbol, the Unigene identifier, the normalized expression level of the mRNA [in relative fluorescence units (RFU)], and the Affymetrix call flags for each transcript (P, present/expressed).

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Ensemble gene ID	Gene symbol	Unigene	PBSC, RFU	PBSC flags	BM, RFU	BM flags
ENSG00000137845	ADAM10	Hs.172028	221.1	PP	315.55	PP
ENSG00000138031	ADCY3	Hs.467898	208.6	PP	178.4	PP
ENSG00000087274	ADD1	Hs.183706	410.2	PP	214.3	PP
ENSG00000143401	ANP32E	Hs.385913	169.2	PP	423.3	PP
ENSG00000143761	ARF1	Hs.286221	1245.2	PP	798.4	PP
ENSG00000163466	ARPC2	Hs.529303	1447.8	PP	1774.7	PP
ENSG00000143153	ATP1B1	Hs.291196	132.4	PP	245.55	PP
ENSG00000174437	ATP2A2	Hs.506759	203.5	PP	255.4	PP
ENSG00000155096	AZIN1	Hs.459106	551.2	PP	619.2	PP
ENSG00000119866	BCL11A	Hs.370549	363.1	PP	387.8	PP
ENSG00000159388	BTG2	Hs.519162	588.2	PP	538.3	PP
ENSG00000171067	C11orf24	Hs.303025	127.9	PP	105.45	PA
ENSG00000139746	C13orf10	Hs.131715	119.8	PP	178.7	PP
ENSG00000152242	C18orf25	Hs.116486	129.7	PP	130.6	PA
ENSG00000117616	C1orf63	Hs.259412	1202.1	PP	1000.85	PP
ENSG00000132823	C20orf111	Hs.75798	346	PP	259.1	PP
ENSG00000031003	C5orf5	Hs.483473	256.3	PP	316.85	PP
ENSG00000132424	C6orf111	Hs.520287	674.8	PP	743.75	PP
ENSG00000112306	C6orf62	Hs.51993	330.6	PP	509.45	PP

8		0				
ENSG0000006795		Hs.46098				
5	CBFB	8	719.1	PP	1032	PP
ENSG0000011223		Hs.43064				
7	CCNC	6	273.3	PP	380.8	PP
ENSG0000011084		Hs.20885				
8	CD69	4	1631.5	PP	1082.1	PP
ENSG0000007083		Hs.46763				
1	CDC42	7	620.1	PP	437.75	PP
ENSG0000017221		Hs.51710				
6	**CEBPB**	6	374.1	PP	391	PP
ENSG0000016620		Hs.36961				
0	COPS2	4	521.2	PP	700.65	PP
ENSG0000010297		Hs.36836				
4	CTCF	7	506.1	PP	535.55	PA
ENSG0000003625		Hs.37228				
7	CUL3	6	554.5	PP	473.25	PP
ENSG0000016820		Hs.52301				
9	DDIT4	2	736.8	PP	535.85	PP
ENSG0000012448		Hs.38077				
7	DDX3X	4	769.8	PP	1229	PP
ENSG0000006704						
8	DDX3Y	Hs.99120	302.6	PP	309.6	PA
ENSG0000013215		Hs.51794				
3	DHX30	8	209.5	PP	193.5	PP
ENSG0000008245		Hs.52268				
8	DLG3	0	136.2	PP	89.45	PP
ENSG0000012859						
0	DNAJB9	Hs.6790	211.5	PP	433.55	PP
ENSG0000016726		Hs.53446				
4	DUS2L	0	140.7	PP	111.5	PA
ENSG0000014350		Hs.49782				
7	DUSP10	2	328.9	PP	371.8	PP
ENSG0000013931		Hs.29865				
8	DUSP6	4	166.6	PP	316.85	PP
ENSG0000011224		Hs.26940				
2	E2F3	8	295.6	PP	585.95	PP
ENSG0000014765		Hs.40936				
4	EBAG9	8	293.7	PP	285.65	PP
ENSG0000012390		Hs.44941				
8	EIF2C2	5	150.2	PP	115.85	PP
ENSG0000010413		Hs.40405				
1	EIF3S1	6	340.4	PP	365.05	PP
ENSG0000011032		Hs.18368				
1	EIF4G2	4	2137	PP	2701.9	PP
ENSG0000010646		Hs.44408				
2	EZH2	2	162.9	PP	216.25	PP
ENSG0000016614		Hs.14644				
7	FBN1	7	195.2	PP	178.7	PP
ENSG0000014375						
6	FBXO28	Hs.64691	106.1	PP	70.5	PA
ENSG0000015170		Hs.50428				
2	FLI1	1	156.4	PP	248.05	PP
ENSG0000016813		Hs.28816				
7	FLJ10707	4	452.5	PP	256.1	PM
ENSG0000015920	FLJ13855	Hs.51429	539	PP	525.1	PP

2		7				
ENSG00000109920	FNBP4	Hs.6834	501.2	PP	497.2	PP
ENSG00000163430	FSTL1	Hs.269512	408.6	PP	227.95	PP
ENSG00000114416	FXR1	Hs.478407	143.9	PP	155.75	PP
ENSG00000138757	G3BP2	Hs.303676	242.8	PP	428.55	PP
ENSG00000196700	GM632	Hs.551552	103.5	PP	145.05	PP
ENSG00000175265	GM88	Hs.182982	627	PP	822.4	PP
ENSG00000147533	GOLGA7	Hs.7953	669.8	PP	592.25	PP
ENSG00000159592	GPBP1L1	Hs.238432	275.7	PP	300.05	PP
ENSG00000128731	HERC2	Hs.434890	257.7	PP	239.3	PP
ENSG00000163349	HIPK1	Hs.532363	347.7	PP	488.5	PP
ENSG00000122566	HNRPA2B1	Hs.487774	1802.2	PP	2268.3	PP
ENSG00000170144	HNRPA3	Hs.516539	375.5	PP	558.6	PP
ENSG00000169045	HNRPH1	Hs.202166	1986.4	PP	2132.6	PP
ENSG00000153807	**HOXA10**	Hs.110637	161.3	PP	200.7	PA
ENSG00000078399	**HOXA9**	Hs.127428	739.2	PP	674	PP
ENSG00000164164	HSHIN1	Hs.270851	303.1	PP	312.65	PP
ENSG00000144381	HSPD1	Hs.113684	2868.6	PP	5689.3	PP
ENSG00000168556	ING2	Hs.107153	177	PP	151.85	PP
ENSG00000186480	INSIG1	Hs.520819	196.9	PP	304.7	PP
ENSG00000145703	IQGAP2	Hs.291030	537.8	PP	457.9	PP
ENSG00000143164	IQWD1	Hs.435741	168.5	PP	156.4	PP
ENSG00000150093	ITGB1	Hs.429052	865.6	PP	593.85	PP
ENSG00000177606	JUN	Hs.525704	1300.5	PP	2286.95	PP
ENSG00000179889	KIAA0251	Hs.370781	386	PP	331	PM
ENSG00000126775	KIAA0831	Hs.414809	254.4	PP	217.45	PP
ENSG00000170759	KIF5B	Hs.327736	346.6	PP	430.75	PP
ENSG00000127528	**KLF2**	Hs.107740	609	PP	859.3	PP
ENSG00000136826	**KLF4**	Hs.37620	536.5	PP	1193.7	PP

6		6				
ENSG0000016678		Hs.17352				
3	LKAP	4	135	PP	182.75	PP
ENSG0000015210		Hs.46994				
2	LOC130074	1	508.5	PP	344.1	PP
ENSG0000012760		Hs.47247				
3	MACF1	5	222.8	PP	248.35	PP
ENSG0000012157		Hs.26952				
9	MAK3	8	268.8	PP	307	PP
ENSG0000001298		Hs.13049				
3	MAP4K5	1	66	PP	116	PP
ENSG0000008118		Hs.44440				
9	MEF2C	9	426	PP	437.85	PP
ENSG0000016594						
3	MOAP1	Hs.24719	527.1	PP	299.1	PP
ENSG0000015925		Hs.42115				
6	MORC3	0	108.8	PP	130.45	PP
ENSG0000014764		Hs.37715				
9	MTDH	5	258.6	PP	329.8	PP
ENSG0000000581		Hs.15141				
0	MYCBP2	1	187	PP	643.55	PP
ENSG0000013742		Hs.54916			1222.0	
0	NOL7	1	1095.5	PP	5	PP
ENSG0000014145		Hs.46477				
8	NPC1	9	126.1	PP	135.8	PM
ENSG0000010645		Hs.29806				
9	NRF1	9	157.5	PP	126.8	PA
ENSG0000018053		Hs.15501				
0	**NRIP1**	7	842	PP	914.85	PP
ENSG0000003568		Hs.37200				
1	NSMAF	0	517.1	PP	517.75	PP
ENSG0000014716		Hs.40541				
2	OGT	0	165.1	PP	183.6	PP
ENSG0000017293		Hs.47597				
9	OXSR1	0	211	PP	186.15	PA
ENSG0000017223		Hs.48203				
9	PAIP1	8	127.8	PP	157	PP
ENSG0000009006		Hs.25372				
0	PAPOLA	6	307.4	PP	286	PP
ENSG0000018561		Hs.14430				
9	PCGF3	9	192.1	PP	237.55	PP
ENSG0000010222		Hs.49606				
5	PCTK1	8	135	PP	88.45	PA
ENSG0000005975		Hs.50641				
8	PCTK2	5	118.3	PP	220.9	PP
ENSG0000013232						
6	PER2	Hs.58756	162.6	PP	308.65	PP
ENSG0000011251		Hs.16620				
1	PHF1	4	903.7	PP	604.1	PP
ENSG0000004314		Hs.48341				
3	PHF15	9	234	PP	320.3	PP
ENSG0000011848		Hs.34892				
2	PHF3	1	260	PP	268.9	PP
ENSG0000005138		Hs.23981				
2	PIK3CB	8	275.1	PP	280.95	PP
ENSG0000015421	PITPNC1	Hs.54913	391.3	PP	316.6	PP

7		0				
ENSG0000011294		Hs.48154				
1	POLS	2	355.5	PP	367.35	PP
ENSG0000012712		Hs.54919				
5	PPCS	6	120.7	PP	188.55	PP
ENSG0000005827						
2	PPP1R12A	Hs.49582	154.9	PP	178.75	PP
ENSG0000000524		Hs.43306				
9	PRKAR2B	8	200.7	PP	237.75	PP
ENSG0000013843		Hs.15735				
0	PTD004	1	848.2	PP	1052.6	PP
ENSG0000017152		Hs.19924				
2	PTGER4	8	531.8	PP	514.8	PP
ENSG0000011253		Hs.51032				
1	QKI	4	284.1	PP	564.45	PP
ENSG0000011939		Hs.37156				
6	RAB14	3	140.5	PP	198.15	PP
ENSG0000015206		Hs.49539				
1	RABGAP1L	1	229.4	PP	396.75	PP
ENSG0000016475						
4	RAD21	Hs.81848	281.3	PP	414.9	PP
ENSG0000001001		Hs.30624				
7	RANBP9	2	381.3	PP	489.95	PP
ENSG0000011647		Hs.19033				
3	RAP1A	4	217.2	PP	367.75	PP
ENSG0000012731		Hs.36992			1537.7	
4	RAP1B	0	1093.1	PP	5	PP
ENSG0000013707		Hs.33350				
5	RNF38	3	322.6	PP	227.7	PP
ENSG0000006397						
8	RNF4	Hs.66394	115.8	PP	325.65	PP
ENSG0000019883		Hs.36925				
8	RYR3	0	116.8	PP	131.8	PP
ENSG0000018256		Hs.51771				
8	SATB1	7	829.9	PP	652.05	PP
ENSG0000012189		Hs.33143				
2	SCC-112	1	220.4	PP	258.2	PP
ENSG0000015664		Hs.18786				
2	SDFR1	6	169.4	PP	193.05	PP
ENSG0000017983						
3	SERTAD2	Hs.77293	498.4	PP	556.2	PP
ENSG0000009671		Hs.36977				
7	SIRT1	9	133.8	PP	124.9	PP
ENSG0000013429		Hs.22184			1026.5	
4	SLC38A2	7	634.3	PP	5	PP
ENSG0000018460		Hs.45995				
2	SNN	2	234.4	PP	239.3	PP
ENSG0000013764		Hs.36859			1084.6	
2	SORL1	2	2264.1	PP	5	PP
ENSG0000019670						
0	SOX18	Hs.8619	1264.6	PP	2674	PP
ENSG0000012476		Hs.35790			2500.6	
6	SOX4	1	2351.7	PP	5	PP
ENSG0000013525		Hs.28519				
0	SRPK2	7	106.2	PP	118.7	PM
ENSG0000010197	STAG2	Hs.49671	392	PP	375.2	PP

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ENSG0000019864		Hs.27627				
8	STK39	1	129.8	PP	111.35	PP
ENSG0000017381		Hs.15058			6098.8	
2	SUI1	0	6046	PP	5	PP
ENSG0000016516		Hs.44639				
9	TCTE1L	2	323	PP	369.75	PP
ENSG0000011412		Hs.37901				
6	TFDP2	8	253.2	PP	196.3	PA
ENSG0000017742		Hs.37355				
6	TGIF	0	116.7	PP	95.35	PM
ENSG0000018386		Hs.47497				
4	TOB2	8	165.3	PP	196.4	PP
ENSG0000019890		Hs.47273				
0	TOP1	7	315.5	PP	468.35	PP
ENSG0000016569		Hs.37085				
9	TSC1	4	232.7	PP	242.3	PP
ENSG0000013238		Hs.46203				
8	UBE2G1	5	272.5	PP	373.45	PP
ENSG0000016976		Hs.51621				
4	UGP2	7	656.9	PP	560.95	PP
ENSG0000016482		Hs.43807				
8	UNC84A	2	146.4	PP	111.15	PP
ENSG0000013565		Hs.43495				
5	USP15	1	197.3	PP	160.35	PP
ENSG0000014395						
2	VPS54	Hs.48499	187.9	PP	151.5	PP
ENSG0000019837		Hs.40845				
3	**WWP2**	8	231	PP	185.05	PP
ENSG0000010021		Hs.43763				
9	XBP1	8	1126.5	PP	826.5	PP
ENSG0000010081		Hs.38892				
1	YY1	7	539.7	PP	740.2	PP
ENSG0000017094		Hs.46723			1016.8	
9	ZNF160	6	1056.4	PP	5	PP
ENSG0000017945						
6	ZNF238	Hs.69997	235.7	PP	241.8	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000004455	AK2	Hs.470907	303.6	PP	498.6	PP
ENSG00000117020	AKT3	Hs.498292	246.4	PP	259.35	PP
ENSG00000170017	ALCAM	Hs.150693	528.9	PP	695.45	PP
ENSG00000101844	APG4A	Hs.8763	139.4	PP	172.75	PA
ENSG00000117713	ARID1A	Hs.468972	477.6	PP	444.8	PP
ENSG00000143153	ATP1B1	Hs.291196	132.4	PP	245.55	PP
ENSG00000126749	C2F	Hs.504628	383.4	PP	460.7	PM
ENSG00000168958	C2orf33	Hs.471528	235.3	PP	302.3	PP
ENSG00000136925	C9orf97	Hs.494595	207.5	PP	180.4	PP
ENSG00000135932	CAB39	Hs.471593	527.9	PP	637.3	PP
ENSG00000142453	CARM1	Hs.371416	141.6	PP	105.7	PA

ENSG00000067955	CBFB	Hs.460988	719.1	PP	1032	PP
ENSG00000108468	CBX1	Hs.77254	432	PP	415.85	PP
ENSG00000082258	CCNT2	Hs.292754	114.4	PP	102.75	PP
ENSG00000172216	**CEBPB**	Hs.517106	374.1	PP	391	PP
ENSG00000153922	CHD1	Hs.519474	89.4	PP	202.95	PP
ENSG00000072609	CHFR	Hs.507336	247.4	PP	253.05	PP
ENSG00000166200	COPS2	Hs.369614	521.2	PP	700.65	PP
ENSG00000108848	CROP	Hs.130293	2166.4	PP	1637.55	PP
ENSG00000048740	CUGBP2	Hs.309288	159.6	PP	334.5	PP
ENSG00000160967	CUTL1	Hs.438974	333.3	PP	412.55	PP
ENSG00000121966	CXCR4	Hs.421986	532.4	PP	1919.4	PP
ENSG00000166347	CYB5	Hs.465413	191.8	PP	277.55	PP
ENSG00000168209	DDIT4	Hs.523012	736.8	PP	535.85	PP
ENSG00000124487	DDX3X	Hs.380774	769.8	PP	1229	PP
ENSG00000136986	DERL1	Hs.241576	223	PP	240.65	PA
ENSG00000109606	DHX15	Hs.5683	1219.8	PP	1620.75	PP
ENSG00000112242	E2F3	Hs.269408	295.6	PP	585.95	PP
ENSG00000186676	EEF1G	Hs.144835	19027.3	PP	14878.45	PP
ENSG00000110321	EIF4G2	Hs.183684	2137	PP	2701.9	PP
ENSG00000004478	FKBP4	Hs.524183	490.7	PP	372.15	PM
ENSG00000118689	FOXO3A	Hs.220950	1368.3	PP	720.35	PP
ENSG00000104064	GABPB2	Hs.546852	129.3	PP	183.75	PM
ENSG00000116717	GADD45A	Hs.80409	266	PP	245.7	PP
ENSG00000141429	GALNT1	Hs.514806	220	PP	273.8	PP
ENSG00000106070	GRB10	Hs.164060	550.7	PP	574.15	PP
ENSG00000143321	HDGF	Hs.506748	243.6	PP	858.8	PP
ENSG00000013583	HEBP1	Hs.294133	387.7	PP	516.4	PP
ENSG00000114315	**HES1**	Hs.250666	232.7	PP	169.8	PP
ENSG00000152804	HHEX	Hs.118651	328.9	PP	298.65	PP
ENSG00000078140	HIP2	Hs.50308	60.5	PP	68.4	PP
ENSG00000010818	HIVEP2	Hs.510172	149.6	PP	157.9	PP
ENSG00000153187	HNRPU	Hs.166463	470.3	PP	887.6	PP
ENSG00000078399	**HOXA9**	Hs.127428	739.2	PP	674	PP
ENSG00000164164	HSHIN1	Hs.270851	303.1	PP	312.65	PP
ENSG00000102753	KPNA3	Hs.527919	250.8	PP	391.35	PP
ENSG00000133703	KRAS	Hs.505033	355.8	PP	363.05	PP
ENSG00000143815	LBR	Hs.435166	1166	PP	1807.35	PP
ENSG00000135363	LMO2	Hs.34560	1997.3	PP	1809.95	PP
ENSG00000110031	LPXN	Hs.125474	233.9	PP	209.7	PP
ENSG00000171492	LRRC8D	Hs.482087	543.3	PP	374.45	PP
ENSG00000127603	MACF1	Hs.472475	222.8	PP	248.35	PP
ENSG00000121579	MAK3	Hs.269528	268.8	PP	307	PP
ENSG00000047849	MAP4	Hs.517949	302.6	PP	276.5	PP
ENSG00000180398	MCFD2	Hs.293689	289.4	PP	258.25	PP
ENSG00000081189	MEF2C	Hs.444409	426	PP	437.85	PP
ENSG00000133026	MYH10	Hs.16355	375.1	PP	362.5	PP
ENSG00000164190	NIPBL	Hs.481927	165.1	PP	145.15	PP
ENSG00000106459	NRF1	Hs.298069	157.5	PP	126.8	PA
ENSG00000162231	NXF1	Hs.523739	543	PP	626	PP
ENSG00000059758	PCTK2	Hs.506415	118.3	PP	220.9	PP
ENSG00000025293	PHF20	Hs.517044	249.8	PP	173.65	PP
ENSG00000073921	PICALM	Hs.163893	357.3	PP	315.6	PP
ENSG00000104695	PPP2CB	Hs.491440	197.6	PP	323.9	PP

ENSG00000117569	PTBP2		Hs.269895	183	PP	160.15	PP
ENSG00000138430	PTD004		Hs.157351	848.2	PP	1052.6	PP
ENSG00000171862	PTEN		Hs.500466	353.7	PP	334.4	PP
ENSG00000185129	PURA		Hs.443121	149.5	PP	224.95	PP
ENSG00000112531	QKI		Hs.510324	284.1	PP	564.45	PP
ENSG00000103769	RAB11A		Hs.321541	1087.7	PP	1020.15	PP
ENSG00000138069	RAB1A		Hs.310645	70.8	PP	109.75	PM
ENSG00000152061	RABGAP1L		Hs.495391	229.4	PP	396.75	PP
ENSG00000137040	RANBP6		Hs.167496	125.2	PP	140.05	PP
ENSG00000127314	RAP1B		Hs.369920	1093.1	PP	1537.75	PP
ENSG00000145715	RASA1		Hs.553501	138.8	PP	103.6	PP
ENSG00000197676	RBM16		Hs.227602	193.8	PP	274	PP
ENSG00000147274	RBMX		Hs.380118	1610.3	PP	1490.7	PP
ENSG00000168214	RBPSUH		Hs.479396	79.3	PP	100.35	PP
ENSG00000117906	RCN2		Hs.79088	121.2	PP	121.5	PP
ENSG00000157916	RER1		Hs.525527	262.6	PP	329.9	PP
ENSG00000170633	RNF34		Hs.292804	424.6	PP	385.65	PP
ENSG00000063978	RNF4		Hs.66394	115.8	PP	325.65	PP
ENSG00000155878	SEC22L1		Hs.534212	662.9	PP	588.95	PP
ENSG00000125354		6-Sep	Hs.496666	335.7	PP	310.55	PP
ENSG00000153914	SFRS12		Hs.519347	258	PP	229.6	PP
ENSG00000161547	SFRS2		Hs.73965	3723.5	PP	4390.4	PP
ENSG00000124523	SIRT5		Hs.282331	252.8	PP	171.5	PM
ENSG00000138821	SLC39A8		Hs.288034	290.7	PP	275.05	PP
ENSG00000159140	SON		Hs.517262	408.8	PP	467.15	PP
ENSG00000172845	SP3		Hs.531587	137.8	PP	293.35	PP
ENSG00000065526	SPEN		Hs.270499	257.6	PP	262.7	PP
ENSG00000115306	SPTBN1		Hs.503178	589.9	PP	344.65	PP
ENSG00000149136	SSRP1		Hs.523680	329.8	PP	503.65	PP
ENSG00000167323	STIM1		Hs.501735	143.2	PP	99.7	PP
ENSG00000198648	STK39		Hs.276271	129.8	PP	111.35	PP
ENSG00000117632	STMN1		Hs.209983	546.6	PP	663.4	PP
ENSG00000135316	SYNCRIP		Hs.472056	178	PP	315.75	PP
ENSG00000136560	TANK		Hs.516490	307.6	PP	221.95	PP
ENSG00000113649	TCERG1		Hs.443465	196.5	PP	257.25	PP
ENSG00000140262	TCF12		Hs.511504	179.4	PP	439.15	PP
ENSG00000139644	TEGT		Hs.35052	757.7	PP	1052.5	PP
ENSG00000106829	TLE4		Hs.444213	309.2	PP	251.15	PP
ENSG00000062716	TMEM49 /// MIRN21		Hs.444569	425.2	PP	441.3	PP
ENSG00000173726	TOMM20		Hs.533192	656.5	PP	888.45	PP
ENSG00000166598	TRA1		Hs.192374	151	PP	339.35	PP
ENSG00000077721	UBE2A		Hs.379466	299.1	PP	400.85	PP
ENSG00000170832	USP32		Hs.132868	120.2	PP	118.35	PP
ENSG00000146457	WTAP		Hs.446091	400.8	PP	406.6	PP
ENSG00000179456	ZNF238		Hs.69997	235.7	PP	241.8	PP
ENSG00000112200	ZNF451		Hs.485628	175.7	PP	176.15	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000114770	ABCC5	Hs.368563	373.4	PP	322.1	PM
ENSG00000115091	ACTR3	Hs.433512	353.8	PP	673.3	PP
ENSG00000143761	ARF1	Hs.286221	1245.2	PP	798.4	PP
ENSG00000143153	ATP1B1	Hs.291196	132.4	PP	245.55	PP
ENSG00000175334	BANF1	Hs.433759	387.5	PP	385	PP
ENSG00000119866	BCL11A	Hs.370549	363.1	PP	387.8	PP
ENSG00000159388	BTG2	Hs.519162	588.2	PP	538.3	PP
ENSG00000111913	C6orf32	Hs.484915	83.8	PP	62.8	PP
ENSG00000168564	CARF	Hs.32922	72.4	PP	130	PP
ENSG00000130940	CASZ1	Hs.553537	255.7	PP	200	PP
ENSG00000163660	CCNL1	Hs.4859	1082.6	PP	1052.5	PP
ENSG00000070831	CDC42	Hs.467637	620.1	PP	437.75	PP
ENSG00000153140	CETN3	Hs.528302	107.1	PP	199.4	PP
ENSG00000122705	CLTA	Hs.522114	1204.4	PP	990.1	PP
ENSG00000108848	CROP	Hs.130293	2166.4	PP	1637.55	PP
ENSG00000048740	CUGBP2	Hs.309288	159.6	PP	334.5	PP
ENSG00000036257	CUL3	Hs.372286	554.5	PP	473.25	PP
ENSG00000121966	CXCR4	Hs.421986	532.4	PP	1919.4	PP
ENSG00000112242	E2F3	Hs.269408	295.6	PP	585.95	PP
ENSG00000134001	EIF2S1	Hs.151777	235.7	PP	299.55	PP
ENSG00000104131	EIF3S1	Hs.404056	340.4	PP	365.05	PP
ENSG00000110321	EIF4G2	Hs.183684	2137	PP	2701.9	PP
ENSG00000066044	ELAVL1	Hs.184492	534.6	PP	734.45	PP
ENSG00000120533	ENY2	Hs.492555	316.2	PP	375.85	PP
ENSG00000120610	EPC1	Hs.167805	148.9	PP	88.7	PA

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ENSG00000157554	ERG	Hs.473819	369.4	PP	298.05	PA
ENSG00000120705	ETF1	Hs.483494	253.8	PP	461.55	PP
ENSG00000119402	FBXW2	Hs.494985	157.2	PP	167.5	PP
ENSG00000181495	FLJ14054	Hs.13528	1289.4	PP	771.75	PP
ENSG00000170345	FOS	Hs.25647	1254.3	PP	1832.65	PP
ENSG00000145907	G3BP	Hs.3353	167.7	PP	319.25	PP
ENSG00000104064	GABPB2	Hs.546852	129.3	PP	183.75	PM
ENSG00000196700	GM632	Hs.551552	103.5	PP	145.05	PP
ENSG00000185245	GP1BA	Hs.1472	274.2	PP	361.5	PP
ENSG00000163349	HIPK1	Hs.532363	347.7	PP	488.5	PP
ENSG00000122566	HNRPA2B1	Hs.487774	1802.2	PP	2268.3	PP
ENSG00000170144	HNRPA3	Hs.516539	375.5	PP	558.6	PP
ENSG00000138668	HNRPD	Hs.480073	785.7	PP	1067.15	PP
ENSG00000164164	HSHIN1	Hs.270851	303.1	PP	312.65	PP
ENSG00000184216	IRAK1	Hs.522819	529.4	PP	607.85	PP
ENSG00000115548	JMJD1A	Hs.531819	264	PP	207.05	PP
ENSG00000114030	KPNA1	Hs.161008	121.8	PP	91.95	PP
ENSG00000166783	LKAP	Hs.173524	135	PP	182.75	PP
ENSG00000135387	M11S1	Hs.471818	464.9	PP	451.45	PP
ENSG00000145495	6-Mar	Hs.432862	597.3	PP	536.05	PP
ENSG00000168906	MAT2A	Hs.516157	1011.4	PP	738.6	PP
ENSG00000015479	MATR3	Hs.268939	252.4	PP	382.35	PP
ENSG00000125952	MAX	Hs.285354	1178.7	PP	1480.1	PP
ENSG00000152601	MBNL1	Hs.478000	294.4	PP	864.5	PP
ENSG00000124733	MEA1	Hs.278362	452.7	PP	460.2	PP
ENSG00000133606	MKRN1	Hs.490347	392.7	PP	350.15	PP
ENSG00000175727	MONDOA	Hs.437153	201.1	PP	301.1	PP
ENSG00000112652	MRPL2	Hs.55041	198.6	PP	110.3	PA

1 ENSG00000138386	NAB1	Hs.107474	187.9	PP	203.9	PP
ENSG00000082641	NFE2L1	Hs.514284	735.5	PP	726.35	PP
ENSG00000106459	NRF1	Hs.298069	157.5	PP	126.8	PA
ENSG00000046651	OFD1	Hs.6483	1022.7	PP	692.15	PP
ENSG00000115421	PAPOLG	Hs.387471	153.2	PP	91.25	PP
ENSG00000169564	PCBP1	Hs.2853	1587.4	PP	1289.35	PP
ENSG00000107242	PIP5K1B	Hs.534371	279	PP	312.25	PP
ENSG00000163806	PPP1CB	Hs.468018	65.7	PP	135.05	PP
ENSG00000112498	PPP1R11	Hs.82887	484.7	PP	463.3	PP
ENSG00000107758	PPP3CB	Hs.500067	318.9	PP	241.25	PP
ENSG00000142875	PRKACB	Hs.487325	1018.3	PP	994.45	PP
ENSG00000143106	PSMA5	Hs.485246	649.7	PP	1036.3	PP
ENSG00000108344	PSMD3	Hs.12970	156.3	PP	101.1	PA
ENSG00000117569	PTBP2	Hs.269895	183	PP	160.15	PP
ENSG00000112531	QKI	Hs.510324	284.1	PP	564.45	PP
ENSG00000075785	RAB7	Hs.15738	99.2	PP	107.25	PP
ENSG00000077092	RARB	Hs.436538	111.5	PP	156.85	PP
ENSG00000067560	RHOA	Hs.247077	1537.7	PP	2368.8	PP
ENSG00000022840	RNF10	Hs.442798	327.5	PP	282.35	PM
ENSG00000123091	RNF11	Hs.309641	125.3	PP	161.5	PP
ENSG00000063978	RNF4	Hs.66394	115.8	PP	325.65	PP
ENSG00000159216	RUNX1	Hs.149261	108.8	PP	211.2	PP
ENSG00000052802	SC4MOL	Hs.105269	146.9	PP	73.7	PA
ENSG00000151967	SCHIP1	Hs.134665	497	PP	417.95	PP
ENSG00000156642	SDFR1	Hs.187866	169.4	PP	193.05	PP
ENSG00000107651	SEC23IP	Hs.435004	115.6	PP	130.8	PA
ENSG00000179833	SERTAD2	Hs.77293	498.4	PP	556.2	PP
ENSG00000119335	SET	Hs.436687	2967	PP	4307.1	PP

5 ENSG00000136450	SFRS1	Hs.68714	1264.9	PP	1622.65	PP
ENSG00000124193	SFRS6	Hs.6891	2001.1	PP	2200.75	PP
ENSG00000096717	SIRT1	Hs.369779	133.8	PP	124.9	PP
ENSG00000005022	SLC25A5	Hs.522767	4938.4	PP	5178.4	PP
ENSG00000102038	SMARCA1	Hs.152292	101.1	PP	72.95	PA
ENSG00000167088	SNRPD1	Hs.464734	518.7	PP	572.8	PP
ENSG00000196700	SOX18	Hs.8619	1264.6	PP	2674	PP
ENSG00000091640	SPAG7	Hs.90436	900.7	PP	517.9	PP
ENSG00000152268	SPON1	Hs.445818	236.5	PP	121.5	PP
ENSG00000180283	SUMO2	Hs.380973	1013.1	PP	783	PP
ENSG00000178691	SUZ12	Hs.462732	602.2	PP	633.3	PP
ENSG00000135316	SYNCRIP	Hs.472056	178	PP	315.75	PP
ENSG00000140416	TPM1	Hs.133892	394.4	PP	661.4	PP
ENSG00000157514	TSC22D3	Hs.522074	1752.5	PP	2189.45	PP
ENSG00000119048	UBE2B	Hs.385986	335	PP	417.45	PP
ENSG00000109332	UBE2D3	Hs.472031	471.2	PP	635.4	PP
ENSG00000132670	VPS16	---	333	PP	243.95	PP
ENSG00000143952	VPS54	Hs.48499	187.9	PP	151.5	PP
ENSG00000158195	WASF2	Hs.469244	430.1	PP	367.5	PP
ENSG00000166913	YWHAB	Hs.279920	222.4	PP	288.75	PP
ENSG00000107372	ZA20D2	Hs.406096	967.2	PP	1262.9	PP
ENSG00000186908	ZDHHC17	Hs.4014	123.5	PP	166.2	PP
ENSG00000119725	ZNF410	Hs.270869	164.4	PP	257.1	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000137822	76P	Hs.549135	383.7	PP	259.6	PP
ENSG00000075624	ACTB	Hs.520640	11983.4	PP	11502.85	PP

ENSG00000172493	AFF1	Hs.480190	480.6	PP	776.35	PP
ENSG00000031003	C5orf5	Hs.483473	256.3	PP	316.85	PP
ENSG00000135932	CAB39	Hs.471593	527.9	PP	637.3	PP
ENSG00000100261	CBX6	Hs.511952	308	PP	255.7	PP
ENSG00000163660	CCNL1	Hs.4859	1082.6	PP	1052.5	PP
ENSG00000082258	CCNT2	Hs.292754	114.4	PP	102.75	PP
ENSG00000135535	CD164	Hs.520313	2274.9	PP	2265.25	PP
ENSG00000153774	CFDP1	Hs.461361	278.6	PP	295.4	PP
ENSG00000111596	CNOT2	Hs.133350	431.4	PP	399.2	PP
ENSG00000111605	CPSF6	Hs.369606	402.6	PP	474.05	PP
ENSG00000009307	CSDE1	Hs.69855	1494.1	PP	1637.9	PP
ENSG00000102974	CTCF	Hs.368367	506.1	PP	535.55	PP
ENSG00000048740	CUGBP2	Hs.309288	159.6	PP	334.5	PP
ENSG00000036257	CUL3	Hs.372286	554.5	PP	473.25	PP
ENSG00000124487	DDX3X	Hs.380774	769.8	PP	1229	PP
ENSG00000141141	DDX52	Hs.408452	124.3	PP	74.65	PP
ENSG00000109606	DHX15	Hs.5683	1219.8	PP	1620.75	PP
ENSG00000108406	DHX40	Hs.29403	233.3	PP	196.45	PP
ENSG00000170522	ELOVL6	Hs.412939	96.5	PP	156.45	PP
ENSG00000085832	EPS15	Hs.83722	144.1	PP	218.2	PP
ENSG00000166147	FBN1	Hs.146447	195.2	PP	178.7	PP
ENSG00000138081	FBXO11	Hs.553547	155.7	PP	259.35	PP
ENSG00000114861	FOXP1	Hs.431498	322.7	PP	410.3	PP
ENSG00000114416	FXR1	Hs.478407	143.9	PP	155.75	PA
ENSG00000138757	G3BP2	Hs.303676	242.8	PP	428.55	PP
ENSG00000166503	HDGFRP3	Hs.513954	139.2	PP	156	PP
ENSG00000164104	HMGB2	Hs.434953	855.9	PP	2145.45	PP
ENSG00000122566	HNRPA2B1	Hs.487774	1802.2	PP	2268.3	PP
ENSG00000138668	HNRPD	Hs.480073	785.7	PP	1067.15	PP
ENSG00000126945	HNRPH2	Hs.278857	189.2	PP	158.45	PP
ENSG00000099783	HNRPM	Hs.465808	968.5	PP	880.2	PP
ENSG00000125944	HNRPR	Hs.373763	839.4	PP	980.1	PP
ENSG00000153187	HNRPU	Hs.166463	470.3	PP	887.6	PP
ENSG00000120075	**HOXB5**	Hs.149548	322	PP	238.15	PP
ENSG00000125347	IRF1	Hs.436061	467.7	PP	299.6	PP
ENSG00000102753	KPNA3	Hs.527919	250.8	PP	391.35	PP
ENSG00000185896	LAMP1	Hs.494419	282.2	PP	383.55	PP
ENSG00000143815	LBR	Hs.435166	1166	PP	1807.35	PP
ENSG00000145012	LPP	Hs.444362	205.6	PP	238.9	PP
ENSG00000120992	LYPLA1	Hs.435850	84.5	PP	420.05	PP
ENSG00000110514	MADD	Hs.82548	423	PP	267.9	PA
ENSG00000161021	MAML1	Hs.484349	331.3	PP	280.35	PP
ENSG00000101367	MAPRE1	Hs.472437	196.1	PP	206.85	PM
ENSG00000166974	MAPRE2	Hs.532824	857.4	PP	715.5	PP
ENSG00000175130	MARCKSL1	Hs.75061	314.8	PP	265.6	PP
ENSG00000164024	METAP1	Hs.480364	351.6	PP	422.25	PP
ENSG00000187109	NAP1L1	Hs.524599	1185.6	PP	1531.65	PP
ENSG00000166579	NDEL1	Hs.372123	218.3	PP	187.2	PP
ENSG00000116044	NFE2L2	Hs.155396	181.2	PP	280.9	PP
ENSG00000167770	OTUB1	Hs.473788	266	PP	155.35	PA
ENSG00000059758	PCTK2	Hs.506415	118.3	PP	220.9	PP
ENSG00000171033	PKIA	Hs.433700	88.6	PP	131.05	PP
ENSG00000146278	PNRC1	Hs.75969	316.4	PP	242.95	PP

ENSG00000112941	POLS	Hs.481542	355.5	PP	367.35	PP
ENSG00000163806	PPP1CB	Hs.468018	65.7	PP	135.05	PP
ENSG00000107758	PPP3CB	Hs.500067	318.9	PP	241.25	PP
ENSG00000137492	PRKRIR	Hs.503315	281.4	PP	549.7	PP
ENSG00000120899	PTK2B	Hs.491322	333.1	PP	183.65	PP
ENSG00000184007	PTP4A2	Hs.470477	110.5	PP	254.55	PP
ENSG00000134644	PUM1	Hs.281707	378.4	PP	422.3	PP
ENSG00000112531	QKI	Hs.510324	284.1	PP	564.45	PP
ENSG00000175582	RAB6A	Hs.503222	371.4	PP	365.75	PP
ENSG00000119318	RAD23B	Hs.521640	156.2	PP	211.05	PP
ENSG00000065150	RANBP5	Hs.513057	123.7	PP	118.85	PP
ENSG00000010017	RANBP9	Hs.306242	381.3	PP	489.95	PP
ENSG00000127314	RAP1B	Hs.369920	1093.1	PP	1537.75	PP
ENSG00000103479	RBL2	Hs.513609	203.5	PP	188.25	PP
ENSG00000134758	RNF138	Hs.302408	186.9	PP	511.9	PP
ENSG00000163602	RYBP	Hs.7910	398	PP	462.8	PP
ENSG00000079332	SARA1	Hs.499960	233.7	PP	442.85	PP
ENSG00000116350	SFRS4	Hs.76122	217.8	PP	375.35	PP
ENSG00000115875	SFRS7	Hs.309090	378.7	PP	743.5	PP
ENSG00000134294	SLC38A2	Hs.221847	634.3	PP	1026.55	PP
ENSG00000008294	SPAG9	Hs.463439	180.3	PP	209.9	PP
ENSG00000116030	SUMO1	Hs.81424	240.9	PP	268.85	PP
ENSG00000106052	TAX1BP1	Hs.34576	550	PP	486.2	PP
ENSG00000100207	TCF20	Hs.475018	251.3	PP	281.15	PP
ENSG00000083312	TNPO1	Hs.482497	483	PP	750.85	PP
ENSG00000077097	TOP2B	Hs.475733	592.4	PP	806	PP
ENSG00000166598	TRA1	Hs.192374	151	PP	339.35	PP
ENSG00000140391	TSPAN3	Hs.5062	516.6	PP	661.45	PP
ENSG00000109332	UBE2D3	Hs.472031	471.2	PP	635.4	PP
ENSG00000135655	USP15	Hs.434951	197.3	PP	160.35	PP
ENSG00000124486	USP9X	Hs.77578	85.3	PP	115.1	PP
ENSG00000078668	VDAC3	Hs.491597	3451.2	PP	4625.2	PP
ENSG00000095787	WAC	Hs.435610	379.2	PP	507.2	PP
ENSG00000149658	YTHDF1	Hs.11747	710.9	PP	778.1	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000165029	ABCA1	Hs.429294	175.1	PP	156.5	PP
ENSG00000173020	ADRBK1	Hs.83636	706	PP	549.3	PM
ENSG00000172493	AFF1	Hs.480190	480.6	PP	776.35	PP
ENSG00000131503	ANKHD1	Hs.434219	168	PP	163.05	PP
ENSG00000062725	APPBP2	Hs.84084	106.4	PP	116.15	PA
ENSG00000165527	ARF6	Hs.525330	444.1	PP	636.85	PP
ENSG00000134108	ARL10C	Hs.250009	578.1	PP	591.95	PP
ENSG00000128989	ARPP-19	Hs.512908	247.7	PP	139.7	PP
ENSG00000111875	ASF1A	Hs.292316	126.5	PP	114.6	PP
ENSG00000171456	ASXL1	Hs.374043	275.6	PP	307.25	PP
ENSG00000017260	ATP2C1	Hs.546361	229.1	PP	322.9	PP
ENSG00000147416	ATP6V1B2	Hs.295917	179.5	PP	183.85	PP
ENSG00000105829	BET1	Hs.489132	150.8	PP	121.8	PP

ENSG00000104765	BNIP3L	Hs.131226	239.7	PP	375.45	PP
ENSG00000136261	BZW2	Hs.487635	1167.4	PP	1664.45	PP
ENSG00000152242	C18orf25	Hs.116486	129.7	PP	130.6	PA
ENSG00000031003	C5orf5	Hs.483473	256.3	PP	316.85	PP
ENSG00000104267	CA2	Hs.155097	119.4	PP	82.3	PA
ENSG00000135932	CAB39	Hs.471593	527.9	PP	637.3	PP
ENSG00000113328	CCNG1	Hs.79101	1025	PP	737.8	PP
ENSG00000134480	CCNH	Hs.292524	651.2	PP	697.05	PP
ENSG00000163660	CCNL1	Hs.4859	1082.6	PP	1052.5	PP
ENSG00000082258	CCNT2	Hs.292754	114.4	PP	102.75	PP
ENSG00000153774	CFDP1	Hs.461361	278.6	PP	295.4	PP
ENSG00000109572	CLCN3	Hs.481186	244.9	PP	248.15	PP
ENSG00000111596	CNOT2	Hs.133350	431.4	PP	399.2	PA
ENSG00000111605	CPSF6	Hs.369606	402.6	PP	474.05	PP
ENSG00000101266	CSNK2A1	Hs.446484	170.4	PP	261.4	PP
ENSG00000102974	CTCF	Hs.368367	506.1	PP	535.55	PP
ENSG00000171793	CTPS	Hs.473087	206.2	PP	242.75	PP
ENSG00000048740	CUGBP2	Hs.309288	159.6	PP	334.5	PP
ENSG00000036257	CUL3	Hs.372286	554.5	PP	473.25	PP
ENSG00000165659	DACH1	Hs.129452	95.1	PP	144.8	PP
ENSG00000124487	DDX3X	Hs.380774	769.8	PP	1229	PP
ENSG00000141141	DDX52	Hs.408452	124.3	PP	74.65	PP
ENSG00000109606	DHX15	Hs.5683	1219.8	PP	1620.75	PP
ENSG00000152128	DKFZP566N034	Hs.369471	538.7	PP	502.55	PP
ENSG00000198121	EDG2	Hs.126667	243.1	PP	147	PA
ENSG00000124802	EEF1E1	Hs.88977	196.2	PP	308	PA
ENSG00000171570	EGLN2	Hs.515417	259	PP	194.45	PM
ENSG00000120738	EGR1	Hs.326035	128.6	PP	290.15	PP
ENSG00000107581	EIF3S10	Hs.523299	522.9	PP	586.55	PP
ENSG00000156976	EIF4A2	Hs.478553	3569	PP	6526.55	PP
ENSG00000131503	EIF4EBP3 /// MASK-BP3	---	285.5	PP	200	PP
ENSG00000109381	ELF2	Hs.260903	150.8	PP	152.4	PP
ENSG00000102034	ELF4	Hs.271940	309.2	PP	202.7	PP
ENSG00000012660	ELOVL5	Hs.520189	681.6	PP	667.3	PP
ENSG00000170522	ELOVL6	Hs.412939	96.5	PP	156.45	PP
ENSG00000085832	EPS15	Hs.83722	144.1	PP	218.2	PP
ENSG00000120705	ETF1	Hs.483494	253.8	PP	461.55	PP
ENSG00000166147	FBN1	Hs.146447	195.2	PP	178.7	PP
ENSG00000138081	FBXO11	Hs.553547	155.7	PP	259.35	PP
ENSG00000181495	FLJ14054	Hs.13528	1289.4	PP	771.75	PP
ENSG00000136122	FLJ22624	Hs.209715	121.6	PP	115.85	PP
ENSG00000125740	FOSB	Hs.75678	1751.3	PP	3599.55	PP
ENSG00000138757	G3BP2	Hs.303676	242.8	PP	428.55	PP
ENSG00000146729	GBAS	Hs.437367	186.8	PP	145.8	PP
ENSG00000115419	GLS	Hs.116448	217.6	PP	242.2	PP
ENSG00000166503	HDGFRP3	Hs.513954	139.2	PP	156	PP
ENSG00000010818	HIVEP2	Hs.510172	149.6	PP	157.9	PP
ENSG00000100281	HMG2L1	Hs.197086	215.2	PP	87.75	PM
ENSG00000164104	HMGB2	Hs.434953	855.9	PP	2145.45	PP
ENSG00000122566	HNRPA2B1	Hs.487774	1802.2	PP	2268.3	PP
ENSG00000092199	HNRPC	Hs.449114	926.9	PP	1161.55	PP
ENSG00000138668	HNRPD	Hs.480073	785.7	PP	1067.15	PP

ENSG00000152795	HNRPDL	Hs.527105	1931.8	PP	1802.05	PP
ENSG00000096746	HNRPH3	Hs.499891	408.7	PP	635.5	PP
ENSG00000165119	HNRPK	Hs.449171	761	PP	1269.35	PP
ENSG00000125944	HNRPR	Hs.373763	839.4	PP	980.1	PP
ENSG00000153187	HNRPU	Hs.166463	470.3	PP	887.6	PP
ENSG00000120075	**HOXB5**	Hs.149548	322	PP	238.15	PP
ENSG00000173744	HRB	Hs.443507	202.6	PP	405.7	PP
ENSG00000164164	HSHIN1	Hs.270851	303.1	PP	312.65	PP
ENSG00000144381	HSPD1	Hs.113684	2868.6	PP	5689.3	PP
ENSG00000136478	HT008	Hs.175414	443.2	PP	336.2	PP
ENSG00000086758	HUWE1	Hs.136905	535.9	PP	503.6	PP
ENSG00000068383	INPP5A	Hs.523360	302.3	PP	279.95	PP
ENSG00000125347	IRF1	Hs.436061	467.7	PP	299.6	PP
ENSG00000171988	JMJD1C	Hs.413416	107	PP	198.85	PP
ENSG00000126814	KIAA1393	Hs.380159	1228.6	PP	1731.35	PP
	KIAA1971 /// LOC339005 ///					
ENSG00000156232	LOC440253	Hs.377360	75.3	PP	71.35	PP
ENSG00000165516	KLHDC2	Hs.509264	709.9	PP	490.3	PP
ENSG00000102753	KPNA3	Hs.527919	250.8	PP	391.35	PP
ENSG00000108424	KPNB1	Hs.532793	415.1	PP	709.85	PP
ENSG00000108424	KPNB1	Hs.532793	160.1	PP	294.95	PP
ENSG00000185896	LAMP1	Hs.494419	282.2	PP	383.55	PP
	LAT1-3TM /// BOLA2 ///					
ENSG00000197017	LOC595101	Hs.444600	269.6	PP	389.55	PP
ENSG00000143815	LBR	Hs.435166	1166	PP	1807.35	PP
ENSG00000157978	LDLRAP1	Hs.184482	223.5	PP	298.4	PP
ENSG00000113368	LMNB1	Hs.89497	75.4	PP	143.6	PA
ENSG00000123684	LPGAT1	Hs.497674	106	PP	114.3	PP
ENSG00000145012	LPP	Hs.444362	205.6	PP	238.9	PP
ENSG00000120992	LYPLA1	Hs.435850	84.5	PP	420.05	PP
ENSG00000003056	M6PR	Hs.134084	566.2	PP	575.55	PP
ENSG00000127603	MACF1	Hs.472475	222.8	PP	248.35	PP
ENSG00000110514	MADD	Hs.82548	423	PP	267.9	PA
ENSG00000121579	MAK3	Hs.269528	268.8	PP	307	PP
ENSG00000161021	MAML1	Hs.484349	331.3	PP	280.35	PP
ENSG00000197442	MAP3K5	Hs.186486	227.6	PP	272.25	PP
ENSG00000055208	MAP3K7IP2	Hs.269775	219.1	PP	142.8	PP
ENSG00000101367	MAPRE1	Hs.472437	196.1	PP	206.85	PM
ENSG00000166974	MAPRE2	Hs.532824	857.4	PP	715.5	PP
ENSG00000175130	MARCKSL1	Hs.75061	314.8	PP	265.6	PP
ENSG00000168906	MAT2A	Hs.516157	1011.4	PP	738.6	PP
ENSG00000015479	MATR3	Hs.268939	252.4	PP	382.35	PP
ENSG00000152601	MBNL1	Hs.478000	294.4	PP	864.5	PP
ENSG00000180398	MCFD2	Hs.293689	289.4	PP	258.25	PP
ENSG00000081189	MEF2C	Hs.444409	426	PP	437.85	PP
ENSG00000143995	**MEIS1**	Hs.526754	452.1	PP	262.65	PP
ENSG00000164024	METAP1	Hs.480364	351.6	PP	422.25	PP
ENSG00000198408	MGEA5	Hs.500842	363.7	PP	363.05	PP
ENSG00000108389	MTMR4	Hs.514373	330.7	PP	407.2	PP
ENSG00000170873	MTSS1	Hs.336994	152.7	PP	194.6	PP
ENSG00000187109	NAP1L1	Hs.524599	1185.6	PP	1531.65	PP

ENSG00000198646	NCOA6	Hs.368971	334.7	PP	445.5	PP
ENSG00000166579	NDEL1	Hs.372123	218.3	PP	187.2	PP
ENSG00000116044	NFE2L2	Hs.155396	181.2	PP	280.9	PP
ENSG00000181163	NPM1	Hs.519452	8905.6	PP	11897.7	PP
ENSG00000180530	NRIP1	Hs.155017	842	PP	914.85	PP
ENSG00000147162	OGT	Hs.405410	165.1	PP	183.6	PP
ENSG00000091039	OSBPL8	Hs.430849	212	PP	251.65	PP
ENSG00000167770	OTUB1	Hs.473788	266	PP	155.35	PA
ENSG00000172939	OXSR1	Hs.475970	211	PP	186.15	PA
ENSG00000059758	PCTK2	Hs.506415	118.3	PP	220.9	PP
ENSG00000150593	PDCD4	Hs.232543	174.3	PP	122.55	PP
ENSG00000143870	PDIA6	Hs.212102	357.6	PP	852.3	PP
ENSG00000073921	PICALM	Hs.163893	357.3	PP	315.6	PP
ENSG00000171033	PKIA	Hs.433700	88.6	PP	131.05	PP
ENSG00000118495	PLAGL1	Hs.444975	187.1	PP	357.8	PP
ENSG00000100941	PNN	Hs.409965	839.5	PP	617.3	PP
ENSG00000146278	PNRC1	Hs.75969	316.4	PP	242.95	PP
ENSG00000163806	PPP1CB	Hs.468018	65.7	PP	135.05	PP
ENSG00000058272	PPP1R12A	Hs.49582	154.9	PP	178.75	PP
ENSG00000154001	PPP2R5E	Hs.334868	135.1	PP	191.45	PP
ENSG00000116731	PRDM2	Hs.371823	329.6	PP	175.6	PP
ENSG00000166501	PRKCB1	Hs.460355	742.5	PP	535.05	PP
ENSG00000137492	PRKRIR	Hs.503315	281.4	PP	549.7	PP
ENSG00000147224	PRPS1	Hs.56	508.2	PP	485.95	PP
ENSG00000171522	PTGER4	Hs.199248	531.8	PP	514.8	PP
ENSG00000184007	PTP4A2	Hs.470477	110.5	PP	254.55	PP
ENSG00000134644	PUM1	Hs.281707	378.4	PP	422.3	PP
ENSG00000055917	PUM2	Hs.467824	238.6	PP	313.25	PP
ENSG00000112531	QKI	Hs.510324	284.1	PP	564.45	PP
ENSG00000048991	R3HDM	Hs.412462	217.6	PP	376.75	PP
ENSG00000119396	RAB14	Hs.371563	140.5	PP	198.15	PP
ENSG00000111737	RAB35	Hs.524788	394.6	PP	431.2	PP
ENSG00000152942	RAD17	Hs.16184	57.2	PP	60	PM
ENSG00000164754	RAD21	Hs.81848	281.3	PP	414.9	PP
ENSG00000119318	RAD23B	Hs.521640	156.2	PP	211.05	PP
ENSG00000065150	RANBP5	Hs.513057	123.7	PP	118.85	PP
ENSG00000010017	RANBP9	Hs.306242	381.3	PP	489.95	PP
ENSG00000116473	RAP1A	Hs.190334	217.2	PP	367.75	PP
ENSG00000127314	RAP1B	Hs.369920	1093.1	PP	1537.75	PP
ENSG00000109756	RAPGEF2	Hs.113912	394.9	PP	551.95	PP
ENSG00000119707	RBM25	Hs.531106	231.5	PP	319.9	PP
ENSG00000049449	RCN1	Hs.97887	294.1	PP	264.85	PP
ENSG00000176624	RKHD2	Hs.465144	210.8	PP	216	PP
ENSG00000124782	RREB1	Hs.298248	339.9	PP	324.15	PP
ENSG00000137815	RTF1	Hs.511096	194.3	PP	256.85	PP
ENSG00000163602	RYBP	Hs.7910	398	PP	462.8	PP
ENSG00000160633	SAFB	Hs.23978	376.8	PP	261.35	PP
ENSG00000130254	SAFB2	Hs.546330	245.2	PP	213.5	PP
ENSG00000182568	SATB1	Hs.517717	829.9	PP	652.05	PP
ENSG00000137575	SDCBP	Hs.200804	934	PP	955.25	PP
ENSG00000155878	SEC22L1	Hs.534212	662.9	PP	588.95	PP
ENSG00000119335	SET	Hs.436687	2967	PP	4307.1	PP
ENSG00000136450	SFRS1	Hs.68714	1264.9	PP	1622.65	PP

ENSG00000116350	SFRS4	Hs.76122	217.8	PP	375.35	PP
ENSG00000115875	SFRS7	Hs.309090	378.7	PP	743.5	PP
ENSG00000198730	SH2BP1	Hs.173288	215.7	PP	203.65	PP
ENSG00000162105	SHANK2	Hs.268726	137.1	PP	128.55	PP
ENSG00000004864	SLC25A13	Hs.489190	106.7	PP	139.8	PP
ENSG00000134294	SLC38A2	Hs.221847	634.3	PP	1026.55	PP
ENSG00000080493	SLC4A4	Hs.5462	124.5	PP	268.4	PP
ENSG00000072501	SMC1L1	Hs.211602	137.5	PP	329.1	PP
ENSG00000102172	SMS	Hs.529887	287.8	PP	275.25	PP
ENSG00000163788	SNRK	Hs.476052	320.6	PP	436.65	PP
ENSG00000008294	SPAG9	Hs.463439	180.3	PP	209.9	PP
ENSG00000065526	SPEN	Hs.270499	257.6	PP	262.7	PP
ENSG00000147475	SPFH2	Hs.125849	125.1	PP	180.9	PP
ENSG00000173757	STAT5B	Hs.132864	463.6	PP	373	PP
ENSG00000168952	STXBP6	Hs.508958	152.6	PP	218.55	PP
ENSG00000173812	SUI1	Hs.150580	6046	PP	6098.85	PP
ENSG00000116030	SUMO1	Hs.81424	240.9	PP	268.85	PP
ENSG00000106052	TAX1BP1	Hs.34576	550	PP	486.2	PP
ENSG00000114126	TFDP2	Hs.379018	253.2	PP	196.3	PA
ENSG00000177426	TGIF	Hs.373550	116.7	PP	95.35	PM
ENSG00000198586	TLK1	Hs.470586	150.2	PP	117.65	PP
ENSG00000120802	TMPO	Hs.11355	206.3	PP	161.7	PP
ENSG00000083312	TNPO1	Hs.482497	483	PP	750.85	PP
ENSG00000183864	TOB2	Hs.474978	165.3	PP	196.4	PP
ENSG00000198900	TOP1	Hs.472737	315.5	PP	468.35	PP
ENSG00000077097	TOP2B	Hs.475733	592.4	PP	806	PP
ENSG00000166598	TRA1	Hs.192374	151	PP	339.35	PP
ENSG00000173334	TRIB1	Hs.444947	238.3	PP	300.85	PP
ENSG00000140391	TSPAN3	Hs.5062	516.6	PP	661.45	PP
ENSG00000131508	UBE2D2	Hs.108332	400.1	PP	512.05	PP
ENSG00000109332	UBE2D3	Hs.472031	471.2	PP	635.4	PP
ENSG00000188021	UBQLN2	Hs.522668	112.4	PP	145.55	PP
ENSG00000169021	UQCRFS1	Hs.170107	1584.8	PP	1518.7	PP
ENSG00000124486	USP9X	Hs.77578	85.3	PP	115.1	PP
ENSG00000101558	VAPA	Hs.165195	1051.8	PP	1198.45	PP
ENSG00000155959	VBP1	Hs.436803	330	PP	595.4	PP
ENSG00000105053	VRK3	Hs.443330	276.1	PP	148	PA
ENSG00000095787	WAC	Hs.435610	379.2	PP	507.2	PP
ENSG00000109046	WSB1	Hs.446017	679.3	PP	880.75	PP
ENSG00000146457	WTAP	Hs.446091	400.8	PP	406.6	PP
ENSG00000149658	YTHDF1	Hs.11747	710.9	PP	778.1	PP
ENSG00000100811	YY1	Hs.388927	539.7	PP	740.2	PP
ENSG00000086666	ZA20D3	Hs.306329	735.1	PP	517.75	PP
ENSG00000185650	ZFP36L1	Hs.85155	94.5	PP	140.7	PP
ENSG00000179456	ZNF238	Hs.69997	235.7	PP	241.8	PP
ENSG00000121848	ZNF364	Hs.523550	205.2	PP	286.9	PP
ENSG00000005955	ZNF403	Hs.514116	382	PP	264.25	PP
ENSG00000036549	ZZZ3	Hs.480506	125	PP	189.7	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000165029	ABCA1	Hs.429294	175.1	PP	156.5	PP
ENSG00000125257	ABCC4	Hs.508423	301.5	PP	348.15	PP
ENSG00000101126	ADNP	Hs.293736	552.6	PP	494.1	PP
ENSG00000173020	ADRBK1	Hs.83636	706	PP	549.3	PM
ENSG00000172493	AFF1	Hs.480190	480.6	PP	776.35	PP
ENSG00000155189	AGPAT5	Hs.490899	207.1	PP	241.35	PP
ENSG00000151320	AKAP6	Hs.509083	137.8	PP	117.05	PP
ENSG00000143761	ARF1	Hs.286221	1245.2	PP	798.4	PP
ENSG00000117713	ARID1A	Hs.468972	477.6	PP	444.8	PP
ENSG00000188042	ARL7	Hs.111554	240.7	PP	203.4	PP
ENSG00000163466	ARPC2	Hs.529303	1447.8	PP	1774.7	PP
ENSG00000128989	ARPP-19	Hs.512908	247.7	PP	139.7	PP
ENSG00000171456	ASXL1	Hs.374043	275.6	PP	307.25	PP
ENSG00000149311	ATM	Hs.435561	221.9	PP	205.5	PP
ENSG00000017260	ATP2C1	Hs.546361	229.1	PP	322.9	PP
ENSG00000155096	AZIN1	Hs.459106	551.2	PP	619.2	PP
ENSG00000119866	BCL11A	Hs.370549	363.1	PP	387.8	PP
ENSG00000134107	BHLHB2	Hs.171825	482.8	PP	341.5	PP
ENSG00000133639	BTG1	Hs.255935	955.9	PP	1057.95	PP
ENSG00000134153	C15orf24	Hs.160565	612.5	PP	706.2	PP
ENSG00000152242	C18orf25	Hs.116486	129.7	PP	130.6	PA
ENSG00000101084	C20orf24	Hs.184062	878.9	PP	1348.2	PP
ENSG00000114405	C3orf14	Hs.47166	131.5	PP	86.85	PA
ENSG00000168476	C8orf20	Hs.289063	470.1	PP	364.3	PA
ENSG00000135837	CAP350	Hs.413045	177.4	PP	220.9	PP
ENSG00000116489	CAPZA1	Hs.514934	766.7	PP	1165.8	PA
ENSG00000077549	CAPZB	Hs.432760	282.7	PP	199.2	PP
ENSG00000142453	CARM1	Hs.371416	141.6	PP	105.7	PA
ENSG00000067955	CBFB	Hs.460988	719.1	PP	1032	PP
ENSG00000118971	CCND2	Hs.376071	1114.1	PP	1244.6	PP
ENSG00000135535	CD164	Hs.520313	2274.9	PP	2265.25	PP
ENSG00000070831	CDC42	Hs.467637	620.1	PP	437.75	PP
ENSG00000111328	CDK2AP1	Hs.433201	1539.3	PP	1576.75	PP
ENSG00000072609	CHFR	Hs.507336	247.4	PP	253.05	PP
ENSG00000110172	CHORDC1	Hs.22857	84.8	PP	156.6	PP
ENSG00000131873	CHSY1	Hs.110488	404.5	PP	490.95	PP
ENSG00000141367	CLTC	Hs.491351	1169	PP	1399.6	PP
ENSG00000162368	CMPK	Hs.11463	333.8	PP	336.55	PP
ENSG00000100528	CNIH	Hs.294603	252.6	PP	391.7	PP
ENSG00000166200	COPS2	Hs.369614	521.2	PP	700.65	PP
ENSG00000178741	COX5A	Hs.401903	808.6	PP	1092.9	PP
ENSG00000005339	CREBBP	Hs.459759	287.2	PP	239.6	PP
ENSG00000149187	CUGBP1	Hs.530727	383	PP	596.3	PP
ENSG00000048740	CUGBP2	Hs.309288	159.6	PP	334.5	PP
ENSG00000196730	DAPK1	Hs.380277	448.2	PP	549.6	PP
ENSG00000124487	DDX3X	Hs.380774	769.8	PP	1229	PP
ENSG00000067048	DDX3Y	Hs.99120	302.6	PP	309.6	PA
ENSG00000108654	DDX5	Hs.279806	3052	PP	3508.95	PP
ENSG00000155792	DEPDC6	Hs.303788	461.4	PP	409.4	PP

ENSG00000109606	DHX15	Hs.5683	1219.8	PP	1620.75	PP
ENSG00000100697	DICER1	Hs.87889	176.8	PP	186.3	PP
ENSG00000151208	DLG5	Hs.500245	73.1	PP	90.5	PP
ENSG00000092964	DPYSL2	Hs.173381	505.1	PP	495.1	PP
ENSG00000157540	DYRK1A	Hs.368240	367.8	PP	751.2	PP
ENSG00000110047	EHD1	Hs.523774	293.2	PP	330.3	PP
ENSG00000110321	EIF4G2	Hs.183684	2137	PP	2701.9	PP
ENSG00000100664	EIF5	Hs.433702	96.4	PP	55.8	PA
ENSG00000120616	EPC1	Hs.167805	148.9	PP	88.7	PA
ENSG00000120705	ETF1	Hs.483494	253.8	PP	461.55	PP
ENSG00000106462	EZH2	Hs.444082	162.9	PP	216.25	PP
ENSG00000119979	FAM45B /// FAM45A	Hs.434241	554.8	PP	690.2	PP
ENSG00000153310	FAM49B	Hs.492869	311.6	PP	329.6	PP
ENSG00000138081	FBXO11	Hs.553547	155.7	PP	259.35	PP
ENSG00000143756	FBXO28	Hs.64691	106.1	PP	70.5	PA
ENSG00000037637	FBXO42	Hs.522384	136.1	PP	120.85	PM
ENSG00000111011	FLJ11021	Hs.432996	202	PP	392.6	PP
ENSG00000136048	FLJ11259	Hs.525634	351.2	PP	243.8	PP
ENSG00000175606	FLJ20533	Hs.106650	420.6	PP	454.55	PP
ENSG00000114861	FOXP1	Hs.431498	322.7	PP	410.3	PP
ENSG00000138757	G3BP2	Hs.303676	242.8	PP	428.55	PP
ENSG00000106070	GRB10	Hs.164060	550.7	PP	574.15	PP
ENSG00000103342	GSPT1	Hs.528780	356.7	PP	369.6	PP
ENSG00000103342	GSPT1	Hs.528780	275.4	PP	515.9	PP
ENSG00000110768	GTF2H1	Hs.523510	167.7	PP	191.7	PP
ENSG00000115207	GTF3C2	Hs.75782	405.3	PP	405	PA
ENSG00000164032	H2AFZ	Hs.119192	1477	PP	3477.65	PP
ENSG00000114315	HES1	Hs.250666	232.7	PP	169.8	PP
ENSG00000163349	HIPK1	Hs.532363	347.7	PP	488.5	PP
ENSG00000118418	HMGN3	Hs.77558	1438.8	PP	1894.65	PP
ENSG00000177733	HNRPA0	Hs.96996	655	PP	723.4	PP
ENSG00000105323	HNRPUL1	Hs.155218	406.9	PP	401.15	PP
ENSG00000106004	**HOXA5**	Hs.37034	507.2	PP	499.3	PP
ENSG00000164164	HSHIN1	Hs.270851	303.1	PP	312.65	PP
ENSG00000086758	HUWE1	Hs.136905	535.9	PP	503.6	PP
ENSG00000071243	ING3	Hs.489811	255.5	PP	407	PP
ENSG00000143127	ITGA10	Hs.158237	145	PP	142.3	PM
ENSG00000008083	JARID2	Hs.269059	1015	PP	894	PP
ENSG00000164151	KIAA0947	Hs.449296	282.9	PP	275.45	PP
ENSG00000155090	**KLF10**	Hs.435001	348.9	PP	357.65	PP
ENSG00000136826	**KLF4**	Hs.376206	536.5	PP	1193.7	PP
ENSG00000102753	KPNA3	Hs.527919	250.8	PP	391.35	PP
ENSG00000107929	LARP5	Hs.498455	274.8	PP	203.9	PP
ENSG00000145012	LPP	Hs.444362	205.6	PP	238.9	PP
ENSG00000127603	MACF1	Hs.472475	222.8	PP	248.35	PP
ENSG00000111885	MAN1A1	Hs.102788	309.1	PP	151	PP
ENSG00000166963	MAP1A	Hs.194301	433.9	PP	321.4	PM
ENSG00000055208	MAP3K7IP2	Hs.269775	219.1	PP	142.8	PP
ENSG00000135525	MAP7	Hs.486548	325.7	PP	390.1	PP
ENSG00000166986	MARS	Hs.355867	460.7	PP	614.95	PP
ENSG00000015479	MATR3	Hs.268939	252.4	PP	382.35	PP
ENSG00000133858	MGC23401	Hs.527874	291	PP	309.55	PP

ENSG00000108788	MLX	Hs.383019	219	PP	195.3	PP
ENSG00000114978	MOBK1B	Hs.196437	596.3	PP	556	PP
ENSG00000123562	MORF4L2	Hs.326387	2189.8	PP	2626.1	PP
ENSG00000147649	MTDH	Hs.377155	258.6	PP	329.8	PP
ENSG00000108389	MTMR4	Hs.514373	330.7	PP	407.2	PP
ENSG00000170873	MTSS1	Hs.336994	152.7	PP	194.6	PP
ENSG00000128654	MTX2	Hs.470728	121.8	PP	135.85	PP
ENSG00000138386	NAB1	Hs.107474	187.9	PP	203.9	PP
ENSG00000189043	NDUFA4	Hs.50098	1613.7	PP	1432.5	PP
ENSG00000050344	NFE2L3	Hs.404741	94.5	PP	84.4	PP
ENSG00000120837	NFYB	Hs.84928	204.1	PP	272.85	PP
ENSG00000164190	NIPBL	Hs.481927	165.1	PP	145.15	PP
ENSG00000180530	NRIP1	Hs.155017	842	PP	914.85	PP
ENSG00000137497	NUMA1	Hs.523873	486.3	PP	295.45	PA
ENSG00000124789	NUP153	Hs.121088	216.4	PP	291.8	PP
ENSG00000065154	OAT	Hs.523332	304	PP	486.9	PP
ENSG00000147162	OGT	Hs.405410	165.1	PP	183.6	PP
ENSG00000117859	OSBPL9	Hs.21938	534.9	PP	419.5	PP
ENSG00000100266	PACSIN2	Hs.162877	717.7	PP	302.25	PP
ENSG00000142864	PAI-RBP1	Hs.530412	337.8	PP	662.45	PP
ENSG00000180370	PAK2	Hs.518530	147.3	PP	198.15	PP
ENSG00000105835	PBEF1	Hs.489615	96.8	PP	138.65	PP
ENSG00000114054	PCCB	Hs.63788	270.6	PP	392.75	PP
ENSG00000114209	PDCD10	Hs.478150	463.6	PP	560.4	PP
ENSG00000184588	PDE4B	Hs.198072	234.1	PP	349.5	PP
ENSG00000164040	PGRMC2	Hs.507910	89.1	PP	87.85	PM
ENSG00000118482	PHF3	Hs.348921	260	PP	268.9	PP
ENSG00000145675	PIK3R1	Hs.132225	249.1	PP	181	PP
ENSG00000137193	PIM1	Hs.81170	1021.7	PP	801.85	PP
ENSG00000154217	PITPNC1	Hs.549130	391.3	PP	316.6	PP
ENSG00000181191	PJA1	Hs.522679	316.3	PP	332.1	PP
ENSG00000152952	PLOD2	Hs.477866	92.1	PP	128.6	PP
ENSG00000004399	PLXND1	Hs.301685	578.6	PP	512.35	PP
ENSG00000146278	PNRC1	Hs.75969	316.4	PP	242.95	PP
ENSG00000078304	PPP2R5C	Hs.368264	174.9	PP	165.25	PP
ENSG00000138814	PPP3CA	Hs.435512	122.5	PP	205	PP
ENSG00000107758	PPP3CB	Hs.500067	318.9	PP	241.25	PP
ENSG00000154845	PPP4R1	Hs.464595	472.6	PP	378.85	PP
ENSG00000131238	PPT1	Hs.3873	767.9	PP	861.2	PP
ENSG00000117569	PTBP2	Hs.269895	183	PP	160.15	PP
ENSG00000171862	PTEN	Hs.500466	353.7	PP	334.4	PP
ENSG00000110958	PTGES3	Hs.50425	1018.1	PP	1526.7	PP
ENSG00000112245	PTP4A1	Hs.227777	439.5	PP	431.2	PP
ENSG00000185129	PURA	Hs.443121	149.5	PP	224.95	PP
ENSG00000112531	QKI	Hs.510324	284.1	PP	564.45	PP
ENSG00000103769	RAB11A	Hs.321541	1087.7	PP	1020.15	PP
ENSG00000017797	RALBP1	Hs.528993	379	PP	244.05	PP
ENSG00000010017	RANBP9	Hs.306242	381.3	PP	489.95	PP
ENSG00000116473	RAP1A	Hs.190334	217.2	PP	367.75	PP
ENSG00000139687	RB1	Hs.408528	152.7	PP	153.35	PP
ENSG00000102054	RBBP7	Hs.495755	942.6	PP	1356.35	PP
ENSG00000136144	RCBTB1	Hs.508021	121.9	PP	194.4	PP
ENSG00000049449	RCN1	Hs.97887	294.1	PP	264.85	PP

ENSG00000089902	RCOR1	Hs.510521	118.3	PP	144.05	PP
ENSG00000176624	RKHD2	Hs.465144	210.8	PP	216	PP
ENSG00000123091	RNF11	Hs.309641	125.3	PP	161.5	PP
ENSG00000134758	RNF138	Hs.302408	186.9	PP	511.9	PP
ENSG00000127870	RNF6	Hs.136885	74.1	PP	122.9	PP
ENSG00000131051	RNPC2	Hs.282901	1756.3	PP	1736.7	PP
ENSG00000137815	RTF1	Hs.511096	194.3	PP	256.85	PP
ENSG00000163602	RYBP	Hs.7910	398	PP	462.8	PP
ENSG00000163785	RYK	Hs.245869	232.7	PP	184.9	PP
ENSG00000092421	SEMA6A	Hs.156967	140	PP	182.2	PP
ENSG00000120742	SERP1	Hs.518326	285.7	PP	343.4	PP
ENSG00000153914	SFRS12	Hs.519347	258	PP	229.6	PP
ENSG00000161547	SFRS2	Hs.73965	3723.5	PP	4390.4	PP
ENSG00000116350	SFRS4	Hs.76122	217.8	PP	375.35	PP
ENSG00000122912	SLC25A16	Hs.180408	693.5	PP	585.25	PP
ENSG00000178537	SLC25A20	Hs.13845	513.4	PP	284.75	PP
ENSG00000134294	SLC38A2	Hs.221847	634.3	PP	1026.55	PP
ENSG00000080493	SLC4A4	Hs.5462	124.5	PP	268.4	PP
ENSG00000175387	SMAD2	Hs.12253	243.4	PP	321.4	PP
ENSG00000184602	SNN	Hs.459952	234.4	PP	239.3	PP
ENSG00000163788	SNRK	Hs.476052	320.6	PP	436.65	PP
ENSG00000089006	SNX5	Hs.316890	327.9	PP	403.25	PP
ENSG00000124766	SOX4	Hs.357901	2351.7	PP	2500.65	PP
ENSG00000095480	SPFH1	Hs.150087	646.4	PP	689.15	PP
ENSG00000115306	SPTBN1	Hs.503178	589.9	PP	344.65	PP
ENSG00000153037	SRP19	Hs.483090	290.8	PP	365.35	PP
ENSG00000096063	SRPK1	Hs.443861	231.6	PP	200.5	PP
ENSG00000198648	STK39	Hs.276271	129.8	PP	111.35	PP
ENSG00000117632	STMN1	Hs.209983	546.6	PP	663.4	PP
ENSG00000165283	STOML2	Hs.3439	880.1	PP	583.05	PP
ENSG00000140262	TCF12	Hs.511504	179.4	PP	439.15	PP
ENSG00000123066	THRAP2	Hs.159799	142.1	PP	396.2	PP
ENSG00000100926	TM9SF1	Hs.91586	214.5	PP	148.05	PP
ENSG00000170348	TMP21	Hs.74137	293.5	PP	280.3	PA
ENSG00000198900	TOP1	Hs.472737	315.5	PP	468.35	PP
ENSG00000165699	TSC1	Hs.370854	232.7	PP	242.3	PP
ENSG00000163084	TSN	Hs.75066	130.8	PP	178.35	PP
ENSG00000077721	UBE2A	Hs.379466	299.1	PP	400.85	PP
ENSG00000131508	UBE2D2	Hs.108332	400.1	PP	512.05	PP
ENSG00000109332	UBE2D3	Hs.472031	471.2	PP	635.4	PP
ENSG00000132388	UBE2G1	Hs.462035	272.5	PP	373.45	PP
ENSG00000185651	UBE2L3	Hs.108104	775.4	PP	605.6	PP
ENSG00000124208	UBE2V1 /// Kua-UEV	Hs.420529	504.3	PP	320.6	PP
ENSG00000114062	UBE3A	Hs.22543	456.9	PP	470.75	PP
ENSG00000130939	UBE4B	Hs.386404	291.8	PP	387.95	PP
ENSG00000135655	USP15	Hs.434951	197.3	PP	160.35	PP
ENSG00000115464	USP34	Hs.468663	1075.5	PP	1012.75	PP
ENSG00000090686	USP48	Hs.467524	366.1	PP	393.65	PP
ENSG00000117533	VAMP4	Hs.6651	271.8	PP	299.3	PP
ENSG00000136485	WDR68	Hs.410596	150.9	PP	192.1	PP
ENSG00000108953	YWHAE	Hs.513851	328.6	PP	424.95	PP
ENSG00000108953	YWHAE	Hs.513851	2306.8	PP	4150.1	PP

ENSG00000086666	ZA20D3	Hs.306329	735.1	PP	517.75	PP
ENSG00000023041	ZDHHC6	Hs.196990	289.3	PP	293.9	PP
ENSG00000179456	ZNF238	Hs.69997	235.7	PP	241.8	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000115091	ACTR3	Hs.433512	353.8	PP	673.3	PP
ENSG00000101126	ADNP	Hs.293736	552.6	PP	494.1	PP
ENSG00000143761	ARF1	Hs.286221	1245.2	PP	798.4	PP
ENSG00000163466	ARPC2	Hs.529303	1447.8	PP	1774.7	PP
ENSG00000155096	AZIN1	Hs.459106	551.2	PP	619.2	PP
ENSG00000134107	BHLHB2	Hs.171825	482.8	PP	341.5	PP
ENSG00000134153	C15orf24	Hs.160565	612.5	PP	706.2	PP
ENSG00000114405	C3orf14	Hs.47166	131.5	PP	86.85	PA
ENSG00000077549	CAPZB	Hs.432760	282.7	PP	199.2	PP
ENSG00000082258	CCNT2	Hs.292754	114.4	PP	102.75	PP
ENSG00000072609	CHFR	Hs.507336	247.4	PP	253.05	PP
ENSG00000100528	CNIH	Hs.294603	252.6	PP	391.7	PP
ENSG00000166200	COPS2	Hs.369614	521.2	PP	700.65	PP
ENSG00000005339	CREBBP	Hs.459759	287.2	PP	239.6	PP
ENSG00000149187	CUGBP1	Hs.530727	383	PP	596.3	PP
ENSG00000108654	DDX5	Hs.279806	3052	PP	3508.95	PP
ENSG00000104131	EIF3S1	Hs.404056	340.4	PP	365.05	PP
ENSG00000156976	EIF4A2	Hs.478553	3569	PP	6526.55	PP
ENSG00000120616	EPC1	Hs.167805	148.9	PP	88.7	PA
ENSG00000120705	ETF1	Hs.483494	253.8	PP	461.55	PP
ENSG00000120699	EXOSC8	Hs.294041	196.9	PP	283.25	PP
ENSG00000106462	EZH2	Hs.444082	162.9	PP	216.25	PP
ENSG00000138081	FBXO11	Hs.553547	155.7	PP	259.35	PP
ENSG00000114861	FOXP1	Hs.431498	322.7	PP	410.3	PP
ENSG00000106070	GRB10	Hs.164060	550.7	PP	574.15	PP
ENSG00000103342	GSPT1	Hs.528780	356.7	PP	369.6	PA
ENSG00000164032	H2AFZ	Hs.119192	1477	PP	3477.65	PP
ENSG00000114315	HES1	Hs.250666	232.7	PP	169.8	PP
ENSG00000029993	HMGB3	Hs.19114	309	PP	460.6	PP
ENSG00000177733	HNRPA0	Hs.96996	655	PP	723.4	PP
ENSG00000096746	HNRPH3	Hs.499891	408.7	PP	635.5	PP
ENSG00000106004	**HOXA5**	Hs.37034	507.2	PP	499.3	PP
ENSG00000067829	IDH3G	Hs.410197	249.2	PP	156.95	PA
ENSG00000002834	LASP1	Hs.334851	786.5	PP	659.05	PP
ENSG00000145012	LPP	Hs.444362	205.6	PP	238.9	PP
ENSG00000135387	M11S1	Hs.471818	464.9	PP	451.45	PP
ENSG00000127603	MACF1	Hs.472475	222.8	PP	248.35	PP
ENSG00000111885	MAN1A1	Hs.102788	309.1	PP	151	PP
ENSG00000108788	MLX	Hs.383019	219	PP	195.3	PP
ENSG00000123562	MORF4L2	Hs.326387	2189.8	PP	2626.1	PP
ENSG00000108389	MTMR4	Hs.514373	330.7	PP	407.2	PP
ENSG00000170873	MTSS1	Hs.336994	152.7	PP	194.6	PP
ENSG00000120837	NFYB	Hs.84928	204.1	PP	272.85	PP
ENSG00000164190	NIPBL	Hs.481927	165.1	PP	145.15	PP

ENSG00000180530	NRIP1	Hs.155017	842	PP	914.85	PP
ENSG00000137497	NUMA1	Hs.523873	486.3	PP	295.45	PA
ENSG00000100266	PACSIN2	Hs.162877	717.7	PP	302.25	PP
ENSG00000180370	PAK2	Hs.518530	147.3	PP	198.15	PP
ENSG00000105835	PBEF1	Hs.489615	96.8	PP	138.65	PP
ENSG00000118482	PHF3	Hs.348921	260	PP	268.9	PP
ENSG00000166037	PIG8	Hs.101014	356.2	PP	374.1	PP
ENSG00000051382	PIK3CB	Hs.239818	275.1	PP	280.95	PP
ENSG00000137193	PIM1	Hs.81170	1021.7	PP	801.85	PP
ENSG00000181191	PJA1	Hs.522679	316.3	PP	332.1	PP
ENSG00000004399	PLXND1	Hs.301685	578.6	PP	512.35	PP
ENSG00000146278	PNRC1	Hs.75969	316.4	PP	242.95	PP
ENSG00000078304	PPP2R5C	Hs.368264	174.9	PP	165.25	PP
ENSG00000131238	PPT1	Hs.3873	767.9	PP	861.2	PP
ENSG00000110958	PTGES3	Hs.50425	1018.1	PP	1526.7	PP
ENSG00000112245	PTP4A1	Hs.227777	439.5	PP	431.2	PP
ENSG00000134644	PUM1	Hs.281707	378.4	PP	422.3	PP
ENSG00000185129	PURA	Hs.443121	149.5	PP	224.95	PP
ENSG00000112531	QKI	Hs.510324	284.1	PP	564.45	PP
ENSG00000119318	RAD23B	Hs.521640	156.2	PP	211.05	PP
ENSG00000017797	RALBP1	Hs.528993	379	PP	244.05	PP
ENSG00000010017	RANBP9	Hs.306242	381.3	PP	489.95	PP
ENSG00000109756	RAPGEF2	Hs.113912	394.9	PP	551.95	PP
ENSG00000139687	RB1	Hs.408528	152.7	PP	153.35	PP
ENSG00000102054	RBBP7	Hs.495755	942.6	PP	1356.35	PP
ENSG00000171700	RGS19	Hs.422336	164.1	PP	279.7	PP
ENSG00000123091	RNF11	Hs.309641	125.3	PP	161.5	PP
ENSG00000137075	RNF38	Hs.333503	322.6	PP	227.7	PP
ENSG00000163602	RYBP	Hs.7910	398	PP	462.8	PP
ENSG00000168758	SEMA4C	Hs.516220	186.7	PP	157.95	PP
ENSG00000092421	SEMA6A	Hs.156967	140	PP	182.2	PP
ENSG00000153914	SFRS12	Hs.519347	258	PP	229.6	PP
ENSG00000161547	SFRS2	Hs.73965	3723.5	PP	4390.4	PP
ENSG00000116350	SFRS4	Hs.76122	217.8	PP	375.35	PP
ENSG00000122912	SLC25A16	Hs.180408	693.5	PP	585.25	PP
ENSG00000178537	SLC25A20	Hs.13845	513.4	PP	284.75	PP
ENSG00000134294	SLC38A2	Hs.221847	634.3	PP	1026.55	PP
ENSG00000089006	SNX5	Hs.316890	327.9	PP	403.25	PP
ENSG00000124766	SOX4	Hs.357901	2351.7	PP	2500.65	PP
ENSG00000008294	SPAG9	Hs.463439	180.3	PP	209.9	PP
ENSG00000095480	SPFH1	Hs.150087	646.4	PP	689.15	PP
ENSG00000115306	SPTBN1	Hs.503178	589.9	PP	344.65	PP
ENSG00000153037	SRP19	Hs.483090	290.8	PP	365.35	PP
ENSG00000096063	SRPK1	Hs.443861	231.6	PP	200.5	PP
ENSG00000124783	SSR1	Hs.114033	600.7	PP	686.65	PP
ENSG00000165283	STOML2	Hs.3439	880.1	PP	583.05	PP
ENSG00000170348	TMP21	Hs.74137	293.5	PP	280.3	PA
ENSG00000091164	TXNL1	Hs.114412	1326.6	PP	1354.5	PP
ENSG00000077721	UBE2A	Hs.379466	299.1	PP	400.85	PP
ENSG00000131508	UBE2D2	Hs.108332	400.1	PP	512.05	PP
ENSG00000114062	UBE3A	Hs.22543	456.9	PP	470.75	PP
ENSG00000130939	UBE4B	Hs.386404	291.8	PP	387.95	PP
ENSG00000152518	ZFP36L2	Hs.503093	4553.7	PP	5205.6	PP

ENSG00000010244	ZNF207	Hs.500775	918.9	PP	742.3	PP
ENSG00000179456	ZNF238	Hs.69997	235.7	PP	241.8	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000108599	AKAP10	Hs.462457	164.1	PP	228.75	PP
ENSG00000170017	ALCAM	Hs.150693	528.9	PP	695.45	PP
ENSG00000123505	AMD1	Hs.159118	648.3	PP	1011.85	PP
ENSG00000144848	APG3L	Hs.477126	235.6	PP	245.05	PP
ENSG00000111875	ASF1A	Hs.292316	126.5	PP	114.6	PP
ENSG00000143153	ATP1B1	Hs.291196	132.4	PP	245.55	PP
ENSG00000155096	AZIN1	Hs.459106	551.2	PP	619.2	PP
ENSG00000119866	BCL11A	Hs.370549	363.1	PP	387.8	PP
ENSG00000171791	BCL2	Hs.150749	151.5	PP	134.45	PP
ENSG00000141452	C18orf8	Hs.529006	232.8	PP	242.05	PP
ENSG00000135932	CAB39	Hs.471593	527.9	PP	637.3	PP
ENSG00000108349	CASC3	Hs.350229	286.5	PP	317.4	PP
ENSG00000196776	CD47	Hs.446414	407.8	PP	514.4	PP
ENSG00000196776	CD47	Hs.446414	1026.3	PP	1175.5	PP
ENSG00000172216	CEBPB	Hs.517106	374.1	PP	391	PP
ENSG00000177200	CHD9	Hs.530936	222.6	PP	263	PP
ENSG00000100528	CNIH	Hs.294603	252.6	PP	391.7	PP
ENSG00000141030	COPS3	Hs.6076	331	PP	374.8	PP
ENSG00000005339	CREBBP	Hs.459759	287.2	PP	239.6	PP
ENSG00000108848	CROP	Hs.130293	2166.4	PP	1637.55	PP
ENSG00000048740	CUGBP2	Hs.309288	159.6	PP	334.5	PP
ENSG00000160967	CUTL1	Hs.438974	333.3	PP	412.55	PP
ENSG00000168209	DDIT4	Hs.523012	736.8	PP	535.85	PP
ENSG00000108406	DHX40	Hs.29403	233.3	PP	196.45	PP
ENSG00000113391	DKFZP564D172	Hs.127788	94	PP	123.9	PP
ENSG00000132002	DNAJB1	Hs.515210	453.4	PP	2770.05	PA
ENSG00000128590	DNAJB9	Hs.6790	211.5	PP	433.55	PP
ENSG00000110047	EHD1	Hs.523774	293.2	PP	330.3	PP
ENSG00000120705	ETF1	Hs.483494	253.8	PP	461.55	PP
ENSG00000138081	FBXO11	Hs.553547	155.7	PP	259.35	PP
ENSG00000170345	FOS	Hs.25647	1254.3	PP	1832.65	PP
ENSG00000114416	FXR1	Hs.478407	143.9	PP	155.75	PP
ENSG00000138757	G3BP2	Hs.303676	242.8	PP	428.55	PP
ENSG00000034713	GABARAPL2	Hs.461379	952	PP	625.75	PP
ENSG00000100644	HIF1A	Hs.509554	866.5	PP	1037.1	PP
ENSG00000010818	HIVEP2	Hs.510172	149.6	PP	157.9	PP
ENSG00000122566	HNRPA2B1	Hs.487774	1802.2	PP	2268.3	PP
ENSG00000153187	HNRPU	Hs.166463	470.3	PP	887.6	PP
ENSG00000113263	ITK	Hs.483938	85.1	PP	57.35	PP
ENSG00000008083	JARID2	Hs.269059	1015	PP	894	PP
ENSG00000115548	JMJD1A	Hs.531819	264	PP	207.05	PP
ENSG00000177606	JUN	Hs.525704	1300.5	PP	2286.95	PP
ENSG00000170852	KBTBD2	Hs.372541	412.2	PP	381.65	PP
ENSG00000055118	KCNH2	Hs.188021	592.3	PP	951	PP
ENSG00000114030	KPNA1	Hs.161008	121.8	PP	91.95	PP

ENSG00000055208	MAP3K7IP2	Hs.269775	219.1	PP	142.8	PP
ENSG00000012983	MAP4K5	Hs.130491	66	PP	116	PP
ENSG00000101367	MAPRE1	Hs.472437	196.1	PP	206.85	PM
ENSG00000168906	MAT2A	Hs.516157	1011.4	PP	738.6	PP
ENSG00000015479	MATR3	Hs.268939	252.4	PP	382.35	PP
ENSG00000143995	**MEIS1**	Hs.526754	452.1	PP	262.65	PP
ENSG00000056586	MNAB	Hs.533499	117.9	PP	127.15	PP
ENSG00000005810	MYCBP2	Hs.151411	187	PP	643.55	PP
ENSG00000164190	NIPBL	Hs.481927	165.1	PP	145.15	PP
ENSG00000147162	OGT	Hs.405410	165.1	PP	183.6	PP
ENSG00000145730	PAM	Hs.369430	187.3	PP	178.45	PP
ENSG00000090060	PAPOLA	Hs.253726	307.4	PP	286	PP
ENSG00000113387	PC4	Hs.229641	700.5	PP	1225.75	PP
ENSG00000168283	PCGF4	Hs.380403	254.7	PP	304.1	PP
ENSG00000059758	PCTK2	Hs.506415	118.3	PP	220.9	PP
ENSG00000184588	PDE4B	Hs.198072	234.1	PP	349.5	PP
ENSG00000184588	PDE4B	Hs.198072	119.8	PP	88.95	PP
ENSG00000197329	PELI1	Hs.7886	83.3	PP	154.5	PP
ENSG00000073921	PICALM	Hs.163893	357.3	PP	315.6	PP
ENSG00000171033	PKIA	Hs.433700	88.6	PP	131.05	PP
ENSG00000136040	PLXNC1	Hs.551522	354.6	PP	387.1	PP
ENSG00000185246	PRPF39	Hs.274337	63.4	PP	107.2	PP
ENSG00000117569	PTBP2	Hs.269895	183	PP	160.15	PP
ENSG00000112531	QKI	Hs.510324	284.1	PP	564.45	PP
ENSG00000138069	RAB1A	Hs.310645	70.8	PP	109.75	PM
ENSG00000175582	RAB6A	Hs.503222	371.4	PP	365.75	PP
ENSG00000119318	RAD23B	Hs.521640	156.2	PP	211.05	PP
ENSG00000109756	RAPGEF2	Hs.113912	394.9	PP	551.95	PP
ENSG00000089902	RCOR1	Hs.510521	118.3	PP	144.05	PP
ENSG00000173039	RELA	Hs.502875	389	PP	393.5	PP
ENSG00000106615	RHEB	Hs.283521	943.5	PP	1172.5	PP
ENSG00000177105	RHOG	Hs.501728	536.1	PP	466.25	PP
ENSG00000132383	RPA1	Hs.461925	256	PP	464.2	PP
ENSG00000124782	RREB1	Hs.298248	339.9	PP	324.15	PP
ENSG00000182568	SATB1	Hs.517717	829.9	PP	652.05	PP
ENSG00000137575	SDCBP	Hs.200804	934	PP	955.25	PP
ENSG00000138758	11-Sep	Hs.128199	350.4	PP	559	PP
ENSG00000179833	SERTAD2	Hs.77293	498.4	PP	556.2	PP
ENSG00000136450	SFRS1	Hs.68714	1264.9	PP	1622.65	PP
ENSG00000136527	SFRS10	Hs.533122	673.5	PP	894.8	PP
ENSG00000155926	SLA	Hs.75367	495.3	PP	494.3	PP
ENSG00000127616	SMARCA4	Hs.327527	238	PP	345.6	PP
ENSG00000115904	SOS1	Hs.278733	144	PP	169.4	PP
ENSG00000172845	SP3	Hs.531587	137.8	PP	293.35	PP
ENSG00000135250	SRPK2	Hs.285197	106.2	PP	118.7	PM
ENSG00000178691	SUZ12	Hs.462732	602.2	PP	633.3	PP
ENSG00000008282	SYPL1	Hs.80919	157.3	PP	190.55	PP
ENSG00000135090	TAOK3	---	518.8	PP	394	PP
ENSG00000114126	TFDP2	Hs.379018	253.2	PP	196.3	PA
ENSG00000123066	THRAP2	Hs.159799	142.1	PP	396.2	PP
ENSG00000106537	TM4SF13	Hs.364544	275.4	PP	526.45	PP
ENSG00000173726	TOMM20	Hs.533192	656.5	PP	888.45	PP
ENSG00000109332	UBE2D3	Hs.472031	471.2	PP	635.4	PP

