CHARACTERIZING A GLATIRAMER ACETATE RELATED DRUG PRODUCT

This application claims priority of U.S. Provisional Application Nos. 61/819,481, filed May 3, 2013 and 61/749,228, filed January 4, 2013, the contents of each of which are hereby incorporated by reference in their entireties.

Throughout this application various publications are referenced by numerical identifiers in parentheses. Full citations of these references can be found following the Examples. The disclosures of these publications in their entireties are hereby incorporated by reference into this application in order to more fully describe the state of the art to which this invention pertains.

Multiple sclerosis (MS) is a chronic, debilitating autoimmune disease of the central nervous system (CNS) with either relapsing-remitting (RR) or progressive course leading to neurologic deterioration and disability. At time of initial diagnosis, RRMS is the most common form of the disease (1) which is characterized by unpredictable acute episodes of neurological dysfunction (relapses), followed by variable recovery and periods of clinical stability. The vast majority of RRMS patients eventually develop secondary progressive (SP) disease with or without superimposed relapses. Around 15% of patients develop a sustained deterioration of their neurological function from the beginning; this form is called primary progressive (PP) MS. Patients who have experienced a single clinical event (Clinically Isolated Syndrome or "CIS") and who show lesion dissemination on subsequent magnetic resonance imaging (MRI) scans according to McDonald's criteria, are also considered as having relapsing MS.(2)

With a prevalence that varies considerably around the world, MS is the most common cause of chronic neurological disability in young adults.(3, 4) Anderson et al. estimated that there were about 350,000 physician-diagnosed patients with MS in the United States in 1990 (approx. 140 per 100,000 population).(5) It is estimated that about 2.5 million individuals are affected worldwide.(6) In general, there has been a trend toward an increasing prevalence and incidence of MS worldwide, but the reasons for this trend are not fully understood.(5)

Current therapeutic approaches consist of i) symptomatic treatment ii) treatment of acute relapses with corticosteroids and iii) treatment aimed to modify the course of the disease. Currently approved therapies target the inflammatory processes of the disease. Most of them are considered to act as immunomodulators but their mechanisms of action have not been completely elucidated. Immunosuppressants or cytotoxic agents are also used in some patients after failure of conventional therapies. Several medications have been approved and clinically ascertained as efficacious for the treatment of RR-MS; including BETASERON®, AVONEX® and REBIF®, which are derivatives of the cytokine interferon beta (IFNB), whose mechanism of action in MS is generally attributed to its immunomodulatory effects, antagonizing pro-inflammatory reactions and inducing suppressor cells.(7) Other approved drugs for the treatment of MS include Mitoxantrone and Natalizumab.

Copaxone® (Teva Pharmaceutical Industries Ltd.) is a glatiramer acetate drug product approved for treatment of patients with relapsing-remitting multiple sclerosis (RRMS) and clinically isolated syndrome (CIS) (8). Glatiramer acetate drug substance (GA), the active substance of Copaxone®, is a complex mixture of polypeptides and is the first member of the glatiramoid class; *i.e.*, a complex mixture of synthetic polypeptides of varying sizes assembled from four naturally occurring amino acids: L-glutamic acid, L-alanine, L-lysine, and L-tyrosine, in a defined molar ratio (9).

GA elicits anti-inflammatory as well as neuroprotective effects in various animal models of chronic inflammatory and neurodegenerative diseases (10-14) and has been shown to be safe and effective in reducing relapses and delaying neurologic disability in MS patients following long-term treatment (15).

The mechanisms underlying GA therapeutic activity are not fully elucidated, but GA activity on immune cells has been well demonstrated. GA appears to act as an altered peptide ligand (APL) of encephalitogenic epitopes within myelin basic protein (MBP) (16) and demonstrates cross-reactivity with MBP at the humoral and cellular levels (17-23). The unique antigenic sequences of the GA

polypeptide mixture compete with myelin antigens for binding to MHC class II molecules on antigen presenting cells (APCs) and presentation to the T cell receptor (TCR), resulting in the induction of anergy or deletion of autoreactive MBP-reactive T cells and proliferation of GA-reactive T cells. At initiation of Copaxone treatment, GA-reactive CD4+ T-cell lines from MS patients secrete both pro-inflammatory T helper type 1 (Th1) and anti-inflammatory Th2 cytokines (21, 24), but continued exposure to Copaxone induces a shift in GA-reactive T cells toward the Th2 phenotype (21, 23, 25-28).

Copaxone also increases the number and suppressive capacity of CD4+CD25+FOXP3+ regulatory T cells, which are functionally impaired in MS patients (29-31). Furthermore, treatment leads to antigen-nonspecific modulation of APC function. Copaxone treatment promotes development of anti-inflammatory type II monocytes characterized by an increase in interleukin (IL)-10 and transforming growth factor-beta (TGF-β) and decreased production of IL-12 and tumor necrosis factor (TNF) (32).

SUMMARY OF THE INVENTION

High-throughput gene expression analysis was used to further characterize the functional pathways that are modulated by GA within immune cells. This technique facilitates investigation of thousands of genes and allows identification of a wide range of biological functions. Microarray gene expression analyses were conducted using GA-primed murine splenocytes reactivated *ex vivo* with GA or with a variant referred to as GA-Natco (Glatimer®, Natco Pharma, Ltd., Hyderabad, India). The transcriptional alteration of genes induced by GA or GA-Natco, were evaluated with respect to functional pathways that may be related to known mechanisms of GA activity. This sensitive high-throughput gene expression analysis sheds some light on the mode of action of GA and on differences between various glatiramoids that are otherwise difficult to detect.

The present invention provides a process for characterizing a glatiramer acetate related drug substance or drug product comprising the steps of:

a) obtaining a batch of the glatiramer acetate related drug substance or drug product;

b) immunizing a mammal with a predetermined amount of a glatiramer acetate related drug substance or drug product;

c) preparing a culture of cells from the mammal of step b) at a predetermined time after immunization;

d) incubating cells from the culture of step c) with a predetermined amount of the glatiramer acetate drug related substance or drug product of step a); and

e) determining the level of expression of at least one gene selected from the group consisting of genes regulated by glatiramer acetate reference standard or glatiramer acetate drug substance or drug product in Gene Expression Omnibus accession number GSE40566; determining the level of expression of at least one gene selected from the group consisting of Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1,

4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247, Igfbp4, Oas2, Bcl11b, Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1, Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, Ccl3, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4; determining the level of expression of at least one gene selected from the group consisting of CD40, CD86, GATA3, HLA-DMA, HLA-DMB, ICOS, IFNG, IFNGR2, IL2, IL13, IL4, IL18, IL12RB1, IL17A, IL17F, IL18R1, IL2RA, IL2RG, IL4R, IL6R, TBX21, TGFBR2, TNF, FOXP3, IL10RB, KLRD1, CD69, LTB, CD83, PRF1, CAMK2D, LTA, FSCN1, TLR7, CSF2, CCR7, FASLG, IL1A, CCL5, CD8B, CXCL10, TLR2, CCL4, TLR7, IGHA1, IL24, SOCS1, OAS1, JAK1, PTPN2, IFITM1, IFI35, STAT2, BCL2, MVD, FDPS, SQLE, NSDHL, DHCR24, Acat2/Acat3, MSMO1, LSS, CYP51A1, NFKBIE, PIK3R1, PPP3CC, CD3D, IL2RB, PTEN, CD3G, ICOS, CAMK2D, NFAT5, LAT, ITK, H2-M2, FASLG, LIF, IGHA1, PRKACB, SGK1, MAPK11, TSC22D3, JUN, FKBP5, ADRB2, MAP3K1, MAPK12, POU2F1, SMARCA2, CDKN1A, TGFB3, HSP90AA1, DHCR24, CCR5, and CXCL9; determining the level of expression of at least one gene selected from the group consisting of Foxp3, Il2, Il1a, Il1b, C3, S100a8, S100a9, Cxcl2, Cxcl3, Ccl4, Ccl3 and Cd14; determining the level of expression of at least one gene selected from the group consisting of the genes presented in Table 8; determining the level of expression of at least one gene selected from the group consisting of the genes presented in Table 10; determining the level of expression of at least one gene selected from the group consisting of FoxP3, GPR83, CD14, TLR2, IFNG, CD40 and IL1B; determining the level of expression of at least one gene selected from the group consisting of the genes presented in Table 12; or determining gene set enrichment analysis for genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells, CD4+ CD8+ T cells, macrophage cells, monocyte

cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes,

thereby characterizing the glatiramer acetate related drug substance or drug product of step a).

The present invention also provides a process for characterizing a glatiramer acetate related drug substance or drug product comprising the steps of:

a) obtaining a batch of the glatiramer acetate related drug substance or drug product;

b) immunizing a mammal with a predetermined amount of a glatiramer acetate related drug substance or drug product;

c) preparing a culture of cells from the mammal of step b) at a predetermined time after immunization;

d) incubating cells from the culture of step c) with a predetermined amount of the glatiramer acetate related drug substance or drug product of step a); and

e) determining the level of biological activity of the cells of step c) selected from the group consisting of, immune response to antigen presenting cells, differentiation of effector lymphocytes, suppression of T lymphocytes, activation of Foxp3 positive regulatory T cells, expansion of mononuclear leukocytes, proliferation of T lymphocytes, expansion of lymphocytes, differentiation of naïve lymphocytes, inflammatory response, adhesion of immune cells, cell movement, migration of cells, chemotaxis of cells, cell movement of phagocytes, chemotaxis of monocytes, cell movement of monocytes and fever,

thereby characterizing the glatiramer acetate related drug substance or drug product of step a).

The present invention also provides a process for discriminating between glatiramer acetate related drug substances or drug products comprising the steps of:

i) characterizing two or more glatiramer acetate related drug

substances or drug products according to a process of the present invention to obtain characteristics of each of the glatiramer acetate related drug substances or drug products; and

ii) comparing the characteristics of the glatiramer acetate related drug substances or drug products obtained in step i),

thereby discriminating between the glatiramer acetate related drug substances or drug products.

The present invention also provides a process for producing a drug product comprising a glatiramer acetate related drug substance, the improvement comprising the steps of:

i) characterizing the glatiramer acetate related drug substance according to a process of the present invention, wherein step e) comprises determining the level of expression of one or more genes selected from the group consisting of Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247, Igfbp4, Oas2, Bcl11b, Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1, Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, Ccl3, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 8; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 10; determining the level of expression of one or more genes selected from the group consisting of FoxP3, GPR83, CD14, TLR2, IFNG, CD40 and IL1B; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 12; or determining gene set enrichment analysis for

genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells, CD4+ CD8+ T cells, macrophage cells, monocyte cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes; and;

ii) discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if the level of expression of a gene selected from the group consisting of Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247, Igfbp4, Oas2 Bcl11b, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4 is decreased relative to a reference standard or if the level of expression of a gene selected from the group consisting of Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1, Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, and Ccl3, is increased relative to a reference standard; discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if the level of expression of a gene selected from the group consisting of the genes presented in Table 8 is not substantially identical to the level of expression of a reference standard; discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if the level of expression of a gene selected from the group consisting of the genes presented in Table 10 is not substantially identical to the level of expression of a reference standard; discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if the level of expression of a gene selected from the group consisting of

GPR83, IFNG and Foxp3 is decreased or if the level of expression of a gene selected from the group consisting of CD14, CD40, TLR2 and IL1B is increased; discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if the level of expression of a gene selected from the group consisting of the genes identified in Table 12 as FoxP3+ T cell genes is decreased or if the level of expression of a gene selected from the group consisting of the genes identified in Table 12 as macrophage genes and the genes identified in Table 12 as monocyte genes is increased; or discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if gene set enrichment analysis indicates downregulation or a lack of upregulation for genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells and CD4+ CD8+ T cells or if gene set enrichment analysis indicates upregulation or a lack of downregulation for genes associated with at least one cell type selected from the group consisting of macrophage cells, monocyte cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes.

The present invention also provides a process for producing a drug product comprising a glatiramer acetate related drug substance, the improvement comprising the steps of:

i) characterizing the glatiramer acetate related drug substance according to a process of the present invention, wherein step e) comprises determining the level of expression of at least one gene selected from the group consisting of Foxp3, Il2, Il1a, Il1b, C3, S100a8, S100a9, Cxcl2, Cxcl3, Ccl4, Ccl3 and Cd14;

ii) discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if the level of expression of FoxP3 is decreased relative to a reference standard or if the level of expression of at least

one gene selected from the group consisting of Il2, Il1a, Il1b, C3, S100a8, S100a9, Cxcl2, Cxcl3, Ccl4, Ccl3 and Cd14 is increased relative to a reference standard.

The present invention also provides a process for producing a drug product comprising a glatiramer acetate related drug substance, the improvement comprising the steps of:

i) characterizing the glatiramer acetate related drug substance according to a process of the present invention, wherein step e) comprises determining the level of biological activity of the cells of step c) selected from the group consisting of, immune response to antigen presenting cells, differentiation of effector lymphocytes, suppression of T lymphocytes, activation of Foxp3 positive regulatory T cells, expansion of mononuclear leukocytes, proliferation of T lymphocytes, expansion of lymphocytes, differentiation of naïve lymphocytes, inflammatory response, adhesion of immune cells, cell movement, migration of cells, chemotaxis of cells, cell movement of phagocytes, chemotaxis of monocytes, cell movement of monocytes and fever;

ii) discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if the level of biological activity selected from the group consisting of immune response to antigen presenting cells, differentiation of effector lymphocytes, suppression of T lymphocytes and activation of Foxp3 positive regulatory T cells is decreased relative to a reference standard or if the level of biological activity selected from the group consisting of expansion of mononuclear leukocytes, proliferation of T lymphocytes, expansion of lymphocytes, differentiation of naïve lymphocytes, inflammatory response, adhesion of immune cells, cell movement, migration of cells, chemotaxis of cells, cell movement of phagocytes, chemotaxis of monocytes, cell movement of monocytes and fever is increased relative to a reference standard.

The present invention also provides a process for releasing a drug product comprising a glatiramer acetate related drug substance, the

improvement comprising the steps of:

i) characterizing the glatiramer acetate related drug product according to a process of the present invention, wherein step e) comprises determining the level of expression of one or more genes selected from the group consisting of Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247, Igfbp4, Oas2, Bcl11b, Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1, Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, Ccl3, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 8; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 10; determining the level of expression of one or more genes selected from the group consisting of FoxP3, GPR83, CD14, TLR2, IFNG, CD40 and IL1B; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 12; or determining gene set enrichment analysis for genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells, CD4+ CD8+ T cells, macrophage cells, monocyte cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes; and;

ii) discarding the batch of the glatiramer acetate related drug product as unacceptable for release if the level of expression of a gene selected from the group consisting of Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik,

Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247, Igfbp4, Oas2 Bcl11b, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4 is decreased relative to a reference standard or if the level of expression of a gene selected from the group consisting of Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1, Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, and Ccl3, is increased relative to a reference standard; discarding the batch of the glatiramer acetate related drug product as unacceptable for release if the level of expression of a gene selected from the group consisting of the genes presented in Table 8 is not substantially identical to the level of expression of a reference standard; discarding the batch of the glatiramer acetate related drug product as unacceptable for release if the level of expression of a gene selected from the group consisting of the genes presented in Table 10 is not substantially identical to the level of expression of a reference standard; discarding the batch of the glatiramer acetate related drug product as unacceptable for release if the level of expression of a gene selected from the group consisting of GPR83, IFNG and Foxp3 is decreased or if the level of expression of a gene selected from the group consisting of CD14, CD40, TLR2 and IL1B is increased; discarding the batch of the glatiramer acetate related drug product as unacceptable for release if the level of expression of a gene selected from the group consisting of the genes identified in Table 12 as FoxP3+ T cell genes is decreased or if the level of expression of a gene selected from the group consisting of the genes identified in Table 12 as macrophage genes and the genes identified in Table 12 as monocyte genes is increased; or discarding the batch of the glatiramer acetate related drug product as unacceptable for release if gene set enrichment analysis indicates downregulation or a

lack of upregulation for genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells and CD4+ CD8+ T cells or if gene set enrichment analysis indicates upregulation or a lack of downregulation for genes associated with at least one cell type selected from the group consisting of macrophage cells, monocyte cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes.

The present invention also provides a process for releasing a drug product comprising a glatiramer acetate related drug substance, the improvement comprising the steps of:

i) characterizing the glatiramer acetate related drug product according to a process of the present invention, wherein step e) comprises determining the level of expression of at least one gene selected from the group consisting of Foxp3, Il2, Il1a, Il1b, C3, S100a8, S100a9, Cxcl2, Cxcl3, Ccl4, Ccl3 and Cd14;

ii) discarding the batch of the glatiramer acetate related drug product as unacceptable for release if the level of expression of FoxP3 is decreased relative to a reference standard or if the level of expression of at least one gene selected from the group consisting of Il2, Il1a, Il1b, C3, S100a8, S100a9, Cxcl2, Cxcl3, Ccl4, Ccl3 and Cd14 is increased relative to a reference standard.

The present invention also provides a process for releasing a drug product comprising a glatiramer acetate related drug substance, the improvement comprising the steps of:

i) characterizing the glatiramer acetate related drug product according to a process of the present invention, wherein step e) comprises determining the level of biological activity of the cells of step c) selected from the group consisting of, immune response to antigen presenting cells, differentiation of effector lymphocytes, suppression of T lymphocytes, activation of Foxp3 positive regulatory T cells, expansion of

mononuclear leukocytes, proliferation of T lymphocytes, expansion of lymphocytes, differentiation of naïve lymphocytes, inflammatory response, adhesion of immune cells, cell movement, migration of cells, chemotaxis of cells, cell movement of phagocytes, chemotaxis of monocytes, cell movement of monocytes and fever;

ii) discarding the batch of the glatiramer acetate related drug product as unacceptable for release if the level of biological activity selected from the group consisting of immune response to antigen presenting cells, differentiation of effector lymphocytes, suppression of T lymphocytes and activation of Foxp3 positive regulatory T cells is decreased relative to a reference standard or if the level of biological activity selected from the group consisting of expansion of mononuclear leukocytes, proliferation of T lymphocytes, expansion of lymphocytes, differentiation of naïve lymphocytes, inflammatory response, adhesion of immune cells, cell movement, migration of cells, chemotaxis of cells, cell movement of phagocytes, chemotaxis of monocytes, cell movement of monocytes and fever is increased relative to a reference standard.

The present invention also provides a method of identifying suboptimal activity of a glatiramer acetate related drug substance or drug product comprising the steps of:

a) administering a glatiramer acetate related drug substance or drug product to a rodent;

b) determining the level of biological activity of the rodent selected from the group consisting of, immune response to antigen presenting cells, differentiation of effector lymphocytes, suppression of T lymphocytes, activation of Foxp3 positive regulatory T cells, expansion of mononuclear leukocytes, proliferation of T lymphocytes, expansion of lymphocytes, differentiation of naïve lymphocytes, inflammatory response, adhesion of immune cells, cell movement, migration of cells, chemotaxis of cells, cell movement of phagocytes, chemotaxis of monocytes, cell movement

of monocytes and fever; and

c) identifying the glatiramer acetate related drug substance or drug product as causing a suboptimal activity if the level of biological activity selected from the group consisting of immune response to antigen presenting cells, differentiation of effector lymphocytes, suppression of T lymphocytes and activation of Foxp3 positive regulatory T cells is decreased relative to a reference standard or if the level of biological activity selected from the group consisting of expansion of mononuclear leukocytes, proliferation of T lymphocytes, expansion of lymphocytes, differentiation of naïve lymphocytes, inflammatory response, adhesion of immune cells, cell movement, migration of cells, chemotaxis of cells, cell movement of phagocytes, chemotaxis of monocytes, cell movement of monocytes and fever is increased relative to a reference standard,

thereby identifying suboptimal activity of the glatiramer acetate related drug substance or drug product.

The present invention also provides a method of identifying suboptimal activity of a glatiramer acetate related drug substance or drug product comprising the steps of:

a) administering a glatiramer acetate related drug substance or drug product to a rodent

b) determining the level of expression in the rodent of one or more genes selected from the group consisting of Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247, Igfbp4, Oas2, Bcl11b, Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1, Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, Ccl3, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and

Scml4; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 8; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 10; determining the level of expression of one or more genes selected from the group consisting of FoxP3, GPR83, CD14, TLR2, IFNG, CD40 and IL1B; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 12; or determining gene set enrichment analysis for genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells, CD4+ CD8+ T cells, macrophage cells, monocyte cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes; and

c) identifying the glatiramer acetate related drug substance or drug product as causing a suboptimal activity if the level of expression of a gene selected from the group consisting of Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247, Igfbp4, Oas2 Bcl11b, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4 is decreased relative to a reference standard or if the level of expression of a gene selected from the group consisting of Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1, Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, and Ccl3, is increased relative to a reference standard; identifying the glatiramer acetate related drug substance or drug product as causing a suboptimal activity if the level of expression of a gene selected from the group consisting of the genes presented in Table 8 is not

substantially identical to the level of expression of a reference standard; identifying the glatiramer acetate related drug substance or drug product as causing a suboptimal activity if the level of expression of a gene selected from the group consisting of the genes presented in Table 10 is not substantially identical to the level of expression of a reference standard; identifying the glatiramer acetate related drug substance or drug product as causing a suboptimal activity if the level of expression of a gene selected from the group consisting of GPR83, IFNG and Foxp3 is decreased or if the level of expression of a gene selected from the group consisting of CD14, CD40, TLR2 and IL1B is increased; identifying the glatiramer acetate related drug substance or drug product as causing a suboptimal activity if the level of expression of a gene selected from the group consisting of the genes identified in Table 12 as FoxP3+ T cell genes is decreased or if the level of expression of a gene selected from the group consisting of the genes identified in Table 12 as macrophage genes and the genes identified in Table 12 as monocyte genes is increased; or identifying the glatiramer acetate related drug substance or drug product as causing a suboptimal activity if gene set enrichment analysis indicates downregulation or a lack of upregulation for genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells and CD4+ CD8+ T cells or if gene set enrichment analysis indicates upregulation or a lack of downregulation for genes associated with at least one cell type selected from the group consisting of macrophage cells, monocyte cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes,

thereby identifying suboptimal activity of the glatiramer acetate related drug substance or drug product.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1: PCA of quantile-normalized, batch-corrected signals, colored by activation groups.

Figure 2: Gene-wise hierarchical clustering of 1474 genes with FDR-adjusted p value < 0.05 and fold change ≥1.3 between GA and Medium-reactivated samples. The genes and gene symbols are listed in columns, and the samples, ordered by sample type, are listed in rows.

Figure 3: Gene-wise hierarchical clustering of 98 genes with FDR-adjusted p value < 0.05 and fold change ≥1.3 between GA-RS and 8 GA-Natco samples. The genes and gene symbols are listed in rows, and the samples, ordered by sample type, are listed in columns. The expression levels of Medium and GA-DP samples for these 98 genes are presented as well.

Figure 4: The biological impact of GA is significantly more consistent than that of other glatiramoids. Among probes with variability induced by activation, more than 4-fold higher probes had significant variation by F-test in other glatiramoid-activated samples when compared to GA activated samples (A). Defining tolerance as the percentage of samples with expression levels falling within the range between the maximum and minimum expression levels induced by reference standard for that probe, for any given tolerance threshold the number of probes failing to meet this this threshold is displayed for both the other glatiramoid and GA (B), showing that in almost all cases more probes fail to meet tolerance following induction by the other glatiramoid. For each individual other glatiramoid batch, the percentage of probes with significant differences in variability when compared to either GA or GA reference standard are plotted in C, along with the percentage of probes with differences in variability between GA and reference standard (dashed green line) for comparison. In each case the other glatiramoid batches have greater differences in variability.

Figure 5: Plot of the coefficient of variation (CV) as a function of intensity for each of the probes when activated by other glatiramoid (black) and GA (red), showing the smaller range of CVs in GA and the wider range in other glatiramoids at any given intensity.

Figure 6: GA induces Tregs more effectively than other glatiramoids. (A) GA induces significantly higher expression of FoxP3 than other glatiramoid. FoxP3 is a key marker of Tregs, and (B) another key Treg marker Gpr83 shows a similar pattern of expression. (C) Both FoxP3 and Gpr83 are low in the same samples as indicated by scatter plot, further strengthening the case that the other glatiramoid fails to induce a strong Treg response in some patients. (D) As further evidence of the difference in FoxP3 induction, GSEA analysis found a significantly stronger upregulation of FoxP3 target genes in GA-activated samples than in other glatiramoid-activated samples. (E) GSEA analysis also found a significant enrichment of Treg-specific genes among the genes with higher expression in GA than in other glatiramoid. *NS = not significant.*

Figure 7: The GSEA enrichment plots for the FoxP3 and Treg GSEA analyses reported in Figure 6D-E.

Figure 8: Cell-type specific differences in the biological impact of GA and other glatiramoids. The heat map depicts relative expression of specific genes in GA-activated samples and other glatiramoid-activated samples. Each of the rows within the Treg section represents a gene with a high cell-type specificity scores for Tregs, while each of the rows in the macrophages and monocyte sections represents genes with high cell-type specificity scores for each of those cell types. The associated gene lists appear as supplementary information. Overall, GA induces higher expression of Treg-associated genes than other glatiramoid, while other glatiramoid induces higher expression of macrophage and monocyte-associated genes than GA.