ENSG00000077254	USP33	Hs.480597	228.7	PP	299.75	PP
ENSG00000119801	YPEL5	Hs.515890	1377.9	PP	1469.25	PP
ENSG00000108953	YWHAE	Hs.513851	328.6	PP	424.95	PP
ENSG00000164924	YWHAZ	Hs.492407	363.6	PP	520.8	PP
ENSG00000107372	ZA20D2	Hs.406096	967.2	PP	1262.9	PP
ENSG00000086666	ZA20D3	Hs.306329	735.1	PP	517.75	PP
ENSG00000179456	ZNF238	Hs.69997	235.7	PP	241.8	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000114770	ABCC5	Hs.368563	373.4	PP	322.1	PM
ENSG00000084234	APLP2	Hs.370247	1126.7	PP	668.55	PP
ENSG00000084234	APLP2	Hs.370247	343.4	PP	262.35	PP
ENSG00000117713	ARID1A	Hs.468972	477.6	PP	444.8	PP
ENSG00000163399	ATP1A1	Hs.371889	370.4	PP	539.1	PP
ENSG00000154640	BTG3	Hs.473420	315.6	PP	378.5	PP
ENSG00000111596	CNOT2	Hs.133350	431.4	PP	399.2	PP
ENSG00000108848	CROP	Hs.130293	2166.4	PP	1637.55	PP
ENSG00000149187	CUGBP1	Hs.530727	383	PP	596.3	PP
ENSG00000160967	CUTL1	Hs.438974	333.3	PP	412.55	PP
ENSG00000124487	DDX3X	Hs.380774	769.8	PP	1229	PP
ENSG00000104131	EIF3S1	Hs.404056	340.4	PP	365.05	PP
ENSG00000110321	EIF4G2	Hs.183684	2137	PP	2701.9	PP
ENSG00000139146	FAM60A	Hs.505154	598.1	PP	788	PP
ENSG00000138081	FBXO11	Hs.553547	155.7	PP	259.35	PP
ENSG00000132589	FLOT2	Hs.514038	393.4	PP	355.45	PP
ENSG00000170345	FOS	Hs.25647	1254.3	PP	1832.65	PP
ENSG00000165879	FRAT1	Hs.126057	207.4	PP	183.35	PP
ENSG00000138668	HNRPD	Hs.480073	785.7	PP	1067.15	PP
ENSG00000173744	HRB	Hs.443507	202.6	PP	405.7	PP
ENSG00000171988	JMJD1C	Hs.413416	107	PP	198.85	PP
ENSG00000176407	KCMF1	Hs.345694	751.2	PP	938.3	PP
ENSG00000168906	MAT2A	Hs.516157	1011.4	PP	738.6	PP
ENSG00000038274	MAT2B	Hs.54642	609.4	PP	461.9	PP
ENSG00000143995	**MEIS1**	Hs.526754	452.1	PP	262.65	PP
ENSG00000125445	MRPS7	Hs.71787	381.8	PP	338.3	PA
ENSG00000153234	NR4A2	Hs.165258	124.6	PP	242.85	PP
ENSG00000059758	PCTK2	Hs.506415	118.3	PP	220.9	PP
ENSG00000114209	PDCD10	Hs.478150	463.6	PP	560.4	PP
ENSG00000168291	PDHB	Hs.161357	453.5	PP	670.7	PP
ENSG00000112511	PHF1	Hs.166204	903.7	PP	604.1	PP
ENSG00000118495	PLAGL1	Hs.444975	187.1	PP	357.8	PP
ENSG00000136040	PLXNC1	Hs.551522	354.6	PP	387.1	PP
ENSG00000163806	PPP1CB	Hs.468018	65.7	PP	135.05	PP
ENSG00000119414	PPP6C	Hs.495128	297.5	PP	557.55	PP
ENSG00000138073	PREB	Hs.279784	324.3	PP	251.45	PP
ENSG00000117569	PTBP2	Hs.269895	183	PP	160.15	PP
ENSG00000185129	PURA	Hs.443121	149.5	PP	224.95	PP
ENSG00000138069	RAB1A	Hs.310645	70.8	PP	109.75	PM
ENSG00000119318	RAD23B	Hs.521640	156.2	PP	211.05	PP

ENSG00000077092	RARB	Hs.436538	111.5	PP	156.85	PP
ENSG00000125976	RBM12	---	321.1	PP	313.35	PP
ENSG00000153250	RBMS1	Hs.470412	144.9	PP	216.05	PP
ENSG00000067560	RHOA	Hs.247077	1537.7	PP	2368.8	PP
ENSG00000137075	RNF38	Hs.333503	322.6	PP	227.7	PP
ENSG00000160633	SAFB	Hs.23978	376.8	PP	261.35	PP
ENSG00000138760	SCARB2	Hs.349656	81.4	PP	116.15	PP
ENSG00000161547	SFRS2	Hs.73965	3723.5	PP	4390.4	PP
ENSG00000102038	SMARCA1	Hs.152292	101.1	PP	72.95	PA
ENSG00000180283	SUMO2	Hs.380973	1013.1	PP	783	PP
ENSG00000109332	UBE2D3	Hs.472031	471.2	PP	635.4	PP
ENSG00000100242	UNC84B	Hs.517622	560.7	PP	333.25	PP
ENSG00000107372	ZA20D2	Hs.406096	967.2	PP	1262.9	PP
ENSG00000086666	ZA20D3	Hs.306329	735.1	PP	517.75	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000114770	ABCC5	Hs.368563	373.4	PP	322.1	PM
ENSG00000075624	ACTB	Hs.520640	11983.4	PP	11502.85	PP
ENSG00000131503	ANKHD1	Hs.434219	168	PP	163.05	PP
ENSG00000177879	AP3S1	Hs.406191	647.6	PP	1020.05	PP
ENSG00000084234	APLP2	Hs.370247	1126.7	PP	668.55	PP
ENSG00000168374	ARF4	Hs.148330	129	PP	157.5	PP
ENSG00000117713	ARID1A	Hs.468972	477.6	PP	444.8	PP
ENSG00000170540	ARL6IP	Hs.75249	155.3	PP	376.15	PP
ENSG00000163399	ATP1A1	Hs.371889	370.4	PP	539.1	PP
ENSG00000143153	ATP1B1	Hs.291196	132.4	PP	245.55	PP
ENSG00000119866	BCL11A	Hs.370549	363.1	PP	387.8	PP
ENSG00000104765	BNIP3L	Hs.131226	239.7	PP	375.45	PP
ENSG00000152242	C18orf25	Hs.116486	129.7	PP	130.6	PA
ENSG00000168958	C2orf33	Hs.471528	235.3	PP	302.3	PP
ENSG00000067955	CBFB	Hs.460988	719.1	PP	1032	PP
ENSG00000163660	CCNL1	Hs.4859	1082.6	PP	1052.5	PP
ENSG00000155111	CDC2L6	Hs.193251	325	PP	341.25	PP
ENSG00000111276	CDKN1B	Hs.238990	333.5	PP	374.65	PP
ENSG00000072609	CHFR	Hs.507336	247.4	PP	253.05	PP
ENSG00000131873	CHSY1	Hs.110488	404.5	PP	490.95	PP
ENSG00000125107	CNOT1	Hs.460923	658.2	PP	662.1	PP
ENSG00000145708	CRHBP	Hs.115617	536.3	PP	346.1	PP
ENSG00000108848	CROP	Hs.130293	2166.4	PP	1637.55	PP
ENSG00000102974	CTCF	Hs.368367	506.1	PP	535.55	PP
ENSG00000168036	CTNNB1	Hs.476018	343.5	PP	364.4	PP
ENSG00000149187	CUGBP1	Hs.530727	383	PP	596.3	PA
ENSG00000160967	CUTL1	Hs.438974	333.3	PP	412.55	PP
ENSG00000165659	DACH1	Hs.129452	95.1	PP	144.8	PP
ENSG00000168209	DDIT4	Hs.523012	736.8	PP	535.85	PP
ENSG00000124487	DDX3X	Hs.380774	769.8	PP	1229	PP
ENSG00000109606	DHX15	Hs.5683	1219.8	PP	1620.75	PP
ENSG00000183690	EFHC2	Hs.521953	162.6	PP	209.65	PP
ENSG00000104131	EIF3S1	Hs.404056	340.4	PP	365.05	PP

	EIF4EBP3 ///					
ENSG00000131503	MASK-BP3	---	285.5	PP	200	PP
ENSG00000110321	EIF4G2	Hs.183684	2137	PP	2701.9	PP
ENSG00000157557	ETS2	Hs.517296	188.3	PP	297.8	PP
ENSG00000138081	FBXO11	Hs.553547	155.7	PP	259.35	PP
ENSG00000143756	FBXO28	Hs.64691	106.1	PP	70.5	PA
ENSG00000170345	FOS	Hs.25647	1254.3	PP	1832.65	PP
ENSG00000165879	FRAT1	Hs.126057	207.4	PP	183.35	PP
ENSG00000065135	GNAI3	Hs.73799	603.4	PP	763.55	PP
ENSG00000091527	H41	Hs.518265	735.1	PP	1129.65	PP
ENSG00000100644	HIF1A	Hs.509554	866.5	PP	1037.1	PP
ENSG00000163349	HIPK1	Hs.532363	347.7	PP	488.5	PP
ENSG00000177733	HNRPA0	Hs.96996	655	PP	723.4	PP
ENSG00000170144	HNRPA3	Hs.516539	375.5	PP	558.6	PP
ENSG00000138668	HNRPD	Hs.480073	785.7	PP	1067.15	PP
ENSG00000120075	**HOXB5**	Hs.149548	322	PP	238.15	PP
ENSG00000173744	HRB	Hs.443507	202.6	PP	405.7	PP
ENSG00000186480	INSIG1	Hs.520819	196.9	PP	304.7	PP
ENSG00000176407	KCMF1	Hs.345694	751.2	PP	938.3	PP
ENSG00000121774	KHDRBS1	Hs.445893	1363	PP	1395.2	PP
ENSG00000136813	KIAA0368	Hs.368255	153.6	PP	135.95	PP
ENSG00000101367	MAPRE1	Hs.472437	196.1	PP	206.85	PM
ENSG00000168906	MAT2A	Hs.516157	1011.4	PP	738.6	PP
ENSG00000038274	MAT2B	Hs.54642	609.4	PP	461.9	PP
ENSG00000152601	MBNL1	Hs.478000	294.4	PP	864.5	PP
ENSG00000143995	**MEIS1**	Hs.526754	452.1	PP	262.65	PP
ENSG00000123562	MORF4L2	Hs.326387	2189.8	PP	2626.1	PP
ENSG00000170873	MTSS1	Hs.336994	152.7	PP	194.6	PP
ENSG00000147140	NONO	Hs.533282	2434.4	PP	2382.1	PP
ENSG00000153234	NR4A2	Hs.165258	124.6	PP	242.85	PP
ENSG00000115758	ODC1	Hs.467701	843.3	PP	1634.7	PP
ENSG00000147162	OGT	Hs.405410	165.1	PP	183.6	PP
ENSG00000172239	PAIP1	Hs.482038	127.8	PP	157	PP
ENSG00000114054	PCCB	Hs.63788	270.6	PP	392.75	PP
ENSG00000114209	PDCD10	Hs.478150	463.6	PP	560.4	PP
ENSG00000118495	PLAGL1	Hs.444975	187.1	PP	357.8	PP
ENSG00000136040	PLXNC1	Hs.551522	354.6	PP	387.1	PP
ENSG00000163806	PPP1CB	Hs.468018	65.7	PP	135.05	PP
ENSG00000119414	PPP6C	Hs.495128	297.5	PP	557.55	PP
ENSG00000116731	PRDM2	Hs.371823	329.6	PP	175.6	PP
ENSG00000138073	PREB	Hs.279784	324.3	PP	251.45	PP
ENSG00000117569	PTBP2	Hs.269895	183	PP	160.15	PP
ENSG00000185129	PURA	Hs.443121	149.5	PP	224.95	PP
ENSG00000112531	QKI	Hs.510324	284.1	PP	564.45	PP
ENSG00000138069	RAB1A	Hs.310645	70.8	PP	109.75	PM
ENSG00000153201	RANBP2	Hs.199561	133.1	PP	185.85	PP
ENSG00000153250	RBMS1	Hs.470412	144.9	PP	216.05	PP
ENSG00000067560	RHOA	Hs.247077	1537.7	PP	2368.8	PP
ENSG00000063978	RNF4	Hs.66394	115.8	PP	325.65	PP
ENSG00000043093	RP42	Hs.104613	236.5	PP	204.45	PP
ENSG00000163602	RYBP	Hs.7910	398	PP	462.8	PP
ENSG00000137575	SDCBP	Hs.200804	934	PP	955.25	PP
ENSG00000162105	SHANK2	Hs.268726	137.1	PP	128.55	PP

ENSG00000147454	SLC25A37	Hs.122514	103	PP	86.95	PA
ENSG00000080493	SLC4A4	Hs.5462	124.5	PP	268.4	PP
ENSG00000102038	SMARCA1	Hs.152292	101.1	PP	72.95	PA
ENSG00000167323	STIM1	Hs.501735	143.2	PP	99.7	PP
ENSG00000180283	SUMO2	Hs.380973	1013.1	PP	783	PP
ENSG00000140262	TCF12	Hs.511504	179.4	PP	439.15	PP
ENSG00000071564	TCF3	Hs.371282	303.8	PP	276.8	PP
ENSG00000071564	TCF3	Hs.371282	322.5	PP	443.9	PM
ENSG00000148737	TCF7L2	Hs.501080	102.3	PP	100.85	PP
ENSG00000163659	TIPARP	Hs.12813	567.1	PP	1548.4	PP
ENSG00000008952	TLOC1	Hs.529591	321.8	PP	343.45	PP
ENSG00000140391	TSPAN3	Hs.5062	516.6	PP	661.45	PP
ENSG00000131508	UBE2D2	Hs.108332	400.1	PP	512.05	PP
ENSG00000170035	UBE2E3	Hs.470804	311.5	PP	258.25	PP
ENSG00000198833	UBE2J1	Hs.163776	342.7	PP	357.2	PP
ENSG00000100242	UNC84B	Hs.517622	560.7	PP	333.25	PP
ENSG00000124164	VAPB	Hs.182625	245	PP	213.5	PP
ENSG00000144560	VGLL4	Hs.373959	299.7	PP	175.6	PP
ENSG00000158195	WASF2	Hs.469244	430.1	PP	367.5	PP
ENSG00000085433	WDR47	Hs.546347	90.4	PP	116.6	PP
ENSG00000083896	YT521	Hs.175955	318.2	PP	505.9	PP
ENSG00000170949	ZNF160	Hs.467236	1056.4	PP	1016.85	PP
ENSG00000179456	ZNF238	Hs.69997	235.7	PP	241.8	PP

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There are no predicted targets for this microRNA in either prediction database

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000108848	CROP	Hs.130293	2166.4	PP	1637.55	PP
ENSG00000110321	EIF4G2	Hs.183684	2137	PP	2701.9	PP
ENSG00000177733	HNRPA0	Hs.96996	655	PP	723.4	PP
ENSG00000010295	HOM-TES-103	Hs.15243	407	PP	355.35	PP
ENSG00000055208	MAP3K7IP2	Hs.269775	219.1	PP	142.8	PP
ENSG00000005302	MSL3L1	Hs.307924	302.5	PP	200.1	PP
ENSG00000100836	PABPN1	Hs.117176	758.2	PP	790.85	PP
ENSG00000110851	PRDM4	Hs.506655	188.6	PP	183.55	PP
ENSG00000111540	RAB5B	Hs.77690	234.1	PP	216.45	PP
ENSG00000010017	RANBP9	Hs.306242	381.3	PP	489.95	PP
ENSG00000134294	SLC38A2	Hs.221847	634.3	PP	1026.55	PP
ENSG00000080503	SMARCA2	Hs.298990	264.4	PP	201.3	PP
ENSG00000137642	SORL1	Hs.368592	2264.1	PP	1084.65	PP
ENSG00000131508	UBE2D2	Hs.108332	400.1	PP	512.05	PP
ENSG00000179456	ZNF238	Hs.69997	235.7	PP	241.8	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000116489	CAPZA1	Hs.514934	766.7	PP	1165.8	PP
ENSG00000009307	CSDE1	Hs.69855	1494.1	PP	1637.9	PP
ENSG00000120738	EGR1	Hs.326035	128.6	PP	290.15	PP
ENSG00000092847	EIF2C1	Hs.22867	292.5	PP	296.95	PP
ENSG00000135930	EIF4E2	Hs.292026	538.3	PP	611.25	PP
ENSG00000116478	HDAC1	Hs.88556	286.1	PP	397	PP
ENSG00000114315	**HES1**	Hs.250666	232.7	PP	169.8	PP
ENSG00000165119	HNRPK	Hs.449171	761	PP	1269.35	PP
ENSG00000008083	JARID2	Hs.269059	1015	PP	894	PP
ENSG00000182979	MTA1	Hs.525629	428.2	PP	237.75	PP
ENSG00000164190	NIPBL	Hs.481927	165.1	PP	145.15	PP
ENSG00000078618	NRD1	Hs.551509	874.1	PP	639.35	PP
ENSG00000120265	PCMT1	Hs.279257	488.1	PP	649.4	PP
ENSG00000115762	PLEKHB2	Hs.469944	181.7	PP	266	PP
ENSG00000137492	PRKRIR	Hs.503315	281.4	PP	549.7	PP
ENSG00000117569	PTBP2	Hs.269895	183	PP	160.15	PP
ENSG00000010017	RANBP9	Hs.306242	381.3	PP	489.95	PP
ENSG00000170881	RNF139	Hs.492751	392.9	PP	435.75	PP
ENSG00000171858	RPS21	Hs.190968	24441.6	PP	21034.85	PP
ENSG00000100784	RPS6KA5	Hs.510225	152.1	PP	132.75	PP
ENSG00000159140	SON	Hs.517262	408.8	PP	467.15	PP
ENSG00000132388	UBE2G1	Hs.462035	272.5	PP	373.45	PP
ENSG00000165280	VCP	Hs.529782	278.5	PP	240.85	PP
ENSG00000115935	WASPIP	Hs.128067	418.1	PP	364.25	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000114770	ABCC5	Hs.368563	373.4	PP	322.1	PM
ENSG00000136518	ACTL6A	Hs.435326	84.2	PP	105.6	PP
ENSG00000177879	AP3S1	Hs.406191	647.6	PP	1020.05	PP
ENSG00000144848	APG3L	Hs.477126	235.6	PP	245.05	PP
ENSG00000129675	ARHGEF6	Hs.522795	1207.5	PP	815.1	PP
ENSG00000117713	ARID1A	Hs.468972	477.6	PP	444.8	PP
ENSG00000119866	BCL11A	Hs.370549	363.1	PP	387.8	PP
ENSG00000110075	C11orf23	Hs.503022	402.6	PP	319.5	PA
ENSG00000139746	C13orf10	Hs.131715	119.8	PP	178.7	PP
ENSG00000101084	C20orf24	Hs.184062	878.9	PP	1348.2	PP
ENSG00000127022	CANX	Hs.529890	1003.1	PP	2097.75	PP
ENSG00000100261	CBX6	Hs.511952	308	PP	255.7	PP
ENSG00000163660	CCNL1	Hs.4859	1082.6	PP	1052.5	PP
ENSG00000082258	CCNT2	Hs.292754	114.4	PP	102.75	PP
ENSG00000070831	CDC42	Hs.467637	620.1	PP	437.75	PP
ENSG00000153922	CHD1	Hs.519474	89.4	PP	202.95	PP
ENSG00000111596	CNOT2	Hs.133350	431.4	PP	399.2	PP
ENSG00000099942	CRKL	Hs.5613	126.4	PP	192.1	PP
ENSG00000009307	CSDE1	Hs.69855	1494.1	PP	1637.9	PP

ENSG00000103653	CSK	Hs.77793	348.1	PP	217.35	PA
ENSG00000113712	CSNK1A1	Hs.442592	1045.3	PP	1263.25	PP
ENSG00000168209	DDIT4	Hs.523012	736.8	PP	535.85	PP
ENSG00000142634	EFHD2	Hs.465374	292.3	PP	242.65	PA
ENSG00000092847	EIF2C1	Hs.22867	292.5	PP	296.95	PP
ENSG00000120533	ENY2	Hs.492555	316.2	PP	375.85	PP
ENSG00000120616	EPC1	Hs.167805	148.9	PP	88.7	PA
ENSG00000157554	ERG	Hs.473819	369.4	PP	298.05	PP
ENSG00000120705	ETF1	Hs.483494	253.8	PP	461.55	PP
ENSG00000182944	EWSR1	Hs.374477	389.7	PP	457.25	PP
ENSG00000150907	FOXO1A	Hs.370666	253.6	PP	140.95	PP
ENSG00000145907	G3BP	Hs.3353	167.7	PP	319.25	PP
ENSG00000141429	GALNT1	Hs.514806	220	PP	273.8	PP
ENSG00000109586	GALNT7	Hs.127407	97.2	PP	153.95	PP
ENSG00000001084	GCLC	Hs.271264	227.6	PP	219.2	PP
ENSG00000177733	HNRPA0	Hs.96996	655	PP	723.4	PP
ENSG00000170144	HNRPA3	Hs.516539	375.5	PP	558.6	PP
ENSG00000152795	HNRPDL	Hs.527105	1931.8	PP	1802.05	PP
ENSG00000099783	HNRPM	Hs.465808	968.5	PP	880.2	PP
ENSG00000044574	HSPA5	Hs.522394	1536.9	PP	3296.1	PP
ENSG00000115548	JMJD1A	Hs.531819	264	PP	207.05	PP
ENSG00000102753	KPNA3	Hs.527919	250.8	PP	391.35	PP
ENSG00000143815	LBR	Hs.435166	1166	PP	1807.35	PP
ENSG00000065548	LEREPO4	Hs.368598	265.5	PP	402.5	PP
ENSG00000111885	MAN1A1	Hs.102788	309.1	PP	151	PP
ENSG00000166974	MAPRE2	Hs.532824	857.4	PP	715.5	PP
ENSG00000168906	MAT2A	Hs.516157	1011.4	PP	738.6	PP
ENSG00000182979	MTA1	Hs.525629	428.2	PP	237.75	PP
ENSG00000147649	MTDH	Hs.377155	258.6	PP	329.8	PP
ENSG00000005810	MYCBP2	Hs.151411	187	PP	643.55	PP
ENSG00000120837	NFYB	Hs.84928	204.1	PP	272.85	PP
ENSG00000153234	NR4A2	Hs.165258	124.6	PP	242.85	PP
ENSG00000177425	PAWR	Hs.406074	148.3	PP	133.85	PP
ENSG00000105835	PBEF1	Hs.489615	96.8	PP	138.65	PP
ENSG00000136040	PLXNC1	Hs.551522	354.6	PP	387.1	PP
ENSG00000112245	PTP4A1	Hs.227777	439.5	PP	431.2	PP
ENSG00000175354	PTPN2	Hs.123352	759.9	PP	273	PP
ENSG00000130508	PXDN	Hs.332197	280.3	PP	114.7	PA
ENSG00000048991	R3HDM	Hs.412462	217.6	PP	376.75	PP
ENSG00000103769	RAB11A	Hs.321541	1087.7	PP	1020.15	PP
ENSG00000138069	RAB1A	Hs.310645	70.8	PP	109.75	PM
ENSG00000119318	RAD23B	Hs.521640	156.2	PP	211.05	PP
ENSG00000145715	RASA1	Hs.553501	138.8	PP	103.6	PP
ENSG00000125976	RBM12	---	321.1	PP	313.35	PP
ENSG00000106615	RHEB	Hs.283521	943.5	PP	1172.5	PP
ENSG00000144580	RQCD1	Hs.148767	284.7	PP	361.25	PP
ENSG00000122545	7-Sep	Hs.191346	815	PP	1146.5	PP
ENSG00000115524	SF3B1	Hs.471011	2127.6	PP	2173.9	PP
ENSG00000115875	SFRS7	Hs.309090	378.7	PP	743.5	PP
ENSG00000113558	SKP1A	Hs.171626	657.2	PP	969.15	PP
ENSG00000059804	SLC2A3	Hs.419240	275.9	PP	351.5	PP
ENSG00000112305	SMAP1	Hs.485717	205.2	PP	129.15	PP
ENSG00000077147	SMBP	Hs.500674	358.3	PP	250.05	PP

ENSG00000159140	SON	Hs.517262	408.8	PP	467.15	PP
ENSG00000124766	SOX4	Hs.357901	2351.7	PP	2500.65	PP
ENSG00000180283	SUMO2	Hs.380973	1013.1	PP	783	PP
ENSG00000008282	SYPL1	Hs.80919	157.3	PP	190.55	PP
ENSG00000136205	TENS1	Hs.520814	443.4	PP	221.15	PP
ENSG00000144043	TEX261	Hs.516087	360.9	PP	229.45	PA
ENSG00000114126	TFDP2	Hs.379018	253.2	PP	196.3	PA
ENSG00000116001	TIA1	Hs.516075	151.6	PP	145	PP
ENSG00000170348	TMP21	Hs.74137	293.5	PP	280.3	PA
ENSG00000063244	U2AF2	Hs.528007	191	PP	227.15	PP
ENSG00000131508	UBE2D2	Hs.108332	400.1	PP	512.05	PP
ENSG00000103275	UBE2I	Hs.302903	452.9	PP	427.25	PP
ENSG00000009335	UBE3C	Hs.118351	67.5	PP	175.9	PM
ENSG00000118900	UBN1	Hs.440219	138.4	PP	302.15	PP
ENSG00000162607	USP1	Hs.35086	275.3	PP	614.05	PP
ENSG00000101558	VAPA	Hs.165195	1051.8	PP	1198.45	PP
ENSG00000108828	VAT1	Hs.514199	649.7	PP	585.4	PP
ENSG00000165280	VCP	Hs.529782	278.5	PP	240.85	PP
ENSG00000107372	ZA20D2	Hs.406096	967.2	PP	1262.9	PP
ENSG00000152518	ZFP36L2	Hs.503093	4553.7	PP	5205.6	PP
ENSG00000179456	ZNF238	Hs.69997	235.7	PP	241.8	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000138031	ADCY3	Hs.467898	208.6	PP	178.4	PP
ENSG00000117713	ARID1A	Hs.468972	477.6	PP	444.8	PP
ENSG00000143153	ATP1B1	Hs.291196	132.4	PP	245.55	PP
ENSG00000174437	ATP2A2	Hs.506759	203.5	PP	255.4	PP
ENSG00000155096	AZIN1	Hs.459106	551.2	PP	619.2	PP
ENSG00000159388	BTG2	Hs.519162	588.2	PP	538.3	PP
ENSG00000112237	CCNC	Hs.430646	273.3	PP	380.8	PP
ENSG00000118260	CREB1	Hs.516646	122.9	PP	230.35	PP
ENSG00000102974	CTCF	Hs.368367	506.1	PP	535.55	PP
ENSG00000132153	DHX30	Hs.517948	209.5	PP	193.5	PP
ENSG00000128590	DNAJB9	Hs.6790	211.5	PP	433.55	PP
ENSG00000112242	E2F3	Hs.269408	295.6	PP	585.95	PP
ENSG00000123908	EIF2C2	Hs.449415	150.2	PP	115.85	PP
ENSG00000104131	EIF3S1	Hs.404056	340.4	PP	365.05	PP
ENSG00000100664	EIF5	Hs.433702	96.4	PP	55.8	PA
ENSG00000109920	FNBP4	Hs.6834	501.2	PP	497.2	PP
ENSG00000114416	FXR1	Hs.478407	143.9	PP	155.75	PP
ENSG00000057608	GDI2	Hs.299055	198.2	PP	260.65	PP
ENSG00000172534	HCFC1	Hs.83634	146.2	PP	233.9	PA
ENSG00000122566	HNRPA2B1	Hs.487774	1802.2	PP	2268.3	PP
ENSG00000170144	HNRPA3	Hs.516539	375.5	PP	558.6	PP
ENSG00000153807	**HOXA10**	Hs.110637	161.3	PP	200.7	PA
ENSG00000173744	HRB	Hs.443507	202.6	PP	405.7	PP
ENSG00000144381	HSPD1	Hs.113684	2868.6	PP	5689.3	PP
ENSG00000143164	IQWD1	Hs.435741	168.5	PP	156.4	PP
ENSG00000102753	KPNA3	Hs.527919	250.8	PP	391.35	PA

ENSG00000012983	MAP4K5	Hs.130491	66	PP	116	PP
ENSG00000112118	MCM3	Hs.179565	509.1	PP	637.3	PP
ENSG00000081189	MEF2C	Hs.444409	426	PP	437.85	PP
ENSG00000165943	MOAP1	Hs.24719	527.1	PP	299.1	PP
ENSG00000066136	NFYC	Hs.233458	115.5	PP	168	PP
ENSG00000170515	PA2G4	Hs.478044	251.3	PP	523.75	PP
ENSG00000157654	PALM2-AKAP2	Hs.259461	181.4	PP	163.75	PP
ENSG00000145730	PAM	Hs.369430	187.3	PP	178.45	PP
ENSG00000169564	PCBP1	Hs.2853	1587.4	PP	1289.35	PP
ENSG00000102225	PCTK1	Hs.496068	135	PP	88.45	PA
ENSG00000059758	PCTK2	Hs.506415	118.3	PP	220.9	PP
ENSG00000112511	PHF1	Hs.166204	903.7	PP	604.1	PP
ENSG00000112941	POLS	Hs.481542	355.5	PP	367.35	PP
ENSG00000138430	PTD004	Hs.157351	848.2	PP	1052.6	PP
ENSG00000137075	RNF38	Hs.333503	322.6	PP	227.7	PP
ENSG00000063978	RNF4	Hs.66394	115.8	PP	325.65	PP
ENSG00000156642	SDFR1	Hs.187866	169.4	PP	193.05	PP
ENSG00000134294	SLC38A2	Hs.221847	634.3	PP	1026.55	PP
ENSG00000184602	SNN	Hs.459952	234.4	PP	239.3	PP
ENSG00000120833	SOCS2	Hs.485572	715.8	PP	806.65	PP
ENSG00000137642	SORL1	Hs.368592	2264.1	PP	1084.65	PP
ENSG00000124766	SOX4	Hs.357901	2351.7	PP	2500.65	PP
ENSG00000101972	STAG2	Hs.496710	392	PP	375.2	PP
ENSG00000165169	TCTE1L	Hs.446392	323	PP	369.75	PP
ENSG00000177426	TGIF	Hs.373550	116.7	PP	95.35	PM
ENSG00000165699	TSC1	Hs.370854	232.7	PP	242.3	PP
ENSG00000169764	UGP2	Hs.516217	656.9	PP	560.95	PP
ENSG00000135655	USP15	Hs.434951	197.3	PP	160.35	PP
ENSG00000143952	VPS54	Hs.48499	187.9	PP	151.5	PP
ENSG00000166913	YWHAB	Hs.279920	222.4	PP	288.75	PP
ENSG00000170949	ZNF160	Hs.467236	1056.4	PP	1016.85	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000165029	ABCA1	Hs.429294	175.1	PP	156.5	PP
ENSG00000114770	ABCC5	Hs.368563	373.4	PP	322.1	PM
ENSG00000151726	ACSL1	Hs.406678	180.6	PP	193.15	PP
ENSG00000023516	AKAP11	Hs.105105	88.5	PP	69.7	PP
ENSG00000170017	ALCAM	Hs.150693	528.9	PP	695.45	PP
ENSG00000137962	ARHGAP29	Hs.483238	72.2	PP	65.3	PP
ENSG00000117713	ARID1A	Hs.468972	477.6	PP	444.8	PP
ENSG00000054267	ARID4B	Hs.533633	227	PP	252.45	PP
ENSG00000134108	ARL10C	Hs.250009	578.1	PP	591.95	PP
ENSG00000128989	ARPP-19	Hs.512908	247.7	PP	139.7	PP
ENSG00000143970	ASXL2	Hs.119815	694.8	PP	535.25	PP
ENSG00000174437	ATP2A2	Hs.506759	203.5	PP	255.4	PP
ENSG00000017260	ATP2C1	Hs.546361	229.1	PP	322.9	PP
ENSG00000147416	ATP6V1B2	Hs.295917	179.5	PP	183.85	PP
ENSG00000198604	BAZ1A	Hs.509140	102.4	PP	111.2	PA

ENSG00000119866	BCL11A	Hs.370549	363.1	PP	387.8	PP
ENSG00000029363	BCLAF1	Hs.486542	659.8	PP	1252.25	PP
ENSG00000095564	BTAF1	Hs.500526	220.4	PP	333.3	PP
ENSG00000133639	BTG1	Hs.255935	955.9	PP	1057.95	PP
ENSG00000154640	BTG3	Hs.473420	315.6	PP	378.5	PP
ENSG00000119906	C10orf6	Hs.447458	154.8	PP	126.8	PP
ENSG00000110075	C11orf23	Hs.503022	402.6	PP	319.5	PA
ENSG00000134153	C15orf24	Hs.160565	612.5	PP	706.2	PP
ENSG00000152242	C18orf25	Hs.116486	129.7	PP	130.6	PA
ENSG00000101166	C20orf45	Hs.3945	93.1	PP	74.8	PP
ENSG00000162959	C2orf4	Hs.444969	410.5	PP	397.7	PA
ENSG00000031003	C5orf5	Hs.483473	256.3	PP	316.85	PP
ENSG00000112308	C6orf62	Hs.519930	330.6	PP	509.45	PP
ENSG00000112308	C6orf62	Hs.519930	566.8	PP	770.5	PP
ENSG00000112576	CCND3	Hs.534307	539.8	PP	402.15	PP
ENSG00000110848	CD69	Hs.208854	1631.5	PP	1082.1	PP
ENSG00000155111	CDC2L6	Hs.193251	325	PP	341.25	PP
ENSG00000143126	CELSR2	Hs.57652	215.4	PP	148.65	PP
ENSG00000177200	CHD9	Hs.530936	222.6	PP	263	PP
ENSG00000131873	CHSY1	Hs.110488	404.5	PP	490.95	PP
ENSG00000141367	CLTC	Hs.491351	1169	PP	1399.6	PP
ENSG00000162368	CMPK	Hs.11463	333.8	PP	336.55	PP
ENSG00000100528	CNIH	Hs.294603	252.6	PP	391.7	PP
ENSG00000198791	CNOT7	Hs.170553	250.3	PP	508.5	PP
ENSG00000135940	COX5B	Hs.1342	645	PP	568.3	PA
ENSG00000115944	COX7A2L	Hs.339639	1251.1	PP	1258.85	PP
ENSG00000005339	CREBBP	Hs.459759	287.2	PP	239.6	PP
ENSG00000108848	CROP	Hs.130293	2166.4	PP	1637.55	PP
ENSG00000009307	CSDE1	Hs.69855	1494.1	PP	1637.9	PP
ENSG00000103653	CSK	Hs.77793	348.1	PP	217.35	PA
ENSG00000113712	CSNK1A1	Hs.442592	1045.3	PP	1263.25	PP
ENSG00000168036	CTNNB1	Hs.476018	343.5	PP	364.4	PP
ENSG00000036257	CUL3	Hs.372286	554.5	PP	473.25	PP
ENSG00000166266	CUL5	Hs.440320	285.8	PP	246.8	PP
ENSG00000083799	CYLD	Hs.432993	137.6	PP	148.8	PP
ENSG00000124487	DDX3X	Hs.380774	769.8	PP	1229	PP
ENSG00000124795	DEK	Hs.484813	901.9	PP	1127.65	PP
ENSG00000109606	DHX15	Hs.5683	1219.8	PP	1620.75	PP
ENSG00000132002	DNAJB1	Hs.515210	453.4	PP	2770.05	PP
ENSG00000105993	DNAJB6	Hs.490745	189.7	PP	348.5	PP
ENSG00000092964	DPYSL2	Hs.173381	505.1	PP	495.1	PP
ENSG00000117505	DR1	Hs.348418	117.2	PP	188.65	PP
ENSG00000092847	EIF2C1	Hs.22867	292.5	PP	296.95	PP
ENSG00000151247	EIF4E	Hs.249718	156.7	PP	224	PP
ENSG00000111145	ELK3	Hs.46523	372.1	PP	280.75	PP
ENSG00000012660	ELOVL5	Hs.520189	681.6	PP	667.3	PP
ENSG00000120616	EPC1	Hs.167805	148.9	PP	88.7	PA
ENSG00000124882	EREG	Hs.115263	351.8	PP	535.15	PP
ENSG00000124491	F13A1	Hs.335513	290.7	PP	299.8	PP
	FAM45B ///					
ENSG00000119979	FAM45A	Hs.434241	554.8	PP	690.2	PP
ENSG00000139146	FAM60A	Hs.505154	598.1	PP	788	PP
ENSG00000166147	FBN1	Hs.146447	195.2	PP	178.7	PP

ENSG00000173120	FBXL11	Hs.124147	237	PP	192.5	PP
ENSG00000118564	FBXL5	Hs.479208	410.6	PP	319.15	PP
ENSG00000138081	FBXO11	Hs.553547	155.7	PP	259.35	PP
ENSG00000143756	FBXO28	Hs.64691	106.1	PP	70.5	PA
ENSG00000134884	FLJ10154	Hs.508644	843.1	PP	1079.5	PP
ENSG00000153561	FLJ13910	Hs.75277	194.1	PP	143.15	PP
ENSG00000132589	FLOT2	Hs.514038	393.4	PP	355.45	PP
ENSG00000138757	G3BP2	Hs.303676	242.8	PP	428.55	PP
ENSG00000116717	GADD45A	Hs.80409	266	PP	245.7	PP
ENSG00000127955	GNAI1	Hs.134587	104.9	PP	139.15	PP
ENSG00000135677	GNS	Hs.334534	261.1	PP	248.15	PP
ENSG00000106070	GRB10	Hs.164060	550.7	PP	574.15	PP
ENSG00000112406	HECA	Hs.197644	352.2	PP	377.45	PP
ENSG00000164683	HEY1	Hs.234434	164.1	PP	151.85	PP
ENSG00000010818	HIVEP2	Hs.510172	149.6	PP	157.9	PP
ENSG00000169045	HNRPH1	Hs.202166	1986.4	PP	2132.6	PP
ENSG00000126945	HNRPH2	Hs.278857	189.2	PP	158.45	PP
ENSG00000099783	HNRPM	Hs.465808	968.5	PP	880.2	PP
ENSG00000105323	HNRPUL1	Hs.155218	406.9	PP	401.15	PP
ENSG00000106004	**HOXA5**	Hs.37034	507.2	PP	499.3	PP
ENSG00000173744	HRB	Hs.443507	202.6	PP	405.7	PP
ENSG00000164164	HSHIN1	Hs.270851	303.1	PP	312.65	PP
ENSG00000067829	IDH3G	Hs.410197	249.2	PP	156.95	PA
ENSG00000145703	IQGAP2	Hs.291030	537.8	PP	457.9	PP
ENSG00000125347	IRF1	Hs.436061	467.7	PP	299.6	PP
ENSG00000170852	KBTBD2	Hs.372541	412.2	PP	381.65	PP
ENSG00000131149	KIAA0182	Hs.461647	273.2	PP	316.15	PP
ENSG00000143702	KIAA0470	Hs.533635	146.2	PP	325	PP
ENSG00000126775	KIAA0831	Hs.414809	254.4	PP	217.45	PP
ENSG00000105063	KIAA1115	Hs.515610	227.5	PP	221.6	PM
ENSG00000157404	KIT	Hs.479754	339	PP	355.6	PP
ENSG00000136826	**KLF4**	Hs.376206	536.5	PP	1193.7	PP
ENSG00000114030	KPNA1	Hs.161008	121.8	PP	91.95	PP
ENSG00000102753	KPNA3	Hs.527919	250.8	PP	391.35	PP
ENSG00000068697	LAPTM4A	Hs.467807	1059.2	PP	1145.5	PP
ENSG00000107929	LARP5	Hs.498455	274.8	PP	203.9	PP
ENSG00000123684	LPGAT1	Hs.497674	106	PP	114.3	PP
ENSG00000135387	M11S1	Hs.471818	464.9	PP	451.45	PP
ENSG00000003056	M6PR	Hs.134084	566.2	PP	575.55	PP
ENSG00000121579	MAK3	Hs.269528	268.8	PP	307	PP
ENSG00000161021	MAML1	Hs.484349	331.3	PP	280.35	PP
ENSG00000197442	MAP3K5	Hs.186486	227.6	PP	272.25	PP
ENSG00000047849	MAP4	Hs.517949	302.6	PP	276.5	PP
ENSG00000135525	MAP7	Hs.486548	325.7	PP	390.1	PP
ENSG00000101367	MAPRE1	Hs.472437	196.1	PP	206.85	PM
ENSG00000075413	MARK3	Hs.35828	129.9	PP	75.05	PP
ENSG00000038274	MAT2B	Hs.54642	609.4	PP	461.9	PP
ENSG00000152601	MBNL1	Hs.478000	294.4	PP	864.5	PP
ENSG00000138092	MGC11266	Hs.546428	152.2	PP	90.95	PA
ENSG00000133858	MGC23401	Hs.527874	291	PP	309.55	PP
ENSG00000133606	MKRN1	Hs.490347	392.7	PP	350.15	PP
ENSG00000051825	MPHOSPH9	Hs.507175	261.2	PP	160.5	PP
ENSG00000108389	MTMR4	Hs.514373	330.7	PP	407.2	PP

ENSG00000158747	NBL1		Hs.439671	370.3	PP	360.6	PA
ENSG00000166579	NDEL1		Hs.372123	218.3	PP	187.2	PP
ENSG00000082641	NFE2L1		Hs.514284	735.5	PP	726.35	PP
ENSG00000140157	NIPA2		Hs.370367	284.1	PP	685.9	PP
ENSG00000164190	NIPBL		Hs.481927	165.1	PP	145.15	PP
ENSG00000149308	NPAT		Hs.171061	171.1	PP	140.65	PP
ENSG00000124789	NUP153		Hs.121088	216.4	PP	291.8	PP
ENSG00000147162	OGT		Hs.405410	165.1	PP	183.6	PP
ENSG00000141447	OSBPL1A		Hs.370725	204.6	PP	211.75	PP
ENSG00000090060	PAPOLA		Hs.253726	307.4	PP	286	PP
ENSG00000059758	PCTK2		Hs.506415	118.3	PP	220.9	PP
ENSG00000145431	PDGFC		Hs.148162	473.1	PP	395.4	PP
ENSG00000197329	PELI1		Hs.7886	83.3	PP	154.5	PP
ENSG00000025293	PHF20		Hs.517044	249.8	PP	173.65	PP
ENSG00000118482	PHF3		Hs.348921	260	PP	268.9	PP
ENSG00000051382	PIK3CB		Hs.239818	275.1	PP	280.95	PP
ENSG00000163806	PPP1CB		Hs.468018	65.7	PP	135.05	PP
ENSG00000113575	PPP2CA		Hs.483408	360	PP	370.4	PP
ENSG00000115825	PRKD3		Hs.173536	97.5	PP	111.1	PP
ENSG00000197746	PSAP		Hs.523004	1015.2	PP	647.25	PP
ENSG00000117569	PTBP2		Hs.269895	183	PP	160.15	PP
ENSG00000120899	PTK2B		Hs.491322	333.1	PP	183.65	PP
ENSG00000112245	PTP4A1		Hs.227777	439.5	PP	431.2	PP
ENSG00000175354	PTPN2		Hs.123352	759.9	PP	273	PP
ENSG00000185129	PURA		Hs.443121	149.5	PP	224.95	PP
ENSG00000130508	PXDN		Hs.332197	280.3	PP	114.7	PA
ENSG00000112531	QKI		Hs.510324	284.1	PP	564.45	PP
ENSG00000048991	R3HDM		Hs.412462	217.6	PP	376.75	PP
ENSG00000138069	RAB1A		Hs.310645	70.8	PP	109.75	PM
ENSG00000144566	RAB5A		Hs.475663	471.3	PP	578.35	PP
ENSG00000111540	RAB5B		Hs.77690	234.1	PP	216.45	PP
ENSG00000167461	RAB8A		Hs.5947	675.2	PP	756.75	PP
ENSG00000119318	RAD23B		Hs.521640	156.2	PP	211.05	PP
ENSG00000017797	RALBP1		Hs.528993	379	PP	244.05	PP
ENSG00000077092	RARB		Hs.436538	111.5	PP	156.85	PP
ENSG00000067560	RHOA		Hs.247077	1537.7	PP	2368.8	PP
ENSG00000022840	RNF10		Hs.442798	327.5	PP	282.35	PM
ENSG00000123091	RNF11		Hs.309641	125.3	PP	161.5	PP
ENSG00000137075	RNF38		Hs.333503	322.6	PP	227.7	PP
ENSG00000143947	RPS27A		Hs.311640	7964.6	PP	6951	PP
ENSG00000100784	RPS6KA5		Hs.510225	152.1	PP	132.75	PP
ENSG00000130779	RSN		Hs.524809	76.6	PP	58.05	PP
ENSG00000115310	RTN4		Hs.429581	710.8	PP	1341.5	PP
ENSG00000020633	RUNX3		Hs.170019	541.5	PP	272.8	PP
ENSG00000163602	RYBP		Hs.7910	398	PP	462.8	PP
ENSG00000198838	RYR3		Hs.369250	116.8	PP	131.8	PP
ENSG00000182568	SATB1		Hs.517717	829.9	PP	652.05	PP
ENSG00000140497	SCAMP2		Hs.458917	411.8	PP	495	PP
ENSG00000156642	SDFR1		Hs.187866	169.4	PP	193.05	PP
ENSG00000122545		7-Sep	Hs.191346	815	PP	1146.5	PP
ENSG00000179833	SERTAD2		Hs.77293	498.4	PP	556.2	PP
ENSG00000116754	SFRS11		Hs.479693	819.9	PP	1077.55	PP
ENSG00000162105	SHANK2		Hs.268726	137.1	PP	128.55	PP

ENSG00000112305	SMAP1	Hs.485717	205.2	PP	129.15	PP
ENSG00000102172	SMS	Hs.529887	287.8	PP	275.25	PP
ENSG00000163788	SNRK	Hs.476052	320.6	PP	436.65	PP
ENSG00000089006	SNX5	Hs.316890	327.9	PP	403.25	PP
ENSG00000159140	SON	Hs.517262	408.8	PP	467.15	PP
ENSG00000115904	SOS1	Hs.278733	144	PP	169.4	PP
ENSG00000124766	SOX4	Hs.357901	2351.7	PP	2500.65	PP
ENSG00000065526	SPEN	Hs.270499	257.6	PP	262.7	PP
ENSG00000115306	SPTBN1	Hs.503178	589.9	PP	344.65	PP
ENSG00000124783	SSR1	Hs.114033	600.7	PP	686.65	PP
ENSG00000112079	STK38	Hs.409578	365.8	PP	304.4	PP
ENSG00000173812	SUI1	Hs.150580	6046	PP	6098.85	PP
ENSG00000101945	SUV39H1	Hs.522639	267.8	PP	383.35	PP
ENSG00000178691	SUZ12	Hs.462732	602.2	PP	633.3	PP
ENSG00000135090	TAOK3	---	518.8	PP	394	PP
ENSG00000120948	TARDBP	Hs.300624	735	PP	992.75	PP
ENSG00000028839	TBPL1	Hs.486507	170.1	PP	187.95	PP
ENSG00000132604	TERF2	Hs.63335	241.2	PP	215.3	PP
ENSG00000135269	TES	Hs.533391	397.3	PP	457.65	PP
ENSG00000114126	TFDP2	Hs.379018	253.2	PP	196.3	PA
ENSG00000177426	TGIF	Hs.373550	116.7	PP	95.35	PM
ENSG00000183864	TOB2	Hs.474978	165.3	PP	196.4	PP
ENSG00000154174	TOMM70A	Hs.227253	585.1	PP	581.85	PP
ENSG00000166340	TPP1	Hs.523454	200.3	PP	229.1	PP
ENSG00000067167	TRAM1	Hs.491988	573.3	PP	894.4	PP
ENSG00000140391	TSPAN3	Hs.5062	516.6	PP	661.45	PP
ENSG00000119048	UBE2B	Hs.385986	335	PP	417.45	PP
ENSG00000131508	UBE2D2	Hs.108332	400.1	PP	512.05	PP
ENSG00000109332	UBE2D3	Hs.472031	471.2	PP	635.4	PP
ENSG00000132388	UBE2G1	Hs.462035	272.5	PP	373.45	PP
ENSG00000114062	UBE3A	Hs.22543	456.9	PP	470.75	PP
ENSG00000151148	UBE3B	Hs.374067	156.7	PP	146.6	PP
ENSG00000135655	USP15	Hs.434951	197.3	PP	160.35	PP
ENSG00000170832	USP32	Hs.132868	120.2	PP	118.35	PP
ENSG00000077254	USP33	Hs.480597	228.7	PP	299.75	PP
ENSG00000170242	USP47	Hs.501924	321.7	PP	333.3	PP
ENSG00000090686	USP48	Hs.467524	366.1	PP	393.65	PP
ENSG00000173218	VANGL1	Hs.515130	73.8	PP	89.5	PA
ENSG00000144560	VGLL4	Hs.373959	299.7	PP	175.6	PP
ENSG00000115561	VPS24	Hs.255015	277.6	PP	248.55	PP
ENSG00000085433	WDR47	Hs.546347	90.4	PP	116.6	PP
ENSG00000146457	WTAP	Hs.446091	400.8	PP	406.6	PP
ENSG00000119596	YLPM1	Hs.531111	402.5	PP	461.6	PP
ENSG00000119801	YPEL5	Hs.515890	1377.9	PP	1469.25	PP
ENSG00000198492	YTHDF2	Hs.532286	351.2	PP	449.7	PP
ENSG00000166913	YWHAB	Hs.279920	222.4	PP	288.75	PP
ENSG00000107372	ZA20D2	Hs.406096	967.2	PP	1262.9	PP
ENSG00000185650	ZFP36L1	Hs.85155	94.5	PP	140.7	PP
ENSG00000152518	ZFP36L2	Hs.503093	4553.7	PP	5205.6	PP
ENSG00000114514	ZNF148	Hs.380334	211.6	PP	226.65	PP
ENSG00000179456	ZNF238	Hs.69997	235.7	PP	241.8	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000168710	AHCYL1	Hs.485365	408.7	PP	493.4	PP
ENSG00000004455	AK2	Hs.470907	303.6	PP	498.6	PP
ENSG00000114573	ATP6V1A	Hs.477155	710.1	PP	1105.8	PP
ENSG00000115307	AUP1	Hs.411480	382.3	PP	325.35	PP
ENSG00000179218	CALR	Hs.515162	398.5	PP	1371.55	PP
ENSG00000009307	CSDE1	Hs.69855	1494.1	PP	1637.9	PP
ENSG00000036257	CUL3	Hs.372286	554.5	PP	473.25	PP
ENSG00000158486	DNAH3	Hs.526500	258.2	PP	268.35	PM
ENSG00000123908	EIF2C2	Hs.449415	150.2	PP	115.85	PP
ENSG00000100664	EIF5	Hs.433702	96.4	PP	55.8	PA
ENSG00000066044	ELAVL1	Hs.184492	534.6	PP	734.45	PP
ENSG00000139146	FAM60A	Hs.505154	598.1	PP	788	PP
ENSG00000010295	HOM-TES-103	Hs.15243	407	PP	355.35	PP
ENSG00000074356	HSA277841	Hs.120963	222.9	PP	150.05	PP
ENSG00000169032	MAP2K1	Hs.145442	188.8	PP	162.95	PP
ENSG00000121940	MCLC	Hs.552587	115.5	PP	140.65	PP
ENSG00000005810	MYCBP2	Hs.151411	187	PP	643.55	PP
ENSG00000124789	NUP153	Hs.121088	216.4	PP	291.8	PP
ENSG00000141447	OSBPL1A	Hs.370725	204.6	PP	211.75	PP
ENSG00000167770	OTUB1	Hs.473788	266	PP	155.35	PA
ENSG00000112531	QKI	Hs.510324	284.1	PP	564.45	PP
ENSG00000132341	RAN	Hs.10842	1434.8	PP	2597	PP
ENSG00000120948	TARDBP	Hs.300624	735	PP	992.75	PP
ENSG00000140416	TPM1	Hs.133892	394.4	PP	661.4	PP
ENSG00000043514	TRIT1	Hs.356554	335.4	PP	168.4	PP
ENSG00000131508	UBE2D2	Hs.108332	400.1	PP	512.05	PA
ENSG00000118900	UBN1	Hs.440219	138.4	PP	302.15	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000165029	ABCA1	Hs.429294	175.1	PP	156.5	PP
ENSG00000084234	APLP2	Hs.370247	1126.7	PP	668.55	PP
ENSG00000142192	APP	Hs.434980	154.6	PP	154.1	PP
ENSG00000095139	ARCN1	Hs.33642	285	PP	317.05	PP
ENSG00000143761	ARF1	Hs.286221	1245.2	PP	798.4	PP
ENSG00000175220	ARHGAP1	Hs.138860	594	PP	502.3	PP
ENSG00000111875	ASF1A	Hs.292316	126.5	PP	114.6	PP
ENSG00000154518	ATP5G3	Hs.429	1112	PP	1334.45	PP
ENSG00000155096	AZIN1	Hs.459106	551.2	PP	619.2	PP
ENSG00000095739	BAMBI	Hs.533336	207.8	PP	106.85	PP
ENSG00000029363	BCLAF1	Hs.486542	659.8	PP	1252.25	PP
ENSG00000145741	BTF3	Hs.529798	6371.5	PP	4884.45	PP
ENSG00000133639	BTG1	Hs.255935	955.9	PP	1057.95	PP
ENSG00000119906	C10orf6	Hs.447458	154.8	PP	126.8	PP
ENSG00000110075	C11orf23	Hs.503022	402.6	PP	319.5	PA

ENSG00000116489	CAPZA1	Hs.514934	766.7	PP	1165.8	PP
ENSG00000113328	CCNG1	Hs.79101	1025	PP	737.8	PP
ENSG00000163660	CCNL1	Hs.4859	1082.6	PP	1052.5	PP
ENSG00000082258	CCNT2	Hs.292754	114.4	PP	102.75	PP
ENSG00000166226	CCT2	Hs.189772	166.1	PP	259.15	PP
ENSG00000070831	CDC42	Hs.467637	620.1	PP	437.75	PP
ENSG00000111642	CHD4	Hs.162233	299.5	PP	431.1	PP
ENSG00000111596	CNOT2	Hs.133350	431.4	PP	399.2	PP
ENSG00000166200	COPS2	Hs.369614	521.2	PP	700.65	PP
ENSG00000167193	CRK	Hs.461896	114.9	PP	153.9	PP
ENSG00000108848	CROP	Hs.130293	2166.4	PP	1637.55	PA
ENSG00000009307	CSDE1	Hs.69855	1494.1	PP	1637.9	PP
ENSG00000103653	CSK	Hs.77793	348.1	PP	217.35	PA
ENSG00000102974	CTCF	Hs.368367	506.1	PP	535.55	PP
ENSG00000036257	CUL3	Hs.372286	554.5	PP	473.25	PP
ENSG00000160967	CUTL1	Hs.438974	333.3	PP	412.55	PP
ENSG00000071626	DAZAP1	Hs.222510	49.7	PP	130.7	PA
ENSG00000183283	DAZAP2	Hs.369761	1267.2	PP	976.7	PP
ENSG00000124487	DDX3X	Hs.380774	769.8	PP	1229	PP
ENSG00000108654	DDX5	Hs.279806	3052	PP	3508.95	PP
ENSG00000109606	DHX15	Hs.5683	1219.8	PP	1620.75	PP
ENSG00000112242	E2F3	Hs.269408	295.6	PP	585.95	PP
ENSG00000092847	EIF2C1	Hs.22867	292.5	PP	296.95	PP
ENSG00000104131	EIF3S1	Hs.404056	340.4	PP	365.05	PP
ENSG00000107581	EIF3S10	Hs.523299	522.9	PP	586.55	PP
ENSG00000151247	EIF4E	Hs.249718	156.7	PP	224	PP
ENSG00000110321	EIF4G2	Hs.183684	2137	PP	2701.9	PP
ENSG00000106462	EZH2	Hs.444082	162.9	PP	216.25	PP
ENSG00000139146	FAM60A	Hs.505154	598.1	PP	788	PP
ENSG00000173120	FBXL11	Hs.124147	237	PP	192.5	PP
ENSG00000118564	FBXL5	Hs.479208	410.6	PP	319.15	PP
ENSG00000138081	FBXO11	Hs.553547	155.7	PP	259.35	PP
ENSG00000022267	FHL1	Hs.435369	5240	PP	3151.75	PP
ENSG00000170345	FOS	Hs.25647	1254.3	PP	1832.65	PP
ENSG00000150907	FOXO1A	Hs.370666	253.6	PP	140.95	PP
ENSG00000114861	FOXP1	Hs.431498	322.7	PP	410.3	PP
ENSG00000163430	FSTL1	Hs.269512	408.6	PP	227.95	PP
ENSG00000143641	GALNT2	Hs.300834	321.4	PP	333.55	PP
ENSG00000057608	GDI2	Hs.299055	198.2	PP	260.65	PP
ENSG00000115806	GORASP2	Hs.431317	359.7	PP	304.85	PP
ENSG00000110768	GTF2H1	Hs.523510	167.7	PP	191.7	PP
ENSG00000143321	HDGF	Hs.506748	243.6	PP	858.8	PP
ENSG00000051108	HERPUD1	Hs.146393	253	PP	588.95	PP
ENSG00000010818	HIVEP2	Hs.510172	149.6	PP	157.9	PP
ENSG00000029993	HMGB3	Hs.19114	309	PP	460.6	PP
ENSG00000122566	HNRPA2B1	Hs.487774	1802.2	PP	2268.3	PP
ENSG00000170144	HNRPA3	Hs.516539	375.5	PP	558.6	PP
ENSG00000096746	HNRPH3	Hs.499891	408.7	PP	635.5	PP
ENSG00000099783	HNRPM	Hs.465808	968.5	PP	880.2	PP
ENSG00000125944	HNRPR	Hs.373763	839.4	PP	980.1	PP
ENSG00000153187	HNRPU	Hs.166463	470.3	PP	887.6	PP
ENSG00000105323	HNRPUL1	Hs.155218	406.9	PP	401.15	PP
ENSG00000173744	HRB	Hs.443507	202.6	PP	405.7	PP

ENSG00000067829	IDH3G	Hs.410197	249.2	PP	156.95	PA
ENSG00000070061	IKBKAP	Hs.494738	157.6	PP	208.95	PP
ENSG00000115548	JMJD1A	Hs.531819	264	PP	207.05	PP
ENSG00000177606	JUN	Hs.525704	1300.5	PP	2286.95	PP
ENSG00000170852	KBTBD2	Hs.372541	412.2	PP	381.65	PP
ENSG00000121774	KHDRBS1	Hs.445893	1363	PP	1395.2	PP
ENSG00000102753	KPNA3	Hs.527919	250.8	PP	391.35	PP
ENSG00000108424	KPNB1	Hs.532793	415.1	PP	709.85	PP
ENSG00000160789	LMNA	Hs.491359	309.3	PP	352.9	PP
ENSG00000121104	LOC81558	Hs.514308	3067.5	PP	1370.7	PP
ENSG00000163818	LZTFL1	Hs.30824	199	PP	253.95	PP
ENSG00000173327	MAP3K11	Hs.502872	355.1	PP	326.8	PP
ENSG00000104814	MAP4K1	Hs.95424	586.5	PP	231.45	PP
ENSG00000101367	MAPRE1	Hs.472437	196.1	PP	206.85	PM
ENSG00000136536	7-Mar	Hs.529272	175.3	PP	173.1	PP
ENSG00000165406	8-Mar	Hs.499489	295.9	PP	295.85	PP
ENSG00000166986	MARS	Hs.355867	460.7	PP	614.95	PP
ENSG00000168906	MAT2A	Hs.516157	1011.4	PP	738.6	PP
ENSG00000038274	MAT2B	Hs.54642	609.4	PP	461.9	PP
ENSG00000081189	MEF2C	Hs.444409	426	PP	437.85	PP
ENSG00000143995	**MEIS1**	Hs.526754	452.1	PP	262.65	PP
ENSG00000133606	MKRN1	Hs.490347	392.7	PP	350.15	PP
ENSG00000100330	MTMR3	Hs.474536	204.7	PP	287	PP
ENSG00000108389	MTMR4	Hs.514373	330.7	PP	407.2	PP
ENSG00000133026	MYH10	Hs.16355	375.1	PP	362.5	PP
ENSG00000136504	MYST2	Hs.21907	331.7	PP	192.25	PP
ENSG00000166579	NDEL1	Hs.372123	218.3	PP	187.2	PP
ENSG00000125356	NDUFA1	Hs.534168	2121.1	PP	1598.7	PP
ENSG00000069869	NEDD4	Hs.1565	186.1	PP	193.9	PP
ENSG00000082641	NFE2L1	Hs.514284	735.5	PP	726.35	PP
ENSG00000120837	NFYB	Hs.84928	204.1	PP	272.85	PP
ENSG00000164190	NIPBL	Hs.481927	165.1	PP	145.15	PP
ENSG00000137420	NOL7	Hs.549161	1095.5	PP	1222.05	PP
ENSG00000181163	NPM1	Hs.519452	8905.6	PP	11897.7	PP
ENSG00000181163	NPM1	Hs.519452	2088.9	PP	2381.65	PP
ENSG00000153234	NR4A2	Hs.165258	124.6	PP	242.85	PP
ENSG00000046651	OFD1	Hs.6483	1022.7	PP	692.15	PP
ENSG00000141447	OSBPL1A	Hs.370725	204.6	PP	211.75	PP
ENSG00000090060	PAPOLA	Hs.253726	307.4	PP	286	PP
ENSG00000115421	PAPOLG	Hs.387471	153.2	PP	91.25	PP
ENSG00000157212	PAXIP1	Hs.443881	139.4	PP	130.7	PP
ENSG00000056661	PCGF2	Hs.371617	231.6	PP	160.8	PP
ENSG00000185619	PCGF3	Hs.144309	192.1	PP	237.55	PP
ENSG00000059758	PCTK2	Hs.506415	118.3	PP	220.9	PP
ENSG00000164040	PGRMC2	Hs.507910	89.1	PP	87.85	PM
ENSG00000025293	PHF20	Hs.517044	249.8	PP	173.65	PP
ENSG00000181191	PJA1	Hs.522679	316.3	PP	332.1	PP
ENSG00000136040	PLXNC1	Hs.551522	354.6	PP	387.1	PP
ENSG00000100941	PNN	Hs.409965	839.5	PP	617.3	PP
ENSG00000163806	PPP1CB	Hs.468018	65.7	PP	135.05	PP
ENSG00000113575	PPP2CA	Hs.483408	360	PP	370.4	PP
ENSG00000107758	PPP3CB	Hs.500067	318.9	PP	241.25	PP
ENSG00000119414	PPP6C	Hs.495128	297.5	PP	557.55	PP

ENSG00000116731	PRDM2	Hs.371823	329.6	PP	175.6	PP
ENSG00000100519	PSMC6	Hs.156171	143.7	PP	216.4	PP
ENSG00000125818	PSMF1	Hs.471917	254.5	PP	259.45	PP
ENSG00000175354	PTPN2	Hs.123352	759.9	PP	273	PP
ENSG00000134644	PUM1	Hs.281707	378.4	PP	422.3	PP
ENSG00000130508	PXDN	Hs.332197	280.3	PP	114.7	PA
ENSG00000112531	QKI	Hs.510324	284.1	PP	564.45	PP
ENSG00000103769	RAB11A	Hs.321541	1087.7	PP	1020.15	PP
ENSG00000119396	RAB14	Hs.371563	140.5	PP	198.15	PP
ENSG00000111540	RAB5B	Hs.77690	234.1	PP	216.45	PP
ENSG00000175582	RAB6A	Hs.503222	371.4	PP	365.75	PP
ENSG00000119318	RAD23B	Hs.521640	156.2	PP	211.05	PP
ENSG00000132341	RAN	Hs.10842	1434.8	PP	2597	PP
ENSG00000127314	RAP1B	Hs.369920	1093.1	PP	1537.75	PP
ENSG00000109756	RAPGEF2	Hs.113912	394.9	PP	551.95	PP
ENSG00000123091	RNF11	Hs.309641	125.3	PP	161.5	PP
ENSG00000127870	RNF6	Hs.136885	74.1	PP	122.9	PP
ENSG00000043093	RP42	Hs.104613	236.5	PP	204.45	PP
ENSG00000100784	RPS6KA5	Hs.510225	152.1	PP	132.75	PP
ENSG00000148484	RSU1	Hs.524161	298.8	PP	294.55	PP
ENSG00000159216	RUNX1	Hs.149261	108.8	PP	211.2	PP
ENSG00000163602	RYBP	Hs.7910	398	PP	462.8	PP
ENSG00000079332	SARA1	Hs.499960	233.7	PP	442.85	PP
ENSG00000151967	SCHIP1	Hs.134665	497	PP	417.95	PP
ENSG00000179833	SERTAD2	Hs.77293	498.4	PP	556.2	PP
ENSG00000119335	SET	Hs.436687	2967	PP	4307.1	PP
ENSG00000162105	SHANK2	Hs.268726	137.1	PP	128.55	PP
ENSG00000096717	SIRT1	Hs.369779	133.8	PP	124.9	PP
ENSG00000113558	SKP1A	Hs.171626	657.2	PP	969.15	PP
ENSG00000075415	SLC25A3	Hs.290404	2025.9	PP	2749.5	PP
ENSG00000059804	SLC2A3	Hs.419240	275.9	PP	351.5	PP
ENSG00000080503	SMARCA2	Hs.298990	264.4	PP	201.3	PP
ENSG00000173473	SMARCC1	Hs.476179	487	PP	483.35	PP
ENSG00000120833	SOCS2	Hs.485572	715.8	PP	806.65	PP
ENSG00000159140	SON	Hs.517262	408.8	PP	467.15	PP
ENSG00000137642	SORL1	Hs.368592	2264.1	PP	1084.65	PP
ENSG00000124766	SOX4	Hs.357901	2351.7	PP	2500.65	PP
ENSG00000008294	SPAG9	Hs.463439	180.3	PP	209.9	PP
ENSG00000168610	STAT3	Hs.463059	401.7	PP	390.05	PP
ENSG00000132718	SYT11	Hs.32984	106.3	PP	102.95	PP
ENSG00000108264	TADA2L	Hs.500066	108	PP	97.9	PA
ENSG00000120948	TARDBP	Hs.300624	735	PP	992.75	PP
ENSG00000106052	TAX1BP1	Hs.34576	550	PP	486.2	PP
ENSG00000113649	TCERG1	Hs.443465	196.5	PP	257.25	PP
ENSG00000101337	TM9SF4	Hs.529360	129.2	PP	121.3	PP
ENSG00000170348	TMP21	Hs.74137	293.5	PP	280.3	PA
ENSG00000083312	TNPO1	Hs.482497	483	PP	750.85	PP
ENSG00000102804	TSC22D1	Hs.450972	1492.8	PP	2518.9	PP
ENSG00000117289	TXNIP	Hs.533977	698.8	PP	1099.3	PP
ENSG00000150991	UBC	Hs.520348	2138.1	PP	2607.15	PP
ENSG00000119048	UBE2B	Hs.385986	335	PP	417.45	PP
ENSG00000170035	UBE2E3	Hs.470804	311.5	PP	258.25	PP
ENSG00000009335	UBE3C	Hs.118351	67.5	PP	175.9	PM

ENSG00000077254	USP33	Hs.480597	228.7	PP	299.75	PP
ENSG00000134215	VAV3	Hs.267659	615.4	PP	341.3	PP
ENSG00000026025	VIM	Hs.533317	4064.1	PP	2437.95	PP
ENSG00000132716	WDR42A	Hs.492236	195.9	PP	233.1	PP
ENSG00000166913	YWHAB	Hs.279920	222.4	PP	288.75	PP
ENSG00000107372	ZA20D2	Hs.406096	967.2	PP	1262.9	PP
ENSG00000185650	ZFP36L1	Hs.85155	94.5	PP	140.7	PP
ENSG00000015171	ZMYND11	Hs.292265	403.3	PP	784.1	PP
ENSG00000114514	ZNF148	Hs.380334	211.6	PP	226.65	PP
ENSG00000169714	ZNF9	Hs.518249	1408.6	PP	1399.55	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000165029	ABCA1	Hs.429294	175.1	PP	156.5	PP
ENSG00000170776	AKAP13	Hs.459211	192.3	PP	198.75	PA
ENSG00000117020	AKT3	Hs.498292	246.4	PP	259.35	PP
ENSG00000133805	AMPD3	Hs.501890	253.6	PP	285.4	PP
ENSG00000107104	ANKRD15	Hs.493272	235.2	PP	131.45	PP
ENSG00000182287	AP1S2	Hs.121592	292	PP	269.6	PP
ENSG00000142192	APP	Hs.434980	154.6	PP	154.1	PP
ENSG00000143761	ARF1	Hs.286221	1245.2	PP	798.4	PP
ENSG00000175220	ARHGAP1	Hs.138860	594	PP	502.3	PP
ENSG00000104880	ARHGEF18	Hs.465763	366	PP	254.9	PA
ENSG00000054267	ARID4B	Hs.533633	227	PP	252.45	PP
ENSG00000188042	ARL7	Hs.111554	240.7	PP	203.4	PP
ENSG00000111875	ASF1A	Hs.292316	126.5	PP	114.6	PP
ENSG00000095739	BAMBI	Hs.533336	207.8	PP	106.85	PP
ENSG00000029363	BCLAF1	Hs.486542	659.8	PP	1252.25	PP
ENSG00000133639	BTG1	Hs.255935	955.9	PP	1057.95	PP
ENSG00000159388	BTG2	Hs.519162	588.2	PP	538.3	PP
ENSG00000154640	BTG3	Hs.473420	315.6	PP	378.5	PP
ENSG00000110075	C11orf23	Hs.503022	402.6	PP	319.5	PA
ENSG00000141452	C18orf8	Hs.529006	232.8	PP	242.05	PP
ENSG00000105176	C19orf2	Hs.466391	501.6	PP	404.65	PP
ENSG00000117616	C1orf63	Hs.259412	1202.1	PP	1000.85	PP
ENSG00000110888	C1QDC1	Hs.234355	291.3	PP	261.05	PP
ENSG00000127022	CANX	Hs.529890	1003.1	PP	2097.75	PP
ENSG00000127022	CANX	Hs.529890	253.4	PP	361.2	PP
ENSG00000118971	CCND2	Hs.376071	1114.1	PP	1244.6	PA
ENSG00000113328	CCNG1	Hs.79101	1025	PP	737.8	PP
ENSG00000138764	CCNG2	Hs.13291	120.9	PP	268.8	PP
ENSG00000163660	CCNL1	Hs.4859	1082.6	PP	1052.5	PP
ENSG00000082258	CCNT2	Hs.292754	114.4	PP	102.75	PP
ENSG00000110848	CD69	Hs.208854	1631.5	PP	1082.1	PP
ENSG00000143126	CELSR2	Hs.57652	215.4	PP	148.65	PP
ENSG00000177200	CHD9	Hs.530936	222.6	PP	263	PP
ENSG00000131873	CHSY1	Hs.110488	404.5	PP	490.95	PP
ENSG00000162368	CMPK	Hs.11463	333.8	PP	336.55	PP
ENSG00000198791	CNOT7	Hs.170553	250.3	PP	508.5	PP
ENSG00000121058	COIL	Hs.532795	134.2	PP	210.15	PP

ENSG00000167193	CRK	Hs.461896	114.9	PP	153.9	PP
ENSG00000108848	CROP	Hs.130293	2166.4	PP	1637.55	PP
ENSG00000103653	CSK	Hs.77793	348.1	PP	217.35	PA
ENSG00000102974	CTCF	Hs.368367	506.1	PP	535.55	PP
ENSG00000048740	CUGBP2	Hs.309288	159.6	PP	334.5	PP
ENSG00000183283	DAZAP2	Hs.369761	1267.2	PP	976.7	PP
ENSG00000124487	DDX3X	Hs.380774	769.8	PP	1229	PP
ENSG00000108654	DDX5	Hs.279806	3052	PP	3508.95	PP
ENSG00000105993	DNAJB6	Hs.490745	189.7	PP	348.5	PP
ENSG00000128590	DNAJB9	Hs.6790	211.5	PP	433.55	PP
ENSG00000092964	DPYSL2	Hs.173381	505.1	PP	495.1	PP
ENSG00000139318	DUSP6	Hs.298654	166.6	PP	316.85	PP
ENSG00000157540	DYRK1A	Hs.368240	367.8	PP	751.2	PP
ENSG00000112242	E2F3	Hs.269408	295.6	PP	585.95	PP
ENSG00000104517	EDD1	Hs.492445	254.6	PP	227.15	PP
ENSG00000120738	EGR1	Hs.326035	128.6	PP	290.15	PP
ENSG00000092847	EIF2C1	Hs.22867	292.5	PP	296.95	PP
ENSG00000104131	EIF3S1	Hs.404056	340.4	PP	365.05	PP
ENSG00000107581	EIF3S10	Hs.523299	522.9	PP	586.55	PP
ENSG00000151247	EIF4E	Hs.249718	156.7	PP	224	PP
ENSG00000110321	EIF4G2	Hs.183684	2137	PP	2701.9	PP
ENSG00000109381	ELF2	Hs.260903	150.8	PP	152.4	PP
ENSG00000111145	ELK3	Hs.46523	372.1	PP	280.75	PP
ENSG00000050405	EPLIN	Hs.525419	265.5	PP	309.7	PP
ENSG00000124882	EREG	Hs.115263	351.8	PP	535.15	PP
ENSG00000120705	ETF1	Hs.483494	253.8	PP	461.55	PP
ENSG00000108799	EZH1	Hs.194669	211.4	PP	194.45	PP
ENSG00000106462	EZH2	Hs.444082	162.9	PP	216.25	PP
	FAM45B ///					
ENSG00000119979	FAM45A	Hs.434241	554.8	PP	690.2	PP
ENSG00000139146	FAM60A	Hs.505154	598.1	PP	788	PP
ENSG00000173120	FBXL11	Hs.124147	237	PP	192.5	PP
ENSG00000118564	FBXL5	Hs.479208	410.6	PP	319.15	PP
ENSG00000138081	FBXO11	Hs.553547	155.7	PP	259.35	PP
ENSG00000143756	FBXO28	Hs.64691	106.1	PP	70.5	PA
ENSG00000022267	FHL1	Hs.435369	5240	PP	3151.75	PP
ENSG00000111011	FLJ11021	Hs.432996	202	PP	392.6	PP
ENSG00000109920	FNBP4	Hs.6834	501.2	PP	497.2	PP
ENSG00000198815	FOXJ3	Hs.26023	458.7	PP	380.45	PP
ENSG00000114416	FXR1	Hs.478407	143.9	PP	155.75	PP
ENSG00000145907	G3BP	Hs.3353	167.7	PP	319.25	PP
ENSG00000104064	GABPB2	Hs.546852	129.3	PP	183.75	PM
ENSG00000143641	GALNT2	Hs.300834	321.4	PP	333.55	PP
ENSG00000196700	GM632	Hs.551552	103.5	PP	145.05	PP
ENSG00000113384	GOLPH3	Hs.408909	585.8	PP	782.9	PP
ENSG00000112406	HECA	Hs.197644	352.2	PP	377.45	PP
ENSG00000100644	HIF1A	Hs.509554	866.5	PP	1037.1	PP
ENSG00000010818	HIVEP2	Hs.510172	149.6	PP	157.9	PP
ENSG00000029993	HMGB3	Hs.19114	309	PP	460.6	PP
ENSG00000122566	HNRPA2B1	Hs.487774	1802.2	PP	2268.3	PP
ENSG00000096746	HNRPH3	Hs.499891	408.7	PP	635.5	PP
ENSG00000153187	HNRPU	Hs.166463	470.3	PP	887.6	PP
ENSG00000164164	HSHIN1	Hs.270851	303.1	PP	312.65	PP

ENSG00000067829	IDH3G	Hs.410197	249.2	PP	156.95	PA
ENSG00000168556	ING2	Hs.107153	177	PP	151.85	PP
ENSG00000125347	IRF1	Hs.436061	467.7	PP	299.6	PP
ENSG00000116679	IVNS1ABP	Hs.497183	251.6	PP	288.25	PP
ENSG00000117139	JARID1B	Hs.443650	203.6	PP	353.6	PP
ENSG00000115548	JMJD1A	Hs.531819	264	PP	207.05	PP
ENSG00000177606	JUN	Hs.525704	1300.5	PP	2286.95	PP
ENSG00000137944	KAT3	Hs.481898	518.7	PP	319.8	PP
ENSG00000121774	KHDRBS1	Hs.445893	1363	PP	1395.2	PP
ENSG00000143702	KIAA0470	Hs.533635	146.2	PP	325	PP
ENSG00000102753	KPNA3	Hs.527919	250.8	PP	391.35	PP
ENSG00000068697	LAPTM4A	Hs.467807	1059.2	PP	1145.5	PP
ENSG00000172292	LASS6	Hs.506829	536.2	PP	463.8	PP
ENSG00000121104	LOC81558	Hs.514308	3067.5	PP	1370.7	PP
ENSG00000123684	LPGAT1	Hs.497674	106	PP	114.3	PP
ENSG00000171492	LRRC8D	Hs.482087	543.3	PP	374.45	PP
ENSG00000163818	LZTFL1	Hs.30824	199	PP	253.95	PP
ENSG00000003056	M6PR	Hs.134084	566.2	PP	575.55	PP
ENSG00000187391	MAGI2	Hs.488945	93	PP	59.4	PA
ENSG00000173327	MAP3K11	Hs.502872	355.1	PP	326.8	PP
ENSG00000197442	MAP3K5	Hs.186486	227.6	PP	272.25	PP
ENSG00000104814	MAP4K1	Hs.95424	586.5	PP	231.45	PP
ENSG00000135525	MAP7	Hs.486548	325.7	PP	390.1	PP
ENSG00000101367	MAPRE1	Hs.472437	196.1	PP	206.85	PM
ENSG00000166974	MAPRE2	Hs.532824	857.4	PP	715.5	PP
ENSG00000145495	6-Mar	Hs.432862	597.3	PP	536.05	PP
ENSG00000165406	8-Mar	Hs.499489	295.9	PP	295.85	PP
ENSG00000038274	MAT2B	Hs.54642	609.4	PP	461.9	PP
ENSG00000015479	MATR3	Hs.268939	252.4	PP	382.35	PP
ENSG00000124733	MEA1	Hs.278362	452.7	PP	460.2	PP
ENSG00000081189	MEF2C	Hs.444409	426	PP	437.85	PP
ENSG00000138092	MGC11266	Hs.546428	152.2	PP	90.95	PA
ENSG00000198408	MGEA5	Hs.500842	363.7	PP	363.05	PP
ENSG00000133606	MKRN1	Hs.490347	392.7	PP	350.15	PP
ENSG00000185787	MORF4L1	Hs.374503	3350.8	PP	4457.05	PP
ENSG00000100330	MTMR3	Hs.474536	204.7	PP	287	PP
ENSG00000108389	MTMR4	Hs.514373	330.7	PP	407.2	PP
ENSG00000005810	MYCBP2	Hs.151411	187	PP	643.55	PP
ENSG00000132780	NASP	Hs.319334	273.5	PP	312.4	PP
ENSG00000158747	NBL1	Hs.439671	370.3	PP	360.6	PA
ENSG00000166579	NDEL1	Hs.372123	218.3	PP	187.2	PP
ENSG00000125356	NDUFA1	Hs.534168	2121.1	PP	1598.7	PP
ENSG00000069869	NEDD4	Hs.1565	186.1	PP	193.9	PP
ENSG00000120837	NFYB	Hs.84928	204.1	PP	272.85	PP
ENSG00000137420	NOL7	Hs.549161	1095.5	PP	1222.05	PP
ENSG00000149308	NPAT	Hs.171061	171.1	PP	140.65	PP
ENSG00000153234	NR4A2	Hs.165258	124.6	PP	242.85	PP
ENSG00000141447	OSBPL1A	Hs.370725	204.6	PP	211.75	PP
ENSG00000090060	PAPOLA	Hs.253726	307.4	PP	286	PP
ENSG00000157212	PAXIP1	Hs.443881	139.4	PP	130.7	PP
ENSG00000197111	PCBP2	Hs.546271	2032.3	PP	1761.15	PP
ENSG00000185619	PCGF3	Hs.144309	192.1	PP	237.55	PP
ENSG00000059758	PCTK2	Hs.506415	118.3	PP	220.9	PP

ENSG00000114209	PDCD10	Hs.478150	463.6	PP	560.4	PP
ENSG00000112511	PHF1	Hs.166204	903.7	PP	604.1	PP
ENSG00000166037	PIG8	Hs.101014	356.2	PP	374.1	PP
ENSG00000145675	PIK3R1	Hs.132225	249.1	PP	181	PP
ENSG00000171033	PKIA	Hs.433700	88.6	PP	131.05	PP
ENSG00000136040	PLXNC1	Hs.551522	354.6	PP	387.1	PP
ENSG00000100941	PNN	Hs.409965	839.5	PP	617.3	PP
ENSG00000113575	PPP2CA	Hs.483408	360	PP	370.4	PP
ENSG00000078304	PPP2R5C	Hs.368264	174.9	PP	165.25	PP
ENSG00000138814	PPP3CA	Hs.435512	122.5	PP	205	PP
ENSG00000107758	PPP3CB	Hs.500067	318.9	PP	241.25	PP
ENSG00000119414	PPP6C	Hs.495128	297.5	PP	557.55	PP
ENSG00000116731	PRDM2	Hs.371823	329.6	PP	175.6	PP
ENSG00000005249	PRKAR2B	Hs.433068	200.7	PP	237.75	PP
ENSG00000171862	PTEN	Hs.500466	353.7	PP	334.4	PP
ENSG00000112245	PTP4A1	Hs.227777	439.5	PP	431.2	PP
ENSG00000175354	PTPN2	Hs.123352	759.9	PP	273	PP
ENSG00000134644	PUM1	Hs.281707	378.4	PP	422.3	PP
ENSG00000185129	PURA	Hs.443121	149.5	PP	224.95	PP
ENSG00000130508	PXDN	Hs.332197	280.3	PP	114.7	PA
ENSG00000112531	QKI	Hs.510324	284.1	PP	564.45	PP
ENSG00000103769	RAB11A	Hs.321541	1087.7	PP	1020.15	PP
ENSG00000119396	RAB14	Hs.371563	140.5	PP	198.15	PP
ENSG00000111737	RAB35	Hs.524788	394.6	PP	431.2	PP
ENSG00000111540	RAB5B	Hs.77690	234.1	PP	216.45	PP
ENSG00000175582	RAB6A	Hs.503222	371.4	PP	365.75	PP
ENSG00000119318	RAD23B	Hs.521640	156.2	PP	211.05	PP
ENSG00000127314	RAP1B	Hs.369920	1093.1	PP	1537.75	PP
ENSG00000109756	RAPGEF2	Hs.113912	394.9	PP	551.95	PP
ENSG00000101265	RASSF2	Hs.379970	129.4	PP	203.9	PP
ENSG00000139687	RB1	Hs.408528	152.7	PP	153.35	PP
ENSG00000102054	RBBP7	Hs.495755	942.6	PP	1356.35	PP
ENSG00000103479	RBL2	Hs.513609	203.5	PP	188.25	PP
ENSG00000089902	RCOR1	Hs.510521	118.3	PP	144.05	PP
ENSG00000082996	RNF13	Hs.12333	230.9	PP	344.6	PP
ENSG00000063978	RNF4	Hs.66394	115.8	PP	325.65	PP
ENSG00000127870	RNF6	Hs.136885	74.1	PP	122.9	PP
ENSG00000043093	RP42	Hs.104613	236.5	PP	204.45	PP
ENSG00000117748	RPA2	Hs.79411	289.9	PP	378.45	PP
ENSG00000117676	RPS6KA1	Hs.149957	288.1	PP	176.7	PA
ENSG00000100784	RPS6KA5	Hs.510225	152.1	PP	132.75	PP
ENSG00000159216	RUNX1	Hs.149261	108.8	PP	211.2	PP
ENSG00000163602	RYBP	Hs.7910	398	PP	462.8	PP
ENSG00000079332	SARA1	Hs.499960	233.7	PP	442.85	PP
ENSG00000140497	SCAMP2	Hs.458917	411.8	PP	495	PP
ENSG00000137575	SDCBP	Hs.200804	934	PP	955.25	PP
ENSG00000120742	SERP1	Hs.518326	285.7	PP	343.4	PP
ENSG00000179833	SERTAD2	Hs.77293	498.4	PP	556.2	PP
ENSG00000119335	SET	Hs.436687	2967	PP	4307.1	PP
ENSG00000112081	SFRS3	Hs.405144	884.9	PP	923.3	PP
ENSG00000096717	SIRT1	Hs.369779	133.8	PP	124.9	PP
ENSG00000134294	SLC38A2	Hs.221847	634.3	PP	1026.55	PP
ENSG00000080493	SLC4A4	Hs.5462	124.5	PP	268.4	PP

ENSG00000080503	SMARCA2	Hs.298990	264.4	PP	201.3	PP
ENSG00000159140	SON	Hs.517262	408.8	PP	467.15	PP
ENSG00000137642	SORL1	Hs.368592	2264.1	PP	1084.65	PP
ENSG00000115904	SOS1	Hs.278733	144	PP	169.4	PP
ENSG00000196700	SOX18	Hs.8619	1264.6	PP	2674	PP
ENSG00000096063	SRPK1	Hs.443861	231.6	PP	200.5	PP
ENSG00000168610	STAT3	Hs.463059	401.7	PP	390.05	PP
ENSG00000112079	STK38	Hs.409578	365.8	PP	304.4	PP
ENSG00000132718	SYT11	Hs.32984	106.3	PP	102.95	PP
ENSG00000106052	TAX1BP1	Hs.34576	550	PP	486.2	PP
ENSG00000100207	TCF20	Hs.475018	251.3	PP	281.15	PP
ENSG00000152291	TGOLN2	Hs.14894	430.2	PP	542.8	PP
ENSG00000123066	THRAP2	Hs.159799	142.1	PP	396.2	PP
ENSG00000106829	TLE4	Hs.444213	309.2	PP	251.15	PP
ENSG00000106537	TM4SF13	Hs.364544	275.4	PP	526.45	PP
ENSG00000117289	TXNIP	Hs.533977	698.8	PP	1099.3	PP
ENSG00000119048	UBE2B	Hs.385986	335	PP	417.45	PP
ENSG00000170035	UBE2E3	Hs.470804	311.5	PP	258.25	PP
ENSG00000132388	UBE2G1	Hs.462035	272.5	PP	373.45	PP
ENSG00000198833	UBE2J1	Hs.163776	342.7	PP	357.2	PP
ENSG00000114062	UBE3A	Hs.22543	456.9	PP	470.75	PP
ENSG00000009335	UBE3C	Hs.118351	67.5	PP	175.9	PM
ENSG00000153560	UBP1	Hs.118041	280.2	PP	408.6	PP
ENSG00000170832	USP32	Hs.132868	120.2	PP	118.35	PP
ENSG00000173218	VANGL1	Hs.515130	73.8	PP	89.5	PA
ENSG00000144560	VGLL4	Hs.373959	299.7	PP	175.6	PP
ENSG00000122958	VPS26	Hs.499925	508.7	PP	610	PP
ENSG00000132716	WDR42A	Hs.492236	195.9	PP	233.1	PP
ENSG00000134308	YWHAQ	Hs.74405	922.3	PP	2337.65	PP
ENSG00000100811	YY1	Hs.388927	539.7	PP	740.2	PP
ENSG00000066422	ZBTB11	Hs.301956	137.1	PP	100.65	PP
ENSG00000152518	ZFP36L2	Hs.503093	4553.7	PP	5205.6	PP
ENSG00000015171	ZMYND11	Hs.292265	403.3	PP	784.1	PP
ENSG00000167635	ZNF146	Hs.301819	293.3	PP	396.15	PP
ENSG00000114514	ZNF148	Hs.380334	211.6	PP	226.65	PP
ENSG00000136451	ZNF161	Hs.463569	140.5	PP	193.4	PP
ENSG00000179456	ZNF238	Hs.69997	235.7	PP	241.8	PP
ENSG00000169155	ZNF297B	Hs.355581	115.9	PP	112.4	PA
ENSG00000169714	ZNF9	Hs.518249	1408.6	PP	1399.55	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000114770	ABCC5	Hs.368563	373.4	PP	322.1	PM
ENSG00000184009	ACTG1	Hs.514581	11731	PP	14874	PP
ENSG00000151320	AKAP6	Hs.509083	137.8	PP	117.05	PP
ENSG00000145020	AMT	Hs.102	345.8	PP	323.85	PM
ENSG00000062725	APPBP2	Hs.84084	106.4	PP	116.15	PA
ENSG00000175220	ARHGAP1	Hs.138860	594	PP	502.3	PP

ENSG00000116539	ASH1L	Hs.491060	244.1	PP	214.3	PA
ENSG00000171456	ASXL1	Hs.374043	275.6	PP	307.25	PP
ENSG00000082153	BZW1	Hs.355983	536.1	PP	794.1	PP
ENSG00000139746	C13orf10	Hs.131715	119.8	PP	178.7	PP
ENSG00000104327	CALB1	Hs.65425	79.6	PP	42.05	PA
ENSG00000131236	CAP1	Hs.370581	765.9	PP	691	PP
ENSG00000118971	CCND2	Hs.376071	1114.1	PP	1244.6	PP
ENSG00000112576	CCND3	Hs.534307	539.8	PP	402.15	PP
ENSG00000111642	CHD4	Hs.162233	299.5	PP	431.1	PP
ENSG00000100528	CNIH	Hs.294603	252.6	PP	391.7	PP
ENSG00000009307	CSDE1	Hs.69855	1494.1	PP	1637.9	PP
ENSG00000101266	CSNK2A1	Hs.446484	170.4	PP	261.4	PP
ENSG00000159692	CTBP1	Hs.208597	253.9	PP	309.4	PP
ENSG00000161202	DVL3	Hs.388116	134.8	PP	206.95	PP
ENSG00000092847	EIF2C1	Hs.22867	292.5	PP	296.95	PP
ENSG00000123908	EIF2C2	Hs.449415	150.2	PP	115.85	PP
ENSG00000104131	EIF3S1	Hs.404056	340.4	PP	365.05	PP
ENSG00000109381	ELF2	Hs.260903	150.8	PP	152.4	PP
ENSG00000102034	ELF4	Hs.271940	309.2	PP	202.7	PP
ENSG00000112146	FBXO9	Hs.216653	397	PP	447.8	PA
ENSG00000100442	FKBP3	Hs.509226	386.9	PP	438.15	PP
ENSG00000143641	GALNT2	Hs.300834	321.4	PP	333.55	PP
ENSG00000108588	GK001	Hs.202011	160.3	PP	198.45	PP
ENSG00000174021	GNG5	Hs.513557	683.5	PP	869.7	PP
ENSG00000103342	GSPT1	Hs.528780	356.7	PP	369.6	PP
ENSG00000152795	HNRPDL	Hs.527105	1931.8	PP	1802.05	PP
ENSG00000109083	IFT20	Hs.4187	322.8	PP	241.4	PP
ENSG00000171988	JMJD1C	Hs.413416	107	PP	198.85	PP
ENSG00000100097	LGALS1	Hs.445351	454.5	PP	244.1	PP
ENSG00000160789	LMNA	Hs.491359	309.3	PP	352.9	PP
ENSG00000111252	LNK	Hs.506784	230.1	PP	198.8	PP
ENSG00000054219	LY75	Hs.153563	126.4	PP	175.65	PP
ENSG00000011009	LYPLA2 /// LYPLA2P1 /// LOC388499	Hs.534075	585.5	PP	486	PP
ENSG00000166963	MAP1A	Hs.194301	433.9	PP	321.4	PM
ENSG00000075413	MARK3	Hs.35828	129.9	PP	75.05	PP
ENSG00000100330	MTMR3	Hs.474536	204.7	PP	287	PP
ENSG00000138386	NAB1	Hs.107474	187.9	PP	203.9	PP
ENSG00000187109	NAP1L1	Hs.524599	1185.6	PP	1531.65	PP
ENSG00000106459	NRF1	Hs.298069	157.5	PP	126.8	PA
ENSG00000102225	PCTK1	Hs.496068	135	PP	88.45	PA
ENSG00000184588	PDE4B	Hs.198072	234.1	PP	349.5	PP
ENSG00000136040	PLXNC1	Hs.551522	354.6	PP	387.1	PP
ENSG00000056687	RGL2	Hs.509622	340.5	PP	232.1	PA
ENSG00000101782	RIOK3	Hs.445511	276.1	PP	311.7	PP
ENSG00000151967	SCHIP1	Hs.134665	497	PP	417.95	PP
ENSG00000168758	SEMA4C	Hs.516220	186.7	PP	157.95	PP
ENSG00000102038	SMARCA1	Hs.152292	101.1	PP	72.95	PA
ENSG00000145335	SNCA	Hs.271771	337.6	PP	370.9	PP
ENSG00000109332	UBE2D3	Hs.472031	471.2	PP	635.4	PP
ENSG00000135655	USP15	Hs.434951	197.3	PP	160.35	PP
ENSG00000134215	VAV3	Hs.267659	615.4	PP	341.3	PP

ENSG00000073905	VDAC1	Hs.202085	175.6	PP	289.2	PP
ENSG00000122958	VPS26	Hs.499925	508.7	PP	610	PP
ENSG00000166913	YWHAB	Hs.279920	222.4	PP	288.75	PP
ENSG00000107372	ZA20D2	Hs.406096	967.2	PP	1262.9	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000165029	ABCA1	Hs.429294	175.1	PP	156.5	PP
ENSG00000136518	ACTL6A	Hs.435326	84.2	PP	105.6	PP
ENSG00000170776	AKAP13	Hs.459211	192.3	PP	198.75	PA
ENSG00000142192	APP	Hs.434980	154.6	PP	154.1	PP
ENSG00000175220	ARHGAP1	Hs.138860	594	PP	502.3	PP
ENSG00000117713	ARID1A	Hs.468972	477.6	PP	444.8	PP
ENSG00000111875	ASF1A	Hs.292316	126.5	PP	114.6	PP
ENSG00000143153	ATP1B1	Hs.291196	132.4	PP	245.55	PP
ENSG00000095739	BAMBI	Hs.533336	207.8	PP	106.85	PP
ENSG00000029363	BCLAF1	Hs.486542	659.8	PP	1252.25	PP
ENSG00000119906	C10orf6	Hs.447458	154.8	PP	126.8	PP
ENSG00000163660	CCNL1	Hs.4859	1082.6	PP	1052.5	PP
ENSG00000082258	CCNT2	Hs.292754	114.4	PP	102.75	PP
ENSG00000143126	CELSR2	Hs.57652	215.4	PP	148.65	PP
ENSG00000162368	CMPK	Hs.11463	333.8	PP	336.55	PP
ENSG00000111596	CNOT2	Hs.133350	431.4	PP	399.2	PP
ENSG00000115944	COX7A2L	Hs.339639	1251.1	PP	1258.85	PP
ENSG00000167193	CRK	Hs.461896	114.9	PP	153.9	PP
ENSG00000108848	CROP	Hs.130293	2166.4	PP	1637.55	PP
ENSG00000103653	CSK	Hs.77793	348.1	PP	217.35	PA
ENSG00000102974	CTCF	Hs.368367	506.1	PP	535.55	PP
ENSG00000071626	DAZAP1	Hs.222510	49.7	PP	130.7	PA
ENSG00000108654	DDX5	Hs.279806	3052	PP	3508.95	PP
ENSG00000108406	DHX40	Hs.29403	233.3	PP	196.45	PP
ENSG00000128590	DNAJB9	Hs.6790	211.5	PP	433.55	PP
ENSG00000156508	EEF1A1	Hs.439552	40551	PP	40470.15	PA
ENSG00000120738	EGR1	Hs.326035	128.6	PP	290.15	PP
ENSG00000092847	EIF2C1	Hs.22867	292.5	PP	296.95	PP
ENSG00000107581	EIF3S10	Hs.523299	522.9	PP	586.55	PP
ENSG00000110321	EIF4G2	Hs.183684	2137	PP	2701.9	PP
ENSG00000111145	ELK3	Hs.46523	372.1	PP	280.75	PP
ENSG00000120616	EPC1	Hs.167805	148.9	PP	88.7	PA
ENSG00000182944	EWSR1	Hs.374477	389.7	PP	457.25	PP
ENSG00000106462	EZH2	Hs.444082	162.9	PP	216.25	PP
ENSG00000139146	FAM60A	Hs.505154	598.1	PP	788	PP
ENSG00000173120	FBXL11	Hs.124147	237	PP	192.5	PP
ENSG00000118564	FBXL5	Hs.479208	410.6	PP	319.15	PP
ENSG00000178974	FBXO34	Hs.525348	246.4	PP	254.15	PP
ENSG00000022267	FHL1	Hs.435369	5240	PP	3151.75	PP
ENSG00000150907	FOXO1A	Hs.370666	253.6	PP	140.95	PP
ENSG00000143641	GALNT2	Hs.300834	321.4	PP	333.55	PP
ENSG00000115806	GORASP2	Hs.431317	359.7	PP	304.85	PP
ENSG00000106070	GRB10	Hs.164060	550.7	PP	574.15	PP