Figure 9: Box plots of CD14 and TLR2, depicting the lower expression levels in GA and Reference compared to other glatiramoid. This is an additional way of visualizing the differences depicted by kernel density plots in Figure 10A.

Figure 10: Other glatiramoid's impact on monocytes may differ from GA's impact. (A) Other glatiramoid induces significantly higher expression of CD14 and TLR2, as determined by a Wilcoxon rank sum test and depicted as kernel density plots, which can be likened to a smoothed histogram. (B) CD14 and TLR2 expression are both unusually

high in the same (mostly other glatiramoid) samples. (C) FoxP3 expression is unusually low in the sample samples in which CD14 expression is unusually high, suggesting that the other glatiramoid's different impact on monocytes may be related to its different impact on Tregs and consistent with literature suggesting that monocytes play a role in GA-induced FoxP3 expression. (D) FoxP3 expression is unusually low in the sample samples in which IL1B expression is unusually high, suggesting that the other glatiramoid's different impact on monocytes may be related to the differences between LPS-activated monocytes and T-cell contact activated monocytes, which have been described in the literature as having opposite impacts on IL1B production. (E) GSEA analysis found a significant enrichment of monocyte and macrophage-specific genes among the genes with higher expression in other glatiramoid than GA. *NS = not significant.*

Figure 11: Scatter plots showing that the same other glatiramoid samples with unusually low FoxP3 expression also had unusually low IFNG expression, by two different probes of IFNG. Scatter plots illustrating that for two different probes of IFNG, GA and Reference standard upregulated IFNG to a greater extent than other glatiramoid did.

Figure 12: Kernel density plot of CD40, illustrating the fact that this gene had higher expression in other glatiramoid-activated samples than in GA activated samples, consistent with the determination by the Wilcoxon rank-sum test and consistent with literature.

Figure 13: Scatterplot illustrating the high degree of correlation between CD14 and IL1B, lending support to the hypothesis that the IL1B is expressed primarily by monocytes.

Figure 14: GSEA analysis showing that genes with higher expression in other glatiramoid than medium are enriched in genes specific to CD16dim monocytes, while genes with higher expression in GA than medium are enriched in genes specific to CD16+ monocytes.

Figure 15: Flow chart of process for comparing an innovative medicine to a other glatiramoid, and model of key differences between GA and other glatiramoid (A) Oveview of the methods for

analyzing gene expression data to compare the immunological impact of GA to that of other glatiramoid. After processing, direct differences are identified by multiple parametric methods, non-parametric methods, as well as ANOVA-based pattern analysis, and variability analysis. The genes identified by these methods are analyzed using a variety of enrichment-based methods, which result in hypotheses that are then verified through additional methods. (B) The key hypotheses emerging from our studies involve the greater heterogeneity in the other glatiramoid's biological impact compared to GA's, and the fact that GA appears to more effectively upregulate FoxP3 expression and promote tolerance-inducing Tregs, while other glatiramoid appears to upregulated myeloid lineage cells such as monocytes and macrophages which may impair tolerance. Given these findings, it is reasonable to hypothesize that GA may suppress harmful cytotoxic cells more effectively than other glatiramoid, and this hypothesis warrants further investigation.

Figure 16: Illustration of the tolerance method for comparing variability. The expression of genes following activation by GA and other glatiramoid are assessed to determine the percentage of samples following within a tolerance defined by the maximum and minimum expression levels induced by the reference standard (top and bottom of the red box for Gpr83, left and right sides of the red box for FoxP3).

DETAILED DESCRIPTION OF THE INVENTION

Embodiments of the Invention

The present invention provides a process for characterizing a glatiramer acetate related drug substance or drug product comprising the steps of:

a) obtaining a batch of the glatiramer acetate related drug substance or drug product;

b) immunizing a mammal with a predetermined amount of a glatiramer acetate related drug substance or drug product;

c) preparing a culture of cells from the mammal of step b) at a predetermined time after immunization;

d) incubating cells from the culture of step c) with a predetermined amount of the glatiramer acetate drug related substance or drug product of step a); and

e) determining the level of expression of at least one gene selected from the group consisting of genes regulated by glatiramer acetate reference standard or glatiramer acetate drug substance or drug product in Gene Expression Omnibus accession number GSE40566; determining the level of expression of at least one gene selected from the group consisting of Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247, Igfbp4, Oas2, Bcl11b, Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1, Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, Ccl3, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4; determining the level of expression of at least one gene selected from the group consisting of CD40, CD86, GATA3, HLA-DMA, HLA-DMB, ICOS, IFNG, IFNGR2, IL2, IL13, IL4, IL18, IL12RB1, IL17A, IL17F, IL18R1, IL2RA, IL2RG, IL4R,

IL6R, TBX21, TGFBR2, TNF, FOXP3, IL10RB, KLRD1, CD69, LTB, CD83, PRF1, CAMK2D, LTA, FSCN1, TLR7, CSF2, CCR7, FASLG, IL1A, CCL5, CD8B, CXCL10, TLR2, CCL4, TLR7, IGHA1, IL24, SOCS1, OAS1, JAK1, PTPN2, IFITM1, IFI35, STAT2, BCL2, MVD, FDPS, SQLE, NSDHL, DHCR24, Acat2/Acat3, MSMO1, LSS, CYP51A1, NFKBIE, PIK3R1, PPP3CC, CD3D, IL2RB, PTEN, CD3G, ICOS, CAMK2D, NFAT5, LAT, ITK, H2-M2, FASLG, LIF, IGHA1, PRKACB, SGK1, MAPK11, TSC22D3, JUN, FKBP5, ADRB2, MAP3K1, MAPK12, POU2F1, SMARCA2, CDKN1A, TGFB3, HSP90AA1, DHCR24, CCR5, and CXCL9; determining the level of expression of at least one gene selected from the group consisting of Foxp3, Il2, Il1a, Il1b, C3, S100a8, S100a9, Cxcl2, Cxcl3, Ccl4, Ccl3 and Cd14; determining the level of expression of at least one gene selected from the group consisting of the genes presented in Table 8; determining the level of expression of at least one gene selected from the group consisting of the genes presented in Table 10; determining the level of expression of at least one gene selected from the group consisting of FoxP3, GPR83, CD14, TLR2, IFNG, CD40 and IL1B; determining the level of expression of at least one gene selected from the group consisting of the genes presented in Table 12; or determining gene set enrichment analysis for genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells, CD4+ CD8+ T cells, macrophage cells, monocyte cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes,

thereby characterizing the glatiramer acetate related drug substance or drug product of step a).

The present invention also provides a process for characterizing a glatiramer acetate related drug substance or drug product comprising the steps of:

a) obtaining a batch of the glatiramer acetate related drug substance or drug product;

b) immunizing a mammal with a predetermined amount of a

glatiramer acetate related drug substance or drug product;

c) preparing a culture of cells from the mammal of step b) at a predetermined time after immunization;

d) incubating cells from the culture of step c) with a predetermined amount of the glatiramer acetate related drug substance or drug product of step a); and

e) determining the level of biological activity of the cells of step c) selected from the group consisting of, immune response to antigen presenting cells, differentiation of effector lymphocytes, suppression of T lymphocytes, activation of Foxp3 positive regulatory T cells, expansion of mononuclear leukocytes, proliferation of T lymphocytes, expansion of lymphocytes, differentiation of naïve lymphocytes, inflammatory response, adhesion of immune cells, cell movement, migration of cells, chemotaxis of cells, cell movement of phagocytes, chemotaxis of monocytes, cell movement of monocytes and fever,

thereby characterizing the glatiramer acetate related drug substance or drug product of step a).

The present invention also provides a process for discriminating between glatiramer acetate related drug substances or drug products comprising the steps of:

i) characterizing two or more glatiramer acetate related drug substances or drug products according to a process of the present invention to obtain characteristics of each of the glatiramer acetate related drug substances or drug products; and

ii) comparing the characteristics of the glatiramer acetate related drug substances or drug products obtained in step i),

thereby discriminating between the glatiramer acetate related drug substances or drug products.

In one or more embodiments of the present invention, the mammal is a rodent.

In one or more embodiments of the present invention, the culture of

step c) is a primary culture.

In one or more embodiments of the present invention, the glatiramer acetate related drug substance or drug product of step a) is glatiramer acetate drug substance or drug product.

In one or more embodiments of the present invention, the glatiramer acetate related drug substance or drug product of step a) is a glatiramer acetate related drug substance or drug product other than glatiramer acetate drug substance or drug product.

In one or more embodiments of the present invention, the glatiramer acetate related drug substance or drug product of step b) is glatiramer acetate drug substance or drug product.

In one or more embodiments of the present invention, the glatiramer acetate related drug substance or drug product of step b) is a glatiramer acetate related drug substance or drug product other than glatiramer acetate drug substance or drug product.

In one or more embodiments of the present invention, the glatiramer acetate related drug substance or drug product of step b) is the same glatiramer acetate related drug substance or drug product of step a).

In one or more embodiments of the present invention, the glatiramer acetate related drug substance or drug product of step b) is a different glatiramer acetate related drug substance or drug product than the glatiramer acetate related drug substance or drug product of step a).

The present invention also provides a process for producing a drug product comprising a glatiramer acetate related drug substance, the improvement comprising the steps of:

i) characterizing the glatiramer acetate related drug substance according to a process of the present invention, wherein step e) comprises determining the level of expression of one or more genes selected from the group consisting of Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247, Igfbp4, Oas2, Bcl11b, Fscn1, Ctsg,

Mpo, Prtn3, Lyzs, Emr1, Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, Ccl3, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 8; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 10; determining the level of expression of one or more genes selected from the group consisting of FoxP3, GPR83, CD14, TLR2, IFNG, CD40 and IL1B; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 12; or determining gene set enrichment analysis for genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells, CD4+ CD8+ T cells, macrophage cells, monocyte cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes; and;

ii) discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if the level of expression of a gene selected from the group consisting of Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247, Igfbp4, Oas2 Bcl11b, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4 is decreased relative to a reference standard or if the level of expression of a gene selected from the group consisting of Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1, Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10,

Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, and Ccl3, is increased relative to a reference standard; discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if the level of expression of a gene selected from the group consisting of the genes presented in Table 8 is not substantially identical to the level of expression of a reference standard; discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if the level of expression of a gene selected from the group consisting of the genes presented in Table 10 is not substantially identical to the level of expression of a reference standard; discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if the level of expression of a gene selected from the group consisting of GPR83, IFNG and Foxp3 is decreased or if the level of expression of a gene selected from the group consisting of CD14, CD40, TLR2 and IL1B is increased; discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if the level of expression of a gene selected from the group consisting of the genes identified in Table 12 as FoxP3+ T cell genes is decreased or if the level of expression of a gene selected from the group consisting of the genes identified in Table 12 as macrophage genes and the genes identified in Table 12 as monocyte genes is increased; or discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if gene set enrichment analysis indicates downregulation or a lack of upregulation for genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells and CD4+ CD8+ T cells or if gene set enrichment analysis indicates upregulation or a lack of downregulation for genes associated with at least one cell type selected from the group consisting

of macrophage cells, monocyte cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes.

The present invention also provides a process for producing a drug product comprising a glatiramer acetate related drug substance, the improvement comprising the steps of:

i) characterizing the glatiramer acetate related drug substance according to a process of the present invention, wherein step e) comprises determining the level of expression of at least one gene selected from the group consisting of Foxp3, Il2, Il1a, Il1b, C3, S100a8, S100a9, Cxcl2, Cxcl3, Ccl4, Ccl3 and Cd14;

ii) discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if the level of expression of FoxP3 is decreased relative to a reference standard or if the level of expression of at least one gene selected from the group consisting of Il2, Il1a, Il1b, C3, S100a8, S100a9, Cxcl2, Cxcl3, Ccl4, Ccl3 and Cd14 is increased relative to a reference standard.

The present invention also provides a process for producing a drug product comprising a glatiramer acetate related drug substance, the improvement comprising the steps of:

i) characterizing the glatiramer acetate related drug substance according to a process of the present invention, wherein step e) comprises determining the level of biological activity of the cells of step c) selected from the group consisting of, immune response to antigen presenting cells, differentiation of effector lymphocytes, suppression of T lymphocytes, activation of Foxp3 positive regulatory T cells, expansion of mononuclear leukocytes, proliferation of T lymphocytes, expansion of lymphocytes, differentiation of naïve lymphocytes, inflammatory response, adhesion of immune cells, cell movement, migration of cells, chemotaxis of cells, cell movement of phagocytes, chemotaxis of monocytes, cell movement of monocytes and fever;

ii) discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if the level of biological activity selected from the group consisting of immune response to antigen presenting cells, differentiation of effector lymphocytes, suppression of T lymphocytes and activation of Foxp3 positive regulatory T cells is decreased relative to a reference standard or if the level of biological activity selected from the group consisting of expansion of mononuclear leukocytes, proliferation of T lymphocytes, expansion of lymphocytes, differentiation of naïve lymphocytes, inflammatory response, adhesion of immune cells, cell movement, migration of cells, chemotaxis of cells, cell movement of phagocytes, chemotaxis of monocytes, cell movement of monocytes and fever is increased relative to a reference standard.

The present invention also provides a process for releasing a drug product comprising a glatiramer acetate related drug substance, the improvement comprising the steps of:

i) characterizing the glatiramer acetate related drug product according to a process of the present invention, wherein step e) comprises determining the level of expression of one or more genes selected from the group consisting of Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247, Igfbp4, Oas2, Bcl11b, Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1, Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, Ccl3, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 8; determining the level of expression of one or more genes selected from the group consisting of the

genes presented in Table 10; determining the level of expression of one or more genes selected from the group consisting of FoxP3, GPR83, CD14, TLR2, IFNG, CD40 and IL1B; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 12; or determining gene set enrichment analysis for genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells, CD4+ CD8+ T cells, macrophage cells, monocyte cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes; and;

ii) discarding the batch of the glatiramer acetate related drug product as unacceptable for release if the level of expression of a gene selected from the group consisting of Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247, Igfbp4, Oas2 Bcl11b, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4 is decreased relative to a reference standard or if the level of expression of a gene selected from the group consisting of Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1, Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, and Ccl3, is increased relative to a reference standard; discarding the batch of the glatiramer acetate related drug product as unacceptable for release if the level of expression of a gene selected from the group consisting of the genes presented in Table 8 is not substantially identical to the level of expression of a reference standard; discarding the batch of the glatiramer acetate related drug product as unacceptable for release if the level of expression of a gene selected from the group consisting of the genes presented in Table 10 is not

substantially identical to the level of expression of a reference standard; discarding the batch of the glatiramer acetate related drug product as unacceptable for release if the level of expression of a gene selected from the group consisting of GPR83, IFNG and Foxp3 is decreased or if the level of expression of a gene selected from the group consisting of CD14, CD40, TLR2 and IL1B is increased; discarding the batch of the glatiramer acetate related drug product as unacceptable for release if the level of expression of a gene selected from the group consisting of the genes identified in Table 12 as FoxP3+ T cell genes is decreased or if the level of expression of a gene selected from the group consisting of the genes identified in Table 12 as macrophage genes and the genes identified in Table 12 as monocyte genes is increased; or discarding the batch of the glatiramer acetate related drug product as unacceptable for release if gene set enrichment analysis indicates downregulation or a lack of upregulation for genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells and CD4+ CD8+ T cells or if gene set enrichment analysis indicates upregulation or a lack of downregulation for genes associated with at least one cell type selected from the group consisting of macrophage cells, monocyte cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes.

The present invention also provides a process for releasing a drug product comprising a glatiramer acetate related drug substance, the improvement comprising the steps of:

i) characterizing the glatiramer acetate related drug product according to a process of the present invention, wherein step e) comprises determining the level of expression of at least one gene selected from the group consisting of Foxp3, Il2, Il1a, Il1b, C3, S100a8, S100a9, Cxcl2, Cxcl3, Ccl4, Ccl3 and Cd14;

ii) discarding the batch of the glatiramer acetate related drug product as unacceptable for release if the level of expression of FoxP3 is decreased relative to a reference standard or if the level of expression of at least one gene selected from the group consisting of Il2, Il1a, Il1b, C3, S100a8, S100a9, Cxcl2, Cxcl3, Ccl4, Ccl3 and Cd14 is increased relative to a reference standard.

The present invention also provides a process for releasing a drug product comprising a glatiramer acetate related drug substance, the improvement comprising the steps of:

i) characterizing the glatiramer acetate related drug product according to a process of the present invention, wherein step e) comprises determining the level of biological activity of the cells of step c) selected from the group consisting of, immune response to antigen presenting cells, differentiation of effector lymphocytes, suppression of T lymphocytes, activation of Foxp3 positive regulatory T cells, expansion of mononuclear leukocytes, proliferation of T lymphocytes, expansion of lymphocytes, differentiation of naïve lymphocytes, inflammatory response, adhesion of immune cells, cell movement, migration of cells, chemotaxis of cells, cell movement of phagocytes, chemotaxis of monocytes, cell movement of monocytes and fever;

ii) discarding the batch of the glatiramer acetate related drug product as unacceptable for release if the level of biological activity selected from the group consisting of immune response to antigen presenting cells, differentiation of effector lymphocytes, suppression of T lymphocytes and activation of Foxp3 positive regulatory T cells is decreased relative to a reference standard or if the level of biological activity selected from the group consisting of expansion of mononuclear leukocytes, proliferation of T lymphocytes, expansion of lymphocytes, differentiation of naïve lymphocytes, inflammatory response, adhesion of immune cells, cell movement, migration of cells, chemotaxis of cells, cell movement of phagocytes, chemotaxis of monocytes, cell movement

of monocytes and fever is increased relative to a reference standard.

The present invention also provides a method of identifying suboptimal activity of a glatiramer acetate related drug substance or drug product comprising the steps of:

a) administering a glatiramer acetate related drug substance or drug product to a rodent;

b) determining the level of biological activity of the rodent selected from the group consisting of, immune response to antigen presenting cells, differentiation of effector lymphocytes, suppression of T lymphocytes, activation of Foxp3 positive regulatory T cells, expansion of mononuclear leukocytes, proliferation of T lymphocytes, expansion of lymphocytes, differentiation of naïve lymphocytes, inflammatory response, adhesion of immune cells, cell movement, migration of cells, chemotaxis of cells, cell movement of phagocytes, chemotaxis of monocytes, cell movement of monocytes and fever; and

c) identifying the glatiramer acetate related drug substance or drug product as causing a suboptimal activity if the level of biological activity selected from the group consisting of immune response to antigen presenting cells, differentiation of effector lymphocytes, suppression of T lymphocytes and activation of Foxp3 positive regulatory T cells is decreased relative to a reference standard or if the level of biological activity selected from the group consisting of expansion of mononuclear leukocytes, proliferation of T lymphocytes, expansion of lymphocytes, differentiation of naïve lymphocytes, inflammatory response, adhesion of immune cells, cell movement, migration of cells, chemotaxis of cells, cell movement of phagocytes, chemotaxis of monocytes, cell movement of monocytes and fever is increased relative to a reference standard,

thereby identifying suboptimal activity of the glatiramer acetate related drug substance or drug product.

The present invention also provides a method of identifyir suboptimal activity of a glatiramer acetate related drug substanc or drug product comprising the steps of:

a) administering a glatiramer acetate related drug substance or drug product to a rodent

b) determining the level of expression in the rodent of one or more genes selected from the group consisting of Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247, Igfbp4, Oas2, Bcl11b, Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1, Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, Ccl3, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 8; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 10; determining the level of expression of one or more genes selected from the group consisting of FoxP3, GPR83, CD14, TLR2, IFNG, CD40 and IL1B; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 12; or determining gene set enrichment analysis for genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells, CD4+ CD8+ T cells, macrophage cells, monocyte cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes; and

c) identifying the glatiramer acetate related drug substance or drug product as causing a suboptimal activity if the level of

expression of a gene selected from the group consisting o Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm59(Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247, Igfbp4, Oas2 Bcl11b, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4 is decreased relative to a reference standard or if the level of expression of a gene selected from the group consisting of Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1, Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, and Ccl3, is increased relative to a reference standard; identifying the glatiramer acetate related drug substance or drug product as causing a suboptimal activity if the level of expression of a gene selected from the group consisting of the genes presented in Table 8 is not substantially identical to the level of expression of a reference standard; identifying the glatiramer acetate related drug substance or drug product as causing a suboptimal activity if the level of expression of a gene selected from the group consisting of the genes presented in Table 10 is not substantially identical to the level of expression of a reference standard; identifying the glatiramer acetate related drug substance or drug product as causing a suboptimal activity if the level of expression of a gene selected from the group consisting of GPR83, IFNG and Foxp3 is decreased or if the level of expression of a gene selected from the group consisting of CD14, CD40, TLR2 and IL1B is increased; identifying the glatiramer acetate related drug substance or drug product as causing a suboptimal activity if the level of expression of a gene selected from the group consisting of the genes identified in Table 12 as FoxP3+ T cell genes is decreased or if the level of expression of a gene selected from the group consisting of the genes identified in Table 12

as macrophage genes and the genes identified in Table 12 a monocyte genes is increased; or identifying the glatiramer acetate related drug substance or drug product as causing a suboptimal activity if gene set enrichment analysis indicates downregulation or a lack of upregulation for genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells and CD4+ CD8+ T cells or if gene set enrichment analysis indicates upregulation or a lack of downregulation for genes associated with at least one cell type selected from the group consisting of macrophage cells, monocyte cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes,

thereby identifying suboptimal activity of the glatiramer acetate related drug substance or drug product.

In one or more embodiments of the present invention, the level of expression is determined in the blood.

In one or more embodiments of the present invention, the level of expression is determined in PBMCs.

In one or more embodiments of the present invention, the reference standard is the level of expression prior to administration of the glatiramer acetate related drug substance or drug product.

In one or more embodiments of the present invention, the reference standard is the level of expression after administration of glatiramer acetate drug substance or drug product.

In one or more embodiments of the present invention, the rodent is a mouse.

In one or more embodiments of the present invention, the mouse is a female (SJL X BALB/C) F1 mouse.

In one or more embodiments of the present invention, the mouse is about 8 to about 12 weeks old.

In one or more embodiments of the present invention, the primary culture is a culture of spleen cells.

In one or more embodiments of the present invention, the primary culture is a culture of lymph node cells.

In one or more embodiments of the present invention, the primary culture of spleen cells is prepared about 3 days after immunization.

In one or more embodiments of the present invention, the incubation of step d) is for about 24 hours.

In one or more embodiments of the present invention, the glatiramer acetate related drug substance is a glatiramoid or wherein the glatiramer acetate related drug product comprises a glatiramoid.

In one or more embodiments of the present invention, the glatiramer acetate related drug substance is a glatiramoid other than glatiramer acetate drug substance or wherein the glatiramer acetate related drug product comprises a glatiramoid other than glatiramer acetate drug substance.

In one or more embodiments of the present invention the process or method comprises the step of determining the level of expression of at least one gene selected from the group consisting of Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247, Igfbp4, Oas2, Bcl11b, Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1, Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, Ccl3, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4.

In one or more embodiments of the present invention the process or method comprises the step of determining the level of expression of at least one gene selected from the group consisting of Foxp3, Il2, Il1a, Il1b, C3, S100a8, S100a9, Cxcl2, Cxcl3, Ccl4, Ccl3 and Cd14.

In one or more embodiments of the present invention the process or method comprises the step of determining the level of expression of at least one gene selected from the group consisting of genes

regulated by glatiramer acetate drug substance or drug product i Gene Expression Omnibus accession number GSE40566.

In one or more embodiments of the present invention the process or method comprises the step of determining the level of expression of at least one gene selected from the group consisting of CD40, CD86, GATA3, HLA-DMA, HLA-DMB, ICOS, IFNG, IFNGR2, IL2, IL13, IL4, IL18, IL12RB1, IL17A, IL17F, IL18R1, IL2RA, IL2RG, IL4R, IL6R, TBX21, TGFBR2, TNF, FOXP3, IL10RB, KLRD1, CD69, LTB, CD83, PRF1, CAMK2D, LTA, FSCN1, TLR7, CSF2, CCR7, FASLG, IL1A, CCL5, CD8B, CXCL10, TLR2, CCL4, TLR7, IGHA1, IL24, SOCS1, OAS1, JAK1, PTPN2, IFITM1, IFI35, STAT2, BCL2, MVD, FDPS, SQLE, NSDHL, DHCR24, Acat2/Acat3, MSMO1, LSS, CYP51A1, NFKBIE, PIK3R1, PPP3CC, CD3D, IL2RB, PTEN, CD3G, ICOS, CAMK2D, NFAT5, LAT, ITK, H2-M2, FASLG, LIF, IGHA1, PRKACB, SGK1, MAPK11, TSC22D3, JUN, FKBP5, ADRB2, MAP3K1, MAPK12, POU2F1, SMARCA2, CDKN1A, TGFB3, HSP90AA1, DHCR24, CCR5, and CXCL9.

In one or more embodiments of the present invention the process or method comprises the step of determining the level of expression of at least one gene selected from the group consisting of the genes presented in Table 8.

In one or more embodiments of the present invention the process or method comprises the step of determining the level of expression of at least one gene selected from the group consisting of the genes presented in Table 10.

In one or more embodiments of the present invention the process or method comprises the step of determining the level of expression of at least one gene selected from the group consisting of FoxP3, GPR83, CD14, TLR2, IFNG, CD40 and IL1B.

In one or more embodiments of the present invention the process or method comprises the step of determining the level of expression of at least one gene selected from the group consisting of the genes presented in Table 12.

In one or more embodiments of the present invention the process or method comprises the step of determining gene set enrichment analysis for genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+

T cells, gamma delta T cells, natural killer T cells, CD4+ CD8+ cells, macrophage cells, monocyte cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes.

In one or more embodiments of the present invention, determining gene set enrichment analysis comprises the step of evaluating the level of expression of at least one gene selected from the group consisting of genes present in one or more of the rank list files presented in Table 11.

In one or more embodiments of the present invention the reference standard is medium.

Definitions

As used herein, a "naïve subject" is a subject that has not been treated with any multiple sclerosis drug.

As used herein, a "glatiramoid naïve subject" is a subject that has not been treated with any glatiramoid drug. A glatiramoid naïve subject could have been treated with another multiple sclerosis drug.

As used herein, "in the blood of the subject" is represented by PBMCs, lymphocytes, monocytes, macrophages, basophils, dendritic cells or other cells derived from the subject's blood.

As used herein, a "reference standard" is a sample or value which serves as a point of comparison for another sample or value which differs from the reference standard with respect to one or more variables. With specific regard to a subject, a "reference standard" is a value or range of values that characterizes a defined population in a defined state of health. For example, a reference standard can characterize a healthy subject or a subject afflicted with multiple sclerosis, and when the subject is afflicted wit multiple sclerosis the subject can be naïve or having received glatiramer acetate drug substance.

As used herein, the term "glatiramer acetate related drug substance" (GARDS) is intended to include any polypeptide that is able to compete with myelin basic protein on MHC class II in antigen presentation. Glatiramer acetate related substances include

polypeptides with a predetermined sequence as well as mixtures of polypeptides assembled from the four amino acids glutamic acid (E) alanine (A), lysine (K), and tyrosine (Y); from any three of the amino acids Y, E, A and K, *i.e.* YAK, YEK, YEA or EAK; or from three of the amino acids Y, E, A and K and a fourth amino acid. Examples of glatiramer acetate related substances are disclosed in U.S. Patents 6,514,938 A1, 7,299,172 B2, 7,560,100 and 7,655,221 B2 and U.S. Patent Application Publication No. US 2009-0191173 A1, the disclosures of which are hereby incorporated by reference in their entireties. Glatiramer acetate related substances include glatiramoids and glatiramer acetate drug substance.

As used herein, a "glatiramer acetate related drug product" (GARDP) contains a glatiramer acetate related drug substance.

As used herein, a "glatiramer acetate related drug substance or drug product" is a glatiramer acetate related drug substance or a glatiramer acetate related drug product.

As used herein a "glatiramoid" is a complex mixture of synthetic proteins and polypeptides of varying sizes assembled from four naturally occurring amino acids: L-glutamic acid, L-alanine, L-lysine, and L-tyrosine, in a defined molar ratio. Examples of glatiramoids include glatiramer acetate drug substance (*e.g.* Copaxone®) as well as glatiramoids other than Copaxone®, *e.g.* GA-Natco.

As used herein "glatiramer acetate drug substance" (GADS) is glatiramer acetate produced by Teva Pharmaceutical Industries, Ltd. and is the active ingredient in a glatiramer acetate drug product.

As used herein, a "glatiramer acetate drug product" (GAPD) contains a glatiramer acetate drug substance produced by Teva Pharmaceutical Industries, Ltd. which consists of the acetate salts of synthetic polypeptides, containing four naturally occurring amino acids: L-glutamic acid, L-alanine, L-tyrosine, and L-lysine with an average molar fraction of 0.141, 0.427, 0.095, and 0.338, respectively, and has an average molecular weight of 5,000 - 9,000 daltons. (8) A glatiramer acetate drug product as well as a glatiramer acetate drug substance cause the response shown in Figure 2 when tested according to Examples 1 and 2. Copaxone® is a glatiramer acetate drug

product.

As used herein, a "glatiramer acetate drug substance or drug product" is a glatiramer acetate drug substance or a glatiramer acetate drug product.

As used herein a "glatiramer acetate reference standard" is or contains the drug substance found in a glatiramer acetate drug product. Examples of glatiramer acetate reference standards include the glatiramer acetate reference standards of Example 2.

As used herein "suboptimal activity" refers to a negative response or to a response which is less than the response to glatiramer acetate drug substance or glatiramer acetate drug product produced by Teva Pharmaceutical Industries, Ltd.

As used herein, "release" of a drug product refers to making the product available to consumers.

As used herein, "about" with regard to a stated number encompasses a range of +10 percent to -10 percent of the stated value. By way of example, about 100 mg therefore includes the range 90-110 mg and therefore also includes 90, 91, 92, 93, 94, 95 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109 and 110 mg. Accordingly, about 100 mg includes, in an embodiment, 100 mg.

It is understood that where a parameter range is provided, all integers within that range, tenths thereof, and hundredths thereof, are also provided by the invention. For example, "0.2-5 mg" is a disclosure of 0.2 mg, 0.21 mg, 0.22 mg, 0.23 mg etc. up to 0.3 mg, 0.31 mg, 0.32 mg, 0.33 mg etc. up to 0.4 mg, 0.5 mg, 0.6 mg etc. up to 5.0 mg.

All combinations of the various elements described herein are within the scope of the invention.

This invention will be better understood by reference to the Experimental Details which follow, but those skilled in the art will readily appreciate that the specific experiments detailed are only illustrative of the invention as described more fully in the claims which follow thereafter.

Experimental Details

Methods

Mice

All experimental procedures conformed to accepted ethical standards for use of animals in research and were in accordance with Committee for the Care and Use of Experimental Animals guidelines and approved by the Teva Institutional Animal Care and Use Committee. For these experiments, we purchased 8- to 12-week old female (Balb/c x SJL)F1 mice (Harlan, Israel).

Preparation of Mouse Spleen Cell Cultures

All experimental procedures conformed to accepted ethical standards for use of animals in research and were in accordance with Committee for the Care and Use of Experimental Animals guidelines and approved by the Teva Institutional Animal Care and Use Committee. To stimulate induction of GA-reactive T cells, eight female mice 8- to 12-week-old F1 hybrid (SJL X BALB/C) (purchased from Harlan Biotech Israel, Rehovot, Israel) were injected with 100 µL of a 2.5 mg/mL solution of GA reference standard (*GA-RS*) in PBS (250 µg GA-RS per mouse). GA-RS (Teva) is a selected GA drug substance batch defined as the standard batch and used as a reference in Quality Control (QC) release tests of all Copaxone® batches. Mice were housed in individually ventilated cages for Three days after immunization, mice were sacrificed and their spleens were aseptically removed and placed on ice in RPMI 1640. Single cell suspension was prepared.

After red blood cells lysis, splenocytes were pulled and resuspended to a final concentration of 10 x 10^6 cells/mL in defined cell culture media (DCCM1) (Biological Industries, Beit Haemek, Israel) (96.7% v/v) enriched with L-glutamine 2mM (1% v/v), MEM 2mM (1% v/v), sodium pyruvate 1 mM (1% v/v), antibiotic/antimycotic solution (0.2% v/v), and 2-mercaptoethanol (0.1% v/v).

In Vitro Cell Activation

Splenocytes were treated with either: A) *GA*, which included GA

reference standard (GA-RS; 22 samples) and GA drug product (GA-DP; 34 samples from 30 batches) manufactured by Teva; and GA-Natco which included 11 samples from 5 different batches of another glatiramoid manufactured by a company other than Teva.

Aqueous activator samples, mannitol (the non-active excipient in Copaxone®), and Medium were added to 96-well tissue culture plates (3 wells per sample). Splenocytes (125 µL $10x10^6$ SPL cell/mL suspension) were added to the activator solutions and incubated for 24 hours at 37°C. Then, cells were washed, diluted with RNA stabilization solution (RNAlater® solution, Applied Biosystems), and stored at 4°C.

RNA Isolation and Microarray Expression Profiling

Extraction of total RNA from activated splenocytes was performed using PerfectPure RNA Cultures CEKK kit 50 (5Prime GmbH, Hamburg, Germany) and following the manufacturer's instructions. RNA quality was assessed by the absorbance ratio at 260/280 nm and gel electrophoresis (Experion™, Bio-Rad, Hercules, CA). Total RNA extracted from samples was hybridized to Illumina Mouse WG-6_V2 microarray chips containing more than 45,200 transcripts.

Microarray hybridization, array scanning, and initial preprocessing were performed by BioRap (Technion, Haifa, Israel). Eight independent microarray experiments were conducted, each experiment containing one or more medium and GA samples, along with various *GA-related Materials* and *Other Glatiramoids,* samples

Data Analysis

Initial bead-level data preprocessing was performed using Illumina BeadStudio software. The subsequent bioinformatics analyses were conducted in the Bioinformatics Core Facility of the National Institute for Biotechnology in the Negev, Ltd. (NIBN, Beer-Sheva, Israel). Summarization of bead-level data to gene-level signals was performed using the R package "beadarray" (45) after removal of outliers greater than 3 median absolute deviations (MADs). Between-sample quantile normalization was performed using Partek Genomics Suite (Partek, Inc., St. Louis, Missouri), followed by correction of experimental batch effects (*i.e.*, related to differences in dates of

RNA extraction and array processing) using the Partek Batch Remove ™ tool. As a result, 34,666 *Expressed Genes* with expression signal greater than 6 (in a log2 scale) in at least one of the samples were retained for further analysis. Principal component analysis (PCA) of the achieved signals is shown in Figure 1.

Statistical Tests for Identification of Differentially Expressed Genes

The 34,666 *Expressed Genes* were subjected to the following tests: (1) a t-test comparing the GA (*i.e.*, GA-RS and GA-DP) and Medium; (2) a t-test comparing GA-Natco and Medium; and (3) a 1-Way ANOVA test comparing three sample groups: GA-RS, GA-DP, and GA-Natco. This test was run twice: once with all 11 GA-Natco samples, and once with only 8 of the GA-Natco samples. Each 1-Way ANOVA test included two pairwise comparisons ("contrasts"): GA-DP *vs.* GA-RS, and GA-Natco *vs.* GA-RS. Fold change values were presented in linear scale.

Hierarchical Clustering Analyses

Hierarchical clustering analyses were carried out in Expander (46) after standardizing the data so that the mean signal of each gene across the samples equaled zero and the standard deviation equaled one.

Microarray Data Sharing

Microarray data have been deposited in the Gene Expression Omnibus, (www.ncbi.nlm.nih.gov/geo), accession number GSE40566.

Functional Gene Expression Analysis

To identify the leading biological mechanisms associated with genes induced in splenocytes by glatiramoids, gene functional annotation, enrichment, and pathway analyses were performed by Ingenuity Pathways Analysis (IPA) Suite (www.ingenuity.com). The program integrates data from various experimental platforms and primary literature sources to provide insight into molecular interactions, cellular phenotypes, and disease processes, and then predicts downstream biological effects of gene transcription changes. IPA web software was also used to reconstruct regulatory genes and transcriptional factors functional networks. A significance score

(using the right-tailed Fisher's exact test and expressed as a value) for each process is calculated as the number of gen transcripts that participate in a network or pathway relative to ne total number of these genes in all functional/pathway annotati s stored in the IPA database. All p values were applied for multipl testing corrections using Benjamini-Hochberg FDR method with a cut off at p = 0.05.

Example 1

Identification of genes regulated by GA and GA-Natco

Mice were immunized with GA reference standard (RS) and three days later, spleens were removed and cells extracted. Cultured splenocytes were reactivated *ex-vivo* with either medium, mannitol or glatiramoids (GA-RS, GA-DP or GA-Natco) for twenty four hours. RNA was extracted and full gene expression analysis was preformed.

Microarray Analysis

Principal component analysis (PCA) of the normalized gene expression signals showed two main clusters, with medium and mannitol samples in one cluster and glatiramoids (GA-RS, GA-DP and GA Natco) in the other cluster (**Figure 1**).

A total of 1474 genes were up- or down-regulated by GA (*i.e.*, GA reference standard, GA-RS and GA drug product, GA-DP) (FDR-adjusted p value < 0.05) with fold change of ≥1.3 compared to medium-treated samples (**Figure 2**). Gene expression levels of cells activated by GA-RS and by GA-DP were statistically indistinguishable. The comparison between GA-Natco and medium indicated 1894 genes that were up- or down- regulated (FDR-adjusted p value < 0.05, fold change of ≥1.3) with 1271 genes common to both the GA and GA-Natco signatures. When GA-Natco samples were directly compared with GA-RS samples, 75 genes had significantly different expression (FDR adjusted p-value < 0.05). Gene expression patterns were inconsistent within the 11 GA-Natco samples (taken from 5 batches), separating into two separate clusters of 3 (2 batches) and 8 samples (of 3 batches). When the gene expression pattern of GA-RS and the 8 GA-Natco samples were compared, ninety eight genes had FDR adjusted p-value < 0.05, with

a fold change difference ≥1.3 (**Figure 3**).

Example 2

Functional analysis of genes differentially expressed by GA vs. Medium

Functional analysis of the 1474 genes that were either up- or down-regulated following activation with GA samples indicated that among the most significantly influenced biological functions were those associated with increased proliferation and activation of immune cells, including T and B lymphocytes, stimulation and immune response of APCs, and differentiation of effector T-lymphocytes (**Table 1**). Simultaneously, functions related to quantity of cytotoxic T lymphocytes, and to development of hematopoietic progenitor cells, was down-regulated.

Table 1. Significantly enriched biological functions in the GA gene expression signature

	GA* *vs.* Medium	
Functional category	**Response**	**p value†**
Proliferation of lymphocytes	Upregulated	4.81E-38
Proliferation of immune cells	Upregulated	2.86E-39
Proliferation of B lymphocytes	Upregulated	9.66E-18
Proliferation of hematopoietic cell lines	Upregulated	4.20E-11
Activation of lymphocytes	Upregulated	1.88E-29
Activation of T lymphocytes	Upregulated	7.03E-23
Activation of phagocytes	Upregulated	4.96E-14
Activation of mononuclear leukocytes	Upregulated	4.24E-29
Activation of antigen presenting cells	Upregulated	1.05E-13
Stimulation of antigen presenting cells	Upregulated	3.05E-07
Immune response of antigen presenting cells	Upregulated	1.57E-10
Stimulation of macrophages	Upregulated	3.95E-08
Differentiation of effector T lymphocytes	Upregulated	1.99E-07

Suppression of T lymphocytes	Upregulated	5.93E-11
Development of hematopoietic progenitor cells	Down-regulated	9.52E-08
Quantity of cytotoxic T cells	Down-regulated	5.42E-08

*GA-RS and GA-DP

†The significance value associated with a function is a measure of how likely it is that genes from the dataset participate in that function. The significance is expressed as a p value calculated using the right-tailed Fisher's exact test.

The significant canonical pathways associated with gene transcripts altered by GA, and their corresponding genes, can be found in **Table 2**. On this list, T helper cell differentiation was the most significant canonical pathway (p=4.97E-16), and transcriptional activation of this pathway (**Table 3**) is consistent with previously described mechanisms of GA immunomodulatory activity. GA induced Th1 cell activation by enhancing expression of genes encoding proinflammatory cytokines such as IFNγ, IL-2, and increasing expression of TBX21 transcription factor (Table 3). In addition, IL-17A and IL-17F, both related to the TH-17 pathway, were over-expressed in GA samples. Differentiation to the Th2 phenotype was evident by stimulation of genes encoding anti-inflammatory cytokines such as IL-4 and IL-13, as well as over-expression of IL-4R and the GATA family of transcription factors (GATA3), which stimulate IL-4 production (Table 3). IL18R expression was down-regulated by GA, which is also in line with Th2 phenotype (33). These findings are consistent with evidence from GA-treated MS patients showing that upon initiation of GA treatment, CD4+ T-cell lines secrete both pro-inflammatory Th1 and anti-inflammatory Th2 cytokines (21, 24) and that continued exposure to GA induces a shift from a Th1-type cytokine profile to a Th2-type profile (21, 23, 27, 28). In that respect, our gene expression analysis captures the primary events taking place following initial activation of immune cells by GA, i.e. activation of both Th1 and Th2 pathways. FOXP3, an important transcription factor required for the maintenance of regulatory T cells, was over-expressed in GA samples, consistent with findings that GA increases the number and function of CD4+CD25+ T regulatory cells in RRMS patients (30, 31, 34).

Table 2. Significantly Altered Genes and Most Significant Canonical Pathways for *GA* Gene Expression Signature (GA reference standard [GA-RS] and GA drug product [GA-DP] *vs.* medium).

Canonical Pathways	p value	Genes
T Helper Cell Differentiation	4.97E-16	IL12RB1, FOXP3, HLA-DMB, TBX21, IL18R1, TGFBR2, IL2, IL17F, IL4, HLA-DMA, IFNG, IL4R, IL2RG, IL6R, IFNGR2, IL13, IL17A, ICOS, IL18, CD40, IL10RB, CD86, IL2RA, GATA3, TNF
Crosstalk between Dendritic Cells and Natural Killer Cells	5.88E-11	IFNG, IL2RG, KLRD1, CD69, LTB, CD83, IL2RB, IL18, PRF1, CAMK2D, CD40, IL2, LTA, FSCN1, TLR7, CD86, CSF2, TNF, CCR7, FASLG, IL4
Communication between Innate and Adaptive Immune Cells	4.41E-09	IFNG, IL1A, CD83, CCL5, CD8B, CXCL10, TLR2, IL18, CCL4, CD40, IL2, TLR7, CD86, IGHA1, CSF2, TNF, CCR7, IL4
Role of Cytokines in Mediating Communication between Immune Cells	1.36E-06	IFNG, IL1A, IL18, IL2, CSF2, IL13, IL17F, IL24, TNF, IL4, IL17A
Interferon Signaling	5.58E-06	SOCS1, IFNG, OAS1, JAK1, PTPN2, IFNGR2, IFITM1, IFI35, STAT2, BCL2
Super pathway of Cholesterol Biosynthesis	5.14E-06	MVD, FDPS, SQLE, NSDHL, DHCR24, Acat2/Acat3, MSMO1, LSS, CYP51A1
iCOS-iCOSL Signaling in T Helper Cells	5.16E-06	HLA-DMA, IL2RG, NFKBIE, PIK3R1, HLA-DMB, PPP3CC, CD3D, IL2RB, PTEN, CD3G, ICOS, CAMK2D, NFAT5, CD40, IL2, LAT, IL2RA, ITK
Differential Regulation of Cytokine Production in Macrophages and T Helper Cells by IL-17A and IL-17F	9.82E-06	CCL4, CCL5, CSF2, IL13, IL17F, TNF, IL17A
Allograft Rejection Signaling	9.88E-06	IFNG, HLA-DMA, PRF1, CD40, H2-M2, IL2, CD86, HLA-DMB, TNF, FASLG, IL4
Hematopoiesis from Pluripotent Stem Cells	1.03E-05	CD3G, IL1A, LIF, IL2, IGHA1, CSF2, CD3D, CD8B, IL4
Graft-versus-Host Disease Signaling	1.42E-05	IFNG, HLA-DMA, PRF1, IL1A, IL18, IL2, CD86, HLA-DMB, TNF, FASLG
Glucocorticoid Receptor Signaling	1.59E-05	PRKACB, JAK1, SGK1, PIK3R1, NFKBIE, CCL5, MAPK11, TSC22D3, BCL2, TGFBR2, NFAT5, JUN,IL2, FKBP5, ADRB2, IL4, IFNG, MAP3K1, PPP3CC, MAPK12, IL13, CD3D, CD3G, POU2F1, SMARCA2, CDKN1A, TGFB3, HSP90AA1, CSF2, TNF
Cholesterol Biosynthesis I	1.72E-05	SQLE, NSDHL, DHCR24, MSMO1, LSS, CYP51A1
Pathogenesis of Multiple Sclerosis	2.24E-05	CXCL10, CCR5, CXCL9, CCL4, CCL5

5

Table 3. Significantly altered genes in the T helper cell differentiation pathway expressed by splenocytes activated with GA

Symbol	Gene Name	p value GA* *vs.* Medium	Fold Change
CD40	CD40 molecule, TNF receptor superfamily member 5	1.68E-16	1.533
CD86	CD86 molecule	5.45E-10	1.365
GATA3	GATA binding protein 3	2.69E-21	1.877
HLA-DMA	major histocompatibility complex, class II, DM alpha	5.03E-20	1.534
HLA-DMB	major histocompatibility complex, class II, DM beta	9.87E-06	1.398
ICOS	inducible T-cell co-stimulator	1.82E-17	2.164
IFNG	interferon, gamma	1.62E-41	16.847
IFNGR2	interferon gamma receptor 2	2.90E-05	-1.333
IL2	interleukin 2	1.81E-15	2.074
IL13	interleukin 13	1.57E-13	1.330
IL4	interleukin 4	2.73E-30	4.428
IL18	interleukin 18	1.05E-16	-1.383
IL12RB1	interleukin 12 receptor, beta 1	4.03E-24	2.270
IL17A	interleukin 17A	6.85E-08	1.451
IL17F	interleukin 17F	7.71E-12	2.365
IL18R1	interleukin 18 receptor 1	9.57E-21	-1.726
IL2RA	interleukin 2 receptor, alpha	2.96E-28	2.457
IL2RG	interleukin 2 receptor, gamma	7.54E-08	-1.386
IL4R	interleukin 4 receptor	5.56E-17	1.578
IL6R	interleukin 6 receptor	6.63E-10	-1.545
TBX21	T-box 21	5.36E-24	2.654
TGFBR2	transforming growth factor, beta receptor II	2.14E-16	-1.436
TNF	tumor necrosis factor	4.79E-15	1.475
FOXP3	forkhead box P3	4.34E-20	1.406
IL10RB	interleukin 10 receptor, beta	6.16E-06	-1.323

*GA-RS and GA-DP

Example 3

Functional analysis of genes differentially expressed by GA-Natco vs. Medium

Functional analysis of GA-Natco batches *vs.* medium indicated that, as in the GA signature, the most significantly influenced biological functions were associated with increased proliferation of lymphocytes (p=6.48E-35), immune cells (p=2.70E-35), B cells (p=2.74E-15), and hematopoietic cell lines (p=2.02E-10); activation of lymphocytes (6.03E-25), phagocytes (5.95E-07), and monocytes (p=2.25E-24); and stimulation of APCs (p=2.88E-6) and macrophages (p=1.87E-06).

As with GA, T helper cell differentiation was the most significant canonical pathway (p=1.37E-15) for the gene transcripts profile of GA-Natco compared with medium. The transcript signatures of GA-Natco appeared to have similar mechanisms within this pathway to those shown for GA, with a notable exception. FoxP3 was not overexpressed in splenocytes activated by GA-Natco, suggesting upregulation of $CD4^+CD25^+FOXP3$ Tregs could be different than GA.

Other important functional differences between GA and GA-Natco gene expression signatures are shown in **Table 4**. Induction with GA was characterized by upregulation of gene transcripts associated with activation of immune responses of APCs and functions related to differentiation of effector T-cells, with simultaneous suppression of T cells. Biological functions altered by GA-Natco were related to increased T lymphocyte proliferation and expansion of lymphocytes and monocytes. These findings suggest that,GA-Natco may be associated with decreased ability to activate APCs, inappropriate differentiation of effector T-cells, and less suppression of T cells. In addition, GA-Natco had more pro-inflammatory properties as demonstrated by increased expansion of lymphocytes and monocytes, and increased T-cell proliferation.

Table 4. Differences in enrichment of biological functions between GA and GA-Natco gene expression signatures

	GA* *vs.* Medium		GA-Natco *vs.* Medium	
Functional category	**Response**	**p value***	**Response**	**p value**
Induced by GA and not by GA-Natco				
Immune response of antigen presenting cells	Upregulated	1.57E-10	No Change	-
Differentiation of effector lymphocytes	Upregulated	1.99E-07	No change	-
Suppression of T lymphocytes	Upregulated	5.93E-11	No change	-
Induced by GA-Natco and not by GA				
Expansion of mononuclear leukocytes	No change	-	Upregulated	1.58E-15
Proliferation of T lymphocytes	No change	-	upregulated	1.49E-29
Expansion of lymphocytes	No change	-	Upregulated	1.81E-15
Differentiation of naïve lymphocytes	No change	-	Upregulated	2.00E-06

*GA-RS and GA-DP

†The significance value associated with a function is a measure of how likely it is that genes from the dataset participate in that function. The significance is expressed as a p value that is calculated using the right-tailed Fisher's exact test.