ENSG00000112406	HECA	Hs.197644	352.2	PP	377.45	PP
ENSG00000100644	HIF1A	Hs.509554	866.5	PP	1037.1	PP
ENSG00000010818	HIVEP2	Hs.510172	149.6	PP	157.9	PP
ENSG00000137361	HLA-E	Hs.381008	1198.1	PP	595.4	PP
ENSG00000029993	HMGB3	Hs.19114	309	PP	460.6	PP
ENSG00000096746	HNRPH3	Hs.499891	408.7	PP	635.5	PP
ENSG00000153187	HNRPU	Hs.166463	470.3	PP	887.6	PP
ENSG00000067829	IDH3G	Hs.410197	249.2	PP	156.95	PA
ENSG00000168556	ING2	Hs.107153	177	PP	151.85	PP
ENSG00000116679	IVNS1ABP	Hs.497183	251.6	PP	288.25	PP
ENSG00000115548	JMJD1A	Hs.531819	264	PP	207.05	PP
ENSG00000102753	KPNA3	Hs.527919	250.8	PP	391.35	PP
ENSG00000068697	LAPTM4A	Hs.467807	1059.2	PP	1145.5	PP
ENSG00000121104	LOC81558	Hs.514308	3067.5	PP	1370.7	PP
ENSG00000163818	LZTFL1	Hs.30824	199	PP	253.95	PP
ENSG00000173327	MAP3K11	Hs.502872	355.1	PP	326.8	PP
ENSG00000135525	MAP7	Hs.486548	325.7	PP	390.1	PP
ENSG00000112062	MAPK14	Hs.485233	507.4	PP	486.3	PP
ENSG00000165406	8-Mar	Hs.499489	295.9	PP	295.85	PP
ENSG00000038274	MAT2B	Hs.54642	609.4	PP	461.9	PP
ENSG00000015479	MATR3	Hs.268939	252.4	PP	382.35	PP
ENSG00000152601	MBNL1	Hs.478000	294.4	PP	864.5	PP
ENSG00000081189	MEF2C	Hs.444409	426	PP	437.85	PP
ENSG00000133606	MKRN1	Hs.490347	392.7	PP	350.15	PP
ENSG00000100330	MTMR3	Hs.474536	204.7	PP	287	PP
ENSG00000005810	MYCBP2	Hs.151411	187	PP	643.55	PP
ENSG00000166579	NDEL1	Hs.372123	218.3	PP	187.2	PP
ENSG00000082641	NFE2L1	Hs.514284	735.5	PP	726.35	PP
ENSG00000120837	NFYB	Hs.84928	204.1	PP	272.85	PP
ENSG00000137420	NOL7	Hs.549161	1095.5	PP	1222.05	PP
ENSG00000153234	NR4A2	Hs.165258	124.6	PP	242.85	PP
ENSG00000124789	NUP153	Hs.121088	216.4	PP	291.8	PP
ENSG00000046651	OFD1	Hs.6483	1022.7	PP	692.15	PP
ENSG00000141447	OSBPL1A	Hs.370725	204.6	PP	211.75	PP
ENSG00000115421	PAPOLG	Hs.387471	153.2	PP	91.25	PP
ENSG00000157212	PAXIP1	Hs.443881	139.4	PP	130.7	PP
ENSG00000059758	PCTK2	Hs.506415	118.3	PP	220.9	PP
ENSG00000067057	PFKP	Hs.26010	317.5	PP	459	PP
ENSG00000025293	PHF20	Hs.517044	249.8	PP	173.65	PP
ENSG00000171033	PKIA	Hs.433700	88.6	PP	131.05	PP
ENSG00000136040	PLXNC1	Hs.551522	354.6	PP	387.1	PP
ENSG00000100941	PNN	Hs.409965	839.5	PP	617.3	PP
ENSG00000107758	PPP3CB	Hs.500067	318.9	PP	241.25	PP
ENSG00000154845	PPP4R1	Hs.464595	472.6	PP	378.85	PP
ENSG00000119414	PPP6C	Hs.495128	297.5	PP	557.55	PP
ENSG00000100519	PSMC6	Hs.156171	143.7	PP	216.4	PP
ENSG00000175354	PTPN2	Hs.123352	759.9	PP	273	PP
ENSG00000134644	PUM1	Hs.281707	378.4	PP	422.3	PP
ENSG00000185129	PURA	Hs.443121	149.5	PP	224.95	PP
ENSG00000130508	PXDN	Hs.332197	280.3	PP	114.7	PA
ENSG00000112531	QKI	Hs.510324	284.1	PP	564.45	PP
ENSG00000119396	RAB14	Hs.371563	140.5	PP	198.15	PP
ENSG00000111737	RAB35	Hs.524788	394.6	PP	431.2	PP

ENSG00000111540	RAB5B	Hs.77690	234.1	PP	216.45	PP
ENSG00000175582	RAB6A	Hs.503222	371.4	PP	365.75	PP
ENSG00000119318	RAD23B	Hs.521640	156.2	PP	211.05	PP
ENSG00000127314	RAP1B	Hs.369920	1093.1	PP	1537.75	PP
ENSG00000023287	RB1CC1	Hs.196102	95.2	PP	147.45	PP
ENSG00000122257	RBBP6	Hs.188553	131.2	PP	163.35	PP
ENSG00000102054	RBBP7	Hs.495755	942.6	PP	1356.35	PP
ENSG00000127870	RNF6	Hs.136885	74.1	PP	122.9	PP
ENSG00000167971	RNPS1	Hs.355643	1024.8	PP	1501.95	PP
ENSG00000100784	RPS6KA5	Hs.510225	152.1	PP	132.75	PP
ENSG00000148484	RSU1	Hs.524161	298.8	PP	294.55	PP
ENSG00000163602	RYBP	Hs.7910	398	PP	462.8	PP
ENSG00000079332	SARA1	Hs.499960	233.7	PP	442.85	PP
ENSG00000140497	SCAMP2	Hs.458917	411.8	PP	495	PP
ENSG00000168385	2-Sep	Hs.335057	952.7	PP	1251.1	PP
ENSG00000120742	SERP1	Hs.518326	285.7	PP	343.4	PP
ENSG00000179833	SERTAD2	Hs.77293	498.4	PP	556.2	PP
ENSG00000119335	SET	Hs.436687	2967	PP	4307.1	PP
ENSG00000116560	SFPQ	Hs.355934	306.9	PP	689	PP
ENSG00000115875	SFRS7	Hs.309090	378.7	PP	743.5	PP
ENSG00000096717	SIRT1	Hs.369779	133.8	PP	124.9	PP
ENSG00000113558	SKP1A	Hs.171626	657.2	PP	969.15	PP
ENSG00000059804	SLC2A3	Hs.419240	275.9	PP	351.5	PP
ENSG00000173473	SMARCC1	Hs.476179	487	PP	483.35	PP
ENSG00000159140	SON	Hs.517262	408.8	PP	467.15	PP
ENSG00000124766	SOX4	Hs.357901	2351.7	PP	2500.65	PP
ENSG00000008294	SPAG9	Hs.463439	180.3	PP	209.9	PP
ENSG00000168610	STAT3	Hs.463059	401.7	PP	390.05	PP
ENSG00000112079	STK38	Hs.409578	365.8	PP	304.4	PP
ENSG00000108264	TADA2L	Hs.500066	108	PP	97.9	PA
ENSG00000152291	TGOLN2	Hs.14894	430.2	PP	542.8	PP
ENSG00000106537	TM4SF13	Hs.364544	275.4	PP	526.45	PP
ENSG00000102804	TSC22D1	Hs.450972	1492.8	PP	2518.9	PP
ENSG00000150991	UBC	Hs.520348	2138.1	PP	2607.15	PP
ENSG00000119048	UBE2B	Hs.385986	335	PP	417.45	PP
ENSG00000114062	UBE3A	Hs.22543	456.9	PP	470.75	PP
ENSG00000114062	UBE3A	Hs.22543	126.2	PP	89.25	PP
ENSG00000135655	USP15	Hs.434951	197.3	PP	160.35	PP
ENSG00000173218	VANGL1	Hs.515130	73.8	PP	89.5	PA
ENSG00000132716	WDR42A	Hs.492236	195.9	PP	233.1	PP
ENSG00000166913	YWHAB	Hs.279920	222.4	PP	288.75	PP
ENSG00000015171	ZMYND11	Hs.292265	403.3	PP	784.1	PP
ENSG00000114514	ZNF148	Hs.380334	211.6	PP	226.65	PP
ENSG00000179456	ZNF238	Hs.69997	235.7	PP	241.8	PP
ENSG00000169714	ZNF9	Hs.518249	1408.6	PP	1399.55	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000004455	AK2	Hs.470907	303.6	PP	498.6	PP
ENSG00000170776	AKAP13	Hs.459211	192.3	PP	198.75	PA

ENSG00000151320	AKAP6	Hs.509083	137.8	PP	117.05	PP
ENSG00000117020	AKT3	Hs.498292	246.4	PP	259.35	PP
ENSG00000142192	APP	Hs.434980	154.6	PP	154.1	PP
ENSG00000159388	BTG2	Hs.519162	588.2	PP	538.3	PP
ENSG00000135932	CAB39	Hs.471593	527.9	PP	637.3	PP
ENSG00000143126	CELSR2	Hs.57652	215.4	PP	148.65	PP
ENSG00000153922	CHD1	Hs.519474	89.4	PP	202.95	PP
ENSG00000111596	CNOT2	Hs.133350	431.4	PP	399.2	PP
ENSG00000129083	COPB	Hs.339278	686.7	PP	1188.55	PP
ENSG00000005339	CREBBP	Hs.459759	287.2	PP	239.6	PP
ENSG00000009307	CSDE1	Hs.69855	1494.1	PP	1637.9	PP
ENSG00000103653	CSK	Hs.77793	348.1	PP	217.35	PA
ENSG00000168036	CTNNB1	Hs.476018	343.5	PP	364.4	PP
ENSG00000149187	CUGBP1	Hs.530727	383	PP	596.3	PP
ENSG00000166266	CUL5	Hs.440320	285.8	PP	246.8	PP
ENSG00000100697	DICER1	Hs.87889	176.8	PP	186.3	PP
ENSG00000117505	DR1	Hs.348418	117.2	PP	188.65	PP
ENSG00000104517	EDD1	Hs.492445	254.6	PP	227.15	PP
ENSG00000092847	EIF2C1	Hs.22867	292.5	PP	296.95	PP
ENSG00000063046	EIF4B	Hs.512629	519.2	PP	743.85	PP
ENSG00000100664	EIF5	Hs.433702	96.4	PP	55.8	PA
ENSG00000155849	ELMO1	Hs.304578	367.9	PP	339.8	PP
ENSG00000120616	EPC1	Hs.167805	148.9	PP	88.7	PA
ENSG00000120699	EXOSC8	Hs.294041	196.9	PP	283.25	PA
ENSG00000139146	FAM60A	Hs.505154	598.1	PP	788	PP
ENSG00000132589	FLOT2	Hs.514038	393.4	PP	355.45	PP
ENSG00000104064	GABPB2	Hs.546852	129.3	PP	183.75	PM
ENSG00000100083	GGA1	Hs.499158	669.4	PP	749.65	PP
ENSG00000113384	GOLPH3	Hs.408909	585.8	PP	782.9	PP
ENSG00000029993	HMGB3	Hs.19114	309	PP	460.6	PP
ENSG00000122566	HNRPA2B1	Hs.487774	1802.2	PP	2268.3	PP
ENSG00000152795	HNRPDL	Hs.527105	1931.8	PP	1802.05	PP
ENSG00000169045	HNRPH1	Hs.202166	1986.4	PP	2132.6	PP
ENSG00000126945	HNRPH2	Hs.278857	189.2	PP	158.45	PP
ENSG00000096746	HNRPH3	Hs.499891	408.7	PP	635.5	PP
ENSG00000165119	HNRPK	Hs.449171	761	PP	1269.35	PP
ENSG00000104824	HNRPL	Hs.446623	1060.2	PP	889.7	PP
ENSG00000125944	HNRPR	Hs.373763	839.4	PP	980.1	PP
ENSG00000153187	HNRPU	Hs.166463	470.3	PP	887.6	PP
ENSG00000120087	**HOXB7**	Hs.436181	110.1	PP	108.7	PP
ENSG00000173744	HRB	Hs.443507	202.6	PP	405.7	PP
ENSG00000078596	ITM2A	Hs.17109	325.6	PP	367.7	PP
ENSG00000116679	IVNS1ABP	Hs.497183	251.6	PP	288.25	PP
ENSG00000136826	**KLF4**	Hs.376206	536.5	PP	1193.7	PP
ENSG00000166963	MAP1A	Hs.194301	433.9	PP	321.4	PM
ENSG00000175130	MARCKSL1	Hs.75061	314.8	PP	265.6	PP
ENSG00000152601	MBNL1	Hs.478000	294.4	PP	864.5	PP
ENSG00000081189	MEF2C	Hs.444409	426	PP	437.85	PP
ENSG00000125445	MRPS7	Hs.71787	381.8	PP	338.3	PA
ENSG00000147649	MTDH	Hs.377155	258.6	PP	329.8	PP
ENSG00000108389	MTMR4	Hs.514373	330.7	PP	407.2	PP
ENSG00000170873	MTSS1	Hs.336994	152.7	PP	194.6	PP
ENSG00000005810	MYCBP2	Hs.151411	187	PP	643.55	PP

ENSG00000102921	N4BP1	Hs.511839	682.3	PP	668.7	PP
ENSG00000149308	NPAT	Hs.171061	171.1	PP	140.65	PP
ENSG00000169564	PCBP1	Hs.2853	1587.4	PP	1289.35	PP
ENSG00000056661	PCGF2	Hs.371617	231.6	PP	160.8	PP
ENSG00000114209	PDCD10	Hs.478150	463.6	PP	560.4	PP
ENSG00000145675	PIK3R1	Hs.132225	249.1	PP	181	PP
ENSG00000102024	PLS3	Hs.496622	74.1	PP	110.95	PP
ENSG00000119414	PPP6C	Hs.495128	297.5	PP	557.55	PP
ENSG00000110958	PTGES3	Hs.50425	1018.1	PP	1526.7	PP
ENSG00000055917	PUM2	Hs.467824	238.6	PP	313.25	PP
ENSG00000102054	RBBP7	Hs.495755	942.6	PP	1356.35	PP
ENSG00000144580	RQCD1	Hs.148767	284.7	PP	361.25	PP
ENSG00000159216	RUNX1	Hs.149261	108.8	PP	211.2	PP
ENSG00000085365	SCAMP1	Hs.482587	373.6	PP	392.9	PP
ENSG00000151967	SCHIP1	Hs.134665	497	PP	417.95	PP
ENSG00000137575	SDCBP	Hs.200804	934	PP	955.25	PP
ENSG00000156642	SDFR1	Hs.187866	169.4	PP	193.05	PP
ENSG00000179833	SERTAD2	Hs.77293	498.4	PP	556.2	PP
ENSG00000119335	SET	Hs.436687	2967	PP	4307.1	PP
ENSG00000136527	SFRS10	Hs.533122	673.5	PP	894.8	PP
ENSG00000153914	SFRS12	Hs.519347	258	PP	229.6	PP
ENSG00000072501	SMC1L1	Hs.211602	137.5	PP	329.1	PP
ENSG00000163788	SNRK	Hs.476052	320.6	PP	436.65	PP
ENSG00000114520	SNX4	Hs.507243	125.1	PP	245.1	PP
ENSG00000137642	SORL1	Hs.368592	2264.1	PP	1084.65	PP
ENSG00000091640	SPAG7	Hs.90436	900.7	PP	517.9	PP
ENSG00000116649	SRM	Hs.76244	374.8	PP	439.2	PA
ENSG00000178691	SUZ12	Hs.462732	602.2	PP	633.3	PP
ENSG00000120948	TARDBP	Hs.300624	735	PP	992.75	PP
ENSG00000028839	TBPL1	Hs.486507	170.1	PP	187.95	PP
ENSG00000154582	TCEB1	Hs.546305	511.7	PP	636	PP
ENSG00000165169	TCTE1L	Hs.446392	323	PP	369.75	PP
ENSG00000101337	TM9SF4	Hs.529360	129.2	PP	121.3	PP
ENSG00000076554	TPD52	Hs.368433	144.2	PP	223.7	PP
ENSG00000166340	TPP1	Hs.523454	200.3	PP	229.1	PP
ENSG00000143367	TUFT1	Hs.489922	173.6	PP	135.35	PP
ENSG00000131508	UBE2D2	Hs.108332	400.1	PP	512.05	PP
ENSG00000109332	UBE2D3	Hs.472031	471.2	PP	635.4	PP
ENSG00000170035	UBE2E3	Hs.470804	311.5	PP	258.25	PP
ENSG00000132388	UBE2G1	Hs.462035	272.5	PP	373.45	PP
ENSG00000160714	UBE2Q	Hs.516587	457.1	PP	377.95	PP
ENSG00000153560	UBP1	Hs.118041	280.2	PP	408.6	PP
ENSG00000100242	UNC84B	Hs.517622	560.7	PP	333.25	PP
ENSG00000101557	USP14	Hs.464416	542.5	PP	836.8	PP
ENSG00000135655	USP15	Hs.434951	197.3	PP	160.35	PP
ENSG00000108828	VAT1	Hs.514199	649.7	PP	585.4	PP
ENSG00000035403	VCL	Hs.500101	332.1	PP	541.1	PP
ENSG00000073905	VDAC1	Hs.202085	175.6	PP	289.2	PP
ENSG00000100568	VTI1B	Hs.144868	361.4	PP	272.7	PP
ENSG00000152518	ZFP36L2	Hs.503093	4553.7	PP	5205.6	PP
ENSG00000010244	ZNF207	Hs.500775	918.9	PP	742.3	PP
ENSG00000179456	ZNF238	Hs.69997	235.7	PP	241.8	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000151726	ACSL1	Hs.406678	180.6	PP	193.15	PP
ENSG00000136518	ACTL6A	Hs.435326	84.2	PP	105.6	PP
ENSG00000072110	ACTN1	Hs.509765	212.8	PP	362.35	PP
ENSG00000129675	ARHGEF6	Hs.522795	1207.5	PP	815.1	PP
ENSG00000117713	ARID1A	Hs.468972	477.6	PP	444.8	PP
ENSG00000155096	AZIN1	Hs.459106	551.2	PP	619.2	PP
ENSG00000119866	BCL11A	Hs.370549	363.1	PP	387.8	PP
ENSG00000139746	C13orf10	Hs.131715	119.8	PP	178.7	PP
ENSG00000101084	C20orf24	Hs.184062	878.9	PP	1348.2	PP
ENSG00000153113	CAST	Hs.440961	301.7	PP	461.25	PP
ENSG00000143126	CELSR2	Hs.57652	215.4	PP	148.65	PP
ENSG00000060138	CSDA	Hs.221889	969.1	PP	2074.95	PP
ENSG00000103653	CSK	Hs.77793	348.1	PP	217.35	PA
ENSG00000175215	CTDSP2	Hs.524530	1247.3	PP	976.35	PP
ENSG00000168209	DDIT4	Hs.523012	736.8	PP	535.85	PP
ENSG00000132153	DHX30	Hs.517948	209.5	PP	193.5	PP
ENSG00000092964	DPYSL2	Hs.173381	505.1	PP	495.1	PP
ENSG00000142634	EFHD2	Hs.465374	292.3	PP	242.65	PA
ENSG00000120616	EPC1	Hs.167805	148.9	PP	88.7	PA
ENSG00000157554	ERG	Hs.473819	369.4	PP	298.05	PP
ENSG00000120705	ETF1	Hs.483494	253.8	PP	461.55	PP
ENSG00000166147	FBN1	Hs.146447	195.2	PP	178.7	PP
ENSG00000178974	FBXO34	Hs.525348	246.4	PP	254.15	PP
ENSG00000109586	GALNT7	Hs.127407	97.2	PP	153.95	PP
ENSG00000001084	GCLC	Hs.271264	227.6	PP	219.2	PP
ENSG00000152795	HNRPDL	Hs.527105	1931.8	PP	1802.05	PA
ENSG00000096746	HNRPH3	Hs.499891	408.7	PP	635.5	PP
ENSG00000099783	HNRPM	Hs.465808	968.5	PP	880.2	PP
ENSG00000153807	**HOXA10**	Hs.110637	161.3	PP	200.7	PA
ENSG00000078399	**HOXA9**	Hs.127428	739.2	PP	674	PP
ENSG00000120694	HSPH1	Hs.36927	133.6	PP	614	PP
ENSG00000136478	HT008	Hs.175414	443.2	PP	336.2	PP
ENSG00000102753	KPNA3	Hs.527919	250.8	PP	391.35	PP
ENSG00000065548	LEREPO4	Hs.368598	265.5	PP	402.5	PP
ENSG00000161021	MAML1	Hs.484349	331.3	PP	280.35	PP
ENSG00000166974	MAPRE2	Hs.532824	857.4	PP	715.5	PP
ENSG00000168906	MAT2A	Hs.516157	1011.4	PP	738.6	PP
ENSG00000089693	MLF2	Hs.524214	247.5	PP	196.75	PP
ENSG00000147649	MTDH	Hs.377155	258.6	PP	329.8	PP
ENSG00000005810	MYCBP2	Hs.151411	187	PP	643.55	PP
ENSG00000166579	NDEL1	Hs.372123	218.3	PP	187.2	PP
ENSG00000120837	NFYB	Hs.84928	204.1	PP	272.85	PP
ENSG00000153234	NR4A2	Hs.165258	124.6	PP	242.85	PP
ENSG00000134644	PUM1	Hs.281707	378.4	PP	422.3	PP
ENSG00000112531	QKI	Hs.510324	284.1	PP	564.45	PP
ENSG00000048991	R3HDM	Hs.412462	217.6	PP	376.75	PP
ENSG00000138069	RAB1A	Hs.310645	70.8	PP	109.75	PM
ENSG00000119318	RAD23B	Hs.521640	156.2	PP	211.05	PP
ENSG00000127314	RAP1B	Hs.369920	1093.1	PP	1537.75	PP

ENSG00000145715	RASA1	Hs.553501	138.8	PP	103.6	PP
ENSG00000125976	RBM12	---	321.1	PP	313.35	PP
ENSG00000106615	RHEB	Hs.283521	943.5	PP	1172.5	PP
ENSG00000123091	RNF11	Hs.309641	125.3	PP	161.5	PP
ENSG00000153574	RPIA	Hs.469264	170.1	PP	372.1	PP
ENSG00000182568	SATB1	Hs.517717	829.9	PP	652.05	PP
ENSG00000085365	SCAMP1	Hs.482587	373.6	PP	392.9	PP
ENSG00000121542	SEC22L2	Hs.477361	96.7	PP	82.45	PA
ENSG00000122545	7-Sep	Hs.191346	815	PP	1146.5	PP
ENSG00000115524	SF3B1	Hs.471011	2127.6	PP	2173.9	PP
ENSG00000161547	SFRS2	Hs.73965	3723.5	PP	4390.4	PP
ENSG00000059804	SLC2A3	Hs.419240	275.9	PP	351.5	PP
ENSG00000112305	SMAP1	Hs.485717	205.2	PP	129.15	PP
ENSG00000114520	SNX4	Hs.507243	125.1	PP	245.1	PP
ENSG00000124766	SOX4	Hs.357901	2351.7	PP	2500.65	PP
ENSG00000095480	SPFH1	Hs.150087	646.4	PP	689.15	PP
ENSG00000101972	STAG2	Hs.496710	392	PP	375.2	PP
ENSG00000178691	SUZ12	Hs.462732	602.2	PP	633.3	PP
ENSG00000028839	TBPL1	Hs.486507	170.1	PP	187.95	PP
ENSG00000072274	TFRC	Hs.529618	1858.2	PP	2010.55	PP
ENSG00000170348	TMP21	Hs.74137	293.5	PP	280.3	PA
ENSG00000157514	TSC22D3	Hs.522074	1752.5	PP	2189.45	PP
ENSG00000063244	U2AF2	Hs.528007	191	PP	227.15	PP
ENSG00000103275	UBE2I	Hs.302903	452.9	PP	427.25	PP
ENSG00000118900	UBN1	Hs.440219	138.4	PP	302.15	PP
ENSG00000024048	UBR2	Hs.529925	151.4	PP	183.45	PP
ENSG00000135655	USP15	Hs.434951	197.3	PP	160.35	PP
ENSG00000165280	VCP	Hs.529782	278.5	PP	240.85	PP
ENSG00000086666	ZA20D3	Hs.306329	735.1	PP	517.75	PP
ENSG00000152518	ZFP36L2	Hs.503093	4553.7	PP	5205.6	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000184009	ACTG1	Hs.514581	11731	PP	14874	PP
ENSG00000137845	ADAM10	Hs.172028	221.1	PP	315.55	PP
ENSG00000004455	AK2	Hs.470907	303.6	PP	498.6	PP
ENSG00000170776	AKAP13	Hs.459211	192.3	PP	198.75	PA
ENSG00000117020	AKT3	Hs.498292	246.4	PP	259.35	PP
ENSG00000177879	AP3S1	Hs.406191	647.6	PP	1020.05	PP
ENSG00000142192	APP	Hs.434980	154.6	PP	154.1	PP
ENSG00000134108	ARL10C	Hs.250009	578.1	PP	591.95	PP
ENSG00000136950	ARPC5L	Hs.132499	512.3	PP	577.15	PP
ENSG00000174437	ATP2A2	Hs.506759	203.5	PP	255.4	PP
ENSG00000119866	BCL11A	Hs.370549	363.1	PP	387.8	PP
ENSG00000171791	BCL2	Hs.150749	151.5	PP	134.45	PP
ENSG00000160058	BSDC1	Hs.353454	304.8	PP	151.9	PP
ENSG00000159388	BTG2	Hs.519162	588.2	PP	538.3	PP
ENSG00000168175	C14orf32	Hs.437831	559.3	PP	1440.6	PP
ENSG00000132424	C6orf111	Hs.520287	674.8	PP	743.75	PP
ENSG00000135932	CAB39	Hs.471593	527.9	PP	637.3	PP

ENSG00000198898	CAPZA2	Hs.446123	100.3	PP	305.35	PP
ENSG00000142453	CARM1	Hs.371416	141.6	PP	105.7	PA
ENSG00000118971	CCND2	Hs.376071	1114.1	PP	1244.6	PP
ENSG00000082258	CCNT2	Hs.292754	114.4	PP	102.75	PP
ENSG00000135535	CD164	Hs.520313	2274.9	PP	2265.25	PP
ENSG00000143126	CELSR2	Hs.57652	215.4	PP	148.65	PP
ENSG00000172757	CFL1	Hs.170622	1674.1	PP	3264.25	PP
ENSG00000111596	CNOT2	Hs.133350	431.4	PP	399.2	PP
ENSG00000129083	COPB	Hs.339278	686.7	PP	1188.55	PA
ENSG00000166200	COPS2	Hs.369614	521.2	PP	700.65	PP
ENSG00000005339	CREBBP	Hs.459759	287.2	PP	239.6	PP
ENSG00000099942	CRKL	Hs.5613	126.4	PP	192.1	PP
ENSG00000009307	CSDE1	Hs.69855	1494.1	PP	1637.9	PP
ENSG00000133275	CSNK1G2	Hs.181390	529.8	PP	410.25	PA
ENSG00000198561	CTNND1	Hs.166011	160.6	PP	172.65	PM
ENSG00000149187	CUGBP1	Hs.530727	383	PP	596.3	PP
ENSG00000048740	CUGBP2	Hs.309288	159.6	PP	334.5	PP
ENSG00000166266	CUL5	Hs.440320	285.8	PP	246.8	PP
ENSG00000085788	DDHD2	Hs.434966	351.3	PP	262.9	PP
ENSG00000124487	DDX3X	Hs.380774	769.8	PP	1229	PP
ENSG00000139726	DENR	Hs.22393	903	PP	1016.2	PP
ENSG00000100697	DICER1	Hs.87889	176.8	PP	186.3	PP
ENSG00000151208	DLG5	Hs.500245	73.1	PP	90.5	PP
ENSG00000117505	DR1	Hs.348418	117.2	PP	188.65	PP
ENSG00000112242	E2F3	Hs.269408	295.6	PP	585.95	PP
ENSG00000104517	EDD1	Hs.492445	254.6	PP	227.15	PP
ENSG00000092847	EIF2C1	Hs.22867	292.5	PP	296.95	PP
ENSG00000063046	EIF4B	Hs.512629	519.2	PP	743.85	PP
ENSG00000110321	EIF4G2	Hs.183684	2137	PP	2701.9	PP
ENSG00000100664	EIF5	Hs.433702	96.4	PP	55.8	PA
ENSG00000155849	ELMO1	Hs.304578	367.9	PP	339.8	PP
ENSG00000120616	EPC1	Hs.167805	148.9	PP	88.7	PA
ENSG00000120705	ETF1	Hs.483494	253.8	PP	461.55	PP
ENSG00000120699	EXOSC8	Hs.294041	196.9	PP	283.25	PP
ENSG00000139146	FAM60A	Hs.505154	598.1	PP	788	PP
ENSG00000168137	FLJ10707	Hs.288164	452.5	PP	256.1	PM
ENSG00000132589	FLOT2	Hs.514038	393.4	PP	355.45	PP
ENSG00000125740	FOSB	Hs.75678	1751.3	PP	3599.55	PP
ENSG00000138757	G3BP2	Hs.303676	242.8	PP	428.55	PP
ENSG00000109586	GALNT7	Hs.127407	97.2	PP	153.95	PP
ENSG00000135677	GNS	Hs.334534	261.1	PP	248.15	PP
ENSG00000147533	GOLGA7	Hs.7953	669.8	PP	592.25	PP
ENSG00000113384	GOLPH3	Hs.408909	585.8	PP	782.9	PP
ENSG00000091527	H41	Hs.518265	735.1	PP	1129.65	PP
ENSG00000180353	HCLS1	Hs.14601	464.2	PP	503.05	PP
ENSG00000128731	HERC2	Hs.434890	257.7	PP	239.3	PP
ENSG00000122566	HNRPA2B1	Hs.487774	1802.2	PP	2268.3	PP
ENSG00000169045	HNRPH1	Hs.202166	1986.4	PP	2132.6	PP
ENSG00000126945	HNRPH2	Hs.278857	189.2	PP	158.45	PP
ENSG00000096746	HNRPH3	Hs.499891	408.7	PP	635.5	PP
ENSG00000104824	HNRPL	Hs.446623	1060.2	PP	889.7	PP
ENSG00000125944	HNRPR	Hs.373763	839.4	PP	980.1	PP
ENSG00000153187	HNRPU	Hs.166463	470.3	PP	887.6	PP

ENSG00000153807	**HOXA10**	Hs.110637	161.3	PP	200.7	PA
ENSG00000120075	**HOXB5**	Hs.149548	322	PP	238.15	PP
ENSG00000120087	**HOXB7**	Hs.436181	110.1	PP	108.7	PP
ENSG00000173744	HRB	Hs.443507	202.6	PP	405.7	PP
ENSG00000164164	HSHIN1	Hs.270851	303.1	PP	312.65	PP
ENSG00000086758	HUWE1	Hs.136905	535.9	PP	503.6	PP
ENSG00000171105	INSR	Hs.465744	247.7	PP	292.45	PP
ENSG00000078596	ITM2A	Hs.17109	325.6	PP	367.7	PP
ENSG00000116679	IVNS1ABP	Hs.497183	251.6	PP	288.25	PP
ENSG00000170852	KBTBD2	Hs.372541	412.2	PP	381.65	PP
ENSG00000176407	KCMF1	Hs.345694	751.2	PP	938.3	PP
ENSG00000145725	KIAA0433	Hs.212046	164.5	PP	186.45	PP
ENSG00000136826	**KLF4**	Hs.376206	536.5	PP	1193.7	PP
ENSG00000114030	KPNA1	Hs.161008	121.8	PP	91.95	PP
ENSG00000102753	KPNA3	Hs.527919	250.8	PP	391.35	PP
ENSG00000111885	MAN1A1	Hs.102788	309.1	PP	151	PP
ENSG00000166963	MAP1A	Hs.194301	433.9	PP	321.4	PM
ENSG00000135341	MAP3K7	Hs.485968	180.7	PP	202.05	PP
ENSG00000055208	MAP3K7IP2	Hs.269775	219.1	PP	142.8	PP
ENSG00000135525	MAP7	Hs.486548	325.7	PP	390.1	PP
ENSG00000175130	MARCKSL1	Hs.75061	314.8	PP	265.6	PP
ENSG00000152601	MBNL1	Hs.478000	294.4	PP	864.5	PP
ENSG00000081189	MEF2C	Hs.444409	426	PP	437.85	PP
ENSG00000198408	MGEA5	Hs.500842	363.7	PP	363.05	PP
ENSG00000171843	MLLT3	Hs.493585	405.3	PP	334.5	PP
ENSG00000123562	MORF4L2	Hs.326387	2189.8	PP	2626.1	PP
ENSG00000185608	MRPL40	Hs.431307	258.6	PP	272.55	PA
ENSG00000125445	MRPS7	Hs.71787	381.8	PP	338.3	PA
ENSG00000108389	MTMR4	Hs.514373	330.7	PP	407.2	PP
ENSG00000170873	MTSS1	Hs.336994	152.7	PP	194.6	PP
ENSG00000005810	MYCBP2	Hs.151411	187	PP	643.55	PP
ENSG00000102921	N4BP1	Hs.511839	682.3	PP	668.7	PP
ENSG00000082641	NFE2L1	Hs.514284	735.5	PP	726.35	PP
ENSG00000164190	NIPBL	Hs.481927	165.1	PP	145.15	PP
ENSG00000149308	NPAT	Hs.171061	171.1	PP	140.65	PP
ENSG00000180530	NRIP1	Hs.155017	842	PP	914.85	PP
ENSG00000147162	OGT	Hs.405410	165.1	PP	183.6	PP
ENSG00000142864	PAI-RBP1	Hs.530412	337.8	PP	662.45	PP
ENSG00000157654	PALM2-AKAP2	Hs.259461	181.4	PP	163.75	PP
ENSG00000169564	PCBP1	Hs.2853	1587.4	PP	1289.35	PP
ENSG00000056661	PCGF2	Hs.371617	231.6	PP	160.8	PP
ENSG00000120265	PCMT1	Hs.279257	488.1	PP	649.4	PP
ENSG00000059758	PCTK2	Hs.506415	118.3	PP	220.9	PP
ENSG00000114209	PDCD10	Hs.478150	463.6	PP	560.4	PP
ENSG00000150593	PDCD4	Hs.232543	174.3	PP	122.55	PP
ENSG00000143870	PDIA6	Hs.212102	357.6	PP	852.3	PP
ENSG00000025293	PHF20	Hs.517044	249.8	PP	173.65	PP
ENSG00000145675	PIK3R1	Hs.132225	249.1	PP	181	PP
ENSG00000137193	PIM1	Hs.81170	1021.7	PP	801.85	PP
ENSG00000102024	PLS3	Hs.496622	74.1	PP	110.95	PP
ENSG00000100941	PNN	Hs.409965	839.5	PP	617.3	PP
ENSG00000100614	PPM1A	Hs.130036	197.3	PP	259.8	PP
ENSG00000078304	PPP2R5C	Hs.368264	174.9	PP	165.25	PP

ENSG00000138814	PPP3CA		Hs.435512	122.5	PP	205	PP
ENSG00000119414	PPP6C		Hs.495128	297.5	PP	557.55	PP
ENSG00000110851	PRDM4		Hs.506655	188.6	PP	183.55	PP
ENSG00000122862	PRG1		Hs.1908	802.8	PP	1516.65	PP
ENSG00000101040	PRKCBP1		Hs.446240	305.9	PP	329.55	PP
ENSG00000110958	PTGES3		Hs.50425	1018.1	PP	1526.7	PP
ENSG00000055917	PUM2		Hs.467824	238.6	PP	313.25	PP
ENSG00000185129	PURA		Hs.443121	149.5	PP	224.95	PP
ENSG00000112531	QKI		Hs.510324	284.1	PP	564.45	PP
ENSG00000111737	RAB35		Hs.524788	394.6	PP	431.2	PP
ENSG00000077092	RARB		Hs.436538	111.5	PP	156.85	PP
ENSG00000122257	RBBP6		Hs.188553	131.2	PP	163.35	PP
ENSG00000102054	RBBP7		Hs.495755	942.6	PP	1356.35	PP
ENSG00000197676	RBM16		Hs.227602	193.8	PP	274	PP
ENSG00000153250	RBMS1		Hs.470412	144.9	PP	216.05	PP
ENSG00000137075	RNF38		Hs.333503	322.6	PP	227.7	PP
ENSG00000043093	RP42		Hs.104613	236.5	PP	204.45	PP
ENSG00000144713	RPL32		Hs.265174	21137	PP	15449.05	PP
ENSG00000100784	RPS6KA5		Hs.510225	152.1	PP	132.75	PP
ENSG00000144580	RQCD1		Hs.148767	284.7	PP	361.25	PP
ENSG00000137815	RTF1		Hs.511096	194.3	PP	256.85	PP
ENSG00000159216	RUNX1		Hs.149261	108.8	PP	211.2	PP
ENSG00000163602	RYBP		Hs.7910	398	PP	462.8	PP
ENSG00000160633	SAFB		Hs.23978	376.8	PP	261.35	PP
ENSG00000085365	SCAMP1		Hs.482587	373.6	PP	392.9	PP
ENSG00000121892	SCC-112		Hs.331431	220.4	PP	258.2	PP
ENSG00000151967	SCHIP1		Hs.134665	497	PP	417.95	PP
ENSG00000137575	SDCBP		Hs.200804	934	PP	955.25	PP
ENSG00000156642	SDFR1		Hs.187866	169.4	PP	193.05	PP
ENSG00000138802	SEC24B		Hs.292472	221.9	PP	223.3	PP
ENSG00000125354		6-Sep	Hs.496666	335.7	PP	310.55	PP
ENSG00000179833	SERTAD2		Hs.77293	498.4	PP	556.2	PP
ENSG00000080546	SESN1		Hs.59554	235	PP	276.4	PP
ENSG00000119335	SET		Hs.436687	2967	PP	4307.1	PP
ENSG00000136527	SFRS10		Hs.533122	673.5	PP	894.8	PP
ENSG00000161547	SFRS2		Hs.73965	3723.5	PP	4390.4	PP
ENSG00000112081	SFRS3		Hs.405144	884.9	PP	923.3	PP
ENSG00000100650	SFRS5		Hs.166975	4459.7	PP	3466.15	PP
ENSG00000080493	SLC4A4		Hs.5462	124.5	PP	268.4	PP
ENSG00000073584	SMARCE1		Hs.463010	487.1	PP	524.6	PP
ENSG00000163788	SNRK		Hs.476052	320.6	PP	436.65	PP
ENSG00000114520	SNX4		Hs.507243	125.1	PP	245.1	PP
ENSG00000091640	SPAG7		Hs.90436	900.7	PP	517.9	PP
ENSG00000090054	SPTLC1		Hs.90458	251.2	PP	312.95	PP
ENSG00000116649	SRM		Hs.76244	374.8	PP	439.2	PA
ENSG00000178691	SUZ12		Hs.462732	602.2	PP	633.3	PP
ENSG00000135090	TAOK3		---	518.8	PP	394	PP
ENSG00000120948	TARDBP		Hs.300624	735	PP	992.75	PP
ENSG00000028839	TBPL1		Hs.486507	170.1	PP	187.95	PP
ENSG00000154582	TCEB1		Hs.546305	511.7	PP	636	PP
ENSG00000165169	TCTE1L		Hs.446392	323	PP	369.75	PP
ENSG00000198586	TLK1		Hs.470586	150.2	PP	117.65	PP
ENSG00000198561	TMX2		Hs.279861	484.9	PP	411	PP

ENSG00000076554	TPD52	Hs.368433	144.2	PP	223.7	PP
ENSG00000166340	TPP1	Hs.523454	200.3	PP	229.1	PP
ENSG00000067167	TRAM1	Hs.491988	573.3	PP	894.4	PP
ENSG00000166326	TRIM44	Hs.192103	340.6	PP	375.85	PP
ENSG00000157514	TSC22D3	Hs.522074	1752.5	PP	2189.45	PP
ENSG00000143367	TUFT1	Hs.489922	173.6	PP	135.35	PP
ENSG00000077721	UBE2A	Hs.379466	299.1	PP	400.85	PP
ENSG00000131508	UBE2D2	Hs.108332	400.1	PP	512.05	PP
ENSG00000109332	UBE2D3	Hs.472031	471.2	PP	635.4	PP
ENSG00000170035	UBE2E3	Hs.470804	311.5	PP	258.25	PP
ENSG00000160714	UBE2Q	Hs.516587	457.1	PP	377.95	PP
ENSG00000124208	UBE2V1 /// Kua-UEV	Hs.420529	504.3	PP	320.6	PP
ENSG00000130939	UBE4B	Hs.386404	291.8	PP	387.95	PP
ENSG00000153560	UBP1	Hs.118041	280.2	PP	408.6	PP
ENSG00000100242	UNC84B	Hs.517622	560.7	PP	333.25	PP
ENSG00000101557	USP14	Hs.464416	542.5	PP	836.8	PP
ENSG00000135655	USP15	Hs.434951	197.3	PP	160.35	PP
ENSG00000117533	VAMP4	Hs.6651	271.8	PP	299.3	PP
ENSG00000108828	VAT1	Hs.514199	649.7	PP	585.4	PP
ENSG00000035403	VCL	Hs.500101	332.1	PP	541.1	PP
ENSG00000069329	VPS35	Hs.447547	705.1	PP	966.5	PP
ENSG00000100568	VTI1B	Hs.144868	361.4	PP	272.7	PP
ENSG00000084463	WBP11	Hs.524281	245.3	PP	325.4	PP
ENSG00000085433	WDR47	Hs.546347	90.4	PP	116.6	PP
ENSG00000109685	WHSC1	Hs.113876	239.5	PP	283.1	PP
ENSG00000157954	WIPI-2	Hs.122363	680.5	PP	572.7	PP
ENSG00000157954	WIPI-2	Hs.122363	265.4	PP	363.1	PP
ENSG00000083896	YT521	Hs.175955	318.2	PP	505.9	PP
ENSG00000128245	YWHAH	Hs.226755	195	PP	195.4	PP
ENSG00000134308	YWHAQ	Hs.74405	922.3	PP	2337.65	PP
ENSG00000152518	ZFP36L2	Hs.503093	4553.7	PP	5205.6	PP
ENSG00000010244	ZNF207	Hs.500775	918.9	PP	742.3	PP
ENSG00000179456	ZNF238	Hs.69997	235.7	PP	241.8	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000114770	ABCC5	Hs.368563	373.4	PP	322.1	PM
ENSG00000136518	ACTL6A	Hs.435326	84.2	PP	105.6	PP
ENSG00000072110	ACTN1	Hs.509765	212.8	PP	362.35	PP
ENSG00000117713	ARID1A	Hs.468972	477.6	PP	444.8	PP
ENSG00000119866	BCL11A	Hs.370549	363.1	PP	387.8	PP
ENSG00000139746	C13orf10	Hs.131715	119.8	PP	178.7	PP
ENSG00000116489	CAPZA1	Hs.514934	766.7	PP	1165.8	PP
ENSG00000163660	CCNL1	Hs.4859	1082.6	PP	1052.5	PP
ENSG00000070831	CDC42	Hs.467637	620.1	PP	437.75	PP
ENSG00000005339	CREBBP	Hs.459759	287.2	PP	239.6	PP
ENSG00000060138	CSDA	Hs.221889	969.1	PP	2074.95	PP
ENSG00000103653	CSK	Hs.77793	348.1	PP	217.35	PA
ENSG00000175215	CTDSP2	Hs.524530	1247.3	PP	976.35	PP

ENSG00000008283	CYB561	Hs.355264	72.3	PP	201.35	PP
ENSG00000168209	DDIT4	Hs.523012	736.8	PP	535.85	PP
ENSG00000151208	DLG5	Hs.500245	73.1	PP	90.5	PP
ENSG00000092847	EIF2C1	Hs.22867	292.5	PP	296.95	PP
ENSG00000120616	EPC1	Hs.167805	148.9	PP	88.7	PA
ENSG00000120705	ETF1	Hs.483494	253.8	PP	461.55	PP
ENSG00000166147	FBN1	Hs.146447	195.2	PP	178.7	PP
ENSG00000109586	GALNT7	Hs.127407	97.2	PP	153.95	PP
ENSG00000001084	GCLC	Hs.271264	227.6	PP	219.2	PP
ENSG00000170144	HNRPA3	Hs.516539	375.5	PP	558.6	PP
ENSG00000152795	HNRPDL	Hs.527105	1931.8	PP	1802.05	PP
ENSG00000099783	HNRPM	Hs.465808	968.5	PP	880.2	PP
ENSG00000153807	**HOXA10**	Hs.110637	161.3	PP	200.7	PA
ENSG00000074356	HSA277841	Hs.120963	222.9	PP	150.05	PP
ENSG00000144381	HSPD1	Hs.113684	2868.6	PP	5689.3	PP
ENSG00000155090	**KLF10**	Hs.435001	348.9	PP	357.65	PP
ENSG00000102753	KPNA3	Hs.527919	250.8	PP	391.35	PP
ENSG00000065548	LEREPO4	Hs.368598	265.5	PP	402.5	PP
ENSG00000148943	LIN7C	Hs.91393	87.3	PP	121.85	PP
ENSG00000161021	MAML1	Hs.484349	331.3	PP	280.35	PP
ENSG00000166974	MAPRE2	Hs.532824	857.4	PP	715.5	PP
ENSG00000168906	MAT2A	Hs.516157	1011.4	PP	738.6	PP
ENSG00000089693	MLF2	Hs.524214	247.5	PP	196.75	PP
ENSG00000147649	MTDH	Hs.377155	258.6	PP	329.8	PP
ENSG00000005810	MYCBP2	Hs.151411	187	PP	643.55	PP
ENSG00000120837	NFYB	Hs.84928	204.1	PP	272.85	PP
ENSG00000147162	OGT	Hs.405410	165.1	PP	183.6	PP
ENSG00000136040	PLXNC1	Hs.551522	354.6	PP	387.1	PP
ENSG00000112245	PTP4A1	Hs.227777	439.5	PP	431.2	PP
ENSG00000134644	PUM1	Hs.281707	378.4	PP	422.3	PP
ENSG00000112531	QKI	Hs.510324	284.1	PP	564.45	PP
ENSG00000048991	R3HDM	Hs.412462	217.6	PP	376.75	PP
ENSG00000138069	RAB1A	Hs.310645	70.8	PP	109.75	PM
ENSG00000075785	RAB7	Hs.15738	99.2	PP	107.25	PP
ENSG00000119318	RAD23B	Hs.521640	156.2	PP	211.05	PP
ENSG00000127314	RAP1B	Hs.369920	1093.1	PP	1537.75	PP
ENSG00000109756	RAPGEF2	Hs.113912	394.9	PP	551.95	PP
ENSG00000125976	RBM12	---	321.1	PP	313.35	PP
ENSG00000106615	RHEB	Hs.283521	943.5	PP	1172.5	PP
ENSG00000123091	RNF11	Hs.309641	125.3	PP	161.5	PP
ENSG00000153574	RPIA	Hs.469264	170.1	PP	372.1	PP
ENSG00000163602	RYBP	Hs.7910	398	PP	462.8	PP
ENSG00000182568	SATB1	Hs.517717	829.9	PP	652.05	PP
ENSG00000168758	SEMA4C	Hs.516220	186.7	PP	157.95	PP
ENSG00000122545	7-Sep	Hs.191346	815	PP	1146.5	PP
ENSG00000136450	SFRS1	Hs.68714	1264.9	PP	1622.65	PP
ENSG00000161547	SFRS2	Hs.73965	3723.5	PP	4390.4	PP
ENSG00000115875	SFRS7	Hs.309090	378.7	PP	743.5	PP
ENSG00000096717	SIRT1	Hs.369779	133.8	PP	124.9	PP
ENSG00000059804	SLC2A3	Hs.419240	275.9	PP	351.5	PP
ENSG00000112305	SMAP1	Hs.485717	205.2	PP	129.15	PP
ENSG00000114520	SNX4	Hs.507243	125.1	PP	245.1	PP
ENSG00000124766	SOX4	Hs.357901	2351.7	PP	2500.65	PP

ENSG00000095480	SPFH1	Hs.150087	646.4	PP	689.15	PP
ENSG00000101972	STAG2	Hs.496710	392	PP	375.2	PP
ENSG00000178691	SUZ12	Hs.462732	602.2	PP	633.3	PP
ENSG00000120948	TARDBP	Hs.300624	735	PP	992.75	PP
ENSG00000100207	TCF20	Hs.475018	251.3	PP	281.15	PP
ENSG00000144043	TEX261	Hs.516087	360.9	PP	229.45	PA
ENSG00000072274	TFRC	Hs.529618	1858.2	PP	2010.55	PP
ENSG00000170348	TMP21	Hs.74137	293.5	PP	280.3	PA
ENSG00000183864	TOB2	Hs.474978	165.3	PP	196.4	PP
ENSG00000157514	TSC22D3	Hs.522074	1752.5	PP	2189.45	PP
ENSG00000063244	U2AF2	Hs.528007	191	PP	227.15	PP
ENSG00000103275	UBE2I	Hs.302903	452.9	PP	427.25	PP
ENSG00000009335	UBE3C	Hs.118351	67.5	PP	175.9	PM
ENSG00000118900	UBN1	Hs.440219	138.4	PP	302.15	PP
ENSG00000135655	USP15	Hs.434951	197.3	PP	160.35	PP
ENSG00000107372	ZA20D2	Hs.406096	967.2	PP	1262.9	PP
ENSG00000086666	ZA20D3	Hs.306329	735.1	PP	517.75	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000111780	15E1.2	Hs.549299	68.7	PP	68.6	PP
ENSG00000165029	ABCA1	Hs.429294	175.1	PP	156.5	PP
ENSG00000117020	AKT3	Hs.498292	246.4	PP	259.35	PP
ENSG00000142192	APP	Hs.434980	154.6	PP	154.1	PP
ENSG00000137962	ARHGAP29	Hs.483238	72.2	PP	65.3	PP
ENSG00000104880	ARHGEF18	Hs.465763	366	PP	254.9	PA
ENSG00000054267	ARID4B	Hs.533633	227	PP	252.45	PP
ENSG00000111875	ASF1A	Hs.292316	126.5	PP	114.6	PP
ENSG00000143970	ASXL2	Hs.119815	694.8	PP	535.25	PP
ENSG00000017260	ATP2C1	Hs.546361	229.1	PP	322.9	PP
ENSG00000095739	BAMBI	Hs.533336	207.8	PP	106.85	PP
ENSG00000119866	BCL11A	Hs.370549	363.1	PP	387.8	PP
ENSG00000060762	BRP44L	Hs.172755	387.7	PP	334.3	PP
ENSG00000133639	BTG1	Hs.255935	955.9	PP	1057.95	PP
ENSG00000110075	C11orf23	Hs.503022	402.6	PP	319.5	PA
ENSG00000152242	C18orf25	Hs.116486	129.7	PP	130.6	PA
ENSG00000141452	C18orf8	Hs.529006	232.8	PP	242.05	PP
ENSG00000110888	C1QDC1	Hs.234355	291.3	PP	261.05	PP
ENSG00000118971	CCND2	Hs.376071	1114.1	PP	1244.6	PP
ENSG00000163660	CCNL1	Hs.4859	1082.6	PP	1052.5	PP
ENSG00000082258	CCNT2	Hs.292754	114.4	PP	102.75	PP
ENSG00000155111	CDC2L6	Hs.193251	325	PP	341.25	PP
ENSG00000123374	CDK2	Hs.19192	171.5	PP	336.45	PP
ENSG00000177200	CHD9	Hs.530936	222.6	PP	263	PP
ENSG00000198791	CNOT7	Hs.170553	250.3	PP	508.5	PP
ENSG00000138663	COPS4	Hs.190384	331.1	PP	393.8	PA
ENSG00000167193	CRK	Hs.461896	114.9	PP	153.9	PP
ENSG00000102974	CTCF	Hs.368367	506.1	PP	535.55	PP
ENSG00000048740	CUGBP2	Hs.309288	159.6	PP	334.5	PP
ENSG00000121966	CXCR4	Hs.421986	532.4	PP	1919.4	PP

ENSG00000183283	DAZAP2	Hs.369761	1267.2	PP	976.7	PP
ENSG00000124487	DDX3X	Hs.380774	769.8	PP	1229	PP
ENSG00000108406	DHX40	Hs.29403	233.3	PP	196.45	PP
ENSG00000151208	DLG5	Hs.500245	73.1	PP	90.5	PP
ENSG00000105993	DNAJB6	Hs.490745	189.7	PP	348.5	PP
ENSG00000074603	DPP8	Hs.458609	250.4	PP	288	PP
ENSG00000092964	DPYSL2	Hs.173381	505.1	PP	495.1	PP
ENSG00000112242	E2F3	Hs.269408	295.6	PP	585.95	PP
ENSG00000104517	EDD1	Hs.492445	254.6	PP	227.15	PP
ENSG00000156508	EEF1A1	Hs.439552	40551	PP	40470.15	PP
ENSG00000149547	EI24	Hs.343911	166.1	PP	305.55	PP
ENSG00000092847	EIF2C1	Hs.22867	292.5	PP	296.95	PP
ENSG00000104131	EIF3S1	Hs.404056	340.4	PP	365.05	PP
ENSG00000110321	EIF4G2	Hs.183684	2137	PP	2701.9	PP
ENSG00000111145	ELK3	Hs.46523	372.1	PP	280.75	PP
ENSG00000062598	ELMO2	Hs.210469	70.6	PP	59.8	PP
ENSG00000050405	EPLIN	Hs.525419	265.5	PP	309.7	PP
ENSG00000139146	FAM60A	Hs.505154	598.1	PP	788	PP
ENSG00000173120	FBXL11	Hs.124147	237	PP	192.5	PP
ENSG00000118564	FBXL5	Hs.479208	410.6	PP	319.15	PP
ENSG00000138081	FBXO11	Hs.553547	155.7	PP	259.35	PP
ENSG00000022267	FHL1	Hs.435369	5240	PP	3151.75	PP
ENSG00000168137	FLJ10707	Hs.288164	452.5	PP	256.1	PM
ENSG00000111011	FLJ11021	Hs.432996	202	PP	392.6	PP
ENSG00000137273	FOXF2	Hs.484423	109.9	PP	89.85	PP
ENSG00000198815	FOXJ3	Hs.26023	458.7	PP	380.45	PP
ENSG00000196700	GM632	Hs.551552	103.5	PP	145.05	PP
ENSG00000135677	GNS	Hs.334534	261.1	PP	248.15	PP
ENSG00000112406	HECA	Hs.197644	352.2	PP	377.45	PP
ENSG00000010818	HIVEP2	Hs.510172	149.6	PP	157.9	PP
ENSG00000122566	HNRPA2B1	Hs.487774	1802.2	PP	2268.3	PP
ENSG00000096746	HNRPH3	Hs.499891	408.7	PP	635.5	PP
ENSG00000105323	HNRPUL1	Hs.155218	406.9	PP	401.15	PP
ENSG00000143164	IQWD1	Hs.435741	168.5	PP	156.4	PP
ENSG00000115548	JMJD1A	Hs.531819	264	PP	207.05	PP
ENSG00000177606	JUN	Hs.525704	1300.5	PP	2286.95	PP
ENSG00000170852	KBTBD2	Hs.372541	412.2	PP	381.65	PP
ENSG00000114030	KPNA1	Hs.161008	121.8	PP	91.95	PP
ENSG00000005893	LAMP2	Hs.496684	251.3	PP	179	PP
ENSG00000068697	LAPTM4A	Hs.467807	1059.2	PP	1145.5	PP
ENSG00000107929	LARP5	Hs.498455	274.8	PP	203.9	PP
ENSG00000172292	LASS6	Hs.506829	536.2	PP	463.8	PP
ENSG00000121104	LOC81558	Hs.514308	3067.5	PP	1370.7	PP
ENSG00000123684	LPGAT1	Hs.497674	106	PP	114.3	PP
ENSG00000146963	LUC7L2	Hs.530118	153.5	PP	227.3	PP
ENSG00000163818	LZTFL1	Hs.30824	199	PP	253.95	PP
ENSG00000121579	MAK3	Hs.269528	268.8	PP	307	PP
ENSG00000161021	MAML1	Hs.484349	331.3	PP	280.35	PP
ENSG00000173327	MAP3K11	Hs.502872	355.1	PP	326.8	PP
ENSG00000197442	MAP3K5	Hs.186486	227.6	PP	272.25	PP
ENSG00000104814	MAP4K1	Hs.95424	586.5	PP	231.45	PP
ENSG00000135525	MAP7	Hs.486548	325.7	PP	390.1	PP
ENSG00000101367	MAPRE1	Hs.472437	196.1	PP	206.85	PM

ENSG00000165406	8-Mar	Hs.499489	295.9	PP	295.85	PP
ENSG00000038274	MAT2B	Hs.54642	609.4	PP	461.9	PP
ENSG00000081189	MEF2C	Hs.444409	426	PP	437.85	PP
ENSG00000133858	MGC23401	Hs.527874	291	PP	309.55	PP
ENSG00000198408	MGEA5	Hs.500842	363.7	PP	363.05	PP
ENSG00000133606	MKRN1	Hs.490347	392.7	PP	350.15	PP
ENSG00000100330	MTMR3	Hs.474536	204.7	PP	287	PP
ENSG00000108389	MTMR4	Hs.514373	330.7	PP	407.2	PP
ENSG00000158747	NBL1	Hs.439671	370.3	PP	360.6	PA
ENSG00000125356	NDUFA1	Hs.534168	2121.1	PP	1598.7	PP
ENSG00000149308	NPAT	Hs.171061	171.1	PP	140.65	PP
ENSG00000153234	NR4A2	Hs.165258	124.6	PP	242.85	PP
ENSG00000147162	OGT	Hs.405410	165.1	PP	183.6	PP
ENSG00000141447	OSBPL1A	Hs.370725	204.6	PP	211.75	PP
ENSG00000091039	OSBPL8	Hs.430849	212	PP	251.65	PP
ENSG00000090060	PAPOLA	Hs.253726	307.4	PP	286	PP
ENSG00000185619	PCGF3	Hs.144309	192.1	PP	237.55	PP
ENSG00000025293	PHF20	Hs.517044	249.8	PP	173.65	PP
ENSG00000171033	PKIA	Hs.433700	88.6	PP	131.05	PP
ENSG00000136040	PLXNC1	Hs.551522	354.6	PP	387.1	PP
ENSG00000119414	PPP6C	Hs.495128	297.5	PP	557.55	PP
ENSG00000110851	PRDM4	Hs.506655	188.6	PP	183.55	PP
ENSG00000171862	PTEN	Hs.500466	353.7	PP	334.4	PP
ENSG00000112531	QKI	Hs.510324	284.1	PP	564.45	PP
ENSG00000103769	RAB11A	Hs.321541	1087.7	PP	1020.15	PP
ENSG00000119396	RAB14	Hs.371563	140.5	PP	198.15	PP
ENSG00000111737	RAB35	Hs.524788	394.6	PP	431.2	PP
ENSG00000111540	RAB5B	Hs.77690	234.1	PP	216.45	PP
ENSG00000175582	RAB6A	Hs.503222	371.4	PP	365.75	PP
ENSG00000119318	RAD23B	Hs.521640	156.2	PP	211.05	PP
ENSG00000127314	RAP1B	Hs.369920	1093.1	PP	1537.75	PP
ENSG00000109756	RAPGEF2	Hs.113912	394.9	PP	551.95	PP
ENSG00000101265	RASSF2	Hs.379970	129.4	PP	203.9	PP
ENSG00000023287	RB1CC1	Hs.196102	95.2	PP	147.45	PP
ENSG00000102054	RBBP7	Hs.495755	942.6	PP	1356.35	PP
ENSG00000103479	RBL2	Hs.513609	203.5	PP	188.25	PP
ENSG00000127870	RNF6	Hs.136885	74.1	PP	122.9	PP
ENSG00000043093	RP42	Hs.104613	236.5	PP	204.45	PP
ENSG00000117676	RPS6KA1	Hs.149957	288.1	PP	176.7	PA
ENSG00000100784	RPS6KA5	Hs.510225	152.1	PP	132.75	PP
ENSG00000159216	RUNX1	Hs.149261	108.8	PP	211.2	PP
ENSG00000198838	RYR3	Hs.369250	116.8	PP	131.8	PP
ENSG00000079332	SARA1	Hs.499960	233.7	PP	442.85	PP
ENSG00000140497	SCAMP2	Hs.458917	411.8	PP	495	PP
ENSG00000075223	SEMA3C	Hs.269109	95.2	PP	98.7	PP
ENSG00000168385	2-Sep	Hs.335057	952.7	PP	1251.1	PP
ENSG00000179833	SERTAD2	Hs.77293	498.4	PP	556.2	PP
ENSG00000161547	SFRS2	Hs.73965	3723.5	PP	4390.4	PP
ENSG00000162105	SHANK2	Hs.268726	137.1	PP	128.55	PP
ENSG00000175387	SMAD2	Hs.12253	243.4	PP	321.4	PP
ENSG00000163788	SNRK	Hs.476052	320.6	PP	436.65	PP
ENSG00000159140	SON	Hs.517262	408.8	PP	467.15	PP
ENSG00000196700	SOX18	Hs.8619	1264.6	PP	2674	PP

ENSG00000172845	SP3	Hs.531587	137.8	PP	293.35	PP
ENSG00000008294	SPAG9	Hs.463439	180.3	PP	209.9	PP
ENSG00000112079	STK38	Hs.409578	365.8	PP	304.4	PP
ENSG00000101945	SUV39H1	Hs.522639	267.8	PP	383.35	PP
ENSG00000135090	TAOK3	---	518.8	PP	394	PP
ENSG00000120948	TARDBP	Hs.300624	735	PP	992.75	PP
ENSG00000106052	TAX1BP1	Hs.34576	550	PP	486.2	PP
ENSG00000163659	TIPARP	Hs.12813	567.1	PP	1548.4	PP
ENSG00000183864	TOB2	Hs.474978	165.3	PP	196.4	PP
ENSG00000166340	TPP1	Hs.523454	200.3	PP	229.1	PP
ENSG00000117289	TXNIP	Hs.533977	698.8	PP	1099.3	PP
ENSG00000119048	UBE2B	Hs.385986	335	PP	417.45	PP
ENSG00000198833	UBE2J1	Hs.163776	342.7	PP	357.2	PP
ENSG00000114062	UBE3A	Hs.22543	456.9	PP	470.75	PP
ENSG00000135655	USP15	Hs.434951	197.3	PP	160.35	PP
ENSG00000173218	VANGL1	Hs.515130	73.8	PP	89.5	PA
ENSG00000122958	VPS26	Hs.499925	508.7	PP	610	PP
ENSG00000164924	YWHAZ	Hs.492407	363.6	PP	520.8	PP
ENSG00000066422	ZBTB11	Hs.301956	137.1	PP	100.65	PP
ENSG00000186908	ZDHHC17	Hs.4014	123.5	PP	166.2	PP
ENSG00000152518	ZFP36L2	Hs.503093	4553.7	PP	5205.6	PP
ENSG00000015171	ZMYND11	Hs.292265	403.3	PP	784.1	PP
ENSG00000114514	ZNF148	Hs.380334	211.6	PP	226.65	PP
ENSG00000179456	ZNF238	Hs.69997	235.7	PP	241.8	PP
ENSG00000169155	ZNF297B	Hs.355581	115.9	PP	112.4	PA

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000114770	ABCC5	Hs.368563	373.4	PP	322.1	PM
ENSG00000161533	ACOX1	Hs.464137	46.2	PP	73.15	PP
ENSG00000151726	ACSL1	Hs.406678	180.6	PP	193.15	PP
ENSG00000138071	ACTR2	Hs.393201	343.5	PP	1110.1	PP
ENSG00000023516	AKAP11	Hs.105105	88.5	PP	69.7	PP
ENSG00000151320	AKAP6	Hs.509083	137.8	PP	117.05	PP
ENSG00000117020	AKT3	Hs.498292	246.4	PP	259.35	PP
ENSG00000107104	ANKRD15	Hs.493272	235.2	PP	131.45	PP
ENSG00000142192	APP	Hs.434980	154.6	PP	154.1	PP
ENSG00000095139	ARCN1	Hs.33642	285	PP	317.05	PP
ENSG00000168374	ARF4	Hs.148330	129	PP	157.5	PP
ENSG00000134108	ARL10C	Hs.250009	578.1	PP	591.95	PP
ENSG00000110025	ARL2	Hs.502836	357.6	PP	283.6	PA
ENSG00000147416	ATP6V1B2	Hs.295917	179.5	PP	183.85	PP
ENSG00000128524	ATP6V1F	Hs.78089	1146.8	PP	588.65	PM
ENSG00000171791	BCL2	Hs.150749	151.5	PP	134.45	PP
ENSG00000138756	BMP2K	Hs.146551	239.6	PP	167.25	PP
ENSG00000145741	BTF3	Hs.529798	6371.5	PP	4884.45	PP
ENSG00000159388	BTG2	Hs.519162	588.2	PP	538.3	PP
ENSG00000110075	C11orf23	Hs.503022	402.6	PP	319.5	PA
ENSG00000168175	C14orf32	Hs.437831	559.3	PP	1440.6	PP
ENSG00000031003	C5orf5	Hs.483473	256.3	PP	316.85	PP
ENSG00000132424	C6orf111	Hs.520287	674.8	PP	743.75	PP
ENSG00000135932	CAB39	Hs.471593	527.9	PP	637.3	PP
ENSG00000135837	CAP350	Hs.413045	177.4	PP	220.9	PP
ENSG00000198898	CAPZA2	Hs.446123	100.3	PP	305.35	PA
ENSG00000067955	CBFB	Hs.460988	719.1	PP	1032	PP
ENSG00000118971	CCND2	Hs.376071	1114.1	PP	1244.6	PP
ENSG00000082258	CCNT2	Hs.292754	114.4	PP	102.75	PP
ENSG00000135535	CD164	Hs.520313	2274.9	PP	2265.25	PP
ENSG00000004897	CDC27	Hs.463295	217.6	PP	220.6	PP
ENSG00000070831	CDC42	Hs.467637	620.1	PP	437.75	PP
ENSG00000170779	CDCA4	Hs.34045	204.6	PP	276.95	PA
ENSG00000143126	CELSR2	Hs.57652	215.4	PP	148.65	PP
ENSG00000153922	CHD1	Hs.519474	89.4	PP	202.95	PP
ENSG00000177200	CHD9	Hs.530936	222.6	PP	263	PP
ENSG00000110172	CHORDC1	Hs.22857	84.8	PP	156.6	PP
ENSG00000111596	CNOT2	Hs.133350	431.4	PP	399.2	PP
ENSG00000166200	COPS2	Hs.369614	521.2	PP	700.65	PP
ENSG00000005339	CREBBP	Hs.459759	287.2	PP	239.6	PP
ENSG00000111269	CREBL2	Hs.13313	353.2	PP	216.25	PP
ENSG00000099942	CRKL	Hs.5613	126.4	PP	192.1	PP
ENSG00000009307	CSDE1	Hs.69855	1494.1	PP	1637.9	PP
ENSG00000036257	CUL3	Hs.372286	554.5	PP	473.25	PP
ENSG00000166266	CUL5	Hs.440320	285.8	PP	246.8	PP
ENSG00000121966	CXCR4	Hs.421986	532.4	PP	1919.4	PP
ENSG00000165659	DACH1	Hs.129452	95.1	PP	144.8	PP
ENSG00000124487	DDX3X	Hs.380774	769.8	PP	1229	PP
ENSG00000067048	DDX3Y	Hs.99120	302.6	PP	309.6	PA

ENSG00000158796	DEDD	Hs.517342	203.3	PP	276	PP
ENSG00000139726	DENR	Hs.22393	903	PP	1016.2	PP
ENSG00000082458	DLG3	Hs.522680	136.2	PP	89.45	PP
ENSG00000077380	DNCI2	Hs.546250	424.1	PP	451.65	PP
ENSG00000112242	E2F3	Hs.269408	295.6	PP	585.95	PP
ENSG00000171570	EGLN2	Hs.515417	259	PP	194.45	PM
ENSG00000092847	EIF2C1	Hs.22867	292.5	PP	296.95	PP
ENSG00000104131	EIF3S1	Hs.404056	340.4	PP	365.05	PP
ENSG00000107581	EIF3S10	Hs.523299	522.9	PP	586.55	PP
ENSG00000156976	EIF4A2	Hs.478553	3569	PP	6526.55	PP
ENSG00000063046	EIF4B	Hs.512629	519.2	PP	743.85	PP
ENSG00000151247	EIF4E	Hs.249718	156.7	PP	224	PP
ENSG00000110321	EIF4G2	Hs.183684	2137	PP	2701.9	PP
ENSG00000158417	EIF5B	Hs.158688	101.4	PP	113.8	PP
ENSG00000143420	ENSA	Hs.510087	977.6	PP	1356.35	PP
ENSG00000108799	EZH1	Hs.194669	211.4	PP	194.45	PP
ENSG00000139146	FAM60A	Hs.505154	598.1	PP	788	PP
ENSG00000088832	FKBP1A	Hs.471933	373.2	PP	520.25	PP
ENSG00000138757	G3BP2	Hs.303676	242.8	PP	428.55	PP
ENSG00000141429	GALNT1	Hs.514806	220	PP	273.8	PP
ENSG00000065135	GNAI3	Hs.73799	603.4	PP	763.55	PP
ENSG00000110768	GTF2H1	Hs.523510	167.7	PP	191.7	PP
ENSG00000112339	HBS1L	Hs.378532	268.3	PP	299.85	PP
ENSG00000172534	HCFC1	Hs.83634	146.2	PP	233.9	PA
ENSG00000143321	HDGF	Hs.506748	243.6	PP	858.8	PP
ENSG00000181061	HIG1	Hs.7917	396.7	PP	564.55	PP
ENSG00000078140	HIP2	Hs.50308	60.5	PP	68.4	PP
ENSG00000122566	HNRPA2B1	Hs.487774	1802.2	PP	2268.3	PP
ENSG00000170144	HNRPA3	Hs.516539	375.5	PP	558.6	PP
ENSG00000126945	HNRPH2	Hs.278857	189.2	PP	158.45	PP
ENSG00000104824	HNRPL	Hs.446623	1060.2	PP	889.7	PP
ENSG00000153807	**HOXA10**	Hs.110637	161.3	PP	200.7	PA
ENSG00000120087	**HOXB7**	Hs.436181	110.1	PP	108.7	PP
ENSG00000164164	HSHIN1	Hs.270851	303.1	PP	312.65	PP
ENSG00000109971	HSPA8	Hs.180414	2288	PP	5615.25	PP
ENSG00000171105	INSR	Hs.465744	247.7	PP	292.45	PP
ENSG00000143164	IQWD1	Hs.435741	168.5	PP	156.4	PP
ENSG00000008083	JARID2	Hs.269059	1015	PP	894	PP
ENSG00000170852	KBTBD2	Hs.372541	412.2	PP	381.65	PP
ENSG00000176407	KCMF1	Hs.345694	751.2	PP	938.3	PP
ENSG00000121774	KHDRBS1	Hs.445893	1363	PP	1395.2	PP
ENSG00000131149	KIAA0182	Hs.461647	273.2	PP	316.15	PP
ENSG00000126775	KIAA0831	Hs.414809	254.4	PP	217.45	PP
ENSG00000136826	**KLF4**	Hs.376206	536.5	PP	1193.7	PP
ENSG00000102753	KPNA3 /// LAT1-3TM /// BOLA2 ///	Hs.527919	250.8	PP	391.35	PP
ENSG00000197017	LOC595101	Hs.444600	269.6	PP	389.55	PP
ENSG00000168016	LBA1	Hs.517761	235.1	PP	174.9	PP
ENSG00000120963	LOC51123	Hs.374485	636.6	PP	626.2	PP
ENSG00000198799	LRIG2	Hs.448972	194.9	PP	178.65	PP
ENSG00000011009	LYPLA2 ///	Hs.534075	585.5	PP	486	PP

	LYPLA2P1 /// LOC388499					
ENSG00000127603	MACF1	Hs.472475	222.8	PP	248.35	PP
ENSG00000169032	MAP2K1	Hs.145442	188.8	PP	162.95	PP
ENSG00000047849	MAP4	Hs.517949	302.6	PP	276.5	PP
ENSG00000135525	MAP7	Hs.486548	325.7	PP	390.1	PP
ENSG00000101367	MAPRE1	Hs.472437	196.1	PP	206.85	PM
ENSG00000152601	MBNL1	Hs.478000	294.4	PP	864.5	PP
ENSG00000198408	MGEA5	Hs.500842	363.7	PP	363.05	PP
ENSG00000051825	MPHOSPH9	Hs.507175	261.2	PP	160.5	PP
ENSG00000108389	MTMR4	Hs.514373	330.7	PP	407.2	PP
ENSG00000170873	MTSS1	Hs.336994	152.7	PP	194.6	PP
ENSG00000136504	MYST2	Hs.21907	331.7	PP	192.25	PP
ENSG00000102921	N4BP1	Hs.511839	682.3	PP	668.7	PP
ENSG00000082641	NFE2L1	Hs.514284	735.5	PP	726.35	PP
ENSG00000153234	NR4A2	Hs.165258	124.6	PP	242.85	PP
ENSG00000180530	NRIP1	Hs.155017	842	PP	914.85	PP
ENSG00000147162	OGT	Hs.405410	165.1	PP	183.6	PP
ENSG00000167770	OTUB1	Hs.473788	266	PP	155.35	PA
ENSG00000142864	PAI-RBP1	Hs.530412	337.8	PP	662.45	PP
ENSG00000145730	PAM	Hs.369430	187.3	PP	178.45	PP
ENSG00000168283	PCGF4	Hs.380403	254.7	PP	304.1	PP
ENSG00000120265	PCMT1	Hs.279257	488.1	PP	649.4	PP
ENSG00000081154	PCNP	Hs.549185	281.6	PP	507.95	PP
ENSG00000059758	PCTK2	Hs.506415	118.3	PP	220.9	PP
ENSG00000150593	PDCD4	Hs.232543	174.3	PP	122.55	PP
ENSG00000143870	PDIA6	Hs.212102	357.6	PP	852.3	PP
ENSG00000130024	PHF10	Hs.435933	375.2	PP	371.15	PP
ENSG00000043143	PHF15	Hs.483419	234	PP	320.3	PP
ENSG00000025293	PHF20	Hs.517044	249.8	PP	173.65	PP
ENSG00000033800	PIAS1	Hs.162458	102	PP	168.6	PP
ENSG00000145675	PIK3R1	Hs.132225	249.1	PP	181	PP
ENSG00000137193	PIM1	Hs.81170	1021.7	PP	801.85	PP
ENSG00000118495	PLAGL1	Hs.444975	187.1	PP	357.8	PP
ENSG00000052126	PLEKHA5	Hs.188614	312.4	PP	557.7	PP
ENSG00000125686	PPARBP	Hs.462956	187.8	PP	321.7	PP
ENSG00000100614	PPM1A	Hs.130036	197.3	PP	259.8	PP
ENSG00000163806	PPP1CB	Hs.468018	65.7	PP	135.05	PP
ENSG00000112498	PPP1R11	Hs.82887	484.7	PP	463.3	PP
ENSG00000078304	PPP2R5C	Hs.368264	174.9	PP	165.25	PP
ENSG00000107758	PPP3CB	Hs.500067	318.9	PP	241.25	PP
ENSG00000119414	PPP6C	Hs.495128	297.5	PP	557.55	PP
ENSG00000110851	PRDM4	Hs.506655	188.6	PP	183.55	PP
ENSG00000122862	PRG1	Hs.1908	802.8	PP	1516.65	PP
ENSG00000117569	PTBP2	Hs.269895	183	PP	160.15	PP
ENSG00000134644	PUM1	Hs.281707	378.4	PP	422.3	PP
ENSG00000185129	PURA	Hs.443121	149.5	PP	224.95	PP
ENSG00000112531	QKI	Hs.510324	284.1	PP	564.45	PP
ENSG00000138069	RAB1A	Hs.310645	70.8	PP	109.75	PM
ENSG00000119318	RAD23B	Hs.521640	156.2	PP	211.05	PP
ENSG00000010017	RANBP9	Hs.306242	381.3	PP	489.95	PP
ENSG00000127314	RAP1B	Hs.369920	1093.1	PP	1537.75	PP

ENSG00000138698	RAP1GDS1	Hs.132858	169	PP	213.85	PP
ENSG00000109756	RAPGEF2	Hs.113912	394.9	PP	551.95	PP
ENSG00000077092	RARB	Hs.436538	111.5	PP	156.85	PP
ENSG00000197676	RBM16	Hs.227602	193.8	PP	274	PP
ENSG00000004534	RBM6	Hs.188879	383.9	PP	251.5	PP
ENSG00000067560	RHOA	Hs.247077	1537.7	PP	2368.8	PP
ENSG00000126858	RHOT1	Hs.462742	196.4	PP	304.85	PP
ENSG00000176624	RKHD2	Hs.465144	210.8	PP	216	PP
ENSG00000022840	RNF10	Hs.442798	327.5	PP	282.35	PM
ENSG00000134758	RNF138	Hs.302408	186.9	PP	511.9	PP
ENSG00000137075	RNF38	Hs.333503	322.6	PP	227.7	PP
ENSG00000167971	RNPS1	Hs.355643	1024.8	PP	1501.95	PP
ENSG00000144713	RPL32	Hs.265174	21137	PP	15449.05	PP
ENSG00000130779	RSN	Hs.524809	76.6	PP	58.05	PP
ENSG00000137815	RTF1	Hs.511096	194.3	PP	256.85	PP
ENSG00000115310	RTN4	Hs.429581	710.8	PP	1341.5	PP
ENSG00000159216	RUNX1	Hs.149261	108.8	PP	211.2	PP
ENSG00000163602	RYBP	Hs.7910	398	PP	462.8	PP
ENSG00000130066	SAT	Hs.28491	972.4	PP	1889.05	PP
ENSG00000151967	SCHIP1	Hs.134665	497	PP	417.95	PP
ENSG00000010803	SCMH1	Hs.87464	251.2	PP	190.45	PP
ENSG00000137575	SDCBP	Hs.200804	934	PP	955.25	PP
ENSG00000156642	SDFR1	Hs.187866	169.4	PP	193.05	PP
ENSG00000092421	SEMA6A	Hs.156967	140	PP	182.2	PP
ENSG00000168385	2-Sep	Hs.335057	952.7	PP	1251.1	PP
ENSG00000080546	SESN1	Hs.59554	235	PP	276.4	PP
ENSG00000116754	SFRS11	Hs.479693	819.9	PP	1077.55	PP
ENSG00000153914	SFRS12	Hs.519347	258	PP	229.6	PP
ENSG00000161547	SFRS2	Hs.73965	3723.5	PP	4390.4	PP
ENSG00000100650	SFRS5	Hs.166975	4459.7	PP	3466.15	PP
ENSG00000162105	SHANK2	Hs.268726	137.1	PP	128.55	PP
ENSG00000108061	SHOC2	Hs.104315	283.3	PP	262.55	PP
ENSG00000196470	SIAH1	Hs.295923	216.3	PP	346.15	PP
ENSG00000096717	SIRT1	Hs.369779	133.8	PP	124.9	PP
ENSG00000059804	SLC2A3	Hs.419240	275.9	PP	351.5	PP
ENSG00000080493	SLC4A4	Hs.5462	124.5	PP	268.4	PP
ENSG00000112305	SMAP1	Hs.485717	205.2	PP	129.15	PP
ENSG00000102038	SMARCA1	Hs.152292	101.1	PP	72.95	PA
ENSG00000163788	SNRK	Hs.476052	320.6	PP	436.65	PP
ENSG00000120833	SOCS2	Hs.485572	715.8	PP	806.65	PP
ENSG00000159140	SON	Hs.517262	408.8	PP	467.15	PP
ENSG00000137642	SORL1	Hs.368592	2264.1	PP	1084.65	PP
ENSG00000147475	SPFH2	Hs.125849	125.1	PP	180.9	PP
ENSG00000090054	SPTLC1	Hs.90458	251.2	PP	312.95	PP
ENSG00000096063	SRPK1	Hs.443861	231.6	PP	200.5	PP
ENSG00000124783	SSR1	Hs.114033	600.7	PP	686.65	PP
ENSG00000167323	STIM1	Hs.501735	143.2	PP	99.7	PP
ENSG00000166301	STK19	Hs.485102	527.6	PP	424	PP
ENSG00000117632	STMN1	Hs.209983	546.6	PP	663.4	PP
ENSG00000092201	SUPT16H	Hs.213724	531.6	PP	508.3	PP
ENSG00000178691	SUZ12	Hs.462732	602.2	PP	633.3	PP
ENSG00000008282	SYPL1	Hs.80919	157.3	PP	190.55	PP
ENSG00000135090	TAOK3	---	518.8	PP	394	PP

ENSG00000120948	TARDBP	Hs.300624	735	PP	992.75	PP
ENSG00000112592	TBP	Hs.1100	218	PP	214.95	PP
ENSG00000028839	TBPL1	Hs.486507	170.1	PP	187.95	PP
ENSG00000165169	TCTE1L	Hs.446392	323	PP	369.75	PP
ENSG00000198586	TLK1	Hs.470586	150.2	PP	117.65	PP
ENSG00000170348	TMP21	Hs.74137	293.5	PP	280.3	PA
ENSG00000076554	TPD52	Hs.368433	144.2	PP	223.7	PP
ENSG00000111669	TPI1	Hs.524219	1154.9	PP	1213.85	PP
ENSG00000067167	TRAM1	Hs.491988	573.3	PP	894.4	PP
ENSG00000054116	TRAPPC3	Hs.523131	245.5	PP	340.85	PM
ENSG00000157514	TSC22D3	Hs.522074	1752.5	PP	2189.45	PP
ENSG00000077721	UBE2A	Hs.379466	299.1	PP	400.85	PP
ENSG00000131508	UBE2D2	Hs.108332	400.1	PP	512.05	PP
ENSG00000170142	UBE2E1	Hs.164853	318.4	PP	488.3	PP
ENSG00000170035	UBE2E3	Hs.470804	311.5	PP	258.25	PP
ENSG00000103275	UBE2I	Hs.302903	452.9	PP	427.25	PP
ENSG00000198833	UBE2J1	Hs.163776	342.7	PP	357.2	PP
ENSG00000160714	UBE2Q	Hs.516587	457.1	PP	377.95	PP
ENSG00000124208	UBE2V1 /// Kua-UEV	Hs.420529	504.3	PP	320.6	PP
ENSG00000130939	UBE4B	Hs.386404	291.8	PP	387.95	PP
ENSG00000152484	USP12	Hs.42400	170.4	PP	158.75	PP
ENSG00000101557	USP14	Hs.464416	542.5	PP	836.8	PP
ENSG00000135655	USP15	Hs.434951	197.3	PP	160.35	PP
ENSG00000170832	USP32	Hs.132868	120.2	PP	118.35	PP
ENSG00000049245	VAMP3	Hs.66708	730.1	PP	588.5	PP
ENSG00000118640	VAMP8	Hs.534373	891.4	PP	1443.1	PP
ENSG00000101558	VAPA	Hs.165195	1051.8	PP	1198.45	PP
ENSG00000108828	VAT1	Hs.514199	649.7	PP	585.4	PP
ENSG00000167987	VPS37C	Hs.523715	163.6	PP	123.15	PA
ENSG00000143952	VPS54	Hs.48499	187.9	PP	151.5	PP
ENSG00000100568	VTI1B	Hs.144868	361.4	PP	272.7	PP
ENSG00000084463	WBP11	Hs.524281	245.3	PP	325.4	PP
ENSG00000085433	WDR47	Hs.546347	90.4	PP	116.6	PP
ENSG00000157954	WIPI-2	Hs.122363	680.5	PP	572.7	PP
ENSG00000109046	WSB1	Hs.446017	679.3	PP	880.75	PP
ENSG00000115254	XAB1	Hs.18259	544.2	PP	566.2	PP
ENSG00000083896	YT521	Hs.175955	318.2	PP	505.9	PP
ENSG00000108953	YWHAE	Hs.513851	328.6	PP	424.95	PP
ENSG00000128245	YWHAH	Hs.226755	195	PP	195.4	PP
ENSG00000134308	YWHAQ	Hs.74405	922.3	PP	2337.65	PP
ENSG00000107372	ZA20D2	Hs.406096	967.2	PP	1262.9	PP
ENSG00000086666	ZA20D3	Hs.306329	735.1	PP	517.75	PP
ENSG00000186908	ZDHHC17	Hs.4014	123.5	PP	166.2	PP
ENSG00000179456	ZNF238	Hs.69997	235.7	PP	241.8	PP
ENSG00000149182	ZNF289	Hs.436204	600.4	PP	330.95	PP
ENSG00000119725	ZNF410	Hs.270869	164.4	PP	257.1	PP
ENSG00000036549	ZZZ3	Hs.480506	125	PP	189.7	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000165029	ABCA1	Hs.429294	175.1	PP	156.5	PP
ENSG00000184009	ACTG1	Hs.514581	11731	PP	14874	PP
ENSG00000172493	AFF1	Hs.480190	480.6	PP	776.35	PP
ENSG00000062725	APPBP2	Hs.84084	106.4	PP	116.15	PA
ENSG00000177479	ARIH2	Hs.241558	296.7	PP	352.5	PP
ENSG00000171456	ASXL1	Hs.374043	275.6	PP	307.25	PP
ENSG00000095739	BAMBI	Hs.533336	207.8	PP	106.85	PP
ENSG00000163444	C1orf37	Hs.497443	290.5	PP	291.25	PP
ENSG00000136932	C9orf156	Hs.9196	133.4	PP	159.1	PP
ENSG00000111596	CNOT2	Hs.133350	431.4	PP	399.2	PP
ENSG00000005339	CREBBP	Hs.459759	287.2	PP	239.6	PP
ENSG00000167193	CRK	Hs.461896	114.9	PP	153.9	PP
ENSG00000060138	CSDA	Hs.221889	969.1	PP	2074.95	PP
ENSG00000048740	CUGBP2	Hs.309288	159.6	PP	334.5	PP
ENSG00000036257	CUL3	Hs.372286	554.5	PP	473.25	PP
ENSG00000071626	DAZAP1	Hs.222510	49.7	PP	130.7	PA
ENSG00000124487	DDX3X	Hs.380774	769.8	PP	1229	PP
ENSG00000161202	DVL3	Hs.388116	134.8	PP	206.95	PP
ENSG00000112242	E2F3	Hs.269408	295.6	PP	585.95	PP
ENSG00000170522	ELOVL6	Hs.412939	96.5	PP	156.45	PP
ENSG00000168137	FLJ10707	Hs.288164	452.5	PP	256.1	PM
ENSG00000141429	GALNT1	Hs.514806	220	PP	273.8	PP
ENSG00000107485	**GATA3**	Hs.524134	170	PP	187.35	PP
ENSG00000159592	GPBP1L1	Hs.238432	275.7	PP	300.05	PP
ENSG00000106070	GRB10	Hs.164060	550.7	PP	574.15	PP
ENSG00000110768	GTF2H1	Hs.523510	167.7	PP	191.7	PA
ENSG00000077809	GTF2I /// GTF2IP1	Hs.520459	325.7	PP	556	PP
ENSG00000103657	HERC1	Hs.210385	186.9	PP	236.05	PP
ENSG00000010818	HIVEP2	Hs.510172	149.6	PP	157.9	PP
ENSG00000138668	HNRPD	Hs.480073	785.7	PP	1067.15	PP
ENSG00000165119	HNRPK	Hs.449171	761	PP	1269.35	PP
ENSG00000126814	KIAA1393	Hs.380159	1228.6	PP	1731.35	PP
ENSG00000136826	**KLF4**	Hs.376206	536.5	PP	1193.7	PP
ENSG00000120963	LOC51123	Hs.374485	636.6	PP	626.2	PP
ENSG00000124831	LRRFIP1	Hs.471779	429.8	PP	408.25	PP
ENSG00000135341	MAP3K7	Hs.485968	180.7	PP	202.05	PP
ENSG00000047849	MAP4	Hs.517949	302.6	PP	276.5	PP
ENSG00000101367	MAPRE1	Hs.472437	196.1	PP	206.85	PM
ENSG00000168906	MAT2A	Hs.516157	1011.4	PP	738.6	PP
ENSG00000134046	MBD2	Hs.25674	271.8	PP	193.25	PP
ENSG00000125445	MRPS7	Hs.71787	381.8	PP	338.3	PA
ENSG00000100330	MTMR3	Hs.474536	204.7	PP	287	PP
ENSG00000198646	NCOA6	Hs.368971	334.7	PP	445.5	PP
ENSG00000196498	NCOR2	Hs.137510	340.6	PP	374.05	PP
ENSG00000147140	NONO	Hs.533282	2434.4	PP	2382.1	PP
ENSG00000125686	PPARBP	Hs.462956	187.8	PP	321.7	PP
ENSG00000078304	PPP2R5C	Hs.368264	174.9	PP	165.25	PP
ENSG00000171862	PTEN	Hs.500466	353.7	PP	334.4	PP

ENSG00000134644	PUM1	Hs.281707	378.4	PP	422.3	PP
ENSG00000055917	PUM2	Hs.467824	238.6	PP	313.25	PP
ENSG00000109756	RAPGEF2	Hs.113912	394.9	PP	551.95	PP
ENSG00000023287	RB1CC1	Hs.196102	95.2	PP	147.45	PP
ENSG00000137075	RNF38	Hs.333503	322.6	PP	227.7	PP
ENSG00000163602	RYBP	Hs.7910	398	PP	462.8	PP
ENSG00000138760	SCARB2	Hs.349656	81.4	PP	116.15	PP
ENSG00000136450	SFRS1	Hs.68714	1264.9	PP	1622.65	PP
ENSG00000134294	SLC38A2	Hs.221847	634.3	PP	1026.55	PP
ENSG00000112305	SMAP1	Hs.485717	205.2	PP	129.15	PP
ENSG00000173473	SMARCC1	Hs.476179	487	PP	483.35	PP
ENSG00000114520	SNX4	Hs.507243	125.1	PP	245.1	PP
ENSG00000159140	SON	Hs.517262	408.8	PP	467.15	PP
ENSG00000008294	SPAG9	Hs.463439	180.3	PP	209.9	PP
ENSG00000113140	SPARC	Hs.111779	427	PP	408.4	PP
ENSG00000102572	STK24	Hs.508514	958.4	PP	1363.75	PP
ENSG00000143367	TUFT1	Hs.489922	173.6	PP	135.35	PP
ENSG00000109332	UBE2D3	Hs.472031	471.2	PP	635.4	PP
ENSG00000132388	UBE2G1	Hs.462035	272.5	PP	373.45	PP
ENSG00000015171	ZMYND11	Hs.292265	403.3	PP	784.1	PP

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see 16b

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	BM RFU
ENSG00000114770	ABCC5	Hs.368563	373.4	322.1
ENSG00000151726	ACSL1	Hs.406678	180.6	193.15
ENSG00000173020	ADRBK1	Hs.83636	706	549.3
ENSG00000172493	AFF1	Hs.480190	480.6	776.35
ENSG00000168448	AGPAT1	Hs.409230	228.5	163.65
ENSG00000151320	AKAP6	Hs.509083	137.8	117.05
ENSG00000117020	AKT3	Hs.498292	246.4	259.35
ENSG00000107104	ANKRD15	Hs.493272	235.2	131.45
ENSG00000084234	APLP2	Hs.370247	1126.7	668.55
ENSG00000062725	APPBP2	Hs.84084	106.4	116.15
ENSG00000134287	ARF3	Hs.119177	302.8	475.75
ENSG00000177479	ARIH2	Hs.241558	296.7	352.5
ENSG00000138175	ARL3	Hs.182215	285.9	225.1
ENSG00000143153	ATP1B1	Hs.291196	132.4	245.55
ENSG00000174437	ATP2A2	Hs.506759	203.5	255.4
ENSG00000119866	BCL11A	Hs.370549	363.1	387.8
ENSG00000171791	BCL2	Hs.150749	151.5	134.45
ENSG00000029363	BCLAF1	Hs.486542	659.8	1252.25
ENSG00000134107	BHLHB2	Hs.171825	482.8	341.5
ENSG00000181915	C10orf22	Hs.99821	226.3	203.45
ENSG00000139746	C13orf10	Hs.131715	119.8	178.7
ENSG00000163875	C1orf149	Hs.17118	322.9	274.45