Example 4

Functional analysis of the 98 genes differentiating GA-Natco from GA-RS

As noted, direct comparison of 8 GA-Natco samples and GA-RS revealed 98 genes with fold change ≥1.3. These genes were associated with increased activation of functional processes of immune response, inflammatory response, adhesion of immune cells and stimulation of various cell migration and movement mechanisms (**Table 5**). In the inflammatory response function, inflammation was predicted to be increased in the GA-Natco samples (p=8.67E-19) given that 20 of the 30 differential transcripts were expressed in a direction consistent with active inflammatory response, including over-expression of IL2, IL1A, IL1B, C3, S100A8, and S100A9. Similarly, a prediction towards an increase in cell movement was also made (p=9.55E-15) since 29 of the 39 transcripts, including CXCL2, CXCL3 CCL4, were over-expressed in the GA-Natco samples. Interestingly, a network of inflammatory response genes associated with increased risk of fever, including IL1B, IL1A, CCL4, CCL3, CD14, was over-expressed as well.

Table 5. Increased activation of functional processes in GA-Natco compared with GA-RS

Functional category	p value	Predicted activation state	Number of differentially expressed genes
Inflammatory response	8.67E-19	Increased	30
Adhesion of immune cells	7.57E-17	Increased	20
Cell movement	9.55E-15	Increased	39
Migration of cells	2.08E-15	Increased	38
Chemotaxis of cells	1.46E-14	Increased	22
Cell movement of phagocytes	3.58E-15	Increased	22
Chemotaxis of monocytes	1.18E-08	Increased	8
Cell movement of monocytes	1.09E-11	Increased	12
Fever	8.85E-09	Increased	6

Discussion - Examples 1-4

Glatiramer acetate drug substance (GA, Copaxone®), a mixture of polymers comprised of four amino acids, is an approved drug for treatment of relapsing-remitting multiple sclerosis (RRMS) and clinically isolated syndrome (CIS). GA mediates its activity by induction of GA-specific T cells that shift the T cell balance from a dominant pro-inflammatory phenotype (Th1/Th17), to an anti-inflammatory phenotype (Th2/Treg). In order to further characterize the functional pathways by which GA exerts its activity on immune cells, we used gene expression profiling on GA stimulated splenocytes. Mice were immunized with GA and after 3 days splenocytes were harvested and reactivated with GA *ex vivo*. Gene expression profile and pathway analysis were evaluated in reactivated splenocytes, showing a total of 1474 genes that were significantly up or down regulated by GA. The main functional pathways induced by GA were: increased proliferation and activation of immune cells including T and B lymphocytes, stimulation of antigen presenting cells, and differentiation of effector T lymphocytes. T helper cell differentiation was the most significant canonical pathway associated with gene transcripts altered by GA. Such expression patterns were not observed when another glatiramoid was used for cell activation. The GA induced pathways coincide with known mechanisms of GA activity in MS patients and further support the unique therapeutic effect of this drug.

We aimed to further investigate the mechanisms underlying GA therapeutic activity and to evaluate whether a closely related galtiramoid, GA-Natco, induces the same gene expression pattern as GA. Mice were immunized with GA-RS followed by exposure of excised splenocytes to *ex-vivo* activation with GA or GA-Natco. The most significant transcriptional changes induced by GA were related to T cell activation and differentiation, characterized by: a) upregulation of a mixture of pro- and anti-inflammatory cytokines, b) upregulation of CD4+CD25+FOXP3 regulatory T cells, and c) suppression of T lymphocytes. These findings are consistent with previous publications suggesting that CD4+ T-cell lines, obtained from MS patients after short term GA treatment, secrete both

proinflammatory Th1 (IL-2 and IFN-γ) and anti-inflammatory Th2 (IL-4, IL-5) cytokines (14, 28) while long term exposure to GA, results in a clear shift from the primarily Th1-type cytokine profile to a Th2-type profile (23, 27, 32, 36-40). GA treatment has also been shown to induce formation of CD4+CD25+ regulatory T cells by activation of FOXP3 expression (41) and to increase the number and suppressive capacity of CD4+CD25+FOXP3 and CD4+CD25+FOXP3+CD31+ regulatory T cells in MS patients (30, 31). In addition, our observations that the gene expressions profile of splenocytes treated with GA was functionally associated with induction of T cell suppression, is in line with GA observed effects in MS patients namely, enhanced suppressor activity of CD8+ T cells (42) and increased levels of CD3+CD8+CD28- suppressor T-cells (43).

GA also induced activation of APC related genes in the reactivated splenocytes. Studies in experimental autoimmune encephalomyelitis (EAE) models have shown that GA treatment activates and promotes development of APC's such as anti-inflammatory type II monocytes (32). These cells can promote T cell differentiation to Th2 cells and to CD4+CD25+FoxP3+ regulatory T cells and are considered important for the GA mechanism of action (32).

The specific gene expression pattern induced by GA was investigated in another study using freshly isolated PBMCs from RRMS patients before and after three months of daily GA treatment (44). In this study, GA treatment induced a differential expression of 480 genes. Some of these genes were related to cell proliferation and immune response mechanisms, a finding that coincides with our findings. However, other genes that were depicted at this study were related to antigen-activated apoptosis, adhesion mechanisms and MHC class-I antigen presentation (44). The variations between studies in gene expression patterns may be attributed to protocol differences, including the origin of the cells (human PBMCs vs. murine splenocytes), duration of in-vivo exposure to GA (3 months vs a few days) and the absence of an ex-vivo reactivation phase in the RRMS PBMCs study.

Ex vivo activation of GA-primed splenocytes with GA-DP samples produced statistically indistinguishable gene expression profiles

when compared to splenocytes activated with GA-RS samples. In contrast, the gene expression pattern of the 11 GA-Natco samples was different in 75 genes and produced 2 distinct transcriptional profiles, one composed of three samples and the other of eight samples. Splenocyte activation by these eight GA-Natco samples showed significant differences in expression of 98 genes compared with splenocytes activated by GA.

When compared with GA, the eight GA-Natco samples had a gene expression signature consistent with a lack of transcriptional changes related to appropriate T cell differentiation; activation of APCs, T-cell suppression, and activation of FOXP3 positive regulatory T cells. Moreover, differences between gene expression profiles induced by GA-Natco and GA-RS were associated with significant activation of inflammatory responses and increased inflammatory cell adhesion mechanisms.

In this study, mice were immunized with GA-RS and the transcriptional differences between GA and GA-Natco were determined only in the reactivation phase of GA-primed splenocytes; therefore, these results may not reflect all potential differences between GA and GA-Natco.

Example 5

Using glatiramer Acetate (GA) and another glatiramid (PG) as examples, we sought to develop a thorough set of computational methods to go beyond lists of differentially expressed genes, using transcriptional profiles to robustly compare the immunological impact of two medicines. We focused on (1) comparing the variability of the two drugs as measured in their transcriptional signatures for each drug batch; (2) characterizing the composition of the cell types modulated by each medicine; and (3) characterizing and explaining the immunomodulatory behaviors of the two drugs in the context of the genes they induce and suppress, as well as the immune cell types they modulate and the possible connections to clinical outcome.

Example 6

Variability analysis: GA is significantly more consistent than PG

In comparing medicines produced by different manufacturing processes, it is important to assess if they are equally consistent in their biological impacts. We sought to examine differences in global variability across all relevant probes in order to address the question of whether the biological impact of PG was as consistent as GA. Defining relevant probes as those with variability induced specifically by activation (as opposed to experimental noise such as the variability seen in samples exposed only to medium), we found that 4-fold more probes had significantly higher variability in PG than in GA (Fig. 4A and Table 6).

Table 6. Highly variable probes significant by F-test in either GA or PG

The highly variable probes that were significant by F-test in either GA or other glatiramoid and are depicted in Figure 4A.

Type	Probe	Gene
More variable in generic	ILMN_2927369	KRT82
More variable in generic	ILMN_1248780	SPRR2B
More variable in generic	ILMN_1255612	9430016C22RIK
More variable in generic	ILMN_2465182	XLR3B
More variable in generic	ILMN_1220648	A630014I05RIK
More variable in generic	ILMN_2441895	TYMS
More variable in generic	ILMN_1215680	SAMD3
More variable in generic	ILMN_2662283	2010007H12RIK
More variable in generic	ILMN_2730829	TMUB1
More variable in generic	ILMN_2534501	LOC380738
More variable in generic	ILMN_1229286	2410042D21RIK
More variable in generic	ILMN_2511527	9330133O14RIK
More variable in generic	ILMN_1228867	A130082M07RIK
More variable in generic	ILMN_3009928	4930524E20RIK
More variable in generic	ILMN_2870788	UPB1
More variable in generic	ILMN_2941062	SHROOM2
More variable in generic	ILMN_2444847	4930521G14RIK
More variable in generic	ILMN_2805419	OLFR885
More variable in generic	ILMN_2825562	CYBRD1
More variable in generic	ILMN_2456193	6446580_669
More variable in generic	ILMN_1225456	CHRNA7
More variable in generic	ILMN_2621217	5730508B09RIK
More variable in generic	ILMN_2495555	MAPK8IP2

More variable in generic	ILMN_2653725	LOC100046802
More variable in generic	ILMN_3161601	SNCA
More variable in generic	ILMN_2436890	DHRSX
More variable in generic	ILMN_1225663	LOC384162
More variable in generic	ILMN_1222683	OLFR1441
More variable in generic	ILMN_2691752	OTX2
More variable in generic	ILMN_2460292	8430427H17RIK
More variable in generic	ILMN_2706906	LOC100047937
More variable in generic	ILMN_2820893	SELPLG
More variable in generic	ILMN_1233075	ERCC2
More variable in generic	ILMN_2733594	D630004A14RIK
More variable in generic	ILMN_2768252	MYL7
More variable in generic	ILMN_1233191	5730422E09RIK
More variable in generic	ILMN_2935462	SCN2B
More variable in generic	ILMN_2541335	LOC384887
More variable in generic	ILMN_2626648	41522
More variable in generic	ILMN_2494532	NRG1
More variable in generic	ILMN_2682263	KLHL28
More variable in generic	ILMN_1378821	control_ILMN_1378821
More variable in generic	ILMN_1245775	FUT9
More variable in generic	ILMN_2752524	PAQR9
More variable in generic	ILMN_1234848	TRIM2
More variable in generic	ILMN_2564352	SDHA
More variable in generic	ILMN_1260478	HECW1
More variable in generic	ILMN_2620284	PHLDB1
More variable in generic	ILMN_2741169	CD8B1
More variable in generic	ILMN_2728928	FABP1
More variable in generic	ILMN_2690135	ACSL4
More variable in generic	ILMN_2530757	LOC210143
More variable in generic	ILMN_1223894	E530018B05RIK
More variable in generic	ILMN_2654541	MED19
More variable in generic	ILMN_2769762	CTNNA2
More variable in generic	ILMN_1378704	control_ILMN_1378704
More variable in generic	ILMN_1259595	AI595406
More variable in generic	ILMN_2635132	FOXP3
More variable in generic	ILMN_1250340	A630055A13RIK
More variable in generic	ILMN_2524263	ZFP251
More variable in generic	ILMN_2690574	FOXO3
More variable in generic	ILMN_1239070	MYO18B
More variable in generic	ILMN_2580818	D930042N17RIK
More variable in generic	ILMN_2697415	CD3D
More variable in generic	ILMN_1228620	ZFP583
More variable in generic	ILMN_2502290	TRIM71
More variable in generic	ILMN_2642321	CEACAM13
More variable in generic	ILMN_2661820	AGXT2L1

More variable in generic	ILMN_1244840	4833435K08RIK
More variable in generic	ILMN_1233941	UNCX
More variable in generic	ILMN_1233843	PTPN21
More variable in generic	ILMN_1224922	LRRN2
More variable in generic	ILMN_2737523	F2RL3
More variable in generic	ILMN_2637897	NLRX1
More variable in generic	ILMN_1254631	AI481316
More variable in generic	ILMN_2498330	LOC632997
More variable in generic	ILMN_2769330	CD6
More variable in generic	ILMN_2666330	OIT3
More variable in generic	ILMN_2527328	LOC381360
More variable in generic	ILMN_2883666	PIGN
More variable in generic	ILMN_1257579	NUP210
More variable in generic	ILMN_1235441	STK22S1
More variable in generic	ILMN_2769325	CD6
More variable in generic	ILMN_3006990	EG622339
More variable in generic	ILMN_1216552	CORO2B
More variable in generic	ILMN_2701383	ANKS3
More variable in generic	ILMN_1247936	OLFR571
More variable in generic	ILMN_2998230	GALNS
More variable in generic	ILMN_2610965	DAB2IP
More variable in generic	ILMN_1223081	LOC241962
More variable in generic	ILMN_2598271	ASB17
More variable in generic	ILMN_2979729	OLFR1287
More variable in generic	ILMN_1245710	CCL2
More variable in generic	ILMN_2705689	GGA2
More variable in generic	ILMN_1242912	POF1B
More variable in generic	ILMN_2445249	KRT36
More variable in generic	ILMN_1235485	LOC218501
More variable in generic	ILMN_2964420	LIPK
More variable in generic	ILMN_3104704	KLRA4
More variable in generic	ILMN_1246768	A830026B15RIK
More variable in generic	ILMN_2923717	KCNT1
More variable in generic	ILMN_2798167	BB287469
More variable in generic	ILMN_1246408	LOC100042427
More variable in generic	ILMN_2749437	RHOC
More variable in generic	ILMN_1243092	EG546980
More variable in GA	ILMN_1222230	MEPE
More variable in GA	ILMN_1237927	8430407G10RIK
More variable in GA	ILMN_1380391	control_ILMN_1380391
More variable in GA	ILMN_1222029	RTTN
More variable in GA	ILMN_1256073	PXDN
More variable in GA	ILMN_1221957	LOC637776
More variable in GA	ILMN_1257904	2810403A07RIK
More variable in GA	ILMN_1244123	SLC38A2

More variable in GA	ILMN_2529810	GPR113
More variable in GA	ILMN_1231281	LOC382900
More variable in GA	ILMN_2756771	GMFB
More variable in GA	ILMN_1260480	5033411B22RIK
More variable in GA	ILMN_1258114	A930014P08RIK
More variable in GA	ILMN_2524553	4930555L11RIK
More variable in GA	ILMN_2701797	MEN1
More variable in GA	ILMN_2499058	UBE2I
More variable in GA	ILMN_2759380	2310010M20RIK
More variable in GA	ILMN_1244585	RAP1GAP
More variable in GA	ILMN_2666205	DPP10
More variable in GA	ILMN_1240784	LOC384938
More variable in GA	1770446	1770446
More variable in GA	ILMN_1252393	LOC635340
More variable in GA	ILMN_2700224	KTN1
More variable in GA	ILMN_1217225	CCDC91

As a second method of examining variability, we determined for each probe an acceptable range (i.e. between the minimum and maximum expression induced by GA reference standard). We determined the percentage of samples within this acceptable range for both GA and PG. We defined the maximum allowed percentage of samples with this range as the tolerance threshold, and found that for any given tolerance threshold PG almost always has more probes out of tolerance than GA (Fig. 4B). For instance, 158 probes for PG fail to meet a tolerance of 75% of samples within the range defined by the reference standard, while only 10 probes for GA fail to meet the same tolerance. The very worst PG probe has 5/22 samples within tolerance (22.7%), while the very worst GA probe has 43/68 (63%) of samples within tolerance.

As a third method of examining variability we calculated for each PG batch the percentage of differentially variable probes via F-test between that PG batch and the reference standard, as well as between that PG batch and GA. We then compared these values to the number of differentially variable probes between reference standard and GA, and found that each PG batch was more variable than GA, when both were compared to reference standard (Fig. 4C).

Finally, we examined the coefficient of variation (CV) across all probes in GA and in PG as a function of intensity, and found that

there was a much narrower range of CV values present in GA than in PG at any given intensity (Fig. 5).

It is important not only to identify differences in variability, but also to explore the potential biological impact of these differences. Thus, we calculated for each probe the ratio of the variance in PG to the variance in GA. The highest ranked probe by variability in PG relative to its variability in GA was for FOXP3 (ILMN_2635132, ratio 4.17, Table 7), the key marker of tolerance-inducing regulatory T cells (Tregs). The probe with the second highest ratio of variance in PG to variance in GA was for GPR83 (ILMN_2707941, ratio 4.14), which is also an established Treg marker.(47)

Table 7: Ranked list of probes by ratio of the variance in other glatiramoid-activated samples to the variance in GA-activated samples.

Probe	Gene	Var(generic)/Var(GA)
ILMN_2635132	FOXP3	4.169784637
ILMN_2707941	GPR83	4.141645173
ILMN_2752702	KLHL12	3.56612757
ILMN_2741169	CD8B1	3.455712087
ILMN_2783997	TRIM10	3.370881625
ILMN_3161601	SNCA	3.340589295
ILMN_2601946	5033414K04RIK	3.297834654
ILMN_1228867	A130082M07RIK	3.157262632
ILMN_3136638	SNCA	3.14591837
ILMN_2895284	2210023G05RIK	3.126076675
ILMN_2886128	PCDHA10	3.085624289
ILMN_1257368	GM566	3.073208924
ILMN_2635718	BZRPL1	3.059590672
ILMN_1239724	PSMB1	3.031738703
ILMN_1256142	MARCKS	3.022926531
ILMN_2690574	FOXO3	2.972307993
ILMN_1258520	4933421E18RIK	2.903836286
ILMN_2703061	2810408P10RIK	2.867474892
ILMN_2824625	GM1604	2.825719679
ILMN_1233843	PTPN21	2.825301578
ILMN_2620284	PHLDB1	2.814372655
ILMN_2745073	LOC100047353	2.809357296
ILMN_2749437	RHOC	2.773049302
ILMN_1248780	SPRR2B	2.770363507
ILMN_2703079	PUNC	2.754789803

ILMN_1255719	A930004L03RIK	2.735701046
ILMN_2733594	D630004A14RIK	2.712208469
ILMN_1254631	AI481316	2.710449678
ILMN_2939277	SNCG	2.703626953
ILMN_1225059	SLC16A12	2.697244381
ILMN_1217855	NKG7	2.690910757
ILMN_2753697	CD2	2.674585226
ILMN_1255513	CDR2	2.671217726
ILMN_2965737	KLHL34	2.670969821
ILMN_2524992	EAR2	2.664017605
ILMN_2498330	LOC632997	2.64101161
ILMN_1217629	ITGAE	2.640617288
ILMN_2626648	41522	2.611392387
ILMN_1215949	1700040F17RIK	2.595459871
ILMN_3114124	HSD3B7	2.594406596
ILMN_1216823	UBR5	2.584859171
ILMN_1222683	OLFR1441	2.577789931
ILMN_2606162	PDLIM4	2.57565855
ILMN_1223081	LOC241962	2.54822461
ILMN_2435477	5830406C15RIK	2.537539864
ILMN_2686825	5430427O19RIK	2.536086924
ILMN_1222512	MFSD7B	2.525669655
ILMN_1248854	ICK	2.525643685
ILMN_2705689	GGA2	2.522100556
ILMN_2826881	MYBL2	2.522004768
ILMN_1220648	A630014I05RIK	2.518845526
ILMN_1378704	control_ILMN_1378704	2.501520902
ILMN_2715400	TEF	2.495018969
ILMN_1257579	NUP210	2.490045841
ILMN_2598271	ASB17	2.490015142
ILMN_1225557	E030019B06RIK	2.484827893
ILMN_2644350	THY1	2.476638172
ILMN_1216972	CLEC4E	2.47211937
ILMN_2679094	MAP3K7IP2	2.471543957
ILMN_2820893	SELPLG	2.462368133
ILMN_1223480	D530031C13RIK	2.461106681
ILMN_2495703	CLIP2	2.449801678
ILMN_2679591	ERAP1	2.449203035
ILMN_2465182	XLR3B	2.447786159
ILMN_1219011	3110040M04RIK	2.445802442
ILMN_2870696	HFE	2.434961339
ILMN_3005873	SORT1	2.431402316
ILMN_2515285	WASF3	2.431071739
ILMN_2495555	MAPK8IP2	2.429611427
ILMN_2539917	LOC384538	2.421951597

ILMN_2757838	IPPK	2.416554447
ILMN_3162301	OTTMUSG00000015859	2.414336977
ILMN_2923717	KCNT1	2.414048507
ILMN_2725054	A930006J02RIK	2.409634421
ILMN_1230224	DNAJC6	2.408553983
ILMN_1225663	LOC384162	2.408249488
ILMN_1230818	9630015E22RIK	2.406694567
ILMN_2539295	LOC621968	2.406675656
ILMN_2950828	C030018G13RIK	2.405823034
ILMN_2606792	GBP4	2.404718824
ILMN_1226665	ISLR	2.404321761
ILMN_2769325	CD6	2.398106015
ILMN_1228696	ADA	2.39687535
ILMN_2670368	CAR5B	2.393795851
ILMN_2658878	TG	2.392922859
ILMN_1242548	HIF1A	2.389939819
ILMN_1254380	DBR1	2.386871534
ILMN_2446592	RAD18	2.378012721
ILMN_2425143	MJ-500-31_190	2.377329303
ILMN_2769330	CD6	2.373941676
ILMN_3155363	PPL	2.37383497
ILMN_2454209	TRBV6_AE000663_T_CELL_RECEPTOR_BETA_VARIABLE_6_11	2.372090892
ILMN_1235584	PLEKHA5	2.371229664
ILMN_1218694	C630017J20RIK	2.370593123
ILMN_2859348	TAF9B	2.367681107
ILMN_1231458	IQGAP1	2.366074862
ILMN_2426480	3830612M24	2.365830273
ILMN_2664439	9230109A22RIK	2.3624709
ILMN_2498851	2310075M15RIK	2.359962418

Example 7

Comparing impact on key immune system genes: GA induces Treg markers FoxP3 and Gpr83 more effectively than PG

To systematically examine the differential expression of a particular gene in response to different medicines, we applied multiple methods including both parametric and non-parametric testing. Not only did GA induce FOXP3 expression more consistently than PG, but GA also induced significantly higher expression as determined by 4 parametric methods: ANOVA (adjusted p < 1.37 x 10-3), LIMMA with background subtraction (adjusted p < 6.14 x 10-4), comparative marker selection using signal-to-noise (adjusted p < 1.34 x 10-2 and t-test (adjusted p < 2.12 x 10- 2), and a non-

parametric Wilcoxon rank-sum test (adjusted p < 4.62 x 10-2 (Fig. 6A, Table 8).

Applying the same methods to GPR83, we found that GA induced significantly higher levels of expression than PG: ANOVA (adjusted p < 4.75 x 10-8), LIMMA with background subtraction (adjusted p < 8.67 x 10-10), comparative marker selection using signal-to-noise (adjusted p < 1.34 x 10-2) and t-test (adjusted p < 1.49 x 10-2), and a non-parametric Wilcoxon rank-sum test (adjusted p < 3.45 x 10-4, Fig. 2B). GPR83 is also in the top 20 probes by fold change from GA compared to PG (Table 8).

Table 8: Comparison of expression in GA to expression in GA for each probe, including fold change, ANOVA, LIMMA with background subtraction, comparative marker selection by signal-to-noise ratio, comparative marker selection by t-test, and the Wilcoxon non-parametric method.

			Comparative Marker Selection								Significant in Parametric Tests		
			T-test		SNR		LIMMA		ANOVA			Wilcoxon Rank Sum	
Probe	Gene	Fold Change	Nom. P.	Adj. P.	Nom. P.	Adj. P.	Nom. P.	Adj. P.	Nom. P.	Adj. P.	1-yes,0-no	Nom. P.	Adj. P.
ILMN_2685712	IFNG	1.41	0.000299498	0.014892062	0.000299498	0.013353714	0.000000236	0.0000718	0.000000401	0.000139	1	2.06483E-05	0.004309944
ILMN_2595857	ANKRD37	1.36	0.000299498	0.014892062	0.000299498	0.013353714	5.82E-12	1.69E-08	1.23E-08	0.0000119	1	6.03547E-07	0.000573333
ILMN_2791459	IFNG	1.33	0.000299498	0.014892062	0.000299498	0.013353714	0.00000199	0.000375639	0.00000642	0.00108	1	0.000197175	0.015477107
ILMN_2675232	KLK8	1.284884601	0.000299498	0.014892062	0.000299498	0.013353714	7.43E-19	3.46E-14	5.6E-14	2.61E-09	1	7.95833E-09	0.000122224
ILMN_1220788	GM590	1.284311292	0.000299498	0.014892062	0.000299498	0.013353714	3.92E-10	0.00000057	4.06E-09	0.00000573	1	4.9657E-07	0.000525315
ILMN_1253828	CD247	1.280944226	0.000299498	0.014892062	0.000299498	0.013353714	7.18E-09	0.00000514	0.000000189	0.0000836	1	1.53585E-05	0.003592421
ILMN_2856926	GPR114	1.275591039	0.000299498	0.014892062	0.000299498	0.013353714	3.75E-15	5.82E-11	5.66E-11	0.000000293	1	5.89499E-08	0.000249449
ILMN_1218037	TMIE	1.25825101	0.000299498	0.014892062	0.000299498	0.013353714	1.6E-10	0.000000267	8.95E-09	0.0000105	1	1.80477E-06	0.001090998
ILMN_2664929	CD8B1	1.257683544	0.000299498	0.014892062	0.000299498	0.013353714	6.15E-13	2.6E-09	8E-11	0.000000367	1	1.49655E-07	0.000345407
ILMN_1240428	SATB1	1.253362369	0.000299498	0.014892062	0.000299498	0.013353714	3.36E-10	0.000000504	3.35E-08	0.0000244	1	2.88347E-07	0.000419427
ILMN_2741169	CD8B1	1.24933849	0.000299498	0.014892062	0.000299498	0.013353714	2.32E-15	5.4E-11	3.06E-12	4.75E-08	1	1.57497E-07	0.000345407
ILMN_1250001	4930583H14RIK	1.24042799	0.000942625	0.026071536	0.000639896	0.019410925	0.00000259	0.000464931	0.000033	0.003242217	1	0.000130304	0.012203733
ILMN_2611022	BCL11B	1.239019043	0.000299498	0.014892062	0.000299498	0.013353714	7.52E-10	0.000000915	0.00000014	0.0000707	1	1.5356E-05	0.003592421
ILMN_2707941	GPR83	1.238234714	0.000299498	0.014892062	0.000299498	0.013353714	9.31E-14	8.67E-10	2.22E-12	4.75E-08	1	1.65715E-07	0.000345407
ILMN_2769772	PIK3IP1	1.235639618	0.000299498	0.014892062	0.000299498	0.013353714	8.08E-12	2.21E-08	2.26E-09	0.00000363	1	4.9657E-07	0.000525315
ILMN_2775055	LOC669166	1.234427524	0.000299498	0.014892062	0.000299498	0.013353714	3.92E-12	0.000000014	2.69E-09	0.00000405	1	4.7283E-07	0.000525315
ILMN_3128992	CD27	1.229968408	0.000299498	0.014892062	0.000299498	0.013353714	5.34E-13	2.48E-09	8.67E-11	0.000000367	1	1.10038E-07	0.000299615
ILMN_2416460	TRBV8_AE000663_T_CELL_RECEPTOR_BETA_VARIA	1.227075821	0.000299498	0.014892062	0.000299498	0.013353714	5.05E-12	1.57E-08	2.14E-09	0.00000357	1	2.49646E-06	0.001335664
ILMN_2670150	OAS2	1.223676484	0.000299498	0.014892062	0.000299498	0.013353714	1.69E-08	0.0000104	0.000000275	0.000109783	1	1.80477E-06	0.001090998
ILMN_2454209	TRBV6_AE000663_T_CELL_RECEPTOR_BETA_VARIA	1.223323464	0.000299498	0.014892062	0.000299498	0.013353714	4.23E-09	0.00000323	0.00000012	0.0000626	1	0.000103509	0.010612415
ILMN_2960700	PRF1	1.220037267	0.000299498	0.014892062	0.000299498	0.013353714	0.00000023	0.0000712	0.00000418	0.000771264	1	3.99889E-05	0.006183935
ILMN_1229318	PDK1	1.219922378	0.000299498	0.014892062	0.000299498	0.013353714	1.26E-09	0.00000128	0.000000057	0.0000353	1	1.98091E-06	0.001152569
ILMN_1233589	CD27	1.219317837	0.000299498	0.014892062	0.000299498	0.013353714	3.67E-13	1.9E-09	1.77E-11	0.000000121	1	2.95621E-08	0.000229338
ILMN_2678521	GPR146	1.215770831	0.000299498	0.014892062	0.000299498	0.013353714	1.33E-13	8.87E-10	3.83E-11	0.000000223	1	7.26855E-08	0.000260253
ILMN_1256701	2900016B01RIK	1.215770789	0.000299498	0.014892062	0.000299498	0.013353714	2.75E-08	0.0000147	0.000000448	0.000148861	1	2.54447E-05	0.004756515
ILMN_1215167	DDX5	1.214758445	0.000639896	0.021153497	0.000639896	0.019410925	0.000101652	0.006701969	0.0000543	0.004539402	1	7.0054E-05	0.008469621
ILMN_3145331	TMSB10	1.209579271	0.000299498	0.014892062	0.000299498	0.013353714	4.98E-12	1.57E-08	1.59E-10	0.000000461	1	2.13433E-07	0.00036795
ILMN_1252200	A830055I09RIK	1.206497974	0.000299498	0.014892062	0.000299498	0.013353714	0.00000761	0.001035401	0.0000334	0.003276709	1	5.74504E-05	0.007618639
ILMN_2819380	BC030476	1.206275831	0.000299498	0.014892062	0.000299498	0.013353714	0.000036	0.003145034	0.00012566	0.008308344	1	0.000197175	0.015477107
ILMN_2932359	TPI1	1.204626968	0.000299498	0.014892062	0.000299498	0.013353714	5.08E-08	0.0000227	0.0000011	0.000288061	1	1.53585E-05	0.003592421
ILMN_2837493	EG634650	1.204245484	0.000299498	0.014892062	0.000299498	0.013353714	5.69E-08	0.0000248	5.02E-08	0.0000324	1	4.9657E-07	0.000525315
ILMN_1230137	TPI1	1.204175926	0.000299498	0.014892062	0.000299498	0.013353714	2.06E-08	0.0000124	0.00000121	0.000298774	1	2.88127E-05	0.005099409
ILMN_2944666	IFIT3	1.202746675	0.000299498	0.014892062	0.000299498	0.013353714	5.52E-08	0.0000242	2.84E-08	0.0000217	1	2.74304E-07	0.000411872
ILMN_1217855	NKG7	1.202473931	0.000639896	0.021153497	0.000639896	0.019410925	2.84E-08	0.0000149	0.000000531	0.000169129	1	0.000264806	0.018619193
ILMN_2699898	ITGAE	1.201910561	0.000299498	0.014892062	0.000299498	0.013353714	1.42E-11	3.32E-08	1.38E-10	0.000000429	1	1.04521E-07	0.000299615
ILMN_2516221	TCRB-V8.2	1.20121668	0.000299498	0.014892062	0.000299498	0.013353714	1.11E-08	0.00000752	0.000000435	0.000147963	1	1.13766E-05	0.003078771
ILMN_2652867	TRAT1	1.199470243	0.000299498	0.014892062	0.000299498	0.013353714	6.33E-10	0.000000819	3.26E-08	0.0000241	1	4.12145E-06	0.001712865
ILMN_1229197	OTTMUSG00000016644	1.198389483	0.000299498	0.014892062	0.000299498	0.013353714	4.13E-08	0.00002	1.88E-08	0.0000159	1	9.77116E-07	0.000797927
ILMN_2618148	C330008K14RIK	1.196159524	0.000299498	0.014892062	0.000299498	0.013353714	2.81E-11	5.95E-08	1.46E-08	0.000013	1	1.18196E-06	0.000887369

ILMN_1214841	IL24	1.195664917	0.000942625	0.026071536	0.000942625	0.024301667	0.0000373	0.003229091	0.000140817	0.009031912	1	0.002173782	0.060770595
ILMN_1257496	LOC665446	1.195420235	0.000299498	0.014892062	0.000299498	0.013353714	8.57E-08	0.0000344	0.00000185	0.000412402	1	1.47177E-05	0.003531258
ILMN_2421246	TCRB-V8.3	1.195307771	0.000299498	0.014892062	0.000299498	0.013353714	1.42E-09	0.00000136	4.63E-08	0.0000308	1	5.89742E-06	0.002111595
ILMN_2729252	5830431A10RIK	1.195292385	0.000299498	0.014892062	0.000299498	0.013353714	1.38E-09	0.00000136	2.06E-08	0.0000171	1	1.2393E-06	0.000901339
ILMN_2484932	C030002B11RIK	1.193361778	0.000299498	0.014892062	0.000299498	0.013353714	6.33E-10	0.000000819	5.47E-08	0.0000344	1	8.06586E-07	0.000708454
ILMN_1221819	FCGRT	1.193070246	0.000299498	0.014892062	0.000299498	0.013353714	7.12E-09	0.00000514	2.33E-08	0.0000187	1	9.56517E-06	0.002748564
ILMN_2981167	IFIT2	1.192834198	0.000299498	0.014892062	0.000299498	0.013353714	2.31E-08	0.000013	1.07E-08	0.0000115	1	3.88359E-07	0.000488567
ILMN_2585233	SELPL	1.192768508	0.000299498	0.014892062	0.000299498	0.013353714	8.22E-10	0.000000934	8.63E-08	0.0000485	1	1.41024E-05	0.003473151
ILMN_2697415	CD3D	1.191227881	0.000299498	0.014892062	0.000299498	0.013353714	5.84E-10	0.000000799	3.71E-08	0.0000262	1	5.64085E-06	0.002083846
ILMN_1230345	B830007D08RIK	1.191119956	0.000299498	0.014892062	0.000299498	0.013353714	3.22E-09	0.00000253	1.09E-08	0.0000115	1	1.57497E-07	0.000345407
ILMN_2811263	ZXDA	1.190267135	0.000299498	0.014892062	0.000639896	0.019410925	0.0000175	0.001842826	0.000153672	0.009469751	1	0.000176289	0.014446733
ILMN_2560567	A630006E02RIK	1.189860092	0.000299498	0.014892062	0.000299498	0.013353714	0.0000009	0.00020543	0.0000211	0.002464033	1	9.21443E-05	0.009952034
ILMN_2820893	SELPLG	1.188849449	0.000299498	0.014892062	0.000299498	0.013353714	1.27E-13	8.87E-10	8.13E-12	7.57E-08	1	5.59305E-08	0.000249449
ILMN_1246609	RASGRP1	1.18775349	0.000299498	0.014892062	0.000299498	0.013353714	3.02E-11	6.12E-08	2.46E-09	0.00000382	1	3.34766E-07	0.00044521
ILMN_2660551	LAT	1.187218377	0.000299498	0.014892062	0.000299498	0.013353714	0.000000943	0.000212156	0.00000642	0.001075031	1	0.000130304	0.012203733
ILMN_2507761	7530404M11RIK	1.186381811	0.000299498	0.014892062	0.000299498	0.013353714	0.0000307	0.002787143	0.0000826	0.006091257	1	9.21504E-05	0.009952034
ILMN_2753697	CD2	1.186334291	0.000299498	0.014892062	0.000299498	0.013353714	2.97E-13	1.73E-09	1.04E-10	0.000000395	1	1.92936E-07	0.000345407
ILMN_2601453	A130092J06RIK	1.186313516	0.000299498	0.014892062	0.000299498	0.013353714	3.23E-11	6.26E-08	9.08E-10	0.00000192	1	9.77016E-07	0.000797927
ILMN_1234565	P4HA1	1.18626686	0.000299498	0.014892062	0.000299498	0.013353714	0.000000107	0.0000412	0.000000749	0.000219513	1	8.39227E-06	0.002520227
ILMN_2459899	ADAMTSL4	1.185956519	0.000299498	0.014892062	0.000299498	0.013353714	2.09E-09	0.00000174	0.000000206	0.0000903	1	3.93982E-06	0.001667154
ILMN_2761720	LOC100041103	1.185737904	0.000299498	0.014892062	0.000299498	0.013353714	1.19E-09	0.00000123	3.43E-08	0.0000245	1	9.77016E-07	0.000797927
ILMN_1213954	SGK1	1.185317215	0.000299498	0.014892062	0.000299498	0.013353714	0.000000106	0.000041	0.000000355	0.000132883	1	1.49642E-06	0.00102442
ILMN_2632971	B3GALT4	1.185249067	0.000299498	0.014892062	0.000299498	0.013353714	1.78E-09	0.00000151	2.34E-10	0.000000605	1	6.36427E-09	0.000122224
ILMN_2860649	GBP6	1.184770963	0.000299498	0.014892062	0.000299498	0.013353714	0.00000014	0.0000492	0.000000101	0.0000545	1	1.72245E-06	0.001083444
ILMN_2722784	CD3G	1.184582149	0.000299498	0.014892062	0.000299498	0.013353714	4.91E-08	0.0000224	0.00000016	0.0000754	1	2.06467E-05	0.004309944
ILMN_2667829	PRKCQ	1.183849443	0.000299498	0.014892062	0.000299498	0.013353714	2.77E-11	5.95E-08	1.89E-10	0.000000518	1	8.49731E-08	0.000282517
ILMN_1235499	PROS1	1.183674675	0.000299498	0.014892062	0.000299498	0.013353714	0.000000445	0.000121754	0.00000119	0.00029799	1	2.24533E-05	0.004409839
ILMN_2694955	IGFBP4	1.183278575	0.000299498	0.014892062	0.000299498	0.013353714	0.00000158	0.000316358	0.00000706	0.001150107	1	9.95836E-05	0.010463471
ILMN_2491445	LOC639001	1.183039504	0.000639896	0.021153497	0.000299498	0.013353714	2.23E-08	0.0000126	0.000000429	0.000146987	1	4.70154E-05	0.006881837
ILMN_2661185	SCML4	1.18284704	0.000299498	0.014892062	0.000299498	0.013353714	0.00000016	0.0000542	0.0000016	0.000369569	1	1.81978E-05	0.003995524
ILMN_2454823	6720418B01RIK	1.182721445	0.000299498	0.014892062	0.000299498	0.013353714	0.0000166	0.001786344	0.00013436	0.00874694	1	0.00057968	0.029683566
ILMN_2947526	ECM1	1.181777956	0.000299498	0.014892062	0.000299498	0.013353714	0.00000016	0.0000542	0.000000757	0.000219513	1	7.35697E-06	0.002329557
ILMN_2705407	PABPC1	1.181328619	0.000942625	0.026071536	0.000639896	0.019410925	0.000113957	0.007314851	0.000246029	0.012809759	1	0.000329201	0.021282383
ILMN_1227570	LOC386545	1.180241912	0.000639896	0.021153497	0.000299498	0.013353714	0.000000136	0.0000491	0.00000102	0.000272691	1	5.30373E-05	0.007480988
ILMN_2475156	XIST	1.179666178	0.000639896	0.021153497	0.000639896	0.019410925	0.000363666	0.016386806	0.000634885	0.023714186	1	0.001104095	0.042298211
ILMN_1214650	SCL0002368.1_75	1.179443236	0.000299498	0.014892062	0.000299498	0.013353714	0.0000372	0.003229091	0.0000222	0.00254822	1	3.68613E-05	0.005999236
ILMN_2606825	CMAH	1.17926401	0.000299498	0.014892062	0.000299498	0.013353714	0.000000113	0.0000431	0.000000318	0.000121491	1	7.35697E-06	0.002329557
ILMN_1224032	SKAP1	1.178850818	0.000299498	0.014892062	0.000299498	0.013353714	1.24E-08	0.00000822	6.12E-08	0.0000375	1	3.76554E-06	0.001622913
ILMN_2436183	BCL11B	1.178588337	0.000299498	0.014892062	0.000299498	0.013353714	8.65E-08	0.0000344	0.00000254	0.000523539	1	4.7012E-05	0.006881837
ILMN_2419490	TNFRSF18	1.178043424	0.000299498	0.014892062	0.000299498	0.013353714	7.56E-11	0.000000135	1.53E-08	0.0000132	1	1.56849E-06	0.001042981
ILMN_2432110	LOC100046855	1.176564584	0.000299498	0.014892062	0.000299498	0.013353714	0.000000132	0.0000482	9.52E-08	0.0000521	1	1.12718E-06	0.000874451
ILMN_2443624	BCL11B	1.17644894	0.000299498	0.014892062	0.000299498	0.013353714	0.000000253	0.0000755	0.00000244	0.000512485	1	2.24533E-05	0.004409839
ILMN_1217913	D230007K08RIK	1.176197032	0.000299498	0.014892062	0.000299498	0.013353714	2.34E-08	0.000013	8.68E-08	0.0000485	1	1.02476E-06	0.000822404
ILMN_1215649	C230075M21RIK	1.176099557	0.000299498	0.014892062	0.000299498	0.013353714	0.0000672	0.004933586	0.000413435	0.017763501	1	0.000393771	0.023711359
ILMN_1217629	ITGAE	1.175144353	0.000299498	0.014892062	0.000299498	0.013353714	2.19E-08	0.0000126	1.49E-08	0.0000131	1	4.51028E-06	0.001809827
ILMN_1215862	CXCL9	1.174363745	0.001760487	0.038593802	0.001225688	0.028815909	0.019576508	0.177396072	0.00069086	0.02516235	0	0.001301571	0.046179135
ILMN_2721399	CTSW	1.172718248	0.000299498	0.014892062	0.000299498	0.013353714	2.77E-10	0.000000445	4.69E-09	0.00000642	1	1.8046E-06	0.001090998

ILMN_1248340	LSG1	1.172636468	0.000299498	0.014892062	0.000299498	0.013353714	0.00000275	0.000486333	0.0000158	0.00199766	1	2.65234E-05	0.004803829
ILMN_2618176	SOCS3	1.171028633	0.000299498	0.014892062	0.000299498	0.013353714	5.43E-10	0.000000765	2.48E-08	0.0000192	1	7.35697E-06	0.002329557
ILMN_1218717	LOC385615	1.170940971	0.000299498	0.014892062	0.000299498	0.013353714	0.00000442	0.00708724	0.0000267	0.002856495	1	7.57938E-05	0.008797941
ILMN_1247893	CGEF2-PENDING	1.169922593	0.000299498	0.014892062	0.000299498	0.013353714	0.00000467	0.000729822	0.0000243	0.002709534	1	0.000120719	0.011491043
ILMN_1224473	LOC380797	1.16992167	0.001225688	0.030541554	0.000942625	0.024301667	0.000153758	0.008953955	0.001472162	0.0392018	1	0.00305523	0.073418572
ILMN_2419494	TNFRSF18	1.169716279	0.000299498	0.014892062	0.000299498	0.013353714	7.66E-10	0.000000915	4.99E-08	0.0000324	1	5.39498E-06	0.002025163
ILMN_2612125	ARHGEF18	1.169661163	0.000299498	0.014892062	0.000299498	0.013353714	4.41E-08	0.0000212	0.00000152	0.000360463	1	9.15833E-06	0.002681086
ILMN_2606162	PDLIM4	1.169633574	0.000639896	0.021153497	0.000299498	0.013353714	0.000000478	0.000127055	0.00000832	0.001279253	1	0.000600122	0.030462238
ILMN_1217406	1110013L07RIK	1.169153834	0.000299498	0.014892062	0.000299498	0.013353714	4.77E-08	0.0000223	0.000000286	0.000110081	1	1.13766E-05	0.003078771
ILMN_2568571	C130079K02RIK	1.168909165	0.000299498	0.014892062	0.000299498	0.013353714	0.000000537	0.000139712	0.0000201	0.002389566	1	6.22097E-05	0.007890127
ILMN_2818964	DUSP10	1.168854568	0.000299498	0.014892062	0.000299498	0.013353714	0.0000386	0.003287434	0.000041	0.003797436	1	3.39668E-05	0.00570777
ILMN_2431390	TCRB-V8.2	1.167218786	0.000639896	0.021153497	0.000299498	0.013353714	1.7E-09	0.00000149	7.75E-08	0.0000451	1	1.23973E-05	0.003224592
ILMN_2456911	TRBV31_X03277_T_CELL_RECEPTOR_BETA_VARIABL	1.166841194	0.000639896	0.021153497	0.000299498	0.013353714	0.00000163	0.000324593	0.0000123	0.001649893	1	0.000540727	0.028504193
ILMN_2981169	IFIT2	1.165766787	0.000299498	0.014892062	0.000299498	0.013353714	0.0000117	0.001399848	0.00000211	0.00045645	1	3.43889E-06	0.001569314
ILMN_1249366	LOC100046608	1.165718568	0.000299498	0.014892062	0.000299498	0.013353714	1.59E-09	0.00000145	0.000000155	0.0000735	1	5.64035E-06	0.002083846
ILMN_1246194	LOC667370	1.165517165	0.000299498	0.014892062	0.000299498	0.013353714	0.000898696	0.029171279	0.000236413	0.012496999	1	0.00022037	0.016464793
ILMN_1236507	5830496L11RIK	1.164879502	0.000299498	0.014892062	0.000299498	0.013353714	0.0000665	0.00488934	0.000431891	0.018308965	1	0.000486846	0.026691654
ILMN_1254692	MS4A6B	1.164318447	0.000299498	0.014892062	0.000299498	0.013353714	0.00000049	0.000129541	0.000000808	0.000227616	1	3.59866E-06	0.001580255
ILMN_3156208	GPR146	1.164011442	0.000299498	0.014892062	0.000299498	0.013353714	2.38E-08	0.000013	0.000000386	0.00013797	1	6.44447E-06	0.002189569
ILMN_2734391	RAMP1	1.16383138	0.000299498	0.014892062	0.000299498	0.013353714	5.98E-09	0.00000442	2.14E-09	0.00000357	1	3.18544E-07	0.00044521
ILMN_1224091	XIST	1.16230787	0.000639896	0.021153497	0.000942625	0.024301667	0.000840483	0.02804442	0.000952078	0.030395331	1	0.001531279	0.050161589
ILMN_2456216	5330403D14RIK	1.161809103	0.000942625	0.026071536	0.000942625	0.024301667	0.0000367	0.003197871	0.000314936	0.015019787	1	0.000903743	0.038000482
ILMN_2627441	PELI1	1.161752176	0.000299498	0.014892062	0.000299498	0.013353714	0.00000119	0.000254149	0.00000113	0.000290416	1	4.31186E-06	0.001776143
ILMN_2891245	RHBDL2	1.161573842	0.002018395	0.042006944	0.002018395	0.039534447	0.000501839	0.020403653	0.001206544	0.035013094	1	0.001977573	0.05767797
ILMN_1232804	LOC276837	1.161420855	0.000299498	0.014892062	0.000299498	0.013353714	0.000000319	0.0000928	0.000001	0.000269028	1	6.47271E-05	0.008034278
ILMN_1232537	ARL4C	1.160980448	0.000299498	0.014892062	0.000299498	0.013353714	0.000000413	0.000115003	0.00000371	0.000722503	1	7.28705E-05	0.008652811
ILMN_2444432	TRBV1_AE000663_T_CELL_RECEPTOR_BETA_VARIA	1.160799824	0.000299498	0.014892062	0.000299498	0.013353714	0.00000104	0.00022691	0.00000112	0.000290018	1	7.57938E-05	0.008797941
ILMN_2756046	FFAR2	1.160027707	0.000299498	0.014892062	0.000299498	0.013353714	0.0000389	0.003300557	0.000000133	0.000068	1	2.99936E-06	0.00146959
ILMN_1214163	B230380D07RIK	1.159421403	0.000299498	0.014892062	0.000299498	0.013353714	6.66E-08	0.0000279	0.000000461	0.000152045	1	4.16456E-05	0.006397623
ILMN_2613832	MGST2	1.159082249	0.000299498	0.014892062	0.000299498	0.013353714	0.00000018	0.0000594	1.27E-08	0.0000119	1	1.49656E-06	0.00102442
ILMN_2506039	A130090K04RIK	1.158817015	0.000299498	0.014892062	0.000299498	0.013353714	0.000000661	0.000160197	0.000000404	0.00013924	1	7.03988E-06	0.002307643
ILMN_1219179	A830081L15RIK	1.158794735	0.000299498	0.014892062	0.000299498	0.013353714	0.00000165	0.00032655	0.00000379	0.000732759	1	8.39227E-06	0.002520227
ILMN_1248898	A830092P18RIK	1.158658732	0.000299498	0.014892062	0.000299498	0.013353714	0.00000523	0.000783227	0.0000278	0.002931426	1	9.5799E-05	0.010180718
ILMN_2651575	IFNGR1	1.158581155	0.000299498	0.014892062	0.000299498	0.013353714	0.000000563	0.000143319	0.00000707	0.001150107	1	1.1878E-05	0.003141395
ILMN_2708580	INADL	1.158423303	0.000299498	0.014892062	0.000299498	0.013353714	0.000000133	0.0000482	0.000000241	0.000101903	1	3.76554E-06	0.001622913
ILMN_1236256	ARHGEF1	1.158058706	0.000299498	0.014892062	0.000639896	0.019410925	0.000121164	0.007605138	0.00023881	0.012588785	1	0.00022037	0.016464793
ILMN_2525855	FUS	1.157139415	0.000299498	0.014892062	0.000299498	0.013353714	0.0000124	0.001448071	0.0000814	0.006023296	1	9.5799E-05	0.010180718
ILMN_2526938	LOC623121	1.157084959	0.000299498	0.014892062	0.000299498	0.013353714	0.0000881	0.006063068	0.000165402	0.009948464	1	0.000393771	0.023711359
ILMN_1213664	LOC665425	1.156699853	0.000942625	0.026071536	0.000639896	0.019410925	0.00000457	0.000720402	0.0000219	0.002525607	1	0.000157497	0.013500967
ILMN_1255743	IL6RA	1.1564233	0.000299498	0.014892062	0.000299498	0.013353714	0.0000121	0.001432469	0.0000346	0.003367292	1	0.00011618	0.011242898
ILMN_2646625	JUN	1.155896052	0.000299498	0.014892062	0.000299498	0.013353714	4.75E-08	0.0000223	0.000000043	0.0000294	1	8.0667E-07	0.000708454
ILMN_2843019	KLHDC1	1.155520822	0.000299498	0.014892062	0.000299498	0.013353714	0.000000572	0.00014393	0.00000446	0.000810182	1	3.00244E-05	0.00527375
ILMN_3047389	GBP2	1.155409559	0.003970394	0.064249	0.004674836	0.068774915	0.004390712	0.075470625	0.003544179	0.067235737	0	0.003774648	0.082954936
ILMN_1257639	0610009J05RIK	1.155036694	0.000299498	0.014892062	0.000299498	0.013353714	0.0000254	0.002457811	0.000140358	0.009023792	1	0.000157487	0.013500967
ILMN_1239770	PELI1	1.154754524	0.000299498	0.014892062	0.000299498	0.013353714	2.15E-08	0.0000125	6.23E-08	0.0000377	1	1.56849E-06	0.001042981