ENSG00000117616	C1orf63	Hs.259412	1202.1	1000.85
ENSG00000031003	C5orf5	Hs.483473	256.3	316.85
ENSG00000132424	C6orf111	Hs.520287	674.8	743.75
ENSG00000112308	C6orf62	Hs.519930	330.6	509.45
ENSG00000074410	CA12	Hs.210995	125.1	133.8
ENSG00000135932	CAB39	Hs.471593	527.9	637.3
ENSG00000168564	CARF	Hs.32922	72.4	130
ENSG00000142453	CARM1	Hs.371416	141.6	105.7
ENSG00000110619	CARS	Hs.274873	822.3	683.8
ENSG00000110848	CD69	Hs.208854	1631.5	1082.1
ENSG00000114331	CENTB2	Hs.478746	117.5	82.45
ENSG00000163320	CGGBP1	Hs.444818	693.4	680
ENSG00000177200	CHD9	Hs.530936	222.6	263
ENSG00000111596	CNOT2	Hs.133350	431.4	399.2
ENSG00000108848	CROP	Hs.130293	2166.4	1637.55
ENSG00000198561	CTNND1	Hs.166011	160.6	172.65
ENSG00000149187	CUGBP1	Hs.530727	332.5	326.7
ENSG00000048740	CUGBP2	Hs.309288	159.6	334.5
ENSG00000036257	CUL3	Hs.372286	554.5	473.25
ENSG00000121966	CXCR4	Hs.421986	532.4	1919.4
ENSG00000183283	DAZAP2	Hs.369761	1267.2	976.7
ENSG00000124487	DDX3X	Hs.380774	769.8	1229
ENSG00000067048	DDX3Y	Hs.99120	302.6	309.6
ENSG00000136986	DERL1	Hs.241576	223	240.65
ENSG00000092964	DPYSL2	Hs.173381	505.1	495.1
ENSG00000143507	DUSP10	Hs.497822	328.9	371.8
ENSG00000139318	DUSP6	Hs.298654	166.6	316.85
ENSG00000120738	EGR1	Hs.326035	128.6	290.15
ENSG00000092847	EIF2C1	Hs.22867	292.5	296.95
ENSG00000123908	EIF2C2	Hs.449415	150.2	115.85
ENSG00000156976	EIF4A2	Hs.478553	3569	6526.55
ENSG00000132507	EIF5A	Hs.534314	1102.8	2858.65
ENSG00000109381	ELF2	Hs.260903	150.8	152.4
ENSG00000120616	EPC1	Hs.167805	148.9	88.7
ENSG00000157554	ERG	Hs.473819	369.4	298.05
ENSG00000120705	ETF1	Hs.483494	253.8	461.55
ENSG00000139146	FAM60A	Hs.505154	598.1	788
ENSG00000138081	FBXO11	Hs.553547	155.7	259.35
ENSG00000143756	FBXO28	Hs.64691	106.1	70.5
ENSG00000196504	FNBP3	Hs.298735	158.7	311.55
ENSG00000170345	FOS	Hs.25647	1254.3	1832.65
ENSG00000114861	FOXP1	Hs.431498	322.7	410.3
ENSG00000138757	G3BP2	Hs.303676	242.8	428.55
ENSG00000165219	GAPVD1	Hs.495134	250	262.35
ENSG00000165678	GHITM	Hs.352656	765.3	729.1
ENSG00000115419	GLS	Hs.116448	217.6	242.2
ENSG00000127955	GNAI1	Hs.134587	104.9	139.15
ENSG00000106070	GRB10	Hs.164060	550.7	574.15
ENSG00000103342	GSPT1	Hs.528780	356.7	369.6
ENSG00000166503	HDGFRP3	Hs.513954	139.2	156
ENSG00000112406	HECA	Hs.197644	352.2	377.45
ENSG00000163349	HIPK1	Hs.532363	347.7	488.5
ENSG00000189403	HMGB1	Hs.434102	500.1	602.95

ENSG00000164104	HMGB2		Hs.434953	855.9	2145.45
ENSG00000177733	HNRPA0		Hs.96996	655	723.4
ENSG00000169045	HNRPH1		Hs.202166	1986.4	2132.6
ENSG00000096746	HNRPH3		Hs.499891	408.7	635.5
ENSG00000165119	HNRPK		Hs.449171	761	1269.35
ENSG00000120075	**HOXB5**		Hs.149548	322	238.15
ENSG00000173744	HRB		Hs.443507	202.6	405.7
ENSG00000164164	HSHIN1		Hs.270851	303.1	312.65
ENSG00000044574	HSPA5		Hs.522394	1536.9	3296.1
ENSG00000129351	ILF3		Hs.465885	191	302.25
ENSG00000068383	INPP5A		Hs.523360	302.3	279.95
ENSG00000148384	INPP5E		Hs.120998	206.1	242.45
ENSG00000145703	IQGAP2		Hs.291030	537.8	457.9
ENSG00000121774	KHDRBS1		Hs.445893	1363	1395.2
ENSG00000131149	KIAA0182		Hs.461647	273.2	316.15
ENSG00000145725	KIAA0433		Hs.212046	164.5	186.45
ENSG00000067082	**KLF6**		Hs.285313	684.3	579.85
ENSG00000114030	KPNA1		Hs.161008	121.8	91.95
ENSG00000168016	LBA1		Hs.517761	235.1	174.9
ENSG00000143815	LBR		Hs.435166	1166	1807.35
ENSG00000148943	LIN7C		Hs.91393	87.3	121.85
ENSG00000124831	LRRFIP1		Hs.471779	429.8	408.25
ENSG00000121579	MAK3		Hs.269528	268.8	307
ENSG00000166963	MAP1A		Hs.194301	433.9	321.4
ENSG00000055208	MAP3K7IP2		Hs.269775	219.1	142.8
ENSG00000145495		6-Mar	Hs.432862	597.3	536.05
ENSG00000175130	MARCKSL1		Hs.75061	314.8	265.6
ENSG00000168906	MAT2A		Hs.516157	1011.4	738.6
ENSG00000164024	METAP1		Hs.480364	351.6	422.25
ENSG00000168282	MGAT2		Hs.93338	130.6	123.5
ENSG00000133606	MKRN1		Hs.490347	392.7	350.15
ENSG00000171843	MLLT3		Hs.493585	405.3	334.5
ENSG00000185787	MORF4L1		Hs.374503	3350.8	4457.05
ENSG00000123562	MORF4L2		Hs.326387	2189.8	2626.1
ENSG00000101928	MOSPD1		Hs.378505	121.1	171.3
ENSG00000005810	MYCBP2		Hs.151411	187	643.55
ENSG00000133026	MYH10		Hs.16355	375.1	362.5
ENSG00000136504	MYST2		Hs.21907	331.7	192.25
ENSG00000138386	NAB1		Hs.107474	187.9	203.9
ENSG00000131507	NDFIP1		Hs.9788	112	90.45
ENSG00000137420	NOL7		Hs.549161	1095.5	1222.05
ENSG00000181163	NPM1		Hs.519452	8905.6	11897.7
ENSG00000153234	NR4A2		Hs.165258	124.6	242.85
ENSG00000180530	NRIP1		Hs.155017	842	914.85
ENSG00000035681	NSMAF		Hs.372000	517.1	517.75
ENSG00000124789	NUP153		Hs.121088	216.4	291.8
ENSG00000115758	ODC1		Hs.467701	843.3	1634.7
ENSG00000147162	OGT		Hs.405410	165.1	183.6
ENSG00000182606	OIP106		Hs.535711	319.3	255.5
ENSG00000091039	OSBPL8		Hs.430849	212	251.65
ENSG00000100836	PABPN1		Hs.117176	758.2	790.85
ENSG00000145730	PAM		Hs.369430	187.3	178.45
ENSG00000115421	PAPOLG		Hs.387471	153.2	91.25

ENSG00000056661	PCGF2	Hs.371617	231.6	160.8
ENSG00000081154	PCNP	Hs.549185	281.6	507.95
ENSG00000059758	PCTK2	Hs.506415	118.3	220.9
ENSG00000114209	PDCD10	Hs.478150	463.6	560.4
ENSG00000150593	PDCD4	Hs.232543	174.3	122.55
ENSG00000143870	PDIA6	Hs.212102	357.6	852.3
ENSG00000197329	PELI1	Hs.7886	83.3	154.5
ENSG00000132326	PER2	Hs.58756	162.6	308.65
ENSG00000043143	PHF15	Hs.483419	234	320.3
ENSG00000118482	PHF3	Hs.348921	260	268.9
ENSG00000073921	PICALM	Hs.163893	357.3	315.6
ENSG00000104886	PLEKHJ1	Hs.501353	436	272.7
ENSG00000102024	PLS3	Hs.496622	74.1	110.95
ENSG00000136040	PLXNC1	Hs.551522	354.6	387.1
ENSG00000112941	POLS	Hs.481542	355.5	367.35
ENSG00000138032	PPM1B	Hs.416769	79.1	82.15
ENSG00000163806	PPP1CB	Hs.468018	65.7	135.05
ENSG00000197746	PSAP	Hs.523004	1015.2	647.25
ENSG00000125818	PSMF1	Hs.471917	254.5	259.45
ENSG00000117569	PTBP2	Hs.269895	183	160.15
ENSG00000134644	PUM1	Hs.281707	378.4	422.3
ENSG00000185129	PURA	Hs.443121	149.5	224.95
ENSG00000112531	QKI	Hs.510324	284.1	564.45
ENSG00000103769	RAB11A	Hs.321541	1087.7	1020.15
ENSG00000119396	RAB14	Hs.371563	140.5	198.15
ENSG00000175582	RAB6A	Hs.503222	371.4	365.75
ENSG00000164754	RAD21	Hs.81848	281.3	414.9
ENSG00000108175	RAI17	Hs.193118	574.3	778.8
ENSG00000132341	RAN	Hs.10842	1434.8	2597
ENSG00000065150	RANBP5	Hs.513057	123.7	118.85
ENSG00000010017	RANBP9	Hs.306242	381.3	489.95
ENSG00000127314	RAP1B	Hs.369920	1093.1	1537.75
ENSG00000138698	RAP1GDS1	Hs.132858	169	213.85
ENSG00000109756	RAPGEF2	Hs.113912	394.9	551.95
ENSG00000102054	RBBP7	Hs.495755	942.6	1356.35
ENSG00000086589	RBM22	Hs.202023	339.1	441.85
ENSG00000119707	RBM25	Hs.531106	231.5	319.9
ENSG00000168214	RBPSUH	Hs.479396	79.3	100.35
ENSG00000089902	RCOR1	Hs.510521	118.3	144.05
ENSG00000176624	RKHD2	Hs.465144	210.8	216
ENSG00000170633	RNF34	Hs.292804	424.6	385.65
ENSG00000043093	RP42	Hs.104613	236.5	204.45
ENSG00000130779	RSN	Hs.524809	76.6	58.05
ENSG00000137815	RTF1	Hs.511096	194.3	256.85
ENSG00000159216	RUNX1	Hs.149261	108.8	211.2
ENSG00000163602	RYBP	Hs.7910	398	462.8
ENSG00000079332	SARA1	Hs.499960	233.7	442.85
ENSG00000151967	SCHIP1	Hs.134665	497	417.95
ENSG00000156642	SDFR1	Hs.187866	169.4	193.05
ENSG00000168758	SEMA4C	Hs.516220	186.7	157.95
ENSG00000179833	SERTAD2	Hs.77293	498.4	556.2
ENSG00000096717	SIRT1	Hs.369779	133.8	124.9
ENSG00000165646	SLC18A2	Hs.369009	271.3	225.6

ENSG00000147454	SLC25A37	Hs.122514	103	86.95
ENSG00000059804	SLC2A3	Hs.419240	275.9	351.5
ENSG00000134294	SLC38A2	Hs.221847	634.3	1026.55
ENSG00000112305	SMAP1	Hs.485717	205.2	129.15
ENSG00000077147	SMBP	Hs.500674	358.3	250.05
ENSG00000159140	SON	Hs.517262	408.8	467.15
ENSG00000115904	SOS1	Hs.278733	144	169.4
ENSG00000067066	SP100	Hs.369056	171.3	158.85
ENSG00000091640	SPAG7	Hs.90436	900.7	517.9
ENSG00000135250	SRPK2	Hs.285197	106.2	118.7
ENSG00000198648	STK39	Hs.276271	129.8	111.35
ENSG00000117632	STMN1	Hs.209983	546.6	663.4
ENSG00000168952	STXBP6	Hs.508958	152.6	218.55
ENSG00000008282	SYPL1	Hs.80919	157.3	190.55
ENSG00000120948	TARDBP	Hs.300624	735	992.75
ENSG00000028839	TBPL1	Hs.486507	170.1	187.95
ENSG00000113649	TCERG1	Hs.443465	196.5	257.25
ENSG00000136205	TENS1	Hs.520814	443.4	221.15
ENSG00000198176	TFDP1	Hs.79353	156.5	362.8
ENSG00000198561	TMX2	Hs.279861	484.9	411
ENSG00000166598	TRA1	Hs.192374	151	339.35
ENSG00000165699	TSC1	Hs.370854	232.7	242.3
ENSG00000119048	UBE2B	Hs.385986	335	417.45
ENSG00000160714	UBE2Q	Hs.516587	457.1	377.95
ENSG00000124208	UBE2V1 /// Kua-UEV	Hs.420529	504.3	320.6
ENSG00000009335	UBE3C	Hs.118351	67.5	175.9
ENSG00000153560	UBP1	Hs.118041	280.2	408.6
ENSG00000135655	USP15	Hs.434951	197.3	160.35
ENSG00000077254	USP33	Hs.480597	228.7	299.75
ENSG00000108828	VAT1	Hs.514199	649.7	585.4
ENSG00000144560	VGLL4	Hs.373959	299.7	175.6
ENSG00000109046	WSB1	Hs.446017	679.3	880.75
ENSG00000083896	YT521	Hs.175955	318.2	505.9
ENSG00000100811	YY1	Hs.388927	539.7	740.2
ENSG00000107372	ZA20D2	Hs.406096	967.2	1262.9
ENSG00000086666	ZA20D3	Hs.306329	735.1	517.75
ENSG00000058673	ZC3H11A	Hs.532399	665.7	989.4
ENSG00000153786	ZDHHC7	Hs.461610	713.7	620.1
ENSG00000152518	ZFP36L2	Hs.503093	4553.7	5205.6
ENSG00000170949	ZNF160	Hs.467236	1056.4	1016.85
ENSG00000179456	ZNF238	Hs.69997	235.7	241.8

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000161203	AP2M1	Hs.518460	687.4	PP	387.65	PA
ENSG00000108561	C1QBP	Hs.553487	302.1	PP	421.75	PP
ENSG00000104327	CALB1	Hs.65425	79.6	PP	42.05	PA
ENSG00000102974	CTCF	Hs.368367	506.1	PP	535.55	PP
ENSG00000075711	DLG1	Hs.292549	327.5	PP	426.8	PP

ENSG00000086061	DNAJA1	Hs.445203	1073.8	PP	1437.15	PP
ENSG00000120699	EXOSC8	Hs.294041	196.9	PP	283.25	PP
ENSG00000179115	FARSLA	Hs.23111	250.6	PP	414.1	PP
ENSG00000138081	FBXO11	Hs.553547	155.7	PP	259.35	PP
ENSG00000153487	ING1	Hs.46700	247.1	PP	176.1	PA
ENSG00000068383	INPP5A	Hs.523360	302.3	PP	279.95	PP
ENSG00000135387	M11S1	Hs.471818	464.9	PP	451.45	PP
ENSG00000125952	MAX	Hs.285354	1178.7	PP	1480.1	PP
ENSG00000082641	NFE2L1	Hs.514284	735.5	PP	726.35	PP
ENSG00000116044	NFE2L2	Hs.155396	181.2	PP	280.9	PP
ENSG00000180530	NRIP1	Hs.155017	842	PP	914.85	PP
ENSG00000169564	PCBP1	Hs.2853	1587.4	PP	1289.35	PP
ENSG00000056661	PCGF2	Hs.371617	231.6	PP	160.8	PP
ENSG00000162734	PEA15	Hs.517216	180.3	PP	156.05	PP
ENSG00000136040	PLXNC1	Hs.551522	354.6	PP	387.1	PP
ENSG00000104762	PPP2R2A	Hs.146339	331.7	PP	299.6	PP
ENSG00000078304	PPP2R5C	Hs.368264	174.9	PP	165.25	PP
ENSG00000056687	RGL2	Hs.509622	340.5	PP	232.1	PA
ENSG00000043093	RP42	Hs.104613	236.5	PP	204.45	PP
ENSG00000159140	SON	Hs.517262	408.8	PP	467.15	PP
ENSG00000166301	STK19	Hs.485102	527.6	PP	424	PA
ENSG00000117632	STMN1	Hs.209983	546.6	PP	663.4	PP
ENSG00000124222	STX16	Hs.307913	474.2	PP	228.9	PP
ENSG00000120948	TARDBP	Hs.300624	735	PP	992.75	PP
ENSG00000166326	TRIM44	Hs.192103	340.6	PP	375.85	PP
ENSG00000119801	YPEL5	Hs.515890	1377.9	PP	1469.25	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000148700	ADD3	Hs.501012	258.6	PP	299.05	PP
ENSG00000168374	ARF4	Hs.148330	129	PP	157.5	PP
ENSG00000143153	ATP1B1	Hs.291196	132.4	PP	245.55	PP
ENSG00000174437	ATP2A2	Hs.506759	203.5	PP	255.4	PP
ENSG00000119866	BCL11A	Hs.370549	363.1	PP	387.8	PP
ENSG00000095564	BTAF1	Hs.500526	220.4	PP	333.3	PP
ENSG00000082153	BZW1	Hs.355983	536.1	PP	794.1	PP
ENSG00000181915	C10orf22	Hs.99821	226.3	PP	203.45	PP
ENSG00000179218	CALR	Hs.515162	398.5	PP	1371.55	PP
ENSG00000118816	CCNI	Hs.518827	913.5	PP	1344.25	PP
ENSG00000163468	CCT3	Hs.491494	1044.4	PP	1212.8	PP
ENSG00000135535	CD164	Hs.520313	2274.9	PP	2265.25	PP
ENSG00000111276	CDKN1B	Hs.238990	333.5	PP	374.65	PP
ENSG00000143126	CELSR2	Hs.57652	215.4	PP	148.65	PP
ENSG00000109572	CLCN3	Hs.481186	244.9	PP	248.15	PP
ENSG00000118260	CREB1	Hs.516646	122.9	PP	230.35	PP
ENSG00000111269	CREBL2	Hs.13313	353.2	PP	216.25	PP
ENSG00000048740	CUGBP2	Hs.309288	159.6	PP	334.5	PP
ENSG00000165659	DACH1	Hs.129452	95.1	PP	144.8	PP
ENSG00000132153	DHX30	Hs.517948	209.5	PP	193.5	PP
ENSG00000082458	DLG3	Hs.522680	136.2	PP	89.45	PP

ENSG00000120738	EGR1	Hs.326035	128.6	PP	290.15	PP
ENSG00000139146	FAM60A	Hs.505154	598.1	PP	788	PP
ENSG00000105216	FAM61A	Hs.407368	242.1	PP	291.3	PP
ENSG00000118564	FBXL5	Hs.479208	410.6	PP	319.15	PP
ENSG00000138081	FBXO11	Hs.553547	155.7	PP	259.35	PA
ENSG00000068078	FGFR3	Hs.1420	185.4	PP	135.5	PA
ENSG00000175606	FLJ20533	Hs.106650	420.6	PP	454.55	PP
ENSG00000034713	GABARAPL2	Hs.461379	952	PP	625.75	PP
ENSG00000188486	H2AFX	Hs.477879	97.1	PP	383.1	PA
ENSG00000091527	H41	Hs.518265	735.1	PP	1129.65	PP
ENSG00000010818	HIVEP2	Hs.510172	149.6	PP	157.9	PP
ENSG00000106004	**HOXA5**	Hs.37034	507.2	PP	499.3	PP
ENSG00000074356	HSA277841	Hs.120963	222.9	PP	150.05	PP
ENSG00000068745	IHPK2	Hs.476221	648.7	PP	414.15	PP
ENSG00000105135	ILVBL	Hs.78880	243.6	PP	297	PP
ENSG00000186480	INSIG1	Hs.520819	196.9	PP	304.7	PP
ENSG00000140575	IQGAP1	Hs.430551	113	PP	199.1	PP
ENSG00000136240	KDELR2	Hs.520210	123.7	PP	161.05	PM
ENSG00000088247	KHSRP	Hs.91142	163.3	PP	288.9	PP
ENSG00000102753	KPNA3	Hs.527919	250.8	PP	391.35	PP
ENSG00000102897	LOC57149	Hs.185489	370.6	PP	303.95	PP
ENSG00000077454	LRCH4	Hs.125742	1133.8	PP	712.75	PP
ENSG00000011009	LYPLA2 /// LYPLA2P1 /// LOC388499	Hs.534075	585.5	PP	486	PP
ENSG00000135387	M11S1	Hs.471818	464.9	PP	451.45	PP
ENSG00000143033	M96	Hs.31016	147.6	PP	141.55	PP
ENSG00000161021	MAML1	Hs.484349	331.3	PP	280.35	PP
ENSG00000166963	MAP1A	Hs.194301	433.9	PP	321.4	PM
ENSG00000100030	MAPK1	Hs.431850	274.3	PP	145	PP
ENSG00000175130	MARCKSL1	Hs.75061	314.8	PP	265.6	PP
ENSG00000166986	MARS	Hs.355867	460.7	PP	614.95	PP
ENSG00000015479	MATR3	Hs.268939	252.4	PP	382.35	PP
ENSG00000133895	MEN1	Hs.423348	113.9	PP	175.85	PP
ENSG00000079277	MKNK1	Hs.371594	233.1	PP	239.5	PP
ENSG00000143033	MTF2	Hs.31016	559	PP	738.65	PP
ENSG00000118513	MYB	Hs.531941	1984.2	PP	2558.15	PP
ENSG00000005810	MYCBP2	Hs.151411	187	PP	643.55	PP
ENSG00000133026	MYH10	Hs.16355	375.1	PP	362.5	PP
ENSG00000115053	NCL	Hs.79110	1203.2	PP	2603.05	PP
ENSG00000166579	NDEL1	Hs.372123	218.3	PP	187.2	PP
ENSG00000173848	NET1	Hs.25155	264.1	PP	310.45	PP
ENSG00000116044	NFE2L2	Hs.155396	181.2	PP	280.9	PP
ENSG00000158793	NIT1	Hs.146406	409.1	PP	328.05	PP
ENSG00000149308	NPAT	Hs.171061	171.1	PP	140.65	PP
ENSG00000147162	OGT	Hs.405410	165.1	PP	183.6	PP
ENSG00000141447	OSBPL1A	Hs.370725	204.6	PP	211.75	PP
ENSG00000091039	OSBPL8	Hs.430849	212	PP	251.65	PP
ENSG00000102225	PCTK1	Hs.496068	135	PP	88.45	PA
ENSG00000059758	PCTK2	Hs.506415	118.3	PP	220.9	PP
ENSG00000137193	PIM1	Hs.81170	1021.7	PP	801.85	PP
ENSG00000102096	PIM2	Hs.496096	251.9	PP	288.3	PM
ENSG00000152952	PLOD2	Hs.477866	92.1	PP	128.6	PP

ENSG00000100034	PPM1F	Hs.112728	179.2	PP	108.2	PA
ENSG00000197746	PSAP	Hs.523004	1015.2	PP	647.25	PP
ENSG00000106588	PSMA2	Hs.333786	204.2	PP	240.35	PP
ENSG00000117569	PTBP2	Hs.269895	183	PP	160.15	PP
ENSG00000171522	PTGER4	Hs.199248	531.8	PP	514.8	PP
ENSG00000185129	PURA	Hs.443121	149.5	PP	224.95	PP
ENSG00000112531	QKI	Hs.510324	284.1	PP	564.45	PP
ENSG00000111540	RAB5B	Hs.77690	234.1	PP	216.45	PP
ENSG00000116473	RAP1A	Hs.190334	217.2	PP	367.75	PP
ENSG00000127314	RAP1B	Hs.369920	1093.1	PP	1537.75	PP
ENSG00000109756	RAPGEF2	Hs.113912	394.9	PP	551.95	PP
ENSG00000145715	RASA1	Hs.553501	138.8	PP	103.6	PP
ENSG00000056687	RGL2	Hs.509622	340.5	PP	232.1	PA
ENSG00000123091	RNF11	Hs.309641	125.3	PP	161.5	PP
ENSG00000134758	RNF138	Hs.302408	186.9	PP	511.9	PP
ENSG00000043093	RP42	Hs.104613	236.5	PP	204.45	PP
ENSG00000136715	SAP130	Hs.32995	229	PP	246.4	PP
ENSG00000140497	SCAMP2	Hs.458917	411.8	PP	495	PP
ENSG00000140612	SEC11L1	Hs.9534	1920.5	PP	2226.35	PP
ENSG00000092421	SEMA6A	Hs.156967	140	PP	182.2	PP
ENSG00000080546	SESN1	Hs.59554	235	PP	276.4	PP
ENSG00000119335	SET	Hs.436687	2967	PP	4307.1	PP
ENSG00000182199	SHMT2	Hs.75069	828.3	PP	865.1	PP
ENSG00000173473	SMARCC1	Hs.476179	487	PP	483.35	PP
ENSG00000184602	SNN	Hs.459952	234.4	PP	239.3	PP
ENSG00000100596	SPTLC2	Hs.435661	433.7	PP	462.25	PP
ENSG00000120948	TARDBP	Hs.300624	735	PP	992.75	PP
ENSG00000006638	TBXA2R	Hs.442530	258.9	PP	217.8	PP
ENSG00000183864	TOB2	Hs.474978	165.3	PP	196.4	PP
ENSG00000173726	TOMM20	Hs.533192	656.5	PP	888.45	PP
ENSG00000198900	TOP1	Hs.472737	315.5	PP	468.35	PP
ENSG00000077097	TOP2B	Hs.475733	592.4	PP	806	PP
ENSG00000111669	TPI1	Hs.524219	1154.9	PP	1213.85	PP
ENSG00000140416	TPM1	Hs.133892	394.4	PP	661.4	PP
ENSG00000157514	TSC22D3	Hs.522074	1752.5	PP	2189.45	PP
ENSG00000131508	UBE2D2	Hs.108332	400.1	PP	512.05	PP
ENSG00000114062	UBE3A	Hs.22543	456.9	PP	470.75	PP
ENSG00000118900	UBN1	Hs.440219	138.4	PP	302.15	PP
ENSG00000141968	VAV1	Hs.116237	535.2	PP	272.75	PA
ENSG00000100897	WDR23	Hs.525251	455.1	PP	382.25	PP
ENSG00000082898	XPO1	Hs.370770	994.7	PP	1393.85	PP
ENSG00000128245	YWHAH	Hs.226755	195	PP	195.4	PP
ENSG00000147130	ZNF261	Hs.522684	475.8	PP	232.55	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000168374	ARF4	Hs.148330	129	PP	157.5	PP
ENSG00000143153	ATP1B1	Hs.291196	132.4	PP	245.55	PP
ENSG00000174437	ATP2A2	Hs.506759	203.5	PP	255.4	PP
ENSG00000119866	BCL11A	Hs.370549	363.1	PP	387.8	PP

ENSG00000134107	BHLHB2	Hs.171825	482.8	PP	341.5	PP
ENSG00000168564	CARF	Hs.32922	72.4	PP	130	PP
ENSG00000113328	CCNG1	Hs.79101	1025	PP	737.8	PP
ENSG00000141367	CLTC	Hs.491351	1169	PP	1399.6	PP
ENSG00000111596	CNOT2	Hs.133350	431.4	PP	399.2	PP
ENSG00000108848	CROP	Hs.130293	2166.4	PP	1637.55	PP
ENSG00000149187	CUGBP1	Hs.530727	383	PP	596.3	PP
ENSG00000048740	CUGBP2	Hs.309288	159.6	PP	334.5	PP
ENSG00000172115	CYCS	Hs.437060	791.3	PP	2063.1	PP
ENSG00000168209	DDIT4	Hs.523012	736.8	PP	535.85	PP
ENSG00000109606	DHX15	Hs.5683	1219.8	PP	1620.75	PP
ENSG00000120738	EGR1	Hs.326035	128.6	PP	290.15	PP
ENSG00000132507	EIF5A	Hs.534314	1102.8	PP	2858.65	PP
ENSG00000120616	EPC1	Hs.167805	148.9	PP	88.7	PA
ENSG00000120705	ETF1	Hs.483494	253.8	PP	461.55	PP
ENSG00000139146	FAM60A	Hs.505154	598.1	PP	788	PP
ENSG00000138081	FBXO11	Hs.553547	155.7	PP	259.35	PP
ENSG00000106070	GRB10	Hs.164060	550.7	PP	574.15	PP
ENSG00000103342	GSPT1	Hs.528780	356.7	PP	369.6	PP
ENSG00000170144	HNRPA3	Hs.516539	375.5	PP	558.6	PP
ENSG00000126945	HNRPH2	Hs.278857	189.2	PP	158.45	PP
ENSG00000044574	HSPA5	Hs.522394	1536.9	PP	3296.1	PA
ENSG00000142856	ITGB3BP	Hs.166539	234.8	PP	372	PP
ENSG00000078596	ITM2A	Hs.17109	325.6	PP	367.7	PP
ENSG00000121774	KHDRBS1	Hs.445893	1363	PP	1395.2	PP
ENSG00000108424	KPNB1	Hs.532793	415.1	PP	709.85	PP
ENSG00000168906	MAT2A	Hs.516157	1011.4	PP	738.6	PP
ENSG00000123562	MORF4L2	Hs.326387	2189.8	PP	2626.1	PP
ENSG00000170873	MTSS1	Hs.336994	152.7	PP	194.6	PP
ENSG00000133026	MYH10	Hs.16355	375.1	PP	362.5	PP
ENSG00000136504	MYST2	Hs.21907	331.7	PP	192.25	PP
ENSG00000164190	NIPBL	Hs.481927	165.1	PP	145.15	PP
ENSG00000124789	NUP153	Hs.121088	216.4	PP	291.8	PP
ENSG00000046651	OFD1	Hs.6483	1022.7	PP	692.15	PP
ENSG00000091039	OSBPL8	Hs.430849	212	PP	251.65	PP
ENSG00000172239	PAIP1	Hs.482038	127.8	PP	157	PP
ENSG00000157654	PALM2-AKAP2	Hs.259461	181.4	PP	163.75	PP
ENSG00000145730	PAM	Hs.369430	187.3	PP	178.45	PP
ENSG00000115421	PAPOLG	Hs.387471	153.2	PP	91.25	PP
ENSG00000059758	PCTK2	Hs.506415	118.3	PP	220.9	PP
ENSG00000065485	PDIA5	Hs.477352	352.8	PP	418.95	PP
ENSG00000138814	PPP3CA	Hs.435512	122.5	PP	205	PP
ENSG00000125818	PSMF1	Hs.471917	254.5	PP	259.45	PP
ENSG00000121390	PSPC1	Hs.213198	142.5	PP	179.5	PP
ENSG00000138430	PTD004	Hs.157351	848.2	PP	1052.6	PP
ENSG00000134644	PUM1	Hs.281707	378.4	PP	422.3	PP
ENSG00000185129	PURA	Hs.443121	149.5	PP	224.95	PP
ENSG00000010017	RANBP9	Hs.306242	381.3	PP	489.95	PP
ENSG00000163602	RYBP	Hs.7910	398	PP	462.8	PP
ENSG00000168758	SEMA4C	Hs.516220	186.7	PP	157.95	PP
ENSG00000116560	SFPQ	Hs.355934	306.9	PP	689	PP
ENSG00000096717	SIRT1	Hs.369779	133.8	PP	124.9	PP

ENSG00000095480	SPFH1	Hs.150087	646.4	PP	689.15	PP
ENSG00000124783	SSR1	Hs.114033	600.7	PP	686.65	PP
ENSG00000168610	STAT3	Hs.463059	401.7	PP	390.05	PP
ENSG00000102572	STK24	Hs.508514	958.4	PP	1363.75	PP
ENSG00000168952	STXBP6	Hs.508958	152.6	PP	218.55	PP
ENSG00000028839	TBPL1	Hs.486507	170.1	PP	187.95	PP
ENSG00000136205	TENS1	Hs.520814	443.4	PP	221.15	PP
ENSG00000077097	TOP2B	Hs.475733	592.4	PP	806	PP
ENSG00000166598	TRA1	Hs.192374	151	PP	339.35	PP
ENSG00000165699	TSC1	Hs.370854	232.7	PP	242.3	PP
ENSG00000134215	VAV3	Hs.267659	615.4	PP	341.3	PP
ENSG00000132716	WDR42A	Hs.492236	195.9	PP	233.1	PP
ENSG00000170949	ZNF160	Hs.467236	1056.4	PP	1016.85	PP
ENSG00000179456	ZNF238	Hs.69997	235.7	PP	241.8	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000114770	ABCC5	Hs.368563	373.4	PP	322.1	PM
ENSG00000184009	ACTG1	Hs.514581	11731	PP	14874	PP
ENSG00000151320	AKAP6	Hs.509083	137.8	PP	117.05	PP
ENSG00000123505	AMD1	Hs.159118	648.3	PP	1011.85	PP
ENSG00000062725	APPBP2	Hs.84084	106.4	PP	116.15	PA
ENSG00000175220	ARHGAP1	Hs.138860	594	PP	502.3	PP
ENSG00000117713	ARID1A	Hs.468972	477.6	PP	444.8	PP
ENSG00000116539	ASH1L	Hs.491060	244.1	PP	214.3	PA
ENSG00000171456	ASXL1	Hs.374043	275.6	PP	307.25	PP
ENSG00000082153	BZW1	Hs.355983	536.1	PP	794.1	PP
ENSG00000136261	BZW2	Hs.487635	1167.4	PP	1664.45	PP
ENSG00000104327	CALB1	Hs.65425	79.6	PP	42.05	PA
ENSG00000131236	CAP1	Hs.370581	765.9	PP	691	PP
ENSG00000112576	CCND3	Hs.534307	539.8	PP	402.15	PP
ENSG00000111642	CHD4	Hs.162233	299.5	PP	431.1	PP
ENSG00000100528	CNIH	Hs.294603	252.6	PP	391.7	PP
ENSG00000108848	CROP	Hs.130293	2166.4	PP	1637.55	PP
ENSG00000009307	CSDE1	Hs.69855	1494.1	PP	1637.9	PP
ENSG00000101266	CSNK2A1	Hs.446484	170.4	PP	261.4	PP
ENSG00000048740	CUGBP2	Hs.309288	159.6	PP	334.5	PP
ENSG00000119689	DLST /// DLSTP	Hs.480230	187.3	PP	148.8	PM
ENSG00000161202	DVL3	Hs.388116	134.8	PP	206.95	PP
ENSG00000092847	EIF2C1	Hs.22867	292.5	PP	296.95	PP
ENSG00000104131	EIF3S1	Hs.404056	340.4	PP	365.05	PP
ENSG00000110321	EIF4G2	Hs.183684	2137	PP	2701.9	PP
ENSG00000109381	ELF2	Hs.260903	150.8	PP	152.4	PA
ENSG00000100442	FKBP3	Hs.509226	386.9	PP	438.15	PP
ENSG00000141429	GALNT1	Hs.514806	220	PP	273.8	PP
ENSG00000108588	GK001	Hs.202011	160.3	PP	198.45	PP
ENSG00000174021	GNG5	Hs.513557	683.5	PP	869.7	PP
ENSG00000103342	GSPT1	Hs.528780	356.7	PP	369.6	PP
ENSG00000152795	HNRPDL	Hs.527105	1931.8	PP	1802.05	PP

ENSG00000078399	**HOXA9**	Hs.127428	739.2	PP	674	PP
ENSG00000109083	IFT20	Hs.4187	322.8	PP	241.4	PP
ENSG00000105135	ILVBL	Hs.78880	243.6	PP	297	PP
ENSG00000140575	IQGAP1	Hs.430551	113	PP	199.1	PP
ENSG00000171988	JMJD1C	Hs.413416	107	PP	198.85	PP
ENSG00000100097	LGALS1	Hs.445351	454.5	PP	244.1	PP
ENSG00000111252	LNK	Hs.506784	230.1	PP	198.8	PP
ENSG00000145012	LPP	Hs.444362	205.6	PP	238.9	PP
ENSG00000054219	LY75	Hs.153563	126.4	PP	175.65	PP
ENSG00000166963	MAP1A	Hs.194301	433.9	PP	321.4	PM
ENSG00000075413	MARK3	Hs.35828	129.9	PP	75.05	PP
ENSG00000147065	MSN	Hs.87752	793.3	PP	791.75	PP
ENSG00000100330	MTMR3	Hs.474536	204.7	PP	287	PP
ENSG00000138386	NAB1	Hs.107474	187.9	PP	203.9	PP
ENSG00000106459	NRF1	Hs.298069	157.5	PP	126.8	PA
ENSG00000184588	PDE4B	Hs.198072	234.1	PP	349.5	PP
ENSG00000136040	PLXNC1	Hs.551522	354.6	PP	387.1	PP
ENSG00000119396	RAB14	Hs.371563	140.5	PP	198.15	PP
ENSG00000111540	RAB5B	Hs.77690	234.1	PP	216.45	PP
ENSG00000056687	RGL2	Hs.509622	340.5	PP	232.1	PA
ENSG00000101782	RIOK3	Hs.445511	276.1	PP	311.7	PP
ENSG00000137075	RNF38	Hs.333503	322.6	PP	227.7	PP
ENSG00000151967	SCHIP1	Hs.134665	497	PP	417.95	PP
ENSG00000155878	SEC22L1	Hs.534212	662.9	PP	588.95	PP
ENSG00000168758	SEMA4C	Hs.516220	186.7	PP	157.95	PP
ENSG00000120742	SERP1	Hs.518326	285.7	PP	343.4	PP
ENSG00000153914	SFRS12	Hs.519347	258	PP	229.6	PP
ENSG00000102038	SMARCA1	Hs.152292	101.1	PP	72.95	PA
ENSG00000124783	SSR1	Hs.114033	600.7	PP	686.65	PP
ENSG00000168610	STAT3	Hs.463059	401.7	PP	390.05	PP
ENSG00000119048	UBE2B	Hs.385986	335	PP	417.45	PP
ENSG00000109332	UBE2D3	Hs.472031	471.2	PP	635.4	PP
ENSG00000135655	USP15	Hs.434951	197.3	PP	160.35	PP
ENSG00000134215	VAV3	Hs.267659	615.4	PP	341.3	PP
ENSG00000073905	VDAC1	Hs.202085	175.6	PP	289.2	PP
ENSG00000122958	VPS26	Hs.499925	508.7	PP	610	PP
ENSG00000166913	YWHAB	Hs.279920	222.4	PP	288.75	PP
ENSG00000107372	ZA20D2	Hs.406096	967.2	PP	1262.9	PP
ENSG00000015171	ZMYND11	Hs.292265	403.3	PP	784.1	PP
ENSG00000147130	ZNF261	Hs.522684	475.8	PP	232.55	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000138071	ACTR2	Hs.393201	343.5	PP	1110.1	PP
ENSG00000170017	ALCAM	Hs.150693	528.9	PP	695.45	PP
ENSG00000123268	ATF1	Hs.435267	95.1	PP	109.2	PP
ENSG00000119866	BCL11A	Hs.370549	363.1	PP	387.8	PP
ENSG00000134153	C15orf24	Hs.160565	612.5	PP	706.2	PP
ENSG00000082258	CCNT2	Hs.292754	114.4	PP	102.75	PP
ENSG00000111269	CREBL2	Hs.13313	353.2	PP	216.25	PP

ENSG00000137992	DBT	Hs.270570	2078.5	PP	2456.8	PP
ENSG00000124487	DDX3X	Hs.380774	769.8	PP	1229	PP
ENSG00000157540	DYRK1A	Hs.368240	367.8	PP	751.2	PP
ENSG00000124882	EREG	Hs.115263	351.8	PP	535.15	PP
ENSG00000153807	**HOXA10**	Hs.110637	161.3	PP	200.7	PA
ENSG00000150093	ITGB1	Hs.429052	865.6	PP	593.85	PP
ENSG00000119321	KIAA0674	Hs.522351	310	PP	302.4	PP
ENSG00000127603	MACF1	Hs.472475	222.8	PP	248.35	PP
ENSG00000175130	MARCKSL1	Hs.75061	314.8	PP	265.6	PP
ENSG00000147065	MSN	Hs.87752	793.3	PP	791.75	PP
ENSG00000108389	MTMR4	Hs.514373	330.7	PP	407.2	PP
ENSG00000138386	NAB1	Hs.107474	187.9	PP	203.9	PP
ENSG00000137420	NOL7	Hs.549161	1095.5	PP	1222.05	PP
ENSG00000180530	NRIP1	Hs.155017	842	PP	914.85	PP
ENSG00000090621	PABPC4	Hs.169900	376	PP	622.5	PP
ENSG00000114054	PCCB	Hs.63788	270.6	PP	392.75	PP
ENSG00000107758	PPP3CB	Hs.500067	318.9	PP	241.25	PP
ENSG00000117569	PTBP2	Hs.269895	183	PP	160.15	PP
ENSG00000112531	QKI	Hs.510324	284.1	PP	564.45	PA
ENSG00000139687	RB1	Hs.408528	152.7	PP	153.35	PP
ENSG00000137075	RNF38	Hs.333503	322.6	PP	227.7	PP
ENSG00000159216	RUNX1	Hs.149261	108.8	PP	211.2	PP
ENSG00000179833	SERTAD2	Hs.77293	498.4	PP	556.2	PP
ENSG00000124193	SFRS6	Hs.6891	2001.1	PP	2200.75	PP
ENSG00000147454	SLC25A37	Hs.122514	103	PP	86.95	PA
ENSG00000124222	STX16	Hs.307913	474.2	PP	228.9	PP
ENSG00000132718	SYT11	Hs.32984	106.3	PP	102.95	PP
ENSG00000109332	UBE2D3	Hs.472031	471.2	PP	635.4	PP
ENSG00000162607	USP1	Hs.35086	275.3	PP	614.05	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000 138031	ADCY3	Hs.467898	208.6	PP	178.4 PP	
ENSG00000 004455	AK2	Hs.470907	303.6	PP	498.6 PP	
ENSG00000 123505	AMD1	Hs.159118	648.3	PP	1011.85 PP	
ENSG00000 120868	APAF1	Hs.552567	65.9	PP	94.15 PP	
ENSG00000 062725	APPBP2	Hs.84084	106.4	PP	116.15 PA	
ENSG00000 129675	ARHGEF6	Hs.522795	1207.5	PP	815.1 PP	
ENSG00000	ARID4B	Hs.533633	227	PP	252.45 PP	

054267				
ENSG00000	ARL10C	Hs.250009	578.1 PP	591.95 PP
134108				
ENSG00000	ATP6V1A	Hs.477155	710.1 PP	1105.8 PP
114573				
ENSG00000	AZIN1	Hs.459106	551.2 PP	619.2 PP
155096				
ENSG00000	B4GALT3	Hs.321231	241.5 PP	227.15 PP
158850				
ENSG00000	BCL11A	Hs.370549	363.1 PP	387.8 PP
119866				
ENSG00000	BTG1	Hs.255935	955.9 PP	1057.95 PP
133639				
ENSG00000	BTG2	Hs.519162	588.2 PP	538.3 PP
159388				
ENSG00000	C20orf111	Hs.75798	346 PP	259.1 PP
132823				
ENSG00000	C6orf111	Hs.520287	674.8 PP	743.75 PP
132424				
ENSG00000	C6orf32	Hs.484915	83.8 PP	62.8 PP
111913				
ENSG00000	C9orf78	Hs.278429	172.9 PP	130.25 PP
136819				
ENSG00000	C9orf97	Hs.494595	207.5 PP	180.4 PP
136925				
ENSG00000	CA12	Hs.210995	125.1 PP	133.8 PP
074410				
ENSG00000	CAB39	Hs.471593	527.9 PP	637.3 PP
135932				
ENSG00000	CALB1	Hs.65425	79.6 PP	42.05 PA
104327				
ENSG00000	CAPZA1	Hs.514934	766.7 PP	1165.8 PP
116489				
ENSG00000	CASC3	Hs.350229	286.5 PP	317.4 PP
108349				
ENSG00000	CBFB	Hs.460988	719.1 PP	1032 PP
067955				
ENSG00000	CBX1	Hs.77254	432 PP	415.85 PA
108468				
ENSG00000	CCNG1	Hs.79101	1025 PP	737.8 PP
113328				
ENSG00000	CCT3	Hs.491494	1044.4 PP	1212.8 PP
163468				
ENSG00000	CD34	Hs.374990	830.4 PP	459.3 PP
174059				
ENSG00000	CDC42	Hs.467637	620.1 PP	437.75 PP
070831				
ENSG00000	CLCN3	Hs.481186	244.9 PP	248.15 PP
109572				
ENSG00000	CLK4	Hs.406557	163.3 PP	314.55 PP
113240				
ENSG00000	CLTC	Hs.491351	1169 PP	1399.6 PP
141367				
ENSG00000	CNOT7	Hs.170553	250.3 PP	508.5 PP
198791				
ENSG00000	CORO1C	Hs.330384	257.4 PP	237.9 PP

110880				
ENSG00000	CPSF6	Hs.369606	402.6 PP	474.05 PP
111605				
ENSG00000	CREBBP	Hs.459759	287.2 PP	239.6 PP
005339				
ENSG00000	CRKL	Hs.5613	126.4 PP	192.1 PP
099942				
ENSG00000	CTCF	Hs.368367	506.1 PP	535.55 PP
102974				
ENSG00000	D15F37 ///	Hs.531509	242.3 PP	427.35 PP
140181	LOC440248			
ENSG00000	DAZAP2	Hs.369761	1267.2 PP	976.7 PP
183283				
ENSG00000	DCP2	Hs.443875	204 PP	270.65 PP
172795				
ENSG00000	DDX3X	Hs.380774	769.8 PP	1229 PP
124487				
ENSG00000	DDX5	Hs.279806	3052 PP	3508.95 PP
108654				
ENSG00000	DLG3	Hs.522680	136.2 PP	89.45 PP
082458				
ENSG00000	DVL2	Hs.118640	276.9 PP	232.55 PP
004975				
ENSG00000	E2F3	Hs.269408	295.6 PP	585.95 PP
112242				
ENSG00000	EDD1	Hs.492445	254.6 PP	227.15 PP
104517				
ENSG00000	EIF2C1	Hs.22867	292.5 PP	296.95 PP
092847				
ENSG00000	EIF2C2	Hs.449415	150.2 PP	115.85 PP
123908				
ENSG00000	EIF4A2	Hs.478553	3569 PP	6526.55 PP
156976				
ENSG00000	EIF5	Hs.433702	96.4 PP	55.8 PA
100664				
ENSG00000	EIF5A	Hs.534314	1102.8 PP	2858.65 PP
132507				
ENSG00000	ELMO1	Hs.304578	367.9 PP	339.8 PP
155849				
ENSG00000	ELOVL5	Hs.520189	681.6 PP	667.3 PP
012660				
ENSG00000	ELOVL6	Hs.412939	96.5 PP	156.45 PP
170522				
ENSG00000	EWSR1	Hs.374477	389.7 PP	457.25 PP
182944				
ENSG00000	EXOSC8	Hs.294041	196.9 PP	283.25 PP
120699				
ENSG00000	EZH2	Hs.444082	162.9 PP	216.25 PP
106462				
ENSG00000	F13A1	Hs.335513	290.7 PP	299.8 PP
124491				
ENSG00000	FAM49B	Hs.492869	311.6 PP	329.6 PP
153310				
ENSG00000	FLJ10154	Hs.508644	843.1 PP	1079.5 PP
134884				
ENSG00000	FLJ10707	Hs.288164	452.5 PP	256.1 PM

168137				
ENSG00000	FLJ13855	Hs.514297	539 PP	525.1 PP
159202				
ENSG00000	FLJ13910	Hs.75277	194.1 PP	143.15 PP
153561				
ENSG00000	FOS	Hs.25647	1254.3 PP	1832.65 PP
170345				
ENSG00000	FOSB	Hs.75678	1751.3 PP	3599.55 PP
125740				
ENSG00000	FOXO1A	Hs.370666	253.6 PP	140.95 PP
150907				
ENSG00000	FOXP1	Hs.431498	322.7 PP	410.3 PP
114861				
ENSG00000	FXR1	Hs.478407	143.9 PP	155.75 PP
114416				
ENSG00000	GALNT7	Hs.127407	97.2 PP	153.95 PP
109586				
ENSG00000	**GATA2**	Hs.367725	1993.1 PP	1452.25 PP
179348				
ENSG00000	GNS	Hs.334534	261.1 PP	248.15 PP
135677				
ENSG00000	GOSR2	Hs.463278	197.9 PP	119.7 PP
108433				
ENSG00000	GPR126	Hs.318894	109.5 PP	231.55 PP
112414				
ENSG00000	GSPT1	Hs.528780	356.7 PP	369.6 PP
103342				
ENSG00000	GTF2A2	Hs.512934	276 PP	270.75 PP
140307				
ENSG00000	H2AFZ	Hs.119192	1477 PP	3477.65 PP
164032				
ENSG00000	HNRPA2B1	Hs.487774	1802.2 PP	2268.3 PP
122566				
ENSG00000	HNRPR	Hs.373763	839.4 PP	980.1 PP
125944				
ENSG00000	HNRPU	Hs.166463	470.3 PP	887.6 PP
153187				
ENSG00000	HNRPUL1	Hs.155218	406.9 PP	401.15 PP
105323				
ENSG00000	**HOXA10**	Hs.110637	161.3 PP	200.7 PA
153807				
ENSG00000	**HOXA9**	Hs.127428	739.2 PP	674 PP
078399				
ENSG00000	HRB	Hs.443507	202.6 PP	405.7 PP
173744				
ENSG00000	HSA277841	Hs.120963	222.9 PP	150.05 PP
074356				
ENSG00000	HSPD1	Hs.113684	2868.6 PP	5689.3 PP
144381				
ENSG00000	INSR	Hs.465744	247.7 PP	292.45 PP
171105				
ENSG00000	JAG2	Hs.433445	261.3 PP	227.15 PP
184916				
ENSG00000	JMJD1A	Hs.531819	264 PP	207.05 PP
115548				
ENSG00000	JMJD1C	Hs.413416	107 PP	198.85 PP

171988				
ENSG00000	KIAA0676	Hs.155829	362.1 PP	398.15 PP
197226				
ENSG00000	KIF5B	Hs.327736	346.6 PP	430.75 PP
170759				
ENSG00000	**KLF4**	Hs.376206	536.5 PP	1193.7 PP
136826				
ENSG00000	KPNA3	Hs.527919	250.8 PP	391.35 PP
102753				
ENSG00000	LITAF	Hs.459940	725.1 PP	513.5 PP
189067				
ENSG00000	LRRFIP1	Hs.471779	429.8 PP	408.25 PP
124831				
ENSG00000	LSM1	Hs.425311	378.1 PP	497.8 PP
175324				
ENSG00000	MAK3	Hs.269528	268.8 PP	307 PP
121579				
ENSG00000	MAP4K5	Hs.130491	66 PP	116 PP
012983				
ENSG00000	MAPK14	Hs.485233	507.4 PP	486.3 PP
112062				
ENSG00000	ME2	Hs.233119	471.1 PP	513.15 PP
082212				
ENSG00000	MTDH	Hs.377155	258.6 PP	329.8 PP
147649				
ENSG00000	MTMR4	Hs.514373	330.7 PP	407.2 PP
108389				
ENSG00000	MTSS1	Hs.336994	152.7 PP	194.6 PP
170873				
ENSG00000	MYST2	Hs.21907	331.7 PP	192.25 PP
136504				
ENSG00000	NAB1	Hs.107474	187.9 PP	203.9 PP
138386				
ENSG00000	NDUFS4	Hs.528222	383.2 PP	290.65 PP
164258				
ENSG00000	NEDD4	Hs.1565	186.1 PP	193.9 PP
069869				
ENSG00000	NFE2L1	Hs.514284	735.5 PP	726.35 PP
082641				
ENSG00000	NFE2L2	Hs.155396	181.2 PP	280.9 PP
116044				
ENSG00000	NGFRAP1	Hs.448588	2654.4 PP	3641.6 PP
166681				
ENSG00000	NIPBL	Hs.481927	165.1 PP	145.15 PP
164190				
ENSG00000	NRIP1	Hs.155017	842 PP	914.85 PP
180530				
ENSG00000	NUP153	Hs.121088	216.4 PP	291.8 PP
124789				
ENSG00000	NXF1	Hs.523739	543 PP	626 PP
162231				
ENSG00000	NXT2	Hs.25010	135.9 PP	271.1 PP
101888				
ENSG00000	OFD1	Hs.6483	1022.7 PP	692.15 PP
046651				
ENSG00000	OXSR1	Hs.475970	211 PP	186.15 PA

172939				
ENSG00000 070756	PABPC1	Hs.387804	7565 PP	7921.7 PP
ENSG00000 151846	PABPC3	Hs.458280	4002.7 PP	3510.25 PP
ENSG00000 100836	PABPN1	Hs.117176	758.2 PP	790.85 PP
ENSG00000 157654	PALM2-AKAP2	Hs.259461	181.4 PP	163.75 PP
ENSG00000 145730	PAM	Hs.369430	187.3 PP	178.45 PP
ENSG00000 168283	PCGF4	Hs.380403	254.7 PP	304.1 PP
ENSG00000 184588	PDE4B	Hs.198072	234.1 PP	349.5 PP
ENSG00000 065485	PDIA5	Hs.477352	352.8 PP	418.95 PP
ENSG00000 152556	PFKM	Hs.75160	303.1 PP	332 PP
ENSG00000 167085	PHB	Hs.514303	723.7 PP	649.4 PP
ENSG00000 145675	PIK3R1	Hs.132225	249.1 PP	181 PP
ENSG00000 171033	PKIA	Hs.433700	88.6 PP	131.05 PP
ENSG00000 136040	PLXNC1	Hs.551522	354.6 PP	387.1 PP
ENSG00000 112941	POLS	Hs.481542	355.5 PP	367.35 PP
ENSG00000 163806	PPP1CB	Hs.468018	65.7 PP	135.05 PP
ENSG00000 163806	PPP1CB	Hs.468018	140 PP	176 PP
ENSG00000 186298	PPP1CC	Hs.79081	709.2 PP	1286.15 PP
ENSG00000 104762	PPP2R2A	Hs.146339	331.7 PP	299.6 PP
ENSG00000 107758	PPP3CB	Hs.500067	318.9 PP	241.25 PP
ENSG00000 166501	PRKCB1	Hs.460355	742.5 PP	535.05 PP
ENSG00000 129084	PSMA1	Hs.102798	1702 PP	1305.3 PP
ENSG00000 171522	PTGER4	Hs.199248	531.8 PP	514.8 PP
ENSG00000 112531	QKI	Hs.510324	284.1 PP	564.45 PP
ENSG00000 103769	RAB11A	Hs.321541	1087.7 PP	1020.15 PP
ENSG00000 080371	RAB21	Hs.524590	103.7 PP	212.9 PP
ENSG00000 111737	RAB35	Hs.524788	394.6 PP	431.2 PP
ENSG00000 167461	RAB8A	Hs.5947	675.2 PP	756.75 PP
ENSG00000	RAP1B	Hs.369920	1093.1 PP	1537.75 PP

127314				
ENSG00000	RAPGEF2	Hs.113912	394.9 PP	551.95 PP
109756				
ENSG00000	RERE	Hs.463041	480.2 PP	252.15 PP
142599				
ENSG00000	RGL2	Hs.509622	340.5 PP	232.1 PA
056687				
ENSG00000	RGS1	Hs.75256	90.4 PP	99.4 PP
090104				
ENSG00000	RHEB	Hs.283521	943.5 PP	1172.5 PP
106615				
ENSG00000	RHOA	Hs.247077	1537.7 PP	2368.8 PP
067560				
ENSG00000	RHOT1	Hs.462742	196.4 PP	304.85 PP
126858				
ENSG00000	RNF139	Hs.492751	392.9 PP	435.75 PP
170881				
ENSG00000	RNF38	Hs.333503	322.6 PP	227.7 PP
137075				
ENSG00000	RP42	Hs.104613	236.5 PP	204.45 PP
043093				
ENSG00000	RPN1	Hs.518244	291.2 PP	302.5 PA
163902				
ENSG00000	RPS6KA5	Hs.510225	152.1 PP	132.75 PP
100784				
ENSG00000	RQCD1	Hs.148767	284.7 PP	361.25 PP
144580				
ENSG00000	RTN4	Hs.429581	710.8 PP	1341.5 PP
115310				
ENSG00000	RUNX1	Hs.149261	108.8 PP	211.2 PP
159216				
ENSG00000	RYBP	Hs.7910	398 PP	462.8 PP
163602				
ENSG00000	SATB1	Hs.517717	829.9 PP	652.05 PP
182568				
ENSG00000	SEMA6A	Hs.156967	140 PP	182.2 PP
092421				
ENSG00000	SERTAD2	Hs.77293	498.4 PP	556.2 PP
179833				
ENSG00000	SET	Hs.436687	2967 PP	4307.1 PP
119335				
ENSG00000	SFPQ	Hs.355934	306.9 PP	689 PP
116560				
ENSG00000	SFRS1	Hs.68714	1264.9 PP	1622.65 PP
136450				
ENSG00000	SFRS12	Hs.519347	258 PP	229.6 PP
153914				
ENSG00000	SFRS2IP	Hs.210367	224.1 PP	132.2 PA
139218				
ENSG00000	SHOC2	Hs.104315	283.3 PP	262.55 PP
108061				
ENSG00000	SIRT1	Hs.369779	133.8 PP	124.9 PP
096717				
ENSG00000	SLC25A37	Hs.122514	103 PP	86.95 PA
147454				
ENSG00000	SMAP1	Hs.485717	205.2 PP	129.15 PP

112305				
ENSG00000	SMARCA2	Hs.298990	264.4 PP	201.3 PP
080503				
ENSG00000	STARD7	Hs.469331	1166.2 PP	1442.7 PP
084090				
ENSG00000	STK24	Hs.508514	958.4 PP	1363.75 PP
102572				
ENSG00000	STK39	Hs.276271	129.8 PP	111.35 PP
198648				
ENSG00000	STX16	Hs.307913	474.2 PP	228.9 PP
124222				
ENSG00000	SUMO1	Hs.81424	240.9 PP	268.85 PP
116030				
ENSG00000	SUZ12	Hs.462732	602.2 PP	633.3 PP
178691				
ENSG00000	SYPL1	Hs.80919	157.3 PP	190.55 PP
008282				
ENSG00000	TAOK3	---	518.8 PP	394 PP
135090				
ENSG00000	TGIF	Hs.373550	116.7 PP	95.35 PM
177426				
ENSG00000	THRAP2	Hs.159799	142.1 PP	396.2 PP
123066				
ENSG00000	TIA1	Hs.516075	151.6 PP	145 PP
116001				
ENSG00000	TM9SF4	Hs.529360	129.2 PP	121.3 PP
101337				
ENSG00000	TMSB10	Hs.446574	8602.5 PP	6478.75 PP
034510				
ENSG00000	TNPO1	Hs.482497	483 PP	750.85 PP
083312				
ENSG00000	TNPO3	Hs.193613	392.6 PP	422.55 PP
064419				
ENSG00000	TRIB1	Hs.444947	238.3 PP	300.85 PP
173334				
ENSG00000	TROVE2	Hs.288178	480.7 PP	473.25 PP
116747				
ENSG00000	TSC1	Hs.370854	232.7 PP	242.3 PP
165699				
ENSG00000	TXNDC	Hs.125221	200.8 PP	393.7 PP
139921				
ENSG00000	UBE2E3	Hs.470804	311.5 PP	258.25 PP
170035				
ENSG00000	UBE2N	Hs.524630	415.5 PP	551.55 PP
177889				
ENSG00000	UBE2Q	Hs.516587	457.1 PP	377.95 PP
160714				
ENSG00000	UBE2V1 ///	Hs.420529	504.3 PP	320.6 PP
124208	Kua-UEV			
ENSG00000	UBE4A	Hs.75275	271.3 PP	404.8 PP
110344				
ENSG00000	USP34	Hs.468663	1075.5 PP	1012.75 PP
115464				
ENSG00000	USP9X	Hs.77578	85.3 PP	115.1 PP
124486				
ENSG00000	VCL	Hs.500101	332.1 PP	541.1 PP

035403				
ENSG00000119541	VPS4B	Hs.126550	305.9 PP	385.15 PP
ENSG00000132716	WDR42A	Hs.492236	195.9 PP	233.1 PP
ENSG00000109046	WSB1	Hs.446017	679.3 PP	880.75 PP
ENSG00000169180	XPO6	Hs.460468	395.3 PP	515.4 PP
ENSG00000166913	YWHAB	Hs.279920	222.4 PP	288.75 PP
ENSG00000134308	YWHAQ	Hs.74405	922.3 PP	2337.65 PP
ENSG00000186908	ZDHHC17	Hs.4014	123.5 PP	166.2 PP
ENSG00000185650	ZFP36L1	Hs.85155	94.5 PP	140.7 PP
ENSG00000010244	ZNF207	Hs.500775	918.9 PP	742.3 PP
ENSG00000179456	ZNF238	Hs.69997	235.7 PP	241.8 PP
ENSG00000172466	ZNF24	Hs.514802	240.6 PP	213.65 PP
ENSG00000036549	ZZZ3	Hs.480506	125 PP	189.7 PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000138031	ADCY3	Hs.467898	208.6	PP	178.4	PP
ENSG00000140350	ANP32A	Hs.458747	416	PP	331.55	PP
ENSG00000062725	APPBP2	Hs.84084	106.4	PP	116.15	PA
ENSG00000117713	ARID1A	Hs.468972	477.6	PP	444.8	PP
ENSG00000155096	AZIN1	Hs.459106	551.2	PP	619.2	PP
ENSG00000133935	C14orf1	Hs.15106	292.6	PP	249.85	PP
ENSG00000153113	CAST	Hs.440961	301.7	PP	461.25	PP
ENSG00000108468	CBX1	Hs.77254	432	PP	415.85	PP
ENSG00000100528	CNIH	Hs.294603	252.6	PP	391.7	PP
ENSG00000160967	CUTL1	Hs.438974	333.3	PP	412.55	PP
ENSG00000183283	DAZAP2	Hs.369761	1267.2	PP	976.7	PP
ENSG00000156976	EIF4A2	Hs.478553	3569	PP	6526.55	PP
ENSG00000104064	GABPB2	Hs.546852	129.3	PP	183.75	PM
ENSG00000141429	GALNT1	Hs.514806	220	PP	273.8	PP
ENSG00000106070	GRB10	Hs.164060	550.7	PP	574.15	PP
ENSG00000164032	H2AFZ	Hs.119192	1477	PP	3477.65	PP
ENSG00000100281	HMG2L1	Hs.197086	215.2	PP	87.75	PM
ENSG00000099783	HNRPM	Hs.465808	968.5	PP	880.2	PP
ENSG00000153187	HNRPU	Hs.166463	470.3	PP	887.6	PP
ENSG00000010295	HOM-TES-103	Hs.15243	407	PP	355.35	PP
ENSG00000078399	**HOXA9**	Hs.127428	739.2	PP	674	PP
ENSG00000108622	ICAM2	Hs.431460	319.9	PP	269.45	PP

ENSG00000135387	M11S1	Hs.471818	464.9	PP	451.45	PP
ENSG00000101367	MAPRE1	Hs.472437	196.1	PP	206.85	PM
ENSG00000168906	MAT2A	Hs.516157	1011.4	PP	738.6	PP
ENSG00000152601	MBNL1	Hs.478000	294.4	PP	864.5	PA
ENSG00000081189	MEF2C	Hs.444409	426	PP	437.85	PP
ENSG00000143995	**MEIS1**	Hs.526754	452.1	PP	262.65	PP
ENSG00000108389	MTMR4	Hs.514373	330.7	PP	407.2	PP
ENSG00000133026	MYH10	Hs.16355	375.1	PP	362.5	PP
ENSG00000153234	NR4A2	Hs.165258	124.6	PP	242.85	PP
ENSG00000145730	PAM	Hs.369430	187.3	PP	178.45	PP
ENSG00000136040	PLXNC1	Hs.551522	354.6	PP	387.1	PP
ENSG00000100941	PNN	Hs.409965	839.5	PP	617.3	PP
ENSG00000078304	PPP2R5C	Hs.368264	174.9	PP	165.25	PP
ENSG00000127314	RAP1B	Hs.369920	1093.1	PP	1537.75	PP
ENSG00000181467	RAP2B	Hs.98643	583.1	PP	665.95	PP
ENSG00000125976	RBM12	---	321.1	PP	313.35	PP
ENSG00000137710	RDX	Hs.263671	189.5	PP	184.9	PP
ENSG00000137075	RNF38	Hs.333503	322.6	PP	227.7	PP
ENSG00000137575	SDCBP	Hs.200804	934	PP	955.25	PP
ENSG00000122545	7-Sep	Hs.191346	815	PP	1146.5	PP
ENSG00000136450	SFRS1	Hs.68714	1264.9	PP	1622.65	PP
ENSG00000096717	SIRT1	Hs.369779	133.8	PP	124.9	PP
ENSG00000117394	SLC2A1	Hs.473721	233.5	PP	290.75	PP
ENSG00000124766	SOX4	Hs.357901	2351.7	PP	2500.65	PP
ENSG00000091640	SPAG7	Hs.90436	900.7	PP	517.9	PP
ENSG00000164056	SPRY1	Hs.436944	360.7	PP	268.15	PP
ENSG00000157514	TSC22D3	Hs.522074	1752.5	PP	2189.45	PP
ENSG00000163084	TSN	Hs.75066	130.8	PP	178.35	PP
ENSG00000116809	ZBTB17	Hs.433764	249.3	PP	146.75	PP
ENSG00000114514	ZNF148	Hs.380334	211.6	PP	226.65	PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000138031	ADCY3	Hs.467898	208.6	PP	178.4	PP
ENSG00000143401	ANP32E	Hs.385913	169.2	PP	423.3	PP
ENSG00000117713	ARID1A	Hs.468972	477.6	PP	444.8	PP
ENSG00000174437	ATP2A2	Hs.506759	203.5	PP	255.4	PP
ENSG00000155096	AZIN1	Hs.459106	551.2	PP	619.2	PP
ENSG00000159388	BTG2	Hs.519162	588.2	PP	538.3	PP
ENSG00000112237	CCNC	Hs.430646	273.3	PP	380.8	PP
ENSG00000070831	CDC42	Hs.467637	620.1	PP	437.75	PP
ENSG00000118260	CREB1	Hs.516646	122.9	PP	230.35	PP

ENSG00000082458	DLG3	Hs.522680	136.2 PP	89.45 PP
ENSG00000128590	DNAJB9	Hs.6790	211.5 PP	433.55 PP
ENSG00000112242	E2F3	Hs.269408	295.6 PP	585.95 PP
ENSG00000120738	EGR1	Hs.326035	128.6 PP	290.15 PP
ENSG00000104131	EIF3S1	Hs.404056	340.4 PP	365.05 PP
ENSG00000110321	EIF4G2	Hs.183684	2137 PP	2701.9 PP
ENSG00000100664	EIF5	Hs.433702	96.4 PP	55.8 PA
ENSG00000114416	FXR1	Hs.478407	143.9 PP	155.75 PP
ENSG00000138757	G3BP2	Hs.303676	242.8 PP	428.55 PP
ENSG00000106070	GRB10	Hs.164060	550.7 PP	574.15 PP
ENSG00000172534	HCFC1	Hs.83634	146.2 PP	233.9 PA
ENSG00000173744	HRB	Hs.443507	202.6 PP	405.7 PP
ENSG00000144381	HSPD1	Hs.113684	2868.6 PP	5689.3 PP
ENSG00000143164	IQWD1	Hs.435741	168.5 PP	156.4 PP
ENSG00000150093	ITGB1	Hs.429052	865.6 PP	593.85 PP
ENSG00000117139	JARID1B	Hs.443650	203.6 PP	353.6 PP
ENSG00000136826	**KLF4**	Hs.376206	536.5 PP	1193.7 PA
ENSG00000110514	MADD	Hs.82548	423 PP	267.9 PA
ENSG00000175130	MARCKSL1	Hs.75061	314.8 PP	265.6 PP
ENSG00000180398	MCFD2	Hs.293689	289.4 PP	258.25 PP
ENSG00000081189	MEF2C	Hs.444409	426 PP	437.85 PP
ENSG00000005810	MYCBP2	Hs.151411	187 PP	643.55 PP
ENSG00000106459	NRF1	Hs.298069	157.5 PP	126.8 PA
ENSG00000170515	PA2G4	Hs.478044	251.3 PP	523.75 PP
ENSG00000070756	PABPC1	Hs.387804	7565 PP	7921.7 PP
ENSG00000145730	PAM	Hs.369430	187.3 PP	178.45 PP
ENSG00000090060	PAPOLA	Hs.253726	307.4 PP	286 PP
ENSG00000185619	PCGF3	Hs.144309	192.1 PP	237.55 PP

ENSG00000102225	PCTK1	Hs.496068	135 PP	88.45 PA
ENSG00000025293	PHF20	Hs.517044	249.8 PP	173.65 PP
ENSG00000112941	POLS	Hs.481542	355.5 PP	367.35 PP
ENSG00000180817	PP	Hs.437403	894.8 PP	1860.7 PP
ENSG00000100614	PPM1A	Hs.130036	197.3 PP	259.8 PP
ENSG00000163806	PPP1CB	Hs.468018	65.7 PP	135.05 PP
ENSG00000171522	PTGER4	Hs.199248	531.8 PP	514.8 PP
ENSG00000048991	R3HDM	Hs.412462	217.6 PP	376.75 PP
ENSG00000127314	RAP1B	Hs.369920	1093.1 PP	1537.75 PP
ENSG00000067560	RHOA	Hs.247077	1537.7 PP	2368.8 PP
ENSG00000119729	RHOQ	Hs.549125	187.1 PP	222.3 PP
ENSG00000134758	RNF138	Hs.302408	186.9 PP	511.9 PP
ENSG00000137075	RNF38	Hs.333503	322.6 PP	227.7 PP
ENSG00000182568	SATB1	Hs.517717	829.9 PP	652.05 PP
ENSG00000156642	SDFR1	Hs.187866	169.4 PP	193.05 PP
ENSG00000116754	SFRS11	Hs.479693	819.9 PP	1077.55 PP
ENSG00000153914	SFRS12	Hs.519347	258 PP	229.6 PP
ENSG00000139218	SFRS2IP	Hs.210367	224.1 PP	132.2 PA
ENSG00000096717	SIRT1	Hs.369779	133.8 PP	124.9 PP
ENSG00000184602	SNN	Hs.459952	234.4 PP	239.3 PP
ENSG00000159140	SON	Hs.517262	408.8 PP	467.15 PP
ENSG00000137642	SORL1	Hs.368592	2264.1 PP	1084.65 PP
ENSG00000124766	SOX4	Hs.357901	2351.7 PP	2500.65 PP
ENSG00000172845	SP3	Hs.531587	137.8 PP	293.35 PP
ENSG00000178691	SUZ12	Hs.462732	602.2 PP	633.3 PP
ENSG00000165169	TCTE1L	Hs.446392	323 PP	369.75 PP
ENSG00000116001	TIA1	Hs.516075	151.6 PP	145 PP
ENSG00000183864	TOB2	Hs.474978	165.3 PP	196.4 PP

ENSG00000154174	TOMM70A	Hs.227253	585.1 PP	581.85 PP
ENSG00000170142	UBE2E1	Hs.164853	318.4 PP	488.3 PP
ENSG00000164828	UNC84A	Hs.438072	146.4 PP	111.15 PP
ENSG00000135655	USP15	Hs.434951	197.3 PP	160.35 PP
ENSG00000143952	VPS54	Hs.48499	187.9 PP	151.5 PP
ENSG00000179456	ZNF238	Hs.69997	235.7 PP	241.8 PP

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Ensemble Gene ID	Gene Symbol	Unigene	PBSC RFU	PBSC Flags	BM RFU	BM Flags
ENSG00000123908	EIF2C2	Hs.449415	150.2	PP	115.85	PP
ENSG00000022267	FHL1	Hs.435369	5240	PP	3151.75	PP
ENSG00000153187	HNRPU	Hs.166463	470.3	PP	887.6	PP
ENSG00000152601	MBNL1	Hs.478000	294.4	PP	864.5	PP
ENSG00000100330	MTMR3	Hs.474536	204.7	PP	287	PP
ENSG00000082641	NFE2L1	Hs.514284	735.5	PP	726.35	PP
ENSG00000136448	NMT1	Hs.532790	220.5	PP	219.45	PP
ENSG00000147162	OGT	Hs.405410	165.1	PP	183.6	PP
ENSG00000136238	RAC1	Hs.413812	767.5	PP	1337.4	PP
ENSG00000092421	SEMA6A	Hs.156967	140	PP	182.2	PP

Example 4: MicroRNA-16 inhibits human erythroid differentiation

Abstract

Previously, the inventors determined that microRNA-16 (*miR-16*) is expressed in normal human CD34$^+$ hematopoietic stem-progenitor cells (HSPCs) and predicted by bio-informatics that *miR-16* may regulate erythroid differentiation. Here the inventors report that ectopic *miR-16* expression completely blocked hemin-induced erythroid differentiation of K562 human erythroleukemia cells. Likewise, enforced *miR-16* expression in normal human CD34$^+$ cells strongly inhibited erythroid differentiation, without affecting myeloid differentiation in either colony-forming or suspension culture assays. This study provides functional evidence verifying the inventors' bioinformatic prediction that *miR-16* can selectively regulate human erythroid differentiation.

Introduction

MicroRNAs (miRs) are ~22 nucleotide RNAs that post-transcriptionally regulate mRNA molecules[1] and can thereby control cellular proliferation, differentiation and metabolism[2]. The chromosome 13q14 locus of *miR-15/16*, the first microRNA described as a tumor suppressor gene, is deleted in many human chronic lymphoid leukemia (CLL) cases[3], a finding replicated for the syntenic deletion in mice that develop CLL[4]. In normal B lymphoid cells, *miR-16* down-regulates the level of BCL-2 protein, leading to increased cellular susceptibility to apoptosis[5]. In addition, the *miR-16* family has been bio-informatically suggested to down-regulate cell cycle-associated mRNAs[6]. Recently, *miR-16* has been implicated in Xenopus cellular differentiation via controlling Nodal signaling[7]. In mammalian cellular differentiation, *miR-16* expression increases during terminal erythroid maturation[8].

In a previous study, the inventors determined miR expression in normal human CD34$^+$ HSPCs[9] and combined this with HSPC mRNA expression data[10] to bio-informatically predict possible roles that miRs play in hematopoiesis, with a particular focus on possible control points in stem to progenitor cell transitions. This analysis identified the possible involvement of *miR-16* in either myeloid or erythroid differentiation. In the current study, the inventors document dynamic *miR-16* expression during myeloid and erythroid differentiation, and show by functional assays that *miR-16* expression markedly decreases erythropoiesis in the K562 cell line model and in normal primary human CD34$^+$ HSPCs without affecting myelopoiesis.

Materials and Methods

Cell Culture

K562 (ATCC, Rockville, MD) were cultured, and $CD34^+$ cells from normal adult donor mobilized blood were obtained from the National Heart, Lung, and Blood Institute Program of Excellence in Gene Therapy, Hematopoietic Cell Processing Core (Fred Hutchison Cancer Center) under Institutional Review Board-approved protocols of both the Fred Hutchinson Cancer Center and the Johns Hopkins School of Medicine, and cultured as previously described[9,10].

Lentivirus Production and miR-16 ectopic expression

The 630 bp genomic sequence surrounding *hsa-miR-16a* was inserted into dual promoter FUGW parental vector containing green fluorescent protein (GFP)[11,12]. $CD34^+$ cells were transduced with *miR-16 or* parental control lentivirus as previously decribed[9].

MicroRNA Isolation and Northern Blotting

Erythroid differentiation of K562 cells was induced with 50 ng/ml Hemin[13]. Cells were harvested over a 7 day time course, and total RNA was isolated with TriZol (Invitrogen, Carlsbad, CA). *MiR-16a* expression was determined by miR-microarray as previously described[9], and verified by Northern blotting.

SILAC Proteomic Assay

Control and *miR-16*-transduced K562 cells were treated with hemin or vehicle control. At day 7 (d7), cellular protein was isolated from $2x10^7$ cells and assayed by Stable Isotope Labeling with Amino Acids in Cell Culture (SILAC) proteomics as described[14,15].

Methycellulose Colony-forming and Suspension Culture Assays

Lentivirally transduced $CD34^+$ cells were fluorescence activated cell sorter (FACS)-sorted two days after transduction for GFP^+ cells using a FACS Vantage (BD Biosciences, San Jose, CA) flow cytometer. GFP^+ cells were plated into colony-forming cell (CFC) and suspension culture assays as previously described[9]. CFC-GM and BFU-E colonies from CFC assays were enumerated 14 days after transduction. Cells from suspension cultures were immunostained 7 days after FACS sorting with CD33, CD34, CD71, CD235a and isotype control monoclonal antibodies (BD).

Results and Discussion

***MiR-16* decreased during K562 cell erythroid differentiation**

The inventors' previous miR expression and bio-informatic studies implicated *miR-16* as a possible regulator of human myel- and/or erythropoiesis, because of its multiple predicted hematopoietic-expressed mRNA targets, including MEIS1, CREBBP, CD164, HOXA5, and AGTR2[9]. First, the inventors examined *miR-16* expression during a time course of hemin-induced K562 model erythroid differentiation and HL-60 model differentiation to multiple terminal cell types. *MiR-16* was expressed in both untreated K562 and HL-60 cells. During hemin-induced erythroid differentiation, *mir-16* levels increased slightly at very early time points (1-4 hrs), then decreased to low levels at d1. (Fig 9A) Expression remained low until d7, when the cells were fully differentiated and *mir-16* returned to the level present in uninduced K562. In contrast, *miR-16* levels did not change in HL60 cells treated with any of 4 different inducers of myeloid differentiation. (Fig 9B) These expression kinetics indicated that *miR-16* may selectively hold erythroid, but not myeloid, progenitor cells at an undifferentiated state. Up-regulation of *miR-16* was previously observed in erythroid differentiation, and its expression correlated with the appearance of erythroid cell surface markers such as CD71, CD36, and CD235a[8]. The inventors' expression results confirm that *miR-16* expression is higher in fully differentiated cells, and extends the prior study by revealing that *mir-16* expression is highly dynamic during erythroid differentiation. Based on this dynamic expression during erythropoiesis, physiologic *miR-16* reduction may allow cells to differentiate along the erythroid lineage.

To determine if sustained *miR-16* can down-regulate erythropoiesis, the inventors transduced K562 cells with *miR-16* and found that benzidine staining (of hemoglobin) was decreased by 78% (data not shown). Furthermore, SILAC proteomics showed that, compared to hemin-treated, control-transduced K562 cells, *miR-16*-transduced, hemin-treated K562 cells had greatly decreased levels of erythrocyte-associated proteins, including the globins. (Fig 9C) Enforced expression of *miR-16* did not change either cellular apoptosis (assayed by viaprobe/annexin V staining), cell cycling (assayed by propidium iodide staining), or cell growth (assayed by cell counts) (data not shown).

Thus, preventing the physiologic reduction in *miR-16* by enforced expression blocked hemin-induced K562 erythroid differentiation.

***Mir-16* suppressed erythropoiesis of normal CD34+ HSPC.**

The inventors next hypothesized that enforced *miR-16* expression would selectively inhibit erythropoiesis of primary human HSPCs. Indeed, *miR-16*-transduced $CD34^+$ cells generated 30% fewer erythroid colonies but only 10% fewer myeloid colonies. (Fig 10a) In addition, the erythroid colonies generated by *miR-16*-transduced $CD34^+$ cells were small and diffuse compared to controls, while the myeloid colonies were normal in size and morphology (not shown). In suspension cultures, cells ectopically expressing *miR-16* generated 3-fold fewer $CD71^+/CD235a^+$ relatively early erythroid cells and 4-fold fewer later $CD71^{++}/CD235a^{++}$ erythroid cells [16]. (Fig 10b) In contrast, there was a 30% increase in the frequency of $CD33^+$ myeloid cells in the suspension cultures of *miR-16*-transduced cells, confirming the CFC data that myeloid differentiation was relatively insensitive to *mir-16* expression. (Fig 10b) Although *miR-16* can regulate apoptosis in B lymphoid cells[3,5] and has also been suggested as a cell cycle inhibitor[6], the inventors found that apoptosis, cell cycling, and cell counts of *mir-16*-transduced $CD34^+$ cells in suspension cultures were comparable to controls (data not shown).

The inventors' original study of miR expression in HSPCs identified *miR-16* as a hematopoietic expressed (HE)-miR, and target annotation indicated it as a possible regulator of erythropoiesis[9]. The inventors also showed that several mRNAs predicted to be *miR-16* targets are in fact translationally controlled in hematopoietic cells[9]. In the functional studies herein, the inventors have demonstrated that *miR-16* can potently and selectively down-regulate erythropoiesis of both K562 erythroleukemia cells and normal primary $CD34^+$ HSPCs.

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Example 5: miRNAs expressed by all stem cells

Undifferentiated human embryonic stem cells (hESCs) expressed a small set of "ES-microRNAs", and mir-155 was expressed in day 9 and 14 EBs: Recently, the ability of hESCs110 to differentiate into hematopoietic lineage cells has been demonstrated in several laboratories, including our own. Differentiation of hESCs, via EBs or upon co-culture with the S17 or OP9 stromal cell line, can give rise to endothelial and hematopoietic cells including hematopoietic CFCs. Our recently reported human hESC/EB-derived hematopoietic model, using the NIH-approved H1 (WA01) hESC cell line, exhibits both waves (primitive and definitive) of human hematopoiesis. Differentiation into

hematopoietic cells can be evaluated using cytological staining, monoclonal antibody (Mab)/flow cytometric evaluation for lineage markers, qRT-PCR for hematopoietic transcription factors, and CFC assays. Similar results have been obtained using H9 (WA09) hESCs (unpublished).

Profiling microRNA expression in hematopoietic cells developing from hESCs: Based on our extensive experience with hESC-derived hematopoiesis, we generated and immuno-purified undifferentiated hESCs and differentiating EB cells over a time course of hESC to EB differentiation[90, 111], and microRNAs and mRNAs were assessed in these cells by microarrays and/or qRT-PCR and BioPlex assays. hESCs were transferred from "pluripotent" growth conditions to "EB conditions" where, without PMEFs or cytokines, EBs form and spontaneous differentiation occurs. In characterizing hem-endothelial development in this model system (Zambidis et al. (2005) Blood 106:860), we established that (a) expression of hematopoiesis-associated mRNAs/proteins begins at ~1 week of EB culture, when these cells produce mainly erythroid progeny containing embryonic hemoglobins (suggesting "embryonic" or "primitive" hematopoiesis); and (b) characteristics of "adult" (or "definitive") hematopoiesis, such as generation of increased numbers of mono-granulocytic progenitors plus erythroid progenitors producing cells containing fetal and adult hemoglobins, are present at 9-20+ days. Therefore, the following FACS-enriched hematopoietic cell-enriched subsets were harvested at the following critical time points (Zambidis et al. (2005) Blood 106:860):

(i) Undifferentiated hESCs ($CD9^+/TRA\text{-}160^+$ at EB day 0),

(ii) Embryonic ("primitive") erythroid-enriched cells ($CD34^+/CD31^-/CD13^-$ at EB day 6),

(iii) Embryonic plus some adult-type ("definitive") erythroid-enriched cells ($CD34^+/CD31^-/CD13^-$ at EB day 9), and

(iv) Embryonic and adult type erythroid-enriched cells ($CD34^+/CD31^-/CD13^-$ at EB day 14).

We have obtained enough cells at each of these time points to perform multiple FACS-analyses and qRT-PCR assays (Zambidis et al. (2005) Blood 106:860). These experiments were done using H1 and then H9 hESC lines. Data from hESCs were entered into our TID, and the microRNAs expressed in both hESC lines were prioritized for

comparisons to the subsets obtained from primary adult human and mouse hematopoietic tissues.

Informatic analyses using the TID: Once microRNA and mRNA expression data was obtained, we normalized and analyze the data, using 2 software tools developed by Dr. Georgantas (Georgantas et al. (2007) PNAS 104:2750 and Georgantas et al. (2004) Cancer Res. 64:4434), which can (a) identify changes in microRNA and mRNA expression between chosen sources of hematopoietic cells and stages of erythroid differentiation, and (b) predict, at each of these stages, the effect of individual microRNAs on erythropoiesis by predicting their effects on specific mRNA targets expressed by the same cells.

We found only 9 microRNAs that were expressed in both H1 and H9 hESCs during growth under undifferentiated ("pluripotent") conditions. 8 of the 9 "ES-microRNAs" are also HE-microRNAs (1 of these 9 (mir-212) was just below the expression level threshold in CD34+ cells; Table 1). We hypothesize that these ES/HE-microRNAs may regulate general stemness properties shared by other types of stem cells. Note also that the ES-microRNAs do not include the mir-155 HE-microRNA or certain other HE-microRNAs predicted to control hematopoiesis: mir-16, -146, -181, or -128; this leads us to suspect that these 5 microRNAs may be more specific for the regulation of hematopoietic differentiation than of general stemness.

Neural and mesenchymal stem cells were also investigated. Human neural stem cells (NSC) and mesenchymal stem cells (MSC) were isolated as described in Science 284(5411):143-147 and Stem Cells 24(12)2851-2857. The results indicated that the same miRNAs expressed in human embryonic stem cells were also found to be expressed and forming a similar signature in neural and mesenchyman stem cells (see Table 6).

Table 6: MicroRNAs Expressed by All Stem Cells

microRNA	$CD34^+$ HSPCs		hESCs	NSC	MSC
	PBSC RFU[2]	*BM RFU*			
hsa-let-7b	163,441	202,826	87,674	134,000	175,374
hsa-mir-17	169,601	839,361	87,521	2,612,500	585,167
hsa-mir-92-1	4,115,379	5,793,765	478,045	4,290,750	3,146,564
hsa-mir-92-2-p	3,477,367	4,760,875	638,159	4,810,875	3,475,815
hsa-mir-130a	186,958	420,271	95,444	488,850	388,921
hsa-mir-193	104,803	481,103	131,861	116,025	256,445
hsa-mir-197	182,695	231,027	84,921	167,700	145,645
hsa-mir-212 (SEQ ID NO: 34)	81,476	80,414	95,013	172,350	154,554

hsa-mir-222	354,343	200,347	94,847	703,500	612,315

Example 6: miRNA-155 is expressed in early hematopoietic stem cells

Using qRT-PCR, we assessed levels of mir-155 at 2 time points of EB differentiation of H1 hESCs90. We had previously shown that, in day 9 EBs, hematopoietic cells are mainly embryonic ("primitive") whereas adult ("definitive") hematopoietic cells are present by day 14. mir-155 was not detected in undifferentiated hESCs but was expressed at days 9 and 14 of EB differentiation, further circumstantially implicating mir-155 as a hematopoiesis-associated microRNA. Based on TID-predicted target mRNAs, mir-155 may control embryonic hematopoiesis. For example, mir-155 has been recently reported to down-regulate angiotensin receptor II (AGTRII); AGTRII is a new marker for, and may be mechanistically involved in, early embryonic hematopoiesis. Therefore, we have transduced H1 hESCs with our mir-155 lentivector. To date, we have observed no difference in the growth rate of mir-155-transduced vs control-transduced hESCs, under "pluripotent" conditions.

Thus, mir-155 allows hESCs to develop into early embryonic HSPCs, but inhibits further differentiation. These differentiation-arrested cells remain able to expand.

Equivalents

Those skilled in the art will recognize, or be able to ascertain using no more than routine experimentation, many equivalents of the specific embodiments of the invention described herein. Such equivalents are intended to be encompassed by the following claims.

CLAIMS:

1. A method for modulating the differentiation of a stem-progenitor cell (SPC), comprising contacting a stem-progenitor cell with one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of SEQ ID NOs: 1-34 or the complement thereof.

2. The method of claim 1, wherein modulating the differentiation of a stem-progenitor cell is inhibiting the differentiation of a stem-progenitor cell, and the stem-progenitor cell is contacted with one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of SEQ ID NOs: 1-34.

3. The method of claim 1, wherein modulating the differentiation of a stem-progenitor cell is stimulating the differentiation of a stem-progenitor cell, and the stem-progenitor cell is contacted with one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of the complements of SEQ ID NOs: 1-34.

4. The method of claim 1, wherein the stem-progenitor cell is a hematopoietic stem-progenitor cell and the SEQ ID NOs are selected from the group consisting of the sequences of mir-128a, mir-181a, mir-146, mir-155, mir-24a, mir-17, mir-16, mir-103, mir-107, mir-223, mir-221 and mir-222 or the complement thereof.

5. The method of claim 4, wherein the hematopoietic stem-progenitor cell is CD34+.

6. The method of claim 4, wherein the differentiation of the hematopoietic stem-progenitor cell beyond the stage of multipotent progenitor cell (MPP) and/or before the stage of common lymphoic progenitor (CLP) or common myeloid progenitor (CMP) is inhibited, and the SEQ ID NOs are selected from the group consisting of mir-128a, mir-181a, mir-146, mir-155, mir-24a, and mir-17.

7. The method of claim 4, wherein the differentiation of the hematopoietic stem-progenitor cell beyond the stage of MPP and before the stage of CLP is inhibited, and the SEQ ID NO is that of mir-146.

8. The method of claim 4, wherein the differentiation of the hematopoietic stem-progenitor cell beyond the stage of MPP and/or before the stage of CMP is

inhibited, and the SEQ ID NOs are selected from the group consisting of mir-155, mir-24a or mir-17.

9. The method of claim 4, wherein the differentiation of the hematopoietic stem-progenitor cell beyond the stage of CMP and/or before the stage of B/Mac bi-potential is inhibited, and the SEQ ID NOs are those of mir-103 or mir-107.

10. The method of claim 4, wherein the differentiation of the hematopoietic stem-progenitor cell beyond the stage of CMP and/or before the stage of megakaryocyte-erythrocyte progenitor (MEP) is inhibited, and the SEQ ID NO is that of mir-16.

11. The method of claim 4, wherein the differentiation of the hematopoietic stem-progenitor cell beyond the stage of granulocyte-macrophage progenitor cell (GMP) and/or before the stage of granulocytes is inhibited, and the SEQ ID NO is that of mir-223.

12. The method of claim 4, wherein the differentiation of the hematopoietic stem-progenitor cell beyond the stage of MEP and/or before the stage of erythrocyte is inhibited, and the SEQ ID NO is that of mir-221 and/or mir-222.

13. The method of claim 4, wherein the differentiation of the hematopoietic stem-progenitor cell towards the stage of CLP and CMP is stimulated, and the SEQ ID NOs are selected from the group consisting of mir-128a, mir-181a, mir-146, mir-155, mir-24a, and mir-17.

14. The method of claim 4, wherein the differentiation of the hematopoietic stem-progenitor cell towards the stage of CLP is stimulated, and the SEQ ID NO is that of mir-146.

15. The method of claim 4, wherein the differentiation of the hematopoietic stem-progenitor cell towards the stage of CMP is stimulated, and the SEQ ID NOs are selected from the group consisting of mir-155, mir-24a or mir-17.

16. The method of claim 4, wherein the differentiation of the hematopoietic stem-progenitor cell towards the stage of B/Mac bi-potential and GMP is stimulated, and the SEQ ID NOs are those of mir-103 or mir-107.

17. The method of claim 4, wherein the differentiation of the hematopoietic stem-progenitor cell towards the stage of CMP and/or before the stage of MEP is stimulated, and the SEQ ID NO is that of mir-16.

18. The method of claim 4, wherein the differentiation of the hematopoietic stem-progenitor cell towards the stage of granulocyte is stimulated, and the SEQ ID NO is that of mir-223.

19. The method of claim 4, wherein the differentiation of the hematopoietic stem-progenitor cell towards the stage of erythrocyte is stimulated, and the SEQ ID NO is that of mir-221 and/or mir-222.

20. The method of claim 1, wherein the stem-progenitor cell is a human embryonic stem cell (ESC), a neural stem cell or a mesenchymal stem cell, and the SEQ ID NOs are selected from the group consisting of the sequences of let-7b, mir-17, mir-92-1, mir-92-2-p, mir-130a, mir-193, mir-197, mir-212 and mir-222 or the complement thereof.

21. A method for stimulating the differentiation of human embryonic stem cells into embryonic type (primitive) hematopoietic stem cells, comprising contacting the human embryonic stem cells with a nucleic acid comprising a nucleotide sequence that is at least about 90% identical to that of mir-155.

22. A method for preventing the differentiation of human embryonic stem cells into embryonic type (primitive) hematopoietic stem cells, comprising contacting the human embryonic stem cells with a nucleic acid that is at least about 90% identical to that of the complement of mir-155.

23. The method of claim 1, wherein the stem-progenitor cell is *in vitro*.

24. The method of claim 23, wherein the stem-progenitor cell was isolated from a subject.

25. The method of claim 4, wherein the cell is a peripheral blood stem-progenitor cell.

26. The method of claim 4, wherein the cell is a bone marrow cell.

27. A method of modulating the differentiation of a stem-progenitor cell that is in a subject, comprising administering to a stem-progenitor cell in a subject in need thereof one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of SEQ ID NOs: 1-34 or the complement thereof.

28. The method of claim 27, wherein the subject has a disease that is associated with excessive cell differentiation of the stem-progenitor cell and the method comprises

administering to the stem-progenitor cell one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of SEQ ID NOs: 1-34.

29. The method of claim 28, wherein the disease is selected from the group consisting of leukemia or lymphoma; and the SEQ ID NOs are selected from the group consisting of those of mir-128a, mir-181a, mir-146, mir-155, mir-24a, mir-17, mir-16, mir-103, mir-107, mir-223, mir-221 and mir-222 or the complement thereof.

30. The method of claim 27, wherein the subject has a disease that is associated with an excessive number of insufficiently differentiated cells and the method comprises administering to the stem-progenitor cell one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of the complement of SEQ ID NOs: 1-34.

31. The method of claim 30, wherein the disease is solid tumor cancer; the stem-progenitor cell is a cancer stem cell and the SEQ ID NOs are selected from the group consisting of the complements of the sequences of mir-128a, mir-181a, mir-146, mir-155, mir-24a, mir-17, mir-16, mir-103, mir-107, mir-223, mir-221 and mir-222 or the complement thereof.

32. The method of claim 27, wherein the subject has low levels of differentiated hematopoietic cells and the method comprises administering to the stem-progenitor cell one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of the complement of SEQ ID NOs: 1-34.

33. The method of claim 32, wherein the subject is having or has received chemotherapy or radiation therapy or other therapy destroying one or more types of differentiated cells or the subject has a disease selected from the group consisting of thrombocytopenia, an immunodeficiency disease, an anemia, leukopenia, granulocytosis or neutropenia.