ILMN_2669841	6330581N18RIK	1.153993411	0.000299498	0.014892062	0.000299498	0.013353714	0.00000028	0.0000823	0.000000121	0.0000627	1	1.29931E-06	0.000930443
ILMN_2797061	ACTN2	1.153924476	0.000299498	0.014892062	0.000299498	0.013353714	3.85E-08	0.0000189	1.24E-08	0.0000119	1	1.18196E-06	0.000887369
ILMN_2784580	CD3E	1.153886402	0.000942625	0.026071536	0.000299498	0.013353714	0.00000294	0.000516117	0.0000297	0.003067006	1	0.000763113	0.034824155
ILMN_3006219	FYB	1.153762655	0.000299498	0.014892062	0.000299498	0.013353714	0.0000042	0.000676604	0.0000232	0.002627969	1	0.000157497	0.013500967
ILMN_2467190	BAMBI-PS1	1.15354344	0.000299498	0.014892062	0.000299498	0.013353714	0.00000128	0.000266467	0.0000012	0.00029799	1	2.76434E-05	0.004930329
ILMN_2536349	LOC386513	1.153082558	0.000299498	0.014892062	0.000299498	0.013353714	6.12E-08	0.0000262	0.000000494	0.00016183	1	4.16456E-05	0.006397623
ILMN_2432550	TRIB2	1.15299348	0.000299498	0.014892062	0.000299498	0.013353714	0.000000208	0.0000667	0.000000394	0.00013797	1	6.16514E-06	0.002125696
ILMN_2844996	ACTN1	1.152882536	0.000299498	0.014892062	0.000299498	0.013353714	0.00000474	0.000733297	0.0000112	0.001548243	1	0.000140602	0.012732723
ILMN_1247281	5830468F06RIK	1.15264746	0.000299498	0.014892062	0.000299498	0.013353714	0.000000303	0.0000888	0.000000759	0.000219513	1	2.73684E-06	0.001399911
ILMN_1227814	SRR	1.1524679	0.004441009	0.0691859	0.003733327	0.059256725	0.000325514	0.015151707	0.001917313	0.04584872	0	0.004782836	0.09409752
ILMN_1249021	BCL2	1.152415672	0.000299498	0.014892062	0.000299498	0.013353714	2.39E-08	0.000013	0.000000271	0.000109783	1	7.35697E-06	0.002329557
ILMN_2427592	LOC546630	1.152263699	0.000299498	0.014892062	0.000299498	0.013353714	3.87E-08	0.0000189	0.000000074	0.0000436	1	8.87963E-07	0.000765408
ILMN_1259075	NME7	1.152030836	0.000299498	0.014892062	0.000299498	0.013353714	6.14E-08	0.0000262	0.000000253	0.000106116	1	3.43889E-06	0.001569314
ILMN_1343049	control_ILMN_1343049	1.151797691	0.000639896	0.021153497	0.000639896	0.019410925	0.0000486	0.003863238	0.0000962	0.006777584	1	0.000111795	0.010979022
ILMN_3026397	CHKA	1.1512093	0.003733327	0.06184411	0.003970394	0.061967633	0.000796299	0.027301551	0.003501969	0.066778429	0	0.005373402	0.100089876
ILMN_2631610	TMEM71	1.15055696	0.000299498	0.014892062	0.000299498	0.013353714	0.00000196	0.00037186	0.000000731	0.000218104	1	2.99936E-06	0.00146959
ILMN_1227434	ITGB7	1.150210635	0.000639896	0.021153497	0.000299498	0.013353714	0.00000383	0.000632356	0.00000744	0.001193798	1	7.57886E-05	0.008797941
ILMN_1232600	RNF125	1.150131069	0.000299498	0.014892062	0.000299498	0.013353714	7.88E-08	0.0000325	0.000000526	0.000168884	1	8.0326E-06	0.002476116
ILMN_2656854	MYO6	1.149171076	0.000299498	0.014892062	0.000299498	0.013353714	0.0000106	0.001291118	0.000015	0.001927918	1	0.000763113	0.034824155
ILMN_1258652	RBBP2	1.148685264	0.000299498	0.014892062	0.000299498	0.013353714	0.0000026	0.000464931	0.00000949	0.00136995	1	2.24533E-05	0.004409839
ILMN_1245754	CD84	1.148512188	0.000299498	0.014892062	0.000299498	0.013353714	0.0000661	0.004874096	0.00015814	0.009685436	1	0.00042277	0.024660011
ILMN_2780247	LTA	1.147812483	0.001496892	0.034781534	0.000942625	0.024301667	0.0000477	0.003816686	0.000069	0.005349701	1	0.000665544	0.032069437
ILMN_2663930	SLFN1	1.147768768	0.000299498	0.014892062	0.000299498	0.013353714	0.00000138	0.000280532	0.00000835	0.001279253	1	0.000111802	0.010979022
ILMN_3023230	JMJD3	1.147753644	0.000299498	0.014892062	0.000299498	0.013353714	0.00000543	0.000807251	0.0000199	0.002370654	1	0.00011618	0.011242898
ILMN_2764727	ACTN2	1.146764113	0.000299498	0.014892062	0.000299498	0.013353714	1.37E-08	0.00000883	0.00000044	0.000148085	1	2.65234E-05	0.004803829
ILMN_2539295	LOC621968	1.14667536	0.001496892	0.034781534	0.000639896	0.019410925	0.00000448	0.000708724	0.000044	0.003965776	1	0.001797898	0.054876565
ILMN_2448404	SCL0002975.1_346	1.146129707	0.001760487	0.038593802	0.002018395	0.039534447	0.001330158	0.03704155	0.001691073	0.042433629	1	0.002787111	0.070087328
ILMN_1241915	NOTCH1	1.145832115	0.000299498	0.014892062	0.000299498	0.013353714	0.00000308	0.00053349	0.00000333	0.000657593	1	2.24515E-05	0.004409839
ILMN_2605819	EGLN3	1.145595193	0.000639896	0.021153497	0.000639896	0.019410925	0.00000579	0.000845189	0.0000358	0.003445285	1	0.000353739	0.02219068
ILMN_1253699	2900045G02RIK	1.145548347	0.000299498	0.014892062	0.000299498	0.013353714	0.00000247	0.000456032	0.0000131	0.001740513	1	3.12891E-05	0.005434371
ILMN_1244853	LOC100044948	1.14491469	0.000299498	0.014892062	0.000299498	0.013353714	0.00000528	0.000787896	0.000019	0.002312072	1	0.00022037	0.016464793
ILMN_2589871	CD28	1.144678691	0.000639896	0.021153497	0.000299498	0.013353714	0.00000485	0.000741671	0.00000392	0.000746457	1	2.34111E-05	0.00450296
ILMN_2997406	ARL4C	1.144292866	0.000942625	0.026071536	0.000639896	0.019410925	0.0000259	0.002476668	0.0000788	0.005900268	1	0.001686537	0.053258626
ILMN_2860645	GBP6	1.143811908	0.000639896	0.021153497	0.000639896	0.019410925	0.000234052	0.012078075	0.000114517	0.007736431	1	0.000169803	0.014189966
ILMN_1249547	ZFP292	1.143548873	0.000299498	0.014892062	0.000299498	0.013353714	0.0000159	0.001744691	0.0000524	0.004443054	1	0.000163541	0.013740705
ILMN_1236539	PFKL	1.142647393	0.000299498	0.014892062	0.000299498	0.013353714	0.00000177	0.000345252	0.0000425	0.00387062	1	0.000329201	0.021282383
ILMN_2425990	4933421G18RIK	1.142576402	0.000299498	0.014892062	0.000299498	0.013353714	0.0000176	0.001843579	0.0000196	0.002353419	1	5.89742E-06	0.002111595
ILMN_2553041	A130093I21RIK	1.142422921	0.001760487	0.038593802	0.00227139	0.042916604	0.000119156	0.007546078	0.000917336	0.029755562	1	0.000873828	0.037145252
ILMN_1224945	E130113K22RIK	1.141736556	0.000299498	0.014892062	0.000299498	0.013353714	0.00000824	0.001096103	0.0000241	0.002707128	1	1.89821E-05	0.004090548
ILMN_1218525	IL18R1	1.141400055	0.000299498	0.014892062	0.000299498	0.013353714	0.0000071	0.00098878	0.00000253	0.000522839	1	5.52021E-05	0.007602042
ILMN_1243621	A130026C10RIK	1.141355268	0.000299498	0.014892062	0.000299498	0.013353714	0.000146472	0.008715941	0.000674016	0.024761981	1	0.00057968	0.029683566
ILMN_1228608	LOC637353	1.141241268	0.003733327	0.06184411	0.003494726	0.056620496	0.001625443	0.042197151	0.00320971	0.063172249	0	0.005070533	0.096927353
ILMN_1229746	ECM1	1.141034556	0.000299498	0.014892062	0.000299498	0.013353714	0.00000063	0.000155261	0.00000018	0.0000829	1	1.89087E-06	0.001114107
ILMN_2915951	D13ERTD608E	1.140936106	0.000299498	0.014892062	0.000299498	0.013353714	0.0000242	0.0023517	0.0000549	0.004568149	1	5.97852E-05	0.007773248
ILMN_1249864	A630077B13RIK	1.140911297	0.000942625	0.026071536	0.000299498	0.013353714	0.0000339	0.003031411	0.0000306	0.003131644	1	0.000111802	0.010979022
ILMN_2995934	LOC547323	1.140861547	0.000299498	0.014892062	0.000299498	0.013353714	0.00000251	0.000462094	0.00000828	0.001279253	1	3.99889E-05	0.006183935
ILMN_2456391	TCRB-J	1.140797339	0.001760487	0.038593802	0.000299498	0.013353714	0.0000215	0.002169982	0.000104677	0.007215102	1	0.001068077	0.041672924

ILMN_1239469	LEF1	1.140750182	0.000299498	0.014892062	0.000299498	0.013353714	0.00000385	0.000632356	0.0000028	0.000567027	1	9.56597E-06	0.002748564
ILMN_1259463	ANKZF1	1.140723241	0.000299498	0.014892062	0.000299498	0.013353714	0.000000115	0.0000431	0.000000851	0.00023576	1	2.27642E-06	0.00127663
ILMN_3142803	CXCL10	1.140155785	0.003253905	0.056782136	0.003012339	0.051552328	0.005161613	0.083438025	0.002307777	0.05128928	0	0.003346676	0.077347433
ILMN_2594768	THA1	1.139893861	0.001496892	0.034781534	0.000942625	0.024301667	0.0000101	0.00124325	0.000186966	0.010823311	1	0.000470028	0.02607676
ILMN_2677207	LOC100047788	1.139882555	0.005600396	0.080174568	0.004907577	0.070737293	0.001281123	0.036250713	0.002803425	0.058355577	0	0.00675613	0.111794383
ILMN_1226048	AIS04432	1.13986418	0.000299498	0.014892062	0.000299498	0.013353714	0.000000496	0.000130437	0.000000584	0.000181161	1	6.16514E-06	0.002125696
ILMN_1241598	LY116	1.139617809	0.000299498	0.014892062	0.000299498	0.013353714	0.0000304	0.002783394	0.000043	0.003909	1	0.000135352	0.012427306
ILMN_1258272	LOC382646	1.139404236	0.001496892	0.034781534	0.001225688	0.028815909	0.000194457	0.010537108	0.000331984	0.01550964	1	0.001033149	0.040997434
ILMN_1238847	CD3E	1.139135835	0.000639896	0.021153497	0.000299498	0.013353714	0.00000182	0.00035008	0.00000947	0.00136995	1	0.000353739	0.02219068
ILMN_1254218	NISCH	1.138664045	0.000299498	0.014892062	0.000299498	0.013353714	0.0000288	0.002676342	0.00013436	0.00874694	1	7.28705E-05	0.008652811
ILMN_2879858	PRKX	1.138650161	0.000299498	0.014892062	0.000299498	0.013353714	9.55E-12	2.47E-08	4.3E-12	0.00000005	1	1.05033E-08	0.000122224
ILMN_1231490	2410006H16RIK	1.138597457	0.000299498	0.014892062	0.000299498	0.013353714	0.0000613	0.004588271	0.000093	0.006607866	1	9.5799E-05	0.010180718
ILMN_1232707	SAMHD1	1.138552379	0.000299498	0.014892062	0.000299498	0.013353714	0.00000184	0.000353169	0.000000273	0.000109783	1	8.0326E-06	0.002476116
ILMN_1240592	ALS2CL	1.138470539	0.01404445	0.135546677	0.011420742	0.117507061	0.002418468	0.054121371	0.008048713	0.105414587	0	0.019643191	0.192333843
ILMN_3142602	B3GALT4	1.138320625	0.000299498	0.014892062	0.000299498	0.013353714	0.000000128	0.0000472	0.000000285	0.000110081	1	1.72245E-06	0.001083444
ILMN_3031781	ARID5B	1.138169635	0.000639896	0.021153497	0.000942625	0.024301667	0.000174461	0.009713688	0.000378387	0.0167608	1	0.000665544	0.032069437
ILMN_2568028	IL2RG	1.138046812	0.000639896	0.021153497	0.000299498	0.013353714	0.0000163	0.001773716	0.000108979	0.007416137	1	0.000151664	0.013244851
ILMN_1239776	LOC100040243	1.1379032	0.000942625	0.026071536	0.000639896	0.019410925	0.0000766	0.005471813	0.000378448	0.0167608	1	0.000341264	0.021819779
ILMN_1253691	B430201A12RIK	1.137684368	0.000299498	0.014892062	0.000299498	0.013353714	0.000000376	0.000106645	0.000000357	0.000132883	1	4.50187E-07	0.000525315
ILMN_1239238	PRKCH	1.137598283	0.000299498	0.014892062	0.000299498	0.013353714	0.00000445	0.000708724	0.000000927	0.000252346	1	5.30373E-05	0.007480988
ILMN_2663230	SLCO3A1	1.137294887	0.000942625	0.026071536	0.000639896	0.019410925	0.000000228	0.0000712	0.00000754	0.001205762	1	0.00010758	0.010838827
ILMN_1255869	CATNB	1.137232235	0.000299498	0.014892062	0.000299498	0.013353714	0.0000558	0.004277499	0.0000935	0.006622679	1	0.000135361	0.012427306
ILMN_2847773	OTTMUSG00000005523	1.137208625	0.000299498	0.014892062	0.000299498	0.013353714	0.00000407	0.000663099	0.00000411	0.000768531	1	3.39668E-05	0.00570777
ILMN_2945940	RAPGEF4	1.136953118	0.000299498	0.014892062	0.000299498	0.013353714	0.0000964	0.006494076	0.0000445	0.003979315	1	0.000220357	0.016464793
ILMN_2426853	UBD	1.13683555	0.001496892	0.034781534	0.001496892	0.032842408	0.001518945	0.04027676	0.000354708	0.016129651	1	0.001389344	0.047728966
ILMN_2639972	PPP1R3B	1.136776701	0.000299498	0.014892062	0.000299498	0.013353714	0.0000018	0.000347178	0.00000665	0.001105293	1	0.000146035	0.012922953
ILMN_2693461	SSBP2	1.136455877	0.000299498	0.014892062	0.000299498	0.013353714	0.00000811	0.001084428	0.0000104	0.001467743	1	9.95836E-05	0.010463471
ILMN_1258988	IGFBP4	1.136364638	0.006058437	0.083694614	0.003970394	0.061967633	0.000446873	0.018841131	0.001755338	0.043416704	0	0.012677869	0.153956896
ILMN_2509988	LBR	1.136214053	0.000299498	0.014892062	0.000299498	0.013353714	0.000373422	0.016697112	0.000493488	0.020167155	1	0.000317538	0.020788254
ILMN_1230458	IFIT3	1.136194338	0.002018395	0.042006944	0.001496892	0.032842408	0.003998446	0.07166564	0.001978755	0.046801373	0	0.001301631	0.046179135
ILMN_2727235	ANKRD11	1.136184371	0.002018395	0.042006944	0.001225688	0.028815909	0.000575054	0.022103239	0.001101727	0.033170811	1	0.004006777	0.085591297
ILMN_2637714	RASA3	1.135912258	0.000299498	0.014892062	0.000299498	0.013353714	0.000000138	0.0000492	7.38E-08	0.0000436	1	1.92936E-07	0.000345407
ILMN_2595918	GIMAP7	1.135856716	0.000639896	0.021153497	0.000639896	0.019410925	0.00000021	0.0000667	0.00000695	0.001138958	1	0.000183009	0.014712435
ILMN_1231573	SERPINB1A	1.135730392	0.000299498	0.014892062	0.000299498	0.013353714	0.000000905	0.000205533	0.00000222	0.000472255	1	3.83949E-05	0.006099544
ILMN_2459155	ZFP238	1.135647435	0.000299498	0.014892062	0.000299498	0.013353714	0.000171618	0.009624487	0.000316707	0.015073371	1	0.000470028	0.02607676
ILMN_1243910	ZFP292	1.13546193	0.000639896	0.021153497	0.000299498	0.013353714	0.000162342	0.009237839	0.000354016	0.016129651	1	0.000712779	0.033344447
ILMN_1222471	GMFG	1.13543581	0.000299498	0.014892062	0.000299498	0.013353714	9.07E-09	0.0000064	9.8E-09	0.0000111	1	5.74828E-07	0.000569287
ILMN_2469190	B230345P09RIK	1.135305336	0.000639896	0.021153497	0.000942625	0.024301667	0.00017922	0.009895781	0.000539236	0.021235038	1	0.000212355	0.016047225
ILMN_2696492	PHF11	1.135183534	0.000942625	0.026071536	0.000639896	0.019410925	0.0000941	0.00638343	0.000151782	0.009420008	1	0.000504223	0.027322568
ILMN_2996904	OBFC2A	1.135148949	0.000299498	0.014892062	0.000299498	0.013353714	0.00000351	0.000592532	0.00000887	0.001330104	1	2.88127E-05	0.005099409
ILMN_1233449	LOC100044430	1.13513543	0.000299498	0.014892062	0.000299498	0.013353714	0.00000334	0.000570075	0.00000669	0.00110836	1	0.000212368	0.016047225
ILMN_1251193	A630084D02RIK	1.134829034	0.000299498	0.014892062	0.000299498	0.013353714	0.000321826	0.015055331	0.000250502	0.012926945	1	0.000379979	0.02324165
ILMN_2758878	TMEM66	1.13478407	0.002768024	0.051337774	0.001760487	0.036357572	0.000437488	0.018614041	0.000914744	0.029733662	0	0.003149577	0.074838758
ILMN_3160137	ALDOC	1.134554634	0.007644699	0.096726012	0.005830016	0.078761363	0.000824708	0.027696748	0.002110097	0.048647455	0	0.012022966	0.149554514
ILMN_1218051	IQGAP2	1.134418217	0.001496892	0.034781534	0.001225688	0.028815909	0.0000255	0.002460142	0.0000551	0.00457056	1	0.000643	0.031573087
ILMN_1230726	5430406J06RIK	1.13436247	0.001225688	0.030541554	0.000942625	0.024301667	0.000222228	0.011677508	0.000818902	0.027904422	1	0.001581552	0.051264971
ILMN_2879614	ZBP1	1.13418419	0.000639896	0.021153497	0.000639896	0.019410925	0.0000132	0.001509679	0.0000283	0.002963331	1	0.000255296	0.018170157

ILMN_2534207	LOC380706	1.133996759	0.000299498	0.014892062	0.000299498	0.013353714	3.59E-08	0.000018	8.2E-09	0.0000103	1	7.68761E-07	0.000701637
ILMN_2659739	IL7R	1.133870404	0.000299498	0.014892062	0.000299498	0.013353714	0.0000625	0.004670026	0.0000102	0.001439966	1	7.88278E-05	0.009015226
ILMN_2958159	ENO1	1.13384821	0.000299498	0.014892062	0.000299498	0.013353714	0.00000265	0.000471163	0.0000399	0.003729707	1	0.000329201	0.021282383
ILMN_1257704	6030458P06RIK	1.133768716	0.000639896	0.021153497	0.000639896	0.019410925	0.0000499	0.003931786	0.000196678	0.011191632	1	0.000197175	0.015477107
ILMN_2477213	LOC100045240	1.133690768	0.000299498	0.014892062	0.000299498	0.013353714	0.000000265	0.0000787	0.000000757	0.000219513	1	4.12145E-06	0.001712865
ILMN_2513870	ZAP70	1.133508982	0.000299498	0.014892062	0.000299498	0.013353714	0.000000243	0.0000731	0.00000252	0.000522839	1	0.000163531	0.013740705
ILMN_1343061	control_ILMN_1343061	1.133413667	0.058960045	0.296529118	0.053139043	0.27805718	0.044430396	0.27002241	0.050912329	0.282020251	0	0.090139534	0.395157894
ILMN_1258340	TCF12	1.133249325	0.000299498	0.014892062	0.000299498	0.013353714	0.0000229	0.002262156	0.000017	0.002131671	1	2.06483E-05	0.004309944
ILMN_2777019	SPO11	1.133035275	0.000639896	0.021153497	0.000639896	0.019410925	0.000170606	0.009614023	0.000037	0.003539707	1	0.000157497	0.013500967
ILMN_1255907	ARP2	1.132980051	0.000299498	0.014892062	0.000299498	0.013353714	0.0000147	0.00164902	0.0000292	0.003023837	1	4.51564E-05	0.006758509
ILMN_2449620	5830427D02RIK	1.132961187	0.000299498	0.014892062	0.000299498	0.013353714	0.0000477	0.003816686	0.000190185	0.010942585	1	7.57938E-05	0.008797941
ILMN_2477946	SCL0001464.1_61	1.132866527	0.000299498	0.014892062	0.000299498	0.013353714	0.00000865	0.001137893	0.000027	0.002873981	1	0.00040803	0.024132893
ILMN_2627179	ELL3	1.132790682	0.000299498	0.014892062	0.000299498	0.013353714	9.29E-09	0.00000645	1.03E-08	0.0000115	1	1.74307E-07	0.000345407
ILMN_1214318	RASGRP1	1.132335612	0.000639896	0.021153497	0.000299498	0.013353714	0.0000771	0.005486903	0.0000845	0.006173424	1	0.000873828	0.037145252
ILMN_1218206	KLF13	1.132335512	0.002018395	0.042006944	0.001496892	0.032842408	0.00013977	0.008482243	0.000569012	0.022034784	1	0.002540648	0.066400639
ILMN_1233501	C530027B15RIK	1.132246044	0.001225688	0.030541554	0.001225688	0.028815909	0.000144506	0.008645643	0.000609547	0.023104722	1	0.000737547	0.034262098
ILMN_1241522	4921505C17RIK	1.13221457	0.000299498	0.014892062	0.000299498	0.013353714	0.000000662	0.000160197	0.00000201	0.000441415	1	6.16514E-06	0.002125696
ILMN_1226239	INPP4B	1.132137878	0.001760487	0.038593802	0.001760487	0.036357572	0.000195832	0.010599276	0.000409995	0.01769293	1	0.000540669	0.028504193
ILMN_2613422	ITK	1.131935528	0.000639896	0.021153497	0.000639896	0.019410925	0.0000104	0.001272684	0.000056	0.004602895	1	0.000140602	0.012732723
ILMN_2593554	IGTP	1.131930192	0.000299498	0.014892062	0.000299498	0.013353714	0.0000358	0.003145034	0.00000464	0.000834646	1	1.67194E-05	0.003796597
ILMN_1229804	LTA	1.131546852	0.005830016	0.082146349	0.002520973	0.046026289	0.000286115	0.01388718	0.001210751	0.035093672	0	0.008450429	0.125387993
ILMN_2607160	PUM2	1.130377924	0.000639896	0.021153497	0.000299498	0.013353714	0.00000172	0.000335874	0.00000121	0.000298774	1	2.76434E-05	0.004930329
ILMN_3072437	6330500D04RIK	1.130133265	0.003012339	0.054401128	0.002520973	0.046026289	0.000890124	0.029037446	0.001222703	0.035284033	0	0.00210642	0.059970456
ILMN_1251170	AFF4	1.130045502	0.000299498	0.014892062	0.000299498	0.013353714	0.0000524	0.004058867	0.000114081	0.007718214	1	7.0054E-05	0.008469621
ILMN_1246582	LOC436541	1.129946125	0.000639896	0.021153497	0.000639896	0.019410925	0.0000207	0.002110867	0.0000462	0.004074421	1	0.000176289	0.014446733
ILMN_1244891	CST7	1.1298809	0.000299498	0.014892062	0.000299498	0.013353714	0.0000285	0.002659806	0.0000142	0.001859837	1	0.000146035	0.012922953
ILMN_2697693	GRHPR	1.129040446	0.000639896	0.021153497	0.000639896	0.019410925	0.0000147	0.00164902	0.0000385	0.003609572	1	0.000157497	0.013500967
ILMN_1233402	LOC100045981	1.129004666	0.000299498	0.014892062	0.000299498	0.013353714	0.000000169	0.0000566	0.00000129	0.000312387	1	7.03988E-06	0.002307643
ILMN_1258864	BC106179	1.128947865	0.000299498	0.014892062	0.000639896	0.019410925	0.000437229	0.018614041	0.000591655	0.022629221	1	0.000317538	0.020788254
ILMN_1234796	HSD17B12	1.128868369	0.000299498	0.014892062	0.000299498	0.013353714	0.0000811	0.00570333	0.000213294	0.011819303	1	0.000197175	0.015477107
ILMN_1236595	SLA2	1.128559293	0.001760487	0.038593802	0.001225688	0.028815909	0.0000231	0.002276062	0.000247222	0.012817366	1	0.001344859	0.046961097
ILMN_1241952	6230415M23RIK	1.12852499	0.000299498	0.014892062	0.000639896	0.019410925	0.000284848	0.013869053	0.000980227	0.030953762	1	0.00148248	0.049612679
ILMN_2657980	FAAH	1.128386309	0.000299498	0.014892062	0.000299498	0.013353714	0.0000342	0.003043914	0.000140887	0.009031912	1	0.00040803	0.024132893
ILMN_2745614	FAM134B	1.127986989	0.000299498	0.014892062	0.000299498	0.013353714	0.0000227	0.002256884	0.000034	0.003321814	1	0.000264806	0.018619193
ILMN_1240415	LOC234987	1.127947991	0.000299498	0.014892062	0.000299498	0.013353714	0.0000121	0.001432469	0.0000715	0.005501275	1	0.000163531	0.013740705
ILMN_2552490	6720463L11RIK	1.127757726	0.000639896	0.021153497	0.000299498	0.013353714	0.0000289	0.002676832	0.000121849	0.008102409	1	0.000317538	0.020788254
ILMN_2729447	9030612M13RIK	1.12772184	0.000299498	0.014892062	0.000299498	0.013353714	0.00000038	0.000107295	0.00000154	0.000360893	1	1.24004E-05	0.003224592
ILMN_1233293	GBP1	1.127491461	0.000299498	0.014892062	0.000299498	0.013353714	0.000770337	0.026798849	0.0000253	0.002787107	1	3.39668E-05	0.00570777
ILMN_1236105	FYB	1.127293421	0.001760487	0.038593802	0.002018395	0.039534447	0.00046297	0.019206635	0.002468619	0.053569604	0	0.003663228	0.081662975
ILMN_3009860	SELL	1.126985915	0.000639896	0.021153497	0.000299498	0.013353714	0.00000258	0.000464931	0.0000101	0.001437553	1	6.47271E-05	0.008034278
ILMN_1217929	LOC667005	1.126757091	0.000942625	0.026071536	0.000942625	0.024301667	0.000301908	0.014429727	0.000612506	0.023197995	1	0.000763113	0.034824155
ILMN_1219896	LOC623121	1.126643386	0.000299498	0.014892062	0.000639896	0.019410925	0.000172522	0.009663511	0.000360138	0.0162751	1	0.000169803	0.014189966
ILMN_2808485	GBP10	1.126535797	0.000942625	0.026071536	0.000942625	0.024301667	0.000895135	0.029136956	0.000321957	0.015214362	1	0.000903743	0.038000482
ILMN_2628271	LOC100045967	1.126530154	0.001225688	0.030541554	0.000639896	0.019410925	0.00000934	0.00118696	0.00014347	0.009094873	1	0.001741399	0.054110078
ILMN_2959272	RNU6	1.126488141	0.000299498	0.014892062	0.000299498	0.013353714	0.000127096	0.007814972	0.0000785	0.005894011	1	5.52021E-05	0.007602042
ILMN_1240857	COX7A1	1.126488113	0.000299498	0.014892062	0.000299498	0.013353714	0.00000712	0.00098878	0.0000106	0.001479487	1	1.08955E-05	0.00300091
ILMN_1248837	TBXA2R	1.126308353	0.000639896	0.021153497	0.000639896	0.019410925	0.0000496	0.003917954	0.0000556	0.004598957	1	0.00010758	0.010838827