34. A method for increasing the number of red blood cells in a subject, comprising administering to a subject in need thereof, an effective amount a nucleic acid comprising the complement of the nucleotide sequence of mir-16.

35. A method for treating or preventing leukopenia in a subject, comprising administering to a subject in need thereof, an effective amount of a nucleic acid comprising the complement of mi-146.

36. The method of claim 28, wherein the subject is infected with human immunodeficiency virus.

37. A method for repopulating a hematopoietic cell population of a subject, comprising obtaining a hematopoietic stem-progenitor cell from a subject, contacting *ex vivo* the stem-progenitor cell with one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of the complements of SEQ ID NOs: 1-33 to thereby obtain differentiated hematopoietic cells; and administering all or a portion of the differentiated hematopoietic cells to the subject.

38. The method of claim 37, wherein a hematopoietic stem-progenitor cells is contacted with a nucleic acid comprising the complement of the nucleotide sequence of mir-16.

39. A method for expanding a population of stem-progenitor cells, comprising contacting the stem-progenitor cell with one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of SEQ ID NOs: 1-33.

40. A method of modulating the expression of a gene selected from the group consisting of CXCR4, FOS, FOXP1, GATA3, MYB, RUNX-1, RUNX-3, Spi-8, MED, PU.1, CBPβ, CREBBP, HoxA5, HoxB7, Jun, Meis-1, WWP2, ETS, Evi-1, MYB, AGTR1, AGTR2, GATA2, c-kit, MYB,, ETS or PPRγin a cell, comprising administering to the cell one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of the SEQ ID NOs: 1-33 or the complement thereof that interacts with the gene, as set forth in Table 1.

41. An isolated stem-progenitor cell comprising a heterologous nucleic acid that is at least about 90% identical to one or more of the SEQ ID NOs: 1-34 or the complement thereof.

42. The isolated stem-progenitor cell of claim 41, wherein the stem-progenitor cell is a stem cell.

43. The isolated stem-progenitor cell of claim 35, which is a hematopoietic cell.

44. A composition comprising one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of the SEQ ID NOs: 1-34 or the complement thereof and wherein the nucleic acid is linked to a promoter.

45. A kit comprising one or more nucleic acids, wherein each nucleic acid comprises a nucleotide sequence that is at least about 90% identical to one or more of the SEQ ID NOs: 1-34 or the complement thereof and wherein the nucleic acid is linked to a promoter.

46. A method for determining whether a cell is a stem-progenitor cell, comprising determining the level of one or more miRNAs having one of SEQ ID NOs: 1-34, wherein a level of one or more of these miRNAs that is statistically significantly similar to that of Table 1 indicates that the cell is a stem-progenitor cell.

47. A method for detecting a stem-progenitor cell in a population of cells, comprising determining the level of one or more miRNAs having one of SEQ ID NOs: 1-34 in a cell in the population of cells, wherein a level of one or more of these miRNAs that is statistically significantly similar to that of Table 1 indicates the presence of a stem-progenitor cell in the population of cells.

48. A method for determining the proportion of stem-progenitor cells in a population of cells, comprising determining in a small portion of the population of cells the level of one or more miRNAs having one of SEQ ID NOs: 1-34, and comparing the proportion of cells having one or more of these miRNAs to the total number of cells of the small portion of the population, to thereby derive the proportion of stem-progenitor cells in the population of cells.

49. A method for determining the type of stem-progenitor cell of a hematopoietic stem-progenitor cell, comprising determining the presence of one or more miRNAs that are associated with a particular stage of differentiation, wherein the presence of mir-128a and/or mir-181a indicates that the stem-progenitor cell is a LT-HSC, ST-HSC or an MPP; the presence of mir-146 indicates that the stem-progenitor cell is an

MPP that will differentiate into a CLP; the presence of mir-155, mir-24a or mir-17 indicates that the stem-progenitor cell is an MPP that will differentiate into a CMP; the presence of mir-16 indicates that the stem-progenitor cell is a CMP that will differentiate into a MEP; the presence of mir-103 or mir-107 indicates that the stem-progenitor cell with differentiate into a B/Mac or GMP; the presence of mir-223 indicates that the stem-progenitor cell is a GMP that will differentiate into a granulocyte; the presence of mir-221 or mir-222 indicates that the stem-progenitor cell is an MEP that will differentiate into an erythrocyte.

50. The method of claim 49, further comprising determining the presence of mRNA that is specific for a particular stage of differentiation.

51. The method of claim 50, wherein the presence of mRNA of one or more of CXCR4, FOS, FOXP1, GATA3, MYB, RUNX-1, RUNX-3, Spi-8, MED or PU.1 indicates that the stem-progenitor cell is a lymphoid stem-progenitor cell; wherein the presence of mRNA of one or more of CBPβ, CREBBP, CXCR4, HoxA5, HoxB7, Jun, Meis-1, RUNX-1, RUNX-3, WWP2, ETS, Evi-1, MYB or PU.1 indicates that the stem-progenitor cell is a myeloid stem-progenitor cell; and wherein the presence of mRNA of one or more of AGTR1, AGTR2, CREBB, FOS, GATA2, GATA3, Jun, c-kit, MYB, RUNX-1, ETS or PPRγ indicates that the stem-progenitor cell is an erythroid stem-progenitor cell.

52. A method for determining the stemness of a cell, comprising determining the level of one or more miRNAs having a nucleotide sequence of one of let-7b, mir-17, mir-92-1, mir-92-2-p, mir-130a, mir-193, mir-197, mir-212, and mir-222, wherein a level of one or more of these miRNAs that is statistically significantly similar to that of Table 6 indicates that the cell is a stem or stem-progenitor cell.

53. A method for identifying a gene whose expression modulates the differentiation of a stem-progenitor cell, comprising identifying a gene having a sequence from SEQ ID NO: 1-34 in the 3' or 5' UTR, wherein the presence of such as sequence indicates that the gene modulates the differentiation of a stem-progenitor cell.

54. A method for identifying the function of a miRNA, comprising comparing an expression profile of mRNA of a specific cell with that of miRNA of the same cell; comparing the sequences of mRNA and miRNA that are expressed in the cell, wherein the identification of a miRNA having the same as a sequence present in the

gene encoding the mRNA indicates that the miRNA is likely to regulate the expression of the gene.

55. A method of screening a candidate substance for an effect on hematopoietic cell differentiation, comprising providing a hematopoietic cell that expresses one or more nucleic acids of SEQ ID NOS: 1-34; contacting said hematopoietic cell with said candidate substance; and assessing the effect of said candidate substance on the expression or stability of one or more nucleic acids of SEQ ID NOS: 1-34.

56. A method for determining whether a miRNA inhibits the expression of a gene, comprising contacting a cell comprising a reporter construct linked to the 3' or 5' UTR of the gene with the miRNA, and determining the level of expression of the reporter construct, wherein a lower level of reporter construct in the presence of the miRNA relative to its absence indicates that the miRNA inhibits the expression of the gene.

Figure 1

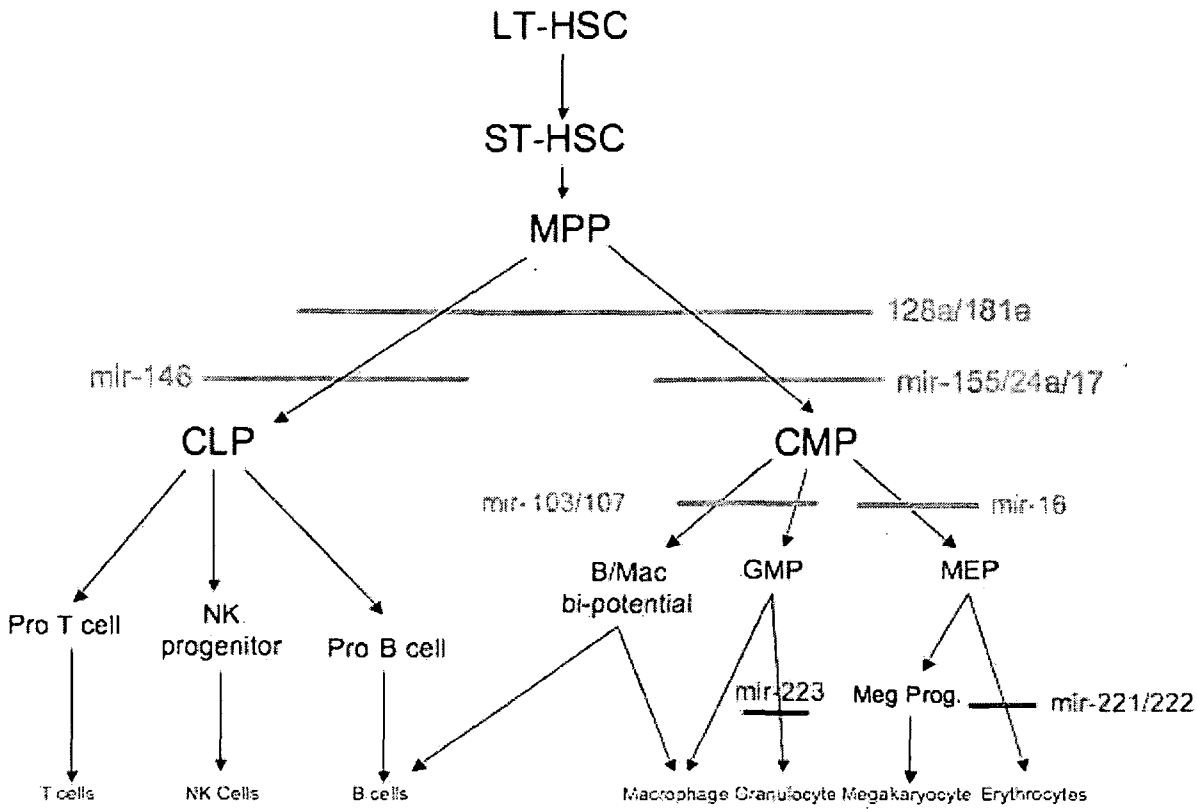

LT-HSC
ST-HSC
MPP
128a/181a
mir-146
mir-155/24a/17
CLP
CMP
mir-103/107
mir-16
B/Mac
bi-potential
GMP
MEP
Pro T cell
NK
progenitor
Pro B cell
mir-223
Meg Prog.
mir-221/222
T cells
NK Cells
B cells
Macrophage
Granulocyte
Megakaryocyte
Erythrocytes

Figure 2

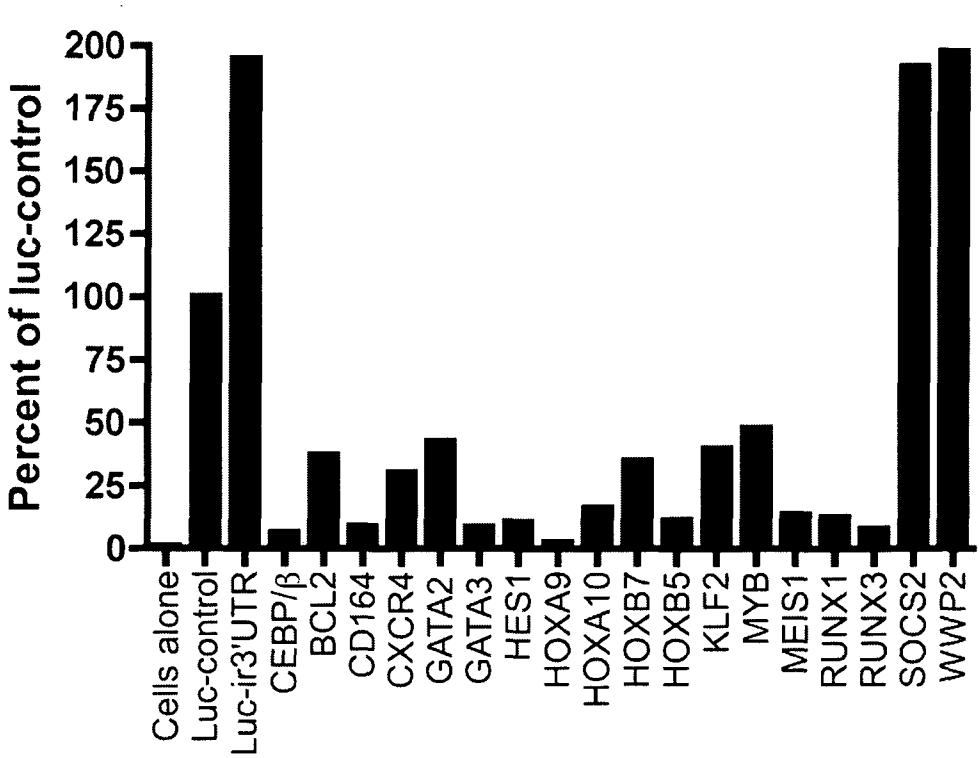

Percent of luc-control
200
175
150
125
100
75
50
25
0
Cells alone
Luc-control
Luc-ir3'UTR
CEBP/β
BCL2
CD164
CXCR4
GATA2
GATA3
HES1
HOXA9
HOXA10
HOXB7
HOXB5
KLF2
MYB
MEIS1
RUNX1
RUNX3
SOCS2
WWP2

Figure 3

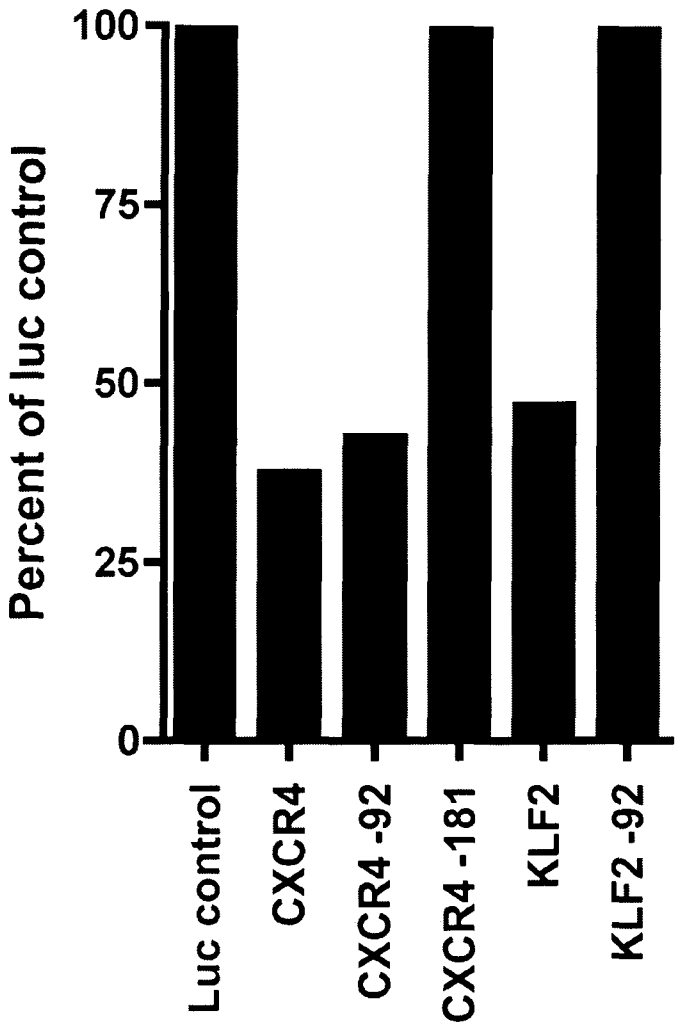

Percent of luc control
100
75
50
25
0
Luc control
CXCR4
CXCR4 -92
CXCR4 -181
KLF2
KLF2 -92

Figure 4

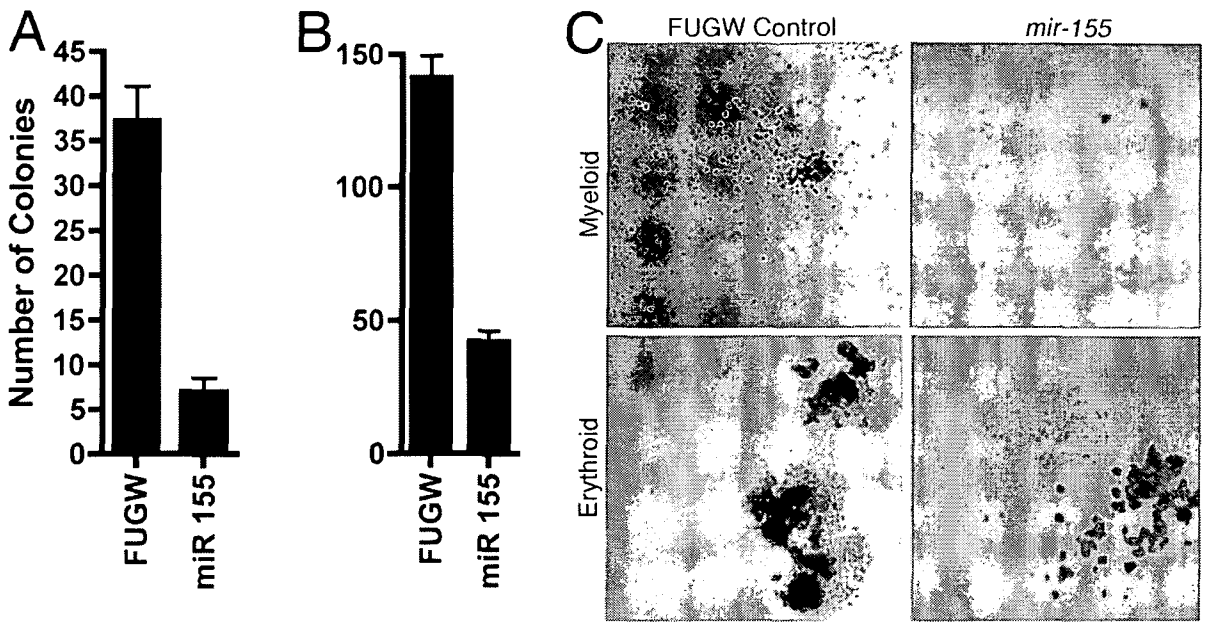

A
Number of Colonies
45
40
35
30
25
20
15
10
5
0
FUGW
miR 155
B
150
100
50
0
FUGW
miR 155
C
FUGW Control
mir-155
Myeloid
Erythroid

Figure 5

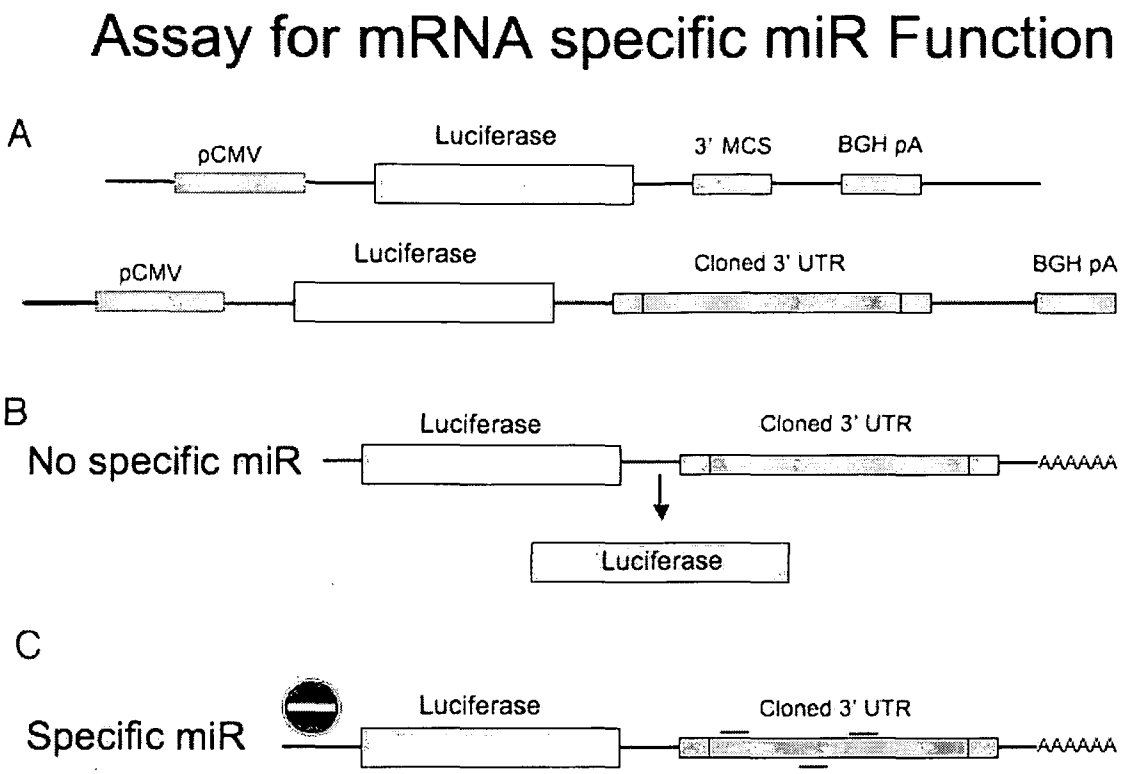
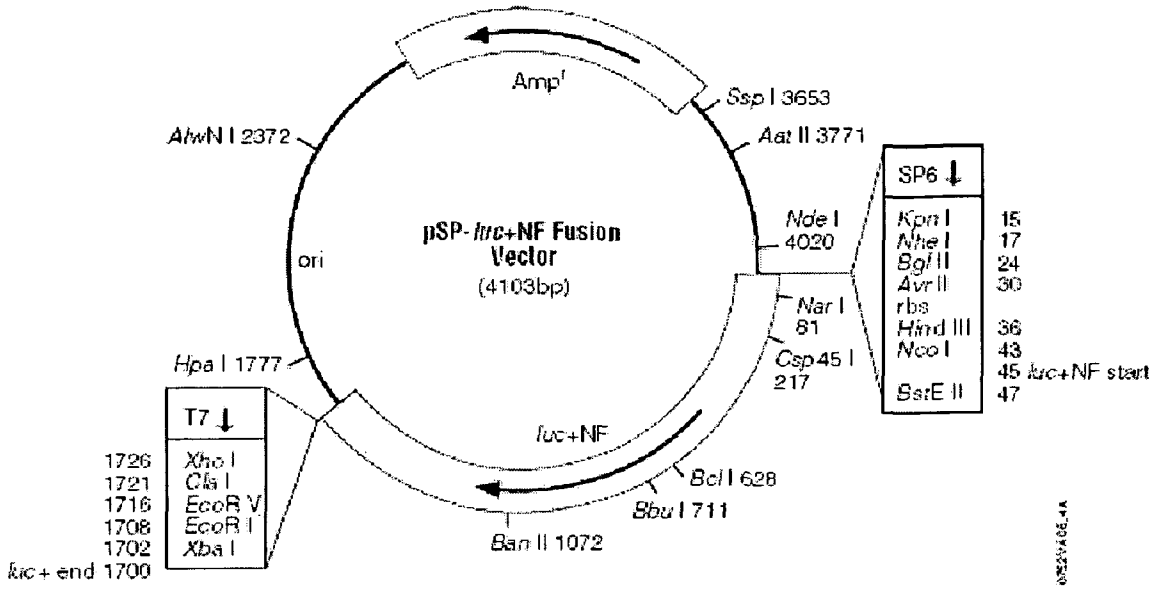

Assay for mRNA specific miR Function
A
pCMV
Luciferase
3' MCS
BGH pA
pCMV
Luciferase
Cloned 3' UTR
BGH pA
B
No specific miR
Luciferase
Cloned 3' UTR
AAAAAA
Luciferase
C
Specific miR
Luciferase
Cloned 3' UTR
AAAAAA

Figure 6

(A) PSP-luc+NF fusion vector



(B) pcDNA-3.1

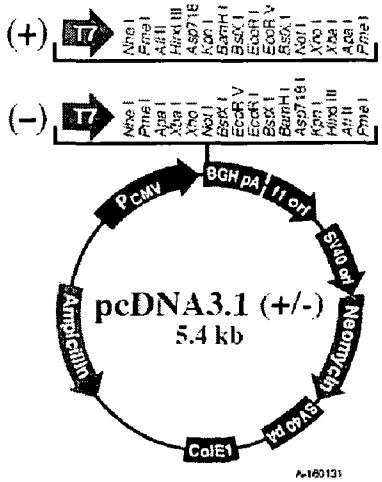


Figure 7

Probe	PBSC intesity	BM CD34 intesity
hsa-let-7a-1-prec	59578	49554
hsa-let-7a-2-precNo1	47000	36872
hsa-let-7a-2-precNo2	77039	71450
hsa-let-7a-3-prec	59391	49687
hsa-let-7b-prec	163442	202827
hsa-let-7c-prec	86575	93386
hsa-let-7d-prec	67896	66178
hsa-let-7d-v1-prec	49066	37354
hsa-let-7d-v2-precNo1	44976	37615
hsa-let-7d-v2-precNo2	77475	102337
hsa-let-7e-prec	79189	68382
hsa-let-7f-1-precNo1	45894	29286
hsa-let-7f-1-precNo2	48158	50057
hsa-let-7f-2-prec2	44112	23938
hsa-let-7g-precNo1	50398	51339
hsa-let-7g-precNo2	44231	29439
hsa-mir-001b-1-prec1	43603	29676
hsa-mir-001b-2-prec	45565	30751
hsa-mir-007-1-prec	44206	36214
hsa-mir-007-2-precNo1	35213	29462
hsa-mir-007-2-precNo2	40143	33065
hsa-mir-007-3-precNo1	79095	33697
hsa-mir-007-3-precNo2	43669	32122
hsa-mir-009-1No1	59376	40944
hsa-mir-009-1No2	43839	29258
hsa-mir-009-2No1	44750	40369
hsa-mir-009-2No2	33674	32902
hsa-mir-009-3No1	50230	186066
hsa-mir-009-3No2	45759	42937
hsa-mir-010a-precNo1	123148	104125
hsa-mir-010a-precNo2	51317	46909
hsa-mir-010b-precNo1	71936	66447
hsa-mir-010b-precNo2	51585	39366
hsa-mir-015a-2-precNo1	48705	31928
hsa-mir-015a-2-precNo2	37497	33946
hsa-mir-015b-precNo1	57380	20085
hsa-mir-015b-precNo2	45680	34107
hsa-mir-016a-chr13	111253	36074
hsa-mir-016b-chr3	124736	51538
hsa-mir-017-precNo1	54312	38666
hsa-mir-017-precNo2	169602	839362
hsa-mir-018-prec	45790	64309
hsa-mir-019a-prec	45977	36911
hsa-mir-019b-1-prec	51593	33628
hsa-mir-019b-2-prec	53151	35447
hsa-mir-020-prec	168041	657935

Figure 7, con'd

hsa-mir-021-prec-17No1	55210	50332
hsa-mir-021-prec-17No2	44330	30967
hsa-mir-022-prec	40950	29168
hsa-mir-023a-prec	445018	896003
hsa-mir-023b-prec	450111	947758
hsa-mir-024-1-precNo1	96912	105926
hsa-mir-024-1-precNo2	35900	88058
hsa-mir-024-2-prec	84306	97241
hsa-mir-025-prec	211423	3574408
hsa-mir-026a-precNo1	364607	867620
hsa-mir-026a-precNo2	46982	37739
hsa-mir-026b-prec	368294	2851707
hsa-mir-027a-prec	54684	113259
hsa-mir-027b-prec	38411	49194
hsa-mir-028-prec	36647	39019
hsa-mir-029a-2No1	54575	48040
hsa-mir-029a-2No2	45541	174993
hsa-mir-029c-prec	60720	415967
hsa-mir-030a-precNo1	72202	165901
hsa-mir-030a-precNo2	40323	41028
hsa-mir-030b-precNo1	136572	91863
hsa-mir-030b-precNo2	47402	25807
hsa-mir-030c-prec	134083	63525
hsa-mir-030d-precNo1	46570	35853
hsa-mir-030d-precNo2	225310	241005
hsa-mir-031-prec	47093	15099
hsa-mir-032-precNo1	42323	33540
hsa-mir-032-precNo2	81310	446233
hsa-mir-033b-prec	66145	33738
hsa-mir-033-prec	51561	94420
hsa-mir-034precNo1	60561	47821
hsa-mir-034-precNo2	47491	35757
hsa-mir-092-prec-13=092-1No1	54086	28356
hsa-mir-092-prec-13=092-1No2	4115379	5793765
hsa-mir-092-prec-X=092-2	3477368	4760875
hsa-mir-093-prec-7.1=093-1	127150	483003
hsa-mir-095-prec-4	50596	147141
hsa-mir-096-prec-7No1	44380	44502
hsa-mir-096-prec-7No2	55092	113063
hsa-mir-098-prec-X	50817	33297
hsa-mir-099b-prec-19No1	49006	31159
hsa-mir-099b-prec-19No2	76214	50842
hsa-mir-099-prec-21	73422	41422
hsa-mir-100-1/2-prec	80739	257028
hsa-mir-101-1/2-precNo1	47240	26615
hsa-mir-101-1/2-precNo2	54359	65848

Figure 7, con'd

hsa-mir-101-prec-9	50981	38465
hsa-mir-102-prec-1	60459	731456
hsa-mir-103-2-prec	103210	686012
hsa-mir-103-prec-5=103-1	158154	885353
hsa-mir-105-prec-X.1=105-1	46995	26760
hsa-mir-106-prec-X	160636	729777
hsa-mir-107-prec-10	136376	832992
hsa-mir-122a-prec	73303	84229
hsa-mir-123-precNo1	319848	183657
hsa-mir-123-precNo2	88342	78632
hsa-mir-124a-1-prec1	52424	53946
hsa-mir-124a-2-prec	45168	17802
hsa-mir-124a-3-prec	52498	68681
hsa-mir-125a-precNo1	76769	37724
hsa-mir-125a-precNo2	49056	25811
hsa-mir-125b-1	73965	27689
hsa-mir-125b-2-precNo1	45528	35533
hsa-mir-125b-2-precNo2	66988	26145
hsa-mir-127-prec	49186	21619
hsa-mir-128a-precNo1	49098	37932
hsa-mir-128a-precNo2	84256	839790
hsa-mir-128b-precNo1	58217	350252
hsa-mir-128b-precNo2	50980	86713
hsa-mir-129-precNo1	60894	46552
hsa-mir-129-precNo2	47060	36859
hsa-mir-130a-precNo1	44184	31457
hsa-mir-130a-precNo2	186958	420271
hsa-mir-132-precNo1	47685	22701
hsa-mir-132-precNo2	45067	34978
hsa-mir-133a-1	47811	30256
hsa-mir-133a-2	44172	35689
hsa-mir-134-precNo1	43920	35045
hsa-mir-134-precNo2	47798	40735
hsa-mir-135-1-prec	46689	39772
hsa-mir-135-2-prec	45266	230316
hsa-mir-136-precNo1	43874	35785
hsa-mir-136-precNo2	46659	47538
hsa-mir-137-prec	45945	34495
hsa-mir-138-1-prec	44299	34421
hsa-mir-138-2-prec	49192	38189
hsa-mir-139-prec	44622	39319
hsa-mir-140No1	45721	33632
hsa-mir-140No2	57745	32640
hsa-mir-141-precNo1	46127	36918
hsa-mir-141-precNo2	43825	29685
hsa-mir-142-prec	62195	45514
hsa-mir-143-prec	47858	44640
hsa-mir-144-precNo1	46458	39278

Figure 7, con'd

hsa-mir-144-precNo2	45438	29306
hsa-mir-145-prec	51059	29628
hsa-mir-146-prec	626547	444648
hsa-mir-147-prec	52449	36964
hsa-mir-148-prec	44174	30432
hsa-mir-149-prec	49909	27406
hsa-mir-150-prec	76507	35166
hsa-mir-151-prec	44537	36367
hsa-mir-152-precNo1	44391	31692
hsa-mir-152-precNo2	50774	30382
hsa-mir-153-1-prec1	45915	50135
hsa-mir-153-1-prec2	42857	35100
hsa-mir-153-2-prec	46687	25228
hsa-mir-154-prec1No1	44157	37108
hsa-mir-154-prec1No2	47358	20022
hsa-mir-155-prec	355623	639819
hsa-mir-181a-precNo1	110744	598831
hsa-mir-181a-precNo2	46396	31287
hsa-mir-181b-precNo1	87324	558980
hsa-mir-181b-precNo2	43309	31833
hsa-mir-181c-precNo1	66345	316089
hsa-mir-181c-precNo2	47580	22140
hsa-mir-182-precNo1	44971	6011680
hsa-mir-182-precNo2	44300	4978572
hsa-mir-183-precNo1	43763	403450
hsa-mir-183-precNo2	46094	4128784
hsa-mir-184-precNo1	44997	51551
hsa-mir-184-precNo2	56984	45889
hsa-mir-185-precNo1	46627	15686
hsa-mir-185-precNo2	42780	22310
hsa-mir-186-prec	48767	34774
hsa-mir-187-precNo1	46066	36758
hsa-mir-187-precNo2	44457	37717
hsa-mir-188-prec	45937	35448
hsa-mir-190-prec	44253	125402
hsa-mir-191-prec	247692	3563677
hsa-mir-192-2/3No1	84710	4600720
hsa-mir-192-2/3No2	47010	44596
hsa-mir-193-precNo1	45002	4692556
hsa-mir-193-precNo2	104804	481104
hsa-mir-194-precNo1	49469	187828
hsa-mir-194-precNo2	44056	25860
hsa-mir-195-prec	77379	48238
hsa-mir-196-1-precNo1	50374	30432
hsa-mir-196-1-precNo2	51459	30147
hsa-mir-196-2-precNo1	47685	23940
hsa-mir-196-2-precNo2	55494	64881
hsa-mir-197-prec	182696	231027
hsa-mir-198-prec	59085	4978514

Figure 7, con'd

hsa-mir-199a-1-prec	48433	1463329
hsa-mir-199a-2-prec	47172	397964
hsa-mir-199b-precNo1	51993	62532
hsa-mir-199b-precNo2	48058	9040
hsa-mir-200a-prec	45375	37501
hsa-mir-202-prec	48566	106352
hsa-mir-203-precNo1	43473	772676
hsa-mir-203-precNo2	44371	3550679
hsa-mir-204-precNo1	42068	1510779
hsa-mir-204-precNo2	61615	99986
hsa-mir-205-prec	50341	1718037
hsa-mir-206-precNo1	79859	187712
hsa-mir-206-precNo2	49837	48806
hsa-mir-208-prec	46333	35905
hsa-mir-210-prec	48483	38644
hsa-mir-211-precNo1	46482	35849
hsa-mir-211-precNo2	48230	19153
hsa-mir-212-precNo1	81476	80414
hsa-mir-212-precNo2	57523	63565
hsa-mir-213-precNo1	272646	1088714
hsa-mir-213-precNo2	47863	25006
hsa-mir-214-prec	57026	22892
hsa-mir-215-precNo1	46803	29621
hsa-mir-215-precNo2	43075	31094
hsa-mir-216-precNo1	47334	27177
hsa-mir-216-precNo2	44473	30057
hsa-mir-217-precNo1	47552	33139
hsa-mir-217-precNo2	45854	31512
hsa-mir-218-1-prec	44945	37320
hsa-mir-218-2-precNo1	45055	33923
hsa-mir-218-2-precNo2	49462	40596
hsa-mir-219-prec	46100	39785
hsa-mir-220-prec	61560	38297
hsa-mir-221-prec	354047	549559
hsa-mir-222-precNo1	354343	200347
hsa-mir-222-precNo2	186394	138190
hsa-mir-223-prec	2038358	504774
hsa-mir-224-prec	72561	30522
hsa-mir-29b-2=102prec7.1=7.2	49977	31658

Figure 8

Shared MicroRNAs

MicroRNA	PBSC, RFU	BM, RFU
hsa-let-7b-prec	163,441.6	202,826.5
hsa-mir-016a-chr13	111,253.4	36,073.5
hsa-mir-016b-chr3	124,735.9	51,537.8
hsa-mir-017-precNo2	169,601.9	839,361.5
hsa-mir-020-prec	168,040.7	657,934.5
hsa-mir-023a-prec	445,017.7	896,002.8
hsa-mir-023b-prec	450,110.6	947,757.5
hsa-mir-024-1-precNo1	96,912.1	105,926.3
hsa-mir-025-prec	211,423.4	3,574,408.0
hsa-mir-026a-precNo1	364,607.1	867,620.3
hsa-mir-026b-prec	368,293.9	2,851,706.5
hsa-mir-030b-precNo1	136,572.1	91,862.5
hsa-mir-030d-precNo2	225,309.7	241,004.5
hsa-mir-092-prec-13=092-1No2	4,115,379.4	5,793,765.0
hsa-mir-092-prec-X=092-2	*3,477,367.9*	*4,760,875.0*
hsa-mir-093-prec-7.1=093-1	127,149.8	483,003.3
hsa-mir-103-2-prec	103,209.9	686,012.0
hsa-mir-103-prec-5=103-1	*158,154.4*	*885,352.8*
hsa-mir-106-prec-X	160,635.8	729,776.8
hsa-mir-107-prec-10	136,376.3	832,992.3
hsa-mir-123-precNo1	319,848.4	183,657.3
hsa-mir-130a-precNo2	186,958.2	420,271.0
hsa-mir-146-prec	626,547.3	444,647.5
hsa-mir-155-prec	355,623.0	639,819.3
hsa-mir-181a-precNo1	110,744.3	598,830.8
hsa-mir-191-prec	247,692.3	3,563,677.2
hsa-mir-193-precNo2	104,803.8	481,103.8
hsa-mir-197-prec	182,695.9	231,027.3
hsa-mir-213-precNo1	272,646.3	1,088,714.0
hsa-mir-221-prec	354,047.4	549,559.3
hsa-mir-222-precNo1	354,343.0	200,347.0
hsa-mir-222-precNo2	*186,393.9*	*138,190.3*
hsa-mir-223-prec	2,038,358.1	504,773.8

PBSC Specific MicroRNAs

MicroRNA	PBSC RFU	BM FRU
hsa-mir-010a-precNo1	123,147.6	104,124.5
hsa-mir-030c-prec	134,082.7	63,524.8

BM Specific MicroRNAs

MicroRNA	PBSC RFU	BM FRU
hsa-let-7c-prec	86,574.9	93,385.5
hsa-let-7d-v2-precNo2	77,475.2	102,337.0
hsa-mir-009-3No1	50,229.9	186,065.5

Figure 8, con'd

hsa-mir-024-1-precNo2	*35,899.8*	*88,057.8*
hsa-mir-024-2-prec	84,306.2	97,241.0
hsa-mir-027a-prec	54,684.4	113,258.8
hsa-mir-029a-2No2	45,541.4	174,992.5
hsa-mir-029c-prec	60,720.3	415,967.3
hsa-mir-030a-precNo1	72,202.2	165,901.0
hsa-mir-032-precNo2	81,310.1	446,232.5
hsa-mir-033-prec	51,561.2	94,419.5
hsa-mir-095-prec-4	50,595.7	147,140.5
hsa-mir-096-prec-7No2	55,092.2	113,063.3
hsa-mir-100-1/2-prec	80,738.6	257,027.8
hsa-mir-102-prec-1	60,459.1	731,456.3
hsa-mir-122a-prec	73,302.6	84,228.5
hsa-mir-123-precNo2	*88,341.9*	*78,632.0*
hsa-mir-128a-precNo2	84,256.3	839,789.5
hsa-mir-128b-precNo1	58,217.3	350,252.3
hsa-mir-128b-precNo2	*50,980.0*	*86,712.8*
hsa-mir-135-2-prec	45,265.8	230,316.3
hsa-mir-181b-precNo1	87,323.7	558,980.3
hsa-mir-181c-precNo1	66,344.7	316,089.0
hsa-mir-182-precNo1	44,971.4	6,011,680.0
hsa-mir-182-precNo2	*44,300.3*	*4,978,572.0*
hsa-mir-183-precNo1	43,763.1	403,449.8
hsa-mir-183-precNo2	*46,094.3*	*4,128,784.0*
hsa-mir-190-prec	44,253.3	125,401.5
hsa-mir-192-2/3No1	84,709.9	4,600,720.0
hsa-mir-193-precNo1	*45,001.6*	*4,692,555.5*
hsa-mir-194-precNo1	49,469.4	187,828.3
hsa-mir-198-prec	59,084.9	4,978,513.5
hsa-mir-199a-1-prec	48,433.3	1,463,328.8
hsa-mir-199a-2-prec	*47,172.0*	*397,964.3*
hsa-mir-202-prec	48,566.3	106,352.3
hsa-mir-203-precNo1	43,473.0	772,675.8
hsa-mir-203-precNo2	*44,371.1*	*3,550,678.8*
hsa-mir-204-precNo1	42,068.4	1,510,778.8
hsa-mir-204-precNo2	*61,615.3*	*99,985.8*
hsa-mir-205-prec	50,340.8	1,718,037.0
hsa-mir-206-precNo1	79,859.4	187,712.3
hsa-mir-212-precNo1	81,475.7	80,413.8

Figure 8, con'd

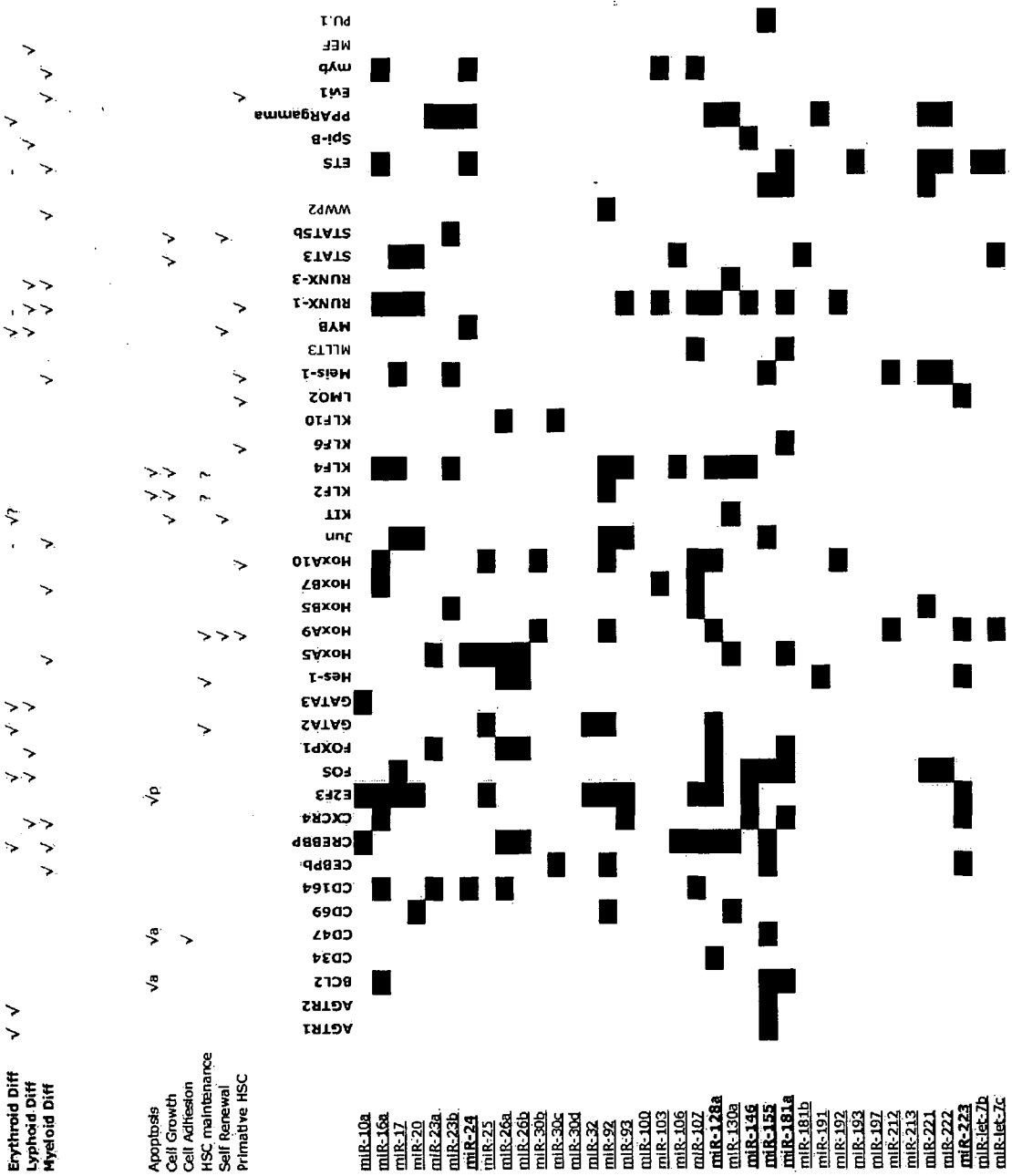


Figure 8, con'd

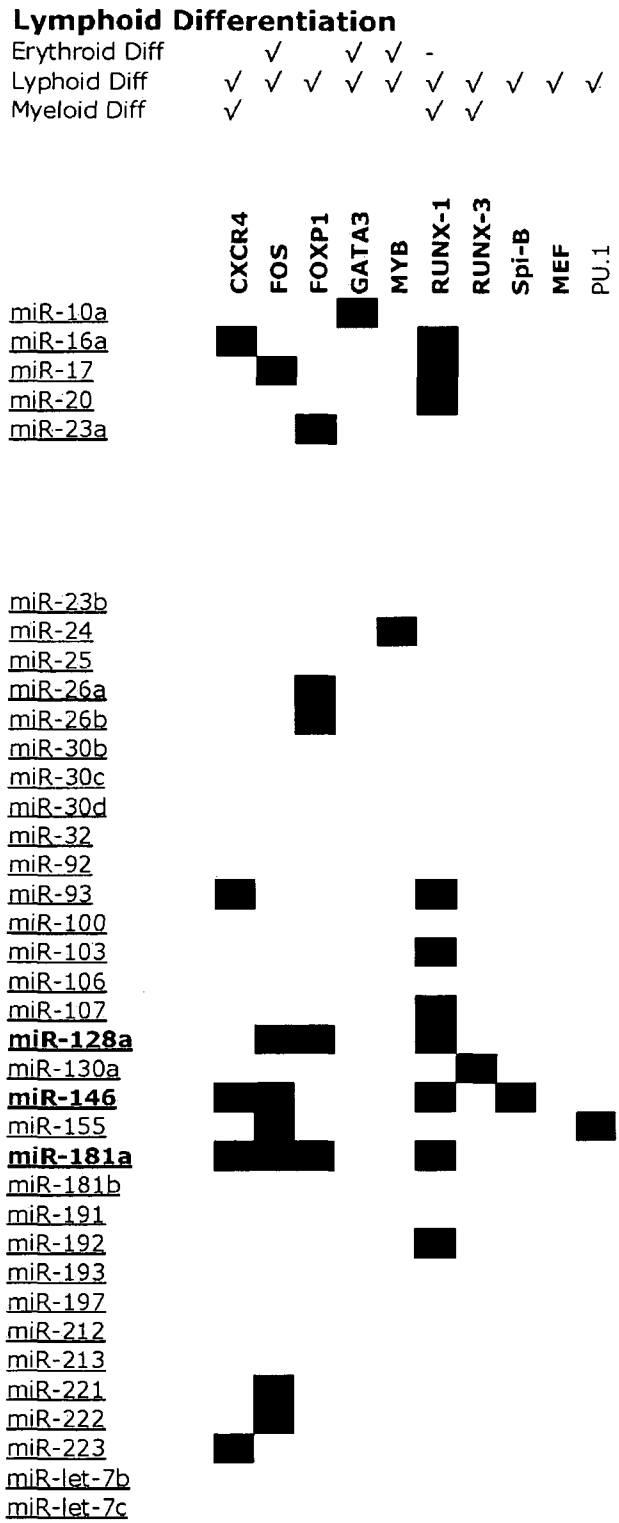


Figure 8, con'd

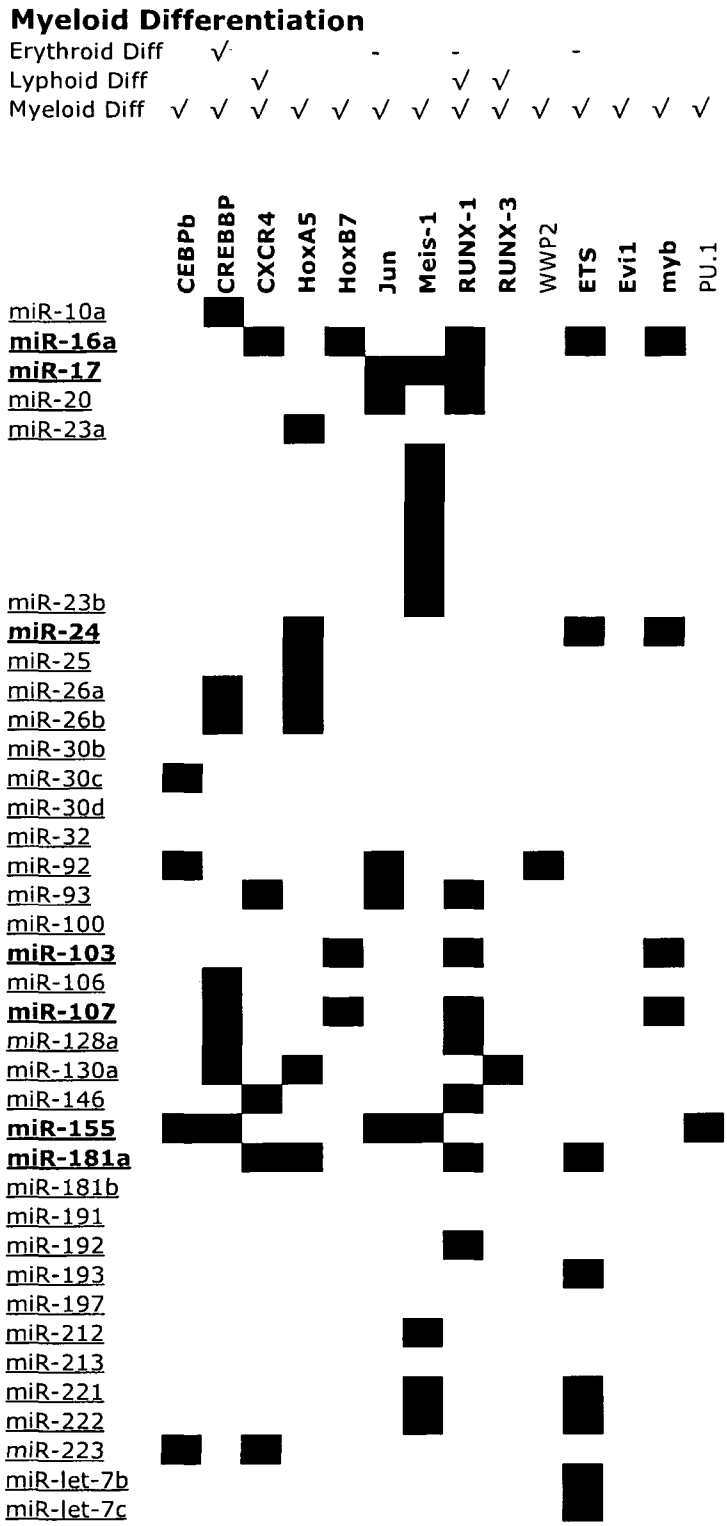


Figure 8, con'd

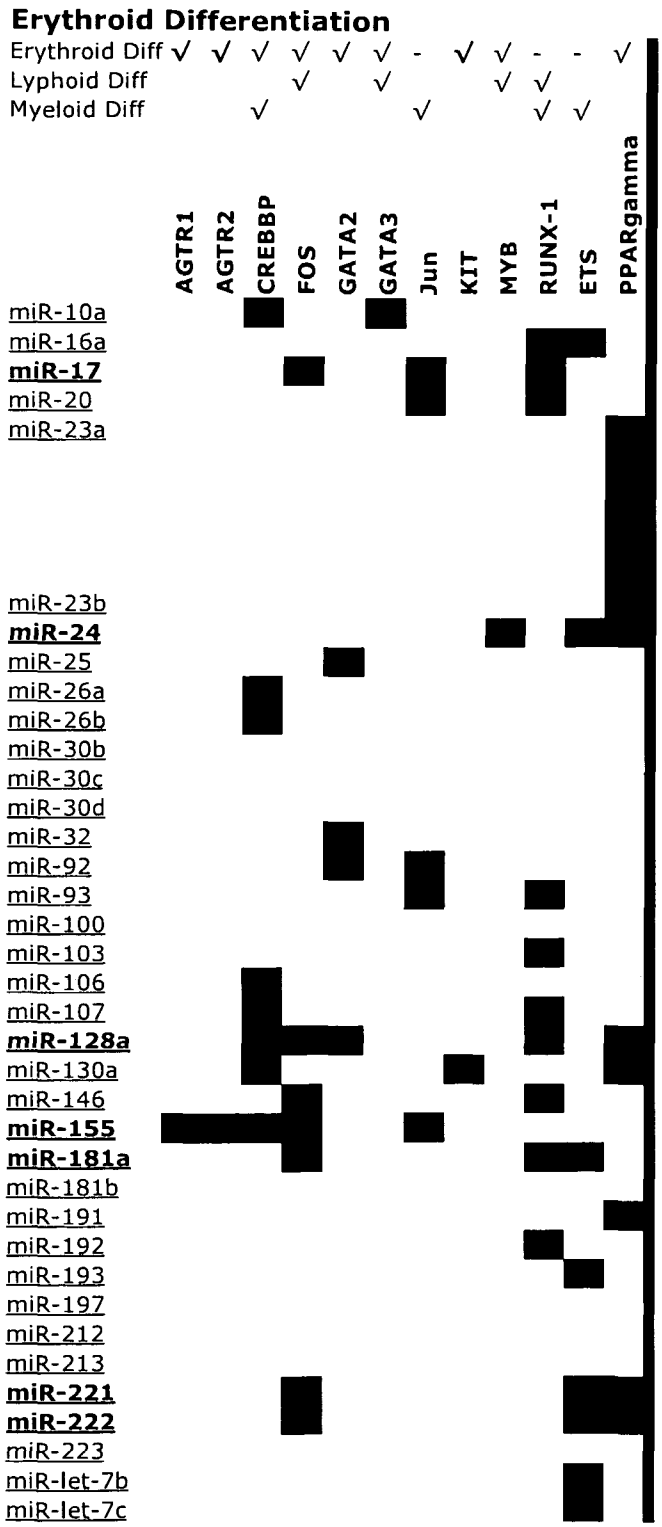


Figure 9

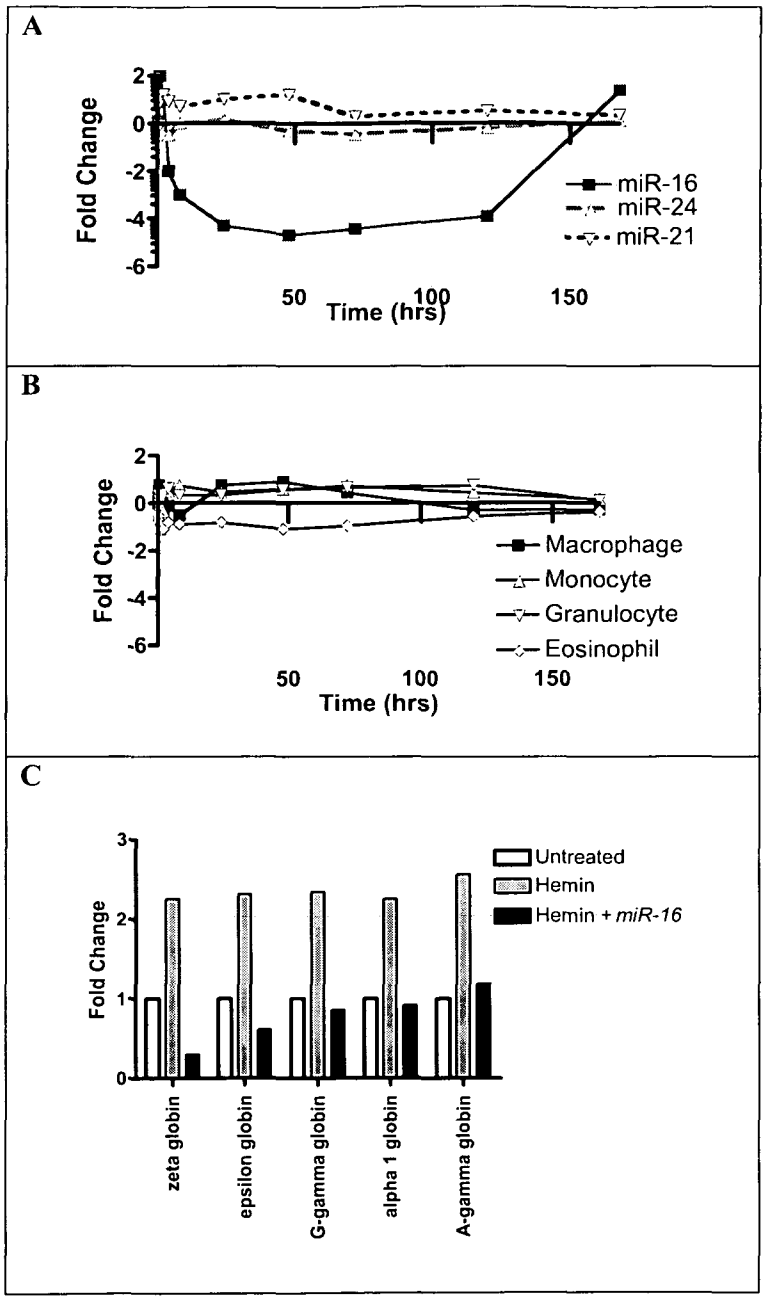

A
Fold Change
2
0
-2
-4
-6
50
100
150
Time (hrs)
miR-16
miR-24
miR-21
B
Fold Change
2
0
-2
-4
-6
50
100
150
Time (hrs)
Macrophage
Monocyte
Granulocyte
Eosinophil
C
Fold Change
3
2
1
0
Untreated
Hemin
Hemin + miR-16
zeta globin
epsilon globin
G-gamma globin
alpha 1 globin
A-gamma globin

Figure 10

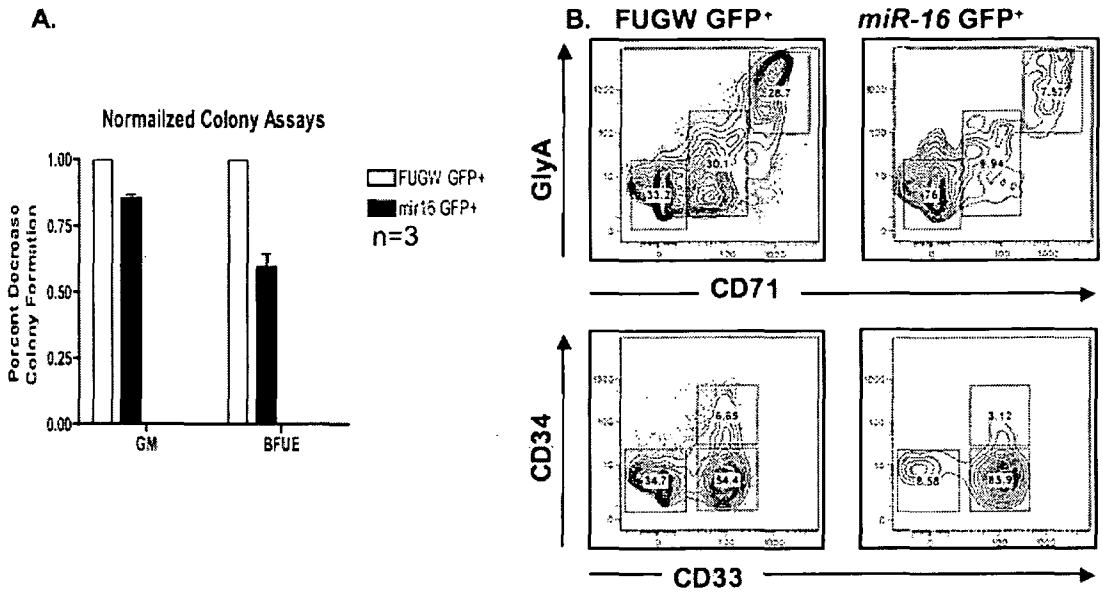

A.
Normailzed Colony Assays
Porcent Decrease Colony Formation
1.00
0.75
0.50
0.25
0.00
GM
BFUE
FUGW GFP+
mir16 GFP+
n=3
B. FUGW GFP+
miR-16 GFP+
GlyA
CD71
CD34
CD33
28.7
30.1
33.2
7.57
1.94
76
6.65
34.7
54.4
3.12
8.58
83.9

Figure 11

	Mature Sequence	miR Sequence
hsa-let-7b	UGAGGUAGUAGGUUGUGUGGUU	CGGGGUGAGGUAGUAGGUUGUGUGGUUUCAGGGCAGUGAUGUUGCCCCUCGGAAGAUAACUAUACAACCUACUGCCUUCCCUG
hsa-mir-10b	UACCCUGUAGAUCCGAAUUGUG	GAUCUGUCUGUCUUCUGUAUAUACCCUGUAGAUCCGAAUUUGUGUGGUGUCACAAAUUCGUAUCUAGGGGAAUAUGUAGUUGACAUAAACACUCCGCUCU
hsa-mir-10a	UACCCUGUAGAUCCGAAUUUGUG	GUCAGCAGUGCCUUAGCAGCACGUAAAUAUUGGCGUUAAGAUUCUAAAAUUAUCUCCAGUAUUAACUGUGCUGCUGAAGUAAGGUUGAC
hsa-mir-17	caaagugcuuacagugcagguag	GUCAGAAUAAUGUCAAAGUGCUUACAGUGCAGGUAGUGAUAUGUGCAUCUACUGCAGUGAAGGCACUUGUAGCAUUAUGGUGAC
hsa-mir-17	acugcagugaaggcacuuguag	GUCAGAAUAAUGUCAAAGUGCUUACAGUGCAGGUAGUGAUAUGUGCAUCUACUGCAGUGAAGGCACUUGUAGCAUUAUGGUGAC
hsa-mir-20	uaaagugcuuauagugcagguag	GUAGCACUAAAGUGCUUAUAGUGCAGGUAGUGUUUAGUUAUCUACUGCAUUAUGAGCACUUAAAGUACUGC
hsa-mir-23a	aucacauugccagggauuucc	GGCCGGCUGGGGUUCCUGGGGAUUUGCUUCCUGUCACAAACUCACAUUGCCAGGGAUUUCCAACCGACC
hsa-mir-23b	aucacauugccagggauuacc	CUCAGGUGCUCUGGCUGCUUGGGUUCCUGGCAUGCUGAUUUGUGACUUUAAAAUCACAUUGCCAGGGAUUACCACGCAACCACGACCUUGGC
hsa-mir-24-1	uggcugaguucagcaggaacag	CUCCGGUGCCUACUGAGCUGAUAUCAGUUCUCAUUUUACACACUGGCUCAGUUCAGCAGGAACAGGAG
hsa-mir-25	cauugcacuugucucggucuga	GGCCAGUGUUGAGAGGCGGAGACUUGGGCAAUUGCUGGACGCUGCCCUGGGCAUUGCACUUGUCUCGGUCUGACAGUGCCGGCC
hsa-mir-26a-1	uucaaguaauccaggauaaggcu	GUGGCCUCGUUCAAGUAAUCCAGGAUAGGCUGUGCAGGUCCCAAUGGGCCUAUUCUUGGUUACUUGCACGGGGACGC
hsa-mir-26a-2	uucaaguaauccaggauaaggcu	GGCUGUGGCUGGAUUCAAGUAAUCCAGGAUAGGCUGUUUCCAUCUGUGAGUGCCUAUUCUUGGUUACUUGCACGGGGACGC
hsa-mir-26b	uucaaguaauucaggauaggu	CCGGGACCCAGUUCAAGUAAUUCAGGAUAGGUUGUGUGCUGUUCCUCCAGCCUGUUCUCCAUUACUUGGCUCGGGGACCGG
hsa-mir-30b	uguaaacauccuacacucagcu	CCGGGACCCAGUUCAAGUAAUUCAGGAUAGGUUGUGUGCUGUUCCUCCAGCCUGUUCUCCAUUACUUGGCUCGGGGACCGG
hsa-mir-30d	uguaaacauccccgacuggaag	GUUGUUGUAAACAUCCCCGACUGGAAGCUGUAAGACACAGCUAAGCUUUCAGUCAGAUGUUUGCUGCUAC
hsa-mir-92a-1	uauugcacuugucccggccugu	CUUUCUACACAGGUUGGGAUCGGUUGCAAUGCUGUGUUUCUGUAUGGUAUUGCACUUGUCCCGGCCUGUUGAGUUUGG
hsa-mir-92a-2	uauugcacuugucccggccug	UCAUCCCUGGGUUGGGAUUUGUUGCAUUACUUGUGUUCUAUAUAAAGUAUUGCACUUGUCCCGGCCUGUGGAAGA
hsa-mir-92b(-2*)	uauugcacucgucccggccucc	CGGGCCCCGGGCGGGCGGGAGGGACGGGACGCGGUGCAGUGUUGUUUUUCCCCCCGCCAAUAUUGCACUCGUCCCGGCCUCCUCCGGGCCCCCCCGGGCCC
hsa-mir-93-1	caaagugcuguucgugcagguag	CUGGGGCUCCAAAGUGCUGUUCGUGCAGGUAGUGUGAUUACCCAACCUACUGCUGAGCUAGCACUUCCCGAGCCCCCGG
hsa-mir-103-1	agcagcauuguacagggcuauga	UACUGCCCCUCGGCUUCUUUACAGUGCUGCCUUGUUGCAUAUGGAUCAAGCAGCAUUGUACAGGGCUAUUGAAGGCAUUG
hsa-mir-103-2	agcagcauuguacagggcuauga	UUGUGCUUUCAGCUUCUUUACAGUGCUGCCUUGUAGCAUUCAGGUCAAGCAGCAUUGUACAGGGCUAUGAAAGAACCA
hsa-mir-106a	aaaagugcuuacagugcagguag	CCUUGGCCAUGUAAAAGUGCUUACAGUGCAGGUAGCUUUUUGAGAUCUACUGCAAUGUAAGCACUUCUUACAUUACCAUGG
hsa-mir-107	agcagcauuguacagggcauuca	CUCUCGCUUUCAGCAGCUUUGUCAGUGUUGCCUUGUGCAGGGAGUUUCAAGCAGCAUUGUACAGGGCUAUCAAAGCACAGA
hsa-mir-122a	ucacagugaaccggucucuuu	UGAGCUGUUGGAUUCGGGGCCGUAGCACACUGUCUGAGAGGUUUACAUUUCUCACAGUGAACCGGUCUCUUUUCAGCUGCUUC
hsa-mir-130a	cagugcaauguuaaaagggcau	UGCUGCUGGCCAGAGCUCUUUUCACAUUGUGCUACUGUCUGCACCUGUCACUAGCAGUGCAAUGUUAAAAGGGCAUUGGCCGUGUAGUG
hsa-mir-146a	ugagaacugaauuccauggguu	CCGAUGUGUAUCCUCAGCUUUGAGAACUGAAUUCCAUGGGUUGUGUCAGUGUCAGACCUCUGAAAUUCAGUUCUUCAGCUGGUCGCCCGG
hsa-mir-146b	ugagaacugaauuccauaggcu	CCUGGCACUGAGAACUGAAUUCCAUAGGCUGUGAGCUCUAGCAAUGCCCUGUGGACUCAGUUCUGGUGCCCGG
hsa-mir-155	uuaaugcuaaucgugauaggggu	CUGUUAAUGCUAAUCGUGAUAGGGGUUUUUGCCUCCAACUGACUCCUACAUAUUAGCAUUAACAG
hsa-mir-181a-1	aacauucaacgcugucggugagu	UGAGUUUUGAGGUUGCUUCAGUGAACAUUCAACGCUGUCGGUGAGUUUGGAAUUAAAAUCAAAACCAUCGACCGUUGAUUGUACCCUAUGGCUAACCAUCAUCUACUCCA
hsa-mir-181a-2	aacauucaacgcugucggugagu	AGAAGGGCUAUCAGGCCAGCCUUCAGAGGACUCCAAGGAACAUUCAACGCUGUCGGUGAGUUUGGGAUUUGAAAAACCACUGACCGUUGACUGUACCUUGGGGUCCUUA
hsa-mir-191	caacggaaucccaaaagcagcug	CGGCUGGACAGCGGGCAACGGAAUCCCAAAAGCAGCUGUUGUCUCCAGAGCAUUCCAGCUGCGCUUGGAUUUCGUCCCCUGCUCUCCUGCCU
hsa-mir-193a	ugggucuuugcgggcgagauga	CGAGGAUGGGAGCUGAGGGCUGGGUCUUUGCGGGCGAGAUGAGGGUGUCGGAUCAACUGGCCUACAAAGUCCCAGUUCUCGGCCCCCG
hsa-mir-193b	aacuggcccucaaagucccgcu	GUGGUCUCAGAAUCGGGGUUUUGAGGGCGAGAUGAGUUUAUGUUUUAUCCAACUGGCCCUCAAAGUCCCGCUUUUGGGGUCAU
hsa-mir-197	uucaccaccuucuccacccagc	GCUGUGCCGGGUAGAGAGGGCAGUGGGAGGUAAGAGCUCUUCACCCUUCACCACCUUCUCCACCCAGCAUGGCC
hsa-mir-212	uaacagucuccagucacggcc	CGGGGCACCCCGCCCGAGCACAGCGCCGCCGGCACCUUGGCUCUAGACUGCUUACUGCCCCGGGCCGCCCCAGUAACAGUCUCCAGUCACGGCCACCGACGCCUGGCCCCGCC
hsa-mir-213	aacauucaacgcugucggugagu	UGAGUUUUGAGGUUGCUUCAGUGAACAUUCAACGCUGUCGGUGAGUUUGGAAUUAAAAUCAAAACCAUCGACCGUUGAUUGUACCCUAUGGCUAACCAUCAUCUACUCCA
hsa-mir-221	agcuacauugucugcuggguuuc	UGAACAUCCAGGUCUGGGGCAUGAACCUGGCAUACAAUGUAGAUUUCUGUGUUCGUUAGGCAACAGCUACAUUGUCUGCUGGGUUUCAGGCUACCUGGAAACAUGUUCUC
hsa-mir-222	agcuacaucuggcuacugggu	GCUGCUGGAAGGUGUAGGUACCCUCAAUGGCUCAGUAGCCAGUGUAGAUCCUGUCUUUCGUAATCAGCAGCUACAUCUGGCUACUGGGUCUCUGAUGGCAUCUUCUAGCU
hsa-mir-223	ugucaguuugucaaauacccca	CCUGGCCUCCUGCAGUGCCACGCUCCGUGUAUUUGACAAGCUGAGUUGGACACUCCAUGUGGUAGAGUGUCAGUUUGUCAAAUACCCCAAGUGCGGCACAUGCUUACCAG

Figure 12

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
2	ENSG00000145495	6-Mar			
3	ENSG00000136536	7-Mar			7-Mar
4	ENSG00000165406	8-Mar			8-Mar
5	ENSG00000168385	2-Sep		2-Sep	
6	ENSG00000125354	6-Sep			
7	ENSG00000122545	7-Sep			
8	ENSG00000138758	11-Sep			
9	ENSG00000111780	15E1.2			
10	ENSG00000137822	76P			
11	ENSG00000165029	ABCA1	ABCA1		ABCA1
12	ENSG00000125257	ABCC4			
13	ENSG00000114770	ABCC5		ABCC5	
14	ENSG00000161533	ACOX1		ACOX1	
15	ENSG00000151726	ACSL1		ACSL1	
16	ENSG00000075624	ACTB			
17	ENSG00000184009	ACTG1	ACTG1		
18	ENSG00000136518	ACTL6A			
19	ENSG00000072110	ACTN1			
20	ENSG00000138071	ACTR2		ACTR2	
21	ENSG00000115091	ACTR3			
22	ENSG00000137845	ADAM10			
23	ENSG00000138031	ADCY3			
24	ENSG00000087274	ADD1			
25	ENSG00000148700	ADD3			
26	ENSG00000101126	ADNP			
27	ENSG00000173020	ADRBK1			
28	ENSG00000172493	AFF1	AFF1		
29	ENSG00000168448	AGPAT1			
30	ENSG00000155189	AGPAT5			
31	ENSG00000168710	AHCYL1			
32	ENSG00000004455	AK2			
33	ENSG00000108599	AKAP10			
34	ENSG00000023516	AKAP11		AKAP11	
35	ENSG00000170776	AKAP13			
36	ENSG00000151320	AKAP6		AKAP6	
37	ENSG00000117020	AKT3		AKT3	
38	ENSG00000170017	ALCAM			
39					
40					
41					
42					
43					
44					
45					

Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
48	ENSG00000177879	AP3S1			
49	ENSG00000120868	APAF1			
50	ENSG00000144848	APG3L			
51	ENSG00000101844	APG4A			
52	ENSG00000084234	APLP2			APLP2
53	ENSG00000142192	APP		APP	APP
54	ENSG00000062725	APPBP2	APPBP2		
55	ENSG00000095139	ARCN1		ARCN1	ARCN1
56	ENSG00000143761	ARF1			ARF1
57	ENSG00000134287	ARF3			
58	ENSG00000168374	ARF4		ARF4	
59	ENSG00000165527	ARF6			
60	ENSG00000175220	ARHGAP1			ARHGAP1
61	ENSG00000137962	ARHGAP29			
62	ENSG00000104880	ARHGEF18			
63	ENSG00000129675	ARHGEF6			
64	ENSG00000117713	ARID1A			
65	ENSG00000054267	ARID4B			
66	ENSG00000177479	ARIH2	ARIH2		
67	ENSG00000134108	ARL10C		ARL10C	
68	ENSG00000110025	ARL2		ARL2	
69	ENSG00000138175	ARL3			
70	ENSG00000170540	ARL6IP			
71	ENSG00000188042	ARL7			
72	ENSG00000163466	ARPC2			
73	ENSG00000136950	ARPC5L			
74	ENSG00000128989	ARPP-19			
75	ENSG00000111875	ASF1A			ASF1A
76	ENSG00000116539	ASH1L			
77	ENSG00000171456	ASXL1	ASXL1		
78	ENSG00000143970	ASXL2			
79	ENSG00000123268	ATF1			
80	ENSG00000149311	ATM			
81	ENSG00000163399	ATP1A1			
82	ENSG00000143153	ATP1B1			
83	ENSG00000174437	ATP2A2			
84	ENSG00000017260	ATP2C1			
85					
86					
87					
88					
89					
90					
91					
92					
93					

Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
94	ENSG00000198604	BAZ1A			
95	ENSG00000119866	BCL11A			
96	ENSG00000171791	**BCL2**		BCL2	
97	ENSG00000029363	BCLAF1			BCLAF1
98	ENSG00000105829	BET1			
99	ENSG00000134107	BHLHB2		BMP2K	
100	ENSG00000138756	BMP2K			
101	ENSG00000104765	BNIP3L			
102	ENSG00000060762	BRP44L			
103	ENSG00000160058	BSDC1			
104	ENSG00000095564	BTAF1			
105	ENSG00000145741	BTF3		BTF3	BTF3
106	ENSG00000133639	BTG1			BTG1
107	ENSG00000159388	BTG2		BTG2	
108	ENSG00000154640	BTG3			
109	ENSG00000082153	BZW1			
110	ENSG00000136261	BZW2			
111	ENSG00000181915	C10orf22			
112	ENSG00000119906	C10orf6			C10orf6
113	ENSG00000110075	C11orf23		C11orf23	C11orf23
114	ENSG00000171067	C11orf24			
115	ENSG00000139746	C13orf10			
116	ENSG00000133935	C14orf1			
117	ENSG00000168175	C14orf32		C14orf32	
118	ENSG00000134153	C15orf24			
119	ENSG00000152242	C18orf25			
120	ENSG00000141452	C18orf8			
121	ENSG00000105176	C19orf2			
122	ENSG00000163875	C1orf149			
123	ENSG00000163444	C1orf37	C1orf37		
124	ENSG00000117616	C1orf63			
125	ENSG00000108561	C1QBP			
126	ENSG00000110888	C1QDC1			
127	ENSG00000132823	C20orf111			
128	ENSG00000101084	C20orf24			
129	ENSG00000101166	C20orf45			
130	ENSG00000126749	C2F			
131					
132					
133					
134					
135					
136					
137					
138					
139					

Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
140	ENSG00000136819	C9orf78			
141	ENSG00000136925	C9orf97			
142	ENSG00000074410	CA12			
143	ENSG00000104267	CA2			
144	ENSG00000135932	CAB39		CAB39	
145	ENSG00000104327	CALB1			
146	ENSG00000179218	CALR			
147	ENSG00000127022	CANX			
148	ENSG00000131236	CAP1			
149	ENSG00000135837	CAP350		CAP350	
150	ENSG00000116489	CAPZA1			CAPZA1
151	ENSG00000198898	CAPZA2		CAPZA2	
152	ENSG00000077549	CAPZB			
153	ENSG00000168564	CARF			
154	ENSG00000142453	CARM1			
155	ENSG00000110619	CARS			
156	ENSG00000108349	CASC3			
157	ENSG00000153113	CAST			
158	ENSG00000130940	CASZ1			
159	ENSG00000067955	CBFB		CBFB	
160	ENSG00000108468	CBX1			
161	ENSG00000100261	CBX6			
162	ENSG00000112237	CCNC			
163	ENSG00000118971	CCND2		CCND2	
164	ENSG00000112576	CCND3			
165	ENSG00000113328	CCNG1			CCNG1
166	ENSG00000138764	CCNG2			
167	ENSG00000134480	CCNH			
168	ENSG00000118816	CCNI			
169	ENSG00000163660	CCNL1			CCNL1
170	ENSG00000082258	CCNT2		CCNT2	CCNT2
171	ENSG00000166226	CCT2			CCT2
172	ENSG00000163468	CCT3			
173	ENSG00000135535	**CD164**		CD164	
174	ENSG00000174059	**CD34**			
175	ENSG00000196776	**CD47**			
176	ENSG00000110848	**CD69**			
177					
178					
179					
180					
181					
182					
183					
184					
185					

Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
186	ENSG00000143126	CELSR2		CELSR2	
187		CENTB2			
188	ENSG00000153140	CETN3			
189	ENSG00000153774	CFDP1			
190	ENSG00000172757	CFL1			
191	ENSG00000163320	CGGBP1			
192	ENSG00000153922	CHD1		CHD1	
193	ENSG00000111642	CHD4			CHD4
194	ENSG00000177200	CHD9		CHD9	
195	ENSG00000072609	CHFR			
196	ENSG00000110172	CHORDC1		CHORDC1	
197	ENSG00000131873	CHSY1			
198	ENSG00000109572	CLCN3			
199	ENSG00000113240	CLK4			
200	ENSG00000122705	CLTA			
201	ENSG00000141367	CLTC			
202	ENSG00000162368	CMPK			
203	ENSG00000100528	CNIH			
204	ENSG00000125107	CNOT1			
205	ENSG00000111596	CNOT2	CNOT2	CNOT2	CNOT2
206	ENSG00000198791	CNOT7			
207	ENSG00000121058	COIL			
208	ENSG00000129083	COPB			
209	ENSG00000166200	COPS2		COPS2	COPS2
210	ENSG00000141030	COPS3			
211	ENSG00000138663	COPS4			
212	ENSG00000110880	CORO1C			
213	ENSG00000178741	COX5A			
214	ENSG00000135940	COX5B			
215	ENSG00000115944	COX7A2L			
216	ENSG00000111605	CPSF6			
217	ENSG00000118260	CREB1			
218	ENSG00000005339	***CREBBP***	CREBBP	CREBBP	
219	ENSG00000111269	CREBL2		CREBL2	
220	ENSG00000145708	CRHBP			
221		CRK	CRK		CRK
222	ENSG00000099942	CRKL		CRKL	
223					
224					
225					
226					
227					
228					
229					
230					
231					

Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
232	ENSG00000175215	CTDSP2			
233	ENSG00000168036	CTNNB1			
234	ENSG00000198561	CTNND1			
235	ENSG00000171793	CTPS			
236	ENSG00000149187	CUGBP1			
237	ENSG00000048740	CUGBP2	CUGBP2		
238	ENSG00000036257	CUL3	CUL3	CUL3	CUL3
239	ENSG00000166266	CUL5		CUL5	
240	ENSG00000160967	CUTL1			CUTL1
241	ENSG00000121966	**CXCR4**		CXCR4	
242	ENSG00000166347	CYB5			
243	ENSG00000008283	CYB561			
244	ENSG00000172115	CYCS			
245	ENSG00000083799	CYLD			
246	ENSG00000140181	D15F37 /// LOC440248			
247	ENSG00000165659	DACH1		DACH1	
248	ENSG00000196730	DAPK1			
249	ENSG00000071626	DAZAP1	DAZAP1		DAZAP1
250	ENSG00000183283	DAZAP2			DAZAP2
251	ENSG00000137992	DBT			
252	ENSG00000172795	DCP2			
253	ENSG00000085788	DDHD2			
254	ENSG00000168209	DDIT4			
255	ENSG00000124487	DDX3X	DDX3X	DDX3X	DDX3X
256	ENSG00000067048	DDX3Y		DDX3Y	
257	ENSG00000108654	DDX5			DDX5
258	ENSG00000141141	DDX52			
259	ENSG00000158796	DEDD		DEDD	
260	ENSG00000124795	DEK			
261	ENSG00000139726	DENR		DENR	
262	ENSG00000155792	DEPDC6			
263	ENSG00000136986	DERL1			
264	ENSG00000109606	DHX15			DHX15
265	ENSG00000132153	DHX30			
266	ENSG00000108406	DHX40			
267	**ENSG00000100697**	**DICER1**			
268					
269					
270					
271					
272					
273					

Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
274	ENSG00000158486	DNAH3			
275	ENSG00000086061	DNAJA1			
276	ENSG00000132002	DNAJB1			
277	ENSG00000105993	DNAJB6			
278	ENSG00000128590	DNAJB9			
279	ENSG00000077380	DNCI2		DNCI2	
280	ENSG00000074603	DPP8			
281	ENSG00000092964	DPYSL2			
282	ENSG00000117505	DR1			
283	ENSG00000167264	DUS2L			
284	ENSG00000143507	DUSP10			
285	ENSG00000139318	DUSP6			
286	ENSG00000004975	DVL2			
287	ENSG00000161202	DVL3	DVL3		
288	ENSG00000157540	DYRK1A			
289	**ENSG00000112242**	**E2F3**	E2F3	E2F3	**E2F3**
290	ENSG00000147654	EBAG9			
291	ENSG00000104517	EDD1			
292	ENSG00000198121	EDG2			
293	ENSG00000156508	EEF1A1			
294	ENSG00000124802	EEF1E1			
295	ENSG00000186676	EEF1G			
296	ENSG00000183690	EFHC2			
297	ENSG00000142634	EFHD2			
298	ENSG00000171570	EGLN2		EGLN2	
299	ENSG00000120738	EGR1			
300	ENSG00000110047	EHD1			
301		EI24			
302	ENSG00000092847	EIF2C1		EIF2C1	EIF2C1
303	ENSG00000123908	EIF2C2			
304	ENSG00000134001	EIF2S1		EIF3S1	
305	ENSG00000104131	EIF3S1			EIF3S1
306	ENSG00000107581	EIF3S10		EIF3S10	EIF3S10
307	ENSG00000156976	EIF4A2		EIF4A2	
308	ENSG00000063046	EIF4B		EIF4B	
309	ENSG00000151247	EIF4E		EIF4E	EIF4E
310	ENSG00000135930	EIF4E2			
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Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
318	ENSG00000102034	ELF4			
319	ENSG00000111145	ELK3			
320	ENSG00000155849	ELMO1			
321	ENSG00000062598	ELMO2			
322	ENSG00000012660	ELOVL5			
323	ENSG00000170522	ELOVL6	ELOVL6		
324	ENSG00000143420	ENSA		ENSA	
325	ENSG00000120533	ENY2			
326	ENSG00000120616	EPC1			
327	ENSG00000050405	EPLIN			
328	ENSG00000085832	EPS15			
329	ENSG00000124882	EREG			
330	ENSG00000157554	ERG			
331	ENSG00000120705	ETF1			
332	ENSG00000157557	ETS2			
333	ENSG00000182944	EWSR1			
334	ENSG00000120699	EXOSC8			
335	ENSG00000108799	EZH1		EZH1	
336	ENSG00000106462	EZH2			EZH2
337	ENSG00000124491	F13A1			
		FAM45B ///			
338	ENSG00000119979	FAM45A			
339	ENSG00000153310	FAM49B			
340	ENSG00000139146	FAM60A		FAM60A	FAM60A
341	ENSG00000105216	FAM61A			
342	ENSG00000179115	FARSLA			
343	ENSG00000166147	FBN1			
344	ENSG00000173120	FBXL11			FBXL11
345	ENSG00000118564	FBXL5			FBXL5
346	ENSG00000138081	FBXO11			FBXO11
347		FOXO1A			
348	ENSG00000143756	FBXO28			
349	ENSG00000178974	FBXO34			
350	ENSG00000037637	FBXO42			
351	ENSG00000112146	FBXO9			
352	ENSG00000119402	FBXW2			
353	ENSG00000068078	FGFR3			
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Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
363	ENSG00000159202	FLJ13855			
364	ENSG00000153561	FLJ13910			
365	ENSG00000181495	FLJ14054			
366	ENSG00000175606	FLJ20533			
367	ENSG00000136122	FLJ22624			
368	ENSG00000132589	FLOT2			
369	ENSG00000196504	FNBP3			
370		FNBP4			
371	ENSG00000170345	***FOS***			FOS
372	ENSG00000125740	FOSB			
373	ENSG00000137273	FOXF2			
374	ENSG00000198815	FOXJ3			
375	ENSG00000150907	FOXO1A			FOXO1A
376	ENSG00000118689	FOXO3A			
377	ENSG00000114861	**FOXP1**			FOXP1
378	ENSG00000165879	FRAT1			
379	ENSG00000163430	FSTL1			FSTL1
380	ENSG00000114416	FXR1			
381	ENSG00000145907	G3BP			
382	ENSG00000138757	G3BP2		G3BP2	
383	ENSG00000034713	GABARAPL2			
384	ENSG00000104064	GABPB2			
385	ENSG00000116717	GADD45A			
386	ENSG00000141429	GALNT1	GALNT1	GALNT1	
387	ENSG00000143641	GALNT2			GALNT2
388	ENSG00000109586	GALNT7			
389	ENSG00000165219	GAPVD1			
390	ENSG00000179348	**GATA2**			
391	ENSG00000107485	**GATA3**	**GATA3**		
392	ENSG00000146729	GBAS			
393	ENSG00000001084	GCLC			
394	ENSG00000057608	GDI2			GDI2
395	ENSG00000100083	GGA1			
396	ENSG00000165678	GHITM			
397	ENSG00000108588	GK001			
398	ENSG00000115419	GLS			
399	ENSG00000196700	GM632			
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Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
409	ENSG00000185245	GP1BA			
410	ENSG00000159592	GPBP1L1	GPBP1L1		
411	ENSG00000112414	GPR126			
412	ENSG00000106070	GRB10	GRB10		
413	ENSG00000103342	GSPT1			
414	ENSG00000140307	GTF2A2			
415	ENSG00000110768	GTF2H1	GTF2H1	GTF2H1	GTF2H1
416	ENSG00000077809	GTF2I ///	GTF2I ///		
417	ENSG00000115207	GTF3C2			
418	ENSG00000188486	H2AFX			
419		H2AFZ			
420	ENSG00000091527	H41			
421	ENSG00000112339	HBS1L		HBS1L	
422	ENSG00000172534	HCFC1		HCFC1	
423	ENSG00000180353	HCLS1			
424	ENSG00000116478	HDAC1			
425	ENSG00000143321	HDGF		HDGF	HDGF
426	ENSG00000166503	HDGFRP3			
427	ENSG00000013583	HEBP1			
428	ENSG00000112406	HECA			
429	ENSG00000103657	HERC1	HERC1		
430	ENSG00000128731	HERC2			
431	ENSG00000051108	HERPUD1			HERPUD1
432	ENSG00000114315	**HES1**			
433	ENSG00000164683	HEY1			
434	ENSG00000152804	HHEX			
435	ENSG00000100644	HIF1A			
436	ENSG00000181061	HIG1		HIG1	
437	ENSG00000078140	HIP2		HIP2	
438	ENSG00000163349	HIPK1			
439	ENSG00000010818	HIVEP2	HIVEP2		HIVEP2
440	ENSG00000137361	HLA-E			
441	ENSG00000100281	HMG2L1			
442	ENSG00000189403	HMGB1			
443	ENSG00000164104	HMGB2			
444	ENSG00000029993	HMGB3			HMGB3
445		HMGN3			
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Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
455	ENSG00000096746	HNRPH3			HNRPH3
456	ENSG00000165119	HNRPK	HNRPK		
457	ENSG00000104824	HNRPL		HNRPL	
458	ENSG00000099783	HNRPM			HNRPM
459	ENSG00000125944	HNRPR			HNRPR
460	ENSG00000153187	HNRPU			HNRPU
461	ENSG00000105323	HNRPUL1			HNRPUL1
462	ENSG00000010295	HOM-TES-103			
463	ENSG00000106004	**HOXA5**			
464	ENSG00000078399	**HOXA9**			
465	ENSG00000120075	**HOXB5**			
466	ENSG00000120087	**HOXB7**		**HOXB7**	
467	ENSG00000153807	**HOXA10**		**HOXA10**	
468	ENSG00000173744	HRB			HRB
469	ENSG00000074356	HSA277841			
470	ENSG00000164164	HSHIN1		HSHIN1	
471	ENSG00000044574	HSPA5			
472	ENSG00000109971	HSPA8		HSPA8	
473	ENSG00000144381	HSPD1			
474	ENSG00000120694	HSPH1			
475	ENSG00000136478	HT008			
476	ENSG00000086758	HUWE1			
477	ENSG00000108622	ICAM2			
478	ENSG00000067829	IDH3G			IDH3G
479	ENSG00000109083	IFT20			
480	ENSG00000068745	IHPK2			
481	ENSG00000070061	***IKBKAP***			IKBKAP
482	ENSG00000129351	ILF3			
483	ENSG00000105135	ILVBL			
484	ENSG00000153487	ING1			
485	ENSG00000168556	ING2			
486	ENSG00000071243	ING3			
487	ENSG00000068383	INPP5A			
488	ENSG00000148384	INPP5E			
489	ENSG00000186480	INSIG1			
490	ENSG00000171105	INSR		INSR	
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Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
500	ENSG00000078596	ITM2A			
501	ENSG00000116679	IVNS1ABP			
502	ENSG00000184916	JAG2			
503	ENSG00000117139	JARID1B			
504	ENSG00000008083	JARID2		JARID2	
505	ENSG00000115548	JMJD1A			JMJD1A
506	ENSG00000171988	JMJD1C			
507	ENSG00000177606	***JUN***			JUN
508	ENSG00000137944	KAT3			
509	ENSG00000170852	KBTBD2		KBTBD2	KBTBD2
510	ENSG00000176407	KCMF1		KCMF1	
511	ENSG00000055118	KCNH2			
512	ENSG00000136240	KDELR2			
513	ENSG00000121774	KHDRBS1		KHDRBS1	KHDRBS1
514	ENSG00000088247	KHSRP			
515	ENSG00000131149	KIAA0182		KIAA0182	
516	ENSG00000179889	KIAA0251			
517	ENSG00000136813	KIAA0368			
518	ENSG00000145725	KIAA0433			
519	ENSG00000143702	KIAA0470			
520	ENSG00000119321	KIAA0674			
521	ENSG00000197226	KIAA0676			
522	ENSG00000126775	KIAA0831		KIAA0831	
523	ENSG00000164151	KIAA0947			
524	ENSG00000105063	KIAA1115			
525	ENSG00000126814	KIAA1393	KIAA1393		
526	ENSG00000156232	KIAA1971 ///			
527	ENSG00000170759	KIF5B			
528	ENSG00000157404	**KIT**			
529	ENSG00000127528	**KLF2**			
530	ENSG00000136826	**KLF4**	**KLF4**	**KLF4**	
531	ENSG00000067082	**KLF6**			
532	ENSG00000155090	**KLF10**			
533	ENSG00000165516	KLHDC2			
534	ENSG00000114030	KPNA1			
535	ENSG00000102753	KPNA3		KPNA3	KPNA3
536	ENSG00000108424	KPNB1			KPNB1
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Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
546	ENSG00000143815	LBR			
547	ENSG00000157978	LDLRAP1			
548	ENSG00000065548	LEREPO4			
549	ENSG00000100097	LGALS1			
550	ENSG00000148943	LIN7C			
551	ENSG00000189067	LITAF			
552	ENSG00000166783	LKAP			
553	ENSG00000160789	LMNA			LMNA
554	ENSG00000113368	LMNB1			
555	ENSG00000135363	**LMO2**			
556	ENSG00000111252	LNK			
557	ENSG00000152102	LOC130074			
558	ENSG00000120963	LOC51123	LOC51123	LOC51123	
559	ENSG00000102897	LOC57149			
560	ENSG00000121104	LOC81558			LOC81558
561	ENSG00000123684	LPGAT1			
562	ENSG00000145012	LPP			
563	ENSG00000110031	LPXN			
564	ENSG00000077454	LRCH4			
565	ENSG00000198799	LRIG2		LRIG2	
566	ENSG00000171492	LRRC8D			
567	ENSG00000124831	LRRFIP1	LRRFIP1		
568	ENSG00000175324	LSM1			
569	ENSG00000146963	LUC7L2			
570	ENSG00000054219	LY75			
571	ENSG00000120992	LYPLA1			
572	ENSG00000011009	LYPLA2 /// LYPLA2P1 /// LOC388499		LYPLA2 /// LYPLA2P1 /// LOC388499	
573	ENSG00000163818	LZTFL1			LZTFL1
574	ENSG00000135387	M11S1			
575	ENSG00000003056	M6PR			
576	ENSG00000143033	M96			
577	ENSG00000127603	MACF1		MACF1	
578	ENSG00000110514	MADD			
579	ENSG00000187391	MAGI2			
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Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
589	ENSG00000047849	MAP4	MAP4	MAP4	
590	ENSG00000104814	MAP4K1			MAP4K1
591	ENSG00000012983	MAP4K5			
592	ENSG00000135525	MAP7		MAP7	
593	ENSG00000100030	MAPK1			
594	ENSG00000112062	MAPK14			
595	ENSG00000101367	MAPRE1	MAPRE1	MAPRE1	MAPRE1
596	ENSG00000166974	MAPRE2			
597	ENSG00000175130	MARCKSL1			
598	ENSG00000075413	MARK3			
599	ENSG00000166986	MARS			MARS
600	ENSG00000168906	MAT2A	MAT2A		MAT2A
601	ENSG00000038274	MAT2B			MAT2B
602	ENSG00000015479	MATR3			
603	ENSG00000125952	MAX			
604	ENSG00000134046	MBD2	MBD2		
605	ENSG00000152601	MBNL1		MBNL1	
606	ENSG00000180398	MCFD2			
607	ENSG00000121940	MCLC			
608	ENSG00000112118	MCM3			
609	ENSG00000082212	ME2			
610	ENSG00000124733	MEA1			
611	ENSG00000081189	MEF2C			MEF2C
612	ENSG00000143995	**MEIS1**			**MEIS1**
613	ENSG00000133895	MEN1			
614	ENSG00000164024	METAP1			
615	ENSG00000168282	MGAT2			
616	ENSG00000138092	MGC11266			
617	ENSG00000133858	MGC23401			
618	ENSG00000198408	MGEA5		MGEA5	
619	ENSG00000079277	MKNK1			
620	ENSG00000133606	MKRN1			MKRN1
621	ENSG00000089693	MLF2			
622	**ENSG00000171843**	**MLLT3**			
623	ENSG00000108788	MLX			
624	ENSG00000056586	MNAB			
625	ENSG00000165943	MOAP1			
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Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
635	ENSG00000125445	MRPS7	MRPS7		
636	ENSG00000005302	MSL3L1			
637	ENSG00000147065	MSN			
638	ENSG00000182979	MTA1			
639	ENSG00000147649	MTDH			
640	ENSG00000143033	MTF2			
641	ENSG00000100330	MTMR3	MTMR3		MTMR3
642	ENSG00000108389	MTMR4		MTMR4	MTMR4
643	ENSG00000170873	MTSS1		MTSS1	
644	ENSG00000128654	MTX2			
645	ENSG00000118513	**MYB**			
646	ENSG00000005810	MYCBP2			
647	ENSG00000133026	MYH10			MYH10
648	ENSG00000136504	MYST2		MYST2	MYST2
649	ENSG00000102921	N4BP1		N4BP1	
650	ENSG00000138386	NAB1			
651	ENSG00000187109	NAP1L1			
652	ENSG00000132780	NASP			
653	ENSG00000158747	NBL1			
654	ENSG00000115053	NCL			
655	ENSG00000198646	NCOA6	NCOA6		
656	ENSG00000196498	NCOR2	NCOR2		
657	ENSG00000166579	NDEL1			NDEL1
658	ENSG00000131507	NDFIP1			
659	ENSG00000125356	NDUFA1			NDUFA1
660	ENSG00000189043	NDUFA4			
661		NDUFS4			
662	ENSG00000069869	NEDD4			NEDD4
663	ENSG00000173848	NET1			
664	ENSG00000082641	NFE2L1		NFE2L1	NFE2L1
665	ENSG00000116044	NFE2L2			
666	ENSG00000050344	NFE2L3			
667	ENSG00000120837	NFYB			NFYB
668	ENSG00000066136	NFYC			
669	ENSG00000166681	NGFRAP1			
670	ENSG00000140157	NIPA2			
671	ENSG00000164190	NIPBL			NIPBL
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Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
681	ENSG00000106459	NRF1			
682	ENSG00000180530	**NRIP1**		NRIP1	
683	ENSG00000035681	NSMAF			
684	ENSG00000137497	NUMA1			
685	ENSG00000124789	NUP153			
686	ENSG00000162231	NXF1			
687	ENSG00000101888	NXT2			
688	ENSG00000065154	OAT			
689	ENSG00000115758	ODC1			
690	ENSG00000046651	OFD1			OFD1
691	ENSG00000147162	OGT		OGT	
692	ENSG00000182606	OIP106			
693	ENSG00000141447	OSBPL1A			OSBPL1A
694	ENSG00000091039	OSBPL8			
695	ENSG00000117859	OSBPL9			
696	ENSG00000167770	OTUB1		OTUB1	
697	ENSG00000172939	OXSR1			
698	ENSG00000170515	PA2G4			
699	ENSG00000070756	PABPC1			
700	ENSG00000151846	PABPC3			
701	ENSG00000090621	PABPC4			
702	ENSG00000100836	PABPN1			
703	ENSG00000100266	PACSIN2			
704	ENSG00000172239	PAIP1			
705	ENSG00000142864	PAI-RBP1		PAI-RBP1	
706	ENSG00000180370	PAK2			
707	ENSG00000157654	PALM2-AKAP2			
708	ENSG00000145730	PAM		PAM	
709	ENSG00000090060	PAPOLA			PAPOLA
710	ENSG00000115421	PAPOLG			PAPOLG
711	ENSG00000177425	PAWR			
712	ENSG00000157212	PAXIP1			PAXIP1
713	ENSG00000105835	PBEF1			
714	ENSG00000113387	PC4			
715	ENSG00000169564	PCBP1			
716	ENSG00000197111	PCBP2			
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Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
726	ENSG00000150593	PDCD4		PDCD4	
727	ENSG00000184588	PDE4B			
728	ENSG00000145431	PDGFC			
729	ENSG00000168291	PDHB			
730	ENSG00000065485	PDIA5			
731	ENSG00000143870	PDIA6		PDIA6	
732	ENSG00000162734	PEA15			
733	ENSG00000197329	PELI1			
734	ENSG00000132326	PER2			
735	ENSG00000152556	PFKM			
736	ENSG00000067057	PFKP			
737	ENSG00000164040	PGRMC2			PGRMC2
738	ENSG00000167085	PHB			
739	ENSG00000112511	PHF1			
740	ENSG00000130024	PHF10		PHF10	
741	ENSG00000043143	PHF15		PHF15	
742	ENSG00000025293	PHF20		PHF20	PHF20
743	ENSG00000118482	PHF3			
744	ENSG00000033800	PIAS1		PIAS1	
745	ENSG00000073921	PICALM			
746	ENSG00000166037	PIG8			
747	ENSG00000051382	PIK3CB			
748	ENSG00000145675	PIK3R1		PIK3R1	
749	ENSG00000137193	PIM1		PIM1	
750	ENSG00000102096	PIM2			
751	ENSG00000107242	PIP5K1B			
752	ENSG00000154217	PITPNC1			
753	ENSG00000181191	PJA1			PJA1
754	ENSG00000171033	PKIA			
755	ENSG00000118495	PLAGL1		PLAGL1	
756	ENSG00000052126	PLEKHA5		PLEKHA5	
757	ENSG00000115762	PLEKHB2			
758	ENSG00000104886	PLEKHJ1			
759	ENSG00000152952	PLOD2			
760	ENSG00000102024	PLS3			
761	ENSG00000136040	PLXNC1			PLXNC1
762	ENSG00000004399	PLXND1			
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Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
772	ENSG00000163806	PPP1CB		PPP1CB	PPP1CB
773	ENSG00000186298	PPP1CC			
774	ENSG00000112498	PPP1R11		PPP1R11	
775	ENSG00000058272	PPP1R12A			
776	ENSG00000113575	PPP2CA			PPP2CA
777	ENSG00000104695	PPP2CB			
778	ENSG00000104762	PPP2R2A			
779	ENSG00000078304	PPP2R5C	PPP2R5C	PPP2R5C	
780	ENSG00000154001	PPP2R5E			
781	ENSG00000138814	PPP3CA			
782	ENSG00000107758	PPP3CB		PPP3CB	PPP3CB
783	ENSG00000154845	PPP4R1			
784	ENSG00000119414	PPP6C		PPP6C	PPP6C
785	ENSG00000131238	PPT1			
786	ENSG00000116731	PRDM2			PRDM2
787	ENSG00000110851	PRDM4		PRDM4	
788	ENSG00000138073	PREB			
789	ENSG00000122862	PRG1		PRG1	
790	ENSG00000142875	PRKACB			
791	ENSG00000005249	PRKAR2B			
792	ENSG00000166501	PRKCB1			
793	ENSG00000101040	PRKCBP1			
794	ENSG00000115825	PRKD3			
795	ENSG00000137492	PRKRIR			
796	ENSG00000185246	PRPF39			
797	ENSG00000147224	PRPS1			
798	ENSG00000197746	PSAP			
799	ENSG00000129084	PSMA1			
800	ENSG00000106588	PSMA2			
801	ENSG00000143106	PSMA5			
802	ENSG00000100519	PSMC6			PSMC6
803	ENSG00000108344	PSMD3			
804	ENSG00000125818	PSMF1			PSMF1
805	ENSG00000121390	PSPC1			
806	ENSG00000117569	PTBP2		PTBP2	
807	ENSG00000138430	PTD004			
808	ENSG00000171862	PTEN	PTEN		
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Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
818	ENSG00000130508	PXDN			PXDN
819	ENSG00000112531	QKI		QKI	QKI
820	ENSG00000048991	R3HDM			
821	ENSG00000103769	RAB11A			RAB11A
822	ENSG00000119396	RAB14			RAB14
823	ENSG00000138069	RAB1A		RAB1A	
824	ENSG00000080371	RAB21			
825	ENSG00000111737	RAB35			
826	ENSG00000144566	RAB5A			
827	ENSG00000111540	RAB5B			RAB5B
828	ENSG00000175582	RAB6A			RAB6A
829	ENSG00000075785	RAB7			
830	ENSG00000167461	RAB8A			
831	ENSG00000152061	RABGAP1L			
832	ENSG00000136238	RAC1			
833	ENSG00000152942	RAD17			
834	ENSG00000164754	RAD21			
835	ENSG00000119318	RAD23B		RAD23B	RAD23B
836	ENSG00000108175	RAI17			
837	ENSG00000017797	RALBP1			
838	ENSG00000132341	RAN			RAN
839	ENSG00000153201	RANBP2			
840	ENSG00000065150	RANBP5			
841	ENSG00000137040	RANBP6			
842	ENSG00000010017	RANBP9		RANBP9	
843	ENSG00000116473	RAP1A			
844	ENSG00000127314	RAP1B		RAP1B	RAP1B
845	ENSG00000138698	RAP1GDS1		RAP1GDS1	
846	ENSG00000181467	RAP2B			
847	ENSG00000109756	**RAPGEF2**	RAPGEF2	RAPGEF2	RAPGEF2
848	ENSG00000077092	RARB		RARB	
849	ENSG00000145715	RASA1			
850	ENSG00000101265	RASSF2			
851	ENSG00000139687	RB1			
852	ENSG00000023287	RB1CC1	RB1CC1		
853	ENSG00000122257	RBBP6			
854	ENSG00000102054	RBBP7			
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Figure 12, con'd