ILMN_1213986	LOC380617	1.126269609	0.000299498	0.014892062	0.000299498	0.013353714	0.0000257	0.002474589	0.0000184	0.002261567	1	2.24533E-05	0.004409839
ILMN_2565089	A830083H19RIK	1.126188031	0.000299498	0.014892062	0.000299498	0.013353714	0.0000412	0.003471427	0.000057	0.00465062	1	3.99889E-05	0.006183935
ILMN_2756628	CMC1	1.125722229	0.000299498	0.014892062	0.000299498	0.013353714	1.76E-09	0.00000151	6.75E-09	0.00000872	1	3.51784E-07	0.000454847
ILMN_2689307	SPNB2	1.125305551	0.000299498	0.014892062	0.000299498	0.013353714	0.0000723	0.00525285	0.000235982	0.01249632	1	0.000284828	0.019439747
ILMN_2551741	0610010I05RIK	1.124918642	0.000639896	0.021153497	0.000639896	0.019410925	0.000463127	0.019206635	0.001042662	0.032055996	1	0.000540698	0.028504193
ILMN_1343062	control_ILMN_1343062	1.124836817	0.065181711	0.311898271	0.059582948	0.295273635	0.052227493	0.293047327	0.059487654	0.305188121	0	0.168994973	0.521874145
ILMN_2749364	LOC382646	1.124580104	0.002768024	0.051337774	0.001760487	0.036357572	0.0000498	0.003931092	0.000245333	0.01278781	0	0.002963349	0.072406838
ILMN_2784272	IFNGR2	1.124504822	0.002018395	0.042006944	0.001760487	0.036357572	0.000859398	0.028451212	0.001629498	0.041583456	1	0.000903743	0.038000482
ILMN_1225348	FAM102A	1.12448091	0.000299498	0.014892062	0.000299498	0.013353714	0.00000714	0.000989051	0.0000248	0.002755904	1	0.000189968	0.015089482
ILMN_2630739	PHF20L1	1.124360297	0.000942625	0.026071536	0.001496892	0.032842408	0.000519149	0.020795881	0.000419249	0.017887063	1	0.000393771	0.023711359
ILMN_2418366	6720427H10RIK	1.124259069	0.000299498	0.014892062	0.000299498	0.013353714	0.000145382	0.008676736	0.000268314	0.013575239	1	0.000540727	0.028504193
ILMN_2846731	1110059E24RIK	1.124049613	0.000299498	0.014892062	0.000299498	0.013353714	2.88E-08	0.0000149	0.000000145	0.0000709	1	2.15328E-05	0.004320203
ILMN_2594855	PDPK1	1.124023837	0.000299498	0.014892062	0.000299498	0.013353714	0.0000466	0.003774527	0.0000558	0.004598957	1	0.000189956	0.015089482
ILMN_1246543	SIAT7C	1.124022495	0.000299498	0.014892062	0.000299498	0.013353714	0.000320008	0.015015535	0.000452506	0.018972559	1	0.000737547	0.034262098
ILMN_2614884	PJA1	1.123647984	0.000299498	0.014892062	0.000299498	0.013353714	0.00000151	0.000303563	0.00000406	0.000761994	1	1.74444E-05	0.003903768
ILMN_1250418	NPC1	1.123625032	0.000299498	0.014892062	0.000299498	0.013353714	0.000000139	0.0000492	0.000000276	0.000109783	1	2.27642E-06	0.00127663
ILMN_2706514	LOC100046608	1.123601186	0.000942625	0.026071536	0.000639896	0.019410925	0.000100461	0.006651733	0.000328884	0.015447583	1	0.001581552	0.051264971
ILMN_1241924	ARL6IP5	1.123582409	0.000299498	0.014892062	0.000299498	0.013353714	0.0000299	0.002749923	0.000106267	0.007284834	1	0.00027463	0.019109041
ILMN_2750265	ELMO1	1.123418741	0.001225688	0.030541554	0.001225688	0.028815909	0.000407095	0.017742578	0.000921456	0.02980611	1	0.001915982	0.056660247
ILMN_2712895	4631423B10RIK	1.123402203	0.000299498	0.014892062	0.000299498	0.013353714	0.0000422	0.003521702	0.000104785	0.007215102	1	0.000176289	0.014446733
ILMN_2719139	AB124611	1.122548641	0.001225688	0.030541554	0.000639896	0.019410925	0.000234828	0.012104699	0.000294012	0.014330244	1	0.001581552	0.051264971
ILMN_2692986	2810410P22RIK	1.122423336	0.001496892	0.034781534	0.001225688	0.028815909	0.000159639	0.009162023	0.000164723	0.009931795	1	0.0007895	0.035437666
ILMN_1228333	PRF1	1.122189532	0.002768024	0.051337774	0.001225688	0.028815909	0.000105496	0.006916233	0.000123189	0.008156571	0	0.002173782	0.060770595
ILMN_2940446	DGKA	1.122160698	0.001760487	0.038593802	0.001496892	0.032842408	0.0000799	0.005652909	0.000441159	0.018633965	1	0.003449313	0.078819425
ILMN_3034381	NUP88	1.121988063	0.000942625	0.026071536	0.000942625	0.024301667	0.000114964	0.007350619	0.000169394	0.010108673	1	0.000246108	0.017705716
ILMN_2668387	CGGBP1	1.121946931	0.000299498	0.014892062	0.000299498	0.013353714	0.00000034	0.0000984	0.000000168	0.000078	1	3.59866E-06	0.001580255
ILMN_2592953	SCG5	1.121946089	0.000299498	0.014892062	0.000299498	0.013353714	0.000026	0.002476668	0.0000347	0.003370075	1	0.000228655	0.016840488
ILMN_1228867	A130082M07RIK	1.121929865	0.000942625	0.026071536	0.000299498	0.013353714	0.00000462	0.000724818	0.0000117	0.001595024	1	0.00042277	0.024660011
ILMN_2785454	HIST2H2AB	1.121848738	0.008987421	0.105475934	0.009654071	0.106524046	0.008895037	0.113652841	0.010392592	0.121665992	0	0.049191671	0.30108149
ILMN_2773900	GLIPR2	1.1217158	0.000639896	0.021153497	0.000639896	0.019410925	0.000000602	0.000149919	0.00000244	0.000512485	1	3.83949E-05	0.006099544
ILMN_2647102	ACTL6A	1.121390591	0.000299498	0.014892062	0.000299498	0.013353714	0.00000884	0.001152122	0.0000424	0.00387062	1	7.57938E-05	0.008797941
ILMN_1256574	NCOA2	1.121377157	0.000942625	0.026071536	0.000942625	0.024301667	0.0000493	0.003911645	0.00022291	0.012129499	1	0.00040803	0.024132893
ILMN_1243902	A530024C08RIK	1.12112103	0.002018395	0.042006944	0.001760487	0.036357572	0.000455051	0.019030791	0.000881288	0.029196677	1	0.00305523	0.073418572
ILMN_1343048	control_ILMN_1343048	1.120964441	0.000639896	0.021153497	0.000639896	0.019410925	0.000238559	0.012189026	0.000271705	0.013620278	1	0.000934606	0.038635069
ILMN_2878979	TNFAIP8L2	1.120676477	0.000299498	0.014892062	0.000299498	0.013353714	0.000000464	0.000126212	0.00000373	0.000722783	1	1.74444E-05	0.003903768
ILMN_2887619	RPS25	1.120128473	0.032410957	0.214642335	0.037882791	0.231276599	0.025251221	0.201975034	0.032264118	0.224678675	0	0.039320852	0.270990186
ILMN_2678724	DUSP10	1.119986223	0.000639896	0.021153497	0.000299498	0.013353714	0.000216155	0.011472502	0.000287644	0.014123395	1	0.000379979	0.02324165
ILMN_1244135	ARPC5	1.119864481	0.003012339	0.054401128	0.003733327	0.059256725	0.007037524	0.099597335	0.005589714	0.086699245	0	0.00450999	0.091557737
ILMN_2651297	4632428N05RIK	1.119607561	0.000299498	0.014892062	0.000299498	0.013353714	0.00000985	0.001218839	0.00000212	0.00045645	1	1.35117E-05	0.003455664
ILMN_2822842	1600014C10RIK	1.119392625	0.000299498	0.014892062	0.000299498	0.013353714	0.0000173	0.001831837	0.00000567	0.00097714	1	1.97985E-05	0.004208042
ILMN_2665545	RIN3	1.119281709	0.000299498	0.014892062	0.000299498	0.013353714	0.0000502	0.003943501	0.0000406	0.003782136	1	0.000246108	0.017705716
ILMN_2703321	ANKZF1	1.119253	0.000299498	0.014892062	0.000299498	0.013353714	0.0000123	0.001443502	0.0000441	0.003965776	1	0.000146035	0.012922953
ILMN_1259917	D330001F19RIK	1.119179745	0.000299498	0.014892062	0.000299498	0.013353714	0.000210302	0.011263162	0.000345083	0.015942739	1	0.000353739	0.02219068
ILMN_1237871	AMPD1	1.119072973	0.000299498	0.014892062	0.000299498	0.013353714	0.000036	0.003145034	0.0000107	0.001483462	1	4.70154E-05	0.006881837
ILMN_1256950	NEURL2	1.11903277	0.000639896	0.021153497	0.000639896	0.019410925	0.0000169	0.001800169	0.0000192	0.002327044	1	3.83949E-05	0.006099544
ILMN_1228020	1500010G04RIK	1.118985348	0.001225688	0.030541554	0.000942625	0.024301667	0.0000866	0.005995631	0.000234419	0.012474872	1	0.000934606	0.038635069
ILMN_1227573	IRF7	1.118870281	0.003970394	0.064249	0.003970394	0.061967633	0.002318102	0.052579328	0.004453929	0.076746435	0	0.002387591	0.063870812

ILMN_2726315	SDF4	1.118652369	0.001496892	0.034781534	0.000639896	0.019410925	0.00000926	0.00118448	0.0000286	0.002983758	1	0.000621233	0.03109305
ILMN_1227907	GMFG	1.11859249	0.000299498	0.014892062	0.000299498	0.013353714	1.41E-08	0.00000898	0.000000113	0.0000599	1	7.03866E-06	0.002307643
ILMN_2881296	TMEM66	1.118516263	0.000299498	0.014892062	0.000299498	0.013353714	0.00000179	0.000347178	0.00000451	0.000814057	1	1.29447E-05	0.003328934
ILMN_3043245	JMJD1A	1.118512017	0.000299498	0.014892062	0.000299498	0.013353714	0.000000231	0.0000712	0.000000523	0.000168884	1	3.93982E-06	0.001667154
ILMN_2580159	C230070D10RIK	1.118494179	0.000942625	0.026071536	0.000942625	0.024301667	0.000556709	0.021670373	0.001253562	0.035750241	1	0.000712779	0.033344447
ILMN_1252472	ITK	1.118457931	0.00227139	0.045458063	0.002768024	0.048451528	0.000596303	0.022658053	0.002340061	0.051632853	0	0.001856078	0.055774594
ILMN_2828916	FRMD6	1.11830741	0.000639896	0.021153497	0.000639896	0.019410925	0.000173432	0.009681132	0.0000582	0.004700168	1	0.000182997	0.014712435
ILMN_1257771	LOC638301	1.118249781	0.001496892	0.034781534	0.000942625	0.024301667	0.0000793	0.005618146	0.0000839	0.006145701	1	0.001218998	0.044502503
ILMN_3002095	IL27RA	1.118221343	0.000639896	0.021153497	0.000639896	0.019410925	0.0000149	0.001663783	0.0000489	0.004233399	1	0.000621233	0.03109305
ILMN_2658961	DGKA	1.118166028	0.001760487	0.038593802	0.001760487	0.036357572	0.000265914	0.013252143	0.000649417	0.024048059	1	0.002314175	0.062958735
ILMN_2038771	control_ILMN_2038771	1.118161322	0.060205719	0.300139071	0.054803588	0.282520365	0.057007789	0.305496381	0.05139364	0.283318913	0	0.154914896	0.50337338
ILMN_2981801	HIST1H2AG	1.118065046	0.000942625	0.026071536	0.000639896	0.019410925	0.000371616	0.016648319	0.000201538	0.011374568	1	0.000504223	0.027322568
ILMN_1249710	E030038D23RIK	1.117909411	0.000299498	0.014892062	0.000299498	0.013353714	0.0000376	0.003237706	0.000154008	0.009469751	1	0.000306263	0.02048222
ILMN_2943057	ARL5C	1.117880079	0.001760487	0.038593802	0.000942625	0.024301667	0.000428331	0.018375605	0.000443074	0.018680938	1	0.000763113	0.034824155
ILMN_1235856	8030474H12RIK	1.117810336	0.000299498	0.014892062	0.000299498	0.013353714	0.00024238	0.012324478	0.000221541	0.012090825	1	0.000103509	0.010612415
ILMN_1247942	MGEA5	1.117806646	0.000639896	0.021153497	0.000639896	0.019410925	0.000306942	0.014534302	0.000519622	0.020743454	1	0.00042277	0.024660011
ILMN_1258509	SIT1	1.117432738	0.000639896	0.021153497	0.000299498	0.013353714	0.000151735	0.008884051	0.000102346	0.007068104	1	0.000237231	0.017362241
ILMN_2544056	HBB-B1	1.117213432	0.039141764	0.237049914	0.035991476	0.224859756	0.020977231	0.184099808	0.029221576	0.212190751	0	0.025142431	0.218223503
ILMN_2729953	PPM1B	1.117036433	0.005370369	0.078183323	0.005370369	0.074974418	0.003641212	0.067632684	0.005035407	0.081966426	0	0.008450429	0.125387993
ILMN_1219602	LOC100048770	1.116440805	0.003970394	0.064249	0.003733327	0.059256725	0.006317929	0.093553116	0.002151161	0.049131535	0	0.004251793	0.088827736
ILMN_2681670	VPS37B	1.116406759	0.000299498	0.014892062	0.000299498	0.013353714	0.00000824	0.001096103	0.0000174	0.002162819	1	6.22097E-05	0.007890127
ILMN_1234955	6430573H23RIK	1.116406299	0.001760487	0.038593802	0.002018395	0.039534447	0.000742364	0.026039808	0.001614985	0.04134913	1	0.002387591	0.063870812
ILMN_2582659	E030040J04RIK	1.116391042	0.000299498	0.014892062	0.000299498	0.013353714	0.0000266	0.002516087	0.000057	0.00465062	1	0.00010758	0.010838827
ILMN_1252514	C920016N10RIK	1.116354745	0.001760487	0.038593802	0.001225688	0.028815909	0.000151132	0.008859861	0.000433591	0.018347587	1	0.0007895	0.035437666
ILMN_2617433	ACTB	1.11629809	0.003970394	0.064249	0.003253905	0.054324155	0.002870664	0.059952728	0.002726633	0.057221177	0	0.00553098	0.101481885
ILMN_2738972	CNOT4	1.116182237	0.000299498	0.014892062	0.000299498	0.013353714	0.0000107	0.001302986	0.00000896	0.00133296	1	2.65234E-05	0.004803829
ILMN_2553280	4732470M22RIK	1.1161327	0.000299498	0.014892062	0.000299498	0.013353714	0.00000649	0.000934608	0.0000318	0.003192608	1	0.000111802	0.010979022
ILMN_1238725	C130086J11RIK	1.116108151	0.013826671	0.134561326	0.015131078	0.138695553	0.012860546	0.140951218	0.014592729	0.14770671	0	0.023367993	0.210226124
ILMN_2998813	SEMA4F	1.115968974	0.000299498	0.014892062	0.000299498	0.013353714	0.0000207	0.002110867	0.0000384	0.003609572	1	8.86334E-05	0.009822905
ILMN_1236445	9130227N12RIK	1.115922245	0.002520973	0.048392748	0.001760487	0.036357572	0.000961228	0.030645413	0.001935598	0.046142977	1	0.00305523	0.073418572
ILMN_1220893	ZFP281	1.115869505	0.000299498	0.014892062	0.000299498	0.013353714	0.00000124	0.000260429	0.000000812	0.000227616	1	5.3945E-06	0.002025163
ILMN_2417398	IGHV10S1_AF064442_IG_HEAVY_VARIABLE_10S1_1	1.115826459	0.004907577	0.073992984	0.005600396	0.076777595	0.009191991	0.115919703	0.004863496	0.080501378	0	0.005531174	0.101481885
ILMN_1238893	LIME1	1.115781178	0.001760487	0.038593802	0.000639896	0.019410925	0.000124926	0.007753235	0.000143613	0.009094873	1	0.001141234	0.042874093
ILMN_2706550	SUSD3	1.115744092	0.001225688	0.030541554	0.000942625	0.024301667	0.000143784	0.008619217	0.000167018	0.010005399	1	0.000816732	0.036034504
ILMN_1242235	TOP2A	1.115488708	0.000639896	0.021153497	0.000299498	0.013353714	0.000000923	0.000208593	0.00000447	0.00081037	1	7.28705E-05	0.008652811
ILMN_2638923	RN18S	1.115471516	0.003012339	0.054401128	0.005830016	0.078761363	0.007123051	0.100168171	0.007948853	0.10463667	0	0.002620495	0.067689332
ILMN_1232894	ZNRF1	1.115445926	0.000299498	0.014892062	0.000299498	0.013353714	0.0000217	0.002174307	0.0000588	0.004724126	1	0.00010758	0.010838827
ILMN_1218799	EMB	1.115430499	0.000299498	0.014892062	0.000299498	0.013353714	0.00000545	0.00080859	0.00000586	0.00100296	1	1.04339E-05	0.002925693
ILMN_1257209	WIPF1	1.115376002	0.000299498	0.014892062	0.000299498	0.013353714	0.0000145	0.001637789	0.000022	0.002530716	1	9.57926E-05	0.010180718
ILMN_2711705	DUSP11	1.115060696	0.000299498	0.014892062	0.000299498	0.013353714	0.000000199	0.0000652	0.0000011	0.000288061	1	3.99889E-05	0.006183935
ILMN_1236202	C430015M08RIK	1.114991211	0.000639896	0.021153497	0.000942625	0.024301667	0.000302563	0.014429727	0.000998638	0.031261571	1	0.002041151	0.058756619
ILMN_1233474	IL2RA	1.114952254	0.00809366	0.100146322	0.005370369	0.074974418	0.001679483	0.043166689	0.003200353	0.063041403	0	0.005220076	0.098611557
ILMN_2762863	AI606181	1.114892504	0.000639896	0.021153497	0.000299498	0.013353714	0.000192589	0.010448077	0.000197935	0.011235697	1	0.0007895	0.035437666
ILMN_2644350	THY1	1.114766581	0.000942625	0.026071536	0.000639896	0.019410925	0.0000457	0.003725334	0.00012026	0.008031164	1	0.002463032	0.065251421
ILMN_1255860	KLRD1	1.114664485	0.000299498	0.014892062	0.000299498	0.013353714	0.000179589	0.009904436	0.0000691	0.005350074	1	0.000183009	0.014712435
ILMN_2636403	AXUD1	1.11465607	0.000299498	0.014892062	0.000299498	0.013353714	0.000000985	0.000217336	0.000000614	0.00018775	1	1.08955E-05	0.00300091