	A	B	C	D	E
1			miR-10a	miR-16a	miR-17
864	ENSG00000136144	RCBTB1			
865	ENSG00000049449	RCN1			
866	ENSG00000117906	RCN2			
867	ENSG00000089902	RCOR1			
868	ENSG00000137710	RDX			
869	ENSG00000173039	RELA			
870	ENSG00000157916	RER1			
871	ENSG00000142599	RERE			
872	ENSG00000056687	RGL2			
873	ENSG00000090104	RGS1			
874	ENSG00000171700	RGS19			
875	ENSG00000106615	RHEB			
876	ENSG00000067560	RHOA		RHOA	
877	ENSG00000177105	RHOG			
878	ENSG00000119729	RHOQ			
879	ENSG00000126858	RHOT1		RHOT1	
880	ENSG00000101782	RIOK3			
881	ENSG00000176624	RKHD2		RKHD2	
882	ENSG00000022840	RNF10		RNF10	
883	ENSG00000123091	RNF11			RNF11
884	ENSG00000082996	RNF13			
885	ENSG00000134758	RNF138		RNF138	
886	ENSG00000170881	RNF139			
887	ENSG00000170633	RNF34			
888	ENSG00000137075	RNF38	RNF38	RNF38	
889	ENSG00000063978	RNF4			
890	ENSG00000127870	RNF6			RNF6
891	ENSG00000131051	RNPC2			
892	ENSG00000167971	RNPS1		RNPS1	
893	ENSG00000043093	RP42			RP42
894	ENSG00000132383	RPA1			
895	ENSG00000117748	RPA2			
896	ENSG00000153574	RPIA			
897	ENSG00000144713	RPL32		RPL32	
898	ENSG00000163902	RPN1			
899	ENSG00000171858	RPS21			
900	ENSG00000143947	RPS27A			
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Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
910	ENSG00000020633	**RUNX3**			
911	ENSG00000163602	RYBP	RYBP	RYBP	RYBP
912	ENSG00000163785	RYK			
913	ENSG00000198838	RYR3			
914	ENSG00000160633	SAFB			
915	ENSG00000130254	SAFB2			
916	ENSG00000136715	SAP130			
917	ENSG00000079332	SARA1			SARA1
918	ENSG00000130066	SAT		SAT	
919	ENSG00000182568	SATB1			
920	ENSG00000052802	SC4MOL			
921	ENSG00000085365	SCAMP1		SCHIP1	
922	ENSG00000140497	SCAMP2			
923	ENSG00000138760	SCARB2	SCARB2		
924	ENSG00000121892	SCC-112			
925	ENSG00000151967	SCHIP1			SCHIP1
926	ENSG00000010803	SCMH1		SCMH1	
927	ENSG00000137575	SDCBP		SDCBP	
928	ENSG00000156642	SDFR1		SDFR1	
929	ENSG00000140612	SEC11L1			
930	ENSG00000155878	SEC22L1			
931	ENSG00000121542	SEC22L2			
932	ENSG00000107651	SEC23IP			
933	ENSG00000138802	SEC24B			
934	ENSG00000075223	SEMA3C			
935	ENSG00000168758	SEMA4C			
936	ENSG00000092421	SEMA6A		SEMA6A	
937	ENSG00000122545	*SEPT7*			
938	ENSG00000120742	SERP1			
939	ENSG00000179833	SERTAD2			SERTAD2
940	ENSG00000080546	SESN1		SESN1	
941	ENSG00000119335	SET			SET
942	ENSG00000115524	SF3B1			
943	ENSG00000116560	SFPQ			
944	ENSG00000136450	SFRS1	SFRS1		
945		SFRS2			
946		SFRS3			
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Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
956	ENSG00000116350	SFRS4			
957	ENSG00000100650	SFRS5		SFRS5	
958	ENSG00000124193	SFRS6			
959	ENSG00000115875	SFRS7			
960	ENSG00000198730	SH2BP1			
961	ENSG00000162105	SHANK2		SHANK2	SHANK2
962	ENSG00000182199	SHMT2			
963	ENSG00000108061	SHOC2		SHOC2	
964	ENSG00000196470	SIAH1		SIAH1	
965	ENSG00000096717	SIRT1		SIRT1	SIRT1
966	ENSG00000124523	SIRT5			
967	ENSG00000113558	SKP1A			SKP1A
968	ENSG00000155926	SLA			
969	ENSG00000165646	SLC18A2			
970	ENSG00000004864	SLC25A13			
971	ENSG00000122912	SLC25A16			
972	ENSG00000178537	SLC25A20			
973	ENSG00000075415	SLC25A3			SLC25A3
974	ENSG00000147454	SLC25A37			
975	ENSG00000005022	SLC25A5			
976	ENSG00000117394	SLC2A1			
977	ENSG00000059804	SLC2A3		SLC2A3	SLC2A3
978	ENSG00000134294	SLC38A2	SLC38A2		
979	ENSG00000138821	SLC39A8			
980	ENSG00000080493	SLC4A4		SLC4A4	
981	ENSG00000175387	**SMAD2**			
982	ENSG00000112305	SMAP1	SMAP1	SMAP1	
983	ENSG00000102038	SMARCA1		SMARCA1	
984		SMARCA2			SMARCA2
985	ENSG00000127616	SMARCA4			
986	ENSG00000173473	SMARCC1	SMARCC1		SMARCC1
987	ENSG00000073584	SMARCE1			
988	ENSG00000077147	SMBP			
989	ENSG00000072501	SMC1L1			
990	ENSG00000102172	SMS			
991	ENSG00000145335	SNCA			
992	ENSG00000184602	SNN			
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Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
1002	ENSG00000124766	SOX4			SOX4
1003	ENSG00000067066	SP100			
1004	ENSG00000172845	SP3			
1005	ENSG00000091640	SPAG7			
1006	ENSG00000008294	SPAG9	SPAG9		SPAG9
1007	ENSG00000113140	SPARC	SPARC		
1008	ENSG00000065526	SPEN			
1009	ENSG00000095480	SPFH1			
1010	ENSG00000147475	SPFH2		SPFH2	
1011	ENSG00000152268	SPON1			
1012		SRPK2			
1013	ENSG00000164056	SPRY1			
1014	ENSG00000115306	SPTBN1			
1015	ENSG00000090054	SPTLC1		SPTLC1	
1016	ENSG00000100596	SPTLC2			
1017	ENSG00000116649	SRM			
1018	ENSG00000153037	SRP19			
1019	ENSG00000096063	SRPK1		SRPK1	
1020	ENSG00000135250	SRPK2			
1021	ENSG00000124783	SSR1		SSR1	
1022	ENSG00000149136	SSRP1			
1023	ENSG00000101972	STAG2			
1024	ENSG00000084090	STARD7			
1025	**ENSG00000168610**	**STAT3**			**STAT3**
1026	ENSG00000173757	**STAT5B**			
1027	ENSG00000167323	STIM1		STIM1	
1028	ENSG00000166301	STK19		STK19	
1029	ENSG00000102572	STK24	STK24		
1030	ENSG00000112079	STK38			
1031	ENSG00000198648	STK39			
1032	ENSG00000117632	STMN1		STMN1	
1033	ENSG00000165283	STOML2			
1034	ENSG00000124222	STX16			
1035	ENSG00000168952	STXBP6			
1036	ENSG00000173812	SUI1			
1037	ENSG00000116030	SUMO1			
1038	ENSG00000180283	SUMO2			
1039					
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Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
1048	ENSG00000120948	TARDBP		TARDBP	TARDBP
1049		TAX1BP1			TAX1BP1
1050		TBP		TBP	
1051		TBPL1		TBPL1	
1052		TBXA2R			
1053		TCEB1			
1054	ENSG00000113649	TCERG1			TCERG1
1055		TCF12			
1056		TCF20			
1057		TCF3			
1058		TCF7L2			
1059		TCTE1L		TCTE1L	
1060		TEGT			
1061		TENS1			
1062		TERF2			
1063		TES			
1064		TEX261			
1065	ENSG00000198176	TFDP1			
1066		TFDP2			
1067		TFRC			
1068		TGIF			
1069		TGOLN2			
1070	ENSG00000123066	THRAP2			
1071	ENSG00000116001	TIA1			
1072		TIPARP			
1073		TLE4			
1074		TLK1		TLK1	
1075		TLOC1			
1076		TM4SF13			
1077		TM9SF1			
1078	ENSG00000101337	TM9SF4			TM9SF4
		TMEM49 ///			
1079	ENSG00000062716	MIRN21			
1080		TMP21		TMP21	TMP21
1081	ENSG00000120802	TMPO			
1082		TMSB10			
1083		TMX2			
1084					
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Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
1093	ENSG00000111669	TPI1		TPI1	
1094	ENSG00000140416	TPM1			
1095		TPP1			
1096		TRA1			
1097		TRAM1		TRAM1	
1098		TRAPPC3			
1099	ENSG00000166326	TRIM44			
1100		TRIB1			
1101	ENSG00000043514	TRIT1			
1102		TROVE2			
1103		TSPAN3			
1104		TSC1			
1105	ENSG00000102804	TSC22D1			TSC22D1
1106	ENSG00000157514	TSC22D3		TSC22D3	
1107	ENSG00000163084	TSN			
1108		TSPAN3			
1109	ENSG00000143367	TUFT1	TUFT1		
1110	ENSG00000139921	TXNDC			
1111		TXNL1			
1112		TXNIP			TXNIP
1113		U2AF2			
1114		UBC			UBC
1115	ENSG00000077721	UBE2A		UBE2A	
1116		UBE2B			UBE2B
1117	ENSG00000131508	UBE2D2		UBE2D2	
1118		UBE2D3	UBE2D3		
1119		UBE2E1		UBE2E1	
1120		UBE2E3		UBE2E3	UBE2E3
1121		UBE2G1	UBE2G1		
1122	ENSG00000103275	UBE2I		UBE2I	
1123		UBE2J1		UBE2J1	
1124	ENSG00000185651	UBE2L3			
1125		UBE2N			
1126		UBE2Q		UBE2Q	
1127		UBE2V1 /// Kua-UEV		UBE2V1 /// Kua-UEV	
1128	ENSG00000114062	UBE3A			
1129					
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1137					

Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
1138	ENSG00000164828	UNC84A			
1139	ENSG00000100242	UNC84B			
1140		UQCRFS1			
1141		USP1			
1142	ENSG00000152484	USP12		USP12	
1143	ENSG00000101557	USP14		USP14	
1144		USP15		USP15	
1145		USP32		USP32	
1146	ENSG00000077254	USP33			USP33
1147	ENSG00000115464	USP34			
1148		USP47			
1149		USP48			
1150		USP9X			
1151	ENSG00000173218	VANGL1			
1152	ENSG00000101558	VAPA			
1153	ENSG00000124164	VAPB			
1154		VAMP3		VAMP3	
1155		VAMP4			
1156		VAMP8		VAMP8	
1157		VAPA		VAPA	
1158		VAT1		VAT1	
1159		VAV1			
1160		VAV3			VAV3
1161		VCL			
1162	ENSG00000165280	VCP			
1163	ENSG00000073905	VDAC1			
1164	ENSG00000078668	VDAC3			
1165		VGLL4			
1166		VIM			VIM
1167		VPS24			
1168		VPS35			
1169	ENSG00000167987	VPS37C		VPS37C	
1170		VPS4B			
1171		VPS16			
1172		VPS26			
1173		VPS54		VPS54	
1174	ENSG00000105053	VRK3			
1175					
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1177					
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Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
1184	ENSG00000109685	WHSC1			
1185		WIPI-2		WIPI-2	
1186		WSB1		WSB1	
1187	ENSG00000146457	WTAP			
1188		**WWP2**			
1189	ENSG00000115254	XAB1		XAB1	
1190		XPO1			
1191	ENSG00000169180	XPO6			
1192		YLPM1			
1193		YPEL5			
1194		YTHDF1			
1195		YTHDF2			
1196		YT521		YT521	
1197		YWHAB			YWHAB
1198		YWHAE		YWHAE	
1199		YWHAH		YWHAH	
1200	ENSG00000134308	YWHAQ		YWHAQ	
1201		YWHAZ			
1202		YY1			
1203		ZA20D2		ZA20D2	ZA20D2
1204		ZA20D3		ZA20D3	
1205		ZBTB11			
1206		ZC3H11A			
1207		ZDHHC6			
1208		ZDHHC7			
1209		ZDHHC17		ZDHHC17	
1210		ZFP36L1			ZFP36L1
1211		ZFP36L2			
1212		ZMYND11	ZMYND11		ZMYND11
1213	ENSG00000010244	ZNF207			
1214		ZNF146			
1215		ZNF148			ZNF148
1216		ZNF160			
1217		ZNF161			
1218		ZNF410			
1219		ZNF207			
1220		ZNF238		ZNF238	
1221					
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Figure 12, con'd

	A	B	C	D	E
1			**miR-10a**	**miR-16a**	**miR-17**
1230	ENSG00000036549	ZZZ3		ZZZ3	

Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
2	ENSG00000145495	6-Mar				
3	ENSG00000136536					
4	ENSG00000165406	8-Mar				
5	ENSG00000168385					
6	ENSG00000125354					
7	ENSG00000122545					
8	ENSG00000138758					
9	ENSG00000111780					
10	ENSG00000137822		76P			
11	ENSG00000165029	ABCA1		ABCA1		
12	ENSG00000125257					
13	ENSG00000114770					
14	ENSG00000161533					
15	ENSG00000151726					
16	ENSG00000075624		ACTB			
17	ENSG00000184009					
18	ENSG00000136518					
19	ENSG00000072110					
20	ENSG00000138071					
21	ENSG00000115091					
22	ENSG00000137845					
23	ENSG00000138031					ADCY3
24	ENSG00000087274					
25	ENSG00000148700				ADD3	
26	ENSG00000101126					
27	ENSG00000173020			ADRBK1		
28	ENSG00000172493		AFF1	AFF1		
29	ENSG00000168448					
30	ENSG00000155189					
31	ENSG00000168710					
32	ENSG00000004455					
33	ENSG00000108599					
34	ENSG00000023516					
35	ENSG00000170776	AKAP13				
36	ENSG00000151320					
37	ENSG00000117020	AKT3				
38	ENSG00000170017					
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
48	ENSG00000177879					
49	ENSG00000120868					
50	ENSG00000144848					
51	ENSG00000101844					
52	ENSG00000084234					
53	ENSG00000142192	APP				
54	ENSG00000062725			APPBP2		
55	ENSG00000095139					
56	ENSG00000143761	ARF1				
57	ENSG00000134287					
58	ENSG00000168374				ARF4	
59	ENSG00000165527			ARF6		
60	ENSG00000175220	ARHGAP1				
61	ENSG00000137962					
62	ENSG00000104880	ARHGEF18				
63	ENSG00000129675					
64	ENSG00000117713					ARID1A
65	ENSG00000054267	ARID4B				
66	ENSG00000177479					
67	ENSG00000134108			ARL10C		
68	ENSG00000110025					
69	ENSG00000138175					
70	ENSG00000170540					
71	ENSG00000188042	ARL7				
72	ENSG00000163466					
73	ENSG00000136950					
74	ENSG00000128989			ARPP-19		
75	ENSG00000111875	ASF1A		ASF1A		
76	ENSG00000116539					
77	ENSG00000171456			ASXL1		
78	ENSG00000143970					
79	ENSG00000123268					
80	ENSG00000149311					
81	ENSG00000163399					
82	ENSG00000143153				ATP1B1	ATP1B1
83	ENSG00000174437				ATP2A2	ATP2A2
84	ENSG00000017260			ATP2C1		
85						
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
94	ENSG00000198604					
95	ENSG00000119866				BCL11A	
96	ENSG00000171791					
97	ENSG00000029363	BCLAF1				
98	ENSG00000105829			BET1		
99	ENSG00000134107					
100	ENSG00000138756					
101	ENSG00000104765			BNIP3L		
102	ENSG00000060762					
103	ENSG00000160058					
104	ENSG00000095564				BTAF1	
105	ENSG00000145741					
106	ENSG00000133639	BTG1				
107	ENSG00000159388	BTG2				BTG2
108	ENSG00000154640	BTG3				
109	ENSG00000082153				BZW1	
110	ENSG00000136261			BZW2		
111	ENSG00000181915				C10orf22	
112	ENSG00000119906					
113	ENSG00000110075	C11orf23				
114	ENSG00000171067					
115	ENSG00000139746					
116	ENSG00000133935					
117	ENSG00000168175					
118	ENSG00000134153					
119	ENSG00000152242			C18orf25		
120	ENSG00000141452	C18orf8				
121	ENSG00000105176	C19orf2				
122	ENSG00000163875					
123	ENSG00000163444					
124	ENSG00000117616	C1orf63				
125	ENSG00000108561					
126	ENSG00000110888	C1QDC1				
127	ENSG00000132823					
128	ENSG00000101084					
129	ENSG00000101166					
130	ENSG00000126749					
131						
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139						

Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
140	ENSG00000136819					
141	ENSG00000136925					
142	ENSG00000074410					
143	ENSG00000104267			CA2		
144	ENSG00000135932		CAB39	CAB39		
145	ENSG00000104327					
146	ENSG00000179218				CALR	
147	ENSG00000127022	CANX				
148	ENSG00000131236					
149	ENSG00000135837					
150	ENSG00000116489					
151	ENSG00000198898					
152	ENSG00000077549					
153	ENSG00000168564					
154	ENSG00000142453					
155	ENSG00000110619					
156	ENSG00000108349					
157	ENSG00000153113					
158	ENSG00000130940					
159	ENSG00000067955					
160	ENSG00000108468					
161	ENSG00000100261		CBX6			
162	ENSG00000112237					CCNC
163	ENSG00000118971	CCND2				
164	ENSG00000112576					
165	ENSG00000113328	CCNG1		CCNG1		
166	ENSG00000138764	CCNG2				
167	ENSG00000134480			CCNH		
168	ENSG00000118816				CCNI	
169	ENSG00000163660	CCNL1	CCNL1	CCNL1		
170	ENSG00000082258	CCNT2	CCNT2	CCNT2		
171	ENSG00000166226					
172	ENSG00000163468				CCT3	
173	ENSG00000135535		CD164		CD164	
174	ENSG00000174059					
175	ENSG00000196776					
176	ENSG00000110848	CD69				
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
186	ENSG00000143126	CELSR2			CELSR2	
187						
188	ENSG00000153140					
189	ENSG00000153774		CFDP1	CFDP1		
190	ENSG00000172757					
191	ENSG00000163320					
192	ENSG00000153922					
193	ENSG00000111642					
194	ENSG00000177200	CHD9				
195	ENSG00000072609					
196	ENSG00000110172					
197	ENSG00000131873	CHSY1				
198	ENSG00000109572			CLCN3	CLCN3	
199	ENSG00000113240					
200	ENSG00000122705					
201	ENSG00000141367					
202	ENSG00000162368	CMPK				
203	ENSG00000100528					
204	ENSG00000125107					
205	ENSG00000111596		CNOT2	CNOT2		
206	ENSG00000198791	CNOT7				
207	ENSG00000121058	COIL				
208	ENSG00000129083					
209	ENSG00000166200					
210	ENSG00000141030					
211	ENSG00000138663					
212	ENSG00000110880					
213	ENSG00000178741					
214	ENSG00000135940					
215	ENSG00000115944					
216	ENSG00000111605		CPSF6	CPSF6		
217	ENSG00000118260				CREB1	CREB1
218	ENSG00000005339					
219	ENSG00000111269				CREBL2	
220	ENSG00000145708					
221		CRK				
222	ENSG00000099942					
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
232	ENSG00000175215					
233	ENSG00000168036					
234	ENSG00000198561					
235	ENSG00000171793			CTPS		
236	ENSG00000149187					
237	ENSG00000048740	CUGBP2	CUGBP2	CUGBP2	CUGBP2	
238	ENSG00000036257		CUL3	CUL3		
239	ENSG00000166266					
240	ENSG00000160967					
241	ENSG00000121966					
242	ENSG00000166347					
243	ENSG00000008283					
244	ENSG00000172115					
245	ENSG00000083799					
246	ENSG00000140181					
247	ENSG00000165659			DACH1	DACH1	
248	ENSG00000196730					
249	ENSG00000071626					
250	ENSG00000183283	DAZAP2				
251	ENSG00000137992					
252	ENSG00000172795					
253	ENSG00000085788					
254	ENSG00000168209					
255	ENSG00000124487	DDX3X	DDX3X	DDX3X		
256	ENSG00000067048					
257	ENSG00000108654	DDX5				
258	ENSG00000141141		DDX52	DDX52		
259	ENSG00000158796					
260	ENSG00000124795					
261	ENSG00000139726					
262	ENSG00000155792					
263	ENSG00000136986					
264	ENSG00000109606		DHX15	DHX15		
265	ENSG00000132153				DHX30	DHX30
266	ENSG00000108406		DHX40			
267	**ENSG00000100697**					
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
274	ENSG00000158486					
275	ENSG00000086061					
276	ENSG00000132002					
277	ENSG00000105993	DNAJB6				
278	ENSG00000128590	DNAJB9				DNAJB9
279	ENSG00000077380					
280	ENSG00000074603					
281	ENSG00000092964	DPYSL2				
282	ENSG00000117505					
283	ENSG00000167264					
284	ENSG00000143507					
285	ENSG00000139318	DUSP6				
286	ENSG00000004975					
287	ENSG00000161202					
288	ENSG00000157540	DYRK1A				
289	**ENSG00000112242**	**E2F3**				**E2F3**
290	ENSG00000147654					
291	ENSG00000104517	EDD1				
292	ENSG00000198121			EDG2		
293	ENSG00000156508					
294	ENSG00000124802			EEF1E1		
295	ENSG00000186676					
296	ENSG00000183690					
297	ENSG00000142634					
298	ENSG00000171570			EGLN2		
299	ENSG00000120738	EGR1		EGR1	EGR1	
300	ENSG00000110047					
301						
302	ENSG00000092847	EIF2C1				
303	ENSG00000123908					EIF2C2
304	ENSG00000134001					
305	ENSG00000104131	EIF3S1				EIF3S1
306	ENSG00000107581	EIF3S10		EIF3S10		
307	ENSG00000156976			EIF4A2		
308	ENSG00000063046					
309	ENSG00000151247	EIF4E				
310	ENSG00000135930	EIF4G2				
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
318	ENSG00000102034			ELF4		
319	ENSG00000111145	ELK3				
320	ENSG00000155849					
321	ENSG00000062598					
322	ENSG00000012660			ELOVL5		
323	ENSG00000170522		ELOVL6	ELOVL6		
324	ENSG00000143420					
325	ENSG00000120533					
326	ENSG00000120616					
327	ENSG00000050405	EPLIN				
328	ENSG00000085832		EPS15	EPS15		
329	ENSG00000124882	EREG				
330	ENSG00000157554					
331	ENSG00000120705	ETF1		ETF1		
332	ENSG00000157557					
333	ENSG00000182944					
334	ENSG00000120699					
335	ENSG00000108799	EZH1				
336	ENSG00000106462	EZH2				
337	ENSG00000124491					
		FAM45B ///				
338	ENSG00000119979	FAM45A				
339	ENSG00000153310					
340	ENSG00000139146	FAM60A			FAM60A	
341	ENSG00000105216				FAM61A	
342	ENSG00000179115					
343	ENSG00000166147		FBN1	FBN1		
344	ENSG00000173120	FBXL11				
345	ENSG00000118564	FBXL5			FBXL5	
346	ENSG00000138081	FBXO11	FBXO11	FBXO11	FBXO11	
347						
348	ENSG00000143756	FBXO28				
349	ENSG00000178974					
350	ENSG00000037637					
351	ENSG00000112146					
352	ENSG00000119402					
353	ENSG00000068078				FGFR3	
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
363	ENSG00000159202					
364	ENSG00000153561					
365	ENSG00000181495			FLJ14054		
366	ENSG00000175606				FLJ20533	
367	ENSG00000136122			FLJ22624		
368	ENSG00000132589					
369	ENSG00000196504					
370		FNBP4				FNBP4
371	ENSG00000170345					
372	ENSG00000125740			FOSB		
373	ENSG00000137273					
374	ENSG00000198815	FOXJ3				
375	ENSG00000150907					
376	ENSG00000118689					
377	ENSG00000114861		**FOXP1**			
378	ENSG00000165879					
379	ENSG00000163430					
380	ENSG00000114416	FXR1	FXR1			FXR1
381	ENSG00000145907	G3BP				
382	ENSG00000138757	GABPB2	G3BP2	G3BP2		
383	ENSG00000034713				GABARAPL2	
384	ENSG00000104064					
385	ENSG00000116717					
386	ENSG00000141429					
387	ENSG00000143641	GALNT2				
388	ENSG00000109586					
389	ENSG00000165219					
390	ENSG00000179348					
391	ENSG00000107485					
392	ENSG00000146729			GBAS		
393	ENSG00000001084					
394	ENSG00000057608					GDI2
395	ENSG00000100083					
396	ENSG00000165678					
397	ENSG00000108588					
398	ENSG00000115419			GLS		
399	ENSG00000196700	GM632				
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
409	ENSG00000185245					
410	ENSG00000159592					
411	ENSG00000112414					
412	ENSG00000106070					
413	ENSG00000103342					
414	ENSG00000140307					
415	ENSG00000110768					
416	ENSG00000077809					
417	ENSG00000115207					
418	ENSG00000188486				H2AFX	
419						
420	ENSG00000091527				H41	
421	ENSG00000112339					
422	ENSG00000172534					HCFC1
423	ENSG00000180353					
424	ENSG00000116478					
425	ENSG00000143321					
426	ENSG00000166503		HDGFRP3	HDGFRP3		
427	ENSG00000013583					
428	ENSG00000112406	HECA				
429	ENSG00000103657					
430	ENSG00000128731					
431	ENSG00000051108					
432	ENSG00000114315					
433	ENSG00000164683					
434	ENSG00000152804					
435	ENSG00000100644	HIF1A				
436	ENSG00000181061					
437	ENSG00000078140					
438	ENSG00000163349					
439	ENSG00000010818	HIVEP2		HIVEP2	HIVEP2	
440	ENSG00000137361					
441	ENSG00000100281			HMG2L1		
442	ENSG00000189403					
443	ENSG00000164104		HMGB2	HMGB2		
444	ENSG00000029993	HMGB3				
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
455	ENSG00000096746	HNRPH3		HNRPH3		
456	ENSG00000165119			HNRPK		
457	ENSG00000104824					
458	ENSG00000099783		HNRPM			
459	ENSG00000125944		HNRPR	HNRPR		
460	ENSG00000153187	HNRPU	HNRPU	HNRPU		
461	ENSG00000105323					
462	ENSG00000010295					
463	ENSG00000106004		**HOXB5**		**HOXA5**	
464	ENSG00000078399			**HOXB5**		
465	ENSG00000120075					
466	ENSG00000120087					
467	ENSG00000153807					**HOXA10**
468	ENSG00000173744			HRB		HRB
469	ENSG00000074356				HSA277841	
470	ENSG00000164164	HSHIN1		HSHIN1		
471	ENSG00000044574					
472	ENSG00000109971					
473	ENSG00000144381			HSPD1		HSPD1
474	ENSG00000120694					
475	ENSG00000136478			HT008		
476	ENSG00000086758			HUWE1		
477	ENSG00000108622					
478	ENSG00000067829	IDH3G				
479	ENSG00000109083					
480	ENSG00000068745				IHPK2	
481	ENSG00000070061					
482	ENSG00000129351					
483	ENSG00000105135				ILVBL	
484	ENSG00000153487					
485	ENSG00000168556					
486	ENSG00000071243	ING2				
487	ENSG00000068383			INPP5A		
488	ENSG00000148384					
489	ENSG00000186480				INSIG1	
490	ENSG00000171105					
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
500	ENSG00000078596					
501	ENSG00000116679	IVNS1ABP				
502	ENSG00000184916					
503	ENSG00000117139	JARID1B				
504	ENSG00000008083					
505	ENSG00000115548	JMJD1A				
506	ENSG00000171988			JMJD1C		
507	ENSG00000177606	JUN				
508	ENSG00000137944	KAT3				
509	ENSG00000170852					
510	ENSG00000176407					
511	ENSG00000055118					
512	ENSG00000136240				KDELR2	
513	ENSG00000121774	KHDRBS1				
514	ENSG00000088247				KHSRP	
515	ENSG00000131149					
516	ENSG00000179889					
517	ENSG00000136813					
518	ENSG00000145725					
519	ENSG00000143702	KIAA0470				
520	ENSG00000119321					
521	ENSG00000197226					
522	ENSG00000126775					
523	ENSG00000164151					
524	ENSG00000105063					
525	ENSG00000126814			KIAA1393		
526	ENSG00000156232			KIAA1971		
527	ENSG00000170759					
528	ENSG00000157404					
529	ENSG00000127528					
530	ENSG00000136826					
531	ENSG00000067082					
532	ENSG00000155090					
533	ENSG00000165516			KLHDC2		
534	ENSG00000114030					
535	ENSG00000102753	KPNA3	KPNA3	KPNA3	KPNA3	KPNA3
536	ENSG00000108424			KPNB1		
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
546	ENSG00000143815		LBR	LBR		
547	ENSG00000157978			LDLRAP1		
548	ENSG00000065548					
549	ENSG00000100097					
550	ENSG00000148943					
551	ENSG00000189067					
552	ENSG00000166783					
553	ENSG00000160789					
554	ENSG00000113368			LMNB1		
555	ENSG00000135363					
556	ENSG00000111252					
557	ENSG00000152102					
558	ENSG00000120963					
559	ENSG00000102897				LOC57149	
560	ENSG00000121104	LOC81558				
561	ENSG00000123684	LPGAT1		LPGAT1		
562	ENSG00000145012		LPP	LPP		
563	ENSG00000110031					
564	ENSG00000077454				LRCH4	
565	ENSG00000198799					
566	ENSG00000171492	LRRC8D				
567	ENSG00000124831					
568	ENSG00000175324					
569	ENSG00000146963					
570	ENSG00000054219			LYPLA1		
571	ENSG00000120992		LYPLA1			
572	ENSG00000011009				LYPLA2 /// LYPLA2P1 /// LOC388499	
573	ENSG00000163818	LZTFL1				
574	ENSG00000135387				M11S1	
575	ENSG00000003056	M6PR		M6PR		
576	ENSG00000143033				M96	
577	ENSG00000127603			MACF1		
578	ENSG00000110514		MADD	MADD		
579	ENSG00000187391	MAGI2				
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
589	ENSG00000047849					
590	ENSG00000104814	MAP4K1				
591	ENSG00000012983					MAP4K5
592	ENSG00000135525	MAP7				
593	ENSG00000100030				MAPK1	
594	ENSG00000112062					
595	ENSG00000101367	MAPRE1	MAPRE1	MAPRE1		
596	ENSG00000166974	MAPRE2	MAPRE2	MAPRE2		
597	ENSG00000175130		MARCKSL1	MARCKSL1	MARCKSL1	
598	ENSG00000075413					
599	ENSG00000166986				MARS	
600	ENSG00000168906			MAT2A		
601	ENSG00000038274	MAT2B				
602	ENSG00000015479	MATR3		MATR3	MATR3	
603	ENSG00000125952					
604	ENSG00000134046					
605	ENSG00000152601			MBNL1		
606	ENSG00000180398			MCFD2		
607	ENSG00000121940					
608	ENSG00000112118					MCM3
609	ENSG00000082212					
610	ENSG00000124733	MEA1				
611	ENSG00000081189	MEF2C		MEF2C		MEF2C
612	ENSG00000143995			**MEIS1**		
613	ENSG00000133895				MEN1	
614	ENSG00000164024		METAP1	METAP1		
615	ENSG00000168282					
616	ENSG00000138092	MGC11266				
617	ENSG00000133858					
618	ENSG00000198408	MGEA5		MGEA5		
619	ENSG00000079277				MKNK1	
620	ENSG00000133606	MKRN1				
621	ENSG00000089693					
622	**ENSG00000171843**					
623	ENSG00000108788					
624	ENSG00000056586					
625	ENSG00000165943					MOAP1
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
635	ENSG00000125445					
636	ENSG00000005302					
637	ENSG00000147065					
638	ENSG00000182979					
639	ENSG00000147649					
640	ENSG00000143033				MTF2	
641	ENSG00000100330	MTMR3				
642	ENSG00000108389	MTMR4		MTMR4		
643	ENSG00000170873			MTSS1		
644	ENSG00000128654					
645	ENSG00000118513				MYB	
646	ENSG00000005810	MYCBP2			MYCBP2	
647	ENSG00000133026				MYH10	
648	ENSG00000136504					
649	ENSG00000102921					
650	ENSG00000138386					
651	ENSG00000187109		NAP1L1	NAP1L1		
652	ENSG00000132780	NASP				
653	ENSG00000158747	NBL1				
654	ENSG00000115053				NCL	
655	ENSG00000198646			NCOA6		
656	ENSG00000196498					
657	ENSG00000166579	NDEL1	NDEL1	NDEL1	NDEL1	
658	ENSG00000131507					
659	ENSG00000125356	NDUFA1				
660	ENSG00000189043					
661						
662	ENSG00000069869	NEDD4				
663	ENSG00000173848				NET1	
664	ENSG00000082641					
665	ENSG00000116044		NFE2L2	NFE2L2	NFE2L2	
666	ENSG00000050344					
667	ENSG00000120837	NFYB				
668	ENSG00000066136					NFYC
669	ENSG00000166681					
670	ENSG00000140157					
671	ENSG00000164190					
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
681	ENSG00000106459					
682	ENSG00000180530			NRIP1		
683	ENSG00000035681					
684	ENSG00000137497					
685	ENSG00000124789					
686	ENSG00000162231					
687	ENSG00000101888					
688	ENSG00000065154					
689	ENSG00000115758					
690	ENSG00000046651					
691	ENSG00000147162			OGT	OGT	
692	ENSG00000182606					
693	ENSG00000141447	OSBPL1A			OSBPL1A	
694	ENSG00000091039			OSBPL8	OSBPL8	
695	ENSG00000117859					
696	ENSG00000167770		OTUB1	OTUB1		
697	ENSG00000172939			OXSR1		
698	ENSG00000170515					PA2G4
699	ENSG00000070756					
700	ENSG00000151846					
701	ENSG00000090621					
702	ENSG00000100836					
703	ENSG00000100266					
704	ENSG00000172239					
705	ENSG00000142864					
706	ENSG00000180370					
707	ENSG00000157654					PALM2-AKAP2
708	ENSG00000145730					PAM
709	ENSG00000090060	PAPOLA				
710	ENSG00000115421					
711	ENSG00000177425					
712	ENSG00000157212	PAXIP1				
713	ENSG00000105835					
714	ENSG00000113387					
715	ENSG00000169564					PCBP1
716	ENSG00000197111	PCBP2				
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
726	ENSG00000150593			PDCD4		
727	ENSG00000184588					
728	ENSG00000145431					
729	ENSG00000168291					
730	ENSG00000065485					
731	ENSG00000143870			PDIA6		
732	ENSG00000162734					
733	ENSG00000197329					
734	ENSG00000132326					
735	ENSG00000152556					
736	ENSG00000067057					
737	ENSG00000164040					
738	ENSG00000167085					
739	ENSG00000112511	PHF1				PHF1
740	ENSG00000130024					
741	ENSG00000043143					
742	ENSG00000025293					
743	ENSG00000118482					
744	ENSG00000033800					
745	ENSG00000073921			PICALM		
746	ENSG00000166037	PIG8				
747	ENSG00000051382					
748	ENSG00000145675	PIK3R1				
749	ENSG00000137193				PIM1	
750	ENSG00000102096				PIM2	
751	ENSG00000107242					
752	ENSG00000154217					
753	ENSG00000181191					
754	ENSG00000171033	PKIA	PKIA	PKIA		
755	ENSG00000118495			PLAGL1		
756	ENSG00000052126					
757	ENSG00000115762					
758	ENSG00000104886					
759	ENSG00000152952				PLOD2	
760	ENSG00000102024					
761	ENSG00000136040	PLXNC1				
762	ENSG00000004399					
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
772	ENSG00000163806		PPP1CB	PPP1CB		
773	ENSG00000186298					
774	ENSG00000112498					
775	ENSG00000058272			PPP1R12A		
776	ENSG00000113575	PPP2CA				
777	ENSG00000104695					
778	ENSG00000104762					
779	ENSG00000078304	PPP2R5C				
780	ENSG00000154001			PPP2R5E		
781	ENSG00000138814	PPP3CA				
782	ENSG00000107758	PPP3CB	PPP3CB			
783	ENSG00000154845					
784	ENSG00000119414	PPP6C				
785	ENSG00000131238					
786	ENSG00000116731	PRDM2		PRDM2		
787	ENSG00000110851					
788	ENSG00000138073					
789	ENSG00000122862					
790	ENSG00000142875					
791	ENSG00000005249	PRKAR2B				
792	ENSG00000166501			PRKCB1		
793	ENSG00000101040					
794	ENSG00000115825					
795	ENSG00000137492		PRKRIR	PRKRIR		
796	ENSG00000185246					
797	ENSG00000147224			PRPS1		
798	ENSG00000197746				PSAP	
799	ENSG00000129084					
800	ENSG00000106588				PSMA2	
801	ENSG00000143106					
802	ENSG00000100519					
803	ENSG00000108344					
804	ENSG00000125818					
805	ENSG00000121390					
806	ENSG00000117569				PTBP2	
807	ENSG00000138430					PTD004
808	ENSG00000171862	PTEN				
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
818	ENSG00000130508	PXDN				
819	ENSG00000112531	QKI	QKI	QKI	QKI	
820	ENSG00000048991			R3HDM		
821	ENSG00000103769	RAB11A				
822	ENSG00000119396	RAB14		RAB14		
823	ENSG00000138069					
824	ENSG00000080371					
825	ENSG00000111737	RAB35		RAB35		
826	ENSG00000144566					
827	ENSG00000111540	RAB5B			RAB5B	
828	ENSG00000175582	RAB6A	RAB6A			
829	ENSG00000075785					
830	ENSG00000167461					
831	ENSG00000152061					
832	ENSG00000136238					
833	ENSG00000152942			RAD17		
834	ENSG00000164754			RAD21		
835	ENSG00000119318	RAD23B	RAD23B	RAD23B		
836	ENSG00000108175					
837	ENSG00000017797					
838	ENSG00000132341					
839	ENSG00000153201					
840	ENSG00000065150		RANBP5	RANBP5		
841	ENSG00000137040					
842	ENSG00000010017		RANBP9	RANBP9		
843	ENSG00000116473			RAP1A	RAP1A	
844	ENSG00000127314	RAP1B	RAP1B	RAP1B	RAP1B	
845	ENSG00000138698					
846	ENSG00000181467					
847	ENSG00000109756	RAPGEF2		RAPGEF2	RAPGEF2	
848	ENSG00000077092					
849	ENSG00000145715				RASA1	
850	ENSG00000101265	RASSF2				
851	ENSG00000139687	RB1				
852	ENSG00000023287					
853	ENSG00000122257					
854	ENSG00000102054	RBBP7				
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
864	ENSG00000136144					
865	ENSG00000049449			RCN1		
866	ENSG00000117906					
867	ENSG00000089902	RCOR1				
868	ENSG00000137710					
869	ENSG00000173039					
870	ENSG00000157916					
871	ENSG00000142599					
872	ENSG00000056687				RGL2	
873	ENSG00000090104					
874	ENSG00000171700					
875	ENSG00000106615					
876	ENSG00000067560					
877	ENSG00000177105					
878	ENSG00000119729					
879	ENSG00000126858					
880	ENSG00000101782					
881	ENSG00000176624			RKHD2		
882	ENSG00000022840					
883	ENSG00000123091				RNF11	
884	ENSG00000082996	RNF13				
885	ENSG00000134758		RNF138		RNF138	
886	ENSG00000170881					
887	ENSG00000170633					
888	ENSG00000137075					RNF38
889	ENSG00000063978	RNF4				RNF4
890	ENSG00000127870	RNF6				
891	ENSG00000131051					
892	ENSG00000167971					
893	ENSG00000043093	RP42			RP42	
894	ENSG00000132383					
895	ENSG00000117748	RPA2				
896	ENSG00000153574					
897	ENSG00000144713					
898	ENSG00000163902					
899	ENSG00000171858					
900	ENSG00000143947					
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
910	ENSG00000020633					
911	ENSG00000163602	RYBP	RYBP	RYBP		
912	ENSG00000163785					
913	ENSG00000198838					
914	ENSG00000160633			SAFB		
915	ENSG00000130254			SAFB2		
916	ENSG00000136715				SAP130	
917	ENSG00000079332	SARA1	SARA1			
918	ENSG00000130066					
919	ENSG00000182568			SATB1		
920	ENSG00000052802					
921	ENSG00000085365					
922	ENSG00000140497	SCAMP2			SCAMP2	
923	ENSG00000138760					
924	ENSG00000121892					
925	ENSG00000151967					
926	ENSG00000010803					
927	ENSG00000137575	SDCBP		SDCBP		
928	ENSG00000156642					SDFR1
929	ENSG00000140612				SEC11L1	
930	ENSG00000155878					
931	ENSG00000121542			SEC22L1		
932	ENSG00000107651					
933	ENSG00000138802					
934	ENSG00000075223					
935	ENSG00000168758					
936	ENSG00000092421				SEMA6A	
937	ENSG00000122545					
938	ENSG00000120742	SERP1				
939	ENSG00000179833	SERTAD2				
940	ENSG00000080546				SESN1	
941	ENSG00000119335	SET		SET	SET	
942	ENSG00000115524					
943	ENSG00000116560					
944	ENSG00000136450			SFRS1		
945						
946		SFRS3				
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
956	ENSG00000116350		SFRS4	SFRS4		
957	ENSG00000100650					
958	ENSG00000124193					
959	ENSG00000115875		SFRS7	SFRS7		
960	ENSG00000198730			SH2BP1		
961	ENSG00000162105			SHANK2		
962	ENSG00000182199				SHMT2	
963	ENSG00000108061					
964	ENSG00000196470					
965	ENSG00000096717	SIRT1				
966	ENSG00000124523					
967	ENSG00000113558					
968	ENSG00000155926					
969	ENSG00000165646					
970	ENSG00000004864			SLC25A13		
971	ENSG00000122912					
972	ENSG00000178537					
973	ENSG00000075415					
974	ENSG00000147454					
975	ENSG00000005022					
976	ENSG00000117394					
977	ENSG00000059804					
978	ENSG00000134294	SLC38A2	SLC38A2	SLC38A2		SLC38A2
979	ENSG00000138821					
980	ENSG00000080493	SLC4A4		SLC4A4		
981	ENSG00000175387					
982	ENSG00000112305					
983	ENSG00000102038					
984		SMARCA2				
985	ENSG00000127616					
986	ENSG00000173473				SMARCC1	
987	ENSG00000073584					
988	ENSG00000077147					
989	ENSG00000072501			SMC1L1		
990	ENSG00000102172					
991	ENSG00000145335					
992	ENSG00000184602				SNN	SNN
993						
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1001						

Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
1002	ENSG00000124766					SOX4
1003	ENSG00000067066					
1004	ENSG00000172845					
1005	ENSG00000091640					
1006	ENSG00000008294		SPAG9	SPAG9		
1007	ENSG00000113140					
1008	ENSG00000065526			SPEN		
1009	ENSG00000095480					
1010	ENSG00000147475			SPFH2		
1011	ENSG00000152268					
1012						
1013	ENSG00000164056					
1014	ENSG00000115306					
1015	ENSG00000090054					
1016	ENSG00000100596				SPTLC2	
1017	ENSG00000116649					
1018	ENSG00000153037					
1019	ENSG00000096063	SRPK1				
1020	ENSG00000135250					
1021	ENSG00000124783					
1022	ENSG00000149136					
1023	ENSG00000101972					STAG2
1024	ENSG00000084090					
1025	**ENSG00000168610**	**STAT3**				
1026	ENSG00000173757			STAT5B		
1027	ENSG00000167323					
1028	ENSG00000166301					
1029	ENSG00000102572					
1030	ENSG00000112079	STK38				
1031	ENSG00000198648					
1032	ENSG00000117632					
1033	ENSG00000165283					
1034	ENSG00000124222					
1035	ENSG00000168952			STXBP6		
1036	ENSG00000173812			SUI1		
1037	ENSG00000116030			SUMO1		
1038	ENSG00000180283		SUMO1			
1039						
1040						
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1047						

Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
1048	ENSG00000120948				TARDBP	
1049		TAX1BP1	TAX1BP1	TAX1BP1		
1050						
1051						
1052					TBXA2R	
1053						
1054	ENSG00000113649					
1055						
1056		TCF20	TCF20			
1057						
1058						
1059						TCTE1L
1060						
1061						
1062						
1063						
1064						
1065	ENSG00000198176					
1066				TFDP2		
1067						
1068				TGIF		TGIF
1069		TGOLN2				
1070	ENSG00000123066	THRAP2				
1071	ENSG00000116001					
1072						
1073		TLE4				
1074				TLK1		
1075						
1076		TM4SF13				
1077						
1078	ENSG00000101337					
1079	ENSG00000062716					
1080						
1081	ENSG00000120802			TMPO		
1082						
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
1093	ENSG00000111669				TPI1	
1094	ENSG00000140416				TPM1	
1095						
1096			TRA1	TRA1		
1097						
1098						
1099	ENSG00000166326					
1100				TRIB1		
1101	ENSG00000043514					
1102						
1103						
1104						TSC1
1105	ENSG00000102804					
1106	ENSG00000157514				TSC22D3	
1107	ENSG00000163084					
1108			TSPAN3	TSPAN3		
1109	ENSG00000143367					
1110	ENSG00000139921					
1111						
1112		TXNIP				
1113						
1114						
1115	ENSG00000077721					
1116		UBE2B				
1117	ENSG00000131508			UBE2D2	UBE2D2	
1118			UBE2D3	UBE2D3		
1119						
1120		UBE2E3				
1121		UBE2G1				
1122	ENSG00000103275					
1123		UBE2J1				
1124	ENSG00000185651					
1125						
1126						
1127						
1128	ENSG00000114062	UBE3A			UBE3A	
1129						
1130						
1131						
1132						
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Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
1138	ENSG00000164828					
1139	ENSG00000100242					
1140				UQCRFS1		
1141						
1142	ENSG00000152484					
1143	ENSG00000101557					
1144			USP15			USP15
1145		USP32				
1146	ENSG00000077254					
1147	ENSG00000115464					
1148						
1149						
1150			USP9X	USP9X		
1151	ENSG00000173218	VANGL1				
1152	ENSG00000101558			VAPA		
1153	ENSG00000124164					
1154						
1155						
1156						
1157						
1158						
1159						
1160						
1161					WDR23	
1162	ENSG00000165280			VBP1		
1163	ENSG00000073905					
1164	ENSG00000078668		VDAC3			
1165		VGLL4				
1166						
1167						
1168						
1169	ENSG00000167987					
1170						
1171						
1172		VPS26				
1173						VPS54
1174	ENSG00000105053			VRK3		
1175						
1176						
1177						
1178						
1179						
1180						
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1183						

Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
1184	ENSG00000109685					
1185						
1186				WSB1		
1187	ENSG00000146457			WTAP		
1188						
1189	ENSG00000115254					
1190						
1191	ENSG00000169180					
1192						
1193						
1194			YTHDF1	YTHDF1		
1195						
1196						
1197						YWHAB
1198						
1199					YWHAH	
1200	ENSG00000134308	YWHAQ				
1201						
1202		YY1		YY1		
1203						
1204				ZA20D3		
1205		ZBTB11				
1206						
1207						
1208						
1209						
1210				ZFP36L1		
1211		ZFP36L2				
1212		ZMYND11				
1213	ENSG00000010244					
1214		ZNF146				
1215		ZNF148				
1216						ZNF160
1217		ZNF161			ZNF161	
1218						
1219						
1220		ZNF238		ZNF238		
1221						
1222						
1223						
1224						
1225						
1226						
1227						
1228						
1229						

Figure 12, con'd

	A	F	G	H	I	J
1		**miR-20**	**miR-23a**	**miR-23b**	**miR-24**	**miR-25**
1230	ENSG00000036549			ZZZ3		

Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
2	ENSG00000145495					
3	ENSG00000136536					
4	ENSG00000165406					
5	ENSG00000168385					
6	ENSG00000125354					
7	ENSG00000122545					
8	ENSG00000138758					
9	ENSG00000111780					
10	ENSG00000137822					
11	ENSG00000165029	ABCA1				
12	ENSG00000125257	ABCC4				
13	ENSG00000114770				ABCC5	ABCC5
14	ENSG00000161533					
15	ENSG00000151726			ACSL1		
16	ENSG00000075624					
17	ENSG00000184009					
18	ENSG00000136518			ACTL6A	ACTL6A	ACTL6A
19	ENSG00000072110			ACTN1	ACTN1	
20	ENSG00000138071					
21	ENSG00000115091		ACTR3			
22	ENSG00000137845					
23	ENSG00000138031					
24	ENSG00000087274					
25	ENSG00000148700					
26	ENSG00000101126	ADNP	ADNP			
27	ENSG00000173020	ADRBK1				
28	ENSG00000172493	AFF1				
29	ENSG00000168448	AGPAT5				
30	ENSG00000155189					
31	ENSG00000168710					
32	ENSG00000004455					
33	ENSG00000108599					
34	ENSG00000023516					
35	ENSG00000170776					
36	ENSG00000151320	AKAP6				
37	ENSG00000117020					
38	ENSG00000170017					
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Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
48	ENSG00000177879					AP3S1
49	ENSG00000120868					
50	ENSG00000144848					APG3L
51	ENSG00000101844					
52	ENSG00000084234					
53	ENSG00000142192					
54	ENSG00000062725					
55	ENSG00000095139					
56	ENSG00000143761	ARF1	ARF1			
57	ENSG00000134287					
58	ENSG00000168374					
59	ENSG00000165527					
60	ENSG00000175220					
61	ENSG00000137962					
62	ENSG00000104880					
63	ENSG00000129675			ARHGEF6		ARHGEF6
64	ENSG00000117713	ARID1A		ARID1A	ARID1A	ARID1A
65	ENSG00000054267					
66	ENSG00000177479					
67	ENSG00000134108					
68	ENSG00000110025					
69	ENSG00000138175					
70	ENSG00000170540					
71	ENSG00000188042	ARL7				
72	ENSG00000163466	ARPC2	ARPC2			
73	ENSG00000136950					
74	ENSG00000128989	ARPP-19				
75	ENSG00000111875					
76	ENSG00000116539					
77	ENSG00000171456	ASXL1				
78	ENSG00000143970					
79	ENSG00000123268					
80	ENSG00000149311	ATM				
81	ENSG00000163399					
82	ENSG00000143153					
83	ENSG00000174437					
84	ENSG00000017260	ATP2C1				
85						
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Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
94	ENSG00000198604					
95	ENSG00000119866	BCL11A		BCL11A	BCL11A	BCL11A
96	ENSG00000171791					
97	ENSG00000029363					
98	ENSG00000105829					
99	ENSG00000134107	BHLHB2	BHLHB2			
100	ENSG00000138756					
101	ENSG00000104765					
102	ENSG00000060762					
103	ENSG00000160058					
104	ENSG00000095564					
105	ENSG00000145741					
106	ENSG00000133639	BTG1				
107	ENSG00000159388					
108	ENSG00000154640					
109	ENSG00000082153					
110	ENSG00000136261					
111	ENSG00000181915					
112	ENSG00000119906					
113	ENSG00000110075					C11orf23
114	ENSG00000171067	C15orf24				
115	ENSG00000139746			C13orf10	C13orf10	C13orf10
116	ENSG00000133935					
117	ENSG00000168175					
118	ENSG00000134153		C15orf24			C20orf24
119	ENSG00000152242	C18orf25				
120	ENSG00000141452					
121	ENSG00000105176					
122	ENSG00000163875					
123	ENSG00000163444					
124	ENSG00000117616					
125	ENSG00000108561					
126	ENSG00000110888					
127	ENSG00000132823					
128	ENSG00000101084	C20orf24		C20orf24		
129	ENSG00000101166					
130	ENSG00000126749					
131						
132						
133						
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137						
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139						

Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
140	ENSG00000136819					
141	ENSG00000136925					
142	ENSG00000074410					
143	ENSG00000104267					
144	ENSG00000135932					
145	ENSG00000104327					
146	ENSG00000179218					
147	ENSG00000127022					CANX
148	ENSG00000131236					
149	ENSG00000135837	CAP350				
150	ENSG00000116489	CAPZA1			CAPZA1	
151	ENSG00000198898					
152	ENSG00000077549	CAPZB	CAPZB			
153	ENSG00000168564					
154	ENSG00000142453	CARM1				
155	ENSG00000110619					
156	ENSG00000108349					
157	ENSG00000153113			CAST		
158	ENSG00000130940					
159	ENSG00000067955	CBFB				
160	ENSG00000108468					
161	ENSG00000100261					CBX6
162	ENSG00000112237					
163	ENSG00000118971	CCND2				
164	ENSG00000112576					
165	ENSG00000113328					
166	ENSG00000138764					
167	ENSG00000134480					
168	ENSG00000118816					
169	ENSG00000163660				CCNL1	CCNL1
170	ENSG00000082258		CCNT2			CCNT2
171	ENSG00000166226					
172	ENSG00000163468					
173	ENSG00000135535	CD164				
174	ENSG00000174059					
175	ENSG00000196776					
176	ENSG00000110848					
177						
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Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
186	ENSG00000143126			CELSR2		
187						
188	ENSG00000153140					
189	ENSG00000153774					
190	ENSG00000172757					
191	ENSG00000163320					
192	ENSG00000153922					CHD1
193	ENSG00000111642					
194	ENSG00000177200					
195	ENSG00000072609	CHFR	CHFR			
196	ENSG00000110172	CHORDC1				
197	ENSG00000131873	CHSY1				
198	ENSG00000109572					
199	ENSG00000113240					
200	ENSG00000122705					
201	ENSG00000141367	CLTC				
202	ENSG00000162368	CMPK				
203	ENSG00000100528	CNIH	CNIH			
204	ENSG00000125107					
205	ENSG00000111596					CNOT2
206	ENSG00000198791					
207	ENSG00000121058					
208	ENSG00000129083					
209	ENSG00000166200	COPS2	COPS2			
210	ENSG00000141030					
211	ENSG00000138663					
212	ENSG00000110880					
213	ENSG00000178741	COX5A				
214	ENSG00000135940					
215	ENSG00000115944					
216	ENSG00000111605					
217	ENSG00000118260					
218	ENSG00000005339	CREBBP	CREBBP			
219	ENSG00000111269					
220	ENSG00000145708					
221						
222	ENSG00000099942					CRKL
223						
224						
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226						
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229						
230						
231						

Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
232	ENSG00000175215			CTDSP2	CTDSP2	
233	ENSG00000168036					
234	ENSG00000198561					
235	ENSG00000171793					
236	ENSG00000149187	CUGBP1	CUGBP1			
237	ENSG00000048740	CUGBP2				
238	ENSG00000036257					
239	ENSG00000166266					
240	ENSG00000160967					
241	ENSG00000121966					
242	ENSG00000166347					
243	ENSG00000008283				CYB561	
244	ENSG00000172115					
245	ENSG00000083799					
246	ENSG00000140181					
247	ENSG00000165659					
248	ENSG00000196730	DAPK1				
249	ENSG00000071626					
250	ENSG00000183283					
251	ENSG00000137992					
252	ENSG00000172795					
253	ENSG00000085788					
254	ENSG00000168209			DDIT4	DDIT4	DDIT4
255	ENSG00000124487	DDX3X				
256	ENSG00000067048	DDX3Y				
257	ENSG00000108654	DDX5	DDX5			
258	ENSG00000141141					
259	ENSG00000158796					
260	ENSG00000124795					
261	ENSG00000139726					
262	ENSG00000155792	DEPDC6				
263	ENSG00000136986					
264	ENSG00000109606	DHX15				
265	ENSG00000132153			DHX30		
266	ENSG00000108406					
267	**ENSG00000100697**	DICER1				
268						
269						
270						
271						
272						
273						

Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
274	ENSG00000158486					
275	ENSG00000086061					
276	ENSG00000132002					
277	ENSG00000105993					
278	ENSG00000128590					
279	ENSG00000077380					
280	ENSG00000074603					
281	ENSG00000092964	DPYSL2		DPYSL2		
282	ENSG00000117505					
283	ENSG00000167264					
284	ENSG00000143507					
285	ENSG00000139318					
286	ENSG00000004975					
287	ENSG00000161202					
288	ENSG00000157540	DYRK1A				
289	**ENSG00000112242**					
290	ENSG00000147654					
291	ENSG00000104517					
292	ENSG00000198121					
293	ENSG00000156508					
294	ENSG00000124802					
295	ENSG00000186676					
296	ENSG00000183690					
297	ENSG00000142634			EFHD2		EFHD2
298	ENSG00000171570					
299	ENSG00000120738					
300	ENSG00000110047	EHD1				
301						
302	ENSG00000092847				EIF2C1	EIF2C1
303	ENSG00000123908					
304	ENSG00000134001					
305	ENSG00000104131		EIF3S1			
306	ENSG00000107581					
307	ENSG00000156976		EIF4A2			
308	ENSG00000063046					
309	ENSG00000151247					
310	ENSG00000135930					
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Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
318	ENSG00000102034					
319	ENSG00000111145					
320	ENSG00000155849					
321	ENSG00000062598					
322	ENSG00000012660					
323	ENSG00000170522					
324	ENSG00000143420					
325	ENSG00000120533					ENY2
326	ENSG00000120616	EPC1	EPC1	EPC1	EPC1	EPC1
327	ENSG00000050405					
328	ENSG00000085832					
329	ENSG00000124882					
330	ENSG00000157554			ERG		ERG
331	ENSG00000120705	ETF1	ETF1	ETF1	ETF1	ETF1
332	ENSG00000157557					
333	ENSG00000182944					EWSR1
334	ENSG00000120699		EXOSC8			
335	ENSG00000108799					
336	ENSG00000106462	EZH2	EZH2			
337	ENSG00000124491					
		FAM45B ///				
338	ENSG00000119979	FAM45A				
339	ENSG00000153310	FAM49B				
340	ENSG00000139146					
341	ENSG00000105216					
342	ENSG00000179115					
343	ENSG00000166147			FBN1	FBN1	
344	ENSG00000173120					
345	ENSG00000118564					
346	ENSG00000138081	FBXO11	FBXO11			
347						FOXO1A
348	ENSG00000143756	FBXO28				
349	ENSG00000178974			FBXO34		
350	ENSG00000037637	FBXO42				
351	ENSG00000112146					
352	ENSG00000119402					
353	ENSG00000068078					
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Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
363	ENSG00000159202					
364	ENSG00000153561					
365	ENSG00000181495					
366	ENSG00000175606	FLJ20533				
367	ENSG00000136122					
368	ENSG00000132589					
369	ENSG00000196504					
370						
371	ENSG00000170345					
372	ENSG00000125740					
373	ENSG00000137273					
374	ENSG00000198815					
375	ENSG00000150907					
376	ENSG00000118689					
377	ENSG00000114861	**FOXP1**	**FOXP1**			
378	ENSG00000165879					
379	ENSG00000163430					
380	ENSG00000114416					
381	ENSG00000145907					G3BP
382	ENSG00000138757	G3BP2				
383	ENSG00000034713					
384	ENSG00000104064					
385	ENSG00000116717					
386	ENSG00000141429					GALNT1
387	ENSG00000143641					
388	ENSG00000109586			GALNT7	GALNT7	GALNT7
389	ENSG00000165219					
390	ENSG00000179348					
391	ENSG00000107485					
392	ENSG00000146729					
393	ENSG00000001084			GCLC	GCLC	GCLC
394	ENSG00000057608					
395	ENSG00000100083					
396	ENSG00000165678					
397	ENSG00000108588					
398	ENSG00000115419					
399	ENSG00000196700					
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Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
409	ENSG00000185245					
410	ENSG00000159592					
411	ENSG00000112414					
412	ENSG00000106070	GRB10	GRB10			
413	ENSG00000103342	GSPT1	GSPT1			
414	ENSG00000140307					
415	ENSG00000110768	GTF2H1				
416	ENSG00000077809					
417	ENSG00000115207	GTF3C2				
418	ENSG00000188486	H2AFZ	H2AFZ			
419						
420	ENSG00000091527					
421	ENSG00000112339					
422	ENSG00000172534					
423	ENSG00000180353					
424	ENSG00000116478					
425	ENSG00000143321					
426	ENSG00000166503					
427	ENSG00000013583					
428	ENSG00000112406					
429	ENSG00000103657					
430	ENSG00000128731					
431	ENSG00000051108					
432	ENSG00000114315	**HES1**	HES1			
433	ENSG00000164683					
434	ENSG00000152804					
435	ENSG00000100644					
436	ENSG00000181061					
437	ENSG00000078140					
438	ENSG00000163349	HIPK1				
439	ENSG00000010818					
440	ENSG00000137361					
441	ENSG00000100281					
442	ENSG00000189403					
443	ENSG00000164104					
444	ENSG00000029993		HMGB3			
445		HMGN3				
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Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
455	ENSG00000096746		HNRPH3	HNRPH3		
456	ENSG00000165119					
457	ENSG00000104824					
458	ENSG00000099783			HNRPM	HNRPM	HNRPM
459	ENSG00000125944					
460	ENSG00000153187					
461	ENSG00000105323	HNRPUL1				
462	ENSG00000010295					
463	ENSG00000106004	**HOXA5**	**HOXA5**			
464	ENSG00000078399			**HOXA9**		
465	ENSG00000120075					
466	ENSG00000120087					
467	ENSG00000153807			**HOXA10**	**HOXA10**	
468	ENSG00000173744					
469	ENSG00000074356				HSA277841	
470	ENSG00000164164	HSHIN1				
471	ENSG00000044574					HSPA5
472	ENSG00000109971					
473	ENSG00000144381				HSPD1	
474	ENSG00000120694			HSPH1		
475	ENSG00000136478			HT008		
476	ENSG00000086758	HUWE1				
477	ENSG00000108622					
478	ENSG00000067829		IDH3G			
479	ENSG00000109083					
480	ENSG00000068745					
481	ENSG00000070061					
482	ENSG00000129351					
483	ENSG00000105135					
484	ENSG00000153487					
485	ENSG00000168556					
486	ENSG00000071243	ING3				
487	ENSG00000068383					
488	ENSG00000148384					
489	ENSG00000186480					
490	ENSG00000171105					
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Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
500	ENSG00000078596					
501	ENSG00000116679					
502	ENSG00000184916					
503	ENSG00000117139					
504	ENSG00000008083	JARID2				
505	ENSG00000115548					JMJD1A
506	ENSG00000171988					
507	ENSG00000177606					
508	ENSG00000137944					
509	ENSG00000170852					
510	ENSG00000176407					
511	ENSG00000055118					
512	ENSG00000136240					
513	ENSG00000121774					
514	ENSG00000088247					
515	ENSG00000131149					
516	ENSG00000179889					
517	ENSG00000136813					
518	ENSG00000145725					
519	ENSG00000143702					
520	ENSG00000119321					
521	ENSG00000197226					
522	ENSG00000126775					
523	ENSG00000164151	KIAA0947				
524	ENSG00000105063					
525	ENSG00000126814					
526	ENSG00000156232					
527	ENSG00000170759					
528	ENSG00000157404					
529	ENSG00000127528					
530	ENSG00000136826	**KLF4**				
531	ENSG00000067082					
532	ENSG00000155090	**KLF10**			**KLF10**	
533	ENSG00000165516					
534	ENSG00000114030					
535	ENSG00000102753	KPNA3		KPNA3	KPNA3	KPNA3
536	ENSG00000108424					
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Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
546	ENSG00000143815					LBR
547	ENSG00000157978					
548	ENSG00000065548			LEREPO4	LEREPO4	LEREPO4
549	ENSG00000100097					
550	ENSG00000148943				LIN7C	
551	ENSG00000189067					
552	ENSG00000166783					
553	ENSG00000160789					
554	ENSG00000113368					
555	ENSG00000135363					
556	ENSG00000111252					
557	ENSG00000152102					
558	ENSG00000120963					
559	ENSG00000102897					
560	ENSG00000121104					
561	ENSG00000123684					
562	ENSG00000145012	LPP	LPP			
563	ENSG00000110031					
564	ENSG00000077454					
565	ENSG00000198799					
566	ENSG00000171492					
567	ENSG00000124831					
568	ENSG00000175324					
569	ENSG00000146963					
570	ENSG00000054219					
571	ENSG00000120992					
572	ENSG00000011009					
573	ENSG00000163818					
574	ENSG00000135387		M11S1			
575	ENSG00000003056					
576	ENSG00000143033					
577	ENSG00000127603	MACF1	MACF1			
578	ENSG00000110514					
579	ENSG00000187391					
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Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
589	ENSG00000047849					
590	ENSG00000104814					
591	ENSG00000012983					
592	ENSG00000135525	MAP7				
593	ENSG00000100030					
594	ENSG00000112062					
595	ENSG00000101367					
596	ENSG00000166974			MAPRE2	MAPRE2	MAPRE2
597	ENSG00000175130					
598	ENSG00000075413					
599	ENSG00000166986	MARS				
600	ENSG00000168906			MAT2A	MAT2A	MAT2A
601	ENSG00000038274					
602	ENSG00000015479	MATR3				
603	ENSG00000125952					
604	ENSG00000134046					
605	ENSG00000152601					
606	ENSG00000180398					
607	ENSG00000121940					
608	ENSG00000112118					
609	ENSG00000082212					
610	ENSG00000124733					
611	ENSG00000081189					
612	ENSG00000143995					
613	ENSG00000133895					
614	ENSG00000164024					
615	ENSG00000168282					
616	ENSG00000138092					
617	ENSG00000133858	MGC23401				
618	ENSG00000198408					
619	ENSG00000079277					
620	ENSG00000133606					
621	ENSG00000089693			MLF2	MLF2	
622	**ENSG00000171843**					
623	ENSG00000108788	MLX	MLX			
624	ENSG00000056586					
625	ENSG00000165943					
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Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
635	ENSG00000125445					
636	ENSG00000005302					
637	ENSG00000147065					
638	ENSG00000182979					MTA1
639	ENSG00000147649	MTDH		MTDH	MTDH	MTDH
640	ENSG00000143033					
641	ENSG00000100330					
642	ENSG00000108389	MTMR4	MTMR4			
643	ENSG00000170873	MTSS1	MTSS1			
644	ENSG00000128654	MTX2				
645	ENSG00000118513					
646	ENSG00000005810			MYCBP2	MYCBP2	MYCBP2
647	ENSG00000133026					
648	ENSG00000136504					
649	ENSG00000102921					
650	ENSG00000138386	NAB1				
651	ENSG00000187109					
652	ENSG00000132780					
653	ENSG00000158747					
654	ENSG00000115053					
655	ENSG00000198646					
656	ENSG00000196498					
657	ENSG00000166579			NDEL1		
658	ENSG00000131507					
659	ENSG00000125356					
660	ENSG00000189043	NDUFA4				
661						
662	ENSG00000069869					
663	ENSG00000173848					
664	ENSG00000082641					
665	ENSG00000116044					
666	ENSG00000050344	NFE2L3				
667	ENSG00000120837	NFYB	NFYB	NFYB	NFYB	NFYB
668	ENSG00000066136					
669	ENSG00000166681					
670	ENSG00000140157					
671	ENSG00000164190	NIPBL	NIPBL			
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Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
681	ENSG00000106459					
682	ENSG00000180530	NRIP1	NRIP1			
683	ENSG00000035681					
684	ENSG00000137497	NUMA1	NUMA1			
685	ENSG00000124789	NUP153				
686	ENSG00000162231					
687	ENSG00000101888					
688	ENSG00000065154	OAT				
689	ENSG00000115758					
690	ENSG00000046651					
691	ENSG00000147162	OGT			OGT	
692	ENSG00000182606					
693	ENSG00000141447					
694	ENSG00000091039					
695	ENSG00000117859	OSBPL9				
696	ENSG00000167770					
697	ENSG00000172939					
698	ENSG00000170515					
699	ENSG00000070756					
700	ENSG00000151846					
701	ENSG00000090621					
702	ENSG00000100836					
703	ENSG00000100266	PACSIN2	PACSIN2			
704	ENSG00000172239					
705	ENSG00000142864	PAI-RBP1				
706	ENSG00000180370	PAK2	PAK2			
707	ENSG00000157654					
708	ENSG00000145730					
709	ENSG00000090060					
710	ENSG00000115421					
711	ENSG00000177425					PAWR
712	ENSG00000157212					PBEF1
713	ENSG00000105835	PBEF1	PBEF1			
714	ENSG00000113387					
715	ENSG00000169564					
716	ENSG00000197111					
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Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
726	ENSG00000150593					
727	ENSG00000184588	PDE4B				
728	ENSG00000145431					
729	ENSG00000168291					
730	ENSG00000065485					
731	ENSG00000143870					
732	ENSG00000162734					
733	ENSG00000197329					
734	ENSG00000132326					
735	ENSG00000152556					
736	ENSG00000067057					
737	ENSG00000164040	PGRMC2				
738	ENSG00000167085					
739	ENSG00000112511					
740	ENSG00000130024					
741	ENSG00000043143					
742	ENSG00000025293					
743	ENSG00000118482	PHF3	PHF3			
744	ENSG00000033800					
745	ENSG00000073921					
746	ENSG00000166037		PIG8			
747	ENSG00000051382		PIK3CB			
748	ENSG00000145675	PIK3R1				
749	ENSG00000137193	PIM1	PIM1			
750	ENSG00000102096					
751	ENSG00000107242					
752	ENSG00000154217	PITPNC1				
753	ENSG00000181191	PJA1	PJA1			
754	ENSG00000171033					
755	ENSG00000118495					
756	ENSG00000052126					
757	ENSG00000115762					
758	ENSG00000104886					
759	ENSG00000152952	PLOD2				
760	ENSG00000102024					
761	ENSG00000136040				PLXNC1	PLXNC1
762	ENSG00000004399	PLXND1	PLXND1			
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Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
772	ENSG00000163806					
773	ENSG00000186298					
774	ENSG00000112498					
775	ENSG00000058272					
776	ENSG00000113575					
777	ENSG00000104695					
778	ENSG00000104762					
779	ENSG00000078304	PPP2R5C	PPP2R5C			
780	ENSG00000154001					
781	ENSG00000138814	PPP3CA				
782	ENSG00000107758	PPP3CB				
783	ENSG00000154845	PPP4R1				
784	ENSG00000119414					
785	ENSG00000131238	PPT1	PPT1			
786	ENSG00000116731					
787	ENSG00000110851					
788	ENSG00000138073					
789	ENSG00000122862					
790	ENSG00000142875					
791	ENSG00000005249					
792	ENSG00000166501					
793	ENSG00000101040					
794	ENSG00000115825					
795	ENSG00000137492					
796	ENSG00000185246					
797	ENSG00000147224					
798	ENSG00000197746					
799	ENSG00000129084					
800	ENSG00000106588					
801	ENSG00000143106					
802	ENSG00000100519					
803	ENSG00000108344					
804	ENSG00000125818					
805	ENSG00000121390					
806	ENSG00000117569	PTBP2				
807	ENSG00000138430					
808	ENSG00000171862	PTEN				
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Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
818	ENSG00000130508					PXDN
819	ENSG00000112531	QKI	QKI	QKI	QKI	
820	ENSG00000048991			R3HDM	R3HDM	R3HDM
821	ENSG00000103769	RAB11A				RAB11A
822	ENSG00000119396					
823	ENSG00000138069			RAB1A	RAB1A	RAB1A
824	ENSG00000080371					
825	ENSG00000111737					
826	ENSG00000144566					
827	ENSG00000111540					
828	ENSG00000175582					
829	ENSG00000075785				RAB7	
830	ENSG00000167461					
831	ENSG00000152061					
832	ENSG00000136238					
833	ENSG00000152942					
834	ENSG00000164754					
835	ENSG00000119318		RAD23B	RAD23B	RAD23B	RAD23B
836	ENSG00000108175					
837	ENSG00000017797	RALBP1	RALBP1			
838	ENSG00000132341					
839	ENSG00000153201	RANBP9				
840	ENSG00000065150					
841	ENSG00000137040					
842	ENSG00000010017		RANBP9			
843	ENSG00000116473	RAP1A				
844	ENSG00000127314			RAP1B	RAP1B	
845	ENSG00000138698					
846	ENSG00000181467					
847	ENSG00000109756		RAPGEF2		RAPGEF2	
848	ENSG00000077092					
849	ENSG00000145715			RASA1		RASA1
850	ENSG00000101265					
851	ENSG00000139687	RB1	RB1			
852	ENSG00000023287					
853	ENSG00000122257					
854	ENSG00000102054	RBBP7	RBBP7			
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Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
864	ENSG00000136144	RCBTB1				
865	ENSG00000049449	RCN1				
866	ENSG00000117906					
867	ENSG00000089902	RCOR1				
868	ENSG00000137710					
869	ENSG00000173039					
870	ENSG00000157916					
871	ENSG00000142599					
872	ENSG00000056687					
873	ENSG00000090104					
874	ENSG00000171700		RGS19			
875	ENSG00000106615			RHEB	RHEB	RHEB
876	ENSG00000067560					
877	ENSG00000177105					
878	ENSG00000119729					
879	ENSG00000126858					
880	ENSG00000101782					
881	ENSG00000176624	RKHD2				
882	ENSG00000022840					
883	ENSG00000123091	RNF11	RNF11	RNF11	RNF11	
884	ENSG00000082996					
885	ENSG00000134758	RNF138				
886	ENSG00000170881					
887	ENSG00000170633					
888	ENSG00000137075		RNF38			
889	ENSG00000063978					
890	ENSG00000127870	RNF6				
891	ENSG00000131051	RNPC2				
892	ENSG00000167971					
893	ENSG00000043093					
894	ENSG00000132383					
895	ENSG00000117748					
896	ENSG00000153574			RPIA	RPIA	
897	ENSG00000144713					
898	ENSG00000163902					
899	ENSG00000171858					
900	ENSG00000143947					
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Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
910	ENSG00000020633					
911	ENSG00000163602	RYBP	RYBP		RYBP	
912	ENSG00000163785	RYK				
913	ENSG00000198838					
914	ENSG00000160633					
915	ENSG00000130254					
916	ENSG00000136715					
917	ENSG00000079332					
918	ENSG00000130066					
919	ENSG00000182568			SATB1	SATB1	
920	ENSG00000052802					
921	ENSG00000085365			SCAMP1		
922	ENSG00000140497					
923	ENSG00000138760					
924	ENSG00000121892					
925	ENSG00000151967					
926	ENSG00000010803					
927	ENSG00000137575					
928	ENSG00000156642					
929	ENSG00000140612					
930	ENSG00000155878					
931	ENSG00000121542			SEC22L2		
932	ENSG00000107651					
933	ENSG00000138802					
934	ENSG00000075223					
935	ENSG00000168758		SEMA4C		SEMA4C	
936	ENSG00000092421	SEMA6A	SEMA6A			
937	ENSG00000122545			7-Sep	7-Sep	SEPT7
938	ENSG00000120742	SERP1				
939	ENSG00000179833					
940	ENSG00000080546					
941	ENSG00000119335					
942	ENSG00000115524			SF3B1		SF3B1
943	ENSG00000116560					
944	ENSG00000136450				SFRS1	
945				SFRS2	SFRS2	
946						
947						
948						
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955						

Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
956	ENSG00000116350	SFRS4	SFRS4			
957	ENSG00000100650					
958	ENSG00000124193					
959	ENSG00000115875					
960	ENSG00000198730					
961	ENSG00000162105					
962	ENSG00000182199					
963	ENSG00000108061					
964	ENSG00000196470					
965	ENSG00000096717				SIRT1	
966	ENSG00000124523					
967	ENSG00000113558					SKP1A
968	ENSG00000155926					
969	ENSG00000165646					
970	ENSG00000004864					
971	ENSG00000122912	SLC25A16	SLC25A16			
972	ENSG00000178537	SLC25A20	SLC25A20			
973	ENSG00000075415					
974	ENSG00000147454					
975	ENSG00000005022					
976	ENSG00000117394					
977	ENSG00000059804			SLC2A3	SLC2A3	SLC2A3
978	ENSG00000134294	SLC38A2	SLC38A2			
979	ENSG00000138821					
980	ENSG00000080493	SLC4A4				
981	ENSG00000175387	SMAD2				
982	ENSG00000112305			SMAP1	SMAP1	SMAP1
983	ENSG00000102038					
984						
985	ENSG00000127616					
986	ENSG00000173473					
987	ENSG00000073584					
988	ENSG00000077147					SMBP
989	ENSG00000072501					
990	ENSG00000102172					
991	ENSG00000145335					
992	ENSG00000184602	SNN				
993						
994						
995						
996						
997						
998						
999						
1000						
1001						

Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
1002	ENSG00000124766	SOX4	SOX4	SOX4	SOX4	SOX4
1003	ENSG00000067066					
1004	ENSG00000172845					
1005	ENSG00000091640					
1006	ENSG00000008294		SPAG9			
1007	ENSG00000113140					
1008	ENSG00000065526					
1009	ENSG00000095480	SPFH1	SPFH1	SPFH1	SPFH1	
1010	ENSG00000147475					
1011	ENSG00000152268					
1012						
1013	ENSG00000164056					
1014	ENSG00000115306	SPTBN1	SPTBN1			
1015	ENSG00000090054					
1016	ENSG00000100596					
1017	ENSG00000116649					
1018	ENSG00000153037	SRP19	SRP19			
1019	ENSG00000096063	SRPK1	SRPK1			
1020	ENSG00000135250					
1021	ENSG00000124783		SSR1			
1022	ENSG00000149136					
1023	ENSG00000101972			STAG2	STAG2	
1024	ENSG00000084090					
1025	**ENSG00000168610**					
1026	ENSG00000173757					
1027	ENSG00000167323					
1028	ENSG00000166301					
1029	ENSG00000102572					
1030	ENSG00000112079					
1031	ENSG00000198648	STK39				
1032	ENSG00000117632	STMN1				
1033	ENSG00000165283	STOML2	STOML2			
1034	ENSG00000124222					
1035	ENSG00000168952					
1036	ENSG00000173812					
1037	ENSG00000116030					
1038	ENSG00000180283					SUMO2
1039						
1040						
1041						
1042						
1043						
1044						
1045						
1046						
1047						

Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
1048	ENSG00000120948				TARDBP	
1049						
1050						
1051				TBPL1		
1052						
1053						
1054	ENSG00000113649					
1055		TCF12				
1056					TCF20	
1057						
1058						
1059						
1060						
1061						TENS1
1062						
1063						
1064					TEX261	TEX261
1065	ENSG00000198176					
1066						TFDP2
1067				TFRC	TFRC	
1068						
1069						
1070	ENSG00000123066	THRAP2				
1071	ENSG00000116001					TIA1
1072						
1073						
1074						
1075						
1076						
1077		TM9SF1				
1078	ENSG00000101337					
1079	ENSG00000062716					
1080		TMP21	TMP21	TMP21	TMP21	TMP21
1081	ENSG00000120802					
1082						
1083						
1084						
1085						
1086						
1087						
1088						
1089						
1090						
1091						
1092						

Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
1093	ENSG00000111669					
1094	ENSG00000140416					
1095						
1096						
1097						
1098						
1099	ENSG00000166326					
1100						
1101	ENSG00000043514					
1102						
1103						
1104		TSC1				
1105	ENSG00000102804					
1106	ENSG00000157514			TSC22D3	TSC22D3	
1107	ENSG00000163084	TSN				
1108						
1109	ENSG00000143367					
1110	ENSG00000139921					
1111			TXNL1			
1112						
1113				U2AF2	U2AF2	U2AF2
1114						
1115	ENSG00000077721	UBE2A	UBE2A			
1116						
1117	ENSG00000131508	UBE2D2	UBE2D2			UBE2D2
1118		UBE2D3				
1119						
1120						
1121		UBE2G1				
1122	ENSG00000103275			UBE2I	UBE2I	UBE2I
1123						
1124	ENSG00000185651	UBE2L3				
1125						
1126						
1127		UBE2V1				
1128	ENSG00000114062	UBE3A	UBE3A			
1129						
1130						
1131						
1132						
1133						
1134						
1135						
1136						
1137						

Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
1138	ENSG00000164828					
1139	ENSG00000100242					
1140						
1141						USP1
1142	ENSG00000152484					
1143	ENSG00000101557					
1144		USP15		USP15	USP15	
1145						
1146	ENSG00000077254					
1147	ENSG00000115464	USP34				
1148						
1149		USP48				
1150						
1151	ENSG00000173218					
1152	ENSG00000101558					VAPA
1153	ENSG00000124164					
1154						
1155		VAMP4				
1156						
1157						
1158						VAT1
1159						
1160						
1161						
1162	ENSG00000165280			VCP		VCP
1163	ENSG00000073905					
1164	ENSG00000078668					
1165						
1166						
1167						
1168						
1169	ENSG00000167987					
1170						
1171						
1172						
1173						
1174	ENSG00000105053					
1175						
1176						
1177						
1178						
1179						
1180						
1181						
1182						
1183						

Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
1184	ENSG00000109685					
1185						
1186						
1187	ENSG00000146457					
1188						
1189	ENSG00000115254					
1190						
1191	ENSG00000169180					
1192						
1193						
1194						
1195						
1196						
1197						
1198		YWHAE				
1199						
1200	ENSG00000134308					
1201						
1202						
1203					ZA20D2	ZA20D2
1204		ZA20D3		ZA20D3	ZA20D3	
1205						
1206						
1207		ZDHHC6				
1208						
1209						
1210						
1211			ZFP36L2	ZFP36L2		ZFP36L2
1212						
1213	ENSG00000010244		ZNF207			
1214						
1215						
1216						
1217						
1218						
1219						
1220		ZNF238	ZNF238			ZNF238
1221						
1222						
1223						
1224						
1225						
1226						
1227						
1228						
1229						

Figure 12, con'd

	A	K	L	M	N	O
1		**miR-26a**	**miR-26b**	**miR-30b**	**miR-30c**	**miR-30d**
1230	ENSG00000036549					

Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
2	ENSG00000145495					
3	ENSG00000136536					
4	ENSG00000165406			8-Mar		
5	ENSG00000168385			2-Sep		
6	ENSG00000125354					
7	ENSG00000122545					
8	ENSG00000138758					
9	ENSG00000111780			15E1.2		
10	ENSG00000137822					
11	ENSG00000165029			ABCA1		
12	ENSG00000125257					
13	ENSG00000114770					
14	ENSG00000161533					
15	ENSG00000151726					
16	ENSG00000075624					
17	ENSG00000184009					
18	ENSG00000136518					
19	ENSG00000072110					
20	ENSG00000138071					
21	ENSG00000115091					
22	ENSG00000137845		ADAM10			
23	ENSG00000138031	ADCY3	ADCY3			
24	ENSG00000087274		ADD1			
25	ENSG00000148700					
26	ENSG00000101126					
27	ENSG00000173020					
28	ENSG00000172493					
29	ENSG00000168448					
30	ENSG00000155189					
31	ENSG00000168710					
32	ENSG00000004455					AK2
33	ENSG00000108599					
34	ENSG00000023516					
35	ENSG00000170776					AKAP13
36	ENSG00000151320					AKAP6
37	ENSG00000117020			AKT3		AKT3
38	ENSG00000170017					
39						
40						
41						
42						
43						
44						
45						

Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
48	ENSG00000177879					
49	ENSG00000120868					
50	ENSG00000144848					
51	ENSG00000101844					
52	ENSG00000084234					
53	ENSG00000142192			APP		APP
54	ENSG00000062725					
55	ENSG00000095139					
56	ENSG00000143761		ARF1			
57	ENSG00000134287					
58	ENSG00000168374					
59	ENSG00000165527					
60	ENSG00000175220					
61	ENSG00000137962			ARHGAP29		
62	ENSG00000104880			ARHGEF18		
63	ENSG00000129675					
64	ENSG00000117713	ARID1A				
65	ENSG00000054267			ARID4B		
66	ENSG00000177479					
67	ENSG00000134108					
68	ENSG00000110025					
69	ENSG00000138175					
70	ENSG00000170540					
71	ENSG00000188042					
72	ENSG00000163466		ARPC2			
73	ENSG00000136950					
74	ENSG00000128989					
75	ENSG00000111875			ASF1A		
76	ENSG00000116539					
77	ENSG00000171456					
78	ENSG00000143970			ASXL2		
79	ENSG00000123268					
80	ENSG00000149311					
81	ENSG00000163399		ATP1B1			
82	ENSG00000143153					
83	ENSG00000174437	ATP2A2	ATP2A2			
84	ENSG00000017260			ATP2C1		
85						
86						
87						
88						
89						
90						
91						
92						
93						

Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
94	ENSG00000198604					
95	ENSG00000119866		BCL11A	BCL11A		
96	ENSG00000171791					
97	ENSG00000029363					
98	ENSG00000105829					
99	ENSG00000134107					
100	ENSG00000138756					
101	ENSG00000104765					
102	ENSG00000060762			BRP44L		
103	ENSG00000160058					
104	ENSG00000095564					
105	ENSG00000145741					
106	ENSG00000133639			BTG1		
107	ENSG00000159388	BTG2	BTG2			BTG2
108	ENSG00000154640					
109	ENSG00000082153					
110	ENSG00000136261					
111	ENSG00000181915					
112	ENSG00000119906					
113	ENSG00000110075			C11orf23		
114	ENSG00000171067		C11orf24			
115	ENSG00000139746		C13orf10			
116	ENSG00000133935					
117	ENSG00000168175					
118	ENSG00000134153					
119	ENSG00000152242		C18orf25	C18orf25		
120	ENSG00000141452			C18orf8		
121	ENSG00000105176					
122	ENSG00000163875					
123	ENSG00000163444					
124	ENSG00000117616		C1orf63			
125	ENSG00000108561					
126	ENSG00000110888			C1QDC1		
127	ENSG00000132823		C20orf111			
128	ENSG00000101084					
129	ENSG00000101166					
130	ENSG00000126749					
131						
132						
133						
134						
135						
136						
137						
138						
139						

Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
140	ENSG00000136819					
141	ENSG00000136925					
142	ENSG00000074410					
143	ENSG00000104267					
144	ENSG00000135932					CAB39
145	ENSG00000104327					
146	ENSG00000179218					
147	ENSG00000127022					
148	ENSG00000131236					
149	ENSG00000135837					
150	ENSG00000116489					
151	ENSG00000198898					
152	ENSG00000077549					
153	ENSG00000168564					
154	ENSG00000142453					
155	ENSG00000110619					
156	ENSG00000108349					
157	ENSG00000153113					
158	ENSG00000130940					
159	ENSG00000067955		CBFB			
160	ENSG00000108468					
161	ENSG00000100261					
162	ENSG00000112237	CCNC	CCNC			
163	ENSG00000118971			CCND2		
164	ENSG00000112576					
165	ENSG00000113328					
166	ENSG00000138764					
167	ENSG00000134480					
168	ENSG00000118816					
169	ENSG00000163660			CCNL1		
170	ENSG00000082258			CCNT2		
171	ENSG00000166226					
172	ENSG00000163468					
173	ENSG00000135535					
174	ENSG00000174059					
175	ENSG00000196776					
176	ENSG00000110848		CD69			
177						
178						
179						
180						
181						
182						
183						
184						
185						

Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
186	ENSG00000143126					CELSR2
187						
188	ENSG00000153140					
189	ENSG00000153774					
190	ENSG00000172757					
191	ENSG00000163320					
192	ENSG00000153922					CHD1
193	ENSG00000111642					
194	ENSG00000177200			CHD9		
195	ENSG00000072609					
196	ENSG00000110172					
197	ENSG00000131873					
198	ENSG00000109572					
199	ENSG00000113240					
200	ENSG00000122705					
201	ENSG00000141367					
202	ENSG00000162368					
203	ENSG00000100528					
204	ENSG00000125107					
205	ENSG00000111596					CNOT2
206	ENSG00000198791			CNOT7		
207	ENSG00000121058					
208	ENSG00000129083					COPB
209	ENSG00000166200		COPS2			
210	ENSG00000141030					
211	ENSG00000138663			COPS4		
212	ENSG00000110880					
213	ENSG00000178741					
214	ENSG00000135940					
215	ENSG00000115944					
216	ENSG00000111605					
217	ENSG00000118260	CREB1				
218	ENSG00000005339					CREBBP
219	ENSG00000111269					
220	ENSG00000145708					
221				CRK		
222	ENSG00000099942					
223						
224						
225						
226						
227						
228						
229						
230						
231						

Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
232	ENSG00000175215					
233	ENSG00000168036					CTNNB1
234	ENSG00000198561					
235	ENSG00000171793					
236	ENSG00000149187					CUGBP1
237	ENSG00000048740			CUGBP2		
238	ENSG00000036257		CUL3			
239	ENSG00000166266					CUL5
240	ENSG00000160967					
241	ENSG00000121966			CXCR4		
242	ENSG00000166347					
243	ENSG00000008283					
244	ENSG00000172115					
245	ENSG00000083799					
246	ENSG00000140181					
247	ENSG00000165659					
248	ENSG00000196730					
249	ENSG00000071626					
250	ENSG00000183283			DAZAP2		
251	ENSG00000137992					
252	ENSG00000172795					
253	ENSG00000085788					
254	ENSG00000168209		DDIT4			
255	ENSG00000124487		DDX3X	DDX3X		
256	ENSG00000067048		DDX3Y			
257	ENSG00000108654					
258	ENSG00000141141					
259	ENSG00000158796					
260	ENSG00000124795					
261	ENSG00000139726					
262	ENSG00000155792					
263	ENSG00000136986					
264	ENSG00000109606					
265	ENSG00000132153		DHX30			
266	ENSG00000108406			DHX40		
267	**ENSG00000100697**					**DICER1**
268						
269						
270						
271						
272						
273						

Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
274	ENSG00000158486					
275	ENSG00000086061					
276	ENSG00000132002					
277	ENSG00000105993			DNAJB6		
278	ENSG00000128590	DNAJB9	DNAJB9			
279	ENSG00000077380					
280	ENSG00000074603			DPP8		
281	ENSG00000092964			DPYSL2		
282	ENSG00000117505					DR1
283	ENSG00000167264		DUS2L			
284	ENSG00000143507		DUSP10			
285	ENSG00000139318		DUSP6			
286	ENSG00000004975					
287	ENSG00000161202					
288	ENSG00000157540					
289	**ENSG00000112242**	E2F3	**E2F3**	E2F3		
290	ENSG00000147654		EBAG9			
291	ENSG00000104517			EDD1		EDD1
292	ENSG00000198121					
293	ENSG00000156508			EEF1A1		
294	ENSG00000124802					
295	ENSG00000186676					
296	ENSG00000183690					
297	ENSG00000142634					
298	ENSG00000171570					
299	ENSG00000120738	EGR1				
300	ENSG00000110047					
301				EI24		
302	ENSG00000092847			EIF2C1		EIF2C1
303	ENSG00000123908		EIF2C2		EIF2C2	
304	ENSG00000134001					
305	ENSG00000104131	EIF3S1	EIF3S1	EIF3S1		
306	ENSG00000107581					
307	ENSG00000156976					
308	ENSG00000063046					EIF4B
309	ENSG00000151247					
310	ENSG00000135930					
311						
312						
313						
314						
315						
316						
317						

Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
318	ENSG00000102034					
319	ENSG00000111145			ELK3		
320	ENSG00000155849					ELMO1
321	ENSG00000062598			ELMO2		
322	ENSG00000012660					
323	ENSG00000170522					
324	ENSG00000143420					
325	ENSG00000120533					
326	ENSG00000120616					EPC1
327	ENSG00000050405			EPLIN		
328	ENSG00000085832					
329	ENSG00000124882					
330	ENSG00000157554					
331	ENSG00000120705					
332	ENSG00000157557					
333	ENSG00000182944					
334	ENSG00000120699					EXOSC8
335	ENSG00000108799					
336	ENSG00000106462		EZH2			
337	ENSG00000124491					
338	ENSG00000119979					
339	ENSG00000153310					
340	ENSG00000139146			FAM60A		FAM60A
341	ENSG00000105216					
342	ENSG00000179115					
343	ENSG00000166147		FBN1			
344	ENSG00000173120			FBXL11		
345	ENSG00000118564			FBXL5		
346	ENSG00000138081			FBXO11		
347						
348	ENSG00000143756		FBXO28			
349	ENSG00000178974					
350	ENSG00000037637					
351	ENSG00000112146					
352	ENSG00000119402					
353	ENSG00000068078					
354						
355						
356						
357						
358						
359						
360						
361						
362						

Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
363	ENSG00000159202		FLJ13855			
364	ENSG00000153561					
365	ENSG00000181495					
366	ENSG00000175606					
367	ENSG00000136122					
368	ENSG00000132589					FLOT2
369	ENSG00000196504					
370			FNBP4			
371	ENSG00000170345					
372	ENSG00000125740					
373	ENSG00000137273			FOXF2		
374	ENSG00000198815			FOXJ3		
375	ENSG00000150907					
376	ENSG00000118689					
377	ENSG00000114861					
378	ENSG00000165879					
379	ENSG00000163430		FSTL1			
380	ENSG00000114416	FXR1	FXR1			
381	ENSG00000145907					
382	ENSG00000138757	G3BP2	G3BP2			
383	ENSG00000034713					
384	ENSG00000104064					GABPB2
385	ENSG00000116717					
386	ENSG00000141429					
387	ENSG00000143641					
388	ENSG00000109586					
389	ENSG00000165219					
390	ENSG00000179348					
391	ENSG00000107485					
392	ENSG00000146729					
393	ENSG00000001084					
394	ENSG00000057608					
395	ENSG00000100083					GGA1
396	ENSG00000165678					
397	ENSG00000108588					
398	ENSG00000115419					
399	ENSG00000196700		GM632	GM632		
400						
401						
402						
403						
404						
405						
406						
407						
408						

Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
409	ENSG00000185245					
410	ENSG00000159592		GPBP1L1			
411	ENSG00000112414					
412	ENSG00000106070	GRB10				
413	ENSG00000103342					
414	ENSG00000140307					
415	ENSG00000110768					
416	ENSG00000077809					
417	ENSG00000115207					
418	ENSG00000188486					
419						
420	ENSG00000091527					
421	ENSG00000112339					
422	ENSG00000172534	HCFC1				
423	ENSG00000180353					
424	ENSG00000116478					
425	ENSG00000143321					
426	ENSG00000166503					
427	ENSG00000013583					
428	ENSG00000112406			HECA		
429	ENSG00000103657					
430	ENSG00000128731		HERC2			
431	ENSG00000051108					
432	ENSG00000114315					
433	ENSG00000164683					
434	ENSG00000152804					
435	ENSG00000100644					
436	ENSG00000181061					
437	ENSG00000078140					
438	ENSG00000163349		HIPK1			
439	ENSG00000010818			HIVEP2		
440	ENSG00000137361					
441	ENSG00000100281					
442	ENSG00000189403					
443	ENSG00000164104					
444	ENSG00000029993					HMGB3
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Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
455	ENSG00000096746			HNRPH3		HNRPH3
456	ENSG00000165119					HNRPK
457	ENSG00000104824					HNRPL
458	ENSG00000099783					
459	ENSG00000125944					HNRPR
460	ENSG00000153187				HNRPU	HNRPU
461	ENSG00000105323			HNRPUL1		
462	ENSG00000010295					
463	ENSG00000106004					
464	ENSG00000078399		**HOXA9**			
465	ENSG00000120075					
466	ENSG00000120087					**HOXB7**
467	ENSG00000153807		**HOXA10**			
468	ENSG00000173744	HRB				HRB
469	ENSG00000074356					
470	ENSG00000164164		HSHIN1			
471	ENSG00000044574					
472	ENSG00000109971					
473	ENSG00000144381	HSPD1	HSPD1			
474	ENSG00000120694					
475	ENSG00000136478					
476	ENSG00000086758					
477	ENSG00000108622					
478	ENSG00000067829					
479	ENSG00000109083					
480	ENSG00000068745					
481	ENSG00000070061					
482	ENSG00000129351					
483	ENSG00000105135					
484	ENSG00000153487					
485	ENSG00000168556		ING2			
486	ENSG00000071243					
487	ENSG00000068383					
488	ENSG00000148384					
489	ENSG00000186480		INSIG1			
490	ENSG00000171105					
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Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
500	ENSG00000078596					ITM2A
501	ENSG00000116679					IVNS1ABP
502	ENSG00000184916					
503	ENSG00000117139	JARID1B				
504	ENSG00000008083					
505	ENSG00000115548			JMJD1A		
506	ENSG00000171988					
507	ENSG00000177606		JUN	JUN		
508	ENSG00000137944					
509	ENSG00000170852			KBTBD2		
510	ENSG00000176407					
511	ENSG00000055118					
512	ENSG00000136240					
513	ENSG00000121774					
514	ENSG00000088247					
515	ENSG00000131149					
516	ENSG00000179889		KIAA0251			
517	ENSG00000136813					
518	ENSG00000145725					
519	ENSG00000143702					
520	ENSG00000119321					
521	ENSG00000197226					
522	ENSG00000126775		KIAA0831			
523	ENSG00000164151					
524	ENSG00000105063					
525	ENSG00000126814					
526	ENSG00000156232					
527	ENSG00000170759		KIF5B			
528	ENSG00000157404					
529	ENSG00000127528		**KLF2**			
530	ENSG00000136826	**KLF4**	**KLF4**			**KLF4**
531	ENSG00000067082					
532	ENSG00000155090					
533	ENSG00000165516					
534	ENSG00000114030			KPNA1		
535	ENSG00000102753					
536	ENSG00000108424					
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Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
546	ENSG00000143815					
547	ENSG00000157978					
548	ENSG00000065548					
549	ENSG00000100097					
550	ENSG00000148943					
551	ENSG00000189067					
552	ENSG00000166783		LKAP			
553	ENSG00000160789					
554	ENSG00000113368					
555	ENSG00000135363					
556	ENSG00000111252					
557	ENSG00000152102		LOC130074			
558	ENSG00000120963					
559	ENSG00000102897					
560	ENSG00000121104			LOC81558		
561	ENSG00000123684			LPGAT1		
562	ENSG00000145012					
563	ENSG00000110031					
564	ENSG00000077454					
565	ENSG00000198799					
566	ENSG00000171492					
567	ENSG00000124831					
568	ENSG00000175324					
569	ENSG00000146963			LUC7L2		
570	ENSG00000054219					
571	ENSG00000120992					
572	ENSG00000011009					
573	ENSG00000163818			LZTFL1		
574	ENSG00000135387					
575	ENSG00000003056					
576	ENSG00000143033					
577	ENSG00000127603		MACF1			
578	ENSG00000110514	MADD				
579	ENSG00000187391					
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Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
589	ENSG00000047849					
590	ENSG00000104814			MAP4K1		
591	ENSG00000012983		MAP4K5			
592	ENSG00000135525			MAP7		
593	ENSG00000100030					
594	ENSG00000112062					
595	ENSG00000101367			MAPRE1		
596	ENSG00000166974					
597	ENSG00000175130	MARCKSL1				MARCKSL1
598	ENSG00000075413					
599	ENSG00000166986					
600	ENSG00000168906					
601	ENSG00000038274			MAT2B		
602	ENSG00000015479					
603	ENSG00000125952					
604	ENSG00000134046					
605	ENSG00000152601				MBNL1	MBNL1
606	ENSG00000180398	MCFD2				
607	ENSG00000121940					
608	ENSG00000112118					
609	ENSG00000082212					
610	ENSG00000124733					
611	ENSG00000081189	MEF2C	MEF2C	MEF2C		MEF2C
612	ENSG00000143995					
613	ENSG00000133895					
614	ENSG00000164024					
615	ENSG00000168282					
616	ENSG00000138092					
617	ENSG00000133858			MGC23401		
618	ENSG00000198408			MGEA5		
619	ENSG00000079277					
620	ENSG00000133606			MKRN1		
621	ENSG00000089693					
622	**ENSG00000171843**					
623	ENSG00000108788					
624	ENSG00000056586					
625	ENSG00000165943		MOAP1			
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Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
635	ENSG00000125445					MRPS7
636	ENSG00000005302					
637	ENSG00000147065					
638	ENSG00000182979					
639	ENSG00000147649		MTDH			MTDH
640	ENSG00000143033					
641	ENSG00000100330			MTMR3	MTMR3	
642	ENSG00000108389			MTMR4		MTMR4
643	ENSG00000170873					MTSS1
644	ENSG00000128654					
645	ENSG00000118513					
646	ENSG00000005810	MYCBP2	MYCBP2			MYCBP2
647	ENSG00000133026					
648	ENSG00000136504					
649	ENSG00000102921					N4BP1
650	ENSG00000138386					
651	ENSG00000187109					
652	ENSG00000132780					
653	ENSG00000158747			NBL1		
654	ENSG00000115053					
655	ENSG00000198646					
656	ENSG00000196498					
657	ENSG00000166579					
658	ENSG00000131507					
659	ENSG00000125356			NDUFA1		
660	ENSG00000189043					
661						
662	ENSG00000069869					
663	ENSG00000173848					
664	ENSG00000082641				NFE2L1	
665	ENSG00000116044					
666	ENSG00000050344					
667	ENSG00000120837					
668	ENSG00000066136					
669	ENSG00000166681					
670	ENSG00000140157					
671	ENSG00000164190					
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Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
681	ENSG00000106459	NRF1	NRF1			
682	ENSG00000180530		**NRIP1**			
683	ENSG00000035681		NSMAF			
684	ENSG00000137497					
685	ENSG00000124789					
686	ENSG00000162231					
687	ENSG00000101888					
688	ENSG00000065154					
689	ENSG00000115758					
690	ENSG00000046651					
691	ENSG00000147162		OGT	OGT	OGT	
692	ENSG00000182606					
693	ENSG00000141447			OSBPL1A		
694	ENSG00000091039			OSBPL8		
695	ENSG00000117859					
696	ENSG00000167770					
697	ENSG00000172939		OXSR1			
698	ENSG00000170515	PA2G4				
699	ENSG00000070756	PABPC1				
700	ENSG00000151846					
701	ENSG00000090621					
702	ENSG00000100836					
703	ENSG00000100266					
704	ENSG00000172239		PAIP1			
705	ENSG00000142864					
706	ENSG00000180370					
707	ENSG00000157654					
708	ENSG00000145730	PAM				
709	ENSG00000090060	PAPOLA	PAPOLA	PAPOLA		
710	ENSG00000115421					
711	ENSG00000177425					
712	ENSG00000157212					
713	ENSG00000105835					
714	ENSG00000113387					
715	ENSG00000169564					PCBP1
716	ENSG00000197111					
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Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
726	ENSG00000150593					
727	ENSG00000184588					
728	ENSG00000145431					
729	ENSG00000168291					
730	ENSG00000065485					
731	ENSG00000143870					
732	ENSG00000162734					
733	ENSG00000197329					
734	ENSG00000132326		PER2			
735	ENSG00000152556					
736	ENSG00000067057					
737	ENSG00000164040					
738	ENSG00000167085					
739	ENSG00000112511		PHF1			
740	ENSG00000130024					
741	ENSG00000043143		PHF15			
742	ENSG00000025293	PHF20		PHF20		
743	ENSG00000118482		PHF3			
744	ENSG00000033800					
745	ENSG00000073921					
746	ENSG00000166037					
747	ENSG00000051382		PIK3CB			
748	ENSG00000145675					PIK3R1
749	ENSG00000137193					
750	ENSG00000102096					
751	ENSG00000107242					
752	ENSG00000154217		PITPNC1			
753	ENSG00000181191					
754	ENSG00000171033			PKIA		
755	ENSG00000118495					
756	ENSG00000052126					
757	ENSG00000115762					
758	ENSG00000104886					
759	ENSG00000152952					
760	ENSG00000102024					PLS3
761	ENSG00000136040			PLXNC1		
762	ENSG00000004399					
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Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
772	ENSG00000163806	PPP1CB				
773	ENSG00000186298					
774	ENSG00000112498					
775	ENSG00000058272		PPP1R12A			
776	ENSG00000113575					
777	ENSG00000104695					
778	ENSG00000104762					
779	ENSG00000078304					
780	ENSG00000154001					
781	ENSG00000138814					
782	ENSG00000107758					
783	ENSG00000154845					
784	ENSG00000119414			PPP6C		PPP6C
785	ENSG00000131238					
786	ENSG00000116731					
787	ENSG00000110851			PRDM4		
788	ENSG00000138073					
789	ENSG00000122862					
790	ENSG00000142875					
791	ENSG00000005249		PRKAR2B			
792	ENSG00000166501					
793	ENSG00000101040					
794	ENSG00000115825					
795	ENSG00000137492					
796	ENSG00000185246					
797	ENSG00000147224					
798	ENSG00000197746					
799	ENSG00000129084					
800	ENSG00000106588					
801	ENSG00000143106					
802	ENSG00000100519					
803	ENSG00000108344					
804	ENSG00000125818					
805	ENSG00000121390					
806	ENSG00000117569					
807	ENSG00000138430		PTD004			
808	ENSG00000171862			PTEN		
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Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
818	ENSG00000130508					
819	ENSG00000112531		QKI	QKI		
820	ENSG00000048991	R3HDM				
821	ENSG00000103769			RAB11A		
822	ENSG00000119396		RAB14	RAB14		
823	ENSG00000138069					
824	ENSG00000080371					
825	ENSG00000111737			RAB35		
826	ENSG00000144566					
827	ENSG00000111540			RAB5B		
828	ENSG00000175582			RAB6A		
829	ENSG00000075785					
830	ENSG00000167461					
831	ENSG00000152061		RABGAP1L			
832	ENSG00000136238				RAC1	
833	ENSG00000152942					
834	ENSG00000164754		RAD21			
835	ENSG00000119318			RAD23B		
836	ENSG00000108175					
837	ENSG00000017797					
838	ENSG00000132341					
839	ENSG00000153201					
840	ENSG00000065150					
841	ENSG00000137040					
842	ENSG00000010017		RANBP9			
843	ENSG00000116473		RAP1A			
844	ENSG00000127314	RAP1B	RAP1B	RAP1B		
845	ENSG00000138698					
846	ENSG00000181467					
847	ENSG00000109756			RAPGEF2		
848	ENSG00000077092					
849	ENSG00000145715					
850	ENSG00000101265			RASSF2		
851	ENSG00000139687					
852	ENSG00000023287			RB1CC1		
853	ENSG00000122257					
854	ENSG00000102054			RBBP7		RBBP7
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Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
864	ENSG00000136144					
865	ENSG00000049449					
866	ENSG00000117906					
867	ENSG00000089902					
868	ENSG00000137710					
869	ENSG00000173039					
870	ENSG00000157916					
871	ENSG00000142599					
872	ENSG00000056687					
873	ENSG00000090104					
874	ENSG00000171700					
875	ENSG00000106615					
876	ENSG00000067560	RHOA				
877	ENSG00000177105					
878	ENSG00000119729	RHOQ				
879	ENSG00000126858					
880	ENSG00000101782					
881	ENSG00000176624					
882	ENSG00000022840					
883	ENSG00000123091					
884	ENSG00000082996					
885	ENSG00000134758	RNF138				
886	ENSG00000170881					
887	ENSG00000170633					
888	ENSG00000137075	RNF38	RNF38			
889	ENSG00000063978		RNF4			
890	ENSG00000127870					
891	ENSG00000131051					
892	ENSG00000167971					
893	ENSG00000043093			RP42		
894	ENSG00000132383					
895	ENSG00000117748					
896	ENSG00000153574					
897	ENSG00000144713					
898	ENSG00000163902					
899	ENSG00000171858					
900	ENSG00000143947					
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Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
910	ENSG00000020633					
911	ENSG00000163602					
912	ENSG00000163785					
913	ENSG00000198838		RYR3	RYR3		
914	ENSG00000160633					
915	ENSG00000130254					
916	ENSG00000136715					
917	ENSG00000079332			SARA1		
918	ENSG00000130066					
919	ENSG00000182568	SATB1	SATB1			
920	ENSG00000052802					
921	ENSG00000085365					SCAMP1
922	ENSG00000140497			SCAMP2		
923	ENSG00000138760					
924	ENSG00000121892		SCC-112			
925	ENSG00000151967					SCHIP1
926	ENSG00000010803					
927	ENSG00000137575					SDCBP
928	ENSG00000156642	SDFR1	SDFR1			SDFR1
929	ENSG00000140612					
930	ENSG00000155878					
931	ENSG00000121542					
932	ENSG00000107651					
933	ENSG00000138802					
934	ENSG00000075223			SEMA3C		
935	ENSG00000168758					
936	ENSG00000092421				SEMA6A	
937	ENSG00000122545					
938	ENSG00000120742					
939	ENSG00000179833		SERTAD2	SERTAD2		SERTAD2
940	ENSG00000080546					
941	ENSG00000119335					SET
942	ENSG00000115524					
943	ENSG00000116560					
944	ENSG00000136450					
945				SFRS2		
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Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
956	ENSG00000116350					
957	ENSG00000100650					
958	ENSG00000124193					
959	ENSG00000115875					
960	ENSG00000198730					
961	ENSG00000162105			SHANK2		
962	ENSG00000182199					
963	ENSG00000108061					
964	ENSG00000196470		SIRT1			
965	ENSG00000096717	SIRT1				
966	ENSG00000124523					
967	ENSG00000113558					
968	ENSG00000155926					
969	ENSG00000165646		SLC38A2			
970	ENSG00000004864					
971	ENSG00000122912					
972	ENSG00000178537					
973	ENSG00000075415					
974	ENSG00000147454					
975	ENSG00000005022					
976	ENSG00000117394					
977	ENSG00000059804					
978	ENSG00000134294					
979	ENSG00000138821					
980	ENSG00000080493					
981	ENSG00000175387			SMAD2		
982	ENSG00000112305					
983	ENSG00000102038					
984						
985	ENSG00000127616					
986	ENSG00000173473					
987	ENSG00000073584					
988	ENSG00000077147					
989	ENSG00000072501					SMC1L1
990	ENSG00000102172					
991	ENSG00000145335					
992	ENSG00000184602	SNN	SNN			
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Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
1002	ENSG00000124766	SOX4	SOX4			
1003	ENSG00000067066					
1004	ENSG00000172845	SP3		SP3		
1005	ENSG00000091640					SPAG7
1006	ENSG00000008294			SPAG9		
1007	ENSG00000113140					
1008	ENSG00000065526					
1009	ENSG00000095480					
1010	ENSG00000147475					
1011	ENSG00000152268					
1012						
1013	ENSG00000164056					
1014	ENSG00000115306					
1015	ENSG00000090054					
1016	ENSG00000100596					
1017	ENSG00000116649					SRM
1018	ENSG00000153037					
1019	ENSG00000096063					
1020	ENSG00000135250		SRPK2			
1021	ENSG00000124783					
1022	ENSG00000149136					
1023	ENSG00000101972		STAG2			
1024	ENSG00000084090					
1025	**ENSG00000168610**					
1026	ENSG00000173757					
1027	ENSG00000167323					
1028	ENSG00000166301					
1029	ENSG00000102572					
1030	ENSG00000112079			STK38		
1031	ENSG00000198648		STK39			
1032	ENSG00000117632					
1033	ENSG00000165283					
1034	ENSG00000124222					
1035	ENSG00000168952					
1036	ENSG00000173812		SUI1			
1037	ENSG00000116030					
1038	ENSG00000180283					
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Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
1048	ENSG00000120948			TARDBP		TARDBP
1049				TAX1BP1		
1050						
1051						TBPL1
1052						
1053						TCEB1
1054	ENSG00000113649					
1055						
1056						
1057						
1058						
1059		TCTE1L	TCTE1L			TCTE1L
1060						
1061						
1062						
1063						
1064						
1065	ENSG00000198176					
1066			TFDP2			
1067						
1068			TGIF			
1069						
1070	ENSG00000123066					
1071	ENSG00000116001	TIA1				
1072				TIPARP		
1073						
1074						
1075						
1076						
1077						
1078	ENSG00000101337					TM9SF4
1079	ENSG00000062716					
1080						
1081	ENSG00000120802					
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Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
1093	ENSG00000111669					
1094	ENSG00000140416					
1095				TPP1		TPP1
1096						
1097						
1098						
1099	ENSG00000166326					
1100						
1101	ENSG00000043514					
1102						
1103						
1104			TSC1			
1105	ENSG00000102804					
1106	ENSG00000157514					
1107	ENSG00000163084					
1108						
1109	ENSG00000143367					TUFT1
1110	ENSG00000139921					
1111						
1112				TXNIP		
1113						
1114						
1115	ENSG00000077721					
1116				UBE2B		
1117	ENSG00000131508					UBE2D2
1118						UBE2D3
1119		UBE2E1				
1120						UBE2E3
1121			UBE2G1			UBE2G1
1122	ENSG00000103275					
1123				UBE2J1		
1124	ENSG00000185651					
1125						
1126						UBE2Q
1127						
1128	ENSG00000114062			UBE3A		
1129						
1130						
1131						
1132						
1133						
1134						
1135						
1136						
1137						

Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
1138	ENSG00000164828	UNC84A				
1139	ENSG00000100242		UNC84A			UNC84B
1140						
1141						
1142	ENSG00000152484					
1143	ENSG00000101557					USP14
1144		USP15	USP15	USP15		USP15
1145						
1146	ENSG00000077254					
1147	ENSG00000115464					
1148						
1149						
1150						
1151	ENSG00000173218			VANGL1		
1152	ENSG00000101558					
1153	ENSG00000124164					
1154						
1155						
1156						
1157						
1158						VAT1
1159						
1160						
1161						VCL
1162	ENSG00000165280					
1163	ENSG00000073905					VDAC1
1164	ENSG00000078668					
1165						
1166						
1167						
1168						
1169	ENSG00000167987					
1170						
1171						
1172				VPS26		
1173		VPS54	VPS54			
1174	ENSG00000105053					
1175						
1176						
1177						
1178						
1179						
1180						
1181						
1182						
1183						

Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
1184	ENSG00000109685					
1185						
1186						
1187	ENSG00000146457					
1188			**WWP2**			
1189	ENSG00000115254		XBP1			
1190						
1191	ENSG00000169180					
1192						
1193						
1194						
1195						
1196						
1197						
1198						
1199						
1200	ENSG00000134308					
1201				YWHAZ		
1202			YY1			
1203						
1204						
1205				ZBTB11		
1206						
1207						
1208						
1209				ZDHHC17		
1210						
1211				ZFP36L2		ZFP36L2
1212				ZMYND11		
1213	ENSG00000010244					
1214						
1215				ZNF148		
1216			ZNF160			
1217						
1218						
1219						ZNF207
1220		ZNF238	ZNF238	ZNF238		ZNF238
1221						
1222						
1223						
1224						
1225						
1226						
1227						
1228						
1229						

Figure 12, con'd

	A	P	Q	R	S	T
1		**miR-32**	**miR-92**	**miR-93**	**miR-100**	**miR-103**
1230	ENSG00000036549					

Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
2	ENSG00000145495					
3	ENSG00000136536					
4	ENSG00000165406	8-Mar				
5	ENSG00000168385					
6	ENSG00000125354		6-Sep			
7	ENSG00000122545					
8	ENSG00000138758					
9	ENSG00000111780					
10	ENSG00000137822					
11	ENSG00000165029	ABCA1			ABCA1	
12	ENSG00000125257					
13	ENSG00000114770				ABCC5	ABCC5
14	ENSG00000161533					
15	ENSG00000151726				ACSL1	
16	ENSG00000075624					
17	ENSG00000184009		ACTG1			
18	ENSG00000136518	ACTL6A				
19	ENSG00000072110					
20	ENSG00000138071					
21	ENSG00000115091					ACTR3
22	ENSG00000137845		ADAM10			
23	ENSG00000138031			ADCY3		
24	ENSG00000087274					
25	ENSG00000148700					
26	ENSG00000101126					
27	ENSG00000173020					
28	ENSG00000172493					
29	ENSG00000168448					
30	ENSG00000155189					
31	ENSG00000168710					
32	ENSG00000004455		AK2	AK2		
33	ENSG00000108599					
34	ENSG00000023516				AKAP11	
35	ENSG00000170776	AKAP13	AKAP13			
36	ENSG00000151320					
37	ENSG00000117020		AKT3			
38	ENSG00000170017				ALCAM	
39						
40						
41						
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Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
48	ENSG00000177879		AP3S1			
49	ENSG00000120868			APAF1		
50	ENSG00000144848					
51	ENSG00000101844					
52	ENSG00000084234					
53	ENSG00000142192	APP	APP			
54	ENSG00000062725			APPBP2		
55	ENSG00000095139					
56	ENSG00000143761					ARF1
57	ENSG00000134287					
58	ENSG00000168374					
59	ENSG00000165527					
60	ENSG00000175220	ARHGAP1				
61	ENSG00000137962				ARHGAP29	
62	ENSG00000104880					
63	ENSG00000129675			ARHGEF6		
64	ENSG00000117713	ARID1A			ARID1A	
65	ENSG00000054267			ARID4B	ARID4B	
66	ENSG00000177479					
67	ENSG00000134108		ARL10C	ARL10C	ARL10C	
68	ENSG00000110025					
69	ENSG00000138175					
70	ENSG00000170540					
71	ENSG00000188042					
72	ENSG00000163466					
73	ENSG00000136950		ARPC5L			
74	ENSG00000128989				ARPP-19	
75	ENSG00000111875	ASF1A				
76	ENSG00000116539					
77	ENSG00000171456					
78	ENSG00000143970				ASXL2	
79	ENSG00000123268					
80	ENSG00000149311					
81	ENSG00000163399					
82	ENSG00000143153	ATP1B1				ATP1B1
83	ENSG00000174437		ATP2A2		ATP2A2	
84	ENSG00000017260				ATP2C1	
85						
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91						
92						
93						

Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
94	ENSG00000198604				BAZ1A	
95	ENSG00000119866		BCL11A	BCL11A	BCL11A	BCL11A
96	ENSG00000171791		BCL2			
97	ENSG00000029363	BCLAF1			BCLAF1	
98	ENSG00000105829					
99	ENSG00000134107					
100	ENSG00000138756					
101	ENSG00000104765					
102	ENSG00000060762					
103	ENSG00000160058		BSDC1			
104	ENSG00000095564				BTAF1	
105	ENSG00000145741					
106	ENSG00000133639			BTG1	BTG1	
107	ENSG00000159388		BTG2	BTG2		BTG2
108	ENSG00000154640				BTG3	
109	ENSG00000082153					
110	ENSG00000136261					
111	ENSG00000181915					
112	ENSG00000119906	C10orf6			C10orf6	
113	ENSG00000110075				C11orf23	
114	ENSG00000171067					
115	ENSG00000139746					
116	ENSG00000133935					
117	ENSG00000168175		C14orf32			
118	ENSG00000134153				C15orf24	
119	ENSG00000152242				C18orf25	
120	ENSG00000141452					
121	ENSG00000105176					
122	ENSG00000163875					
123	ENSG00000163444					
124	ENSG00000117616					
125	ENSG00000108561					
126	ENSG00000110888					
127	ENSG00000132823			C20orf111		
128	ENSG00000101084					
129	ENSG00000101166				C20orf45	
130	ENSG00000126749					
131						
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137						
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139						

Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
140	ENSG00000136819			C9orf78		
141	ENSG00000136925			C9orf97		
142	ENSG00000074410			CA12		
143	ENSG00000104267					
144	ENSG00000135932		CAB39	CAB39		
145	ENSG00000104327			CALB1		
146	ENSG00000179218					
147	ENSG00000127022					
148	ENSG00000131236					
149	ENSG00000135837					
150	ENSG00000116489			CAPZA1		
151	ENSG00000198898		CAPZA2			
152	ENSG00000077549					
153	ENSG00000168564					CARF
154	ENSG00000142453		CARM1			
155	ENSG00000110619					
156	ENSG00000108349			CASC3		
157	ENSG00000153113					
158	ENSG00000130940					CASZ1
159	ENSG00000067955			CBFB		
160	ENSG00000108468			CBX1		
161	ENSG00000100261					
162	ENSG00000112237					
163	ENSG00000118971		CCND2			
164	ENSG00000112576				CCND3	
165	ENSG00000113328			CCNG1		
166	ENSG00000138764					
167	ENSG00000134480					
168	ENSG00000118816					
169	ENSG00000163660	CCNL1				CCNL1
170	ENSG00000082258	CCNT2	CCNT2			
171	ENSG00000166226					
172	ENSG00000163468			CCT3		
173	ENSG00000135535		CD164			
174	ENSG00000174059			CD34		
175	ENSG00000196776					
176	ENSG00000110848				CD69	
177						
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Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
186	ENSG00000143126	CELSR2	CELSR2		CELSR2	
187						
188	ENSG00000153140					CETN3
189	ENSG00000153774					
190	ENSG00000172757		CFL1			
191	ENSG00000163320					
192	ENSG00000153922					
193	ENSG00000111642					
194	ENSG00000177200				CHD9	
195	ENSG00000072609					
196	ENSG00000110172					
197	ENSG00000131873				CHSY1	
198	ENSG00000109572			CLCN3		
199	ENSG00000113240			CLK4		
200	ENSG00000122705					CLTA
201	ENSG00000141367			CLTC	CLTC	
202	ENSG00000162368	CMPK			CMPK	
203	ENSG00000100528				CNIH	
204	ENSG00000125107					
205	ENSG00000111596	CNOT2	CNOT2			
206	ENSG00000198791			CNOT7	CNOT7	
207	ENSG00000121058					
208	ENSG00000129083		COPB			
209	ENSG00000166200		COPS2			
210	ENSG00000141030					
211	ENSG00000138663					
212	ENSG00000110880			CORO1C		
213	ENSG00000178741					
214	ENSG00000135940				COX5B	
215	ENSG00000115944	COX7A2L			COX7A2L	
216	ENSG00000111605			CPSF6		
217	ENSG00000118260					
218	ENSG00000005339		CREBBP	CREBBP	CREBBP	
219	ENSG00000111269					
220	ENSG00000145708					
221		CRK				
222	ENSG00000099942		CRKL	CRKL		
223						
224						
225						
226						
227						
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231						

Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
232	ENSG00000175215					
233	ENSG00000168036				CTNNB1	
234	ENSG00000198561		CTNND1			
235	ENSG00000171793					
236	ENSG00000149187		CUGBP1			
237	ENSG00000048740		CUGBP2			CUGBP2
238	ENSG00000036257				CUL3	CUL3
239	ENSG00000166266		CUL5		CUL5	
240	ENSG00000160967					
241	ENSG00000121966					**CXCR4**
242	ENSG00000166347					
243	ENSG00000008283					
244	ENSG00000172115					
245	ENSG00000083799				CYLD	
246	ENSG00000140181			D15F37 /// LOC440248		
247	ENSG00000165659					
248	ENSG00000196730					
249	ENSG00000071626	DAZAP1				
250	ENSG00000183283			DAZAP2		
251	ENSG00000137992					
252	ENSG00000172795			DCP2		
253	ENSG00000085788		DDHD2			
254	ENSG00000168209					
255	ENSG00000124487		DDX3X	DDX3X	DDX3X	
256	ENSG00000067048					
257	ENSG00000108654	DDX5		DDX5		
258	ENSG00000141141					
259	ENSG00000158796					
260	ENSG00000124795				DEK	
261	ENSG00000139726		DENR			
262	ENSG00000155792					
263	ENSG00000136986					
264	ENSG00000109606				DHX15	
265	ENSG00000132153					
266	ENSG00000108406	DHX40				
267	**ENSG00000100697**		**DICER1**			
268						
269						
270						
271						
272						
273						

Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
274	ENSG00000158486					
275	ENSG00000086061					
276	ENSG00000132002				DNAJB1	
277	ENSG00000105993				DNAJB6	
278	ENSG00000128590	DNAJB9				
279	ENSG00000077380					
280	ENSG00000074603					
281	ENSG00000092964				DPYSL2	
282	ENSG00000117505		DR1		DR1	
283	ENSG00000167264					
284	ENSG00000143507					
285	ENSG00000139318					
286	ENSG00000004975			DVL2		
287	ENSG00000161202					
288	ENSG00000157540					
289	**ENSG00000112242**		**E2F3**	E2F3		**E2F3**
290	ENSG00000147654					
291	ENSG00000104517		EDD1	EDD1		
292	ENSG00000198121					
293	ENSG00000156508	EEF1A1				
294	ENSG00000124802					
295	ENSG00000186676					
296	ENSG00000183690					
297	ENSG00000142634					
298	ENSG00000171570					
299	ENSG00000120738	EGR1				
300	ENSG00000110047					
301						
302	ENSG00000092847	EIF2C1	EIF2C1	EIF2C1	EIF2C1	
303	ENSG00000123908			EIF2C2		
304	ENSG00000134001					EIF2S1
305	ENSG00000104131					EIF3S1
306	ENSG00000107581	EIF3S10				
307	ENSG00000156976			EIF4A2		
308	ENSG00000063046		EIF4B			
309	ENSG00000151247				EIF4E	
310	ENSG00000135930					
311						
312						
313						
314						
315						
316						
317						

Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
318	ENSG00000102034					
319	ENSG00000111145	ELK3			ELK3	
320	ENSG00000155849		ELMO1	ELMO1		
321	ENSG00000062598					
322	ENSG00000012660			ELOVL5	ELOVL5	
323	ENSG00000170522			ELOVL6		
324	ENSG00000143420					
325	ENSG00000120533					ENY2
326	ENSG00000120616	EPC1	EPC1		EPC1	EPC1
327	ENSG00000050405					
328	ENSG00000085832					
329	ENSG00000124882				EREG	
330	ENSG00000157554					ERG
331	ENSG00000120705		ETF1			ETF1
332	ENSG00000157557					
333	ENSG00000182944	EWSR1		EWSR1		
334	ENSG00000120699		EXOSC8	EXOSC8		
335	ENSG00000108799					
336	ENSG00000106462	EZH2		EZH2		
337	ENSG00000124491			F13A1	F13A1	
					FAM45B ///	
338	ENSG00000119979				FAM45A	
339	ENSG00000153310			FAM49B		
340	ENSG00000139146	FAM60A	FAM60A		FAM60A	
341	ENSG00000105216					
342	ENSG00000179115					
343	ENSG00000166147				FBN1	
344	ENSG00000173120	FBXL11			FBXL11	
345	ENSG00000118564	FBXL5			FBXL5	
346	ENSG00000138081				FBXO11	
347						
348	ENSG00000143756				FBXO28	
349	ENSG00000178974	FBXO34				
350	ENSG00000037637					
351	ENSG00000112146					
352	ENSG00000119402					FBXW2
353	ENSG00000068078					
354						
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360						
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362						

Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
363	ENSG00000159202			FLJ13855		
364	ENSG00000153561			FLJ13910	FLJ13910	
365	ENSG00000181495					
366	ENSG00000175606					
367	ENSG00000136122					
368	ENSG00000132589		FLOT2		FLOT2	
369	ENSG00000196504					
370						
371	ENSG00000170345			FOS		FOS
372	ENSG00000125740		FOSB	FOSB		
373	ENSG00000137273					
374	ENSG00000198815					
375	ENSG00000150907	FOXO1A		FOXO1A		
376	ENSG00000118689					
377	ENSG00000114861			FOXP1		
378	ENSG00000165879					
379	ENSG00000163430					
380	ENSG00000114416			FXR1		
381	ENSG00000145907					G3BP
382	ENSG00000138757		G3BP2		G3BP2	
383	ENSG00000034713					
384	ENSG00000104064					GABPB2
385	ENSG00000116717				GADD45A	
386	ENSG00000141429					
387	ENSG00000143641	GALNT2				
388	ENSG00000109586		GALNT7	GALNT7		
389	ENSG00000165219					
390	ENSG00000179348			**GATA2**		
391	ENSG00000107485					
392	ENSG00000146729					
393	ENSG00000001084					
394	ENSG00000057608					
395	ENSG00000100083					
396	ENSG00000165678					
397	ENSG00000108588					
398	ENSG00000115419					
399	ENSG00000196700					GM632
400						
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406						
407						
408						

Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
409	ENSG00000185245					GP1BA
410	ENSG00000159592					
411	ENSG00000112414			GPR126		
412	ENSG00000106070	GRB10			GRB10	
413	ENSG00000103342			GSPT1		
414	ENSG00000140307			GTF2A2		
415	ENSG00000110768					
416	ENSG00000077809					
417	ENSG00000115207					
418	ENSG00000188486					
419				H2AFZ		
420	ENSG00000091527		H41			
421	ENSG00000112339					
422	ENSG00000172534					
423	ENSG00000180353		HCLS1			
424	ENSG00000116478					
425	ENSG00000143321					
426	ENSG00000166503					
427	ENSG00000013583					
428	ENSG00000112406	HECA			HECA	
429	ENSG00000103657					
430	ENSG00000128731		HERC2			
431	ENSG00000051108					
432	ENSG00000114315					
433	ENSG00000164683				HEY1	
434	ENSG00000152804					
435	ENSG00000100644	HIF1A				
436	ENSG00000181061					
437	ENSG00000078140					
438	ENSG00000163349					HIPK1
439	ENSG00000010818	HIVEP2			HIVEP2	
440	ENSG00000137361	HLA-E				
441	ENSG00000100281					
442	ENSG00000189403					
443	ENSG00000164104					
444	ENSG00000029993	HMGB3				
445						
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Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
455	ENSG00000096746	HNRPH3	HNRPH3			
456	ENSG00000165119					
457	ENSG00000104824		HNRPL			
458	ENSG00000099783				HNRPM	
459	ENSG00000125944		HNRPR	HNRPR		
460	ENSG00000153187	HNRPU	HNRPU	HNRPU		
461	ENSG00000105323			HNRPUL1	HNRPUL1	
462	ENSG00000010295					
463	ENSG00000106004				**HOXA5**	
464	ENSG00000078399			**HOXA9**		
465	ENSG00000120075		**HOXB5**			
466	ENSG00000120087		**HOXB7**			
467	ENSG00000153807		**HOXA10**	**HOXA10**		
468	ENSG00000173744		HRB	HRB	HRB	
469	ENSG00000074356			HSA277841		
470	ENSG00000164164		HSHIN1		HSHIN1	HSHIN1
471	ENSG00000044574					
472	ENSG00000109971					
473	ENSG00000144381			HSPD1		
474	ENSG00000120694					
475	ENSG00000136478					
476	ENSG00000086758		HUWE1			
477	ENSG00000108622					
478	ENSG00000067829	IDH3G			IDH3G	
479	ENSG00000109083					
480	ENSG00000068745					
481	ENSG00000070061					
482	ENSG00000129351					
483	ENSG00000105135					
484	ENSG00000153487					
485	ENSG00000168556	ING2				
486	ENSG00000071243					
487	ENSG00000068383					
488	ENSG00000148384					
489	ENSG00000186480					
490	ENSG00000171105		INSR	INSR		
491						
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499						

Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
500	ENSG00000078596		ITM2A			
501	ENSG00000116679	IVNS1ABP	IVNS1ABP			
502	ENSG00000184916			JAG2		
503	ENSG00000117139					
504	ENSG00000008083					
505	ENSG00000115548	JMJD1A		JMJD1A		JMJD1A
506	ENSG00000171988			JMJD1C		
507	ENSG00000177606					
508	ENSG00000137944					
509	ENSG00000170852		KBTBD2		KBTBD2	
510	ENSG00000176407		KCMF1			
511	ENSG00000055118					
512	ENSG00000136240					
513	ENSG00000121774					
514	ENSG00000088247					
515	ENSG00000131149				KIAA0182	
516	ENSG00000179889					
517	ENSG00000136813					
518	ENSG00000145725		KIAA0433			
519	ENSG00000143702				KIAA0470	
520	ENSG00000119321					
521	ENSG00000197226			KIAA0676		
522	ENSG00000126775				KIAA0831	
523	ENSG00000164151					
524	ENSG00000105063				KIAA1115	
525	ENSG00000126814					
526	ENSG00000156232					
527	ENSG00000170759			KIF5B		
528	ENSG00000157404				KIT	
529	ENSG00000127528					
530	ENSG00000136826		**KLF4**	**KLF4**	**KLF4**	
531	ENSG00000067082					
532	ENSG00000155090					
533	ENSG00000165516					
534	ENSG00000114030		KPNA1		KPNA1	KPNA1
535	ENSG00000102753	KPNA3	KPNA3	KPNA3	KPNA3	
536	ENSG00000108424					
537						
538						
539						
540						
541						
542						
543						
544						
545						

Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
546	ENSG00000143815					
547	ENSG00000157978					
548	ENSG00000065548					
549	ENSG00000100097					
550	ENSG00000148943					
551	ENSG00000189067			LITAF		
552	ENSG00000166783					LKAP
553	ENSG00000160789					
554	ENSG00000113368					
555	ENSG00000135363					
556	ENSG00000111252					
557	ENSG00000152102					
558	ENSG00000120963					
559	ENSG00000102897					
560	ENSG00000121104	LOC81558				
561	ENSG00000123684				LPGAT1	
562	ENSG00000145012					
563	ENSG00000110031					
564	ENSG00000077454					
565	ENSG00000198799					
566	ENSG00000171492					
567	ENSG00000124831			LRRFIP1		
568	ENSG00000175324			LSM1		
569	ENSG00000146963					
570	ENSG00000054219					
571	ENSG00000120992					
572	ENSG00000011009					
573	ENSG00000163818	LZTFL1				
574	ENSG00000135387				M11S1	M11S1
575	ENSG00000003056				M6PR	
576	ENSG00000143033					
577	ENSG00000127603					
578	ENSG00000110514					
579	ENSG00000187391					
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Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
589	ENSG00000047849				MAP4	
590	ENSG00000104814					
591	ENSG00000012983			MAP4K5		
592	ENSG00000135525	MAP7	MAP7		MAP7	
593	ENSG00000100030					
594	ENSG00000112062	MAPK14		MAPK14		
595	ENSG00000101367				MAPRE1	
596	ENSG00000166974					
597	ENSG00000175130		MARCKSL1			
598	ENSG00000075413				MARK3	
599	ENSG00000166986					
600	ENSG00000168906					MAT2A
601	ENSG00000038274	MAT2B			MAT2B	MATR3
602	ENSG00000015479	MATR3				
603	ENSG00000125952					MAX
604	ENSG00000134046					
605	ENSG00000152601	MBNL1	MBNL1		MBNL1	MBNL1
606	ENSG00000180398					
607	ENSG00000121940					
608	ENSG00000112118					
609	ENSG00000082212			ME2		
610	ENSG00000124733					MEA1
611	ENSG00000081189	MEF2C	MEF2C			
612	ENSG00000143995					
613	ENSG00000133895					
614	ENSG00000164024					
615	ENSG00000168282					
616	ENSG00000138092				MGC11266	
617	ENSG00000133858				MGC23401	
618	ENSG00000198408		MGEA5			
619	ENSG00000079277					
620	ENSG00000133606	MKRN1			MKRN1	MKRN1
621	ENSG00000089693					
622	**ENSG00000171843**		**MLLT3**			
623	ENSG00000108788					
624	ENSG00000056586					
625	ENSG00000165943					
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Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
635	ENSG00000125445		MRPS7			
636	ENSG00000005302					
637	ENSG00000147065					
638	ENSG00000182979					
639	ENSG00000147649			MTDH		
640	ENSG00000143033					
641	ENSG00000100330	MTMR3				
642	ENSG00000108389		MTMR4	MTMR4	MTMR4	
643	ENSG00000170873		MTSS1	MTSS1		
644	ENSG00000128654					
645	ENSG00000118513					
646	ENSG00000005810	MYCBP2	MYCBP2			
647	ENSG00000133026					
648	ENSG00000136504			MYST2		
649	ENSG00000102921		N4BP1			
650	ENSG00000138386			NAB1		
651	ENSG00000187109					
652	ENSG00000132780					
653	ENSG00000158747				NBL1	NAB1
654	ENSG00000115053					
655	ENSG00000198646					
656	ENSG00000196498					
657	ENSG00000166579	NDEL1			NDEL1	
658	ENSG00000131507					
659	ENSG00000125356					
660	ENSG00000189043					
661				NDUFS4		
662	ENSG00000069869			NEDD4		
663	ENSG00000173848					
664	ENSG00000082641	NFE2L1	NFE2L1	NFE2L1	NFE2L1	NFE2L1
665	ENSG00000116044			NFE2L2		
666	ENSG00000050344					
667	ENSG00000120837	NFYB				
668	ENSG00000066136					
669	ENSG00000166681			NGFRAP1		
670	ENSG00000140157				NIPA2	
671	ENSG00000164190		NIPBL	NIPBL	NIPBL	
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Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
681	ENSG00000106459					NRF1
682	ENSG00000180530		NRIP1	NRIP1		
683	ENSG00000035681					
684	ENSG00000137497					
685	ENSG00000124789	NUP153		NUP153	NUP153	
686	ENSG00000162231			NXF1		
687	ENSG00000101888			NXT2		
688	ENSG00000065154					
689	ENSG00000115758					
690	ENSG00000046651	OFD1		OFD1		OFD1
691	ENSG00000147162		OGT		OGT	
692	ENSG00000182606					
693	ENSG00000141447	OSBPL1A			OSBPL1A	
694	ENSG00000091039					
695	ENSG00000117859					
696	ENSG00000167770					
697	ENSG00000172939			OXSR1		
698	ENSG00000170515					
699	ENSG00000070756			PABPC1		
700	ENSG00000151846			PABPC3		
701	ENSG00000090621			PABPN1		
702	ENSG00000100836					
703	ENSG00000100266					
704	ENSG00000172239					
705	ENSG00000142864		PAI-RBP1			
706	ENSG00000180370					
707	ENSG00000157654		PALM2-AKAP2	PALM2-AKAP2		
708	ENSG00000145730			PAM		
709	ENSG00000090060				PAPOLA	
710	ENSG00000115421	PAPOLG				PAPOLG
711	ENSG00000177425					
712	ENSG00000157212	PAXIP1				
713	ENSG00000105835					
714	ENSG00000113387					
715	ENSG00000169564		PCBP1			PCBP1
716	ENSG00000197111					
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Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
726	ENSG00000150593		PDCD4			
727	ENSG00000184588			PDE4B		
728	ENSG00000145431				PDGFC	
729	ENSG00000168291					
730	ENSG00000065485			PDIA5		
731	ENSG00000143870		PDIA6			
732	ENSG00000162734					
733	ENSG00000197329				PELI1	
734	ENSG00000132326					
735	ENSG00000152556			PFKM		
736	ENSG00000067057	PFKP				
737	ENSG00000164040					
738	ENSG00000167085			PHB		
739	ENSG00000112511					
740	ENSG00000130024					
741	ENSG00000043143					
742	ENSG00000025293	PHF20	PHF20		PHF20	
743	ENSG00000118482				PHF3	
744	ENSG00000033800					
745	ENSG00000073921					
746	ENSG00000166037					
747	ENSG00000051382				PIK3CB	
748	ENSG00000145675		PIK3R1	PIK3R1		
749	ENSG00000137193		PIM1			
750	ENSG00000102096					
751	ENSG00000107242					PIP5K1B
752	ENSG00000154217					
753	ENSG00000181191					
754	ENSG00000171033	PKIA		PKIA		
755	ENSG00000118495					
756	ENSG00000052126					
757	ENSG00000115762					
758	ENSG00000104886					
759	ENSG00000152952					
760	ENSG00000102024		PLS3			
761	ENSG00000136040	PLXNC1		PLXNC1		
762	ENSG00000004399					
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Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
772	ENSG00000163806			PPP1CB	PPP1CB	PPP1CB
773	ENSG00000186298			PPP1CC		
774	ENSG00000112498					PPP1R11
775	ENSG00000058272			PPP2R2A		
776	ENSG00000113575				PPP2CA	
777	ENSG00000104695					
778	ENSG00000104762					
779	ENSG00000078304		PPP2R5C			
780	ENSG00000154001					
781	ENSG00000138814		PPP3CA			
782	ENSG00000107758	PPP3CB		PPP3CB		PPP3CB
783	ENSG00000154845	PPP4R1				
784	ENSG00000119414	PPP6C	PPP6C			
785	ENSG00000131238					
786	ENSG00000116731					
787	ENSG00000110851		PRDM4			
788	ENSG00000138073					
789	ENSG00000122862		PRG1			
790	ENSG00000142875					PRKACB
791	ENSG00000005249					
792	ENSG00000166501			PRKCB1		
793	ENSG00000101040		PRKCBP1			
794	ENSG00000115825				PRKD3	
795	ENSG00000137492					
796	ENSG00000185246					
797	ENSG00000147224					
798	ENSG00000197746				PSAP	
799	ENSG00000129084			PSMA1		
800	ENSG00000106588					
801	ENSG00000143106					PSMA5
802	ENSG00000100519	PSMC6				
803	ENSG00000108344					PSMD3
804	ENSG00000125818					
805	ENSG00000121390					
806	ENSG00000117569				PTBP2	
807	ENSG00000138430					PTBP2
808	ENSG00000171862					
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Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
818	ENSG00000130508	PXDN			PXDN	
819	ENSG00000112531	QKI	QKI	QKI	QKI	QKI
820	ENSG00000048991				R3HDM	
821	ENSG00000103769			RAB11A		
822	ENSG00000119396	RAB14				
823	ENSG00000138069				RAB1A	
824	ENSG00000080371			RAB21		
825	ENSG00000111737	RAB35	RAB35	RAB35		
826	ENSG00000144566				RAB5A	
827	ENSG00000111540	RAB5B			RAB5B	
828	ENSG00000175582	RAB6A				
829	ENSG00000075785					RAB7
830	ENSG00000167461			RAB8A	RAB8A	
831	ENSG00000152061					
832	ENSG00000136238					
833	ENSG00000152942					
834	ENSG00000164754					
835	ENSG00000119318	RAD23B			RAD23B	
836	ENSG00000108175					
837	ENSG00000017797				RALBP1	
838	ENSG00000132341					
839	ENSG00000153201					
840	ENSG00000065150					
841	ENSG00000137040					
842	ENSG00000010017					
843	ENSG00000116473					
844	ENSG00000127314	RAP1B		RAP1B		
845	ENSG00000138698					
846	ENSG00000181467					
847	ENSG00000109756			RAPGEF2		
848	ENSG00000077092		RARB		RARB	RARB
849	ENSG00000145715					
850	ENSG00000101265					
851	ENSG00000139687					
852	ENSG00000023287	RB1CC1				
853	ENSG00000122257	RBBP6	RBBP6			
854	ENSG00000102054	RBBP7	RBBP7			
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Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
864	ENSG00000136144					
865	ENSG00000049449					
866	ENSG00000117906					
867	ENSG00000089902					
868	ENSG00000137710					
869	ENSG00000173039					
870	ENSG00000157916					
871	ENSG00000142599			RERE		
872	ENSG00000056687			RGL2		
873	ENSG00000090104			RGS1		
874	ENSG00000171700					
875	ENSG00000106615			RHEB		
876	ENSG00000067560			RHOA	RHOA	RHOA
877	ENSG00000177105					
878	ENSG00000119729					
879	ENSG00000126858			RHOT1		
880	ENSG00000101782					
881	ENSG00000176624					
882	ENSG00000022840				RNF10	RNF10
883	ENSG00000123091				RNF11	RNF11
884	ENSG00000082996					
885	ENSG00000134758					
886	ENSG00000170881			RNF139		
887	ENSG00000170633					
888	ENSG00000137075		RNF38	RNF38	RNF38	
889	ENSG00000063978					RNF4
890	ENSG00000127870	RNF6				
891	ENSG00000131051					
892	ENSG00000167971	RNPS1				
893	ENSG00000043093		RP42	RP42		
894	ENSG00000132383					
895	ENSG00000117748					
896	ENSG00000153574					
897	ENSG00000144713		RPL32			
898	ENSG00000163902			RPN1		
899	ENSG00000171858					
900	ENSG00000143947				RPS27A	
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Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
910	ENSG00000020633				RUNX3	
911	ENSG00000163602	RYBP	RYBP	RYBP	RYBP	
912	ENSG00000163785					
913	ENSG00000198838				RYR3	
914	ENSG00000160633		SAFB			
915	ENSG00000130254					
916	ENSG00000136715					
917	ENSG00000079332	SARA1				
918	ENSG00000130066					
919	ENSG00000182568			SATB1	SATB1	
920	ENSG00000052802					SC4MOL
921	ENSG00000085365		SCAMP1			
922	ENSG00000140497	SCAMP2			SCAMP2	
923	ENSG00000138760					
924	ENSG00000121892		SCC-112			
925	ENSG00000151967		SCHIP1			SCHIP1
926	ENSG00000010803					
927	ENSG00000137575		SDCBP			
928	ENSG00000156642		SDFR1		SDFR1	SDFR1
929	ENSG00000140612					
930	ENSG00000155878					
931	ENSG00000121542					
932	ENSG00000107651					SEC23IP
933	ENSG00000138802		SEC24B			
934	ENSG00000075223					
935	ENSG00000168758					
936	ENSG00000092421			SEMA6A		
937	ENSG00000122545	2-Sep			7-Sep	
938	ENSG00000120742	SERP1				
939	ENSG00000179833	SERTAD2	SERTAD2	SERTAD2	SERTAD2	SERTAD2
940	ENSG00000080546		SESN1			
941	ENSG00000119335	SET	SET	SET		SET
942	ENSG00000115524					
943	ENSG00000116560	SFPQ		SFPQ		
944	ENSG00000136450			SFRS1		SFRS1
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Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
956	ENSG00000116350					
957	ENSG00000100650		SFRS5			
958	ENSG00000124193					SFRS6
959	ENSG00000115875					
960	ENSG00000198730					
961	ENSG00000162105				SHANK2	
962	ENSG00000182199					
963	ENSG00000108061			SHOC2		
964	ENSG00000196470					
965	ENSG00000096717	SIRT1		SIRT1		SIRT1
966	ENSG00000124523					
967	ENSG00000113558	SKP1A				
968	ENSG00000155926					
969	ENSG00000165646					
970	ENSG00000004864					
971	ENSG00000122912					
972	ENSG00000178537					
973	ENSG00000075415					
974	ENSG00000147454			SLC25A37		
975	ENSG00000005022					SLC25A5
976	ENSG00000117394					
977	ENSG00000059804	SLC2A3				
978	ENSG00000134294					
979	ENSG00000138821					
980	ENSG00000080493		SLC4A4			
981	ENSG00000175387					
982	ENSG00000112305			SMAP1	SMAP1	
983	ENSG00000102038					SMARCA1
984				SMARCA2		
985	ENSG00000127616					
986	ENSG00000173473	SMARCC1				
987	ENSG00000073584		SMARCE1			
988	ENSG00000077147					
989	ENSG00000072501					
990	ENSG00000102172				SMS	
991	ENSG00000145335					
992	ENSG00000184602					
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999						
1000						
1001						

Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
1002	ENSG00000124766	SOX4			SOX4	
1003	ENSG00000067066					
1004	ENSG00000172845					
1005	ENSG00000091640		SPAG7			SPAG7
1006	ENSG00000008294	SPAG9				
1007	ENSG00000113140					
1008	ENSG00000065526				SPEN	
1009	ENSG00000095480					
1010	ENSG00000147475					
1011	ENSG00000152268					SPON1
1012						
1013	ENSG00000164056					
1014	ENSG00000115306				SPTBN1	
1015	ENSG00000090054		SPTLC1			
1016	ENSG00000100596					
1017	ENSG00000116649		SRM			
1018	ENSG00000153037					
1019	ENSG00000096063					
1020	ENSG00000135250					
1021	ENSG00000124783				SSR1	
1022	ENSG00000149136					
1023	ENSG00000101972					
1024	ENSG00000084090			STARD7		
1025	**ENSG00000168610**	**STAT3**				
1026	ENSG00000173757					
1027	ENSG00000167323					
1028	ENSG00000166301					
1029	ENSG00000102572			STK24		
1030	ENSG00000112079	STK38			STK38	
1031	ENSG00000198648			STK39		
1032	ENSG00000117632					
1033	ENSG00000165283					
1034	ENSG00000124222			STX16		
1035	ENSG00000168952					
1036	ENSG00000173812				SUI1	
1037	ENSG00000116030			SUMO1		
1038	ENSG00000180283					SUMO2
1039						
1040						
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Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
1048	ENSG00000120948		TARDBP		TARDBP	
1049						
1050						
1051			TBPL1		TBPL1	
1052						
1053			TCEB1			
1054	ENSG00000113649					
1055						
1056						
1057						
1058						
1059			TCTE1L			
1060						
1061						
1062					TERF2	
1063					TES	
1064						
1065	ENSG00000198176					
1066					TFDP2	
1067						
1068				TGIF	TGIF	
1069		TGOLN2				
1070	ENSG00000123066			THRAP2		
1071	ENSG00000116001			TIA1		
1072						
1073						
1074			TLK1			
1075						
1076		TM4SF13				
1077						
1078	ENSG00000101337			TM9SF4		
1079	ENSG00000062716					
1080						
1081	ENSG00000120802					
1082				TMSB10		
1083			TMX2			
1084						
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Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
1093	ENSG00000111669					TPM1
1094	ENSG00000140416					
1095			TPP1		TPP1	
1096						
1097			TRAM1		TRAM1	
1098						
1099	ENSG00000166326		TRIM44			
1100				TRIB1		
1101	ENSG00000043514					
1102				TROVE2		
1103					TSPAN3	
1104				TSC1		
1105	ENSG00000102804	TSC22D1				
1106	ENSG00000157514		TSC22D3			TSC22D3
1107	ENSG00000163084					
1108						
1109	ENSG00000143367		TUFT1			
1110	ENSG00000139921			TXNDC		
1111						
1112						
1113						
1114		UBC				
1115	ENSG00000077721		UBE2A			
1116		UBE2B			UBE2B	UBE2B
1117	ENSG00000131508		UBE2D2		UBE2D2	
1118			UBE2D3		UBE2D3	UBE2D3
1119						
1120			UBE2E3	UBE2E3		
1121					UBE2G1	
1122	ENSG00000103275					
1123						
1124	ENSG00000185651					
1125				UBE2N		
1126			UBE2Q	UBE2Q		
1127			UBE2V1 /// Kua-UEV	UBE2V1 /// Kua-UEV		
1128	ENSG00000114062	UBE3A			UBE3A	
1129						
1130						
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1135						
1136						
1137						

Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
1138	ENSG00000164828					
1139	ENSG00000100242		UNC84B			
1140						
1141						
1142	ENSG00000152484					
1143	ENSG00000101557		USP14			
1144		USP15	USP15		USP15	
1145					USP32	
1146	ENSG00000077254				USP33	
1147	ENSG00000115464			USP34		
1148					USP47	
1149					USP48	
1150				USP9X		
1151	ENSG00000173218	VANGL1			VANGL1	
1152	ENSG00000101558					
1153	ENSG00000124164					
1154						
1155			VAMP4			
1156						
1157						
1158			VAT1			
1159						
1160						
1161			VCL	VCL		
1162	ENSG00000165280					
1163	ENSG00000073905					
1164	ENSG00000078668					
1165					VGLL4	
1166						
1167					VPS24	
1168			VPS35			
1169	ENSG00000167987					
1170				VPS4B		
1171						VPS16
1172						
1173						VPS54
1174	ENSG00000105053					VPS55
1175						
1176						
1177						
1178						
1179						
1180						
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Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
1184	ENSG00000109685		WHSC1			
1185			WIPI-2			
1186				WSB1		
1187	ENSG00000146457				WTAP	
1188						
1189	ENSG00000115254					
1190						
1191	ENSG00000169180			XPO6		
1192					YLPM1	
1193					YPEL5	
1194						
1195					YTHDF2	
1196			YT521			
1197		YWHAB		YWHAB	YWHAB	YWHAB
1198						
1199			YWHAH			
1200	ENSG00000134308		YWHAQ	YWHAQ		
1201						
1202						
1203					ZA20D2	ZA20D2
1204						
1205						
1206						
1207						
1208						
1209				ZDHHC17		ZDHHC17
1210				ZFP36L1	ZFP36L1	
1211			ZFP36L2		ZFP36L2	
1212		ZMYND11				
1213	ENSG00000010244					
1214						
1215		ZNF148			ZNF148	
1216						
1217						
1218						ZNF410
1219			ZNF207	ZNF207		
1220		ZNF238	ZNF238	ZNF238	ZNF238	
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Figure 12, con'd

	A	U	V	W	X	Y
1		**miR-106**	**miR-107**	**miR-128a**	**miR-130a**	**miR-146**
1230	ENSG00000036549			ZZZ3		

Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
2	ENSG00000145495		6-Mar			
3	ENSG00000136536					
4	ENSG00000165406					
5	ENSG00000168385					
6	ENSG00000125354					
7	ENSG00000122545					
8	ENSG00000138758					
9	ENSG00000111780					
10	ENSG00000137822					
11	ENSG00000165029					
12	ENSG00000125257					
13	ENSG00000114770		ABCC5			
14	ENSG00000161533					
15	ENSG00000151726		ACSL1			
16	ENSG00000075624					
17	ENSG00000184009					
18	ENSG00000136518					
19	ENSG00000072110					
20	ENSG00000138071					ACTR2
21	ENSG00000115091					
22	ENSG00000137845					
23	ENSG00000138031					
24	ENSG00000087274					
25	ENSG00000148700					
26	ENSG00000101126					
27	ENSG00000173020		ADRBK1			
28	ENSG00000172493		AFF1			
29	ENSG00000168448		AGPAT1			
30	ENSG00000155189					
31	ENSG00000168710					
32	ENSG00000004455					
33	ENSG00000108599	AKAP10				
34	ENSG00000023516					
35	ENSG00000170776					
36	ENSG00000151320		AKAP6			
37	ENSG00000117020		AKT3			
38	ENSG00000170017	ALCAM				ALCAM
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
48	ENSG00000177879					
49	ENSG00000120868					
50	ENSG00000144848	APG3L				
51	ENSG00000101844					
52	ENSG00000084234		APLP2			
53	ENSG00000142192					
54	ENSG00000062725		APPBP2			
55	ENSG00000095139					
56	ENSG00000143761					
57	ENSG00000134287		ARF3			
58	ENSG00000168374			ARF4		
59	ENSG00000165527					
60	ENSG00000175220					
61	ENSG00000137962					
62	ENSG00000104880					
63	ENSG00000129675					
64	ENSG00000117713					
65	ENSG00000054267					
66	ENSG00000177479		ARIH2			
67	ENSG00000134108					
68	ENSG00000110025					
69	ENSG00000138175		ARL3			
70	ENSG00000170540					
71	ENSG00000188042					
72	ENSG00000163466					
73	ENSG00000136950					
74	ENSG00000128989					
75	ENSG00000111875	ASF1A				
76	ENSG00000116539					
77	ENSG00000171456					
78	ENSG00000143970					
79	ENSG00000123268					ATF1
80	ENSG00000149311					
81	ENSG00000163399					
82	ENSG00000143153	ATP1B1	ATP1B1	ATP1B1		
83	ENSG00000174437		ATP2A2	ATP2A2		
84	ENSG00000017260					
85						
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
94	ENSG00000198604					
95	ENSG00000119866	BCL11A	BCL11A	BCL11A		BCL11A
96	ENSG00000171791	BCL2	BCL2			
97	ENSG00000029363		BCLAF1			
98	ENSG00000105829					
99	ENSG00000134107		BHLHB2	BHLHB2		
100	ENSG00000138756					
101	ENSG00000104765					
102	ENSG00000060762					
103	ENSG00000160058					
104	ENSG00000095564					
105	ENSG00000145741					
106	ENSG00000133639					
107	ENSG00000159388					
108	ENSG00000154640					
109	ENSG00000082153					
110	ENSG00000136261					
111	ENSG00000181915		C10orf22			
112	ENSG00000119906					
113	ENSG00000110075					
114	ENSG00000171067					
115	ENSG00000139746		C13orf10			
116	ENSG00000133935					
117	ENSG00000168175					
118	ENSG00000134153					C15orf24
119	ENSG00000152242					
120	ENSG00000141452	C18orf8				
121	ENSG00000105176					
122	ENSG00000163875		C1orf149			
123	ENSG00000163444					
124	ENSG00000117616		C1orf63			
125	ENSG00000108561					
126	ENSG00000110888					
127	ENSG00000132823					
128	ENSG00000101084					
129	ENSG00000101166					
130	ENSG00000126749					
131						
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
140	ENSG00000136819					
141	ENSG00000136925					
142	ENSG00000074410		CA12			
143	ENSG00000104267					
144	ENSG00000135932	CAB39	CAB39			
145	ENSG00000104327					
146	ENSG00000179218					
147	ENSG00000127022					
148	ENSG00000131236					
149	ENSG00000135837					
150	ENSG00000116489				CAPZA1	
151	ENSG00000198898					
152	ENSG00000077549					
153	ENSG00000168564		CARF	CARF		
154	ENSG00000142453		CARM1			
155	ENSG00000110619		CARS			
156	ENSG00000108349	CASC3				
157	ENSG00000153113					
158	ENSG00000130940					
159	ENSG00000067955					
160	ENSG00000108468					
161	ENSG00000100261					
162	ENSG00000112237					
163	ENSG00000118971					
164	ENSG00000112576					
165	ENSG00000113328					
166	ENSG00000138764			CCNG1		
167	ENSG00000134480					
168	ENSG00000118816					
169	ENSG00000163660					
170	ENSG00000082258					CCNT2
171	ENSG00000166226					
172	ENSG00000163468					
173	ENSG00000135535					
174	ENSG00000174059					
175	ENSG00000196776	CD47				
176	ENSG00000110848		CD69			
177						
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
186	ENSG00000143126					
187			CENTB2			
188	ENSG00000153140					
189	ENSG00000153774					
190	ENSG00000172757					
191	ENSG00000163320		CGGBP1			
192	ENSG00000153922					
193	ENSG00000111642					
194	ENSG00000177200	CHD9	CHD9			
195	ENSG00000072609					
196	ENSG00000110172					
197	ENSG00000131873					
198	ENSG00000109572					
199	ENSG00000113240					
200	ENSG00000122705					
201	ENSG00000141367			CLTC		
202	ENSG00000162368					
203	ENSG00000100528	CNIH				
204	ENSG00000125107					
205	ENSG00000111596		CNOT2	CNOT2		
206	ENSG00000198791					
207	ENSG00000121058					
208	ENSG00000129083					
209	ENSG00000166200					
210	ENSG00000141030	COPS3				
211	ENSG00000138663					
212	ENSG00000110880					
213	ENSG00000178741					
214	ENSG00000135940					
215	ENSG00000115944					
216	ENSG00000111605					
217	ENSG00000118260					
218	ENSG00000005339	CREBBP				
219	ENSG00000111269					CREBL2
220	ENSG00000145708					
221						
222	ENSG00000099942					
223						
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229						
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
232	ENSG00000175215					
233	ENSG00000168036					
234	ENSG00000198561		CTNND1			
235	ENSG00000171793					
236	ENSG00000149187		CUGBP1	CUGBP1		
237	ENSG00000048740	CUGBP2	CUGBP2	CUGBP2		
238	ENSG00000036257		CUL3			
239	ENSG00000166266					
240	ENSG00000160967	CUTL1				
241	ENSG00000121966		CXCR4			
242	ENSG00000166347					
243	ENSG00000008283					
244	ENSG00000172115			CYCS		
245	ENSG00000083799					
246	ENSG00000140181					
247	ENSG00000165659					
248	ENSG00000196730					
249	ENSG00000071626					
250	ENSG00000183283		DAZAP2			
251	ENSG00000137992					DBT
252	ENSG00000172795					
253	ENSG00000085788					
254	ENSG00000168209	DDIT4		DDIT4		
255	ENSG00000124487		DDX3X			DDX3X
256	ENSG00000067048		DDX3Y			
257	ENSG00000108654					
258	ENSG00000141141					
259	ENSG00000158796					
260	ENSG00000124795					
261	ENSG00000139726					
262	ENSG00000155792					
263	ENSG00000136986		DERL1			
264	ENSG00000109606			DHX15		
265	ENSG00000132153					
266	ENSG00000108406	DHX40				
267	**ENSG00000100697**					
268						
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
274	ENSG00000158486					
275	ENSG00000086061					
276	ENSG00000132002	DNAJB1				
277	ENSG00000105993					
278	ENSG00000128590	DNAJB9				
279	ENSG00000077380					
280	ENSG00000074603					
281	ENSG00000092964		DPYSL2			
282	ENSG00000117505					
283	ENSG00000167264					
284	ENSG00000143507		DUSP10			
285	ENSG00000139318		DUSP6			
286	ENSG00000004975					
287	ENSG00000161202					
288	ENSG00000157540					DYRK1A
289	**ENSG00000112242**					
290	ENSG00000147654					
291	ENSG00000104517					
292	ENSG00000198121					
293	ENSG00000156508					
294	ENSG00000124802					
295	ENSG00000186676					
296	ENSG00000183690					
297	ENSG00000142634					
298	ENSG00000171570					
299	ENSG00000120738		EGR1	EGR1	EGR1	
300	ENSG00000110047	EHD1				
301						
302	ENSG00000092847		EIF2C1		EIF2C1	
303	ENSG00000123908		EIF2C2			
304	ENSG00000134001					
305	ENSG00000104131					
306	ENSG00000107581					
307	ENSG00000156976		EIF4A2			
308	ENSG00000063046					
309	ENSG00000151247					
310	ENSG00000135930				EIF4E2	
311						
312						
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315						
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317						

Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
318	ENSG00000102034					
319	ENSG00000111145					
320	ENSG00000155849					
321	ENSG00000062598					
322	ENSG00000012660					
323	ENSG00000170522					
324	ENSG00000143420					
325	ENSG00000120533					
326	ENSG00000120616		EPC1	EPC1		
327	ENSG00000050405					
328	ENSG00000085832					
329	ENSG00000124882					EREG
330	ENSG00000157554		ERG			
331	ENSG00000120705	ETF1	ETF1	ETF1		
332	ENSG00000157557					
333	ENSG00000182944					
334	ENSG00000120699					
335	ENSG00000108799					
336	ENSG00000106462					
337	ENSG00000124491					
338	ENSG00000119979					
339	ENSG00000153310					
340	ENSG00000139146		FAM60A	FAM60A		
341	ENSG00000105216					
342	ENSG00000179115					
343	ENSG00000166147					
344	ENSG00000173120					
345	ENSG00000118564					
346	ENSG00000138081	FBXO11	FBXO11	FBXO11		
347						
348	ENSG00000143756		FBXO28			
349	ENSG00000178974					
350	ENSG00000037637					
351	ENSG00000112146					
352	ENSG00000119402					
353	ENSG00000068078					
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
363	ENSG00000159202					
364	ENSG00000153561					
365	ENSG00000181495					
366	ENSG00000175606					
367	ENSG00000136122					
368	ENSG00000132589					
369	ENSG00000196504					
370						
371	ENSG00000170345	FOS	FOS			
372	ENSG00000125740					
373	ENSG00000137273					
374	ENSG00000198815					
375	ENSG00000150907					
376	ENSG00000118689					
377	ENSG00000114861		FOXP1			
378	ENSG00000165879					
379	ENSG00000163430					
380	ENSG00000114416	FXR1				
381	ENSG00000145907					
382	ENSG00000138757	G3BP2	G3BP2			
383	ENSG00000034713	GABARAPL2				
384	ENSG00000104064					
385	ENSG00000116717					
386	ENSG00000141429					
387	ENSG00000143641					
388	ENSG00000109586					
389	ENSG00000165219		GAPVD1			
390	ENSG00000179348					
391	ENSG00000107485					
392	ENSG00000146729					
393	ENSG00000001084					
394	ENSG00000057608					
395	ENSG00000100083					
396	ENSG00000165678		GHITM			
397	ENSG00000108588					
398	ENSG00000115419		GLS			
399	ENSG00000196700					
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
409	ENSG00000185245					
410	ENSG00000159592					
411	ENSG00000112414					
412	ENSG00000106070		GRB10	GRB10		
413	ENSG00000103342		GSPT1	GSPT1		
414	ENSG00000140307					
415	ENSG00000110768					
416	ENSG00000077809					
417	ENSG00000115207					
418	ENSG00000188486					
419						
420	ENSG00000091527					
421	ENSG00000112339					
422	ENSG00000172534					
423	ENSG00000180353					
424	ENSG00000116478				HDAC1	
425	ENSG00000143321					
426	ENSG00000166503		HDGFRP3			
427	ENSG00000013583					
428	ENSG00000112406		HECA			
429	ENSG00000103657					
430	ENSG00000128731					
431	ENSG00000051108					
432	ENSG00000114315				**HES1**	
433	ENSG00000164683					
434	ENSG00000152804					
435	ENSG00000100644	HIF1A				
436	ENSG00000181061					
437	ENSG00000078140					
438	ENSG00000163349		HIPK1			
439	ENSG00000010818	HIVEP2				
440	ENSG00000137361					
441	ENSG00000100281					
442	ENSG00000189403		HMGB1			
443	ENSG00000164104		HMGB2			
444	ENSG00000029993					
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
455	ENSG00000096746		HNRPH3			
456	ENSG00000165119		HNRPK		HNRPK	
457	ENSG00000104824					
458	ENSG00000099783					
459	ENSG00000125944					
460	ENSG00000153187	HNRPU				
461	ENSG00000105323					
462	ENSG00000010295					
463	ENSG00000106004		**HOXB5**			
464	ENSG00000078399					
465	ENSG00000120075					
466	ENSG00000120087					
467	ENSG00000153807					**HOXA10**
468	ENSG00000173744		HRB			
469	ENSG00000074356					
470	ENSG00000164164		HSHIN1			
471	ENSG00000044574		HSPA5	HSPA5		
472	ENSG00000109971					
473	ENSG00000144381					
474	ENSG00000120694					
475	ENSG00000136478					
476	ENSG00000086758					
477	ENSG00000108622					
478	ENSG00000067829					
479	ENSG00000109083					
480	ENSG00000068745					
481	ENSG00000070061					
482	ENSG00000129351		ILF3			
483	ENSG00000105135					
484	ENSG00000153487					
485	ENSG00000168556					
486	ENSG00000071243					
487	ENSG00000068383		INPP5A			
488	ENSG00000148384		INPP5E			
489	ENSG00000186480					
490	ENSG00000171105					
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
500	ENSG00000078596			ITM2A		
501	ENSG00000116679					
502	ENSG00000184916					
503	ENSG00000117139					
504	ENSG00000008083	JARID2			JARID2	
505	ENSG00000115548					
506	ENSG00000171988	JMJD1A				
507	ENSG00000177606	JUN				
508	ENSG00000137944					
509	ENSG00000170852	KBTBD2				
510	ENSG00000176407					
511	ENSG00000055118	KCNH2				
512	ENSG00000136240					
513	ENSG00000121774		KHDRBS1	KHDRBS1		
514	ENSG00000088247					
515	ENSG00000131149		KIAA0182			
516	ENSG00000179889					
517	ENSG00000136813					
518	ENSG00000145725		KIAA0433			
519	ENSG00000143702					
520	ENSG00000119321					KIAA0674
521	ENSG00000197226					
522	ENSG00000126775					
523	ENSG00000164151					
524	ENSG00000105063					
525	ENSG00000126814					
526	ENSG00000156232					
527	ENSG00000170759					
528	ENSG00000157404					
529	ENSG00000127528					
530	ENSG00000136826					
531	ENSG00000067082		**KLF6**			
532	ENSG00000155090					
533	ENSG00000165516					
534	ENSG00000114030	KPNA1	KPNA1			
535	ENSG00000102753					
536	ENSG00000108424			KPNB1		
537						
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
546	ENSG00000143815		LBR			
547	ENSG00000157978					
548	ENSG00000065548					
549	ENSG00000100097					
550	ENSG00000148943		LIN7C			
551	ENSG00000189067					
552	ENSG00000166783					
553	ENSG00000160789					
554	ENSG00000113368					
555	ENSG00000135363					
556	ENSG00000111252					
557	ENSG00000152102					
558	ENSG00000120963					
559	ENSG00000102897					
560	ENSG00000121104					
561	ENSG00000123684					
562	ENSG00000145012					
563	ENSG00000110031					
564	ENSG00000077454					
565	ENSG00000198799					
566	ENSG00000171492					
567	ENSG00000124831		LRRFIP1			
568	ENSG00000175324					
569	ENSG00000146963					
570	ENSG00000054219					
571	ENSG00000120992					
572	ENSG00000011009					
573	ENSG00000163818					
574	ENSG00000135387					
575	ENSG00000003056					
576	ENSG00000143033					
577	ENSG00000127603					MACF1
578	ENSG00000110514					
579	ENSG00000187391					
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
589	ENSG00000047849					
590	ENSG00000104814					
591	ENSG00000012983	MAP4K5				
592	ENSG00000135525					
593	ENSG00000100030					
594	ENSG00000112062					
595	ENSG00000101367	MAPRE1				
596	ENSG00000166974					
597	ENSG00000175130		MARCKSL1			MARCKSL1
598	ENSG00000075413					
599	ENSG00000166986					
600	ENSG00000168906	MAT2A	MAT2A	MAT2A		
601	ENSG00000038274					
602	ENSG00000015479	MATR3				
603	ENSG00000125952					
604	ENSG00000134046					
605	ENSG00000152601					
606	ENSG00000180398					
607	ENSG00000121940					
608	ENSG00000112118					
609	ENSG00000082212					
610	ENSG00000124733					
611	ENSG00000081189					
612	ENSG00000143995	**MEIS1**				
613	ENSG00000133895					
614	ENSG00000164024		METAP1			
615	ENSG00000168282		MGAT2			
616	ENSG00000138092					
617	ENSG00000133858					
618	ENSG00000198408					
619	ENSG00000079277					
620	ENSG00000133606		MKRN1			
621	ENSG00000089693					
622	**ENSG00000171843**		MLLT3			
623	ENSG00000108788					
624	ENSG00000056586	MNAB				
625	ENSG00000165943					
626						
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
635	ENSG00000125445					
636	ENSG00000005302					
637	ENSG00000147065					MSN
638	ENSG00000182979				MTA1	
639	ENSG00000147649					
640	ENSG00000143033					
641	ENSG00000100330					
642	ENSG00000108389					MTMR4
643	ENSG00000170873			MTSS1		
644	ENSG00000128654					
645	ENSG00000118513					
646	ENSG00000005810	MYCBP2	MYCBP2			
647	ENSG00000133026		MYH10	MYH10		
648	ENSG00000136504		MYST2	MYST2		
649	ENSG00000102921					
650	ENSG00000138386		NAB1			NAB1
651	ENSG00000187109		NDFIP1			
652	ENSG00000132780					
653	ENSG00000158747					
654	ENSG00000115053					
655	ENSG00000198646					
656	ENSG00000196498					
657	ENSG00000166579					
658	ENSG00000131507					
659	ENSG00000125356					
660	ENSG00000189043					
661						
662	ENSG00000069869					
663	ENSG00000173848					
664	ENSG00000082641					
665	ENSG00000116044					
666	ENSG00000050344					
667	ENSG00000120837					
668	ENSG00000066136					
669	ENSG00000166681					
670	ENSG00000140157					
671	ENSG00000164190	NIPBL		NIPBL	NIPBL	
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
681	ENSG00000106459					
682	ENSG00000180530		NRIP1			NRIP1
683	ENSG00000035681		NSMAF			
684	ENSG00000137497					
685	ENSG00000124789		NUP153	NUP153		
686	ENSG00000162231					
687	ENSG00000101888					
688	ENSG00000065154					
689	ENSG00000115758		ODC1			
690	ENSG00000046651			OFD1		
691	ENSG00000147162	OGT	OGT			
692	ENSG00000182606		OIP106			
693	ENSG00000141447					
694	ENSG00000091039		OSBPL8	OSBPL8		
695	ENSG00000117859					
696	ENSG00000167770					
697	ENSG00000172939					
698	ENSG00000170515					
699	ENSG00000070756					
700	ENSG00000151846					
701	ENSG00000090621					PABPC4
702	ENSG00000100836		PABPN1			
703	ENSG00000100266					
704	ENSG00000172239			PAIP1		
705	ENSG00000142864					
706	ENSG00000180370					
707	ENSG00000157654			PALM2-AKAP2		
708	ENSG00000145730	PAM	PAM	PAM		
709	ENSG00000090060	PAPOLA				
710	ENSG00000115421		PAPOLG	PAPOLG		
711	ENSG00000177425					
712	ENSG00000157212					
713	ENSG00000105835					
714	ENSG00000113387	PC4				
715	ENSG00000169564					
716	ENSG00000197111					
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
726	ENSG00000150593		PDCD4			
727	ENSG00000184588	PDE4B				
728	ENSG00000145431					
729	ENSG00000168291					
730	ENSG00000065485			PDIA5		
731	ENSG00000143870		PDIA6			
732	ENSG00000162734					
733	ENSG00000197329	PELI1	PELI1			
734	ENSG00000132326		PER2			
735	ENSG00000152556					
736	ENSG00000067057					
737	ENSG00000164040					
738	ENSG00000167085					
739	ENSG00000112511					
740	ENSG00000130024					
741	ENSG00000043143		PHF15			
742	ENSG00000025293					
743	ENSG00000118482		PHF3			
744	ENSG00000033800					
745	ENSG00000073921	PICALM	PICALM			
746	ENSG00000166037					
747	ENSG00000051382					
748	ENSG00000145675					
749	ENSG00000137193					
750	ENSG00000102096					
751	ENSG00000107242					
752	ENSG00000154217					
753	ENSG00000181191					
754	ENSG00000171033	PKIA				
755	ENSG00000118495					
756	ENSG00000052126					
757	ENSG00000115762				PLEKHB2	
758	ENSG00000104886		PLEKHJ1			
759	ENSG00000152952					
760	ENSG00000102024		PLS3			
761	ENSG00000136040	PLXNC1	PLXNC1			
762	ENSG00000004399					
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
772	ENSG00000163806		PPP1CB			
773	ENSG00000186298					
774	ENSG00000112498					
775	ENSG00000058272					
776	ENSG00000113575					
777	ENSG00000104695					
778	ENSG00000104762					
779	ENSG00000078304					
780	ENSG00000154001					
781	ENSG00000138814			PPP3CA		
782	ENSG00000107758					PPP3CB
783	ENSG00000154845					PTBP2
784	ENSG00000119414					QKI
785	ENSG00000131238					RB1
786	ENSG00000116731					RNF38
787	ENSG00000110851					RUNX1
788	ENSG00000138073					SERTAD2
789	ENSG00000122862					SFRS6
790	ENSG00000142875					SLC25A37
791	ENSG00000005249					STX16
792	ENSG00000166501					SYT11
793	ENSG00000101040					UBE2D3
794	ENSG00000115825					USP1
795	ENSG00000137492				PRKRIR	
796	ENSG00000185246	PRPF39				
797	ENSG00000147224					
798	ENSG00000197746		PSAP			
799	ENSG00000129084					
800	ENSG00000106588					
801	ENSG00000143106					
802	ENSG00000100519					
803	ENSG00000108344					
804	ENSG00000125818		PSMF1	PSMF1		
805	ENSG00000121390			PSPC1		
806	ENSG00000117569	PTBP2	PTBP2		PTBP2	PTBP2
807	ENSG00000138430		PUM1	PTD004		
808	ENSG00000171862					
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
818	ENSG00000130508					
819	ENSG00000112531	QKI	QKI			QKI
820	ENSG00000048991					
821	ENSG00000103769		RAB11A			
822	ENSG00000119396		RAB14			
823	ENSG00000138069	RAB1A				
824	ENSG00000080371					
825	ENSG00000111737					
826	ENSG00000144566					
827	ENSG00000111540					
828	ENSG00000175582	RAB6A	RAB6A			
829	ENSG00000075785					
830	ENSG00000167461					
831	ENSG00000152061					
832	ENSG00000136238					
833	ENSG00000152942					
834	ENSG00000164754		RAD21			
835	ENSG00000119318	RAD23B				
836	ENSG00000108175		RAI17			
837	ENSG00000017797					
838	ENSG00000132341		RAN			
839	ENSG00000153201				RANBP9	
840	ENSG00000065150		RANBP5			
841	ENSG00000137040					
842	ENSG00000010017		RANBP9	RANBP9		
843	ENSG00000116473					
844	ENSG00000127314		RAP1B			
845	ENSG00000138698		RAP1GDS1			
846	ENSG00000181467					
847	ENSG00000109756	RAPGEF2	RAPGEF2			
848	ENSG00000077092					
849	ENSG00000145715					
850	ENSG00000101265					
851	ENSG00000139687					RB1
852	ENSG00000023287					
853	ENSG00000122257					
854	ENSG00000102054		RBBP7			
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
864	ENSG00000136144					
865	ENSG00000049449					
866	ENSG00000117906					
867	ENSG00000089902	RCOR1	RCOR1			
868	ENSG00000137710					
869	ENSG00000173039	RELA				
870	ENSG00000157916					
871	ENSG00000142599					
872	ENSG00000056687					
873	ENSG00000090104					
874	ENSG00000171700					
875	ENSG00000106615	RHEB				
876	ENSG00000067560					
877	ENSG00000177105	RHOG				
878	ENSG00000119729					
879	ENSG00000126858					
880	ENSG00000101782					
881	ENSG00000176624		RKHD2			
882	ENSG00000022840					
883	ENSG00000123091					
884	ENSG00000082996					
885	ENSG00000134758					
886	ENSG00000170881				RNF139	
887	ENSG00000170633		RNF34			
888	ENSG00000137075					RNF38
889	ENSG00000063978					
890	ENSG00000127870					
891	ENSG00000131051					
892	ENSG00000167971					
893	ENSG00000043093		RP42			
894	ENSG00000132383	RPA1				
895	ENSG00000117748					
896	ENSG00000153574					
897	ENSG00000144713					
898	ENSG00000163902					
899	ENSG00000171858				RPS21	
900	ENSG00000143947					
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
910	ENSG00000020633					
911	ENSG00000163602		RYBP	RYBP		
912	ENSG00000163785					
913	ENSG00000198838					
914	ENSG00000160633					
915	ENSG00000130254					
916	ENSG00000136715					
917	ENSG00000079332		SARA1			
918	ENSG00000130066					
919	ENSG00000182568	SATB1				
920	ENSG00000052802					
921	ENSG00000085365					
922	ENSG00000140497					
923	ENSG00000138760					
924	ENSG00000121892					
925	ENSG00000151967		SCHIP1			
926	ENSG00000010803					
927	ENSG00000137575	SDCBP				
928	ENSG00000156642		SDFR1			
929	ENSG00000140612					
930	ENSG00000155878					
931	ENSG00000121542					
932	ENSG00000107651					
933	ENSG00000138802					
934	ENSG00000075223					
935	ENSG00000168758		SEMA4C	SEMA4C		
936	ENSG00000092421					
937	ENSG00000122545					
938	ENSG00000120742					
939	ENSG00000179833	SERTAD2	SERTAD2			SERTAD2
940	ENSG00000080546					
941	ENSG00000119335					
942	ENSG00000115524					
943	ENSG00000116560			SFPQ		
944	ENSG00000136450					
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
956	ENSG00000116350					
957	ENSG00000100650					
958	ENSG00000124193					SFRS6
959	ENSG00000115875					
960	ENSG00000198730					
961	ENSG00000162105					
962	ENSG00000182199					
963	ENSG00000108061					
964	ENSG00000196470					
965	ENSG00000096717		SIRT1	SIRT1		
966	ENSG00000124523					
967	ENSG00000113558					
968	ENSG00000155926	SLA				
969	ENSG00000165646		SLC18A2			
970	ENSG00000004864					
971	ENSG00000122912					
972	ENSG00000178537					
973	ENSG00000075415					
974	ENSG00000147454		SLC25A37			SLC25A37
975	ENSG00000005022					
976	ENSG00000117394					
977	ENSG00000059804		SLC2A3			
978	ENSG00000134294		SLC38A2			
979	ENSG00000138821					
980	ENSG00000080493					
981	ENSG00000175387					
982	ENSG00000112305		SMAP1			
983	ENSG00000102038					
984						
985	ENSG00000127616	SMARCA4				
986	ENSG00000173473					
987	ENSG00000073584					
988	ENSG00000077147		SMBP			
989	ENSG00000072501					
990	ENSG00000102172					
991	ENSG00000145335					
992	ENSG00000184602					
993						
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
1002	ENSG00000124766					
1003	ENSG00000067066		SP100			
1004	ENSG00000172845	SP3				
1005	ENSG00000091640		SPAG7			
1006	ENSG00000008294					
1007	ENSG00000113140					
1008	ENSG00000065526					
1009	ENSG00000095480			SPFH1		
1010	ENSG00000147475					
1011	ENSG00000152268					
1012		SRPK2	SRPK2			
1013	ENSG00000164056					
1014	ENSG00000115306					
1015	ENSG00000090054					
1016	ENSG00000100596					
1017	ENSG00000116649					
1018	ENSG00000153037					
1019	ENSG00000096063					
1020	ENSG00000135250					
1021	ENSG00000124783			SSR1		
1022	ENSG00000149136					
1023	ENSG00000101972					
1024	ENSG00000084090					
1025	**ENSG00000168610**			**STAT3**		
1026	ENSG00000173757					
1027	ENSG00000167323					
1028	ENSG00000166301					
1029	ENSG00000102572			STK24		
1030	ENSG00000112079					
1031	ENSG00000198648		STK39			
1032	ENSG00000117632		STMN1			
1033	ENSG00000165283					
1034	ENSG00000124222					STX16
1035	ENSG00000168952		STXBP6	STXBP6		
1036	ENSG00000173812					
1037	ENSG00000116030					
1038	ENSG00000180283					
1039						
1040						
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1047						

Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
1048	ENSG00000120948		TARDBP			
1049						
1050						
1051			TBPL1	TBPL1		
1052						
1053						
1054	ENSG00000113649		TCERG1			
1055						
1056						
1057						
1058						
1059						
1060						
1061			TENS1	TENS1		
1062						
1063						
1064						
1065	ENSG00000198176		TFDP1			
1066		TFDP2				
1067						
1068						
1069						
1070	ENSG00000123066	THRAP2				
1071	ENSG00000116001					
1072						
1073						
1074						
1075						
1076		TM4SF13				
1077						
1078	ENSG00000101337					
1079	ENSG00000062716					
1080						
1081	ENSG00000120802					
1082						
1083			TMX2			
1084						
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
1093	ENSG00000111669					
1094	ENSG00000140416					
1095						
1096			TRA1	TRA1		
1097						
1098						
1099	ENSG00000166326					
1100						
1101	ENSG00000043514					
1102						
1103						
1104			TSC1	TSC1		
1105	ENSG00000102804					
1106	ENSG00000157514					
1107	ENSG00000163084					
1108						
1109	ENSG00000143367					
1110	ENSG00000139921					
1111						
1112						
1113						
1114						
1115	ENSG00000077721					
1116			UBE2B			
1117	ENSG00000131508					
1118		UBE2D3				UBE2D3
1119						
1120						
1121					UBE2G1	
1122	ENSG00000103275					
1123						
1124	ENSG00000185651					
1125						
1126			UBE2Q			
1127			UBE2V1 /// Kua-UEV			
1128	ENSG00000114062					
1129						
1130						
1131						
1132						
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1137						

Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
1138	ENSG00000164828					
1139	ENSG00000100242					
1140						
1141						USP1
1142	ENSG00000152484					
1143	ENSG00000101557					
1144			USP15			
1145						
1146	ENSG00000077254	USP33	USP33			
1147	ENSG00000115464					
1148						
1149						
1150						
1151	ENSG00000173218					
1152	ENSG00000101558					
1153	ENSG00000124164					
1154						
1155						
1156						
1157						
1158			VAT1			
1159						
1160				VAV3		
1161						
1162	ENSG00000165280				VCP	
1163	ENSG00000073905					
1164	ENSG00000078668					
1165			VGLL4			
1166						
1167						
1168						
1169	ENSG00000167987					
1170						
1171						
1172						
1173						
1174	ENSG00000105053					
1175						
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1177						
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Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
1184	ENSG00000109685					
1185						
1186			WSB1			
1187	ENSG00000146457					
1188						
1189	ENSG00000115254					
1190						
1191	ENSG00000169180					
1192						
1193		YPEL5				
1194						
1195						
1196			YT521			
1197						
1198		YWHAE				
1199						
1200	ENSG00000134308					
1201		YWHAZ				
1202			YY1			
1203		ZA20D2	ZA20D2			
1204		ZA20D3	ZA20D3			
1205						
1206						
1207						
1208						
1209						
1210						
1211			ZFP36L2			
1212						
1213	ENSG00000010244					
1214						
1215						
1216			ZNF160	ZNF160		
1217						
1218						
1219						
1220		ZNF238	ZNF238	ZNF238		
1221						
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1225						
1226						
1227						
1228						
1229						

Figure 12, con'd

	A	Z	AA	AB	AC	AD
1		**miR-155**	**miR-181a**	**miR-181b**	**miR-191**	**miR-192**
1230	ENSG00000036549					

Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
2	ENSG00000145495				
3	ENSG00000136536				
4	ENSG00000165406				
5	ENSG00000168385				
6	ENSG00000125354				
7	ENSG00000122545			7-Sep	
8	ENSG00000138758				
9	ENSG00000111780				
10	ENSG00000137822				
11	ENSG00000165029				
12	ENSG00000125257				
13	ENSG00000114770				
14	ENSG00000161533				
15	ENSG00000151726				
16	ENSG00000075624				
17	ENSG00000184009				
18	ENSG00000136518				
19	ENSG00000072110				
20	ENSG00000138071				
21	ENSG00000115091				
22	ENSG00000137845				
23	ENSG00000138031			ADCY3	
24	ENSG00000087274				
25	ENSG00000148700				
26	ENSG00000101126				
27	ENSG00000173020				
28	ENSG00000172493				
29	ENSG00000168448				
30	ENSG00000155189				
31	ENSG00000168710		AHCYL1		
32	ENSG00000004455		AK2		
33	ENSG00000108599				
34	ENSG00000023516				
35	ENSG00000170776				
36	ENSG00000151320				
37	ENSG00000117020				
38	ENSG00000170017				
39					
40					
41					
42					
43					
44					
45					

Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
48	ENSG00000177879				
49	ENSG00000120868				
50	ENSG00000144848				
51	ENSG00000101844				
52	ENSG00000084234				
53	ENSG00000142192				
54	ENSG00000062725			APPBP2	
55	ENSG00000095139				
56	ENSG00000143761				
57	ENSG00000134287				
58	ENSG00000168374				
59	ENSG00000165527				
60	ENSG00000175220				
61	ENSG00000137962				
62	ENSG00000104880				
63	ENSG00000129675				
64	ENSG00000117713			ARID1A	
65	ENSG00000054267				
66	ENSG00000177479				
67	ENSG00000134108				
68	ENSG00000110025				
69	ENSG00000138175				
70	ENSG00000170540				
71	ENSG00000188042				
72	ENSG00000163466				
73	ENSG00000136950				
74	ENSG00000128989				
75	ENSG00000111875				
76	ENSG00000116539				
77	ENSG00000171456				
78	ENSG00000143970				
79	ENSG00000123268				
80	ENSG00000149311				
81	ENSG00000163399				
82	ENSG00000143153				
83	ENSG00000174437				
84	ENSG00000017260				
85					
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91					
92					
93					

Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
94	ENSG00000198604				
95	ENSG00000119866				
96	ENSG00000171791				
97	ENSG00000029363				
98	ENSG00000105829				
99	ENSG00000134107				
100	ENSG00000138756				
101	ENSG00000104765				
102	ENSG00000060762				
103	ENSG00000160058				
104	ENSG00000095564				
105	ENSG00000145741				
106	ENSG00000133639				
107	ENSG00000159388				
108	ENSG00000154640				
109	ENSG00000082153				
110	ENSG00000136261				
111	ENSG00000181915				
112	ENSG00000119906				
113	ENSG00000110075				
114	ENSG00000171067				
115	ENSG00000139746				
116	ENSG00000133935			C14orf1	
117	ENSG00000168175				
118	ENSG00000134153				
119	ENSG00000152242				
120	ENSG00000141452				
121	ENSG00000105176				
122	ENSG00000163875				
123	ENSG00000163444				
124	ENSG00000117616				
125	ENSG00000108561	C1QBP			
126	ENSG00000110888				
127	ENSG00000132823				
128	ENSG00000101084				
129	ENSG00000101166				
130	ENSG00000126749				
131					
132					
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135					
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137					
138					
139					

Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
140	ENSG00000136819				
141	ENSG00000136925				
142	ENSG00000074410				
143	ENSG00000104267				
144	ENSG00000135932				
145	ENSG00000104327	CALB1			
146	ENSG00000179218		CALR		
147	ENSG00000127022				
148	ENSG00000131236				
149	ENSG00000135837				
150	ENSG00000116489				
151	ENSG00000198898				
152	ENSG00000077549				
153	ENSG00000168564				
154	ENSG00000142453				
155	ENSG00000110619				
156	ENSG00000108349				
157	ENSG00000153113			CAST	
158	ENSG00000130940				
159	ENSG00000067955				
160	ENSG00000108468			CBX1	
161	ENSG00000100261				
162	ENSG00000112237				
163	ENSG00000118971				
164	ENSG00000112576				
165	ENSG00000113328				
166	ENSG00000138764				
167	ENSG00000134480				
168	ENSG00000118816				
169	ENSG00000163660				
170	ENSG00000082258				
171	ENSG00000166226				
172	ENSG00000163468				
173	ENSG00000135535				
174	ENSG00000174059				
175	ENSG00000196776				
176	ENSG00000110848				
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Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
186	ENSG00000143126				
187					
188	ENSG00000153140				
189	ENSG00000153774				
190	ENSG00000172757				
191	ENSG00000163320				
192	ENSG00000153922				
193	ENSG00000111642				
194	ENSG00000177200				
195	ENSG00000072609				
196	ENSG00000110172				
197	ENSG00000131873				
198	ENSG00000109572				
199	ENSG00000113240				
200	ENSG00000122705				
201	ENSG00000141367				
202	ENSG00000162368				
203	ENSG00000100528			CNIH	
204	ENSG00000125107				
205	ENSG00000111596				
206	ENSG00000198791				
207	ENSG00000121058				
208	ENSG00000129083				
209	ENSG00000166200				
210	ENSG00000141030				
211	ENSG00000138663				
212	ENSG00000110880				
213	ENSG00000178741				
214	ENSG00000135940				
215	ENSG00000115944				
216	ENSG00000111605				
217	ENSG00000118260				
218	ENSG00000005339				
219	ENSG00000111269				
220	ENSG00000145708				
221					
222	ENSG00000099942				
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Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
232	ENSG00000175215				
233	ENSG00000168036				
234	ENSG00000198561				
235	ENSG00000171793				
236	ENSG00000149187				
237	ENSG00000048740				
238	ENSG00000036257		CUL3		
239	ENSG00000166266				
240	ENSG00000160967			CUTL1	
241	ENSG00000121966				
242	ENSG00000166347				
243	ENSG00000008283				
244	ENSG00000172115				
245	ENSG00000083799				
246	ENSG00000140181				
247	ENSG00000165659				
248	ENSG00000196730				
249	ENSG00000071626				
250	ENSG00000183283			DAZAP2	
251	ENSG00000137992				
252	ENSG00000172795				
253	ENSG00000085788				
254	ENSG00000168209				
255	ENSG00000124487				
256	ENSG00000067048				
257	ENSG00000108654				
258	ENSG00000141141				
259	ENSG00000158796				
260	ENSG00000124795				
261	ENSG00000139726				
262	ENSG00000155792				
263	ENSG00000136986				
264	ENSG00000109606				
265	ENSG00000132153				
266	ENSG00000108406				
267	**ENSG00000100697**				
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Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
274	ENSG00000158486		DNAH3		
275	ENSG00000086061	DNAJA1			
276	ENSG00000132002				
277	ENSG00000105993				
278	ENSG00000128590				
279	ENSG00000077380				
280	ENSG00000074603				
281	ENSG00000092964				
282	ENSG00000117505				
283	ENSG00000167264				
284	ENSG00000143507				
285	ENSG00000139318				
286	ENSG00000004975				
287	ENSG00000161202				
288	ENSG00000157540				
289	**ENSG00000112242**				
290	ENSG00000147654				
291	ENSG00000104517				
292	ENSG00000198121				
293	ENSG00000156508				
294	ENSG00000124802				
295	ENSG00000186676				
296	ENSG00000183690				
297	ENSG00000142634				
298	ENSG00000171570				
299	ENSG00000120738				
300	ENSG00000110047				
301					
302	ENSG00000092847				
303	ENSG00000123908		EIF2C2		
304	ENSG00000134001				
305	ENSG00000104131				
306	ENSG00000107581				
307	ENSG00000156976			EIF4A2	
308	ENSG00000063046				
309	ENSG00000151247				
310	ENSG00000135930				
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Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
318	ENSG00000102034				
319	ENSG00000111145				
320	ENSG00000155849				
321	ENSG00000062598				
322	ENSG00000012660				
323	ENSG00000170522				
324	ENSG00000143420				
325	ENSG00000120533				
326	ENSG00000120616				
327	ENSG00000050405				
328	ENSG00000085832				
329	ENSG00000124882				
330	ENSG00000157554				
331	ENSG00000120705				
332	ENSG00000157557				
333	ENSG00000182944				
334	ENSG00000120699	EXOSC8			
335	ENSG00000108799				
336	ENSG00000106462				
337	ENSG00000124491				
338	ENSG00000119979				
339	ENSG00000153310				
340	ENSG00000139146		FAM60A		
341	ENSG00000105216				
342	ENSG00000179115	FARSLA			
343	ENSG00000166147				
344	ENSG00000173120				
345	ENSG00000118564				
346	ENSG00000138081	FBXO11			
347					
348	ENSG00000143756				
349	ENSG00000178974				
350	ENSG00000037637				
351	ENSG00000112146				
352	ENSG00000119402				
353	ENSG00000068078				
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Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
363	ENSG00000159202				
364	ENSG00000153561				
365	ENSG00000181495				
366	ENSG00000175606				
367	ENSG00000136122				
368	ENSG00000132589				
369	ENSG00000196504				
370					
371	ENSG00000170345				
372	ENSG00000125740				
373	ENSG00000137273				
374	ENSG00000198815				
375	ENSG00000150907				
376	ENSG00000118689				
377	ENSG00000114861				
378	ENSG00000165879				
379	ENSG00000163430				
380	ENSG00000114416				
381	ENSG00000145907				
382	ENSG00000138757				
383	ENSG00000034713				
384	ENSG00000104064			GABPB2	
385	ENSG00000116717				
386	ENSG00000141429			GALNT1	
387	ENSG00000143641				
388	ENSG00000109586				
389	ENSG00000165219				
390	ENSG00000179348				
391	ENSG00000107485				
392	ENSG00000146729				
393	ENSG00000001084				
394	ENSG00000057608				
395	ENSG00000100083				
396	ENSG00000165678				
397	ENSG00000108588				
398	ENSG00000115419				
399	ENSG00000196700				
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Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
409	ENSG00000185245				
410	ENSG00000159592				
411	ENSG00000112414				
412	ENSG00000106070			GRB10	
413	ENSG00000103342				
414	ENSG00000140307			H2AFZ	
415	ENSG00000110768				
416	ENSG00000077809				
417	ENSG00000115207				
418	ENSG00000188486				
419					
420	ENSG00000091527				
421	ENSG00000112339				
422	ENSG00000172534				
423	ENSG00000180353				
424	ENSG00000116478				
425	ENSG00000143321				
426	ENSG00000166503				
427	ENSG00000013583				
428	ENSG00000112406				
429	ENSG00000103657				
430	ENSG00000128731				
431	ENSG00000051108				
432	ENSG00000114315				
433	ENSG00000164683				
434	ENSG00000152804				
435	ENSG00000100644				
436	ENSG00000181061				
437	ENSG00000078140				
438	ENSG00000163349				
439	ENSG00000010818				
440	ENSG00000137361				
441	ENSG00000100281			HMG2L1	
442	ENSG00000189403				
443	ENSG00000164104				
444	ENSG00000029993				
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Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
455	ENSG00000096746				
456	ENSG00000165119				
457	ENSG00000104824				
458	ENSG00000099783			HNRPM	
459	ENSG00000125944				
460	ENSG00000153187			HNRPU	
461	ENSG00000105323				
462	ENSG00000010295		HOM-TES-103	HOM-TES-103	HOM-TES-103
463	ENSG00000106004				
464	ENSG00000078399			**HOXA9**	
465	ENSG00000120075				
466	ENSG00000120087				
467	ENSG00000153807				
468	ENSG00000173744				
469	ENSG00000074356		HSA277841		
470	ENSG00000164164				
471	ENSG00000044574				
472	ENSG00000109971				
473	ENSG00000144381				
474	ENSG00000120694				
475	ENSG00000136478				
476	ENSG00000086758				
477	ENSG00000108622			ICAM2	
478	ENSG00000067829				
479	ENSG00000109083				
480	ENSG00000068745				
481	ENSG00000070061				
482	ENSG00000129351				
483	ENSG00000105135				
484	ENSG00000153487	ING1			
485	ENSG00000168556				
486	ENSG00000071243				
487	ENSG00000068383	INPP5A			
488	ENSG00000148384				
489	ENSG00000186480				
490	ENSG00000171105				
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Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
500	ENSG00000078596				
501	ENSG00000116679				
502	ENSG00000184916				
503	ENSG00000117139				
504	ENSG00000008083				
505	ENSG00000115548				
506	ENSG00000171988				
507	ENSG00000177606				
508	ENSG00000137944				
509	ENSG00000170852				
510	ENSG00000176407				
511	ENSG00000055118				
512	ENSG00000136240				
513	ENSG00000121774				
514	ENSG00000088247				
515	ENSG00000131149				
516	ENSG00000179889				
517	ENSG00000136813				
518	ENSG00000145725				
519	ENSG00000143702				
520	ENSG00000119321				
521	ENSG00000197226				
522	ENSG00000126775				
523	ENSG00000164151				
524	ENSG00000105063				
525	ENSG00000126814				
526	ENSG00000156232				
527	ENSG00000170759				
528	ENSG00000157404				
529	ENSG00000127528				
530	ENSG00000136826				
531	ENSG00000067082				
532	ENSG00000155090				
533	ENSG00000165516				
534	ENSG00000114030				
535	ENSG00000102753				
536	ENSG00000108424				
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Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
546	ENSG00000143815				
547	ENSG00000157978				
548	ENSG00000065548				
549	ENSG00000100097				
550	ENSG00000148943				
551	ENSG00000189067				
552	ENSG00000166783				
553	ENSG00000160789				
554	ENSG00000113368				
555	ENSG00000135363				
556	ENSG00000111252				
557	ENSG00000152102				
558	ENSG00000120963				
559	ENSG00000102897				
560	ENSG00000121104				
561	ENSG00000123684				
562	ENSG00000145012				
563	ENSG00000110031				
564	ENSG00000077454				
565	ENSG00000198799				
566	ENSG00000171492				
567	ENSG00000124831				
568	ENSG00000175324				
569	ENSG00000146963				
570	ENSG00000054219				
571	ENSG00000120992				
572	ENSG00000011009				
573	ENSG00000163818				
574	ENSG00000135387	M11S1		M11S1	
575	ENSG00000003056				
576	ENSG00000143033				
577	ENSG00000127603				
578	ENSG00000110514				
579	ENSG00000187391				
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Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
589	ENSG00000047849				
590	ENSG00000104814				
591	ENSG00000012983				
592	ENSG00000135525				
593	ENSG00000100030				
594	ENSG00000112062				
595	ENSG00000101367			MAPRE1	
596	ENSG00000166974				
597	ENSG00000175130				
598	ENSG00000075413				
599	ENSG00000166986				
600	ENSG00000168906			MAT2A	
601	ENSG00000038274				
602	ENSG00000015479				
603	ENSG00000125952	MAX			
604	ENSG00000134046				
605	ENSG00000152601			MBNL1	
606	ENSG00000180398			MEF2C	
607	ENSG00000121940		MCLC		
608	ENSG00000112118				
609	ENSG00000082212				
610	ENSG00000124733				
611	ENSG00000081189				
612	ENSG00000143995			**MEIS1**	
613	ENSG00000133895				
614	ENSG00000164024				
615	ENSG00000168282				
616	ENSG00000138092				
617	ENSG00000133858				
618	ENSG00000198408				
619	ENSG00000079277				
620	ENSG00000133606				
621	ENSG00000089693				
622	**ENSG00000171843**				
623	ENSG00000108788				
624	ENSG00000056586				
625	ENSG00000165943				
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Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
635	ENSG00000125445				
636	ENSG00000005302				MSL3L1
637	ENSG00000147065				
638	ENSG00000182979				
639	ENSG00000147649				
640	ENSG00000143033				
641	ENSG00000100330				
642	ENSG00000108389			MTMR4	
643	ENSG00000170873				
644	ENSG00000128654				
645	ENSG00000118513				
646	ENSG00000005810		MYCBP2		
647	ENSG00000133026			MYH10	
648	ENSG00000136504				
649	ENSG00000102921				
650	ENSG00000138386				
651	ENSG00000187109				
652	ENSG00000132780				
653	ENSG00000158747				
654	ENSG00000115053				
655	ENSG00000198646				
656	ENSG00000196498				
657	ENSG00000166579				
658	ENSG00000131507				
659	ENSG00000125356				
660	ENSG00000189043				
661					
662	ENSG00000069869				
663	ENSG00000173848				
664	ENSG00000082641	NFE2L1			
665	ENSG00000116044	NFE2L2			
666	ENSG00000050344				
667	ENSG00000120837				
668	ENSG00000066136				
669	ENSG00000166681				
670	ENSG00000140157				
671	ENSG00000164190				
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Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
681	ENSG00000106459				
682	ENSG00000180530	NRIP1			
683	ENSG00000035681				
684	ENSG00000137497				
685	ENSG00000124789		NUP153		
686	ENSG00000162231				
687	ENSG00000101888				
688	ENSG00000065154				
689	ENSG00000115758				
690	ENSG00000046651				
691	ENSG00000147162				
692	ENSG00000182606				
693	ENSG00000141447		OSBPL1A		
694	ENSG00000091039				
695	ENSG00000117859				
696	ENSG00000167770		OTUB1		
697	ENSG00000172939				
698	ENSG00000170515				
699	ENSG00000070756				
700	ENSG00000151846				
701	ENSG00000090621				
702	ENSG00000100836				PABPN1
703	ENSG00000100266				
704	ENSG00000172239				
705	ENSG00000142864				
706	ENSG00000180370				
707	ENSG00000157654				
708	ENSG00000145730			PAM	
709	ENSG00000090060				
710	ENSG00000115421				
711	ENSG00000177425				
712	ENSG00000157212				
713	ENSG00000105835				
714	ENSG00000113387				
715	ENSG00000169564	PCBP1			
716	ENSG00000197111	PCGF2			
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Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
726	ENSG00000150593				
727	ENSG00000184588				
728	ENSG00000145431				
729	ENSG00000168291				
730	ENSG00000065485				
731	ENSG00000143870				
732	ENSG00000162734	PEA15			
733	ENSG00000197329				
734	ENSG00000132326				
735	ENSG00000152556				
736	ENSG00000067057				
737	ENSG00000164040				
738	ENSG00000167085				
739	ENSG00000112511				
740	ENSG00000130024				
741	ENSG00000043143				
742	ENSG00000025293				
743	ENSG00000118482				
744	ENSG00000033800				
745	ENSG00000073921				
746	ENSG00000166037				
747	ENSG00000051382				
748	ENSG00000145675				
749	ENSG00000137193				
750	ENSG00000102096				
751	ENSG00000107242				
752	ENSG00000154217				
753	ENSG00000181191				
754	ENSG00000171033				
755	ENSG00000118495				
756	ENSG00000052126				
757	ENSG00000115762				
758	ENSG00000104886				
759	ENSG00000152952				
760	ENSG00000102024				
761	ENSG00000136040	PLXNC1		PLXNC1	
762	ENSG00000004399				
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Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
772	ENSG00000163806				
773	ENSG00000186298				
774	ENSG00000112498				
775	ENSG00000058272				
776	ENSG00000113575				
777	ENSG00000104695				
778	ENSG00000104762	PPP2R2A			
779	ENSG00000078304	PPP2R5C		PPP2R5C	
780	ENSG00000154001				
781	ENSG00000138814				
782	ENSG00000107758				
783	ENSG00000154845				
784	ENSG00000119414				
785	ENSG00000131238				
786	ENSG00000116731				
787	ENSG00000110851				PRDM4
788	ENSG00000138073				
789	ENSG00000122862				
790	ENSG00000142875				
791	ENSG00000005249				
792	ENSG00000166501				
793	ENSG00000101040				
794	ENSG00000115825				
795	ENSG00000137492				
796	ENSG00000185246				
797	ENSG00000147224				
798	ENSG00000197746				
799	ENSG00000129084				
800	ENSG00000106588				
801	ENSG00000143106				
802	ENSG00000100519				
803	ENSG00000108344				
804	ENSG00000125818				
805	ENSG00000121390				
806	ENSG00000117569				
807	ENSG00000138430				
808	ENSG00000171862				
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Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
818	ENSG00000130508				
819	ENSG00000112531		QKI		
820	ENSG00000048991				
821	ENSG00000103769				
822	ENSG00000119396				
823	ENSG00000138069				
824	ENSG00000080371				
825	ENSG00000111737				
826	ENSG00000144566				
827	ENSG00000111540				RAB5B
828	ENSG00000175582				
829	ENSG00000075785				
830	ENSG00000167461				
831	ENSG00000152061				
832	ENSG00000136238				
833	ENSG00000152942				
834	ENSG00000164754				
835	ENSG00000119318				
836	ENSG00000108175				
837	ENSG00000017797				
838	ENSG00000132341		RAN		
839	ENSG00000153201				
840	ENSG00000065150				
841	ENSG00000137040				
842	ENSG00000010017				RANBP9
843	ENSG00000116473			RAP1B	
844	ENSG00000127314			RAP2B	
845	ENSG00000138698				
846	ENSG00000181467				
847	ENSG00000109756				
848	ENSG00000077092				
849	ENSG00000145715				
850	ENSG00000101265				
851	ENSG00000139687				
852	ENSG00000023287				
853	ENSG00000122257				
854	ENSG00000102054				
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Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
864	ENSG00000136144				
865	ENSG00000049449				
866	ENSG00000117906				
867	ENSG00000089902				
868	ENSG00000137710			RDX	
869	ENSG00000173039				
870	ENSG00000157916				
871	ENSG00000142599				
872	ENSG00000056687	RGL2			
873	ENSG00000090104				
874	ENSG00000171700				
875	ENSG00000106615				
876	ENSG00000067560				
877	ENSG00000177105				
878	ENSG00000119729				
879	ENSG00000126858				
880	ENSG00000101782				
881	ENSG00000176624				
882	ENSG00000022840				
883	ENSG00000123091				
884	ENSG00000082996				
885	ENSG00000134758				
886	ENSG00000170881				
887	ENSG00000170633				
888	ENSG00000137075			RNF38	
889	ENSG00000063978				
890	ENSG00000127870				
891	ENSG00000131051				
892	ENSG00000167971				
893	ENSG00000043093	RP42			
894	ENSG00000132383				
895	ENSG00000117748				
896	ENSG00000153574				
897	ENSG00000144713				
898	ENSG00000163902				
899	ENSG00000171858				
900	ENSG00000143947				
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Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
910	ENSG00000020633				
911	ENSG00000163602				
912	ENSG00000163785				
913	ENSG00000198838				
914	ENSG00000160633				
915	ENSG00000130254				
916	ENSG00000136715				
917	ENSG00000079332				
918	ENSG00000130066				
919	ENSG00000182568				
920	ENSG00000052802				
921	ENSG00000085365				
922	ENSG00000140497				
923	ENSG00000138760				
924	ENSG00000121892				
925	ENSG00000151967				
926	ENSG00000010803				
927	ENSG00000137575			SDCBP	
928	ENSG00000156642				
929	ENSG00000140612				
930	ENSG00000155878				
931	ENSG00000121542				
932	ENSG00000107651				
933	ENSG00000138802				
934	ENSG00000075223				
935	ENSG00000168758				
936	ENSG00000092421				
937	ENSG00000122545				
938	ENSG00000120742				
939	ENSG00000179833				
940	ENSG00000080546				
941	ENSG00000119335				
942	ENSG00000115524				
943	ENSG00000116560				
944	ENSG00000136450			SFRS1	
945					
946					
947					
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955					

Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
956	ENSG00000116350				
957	ENSG00000100650				
958	ENSG00000124193				
959	ENSG00000115875				
960	ENSG00000198730				
961	ENSG00000162105				
962	ENSG00000182199				
963	ENSG00000108061				
964	ENSG00000196470				
965	ENSG00000096717			SIRT1	
966	ENSG00000124523				
967	ENSG00000113558				
968	ENSG00000155926				
969	ENSG00000165646				
970	ENSG00000004864				
971	ENSG00000122912				
972	ENSG00000178537				
973	ENSG00000075415				
974	ENSG00000147454				
975	ENSG00000005022				
976	ENSG00000117394			SLC2A1	
977	ENSG00000059804				
978	ENSG00000134294				SLC38A2
979	ENSG00000138821				
980	ENSG00000080493				
981	ENSG00000175387				
982	ENSG00000112305				
983	ENSG00000102038				
984					SMARCA2
985	ENSG00000127616				
986	ENSG00000173473				
987	ENSG00000073584				
988	ENSG00000077147				
989	ENSG00000072501				
990	ENSG00000102172				
991	ENSG00000145335				
992	ENSG00000184602				
993					
994					
995					
996					
997					
998					
999					
1000					
1001					

Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
1002	ENSG00000124766			SOX4	
1003	ENSG00000067066				
1004	ENSG00000172845				
1005	ENSG00000091640			SPAG7	
1006	ENSG00000008294				
1007	ENSG00000113140				
1008	ENSG00000065526				
1009	ENSG00000095480				
1010	ENSG00000147475				
1011	ENSG00000152268				
1012					
1013	ENSG00000164056			SPRY1	
1014	ENSG00000115306				
1015	ENSG00000090054				
1016	ENSG00000100596				
1017	ENSG00000116649				
1018	ENSG00000153037				
1019	ENSG00000096063				
1020	ENSG00000135250				
1021	ENSG00000124783				
1022	ENSG00000149136				
1023	ENSG00000101972				
1024	ENSG00000084090				
1025	**ENSG00000168610**				
1026	ENSG00000173757				
1027	ENSG00000167323				
1028	ENSG00000166301	STK19			
1029	ENSG00000102572				
1030	ENSG00000112079				
1031	ENSG00000198648				
1032	ENSG00000117632	STMN1			
1033	ENSG00000165283				
1034	ENSG00000124222	STX16			
1035	ENSG00000168952				
1036	ENSG00000173812				
1037	ENSG00000116030				
1038	ENSG00000180283				
1039					
1040					
1041					
1042					
1043					
1044					
1045					
1046					
1047					

Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
1048	ENSG00000120948	TARDBP	TARDBP		
1049					
1050					
1051					
1052					
1053					
1054	ENSG00000113649				
1055					
1056					
1057					
1058					
1059					
1060					
1061					
1062					
1063					
1064					
1065	ENSG00000198176				
1066					
1067					
1068					
1069					
1070	ENSG00000123066				
1071	ENSG00000116001				
1072					
1073					
1074					
1075					
1076					
1077					
1078	ENSG00000101337				
1079	ENSG00000062716				
1080					
1081	ENSG00000120802				
1082					
1083					
1084					
1085					
1086					
1087					
1088					
1089					
1090					
1091					
1092					

Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
1093	ENSG00000111669				
1094	ENSG00000140416		TPM1		
1095					
1096					
1097					
1098					
1099	ENSG00000166326	TRIM44			
1100					
1101	ENSG00000043514		TRIT1		
1102					
1103					
1104					
1105	ENSG00000102804				
1106	ENSG00000157514			TSC22D3	
1107	ENSG00000163084			TSN	
1108					
1109	ENSG00000143367				
1110	ENSG00000139921				
1111					
1112					
1113					
1114					
1115	ENSG00000077721				
1116					
1117	ENSG00000131508		UBE2D2		UBE2D2
1118					
1119					
1120					
1121					
1122	ENSG00000103275				
1123					
1124	ENSG00000185651				
1125					
1126					
1127					
1128	ENSG00000114062				
1129					
1130					
1131					
1132					
1133					
1134					
1135					
1136					
1137					

Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
1138	ENSG00000164828				
1139	ENSG00000100242				
1140					
1141					
1142	ENSG00000152484				
1143	ENSG00000101557				
1144					
1145					
1146	ENSG00000077254				
1147	ENSG00000115464				
1148					
1149					
1150					
1151	ENSG00000173218				
1152	ENSG00000101558				
1153	ENSG00000124164				
1154					
1155					
1156					
1157					
1158					
1159					
1160					
1161					
1162	ENSG00000165280				
1163	ENSG00000073905				
1164	ENSG00000078668				
1165					
1166					
1167					
1168					
1169	ENSG00000167987				
1170					
1171					
1172					
1173					
1174	ENSG00000105053				
1175					
1176					
1177					
1178					
1179					
1180					
1181					
1182					
1183					

Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
1184	ENSG00000109685				
1185					
1186					
1187	ENSG00000146457				
1188					
1189	ENSG00000115254				
1190					
1191	ENSG00000169180				
1192					
1193		YPEL5			
1194					
1195					
1196					
1197					
1198					
1199					
1200	ENSG00000134308				
1201					
1202					
1203					
1204					
1205				ZBTB17	
1206					
1207					
1208					
1209					
1210					
1211					
1212					
1213	ENSG00000010244				
1214					
1215				ZNF148	
1216					
1217					
1218					
1219					
1220					ZNF238
1221					
1222					
1223					
1224					
1225					
1226					
1227					
1228					
1229					

Figure 12, con'd

	A	AE	AF	AG	AH
1		**miR-193**	**miR-197**	**miR-212**	**miR-213**
1230	ENSG00000036549				

Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
2	ENSG00000145495					
3	ENSG00000136536					
4	ENSG00000165406					
5	ENSG00000168385					
6	ENSG00000125354			6-Sep		
7	ENSG00000122545					
8	ENSG00000138758					
9	ENSG00000111780					
10	ENSG00000137822					
11	ENSG00000165029					
12	ENSG00000125257					
13	ENSG00000114770	ABCC5	ABCC5		ABCC5	ABCC5
14	ENSG00000161533					
15	ENSG00000151726					
16	ENSG00000075624	ACTB				
17	ENSG00000184009				ACTG1	ACTG1
18	ENSG00000136518					
19	ENSG00000072110					
20	ENSG00000138071					
21	ENSG00000115091					
22	ENSG00000137845					
23	ENSG00000138031					
24	ENSG00000087274					
25	ENSG00000148700					
26	ENSG00000101126					
27	ENSG00000173020					
28	ENSG00000172493					
29	ENSG00000168448					
30	ENSG00000155189					
31	ENSG00000168710					
32	ENSG00000004455			AK2		
33	ENSG00000108599					
34	ENSG00000023516					
35	ENSG00000170776					
36	ENSG00000151320				AKAP6	AKAP6
37	ENSG00000117020			AKT3		
38	ENSG00000170017			ALCAM		
39						
40						
41						
42						
43						
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45						

Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
48	ENSG00000177879	AP3S1				
49	ENSG00000120868					
50	ENSG00000144848					
51	ENSG00000101844			APG4A		
52	ENSG00000084234	APLP2	APLP2			
53	ENSG00000142192					
54	ENSG00000062725				APPBP2	APPBP2
55	ENSG00000095139					
56	ENSG00000143761					
57	ENSG00000134287					
58	ENSG00000168374	ARF4				
59	ENSG00000165527					
60	ENSG00000175220				ARHGAP1	ARHGAP1
61	ENSG00000137962					
62	ENSG00000104880					
63	ENSG00000129675					
64	ENSG00000117713	ARID1A	ARID1A	ARID1A		ARID1A
65	ENSG00000054267					
66	ENSG00000177479					
67	ENSG00000134108					
68	ENSG00000110025					
69	ENSG00000138175					
70	ENSG00000170540	ARL6IP				
71	ENSG00000188042					
72	ENSG00000163466					
73	ENSG00000136950					
74	ENSG00000128989					
75	ENSG00000111875					
76	ENSG00000116539				ASH1L	ASH1L
77	ENSG00000171456				ASXL1	ASXL1
78	ENSG00000143970					
79	ENSG00000123268					
80	ENSG00000149311					
81	ENSG00000163399	ATP1A1	ATP1A1			
82	ENSG00000143153	ATP1B1		ATP1B1		
83	ENSG00000174437					
84	ENSG00000017260					
85						
86						
87						
88						
89						
90						
91						
92						
93						

Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
94	ENSG00000198604					
95	ENSG00000119866	BCL11A				
96	ENSG00000171791					
97	ENSG00000029363					
98	ENSG00000105829					
99	ENSG00000134107					
100	ENSG00000138756					
101	ENSG00000104765	BNIP3L				
102	ENSG00000060762					
103	ENSG00000160058					
104	ENSG00000095564					
105	ENSG00000145741					
106	ENSG00000133639					
107	ENSG00000159388					
108	ENSG00000154640		BTG3			
109	ENSG00000082153				BZW1	BZW1
110	ENSG00000136261					BZW2
111	ENSG00000181915					
112	ENSG00000119906					
113	ENSG00000110075					
114	ENSG00000171067					
115	ENSG00000139746				C13orf10	
116	ENSG00000133935					
117	ENSG00000168175					
118	ENSG00000134153					
119	ENSG00000152242	C18orf25				
120	ENSG00000141452					
121	ENSG00000105176					
122	ENSG00000163875					
123	ENSG00000163444					
124	ENSG00000117616					
125	ENSG00000108561					
126	ENSG00000110888					
127	ENSG00000132823					
128	ENSG00000101084					
129	ENSG00000101166					
130	ENSG00000126749			C2F		
131						
132						
133						
134						
135						
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137						
138						
139						

Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
140	ENSG00000136819					
141	ENSG00000136925			C9orf97		
142	ENSG00000074410					
143	ENSG00000104267					
144	ENSG00000135932			CAB39		
145	ENSG00000104327				CALB1	CALB1
146	ENSG00000179218					
147	ENSG00000127022					
148	ENSG00000131236				CAP1	CAP1
149	ENSG00000135837					
150	ENSG00000116489					
151	ENSG00000198898					
152	ENSG00000077549					
153	ENSG00000168564					
154	ENSG00000142453			CARM1		
155	ENSG00000110619					
156	ENSG00000108349					
157	ENSG00000153113					
158	ENSG00000130940					
159	ENSG00000067955	CBFB		CBFB		
160	ENSG00000108468			CBX1		
161	ENSG00000100261					
162	ENSG00000112237					
163	ENSG00000118971				CCND2	
164	ENSG00000112576				CCND3	CCND3
165	ENSG00000113328					
166	ENSG00000138764					
167	ENSG00000134480					
168	ENSG00000118816					
169	ENSG00000163660	CCNL1				
170	ENSG00000082258			CCNT2		
171	ENSG00000166226					
172	ENSG00000163468					
173	ENSG00000135535					
174	ENSG00000174059					
175	ENSG00000196776					
176	ENSG00000110848					
177						
178						
179						
180						
181						
182						
183						
184						
185						

Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
186	ENSG00000143126					
187						
188	ENSG00000153140					
189	ENSG00000153774					
190	ENSG00000172757					
191	ENSG00000163320					
192	ENSG00000153922			CHD1		
193	ENSG00000111642				CHD4	CHD4
194	ENSG00000177200					
195	ENSG00000072609	CHFR		CHFR		
196	ENSG00000110172					
197	ENSG00000131873	CHSY1				
198	ENSG00000109572					
199	ENSG00000113240					
200	ENSG00000122705					
201	ENSG00000141367					
202	ENSG00000162368					
203	ENSG00000100528				CNIH	CNIH
204	ENSG00000125107	CNOT1				
205	ENSG00000111596		CNOT2			
206	ENSG00000198791					
207	ENSG00000121058					
208	ENSG00000129083					
209	ENSG00000166200			COPS2		
210	ENSG00000141030					
211	ENSG00000138663					
212	ENSG00000110880					
213	ENSG00000178741					
214	ENSG00000135940					
215	ENSG00000115944					
216	ENSG00000111605					
217	ENSG00000118260					
218	ENSG00000005339					
219	ENSG00000111269					
220	ENSG00000145708	CRHBP				
221						
222	ENSG00000099942					
223						
224						
225						
226						
227						
228						
229						
230						
231						

Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
232	ENSG00000175215					
233	ENSG00000168036	CTNNB1				
234	ENSG00000198561					
235	ENSG00000171793					
236	ENSG00000149187	CUGBP1	CUGBP1			
237	ENSG00000048740			CUGBP2		CUGBP2
238	ENSG00000036257					
239	ENSG00000166266					
240	ENSG00000160967	CUTL1	CUTL1	CUTL1		
241	ENSG00000121966			**CXCR4**		
242	ENSG00000166347			CYB5		
243	ENSG00000008283					
244	ENSG00000172115					
245	ENSG00000083799					
246	ENSG00000140181					
247	ENSG00000165659	DACH1				
248	ENSG00000196730					
249	ENSG00000071626					
250	ENSG00000183283					
251	ENSG00000137992					
252	ENSG00000172795					
253	ENSG00000085788					
254	ENSG00000168209	DDIT4		DDIT4		
255	ENSG00000124487	DDX3X	DDX3X	DDX3X		
256	ENSG00000067048					
257	ENSG00000108654					
258	ENSG00000141141					
259	ENSG00000158796					
260	ENSG00000124795					
261	ENSG00000139726					
262	ENSG00000155792					
263	ENSG00000136986			DERL1		
264	ENSG00000109606	DHX15		DHX15		
265	ENSG00000132153					
266	ENSG00000108406					
267	**ENSG00000100697**					
268						
269						
270						
271						
272						
273						

Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
274	ENSG00000158486					
275	ENSG00000086061					
276	ENSG00000132002					
277	ENSG00000105993					
278	ENSG00000128590					
279	ENSG00000077380					
280	ENSG00000074603					
281	ENSG00000092964					
282	ENSG00000117505					
283	ENSG00000167264					
284	ENSG00000143507					
285	ENSG00000139318					
286	ENSG00000004975					
287	ENSG00000161202				DVL3	DVL3
288	ENSG00000157540					
289	**ENSG00000112242**			**E2F3**		
290	ENSG00000147654					
291	ENSG00000104517					
292	ENSG00000198121					
293	ENSG00000156508					
294	ENSG00000124802					
295	ENSG00000186676			EEF1G		
296	ENSG00000183690	EFHC2				
297	ENSG00000142634					
298	ENSG00000171570					
299	ENSG00000120738					
300	ENSG00000110047					
301						
302	ENSG00000092847				EIF2C1	EIF2C1
303	ENSG00000123908				EIF2C2	
304	ENSG00000134001					EIF3S1
305	ENSG00000104131	EIF3S1	EIF3S1		EIF3S1	
306	ENSG00000107581					
307	ENSG00000156976					
308	ENSG00000063046					
309	ENSG00000151247					
310	ENSG00000135930					
311						
312						
313						
314						
315						
316						
317						

Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
318	ENSG00000102034				ELF4	
319	ENSG00000111145					
320	ENSG00000155849					
321	ENSG00000062598					
322	ENSG00000012660					
323	ENSG00000170522					
324	ENSG00000143420					
325	ENSG00000120533					
326	ENSG00000120616					
327	ENSG00000050405					
328	ENSG00000085832					
329	ENSG00000124882					
330	ENSG00000157554					
331	ENSG00000120705					
332	ENSG00000157557	ETS2				
333	ENSG00000182944					
334	ENSG00000120699					
335	ENSG00000108799					
336	ENSG00000106462					
337	ENSG00000124491					
338	ENSG00000119979					
339	ENSG00000153310					
340	ENSG00000139146		FAM60A			
341	ENSG00000105216					
342	ENSG00000179115					
343	ENSG00000166147					
344	ENSG00000173120					
345	ENSG00000118564					
346	ENSG00000138081	FBXO11	FBXO11			
347						
348	ENSG00000143756	FBXO28				
349	ENSG00000178974					
350	ENSG00000037637					
351	ENSG00000112146				FBXO9	
352	ENSG00000119402				FKBP3	
353	ENSG00000068078					
354						
355						
356						
357						
358						
359						
360						
361						
362						

Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
363	ENSG00000159202					
364	ENSG00000153561					
365	ENSG00000181495					
366	ENSG00000175606					
367	ENSG00000136122					
368	ENSG00000132589		FLOT2			
369	ENSG00000196504					
370						
371	ENSG00000170345	FOS	FOS			
372	ENSG00000125740					
373	ENSG00000137273					
374	ENSG00000198815					
375	ENSG00000150907					
376	ENSG00000118689			FOXO3A		
377	ENSG00000114861					
378	ENSG00000165879	FRAT1	FRAT1			
379	ENSG00000163430					
380	ENSG00000114416					
381	ENSG00000145907					
382	ENSG00000138757			GABPB2		
383	ENSG00000034713					
384	ENSG00000104064					
385	ENSG00000116717			GADD45A		
386	ENSG00000141429			GALNT1		GALNT1
387	ENSG00000143641				GALNT2	
388	ENSG00000109586					
389	ENSG00000165219					
390	ENSG00000179348					
391	ENSG00000107485					
392	ENSG00000146729					
393	ENSG00000001084					
394	ENSG00000057608					
395	ENSG00000100083					
396	ENSG00000165678					
397	ENSG00000108588				GK001	GK001
398	ENSG00000115419					
399	ENSG00000196700					
400						
401						
402						
403						
404						
405						
406						
407						
408						

Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
409	ENSG00000185245					
410	ENSG00000159592					
411	ENSG00000112414					
412	ENSG00000106070			GRB10		
413	ENSG00000103342				GSPT1	GSPT1
414	ENSG00000140307					
415	ENSG00000110768					
416	ENSG00000077809					
417	ENSG00000115207					
418	ENSG00000188486					
419						
420	ENSG00000091527	H41				
421	ENSG00000112339					
422	ENSG00000172534					
423	ENSG00000180353					
424	ENSG00000116478					
425	ENSG00000143321			HDGF		
426	ENSG00000166503					
427	ENSG00000013583			HEBP1		
428	ENSG00000112406					
429	ENSG00000103657					
430	ENSG00000128731					
431	ENSG00000051108					
432	ENSG00000114315			**HES1**		
433	ENSG00000164683					
434	ENSG00000152804			HHEX		
435	ENSG00000100644	HIF1A				
436	ENSG00000181061					
437	ENSG00000078140			HIP2		
438	ENSG00000163349	HIPK1				
439	ENSG00000010818			HIVEP2		
440	ENSG00000137361					
441	ENSG00000100281					
442	ENSG00000189403					
443	ENSG00000164104					
444	ENSG00000029993					
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Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
455	ENSG00000096746					
456	ENSG00000165119					
457	ENSG00000104824					
458	ENSG00000099783					
459	ENSG00000125944					
460	ENSG00000153187			HNRPU		
461	ENSG00000105323					
462	ENSG00000010295					
463	ENSG00000106004					
464	ENSG00000078399			**HOXA9**		**HOXA9**
465	ENSG00000120075	**HOXB5**				
466	ENSG00000120087					
467	ENSG00000153807					
468	ENSG00000173744	HRB	HRB			
469	ENSG00000074356					
470	ENSG00000164164			HSHIN1		
471	ENSG00000044574					
472	ENSG00000109971					
473	ENSG00000144381					
474	ENSG00000120694					
475	ENSG00000136478					
476	ENSG00000086758					
477	ENSG00000108622					
478	ENSG00000067829					
479	ENSG00000109083				IFT20	IFT20
480	ENSG00000068745					
481	ENSG00000070061					
482	ENSG00000129351					
483	ENSG00000105135					ILVBL
484	ENSG00000153487					
485	ENSG00000168556					
486	ENSG00000071243					
487	ENSG00000068383					
488	ENSG00000148384					
489	ENSG00000186480	INSIG1				
490	ENSG00000171105					
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Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
500	ENSG00000078596					
501	ENSG00000116679					
502	ENSG00000184916					
503	ENSG00000117139					
504	ENSG00000008083					
505	ENSG00000115548					
506	ENSG00000171988		JMJD1C		JMJD1C	JMJD1C
507	ENSG00000177606					
508	ENSG00000137944					
509	ENSG00000170852					
510	ENSG00000176407	KCMF1	KCMF1			
511	ENSG00000055118					
512	ENSG00000136240					
513	ENSG00000121774	KHDRBS1				
514	ENSG00000088247					
515	ENSG00000131149					
516	ENSG00000179889					
517	ENSG00000136813	KIAA0368				
518	ENSG00000145725					
519	ENSG00000143702					
520	ENSG00000119321					
521	ENSG00000197226					
522	ENSG00000126775					
523	ENSG00000164151					
524	ENSG00000105063					
525	ENSG00000126814					
526	ENSG00000156232					
527	ENSG00000170759					
528	ENSG00000157404					
529	ENSG00000127528					
530	ENSG00000136826					
531	ENSG00000067082					
532	ENSG00000155090					
533	ENSG00000165516					
534	ENSG00000114030					
535	ENSG00000102753			KPNA3		
536	ENSG00000108424					
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Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
546	ENSG00000143815			LBR		
547	ENSG00000157978					
548	ENSG00000065548					
549	ENSG00000100097				LGALS1	LGALS1
550	ENSG00000148943					
551	ENSG00000189067					
552	ENSG00000166783					
553	ENSG00000160789				LMNA	
554	ENSG00000113368					
555	ENSG00000135363			LMO2		
556	ENSG00000111252				LNK	LNK
557	ENSG00000152102					
558	ENSG00000120963					
559	ENSG00000102897					
560	ENSG00000121104					
561	ENSG00000123684					
562	ENSG00000145012					LPP
563	ENSG00000110031			LPXN		
564	ENSG00000077454					
565	ENSG00000198799					
566	ENSG00000171492			LRRC8D		
567	ENSG00000124831					
568	ENSG00000175324					
569	ENSG00000146963					
570	ENSG00000054219				LY75	LY75
571	ENSG00000120992					
572	ENSG00000011009				LYPLA2 /// LYPLA2P1 /// LOC388499	
573	ENSG00000163818					
574	ENSG00000135387					
575	ENSG00000003056					
576	ENSG00000143033					
577	ENSG00000127603			MACF1		
578	ENSG00000110514					
579	ENSG00000187391					
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Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
589	ENSG00000047849			MAP4		
590	ENSG00000104814					
591	ENSG00000012983					
592	ENSG00000135525					
593	ENSG00000100030					
594	ENSG00000112062					
595	ENSG00000101367	MAPRE1				
596	ENSG00000166974					
597	ENSG00000175130					
598	ENSG00000075413				MARK3	MARK3
599	ENSG00000166986					
600	ENSG00000168906	MAT2A	MAT2A			
601	ENSG00000038274	MAT2B	MAT2B			
602	ENSG00000015479					
603	ENSG00000125952					
604	ENSG00000134046					
605	ENSG00000152601	MBNL1				
606	ENSG00000180398			MCFD2		
607	ENSG00000121940					
608	ENSG00000112118					
609	ENSG00000082212					
610	ENSG00000124733					
611	ENSG00000081189			MEF2C		
612	ENSG00000143995	**MEIS1**	**MEIS1**			
613	ENSG00000133895					
614	ENSG00000164024					
615	ENSG00000168282					
616	ENSG00000138092					
617	ENSG00000133858					
618	ENSG00000198408					
619	ENSG00000079277					
620	ENSG00000133606					
621	ENSG00000089693					
622	**ENSG00000171843**					
623	ENSG00000108788					
624	ENSG00000056586					
625	ENSG00000165943					
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Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
635	ENSG00000125445		MRPS7			
636	ENSG00000005302					
637	ENSG00000147065					MSN
638	ENSG00000182979					
639	ENSG00000147649					
640	ENSG00000143033					
641	ENSG00000100330				MTMR3	MTMR3
642	ENSG00000108389					
643	ENSG00000170873	MTSS1				
644	ENSG00000128654					
645	ENSG00000118513					
646	ENSG00000005810					
647	ENSG00000133026			MYH10		
648	ENSG00000136504					
649	ENSG00000102921					
650	ENSG00000138386				NAB1	NAB1
651	ENSG00000187109				NAP1L1	
652	ENSG00000132780					
653	ENSG00000158747					
654	ENSG00000115053					
655	ENSG00000198646					
656	ENSG00000196498					
657	ENSG00000166579					
658	ENSG00000131507					
659	ENSG00000125356					
660	ENSG00000189043					
661						
662	ENSG00000069869					
663	ENSG00000173848					
664	ENSG00000082641					
665	ENSG00000116044					
666	ENSG00000050344					
667	ENSG00000120837					
668	ENSG00000066136					
669	ENSG00000166681					
670	ENSG00000140157					
671	ENSG00000164190			NIPBL		
672						
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Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
681	ENSG00000106459			NRF1	NRF1	NRF1
682	ENSG00000180530					
683	ENSG00000035681					
684	ENSG00000137497					
685	ENSG00000124789					
686	ENSG00000162231			NXF1		
687	ENSG00000101888					
688	ENSG00000065154					
689	ENSG00000115758	ODC1				
690	ENSG00000046651					
691	ENSG00000147162	OGT				
692	ENSG00000182606					
693	ENSG00000141447					
694	ENSG00000091039					
695	ENSG00000117859					
696	ENSG00000167770					
697	ENSG00000172939					
698	ENSG00000170515					
699	ENSG00000070756					
700	ENSG00000151846					
701	ENSG00000090621					
702	ENSG00000100836					
703	ENSG00000100266					
704	ENSG00000172239	PAIP1				
705	ENSG00000142864					
706	ENSG00000180370					
707	ENSG00000157654					
708	ENSG00000145730					
709	ENSG00000090060					
710	ENSG00000115421					
711	ENSG00000177425					
712	ENSG00000157212					
713	ENSG00000105835					
714	ENSG00000113387					
715	ENSG00000169564					
716	ENSG00000197111					
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Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
726	ENSG00000150593					
727	ENSG00000184588				PDE4B	PDE4B
728	ENSG00000145431					
729	ENSG00000168291		PDHB			
730	ENSG00000065485					
731	ENSG00000143870					
732	ENSG00000162734					
733	ENSG00000197329					
734	ENSG00000132326					
735	ENSG00000152556					
736	ENSG00000067057					
737	ENSG00000164040					
738	ENSG00000167085					
739	ENSG00000112511		PHF1			
740	ENSG00000130024					
741	ENSG00000043143					
742	ENSG00000025293			PHF20		
743	ENSG00000118482					
744	ENSG00000033800					
745	ENSG00000073921			PICALM		
746	ENSG00000166037					
747	ENSG00000051382					
748	ENSG00000145675					
749	ENSG00000137193					
750	ENSG00000102096					
751	ENSG00000107242					
752	ENSG00000154217					
753	ENSG00000181191					
754	ENSG00000171033					
755	ENSG00000118495	PLAGL1	PLAGL1			
756	ENSG00000052126					
757	ENSG00000115762					
758	ENSG00000104886					
759	ENSG00000152952					
760	ENSG00000102024					
761	ENSG00000136040	PLXNC1	PLXNC1		PLXNC1	PLXNC1
762	ENSG00000004399					
763						
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Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		miR-221	miR-222	miR-223	miR-let-7b	miR-let-7c
772	ENSG00000163806	PPP1CB	PPP1CB			
773	ENSG00000186298					
774	ENSG00000112498					
775	ENSG00000058272					
776	ENSG00000113575					
777	ENSG00000104695			PPP2CB		
778	ENSG00000104762					
779	ENSG00000078304					
780	ENSG00000154001					
781	ENSG00000138814					
782	ENSG00000107758					
783	ENSG00000154845					
784	ENSG00000119414	PPP6C	PPP6C			
785	ENSG00000131238					
786	ENSG00000116731	PRDM2				
787	ENSG00000110851					
788	ENSG00000138073	PREB	PREB			
789	ENSG00000122862					
790	ENSG00000142875					
791	ENSG00000005249					
792	ENSG00000166501					
793	ENSG00000101040					
794	ENSG00000115825					
795	ENSG00000137492					
796	ENSG00000185246					
797	ENSG00000147224					
798	ENSG00000197746					
799	ENSG00000129084					
800	ENSG00000106588					
801	ENSG00000143106					
802	ENSG00000100519					
803	ENSG00000108344					
804	ENSG00000125818					
805	ENSG00000121390					
806	ENSG00000117569	PTBP2	PTBP2	PTBP2		
807	ENSG00000138430			PTD004		
808	ENSG00000171862			PTEN		
809						
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Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
818	ENSG00000130508					
819	ENSG00000112531	QKI		QKI		
820	ENSG00000048991					
821	ENSG00000103769			RAB11A		
822	ENSG00000119396					RAB14
823	ENSG00000138069	RAB1A	RAB1A	RAB1A		
824	ENSG00000080371					
825	ENSG00000111737					
826	ENSG00000144566					
827	ENSG00000111540					RAB5B
828	ENSG00000175582					
829	ENSG00000075785					
830	ENSG00000167461					
831	ENSG00000152061			RABGAP1L		
832	ENSG00000136238					
833	ENSG00000152942					
834	ENSG00000164754					
835	ENSG00000119318		RAD23B			
836	ENSG00000108175					
837	ENSG00000017797					
838	ENSG00000132341					
839	ENSG00000153201	RANBP2				
840	ENSG00000065150					
841	ENSG00000137040			RANBP6		
842	ENSG00000010017					
843	ENSG00000116473					
844	ENSG00000127314			RAP1B		
845	ENSG00000138698					
846	ENSG00000181467					
847	ENSG00000109756					
848	ENSG00000077092		RARB			
849	ENSG00000145715			RASA1		
850	ENSG00000101265					
851	ENSG00000139687					
852	ENSG00000023287					
853	ENSG00000122257					
854	ENSG00000102054					
855						
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Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
864	ENSG00000136144					
865	ENSG00000049449					
866	ENSG00000117906			RCN2		
867	ENSG00000089902					
868	ENSG00000137710					
869	ENSG00000173039					
870	ENSG00000157916			RER1		
871	ENSG00000142599					
872	ENSG00000056687				RGL2	RGL2
873	ENSG00000090104					
874	ENSG00000171700					
875	ENSG00000106615					
876	ENSG00000067560	RHOA	RHOA			
877	ENSG00000177105					
878	ENSG00000119729					
879	ENSG00000126858					
880	ENSG00000101782				RIOK3	RIOK3
881	ENSG00000176624					
882	ENSG00000022840					
883	ENSG00000123091					
884	ENSG00000082996					
885	ENSG00000134758					
886	ENSG00000170881					
887	ENSG00000170633					
888	ENSG00000137075		RNF38	RNF34		RNF38
889	ENSG00000063978	RNF4		RNF4		
890	ENSG00000127870					
891	ENSG00000131051					
892	ENSG00000167971					
893	ENSG00000043093	RP42				
894	ENSG00000132383					
895	ENSG00000117748					
896	ENSG00000153574					
897	ENSG00000144713					
898	ENSG00000163902					
899	ENSG00000171858					
900	ENSG00000143947					
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Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
910	ENSG00000020633					
911	ENSG00000163602	RYBP				
912	ENSG00000163785					
913	ENSG00000198838					
914	ENSG00000160633		SAFB			
915	ENSG00000130254		SCARB2			
916	ENSG00000136715					
917	ENSG00000079332					
918	ENSG00000130066					
919	ENSG00000182568					
920	ENSG00000052802					
921	ENSG00000085365					
922	ENSG00000140497					
923	ENSG00000138760					
924	ENSG00000121892					
925	ENSG00000151967				SCHIP1	SCHIP1
926	ENSG00000010803					
927	ENSG00000137575	SDCBP				
928	ENSG00000156642					
929	ENSG00000140612					
930	ENSG00000155878			SEC22L1		SEC22L1
931	ENSG00000121542					
932	ENSG00000107651					
933	ENSG00000138802					
934	ENSG00000075223					
935	ENSG00000168758				SEMA4C	SEMA4C
936	ENSG00000092421					
937	ENSG00000122545					
938	ENSG00000120742					SERP1
939	ENSG00000179833					
940	ENSG00000080546					
941	ENSG00000119335					
942	ENSG00000115524					
943	ENSG00000116560					
944	ENSG00000136450					
945			SFRS2			
946						
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Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
956	ENSG00000116350					
957	ENSG00000100650					
958	ENSG00000124193					
959	ENSG00000115875					
960	ENSG00000198730					
961	ENSG00000162105					
962	ENSG00000182199	SHANK2				
963	ENSG00000108061					
964	ENSG00000196470					
965	ENSG00000096717					
966	ENSG00000124523			SIRT5		
967	ENSG00000113558					
968	ENSG00000155926					
969	ENSG00000165646					
970	ENSG00000004864					
971	ENSG00000122912					
972	ENSG00000178537					
973	ENSG00000075415					
974	ENSG00000147454	SLC25A37				
975	ENSG00000005022					
976	ENSG00000117394					
977	ENSG00000059804					
978	ENSG00000134294					
979	ENSG00000138821			SLC39A8		
980	ENSG00000080493	SLC4A4				
981	ENSG00000175387					
982	ENSG00000112305					
983	ENSG00000102038	SMARCA1	SMARCA1		SMARCA1	SMARCA1
984						
985	ENSG00000127616					
986	ENSG00000173473					
987	ENSG00000073584					
988	ENSG00000077147					
989	ENSG00000072501					
990	ENSG00000102172					
991	ENSG00000145335				SNCA	
992	ENSG00000184602					
993						
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Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
1002	ENSG00000124766					
1003	ENSG00000067066					
1004	ENSG00000172845			SP3		
1005	ENSG00000091640					
1006	ENSG00000008294					
1007	ENSG00000113140					
1008	ENSG00000065526			SPEN		
1009	ENSG00000095480					
1010	ENSG00000147475					
1011	ENSG00000152268					
1012						
1013	ENSG00000164056					
1014	ENSG00000115306			SPTBN1		
1015	ENSG00000090054					
1016	ENSG00000100596					
1017	ENSG00000116649					
1018	ENSG00000153037					
1019	ENSG00000096063					
1020	ENSG00000135250					
1021	ENSG00000124783					SSR1
1022	ENSG00000149136			SSRP1		
1023	ENSG00000101972					
1024	ENSG00000084090					
1025	**ENSG00000168610**					**STAT3**
1026	ENSG00000173757					
1027	ENSG00000167323	STIM1		STIM1		
1028	ENSG00000166301					
1029	ENSG00000102572					
1030	ENSG00000112079					
1031	ENSG00000198648			STK39		
1032	ENSG00000117632			STMN1		
1033	ENSG00000165283					
1034	ENSG00000124222					
1035	ENSG00000168952					
1036	ENSG00000173812					
1037	ENSG00000116030					
1038	ENSG00000180283	SUMO2	SUMO2			
1039						
1040						
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1042						
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1045						
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1047						

Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
1048	ENSG00000120948					
1049						
1050						
1051						
1052						
1053						
1054	ENSG00000113649			TCERG1		
1055		TCF12		TCF12		
1056						
1057		TCF3				
1058		TCF7L2				
1059						
1060				TEGT		
1061						
1062						
1063						
1064						
1065	ENSG00000198176					
1066						
1067						
1068						
1069						
1070	ENSG00000123066					
1071	ENSG00000116001					
1072		TIPARP				
1073				TLE4		
1074						
1075		TLOC1				
1076						
1077						
1078	ENSG00000101337					
				TMEM49 ///		
1079	ENSG00000062716			MIRN21		
1080						
1081	ENSG00000120802					
1082						
1083						
1084						
1085						
1086						
1087						
1088						
1089						
1090						
1091						
1092						

Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
1093	ENSG00000111669					
1094	ENSG00000140416					
1095						
1096				TRA1		
1097						
1098						
1099	ENSG00000166326					
1100						
1101	ENSG00000043514					
1102						
1103						
1104						
1105	ENSG00000102804					
1106	ENSG00000157514					
1107	ENSG00000163084					
1108		TSPAN3				
1109	ENSG00000143367					
1110	ENSG00000139921					
1111						
1112						
1113						
1114						
1115	ENSG00000077721			UBE2A		
1116						UBE2B
1117	ENSG00000131508	UBE2D2				
1118			UBE2D3		UBE2D3	UBE2D3
1119						
1120		UBE2E3				
1121						
1122	ENSG00000103275					
1123		UBE2J1				
1124	ENSG00000185651					
1125						
1126						
1127						
1128	ENSG00000114062					
1129						
1130						
1131						
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1133						
1134						
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1137						

Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
1138	ENSG00000164828					
1139	ENSG00000100242	UNC84B	UNC84B			
1140						
1141						
1142	ENSG00000152484					
1143	ENSG00000101557					
1144					USP15	USP15
1145				USP32		
1146	ENSG00000077254					
1147	ENSG00000115464					
1148						
1149						
1150						
1151	ENSG00000173218					
1152	ENSG00000101558					
1153	ENSG00000124164	VAPB				
1154						
1155						
1156						
1157						
1158						
1159						
1160					VAV3	VAV3
1161						
1162	ENSG00000165280					
1163	ENSG00000073905				VDAC1	VDAC1
1164	ENSG00000078668					
1165		VGLL4				
1166						
1167						
1168						
1169	ENSG00000167987					
1170						
1171						
1172					VPS26	VPS26
1173						
1174	ENSG00000105053					
1175						
1176						
1177						
1178						
1179						
1180						
1181						
1182						
1183						

Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
1184	ENSG00000109685					
1185						
1186						
1187	ENSG00000146457			WTAP		
1188						
1189	ENSG00000115254					
1190						
1191	ENSG00000169180					
1192						
1193						
1194						
1195						
1196		YT521				
1197					YWHAB	YWHAB
1198						
1199						
1200	ENSG00000134308					
1201						
1202						
1203			ZA20D2		ZA20D2	ZA20D2
1204			ZA20D3			
1205						
1206						
1207						
1208						
1209						
1210						
1211						
1212						ZMYND11
1213	ENSG00000010244					
1214						
1215						
1216		ZNF160				
1217						
1218						
1219						
1220		ZNF238		ZNF238		
1221						
1222						
1223						
1224						
1225						
1226						
1227						
1228						
1229						

Figure 12, con'd

	A	AI	AJ	AK	AL	AM
1		**miR-221**	**miR-222**	**miR-223**	**miR-let-7b**	**miR-let-7c**
1230	ENSG00000036549					

Figure 13

Probe	HAL-01	HL60	K562	KG-1	MV-4-1	REH	TF-1	TF-1a
hsa-let-7a-1-prec	59877	144244.25	43432.75	385696.25	56397.5	48971.5	94844.25	43498.75
hsa-let-7a-2-precNo1	34495	37454	37451.5	45386.75	32736	36261.5	36009	41444.75
hsa-let-7a-2-precNo2	131941.75	231436.75	48639.5	815886.75	60612.25	90857.25	85615.25	46744
hsa-let-7a-3-prec	89887.75	128702.5	46786	428774.5	45481.5	61108.25	49384.25	48040.5
hsa-let-7b-prec	133185.25	397914.25	279078.25	705018.5	208709.75	131773	278812.25	113131.25
hsa-let-7c-prec	100785.75	197445.5	60307	757556.5	71542.75	67090.75	72840.25	49398.5
hsa-let-7d-prec	71773.75	163818.75	22751.5	354802	39725	40494.25	40445.5	45297.5
hsa-let-7d-v1-prec	42222.75	80064.25	37440.5	129837.75	31470	45837.5	31631.75	40413.75
hsa-let-7d-v2-precNo1	36610	40031.25	37547.5	49450.5	28160.25	36097.25	41377.5	42061
hsa-let-7d-v2-precNo2	40499.75	119246.75	57057.75	151772.5	63591.75	46230.25	66822.5	38517
hsa-let-7e-prec	33396.75	171233.25	87065	206395.75	90348.25	46163	99577.5	55011
hsa-let-7f-1-precNo1	36393.75	38424	38177	51385.75	37429.5	42269.5	42667.75	46744.5
hsa-let-7f-1-precNo2	47014.25	55335.25	41240.75	166514	46220.5	45622.75	41851	44695.5
hsa-let-7f-2-prec2	44943	113838	39722.75	209190	42204.25	48405.5	35424	38175.75
hsa-let-7g-precNo1	47568.25	142978	28237.75	185454.25	45787.5	37696	39655.75	39791.5
hsa-let-7g-precNo2	36251	27763.5	28471	46603.75	34604.5	34366.75	29394.5	37196.75
hsa-mir-001b-1-prec1	35131.75	30851.75	29149	39302	28297.5	34554.5	28542.5	38240.75
hsa-mir-001b-2-prec	33773.5	29954	30626.75	51482.75	28325	31488	38393.75	30618.5
hsa-mir-007-1-prec	29098.75	34804	35428.75	42663.25	32013.5	34867	30899.25	36720.25
hsa-mir-007-2-precNo1	34857	30251.75	29508	39103	30859.75	34237.75	29564.25	39567.5
hsa-mir-007-2-precNo2	36393.75	36973.75	32712.5	44072.5	33475	34763	25734	46194.25
hsa-mir-007-3-precNo1	45017.5	64379.5	62320.25	37180.25	44002	39446	67455.75	37775.5
hsa-mir-007-3-precNo2	34459	32421.25	32994.5	42579	31070.75	33137.5	33053.5	45226.5
hsa-mir-009-1No1	40917.75	24654	42568	48077	23581.75	41886.5	36842	41240.5
hsa-mir-009-1No2	33851.25	32076.5	32696.75	39750.5	29028.5	34967.5	32288.75	37232.25
hsa-mir-009-2No1	37984.5	42470	38528.5	52671	35480.5	42435.5	40698.5	50954.75
hsa-mir-009-2No2	33737.5	32070.75	31711.75	44253.5	30288.25	36128.25	33221.25	42637.75
hsa-mir-009-3No1	124810	293724.5	319169.75	682683.75	197083.5	104924.75	1018689.5	181443.75
hsa-mir-009-3No2	43594.5	28018.5	49043	55210.75	34865	37258	35878.25	49054.5
hsa-mir-010a-precNo1	34647	32536.25	47118	54633.5	42004	37497.25	38123.25	50080.75
hsa-mir-010a-precNo2	34093.75	31236.25	39793.5	47520.5	33264.75	35775.5	32850.75	44538.25
hsa-mir-010b-precNo1	34637	33226	38729.25	45927	34770.25	38248	36752	44761.75
hsa-mir-010b-precNo2	35863.5	32483.5	32542	48376.75	30357.75	35473	33335.75	43087.75
hsa-mir-015a-2-precNo1	42294	50414	41443.75	106541.75	43075.25	34022	39564.25	44072
hsa-mir-015a-2-precNo2	35464.5	34583.25	31993	44798.25	30062.25	34387.75	33324.5	42561.75
hsa-mir-015b-precNo1	46564.75	36478	37508.75	56425	34003.75	39266.25	43851.75	43970.5
hsa-mir-015b-precNo2	35686	41227.75	35634.25	56725.75	32170.75	38746.5	32230	42410.25
hsa-mir-016a-chr13	68774.5	253983.75	105060.5	224084.75	69321.75	60526.75	23459.25	48578.5
hsa-mir-016b-chr3	80956	279402.25	105133.5	295321.25	75287.75	75010.25	37334.25	42612.25
hsa-mir-017-precNo1	37193.5	33818	35516	32124.25	35416.75	35801.5	22320.75	40895.25
hsa-mir-017-precNo2	353497.25	1524145.5	1812838.5	2970608.5	700523.75	340941	847229.25	743338.5
hsa-mir-018-prec	29858.75	86746.5	117787	123840	63477.25	34474.75	76786	41373.75
hsa-mir-019a-prec	37080	31065.5	28337.25	32827	30926.75	37650.5	33697	41240.5
hsa-mir-019b-1-prec	36944.25	34171	38498.25	27833.5	28763.5	35374	31398.25	39192.75
hsa-mir-019b-2-prec	36534.5	29121.25	17767.5	41739.5	31038.25	36590.5	36297.75	40224.75
hsa-mir-020-prec	262553.25	860649.5	1443694	2153325.5	660400.75	246801.75	569671.25	596562.5
hsa-mir-021-prec-17No1	39364.25	45472.75	91088.75	144976.75	58726.75	39498.25	41194.75	40672
hsa-mir-021-prec-17No2	35154	28540	31586	44480.25	30297.75	35193.75	33236.75	39154
hsa-mir-022-prec	34988.75	29746.75	30172.25	41271.5	28617.5	27344.75	29702.75	38013.5
hsa-mir-023a-prec	193035.25	742096.75	444545.25	2938261.2	630501	301745.75	175965.5	135560.75
hsa-mir-023b-prec	180238	785796.25	468517	1574769.5	592315.5	182041	247945.25	108168.25
hsa-mir-024-1-precNo1	35058.5	204500	107060.25	368213.5	144906	46153.5	69139	41434.25
hsa-mir-024-1-precNo2	30404.75	109323	101705	54911	62293.5	36723.25	77712.25	47580.25
hsa-mir-024-2-prec	42743.75	227718	115457.75	478312.25	169865.25	54248.5	69193.25	53874.25
hsa-mir-025-prec	390736	1506262.5	3361423	1578707.2	2105188.8	957027.25	1182206.5	1322783
hsa-mir-026a-precNo1	198177.25	584941.25	339185.25	581915.5	325416.5	262311.75	148955.5	158285.25

Figure 13, con'd

hsa-mir-026a-precNo2	38132	42114	41007.75	61262	37983.25	45635.75	22945.25	50864.75
hsa-mir-026b-prec	400196	1078468.5	483160.25	1091019.2	756449.75	483543	171831.5	308082.5
hsa-mir-027a-prec	43458.5	46834.25	38099.25	68475.25	48150.75	47337.25	34913.25	44666.75
hsa-mir-027b-prec	38825.25	41741.5	38606.75	67284.75	37118.25	40817.5	37820.5	45608.5
hsa-mir-028-prec	38129	41290.5	37431	43531.5	34956.75	40022.25	39732	47575.25
hsa-mir-029a-2No1	43517.75	96866.25	56763.25	68072	51549.5	34193	50169.75	45152
hsa-mir-029a-2No2	64145.25	206689.25	158175.25	90684.25	143279.5	42249	166835.75	71361.25
hsa-mir-029c-prec	135824.5	539567	557149.75	276524	458332.5	214444.5	400468	258717.75
hsa-mir-030a-precNo1	76566.75	228089.5	150590.75	299815.5	123975.75	67795.25	156514.75	91314
hsa-mir-030a-precNo2	33122.5	62887.25	50394.5	24920.5	27460	41247.25	37844	45006
hsa-mir-030b-precNo1	34097.25	108451.75	65579	177545	53946.5	43292.25	58153.5	35586.25
hsa-mir-030b-precNo2	40012.5	29746.25	31011.5	52574.5	31955	34551	46531.5	43689.75
hsa-mir-030c-prec	31125.75	98101.5	43300	150151.5	51976.25	32246.75	43098.5	23175.25
hsa-mir-030c-precNo1	37203.5	35352	32761.75	43052.75	32996.5	34812	32773	40097.75
hsa-mir-030d-precNo2	56043	202749.5	106446.75	621818	151251.25	78698	234690.5	93963.25
hsa-mir-031-prec	38355.5	29070	19113.75	46474.5	14185.5	37709.25	27657.5	43278
hsa-mir-032-precNo1	37589	30959	37638	45816	33672	35320.5	35571	37949.5
hsa-mir-032-precNo2	81778.83	308089.75	588506.25	300173.34	357791.84	143565.84	191228	275602
hsa-mir-033b-prec	44366.25	57320.5	55362	144162.25	81621.5	39261	318362.5	55445.25
hsa-mir-033-prec	42205.668	27095	60789.25	41035.664	54565	39168.5	48691	30258.666
hsa-mir-034precNo1	36475.25	38069.25	40244.75	51749.75	17190.25	38010.5	33813.25	35661
hsa-mir-034precNo2	37107.168	38139	42126.25	52531	39284.5	41323.664	46518.164	51175.332
hsa-mir-092-prec-13=092	42884.25	41268	52781	53973.5	29815.75	40572	34265.25	40347.25
hsa-mir-092-prec-13=092	2803663.5	7116032	7374160	3893523.2	3710736.5	4645699	3944756	3949622.2
hsa-mir-092-prec-X=092-	2038781.5	4521164.5	4859022.5	4817463.5	4131910.2	4010835.5	3809459.8	4607592.5
hsa-mir-093-prec-7,1=09:	1064026.64	4102270.75	519443	646731.2	299948.66	150620.5	354627.66	232774
hsa-mir-095-prec-4	43927.25	23281.5	72239.25	73511.25	86324.25	35054.75	297828.25	231600.5
hsa-mir-096-prec-7No1	35225	33962.25	42464	54414.5	33249.332	39225	39328.336	45257.668
hsa-mir-096-prec-7No2	31391	102017.75	101520	63924.25	85941.25	23069.75	126095.5	56276.75
hsa-mir-098-prec-X	37734.75	39973.25	36835.75	45645	35463	36034	32369.5	39163
hsa-mir-099b-prec-19No:	35117.75	24067.25	23003	42756.25	22861.25	35610.25	48283.25	37142
hsa-mir-099b-prec-19No:	35576.75	103100	66703	132127	36902.5	68776.5	112401.75	78143
hsa-mir-099-prec-21	35325	55641.5	46618.25	64775.75	25794	35964.5	56232	34843.75
hsa-mir-100-1/2-prec	42532.25	131401	269074.75	92775.75	88263.25	61410.75	123759.25	72192.5
hsa-mir-101-1/2-precNo1	35161.5	39424.75	37704	47226.25	19598.25	37213.5	13345	42350.25
hsa-mir-101-1/2-precNo2	39113.25	45341.25	96219.25	30707.5	34875	34674	45779	27693
hsa-mir-101-prec-9	30055.5	46204.25	47519	25709.75	28841.5	34063.25	29762	46147.5
hsa-mir-102-prec-1	308443.75	1005211.25	1103320	422648.5	508920.75	312397.75	658503	387000.5
hsa-mir-103-2-prec	210175.5	890720.75	261676.75	1668916.8	360702.5	333282.5	297828.25	231600.5
hsa-mir-103-prec-5=103-	307853.75	1578709	410809.5	2182758.2	435930.75	545443.25	482759.5	293385.75
hsa-mir-105-prec-X.1=10	35651.75	26475	27752.75	32900.25	34555.5	16203.25	39395.75	
hsa-mir-106-prec-X	178374.17	1050456.2	1616078	1523385.2	412378.5	234616	489951.66	391451.34
hsa-mir-107-prec-10	337101.5	1747835.5	563669.25	1967522	508549.5	609753.5	477536.75	267946
hsa-mir-122a-prec	29297	107228.25	74045.5	70011.17	57063	26719.334	74332	35952.168
hsa-mir-123-precNo1	42356	86366	183612.5	366028	165836.5	24181.75	236752	203915.5
hsa-mir-123-precNo2	1603219.2	25540	97369.25	1690958.2	2042067.5	1546279.8	1795497.8	1732278
hsa-mir-124a-1-prec1	38006.75	21099	57228	58533.25	28080.25	40984.5	26053.75	50888.5
hsa-mir-124a-2-prec	58031.5	40047.5	40125.25	74011.164	105236.164	46147	157566.83	63747.664
hsa-mir-124a-3-prec	39171.25	43670.5	79913.5	38448.5	38044.5	31746.5	52592.75	42149.25
hsa-mir-125a-precNo1	92565.33	33971	43937.5	156147.5	205921.66	106145.83	335087.5	147891.66
hsa-mir-125a-precNo2	40209.25	35417	36256	30679	32699	42636.75	37564.25	45847.25
hsa-mir-125b-1	31572.566	26662	42795.75	55346.832	56317	30465.168	85731.83	54278.336
hsa-mir-125b-2-precNo1	35404.75	34559.75	33882.75	44426.75	30162.25	38757.25	34080.25	39345.5
hsa-mir-125b-2-precNo2	36558.75	42843.75	29989.5	26416	30072.75	38632.75	28061	42265
hsa-mir-127-prec	36589.25	38879	33372	53691.5	33137	40191.25	55342.5	40826.25
hsa-mir-128a-precNo1	38842.5	22973.25	22041.75	34070.75	25734.75	40232.5	55512.5	36235
hsa-mir-128a-precNo2	218329	1569383.2	317386.75	517659.75	312134	1295798.8	315429.5	203168.5
hsa-mir-128b-precNo1	86866.75	949442	150501.25	226341.75	85547.75	620004.25	56217.5	78167

Figure 13, con'd

hsa-mir-128b-precNo2	36836.75	82074.5	31912.25	46613.25	26435.5	67496	22889.25	36282.75
hsa-mir-129-precNo1	39956.25	85083.75	46169	18609.25	33024.5	40791.25	72245.75	38147.5
hsa-mir-129-precNo2	35465	32243.5	29393	40160	27586.5	35427.5	28423	38780
hsa-mir-130a-precNo1	35419	31115.25	27806.25	41123.5	28574	34108	30184.25	37755
hsa-mir-130a-precNo2	47068.5	574811.5	89920.75	1281832	103501.25	306602.25	31410	15260.75
hsa-mir-132-precNo1	35784.25	34212.75	32922.5	47934.25	29206	42789	38339	40815.5
hsa-mir-132-precNo2	34882.75	30861.25	31517.5	45945	29552.75	35827.5	32082.5	35534.25
hsa-mir-133a-1	36276.336	33049.75	32749.5	44442.5	37886	30890	37698.332	44567.332
hsa-mir-133a-2	35440	33443.25	32196	45345.25	30526.75	38494.75	24692	39352
hsa-mir-134-precNo1	37253.832	31859	32634.5	48885.332	33249	41141.168	43718.332	45790.336
hsa-mir-134-precNo2	36227.75	39749.25	43248.25	46478	37349	39936.75	32319.75	45128
hsa-mir-135-1-prec	36246.332	40330.5	25959.25	49272.336	36542.5	39117.5	31632.166	45034.336
hsa-mir-135-2-prec	21894	99299	266173.25	110583.75	128228.25	73864.75	99789.5	90390.5
hsa-mir-136-precNo1	32471.168	31029	32505.25	47448	32264.166	38688.832	37448.164	41688
hsa-mir-136-precNo2	37672	46753	35318.5	44322	19892	39391	61149	44835.25
hsa-mir-137-prec	87697.5	33909	32852.25	157699.66	405296.5	145545	458912	150036.17
hsa-mir-138-1-prec	35390.5	36158.5	34885	44983.25	34131.25	36492.25	27241	40081.25
hsa-mir-138-2-prec	32758.332	36133.5	36929.75	198847.17	89172.836	36765.836	54812	43174.164
hsa-mir-139-prec	36590.25	37703	37911.75	47823.25	31428	39048.75	34751	43048
hsa-mir-140No1	36197	33083.75	31701.5	40895.5	31265.5	34388.5	32471.25	37270.75
hsa-mir-140No2	31251	52333.5	24709.25	27386.5	24751.75	30380.5	28867.25	38912.75
hsa-mir-141-precNo1	36276.5	38134.25	34869.75	41363	32686	35877	35914	38193.25
hsa-mir-141-precNo2	34529.25	31158.5	32446.75	41228.25	32728.5	35438.75	34032.5	38534
hsa-mir-142-prec	70944.25	184940.5	55716	218791.25	53452.5	97263.25	51753.75	32250
hsa-mir-143-prec	45169.5	53646.75	48699.75	33117.5	44419.75	30776.25	54278.75	38684.25
hsa-mir-144-precNo1	35212.75	31374.5	38738	39337.75	31989.75	34287.5	32541.5	36222
hsa-mir-144-precNo2	32072.25	27699	29010	38292.25	27893.75	31895.5	29367.25	35553
hsa-mir-145-prec	62222.75	67477	63614	79534.75	83657.5	33617.75	113752.5	57833.25
hsa-mir-146-prec	54552.25	438140.25	450066.25	504783.75	263392	80182	157806.5	121039
hsa-mir-147-prec	36469.25	39956.75	29374.5	42576.75	35831	36523.25	34739.25	38280.25
hsa-mir-148-prec	34942.5	32087	30167.75	40713	30293.75	33520	32153.25	37141.5
hsa-mir-149-prec	37474.164	37171	35028.75	40613.164	33092	36174.5	37909.5	41616.5
hsa-mir-150-prec	106930.5	41791.25	37264.25	123153.5	39533	34857.25	40525	41603.5
hsa-mir-151-prec	38789.5	36880.75	36828	50031.336	32403.834	35238.5	32334.5	40877.668
hsa-mir-152-precNo1	39168.5	13396.5	41530.75	60328.75	35678.75	37119.25	40816.75	31972.75
hsa-mir-152-precNo2	42356.5	42797.25	49362.75	48790.332	39774.168	40284.836	67271.17	51818.5
hsa-mir-153-1-prec1	37909	39924.5	45670.25	48987.25	41639.25	40924	32920.75	45898.5
hsa-mir-153-1-prec2	370E4.5	31289.75	32300.75	46656.164	28353.5	36967.5	32118.666	46090
hsa-mir-153-2-prec	41137	34757	35768.5	54269.25	30097.75	37288.75	44882.5	47655.25
hsa-mir-154-prec1No1	37706.164	34176.75	33935.75	48154.832	33287.668	38892	33485.336	45454.5
hsa-mir-154-prec1No2	38655.5	37037	40863.75	47168.5	23473.5	41225.5	29394	45463.25
hsa-mir-155-prec	222753.33	427613.75	620020.25	805300.2	740008.7	158351.83	32335.5	45105.836
hsa-mir-181a-precNo1	290527	1050017	86227	697697	237062	535766.75	183742.25	107997.25
hsa-mir-181a-precNo2	36409.5	45873.5	45164	41702.25	21303	35461.75	29019.25	41622.5
hsa-mir-181b-precNo1	299655.75	1078172.8	85985.5	1004126.25	277269.25	683789	229806.25	115223
hsa-mir-181b-precNo2	33892.75	34420	31502.5	42302	31317.75	36561.75	31508	39825.75
hsa-mir-181c-precNo1	162469.75	545474	54857.75	640543.75	193409.5	335904	128042.25	53164.75
hsa-mir-181c-precNo2	38147.25	28324.5	38648	47984.75	40207	37349.25	23093.25	41783
hsa-mir-182-precNo1	6273949	7313438.5	6733802.5	6916808	6337161	6296033	6653455	6648128.5
hsa-mir-182-precNo2	5606202.5	7298623	6432639	5334114	4724504.5	5292543	5596285	5211982.5
hsa-mir-183-precNo1	91934.75	354646	413432.25	138119.25	337764.5	127066.5	537459.75	140206.75
hsa-mir-183-precNo2	1474779	5185491	4514153.5	2242820.5	4074175.2	1659261.2	4467957	2190641.8
hsa-mir-184-precNo1	26905.25	48459.5	58320.5	29301.75	69615	34721.5	99887.25	16759.5
hsa-mir-184-precNo2	35734	62778.75	44887.5	51545.25	40233	42709.5	48223.25	33478.75
hsa-mir-185-precNo1	36464.25	22639.25	27159.75	23773	25314.25	37151.5	20284	38973.75
hsa-mir-185-precNo2	48011.25	123399	88855	39305.5	40623.25	36353.5	72274.5	48654.75
hsa-mir-186-prec	34701.75	129585.5	62321	79625	34909.5	23070.25	46274.25	23135.25
hsa-mir-187-precNo1	40652.5	27453.5	24764.25	49198	23002.5	41892.75	34733	46527

Figure 13, con'd

hsa-mir-187-precNo2	38244.5	36712.5	32618.25	46957.75	36805.5	36652	41185.5	42330.5
hsa-mir-188-prec	44212.5	54051	50384.75	42554	31140	30221.75	41166.75	40751.5
hsa-mir-190-prec	64567	196338.5	208029	79794.75	106423.75	55496	185347	66914
hsa-mir-191-prec	4478169	5992681.5	5127236	3418688.5	3237831	4208105.5	3563511.2	3410285.2
hsa-mir-192-2/3No1	2684126.8	5031396	5532501	3572897.2	3832879.8	3185635.8	4348069.5	3726084.2
hsa-mir-192-2/3No2	43312.25	41896.75	20767.25	54805	42394.75	37270.5	57115.25	50783.75
hsa-mir-193-precNo1	2974283.2	5862239	5829552	3602186	4222828	3465874.8	4740979	3358377.2
hsa-mir-193-precNo2	100014.75	756761.75	804571	286927.75	356710.25	124535.5	728212.5	126877.25
hsa-mir-194-precNo1	33684.5	115323.5	121101.5	69876.5	114084.25	36986.25	155006.25	49028.75
hsa-mir-194-precNo2	38283.25	48710.25	51951.75	29721.5	32084	38352	32666.75	41596.75
hsa-mir-195-prec	47623.5	186679.25	80450.25	143155.75	64945.25	32791.75	46305.75	47091.5
hsa-mir-196-1-precNo1	40863.5	61772.5	50405.5	51103	26982.25	40496.75	29516.25	23500.75
hsa-mir-196-1-precNo2	40513.25	56653.75	49402.5	29430.5	32501	39357.25	44276.25	28664
hsa-mir-196-2-precNo1	38584.25	38937.5	38534.25	38843.5	22156.5	40068.25	31605	43546
hsa-mir-196-2-precNo2	29939.25	96779.25	86730.25	68756	45842.75	22924.25	49934.75	33455.75
hsa-mir-197-prec	155573.5	568650.25	465801.75	196970	233377.25	141222.5	411032.5	157956.5
hsa-mir-198-prec	5769709.5	7296547	6951285	5456465	4657956.5	6316066.5	5182846.5	5827302
hsa-mir-199a-1-prec	463550	1849539.5	1840518	1038201	515157.5	1622295.2	650396.75	
hsa-mir-199a-2-prec	69413	388546.5	365168.25	525663.25	281186.5	73796	452659	90867.25
hsa-mir-199b-precNo1	36243	52124.25	47267.75	80291.25	62340.5	35223	90686.25	30383.25
hsa-mir-199b-precNo2	35298	41345	40097.75	41793	26928.25	29331.25	20246.5	40479.5
hsa-mir-200a-prec	39477.5	81249.25	84908.75	42257.5	34809.75	35817.5	59554	45447.5
hsa-mir-202-prec	40233	127067.75	101566.75	44990.5	54034	79153	43180.75	130376.25	49194.75
hsa-mir-203-precNo1	273228.5	900411.25	1252334.5	402505.75	700094.5	372946.75	818386	393368.75
hsa-mir-203-precNo2	1370943.5	5353509	5316583.5	1874366.5	3303802.8	1502322.2	3180366.8	1995062.5
hsa-mir-204-precNo1	960398.75	2155215.8	2445932.2	1003341.25	1645072.8	939581.5	1732213.2	984156.5
hsa-mir-204-precNo2	54251.75	156066.5	142205.5	156885.5	96334	49220.5	826508.75	637744.75
hsa-mir-205-prec	802859.25	2497250.8	2534716	1052615	1120822.5	903527.25	1236513.8	964363.25
hsa-mir-206-precNo1	93966.5	306652.25	277292.5	151804	238033.5	71601.25	355206.5	128251
hsa-mir-206-precNo2	51664	28226	50142.5	68047.25	57824.75	40185	95114.75	32410
hsa-mir-208-prec	38117.25	36479	36753.5	48240.5	34722.25	38427.75	36574	43226.25
hsa-mir-210-prec	31785.5	37205.25	36539.5	35487.5	38155.75	44820.75	16964.25	45866.5
hsa-mir-211-precNo1	39280.25	37209.5	35999	45092.25	33982.75	36723	35838.25	41023.5
hsa-mir-211-precNo2	35856.25	41688.75	17469	45207.5	17952.75	37476.5	15736.25	39367.75
hsa-mir-212-precNo1	71145.25	85190	122517	84620.5	75385.75	35028.5	98129.75	43917
hsa-mir-212-precNo2	45238.5	178888.5	43425.25	178140.25	44888.5	67976	209236	24879.25
hsa-mir-213-precNo1	544281.25	2379134.5	1349857.5	1541639.2	389136.75	1232127	246440	211170
hsa-mir-213-precNo2	37961.25	56638.75	28014.75	35174.5	18856	20109.5	24996	37823.5
hsa-mir-214-prec	35163.5	49569.75	27286	44803.25	35015	42146	24284.5	40919
hsa-mir-215-precNo1	33970.5	33391	42063.5	17984.5	19790.5	33826.75	20010	37677.75
hsa-mir-215-precNo2	33667	29821.75	32046.25	36121.25	27892.75	33674.75	31981	33257.5
hsa-mir-216-precNo1	36223	33848.75	27916.25	38654.25	32005.75	35166	32726.25	40620.75
hsa-mir-216-precNo2	35667.25	33834.75	33278	39930	30219.75	35069.75	30972	38229.5
hsa-mir-217-precNo1	36174.5	32338.75	34041.75	40432.5	31306.25	36104	31498.25	39423
hsa-mir-217-precNo2	36383.25	32125	33267.25	38499.25	28541.25	36048.5	31377	38441
hsa-mir-218-1-prec	39780.5	36829	32191.5	45281.25	35983	38198	28545.5	41624.75
hsa-mir-218-2-precNo1	37118.5	33899	35781.5	43642.25	34789.75	34906.75	39416.75	38887
hsa-mir-218-2-precNo2	41524.25	44344.5	40420	46525.5	38893.5	39979.25	38694.25	44980.75
hsa-mir-219-prec	38007.75	37374	34716.75	46506	34742.25	34660.5	38086.25	40001.25
hsa-mir-220-prec	38565.75	19904.25	38698.25	29746.5	20809.5	31720.25	27578.25	42066.5
hsa-mir-221-prec	40841.75	289304	80772	427719.25	252749.5	36853.25	87759.5	45599.25
hsa-mir-222-precNo1	100711	572440.5	151962.5	858722	342346.5	88037.75	124050.75	90469.75
hsa-mir-222-precNo2	75666.25	338498.25	88813.5	738146.5	257074.75	59458.25	99604.25	80403.5
hsa-mir-223-prec	41385.25	1873740.8	665449	1824183	790330.25	40842.25	273494	167971.25
hsa-mir-224-prec	35503.25	23178.25	21792.5	33744	15549.5	36365.75	50885	34978.25
hsa-mir-29b-2~102prec7.	42139.25	51654.25	36223.75	54139.5	26586.5	44948.75	45481	47335.5