ILMN_2918002	GBP3	1.114435116	0.000942625	0.026071536	0.000299498	0.013353714	0.000573593	0.02206532	0.000153193	0.009469751	1	0.0007895	0.035437666
ILMN_2649068	IRF1	1.114384547	0.007194081	0.092947182	0.007194081	0.090032894	0.006628845	0.096046173	0.005888889	0.088967898	0	0.006383386	0.109238048
ILMN_1215939	1_M15618_T_CELL_RECEPTOR_BETA_VARIABLE_13-1_213	1.114252325	0.000639896	0.021153497	0.000639896	0.019410925	0.0000276	0.002581184	0.000058	0.004693744	1	0.000111795	0.010979022
ILMN_2520264	2010016I18RIK	1.114246403	0.001225688	0.030541554	0.001496892	0.032842408	0.000652141	0.023901742	0.001090408	0.033000801	1	0.001389407	0.047728966
ILMN_1220889	NBR1	1.114192214	0.000299498	0.014892062	0.000299498	0.013353714	0.00041846	0.018119119	0.0000489	0.004233399	1	0.000103509	0.010612415
ILMN_2706803	CRLF3	1.114104774	0.000299498	0.014892062	0.000299498	0.013353714	0.000121041	0.007605138	0.0000382	0.003601497	1	0.000212368	0.016047225
ILMN_2751603	PHXR4	1.11385586	0.008764316	0.104351101	0.01317262	0.127562936	0.00581702	0.089377512	0.019672927	0.172805787	0	0.017311316	0.180185556
ILMN_1240030	NFATC3	1.113638258	0.000299498	0.014892062	0.000299498	0.013353714	0.0000187	0.001936608	0.000099	0.006922165	1	0.000204639	0.01592867
ILMN_1242390	ACTN4	1.113610426	0.006741497	0.089431865	0.005370369	0.074974418	0.002259109	0.051954924	0.003105507	0.061933186	0	0.002963349	0.072406838
ILMN_2510694	NME7	1.113521644	0.002018395	0.042006944	0.001760487	0.036357572	0.000180109	0.009909602	0.000250403	0.012926945	1	0.002540648	0.066400639
ILMN_1258466	LOC380623	1.113479163	0.001496892	0.034781534	0.001225688	0.028815909	0.0000863	0.005995631	0.000491484	0.020138305	1	0.001104095	0.042298211
ILMN_1252089	NFATC3	1.113257321	0.000942625	0.026071536	0.000639896	0.019410925	0.000449807	0.018930527	0.00134792	0.037368442	1	0.001344859	0.046961097
ILMN_2522571	SETD7	1.113080478	0.000299498	0.014892062	0.000299498	0.013353714	0.000171497	0.009624487	0.0000765	0.005770769	1	1.81978E-05	0.003995524
ILMN_2593002	ST6GAL2	1.113003988	0.000299498	0.014892062	0.000299498	0.013353714	0.0000472	0.003800848	0.00000968	0.001390556	1	4.89467E-05	0.007053629
ILMN_1248379	EG434077	1.112625375	0.000299498	0.014892062	0.000299498	0.013353714	0.0000115	0.001387523	0.000012	0.001629081	1	1.53585E-05	0.003592421
ILMN_1223119	BCL11B	1.112508226	0.002018395	0.042006944	0.001225688	0.028815909	0.0000582	0.004418055	0.000128727	0.008463041	1	0.000688785	0.032681842
ILMN_3059798	FOXK1	1.112313504	0.001225688	0.030541554	0.000942625	0.024301667	0.000178164	0.009849192	0.000280684	0.013898949	1	0.000688785	0.032681842
ILMN_2534794	LOC236170	1.112310228	0.005139198	0.076197614	0.004206115	0.064412031	0.000303005	0.014435986	0.000928884	0.029963118	0	0.002620495	0.067689332
ILMN_2618549	RAB7	1.112121637	0.000639896	0.021153497	0.001225688	0.028815909	0.001879355	0.046456904	0.001945449	0.046343295	1	0.001915982	0.056660247
ILMN_2468405	5630401D06RIK	1.111986642	0.000299498	0.014892062	0.000299498	0.013353714	0.000000209	0.0000667	0.00000224	0.00047443	1	9.99008E-06	0.002818469
ILMN_1258587	LOC100044376	1.111863958	0.000299498	0.014892062	0.000299498	0.013353714	0.00000504	0.000761749	0.00000641	0.001075031	1	2.76413E-05	0.004930329
ILMN_1218732	2810426P10RIK	1.11161873	0.000299498	0.014892062	0.000299498	0.013353714	0.0000688	0.005018833	0.000136749	0.008839595	1	0.000183009	0.014712435
ILMN_1237980	0610010D24RIK	1.111616983	0.000639896	0.021153497	0.000299498	0.013353714	0.000147151	0.008736505	0.000319145	0.015112162	1	0.000486846	0.026691654
ILMN_1214874	LOC386068	1.111606821	0.000942625	0.026071536	0.000299498	0.013353714	0.0000748	0.005380504	0.000102298	0.007068104	1	0.000844832	0.036512914
ILMN_1220418	HCST	1.111606518	0.000299498	0.014892062	0.000299498	0.013353714	0.000150502	0.008856418	0.0000483	0.004205779	1	5.74463E-05	0.007618639
ILMN_2550291	2310032M22RIK	1.111606315	0.000639896	0.021153497	0.000639896	0.019410925	0.000109438	0.007113974	0.000121057	0.008061295	1	0.000135361	0.012427306
ILMN_1234202	PHIP	1.111345184	0.000299498	0.014892062	0.000942625	0.024301667	0.00090293	0.029282308	0.001346813	0.037363102	1	0.000486846	0.026691654
ILMN_2426949	TNFRSF14	1.111293325	0.000639896	0.021153497	0.000639896	0.019410925	0.0000768	0.005474285	0.00020508	0.011473406	1	0.000453754	0.02560106
ILMN_2497395	9130004J05RIK	1.111130133	0.001225688	0.030541554	0.001225688	0.028815909	0.000278037	0.013666084	0.000762961	0.026721993	1	0.002106509	0.059970456
ILMN_2715730	SPN	1.111033738	0.000299498	0.014892062	0.000639896	0.019410925	0.0000115	0.00138491	0.0000749	0.005687727	1	0.000284828	0.019439747
ILMN_1217606	1500005K14RIK	1.110936144	0.001225688	0.030541554	0.001496892	0.032842408	0.000360722	0.016283385	0.000242261	0.012705581	1	0.000737547	0.034262098
ILMN_1216313	STIM1	1.110931979	0.001225688	0.030541554	0.00227139	0.042916604	0.001389435	0.037998849	0.003408037	0.065686921	0	0.004644684	0.093111105
ILMN_1252761	DRG1	1.110887212	0.001225688	0.030541554	0.000639896	0.019410925	0.000967613	0.030803623	0.000483066	0.019916078	1	0.000486846	0.026691654
ILMN_2710312	LOC100046650	1.110811588	0.000299498	0.014892062	0.000299498	0.013353714	0.00000957	0.001210856	0.0000519	0.004442214	1	0.000470003	0.02607676
ILMN_1232668	MAD	1.110784132	0.000299498	0.014892062	0.000299498	0.013353714	0.000265521	0.013246761	0.000209487	0.011649906	1	0.000212368	0.016047225
ILMN_2593774	1190002H23RIK	1.110704	0.000299498	0.014892062	0.000299498	0.013353714	0.00000489	0.000743473	0.00000986	0.001403781	1	6.47271E-05	0.008034278
ILMN_2559724	A130014O09RIK	1.110598097	0.011420742	0.120583495	0.008764316	0.10074305	0.005102656	0.082814962	0.006787335	0.095622483	0	0.005692914	0.10310819
ILMN_3002505	ABHD8	1.110530454	0.000942625	0.026071536	0.000942625	0.024301667	0.0000941	0.00638343	0.000199793	0.011313575	1	0.000540727	0.028504193
ILMN_2441724	9430014F16RIK	1.110454831	0.000639896	0.021153497	0.000639896	0.019410925	0.000231088	0.012010162	0.000203189	0.011438788	1	0.000665544	0.032069437
ILMN_1229005	TRAT1	1.110421282	0.000639896	0.021153497	0.000639896	0.019410925	0.000272708	0.013475313	0.000194981	0.011135911	1	0.001104043	0.042298211
ILMN_1229518	B230340J04RIK	1.11037499	0.000299498	0.014892062	0.000299498	0.013353714	0.00000774	0.001050295	0.00000785	0.001234703	1	9.56597E-06	0.002748564
ILMN_2576568	D130062J21RIK	1.110225832	0.001760487	0.038593802	0.002768024	0.048451528	0.002934498	0.06072226	0.005759465	0.08793067	0	0.004510321	0.091557737
ILMN_2491182	A130010C12RIK	1.110126472	0.014262117	0.136875566	0.017939699	0.152968395	0.004392397	0.075471726	0.018680856	0.168124091	0	0.037563093	0.2654797
ILMN_2484278	9930031P18RIK	1.110094091	0.002520973	0.048392748	0.003012339	0.051552328	0.005337456	0.085315071	0.009683569	0.116862873	0	0.012022966	0.149554514
ILMN_2827780	D14ERTD668E	1.11008286	0.000639896	0.021153497	0.000299498	0.013353714	0.0000427	0.003546036	0.0000575	0.004674319	1	0.000642967	0.031573087

ILMN_3112873	TXNIP	1.110031984	0.000942625	0.026071536	0.000639896	0.019410925	0.000143096	0.008611225	0.000243798	0.012729351	1	0.001141234	0.042874093
ILMN_3117602	CD6	1.109929013	0.000299498	0.014892062	0.000299498	0.013353714	0.00000663	0.000949865	0.0000261	0.002837023	1	0.000197163	0.015477107
ILMN_1233424	LBCL1	1.109898196	0.000299498	0.014892062	0.000299498	0.013353714	0.0000427	0.003546036	0.0000532	0.004485638	1	0.000103509	0.010612415
ILMN_2681601	SLC44A2	1.109888463	0.010096998	0.112851217	0.008541654	0.099378843	0.002543443	0.055844168	0.006876599	0.096328868	0	0.009432203	0.132484733
ILMN_2762956	SPCS2	1.109838126	0.000299498	0.014892062	0.000299498	0.013353714	0.0000411	0.003468105	0.000131039	0.00859081	1	0.000189968	0.015089482
ILMN_2632230	D2ERTD391E	1.109720922	0.000299498	0.014892062	0.000299498	0.013353714	0.00000699	0.00098038	0.0000266	0.002856495	1	0.000317538	0.020788254
ILMN_3052501	CD27	1.109550882	0.000942625	0.026071536	0.000639896	0.019410925	0.0000571	0.004360274	0.000117771	0.007898943	1	0.000966442	0.039356938
ILMN_2615096	DPP4	1.109531905	0.000299498	0.014892062	0.000299498	0.013353714	0.000000424	0.00011758	0.000000257	0.000106375	1	2.49646E-06	0.001335664
ILMN_2629112	ASAH3L	1.109478785	0.000299498	0.014892062	0.000299498	0.013353714	0.0000279	0.002603268	0.0000227	0.002596277	1	3.53859E-05	0.005861598
ILMN_1254916	LOC386508	1.109314765	0.000942625	0.026071536	0.000639896	0.019410925	0.0000268	0.002529347	0.000291891	0.014258943	1	0.002106509	0.059970456
ILMN_2686115	RAPGEF6	1.109219239	0.006058437	0.083694614	0.004441009	0.066594341	0.001242443	0.035534793	0.002860747	0.059099453	0	0.008219665	0.123658938
ILMN_3153010	SLITRK5	1.109095163	0.000299498	0.014892062	0.000299498	0.013353714	0.000158137	0.009109888	0.0000467	0.004101953	1	5.97852E-05	0.007773248
ILMN_2571616	C430002D13RIK	1.109088506	0.001225688	0.030541554	0.002018395	0.039534447	0.00120471	0.034938094	0.002233346	0.05034168	0	0.001797898	0.054876565
ILMN_1231785	HDAC2	1.10904434	0.000639896	0.021153497	0.000299498	0.013353714	0.000110441	0.00713983	0.000264563	0.013458572	1	0.000237231	0.017362241
ILMN_1221831	TCFAP2E	1.10874714	0.001760487	0.038593802	0.001760487	0.036357572	0.000606401	0.022854024	0.000618561	0.023351316	1	0.001344859	0.046961097
ILMN_2646456	RNPC2	1.108556752	0.003970394	0.064249	0.003494726	0.056620496	0.002062137	0.049299581	0.002974581	0.060346491	0	0.003346676	0.077347433
ILMN_2504686	MT-ATP6	1.108358727	0.008764316	0.104351101	0.008987421	0.102128981	0.006842996	0.097765784	0.01129715	0.127943658	0	0.013719454	0.160250793
ILMN_2712867	TIMP2	1.108193843	0.000299498	0.014892062	0.000299498	0.013353714	0.0000462	0.003744963	0.0000657	0.005137493	1	5.74504E-05	0.007618639
ILMN_1234006	LOC277136	1.10816163	0.003733327	0.06184411	0.002018395	0.039534447	0.0000764	0.005463264	0.000342456	0.015876812	0	0.001104095	0.042298211
ILMN_2965669	XLR4A	1.108141291	0.000299498	0.014892062	0.000299498	0.013353714	0.00000486	0.000741671	0.00000396	0.000746457	1	1.23984E-05	0.003224592
ILMN_2447538	2210018M11RIK	1.10801562	0.000639896	0.021153497	0.000639896	0.019410925	0.0000305	0.002787143	0.0000653	0.005121772	1	0.000306263	0.02048222
ILMN_1222917	PTPN1	1.107980121	0.003253905	0.056782136	0.003733327	0.059256725	0.002044175	0.048920424	0.003627607	0.068031509	0	0.007351981	0.116676672
ILMN_1255086	2810454F19RIK	1.107686745	0.006741497	0.089431865	0.006514138	0.084466318	0.002424965	0.054188606	0.00487539	0.080587642	0	0.007351739	0.116676672
ILMN_1233554	PBRM1	1.107679536	0.001496892	0.034781534	0.000942625	0.024301667	0.000590155	0.022534829	0.000404783	0.01751061	1	0.000844832	0.036512914
ILMN_1234072	PDLIM1	1.107488297	0.000299498	0.014892062	0.000299498	0.013353714	0.0000459	0.003725624	0.0000726	0.005551592	1	0.000306263	0.02048222
ILMN_1216561	CAMK2D	1.107443275	0.001225688	0.030541554	0.000942625	0.024301667	0.000763982	0.026677465	0.001346924	0.037363102	1	0.00305523	0.073418572
ILMN_2590638	BCL2L11	1.107365706	0.001225688	0.030541554	0.001225688	0.028815909	0.0000915	0.00623516	0.0000482	0.004197605	1	0.000176289	0.014446733
ILMN_2705878	LIMD2	1.107359113	0.000299498	0.014892062	0.000299498	0.013353714	0.00000896	0.001162086	0.00000904	0.001335714	1	6.22097E-05	0.007890127
ILMN_1227100	E130112E08RIK	1.107230432	0.002018395	0.042006944	0.002768024	0.048451528	0.00208027	0.049529569	0.001352545	0.037429791	1	0.00040803	0.024132893
ILMN_1254814	CLK1	1.10722634	0.000942625	0.026071536	0.000942625	0.024301667	0.000229534	0.011977725	0.000414376	0.017763501	1	0.00099928	0.040236595
ILMN_2986458	TERF2IP	1.107174717	0.000299498	0.014892062	0.000299498	0.013353714	0.00036565	0.016444375	0.000252656	0.013009278	1	0.000470028	0.02607676
ILMN_1239729	KIF1B	1.106854993	0.000639896	0.021153497	0.000639896	0.019410925	0.001377178	0.03773799	0.000992676	0.031178183	1	0.000504223	0.027322568
ILMN_1217480	LOC100046080	1.106833133	0.006967815	0.091154627	0.004907577	0.070737293	0.001177205	0.03450589	0.001708869	0.042787906	0	0.004379328	0.090517125
ILMN_2652857	IFI47	1.106721599	0.009432307	0.108259469	0.007644699	0.094076848	0.008284497	0.109488491	0.003876917	0.070436711	0	0.006383169	0.109238048
ILMN_1257107	LOC100043821	1.106674621	0.000639896	0.021153497	0.000639896	0.019410925	0.000540915	0.021355367	0.001177747	0.034456682	1	0.001179524	0.043782528
ILMN_2636339	IRF9	1.106644992	0.002520973	0.048392748	0.000942625	0.024301667	0.000297953	0.014283019	0.000767428	0.026757653	1	0.00270263	0.068855671
ILMN_2479848	SIF1	1.106503824	0.000299498	0.014892062	0.000299498	0.013353714	3.51E-08	0.0000177	0.000000282	0.000110081	1	5.89482E-06	0.002111595
ILMN_1226514	GAB3	1.106492684	0.000299498	0.014892062	0.000299498	0.013353714	0.00000136	0.000277495	0.000000237	0.000101599	1	6.1646E-06	0.002125696
ILMN_3141048	SEPP1	1.106305884	0.001496892	0.034781534	0.000942625	0.024301667	0.000283417	0.013828313	0.000166399	0.009994028	1	0.000643	0.031573087
ILMN_2635871	3110057O12RIK	1.106105831	0.000639896	0.021153497	0.000639896	0.019410925	0.00015081	0.008859861	0.00020499	0.011473406	1	0.000643034	0.031573087
ILMN_2829625	NTNG1	1.106001213	0.001225688	0.030541554	0.001225688	0.028815909	0.000147647	0.008754822	0.000417071	0.017826837	1	0.000438006	0.025077344
ILMN_2635132	FOXP3	1.105736567	0.000639896	0.021153497	0.000299498	0.013353714	0.00000368	0.00061365	0.0000951	0.00136995	1	0.001301631	0.046179135
ILMN_1225109	2310047C21RIK	1.105585656	0.000942625	0.026071536	0.000942625	0.024301667	0.000231451	0.012010162	0.000463947	0.019281568	1	0.000559888	0.029151118
ILMN_1228653	ZBP1	1.105391357	0.008987421	0.105475934	0.00809366	0.096526955	0.003640921	0.067632684	0.005932081	0.089284737	0	0.011706901	0.147795262
ILMN_1236585	LOC634213	1.105197029	0.003253905	0.056782136	0.001496892	0.032842408	0.00010667	0.006973566	0.000361871	0.016337543	0	0.001797898	0.054876565
ILMN_1227803	LOC674707	1.105118227	0.000639896	0.021153497	0.000942625	0.024301667	0.00000863	0.001137392	0.0000456	0.00403955	1	7.28705E-05	0.008652811
ILMN_2706631	LOC100048076	1.105000545	0.000299498	0.014892062	0.000299498	0.013353714	0.000000568	0.000143787	0.00000114	0.000290477	1	7.68769E-06	0.002401604

ILMN_2949605	UBAC2	1.104949833	0.000299498	0.014892062	0.000299498	0.013353714	0.000000468	0.000126769	0.00000161	0.000370841	1	7.28705E-05	0.008652811
ILMN_2651054	LOC100047173	1.104947245	0.001225688	0.030541554	0.000942625	0.024301667	0.000185401	0.010128942	0.000207116	0.011559512	1	0.002540648	0.066400639
ILMN_2691192	RBBP7	1.104851088	0.007419532	0.094878068	0.011860136	0.120066286	0.024744298	0.199923062	0.018129944	0.165469515	0	0.013719454	0.160250793
ILMN_2569336	A130024J05RIK	1.104817015	0.009654071	0.110018185	0.010318182	0.11074271	0.005029371	0.082087062	0.007629856	0.10204046	0	0.012022966	0.149554514
ILMN_1222346	A630097D09RIK	1.104807842	0.000299498	0.014892062	0.000299498	0.013353714	0.00000699	0.00098038	0.0000116	0.001590823	1	1.60246E-05	0.003674655
ILMN_1255419	ZFPN1A1	1.10475855	0.001225688	0.030541554	0.001225688	0.028815909	0.00023251	0.012025158	0.000461073	0.019196381	1	0.001633268	0.052249986
ILMN_2704822	ACAA2	1.104751617	0.00227139	0.045458063	0.00227139	0.042916604	0.000737221	0.025996538	0.001507582	0.039781954	1	0.002041151	0.058756619
ILMN_2595967	LOC100039532	1.104726083	0.000299498	0.014892062	0.000299498	0.013353714	0.0000399	0.003374128	0.0000835	0.006132211	1	0.000353719	0.02219068
ILMN_2628174	ACSS1	1.104609544	0.000299498	0.014892062	0.000299498	0.013353714	0.00000673	0.000954053	0.00000329	0.000651535	1	5.51982E-05	0.007602042
ILMN_2457324	TSSC1	1.10460787	0.000942625	0.026071536	0.000639896	0.019410925	0.000377615	0.016836068	0.000681216	0.024908549	1	0.001301631	0.046179135
ILMN_2631994	HEXIM1	1.104522651	0.000299498	0.014892062	0.000299498	0.013353714	0.000000794	0.000185854	0.000000526	0.000168884	1	3.28593E-06	0.001544952
ILMN_2544890	PDE4B	1.104516163	0.002768024	0.051337774	0.003253905	0.054324155	0.001446451	0.039053348	0.00467606	0.078680163	0	0.00388914	0.084081646
ILMN_2696491	PHF11	1.104484414	0.004206115	0.066690827	0.002520973	0.046026289	0.001306218	0.0366489	0.001777536	0.04368478	0	0.003888993	0.084081646
ILMN_2775098	CYB5	1.104384533	0.000299498	0.014892062	0.000299498	0.013353714	0.00000016	0.0000542	0.000000392	0.00013797	1	5.89742E-06	0.002111595
ILMN_2880467	LASS4	1.104325447	0.00227139	0.045458063	0.001760487	0.036357572	0.000596145	0.022658053	0.00077485	0.026955849	1	0.00099928	0.040236595
ILMN_2812244	MPPE1	1.104198108	0.000299498	0.014892062	0.000299498	0.013353714	0.00000576	0.000845189	0.00000933	0.001361621	1	4.33673E-05	0.006596797
ILMN_3133748	GAB3	1.1040901	0.001496892	0.034781534	0.001225688	0.028815909	0.000026	0.002476668	0.000100197	0.00697141	1	0.000600122	0.030462238
ILMN_2518828	ZNF24	1.104037027	0.000639896	0.021153497	0.000299498	0.013353714	0.0000988	0.006582067	0.000186034	0.010797146	1	0.00011618	0.011242898
ILMN_1258965	TMEM66	1.10397338	0.000942625	0.026071536	0.000942625	0.024301667	0.000122032	0.007605138	0.000271158	0.013615504	1	0.0007895	0.035437666
ILMN_1237886	ENC1	1.103956093	0.000639896	0.021153497	0.000299498	0.013353714	0.0000265	0.002503706	0.0000379	0.003587283	1	0.000135361	0.012427306
ILMN_2492102	LOC630408	1.103768241	0.000639896	0.021153497	0.000299498	0.013353714	0.000213393	0.011363803	0.000340257	0.015806312	1	0.000966442	0.039356938
ILMN_2710166	DDX3X	1.103764891	0.005139198	0.076197614	0.004674836	0.068774915	0.003216093	0.063589034	0.003700581	0.068707988	0	0.004510321	0.091557737
ILMN_2742928	FXYD5	1.103662574	0.019874198	0.164084265	0.014913834	0.137444039	0.005979984	0.090875061	0.008896378	0.111496961	0	0.013017012	0.156039878
ILMN_3071525	CD226	1.103645914	0.003494726	0.059081055	0.002018395	0.039534447	0.000736131	0.025977764	0.000794336	0.027327392	0	0.001977658	0.05767797
ILMN_2720820	A230046K03RIK	1.103616266	0.000299498	0.014892062	0.000299498	0.013353714	0.00000291	0.000513168	0.0000077	0.001222667	1	8.19763E-05	0.009306714
ILMN_1238069	4930539E08RIK	1.103535154	0.000299498	0.014892062	0.000299498	0.013353714	0.0000032	0.000552276	0.0000217	0.002508955	1	0.000157497	0.013500967
ILMN_1238285	DCUN1D5	1.103527312	0.001496892	0.034781534	0.001496892	0.032842408	0.000348114	0.015948481	0.000289089	0.014164441	1	0.000284812	0.019439747
ILMN_1234133	3632431M01RIK	1.103406406	0.000942625	0.026071536	0.000639896	0.019410925	0.000319996	0.015015535	0.000495252	0.020203747	1	0.000284828	0.019439747
ILMN_1217705	C130002K18RIK	1.103274712	0.008318086	0.101656379	0.010318182	0.11074271	0.008238647	0.109099373	0.010773072	0.124430321	0	0.015225452	0.168938998
ILMN_2614966	RAB27A	1.103217796	0.000299498	0.014892062	0.000299498	0.013353714	8.05E-08	0.0000329	2.31E-08	0.0000187	1	1.2393E-06	0.000901339
ILMN_1245393	STXBP3	1.103174614	0.003970394	0.064249	0.00227139	0.042916604	0.001152702	0.034218493	0.001900889	0.045691414	0	0.00553098	0.101481885
ILMN_1239726	SNAI3	1.103168493	0.000639896	0.021153497	0.000639896	0.019410925	0.0000322	0.002892763	0.000113724	0.007705253	1	0.000665544	0.032069437
ILMN_1223028	D230020C06RIK	1.103101789	0.000639896	0.021153497	0.000639896	0.019410925	0.000286457	0.013889283	0.000348862	0.016068328	1	0.000873828	0.037145252
ILMN_2854878	NECAP1	1.10302603	0.000299498	0.014892062	0.000299498	0.013353714	0.00000877	0.001147985	0.0000229	0.002603706	1	8.19763E-05	0.009306714
ILMN_1242802	RAB6	1.103017062	0.000942625	0.026071536	0.000639896	0.019410925	0.000613933	0.022953221	0.000318873	0.015112162	1	0.001856078	0.055774594
ILMN_2535779	LOC383706	1.102993315	0.000639896	0.021153497	0.000942625	0.024301667	0.00056898	0.02197867	0.00070261	0.025381142	1	0.001104095	0.042298211
ILMN_1228235	CTSE	1.102982206	0.000942625	0.026071536	0.000942625	0.024301667	0.000290789	0.014070003	0.000184022	0.010707081	1	0.00057968	0.029683566
ILMN_3163163	A430078G23RIK	1.102898707	0.000639896	0.021153497	0.000639896	0.019410925	0.00013728	0.008352935	0.00013654	0.008839388	1	0.00022037	0.016464793
ILMN_2732190	PBRM1	1.102890972	0.006058437	0.083694614	0.003970394	0.061967633	0.001140652	0.034012759	0.00113476	0.033772175	0	0.013719454	0.160250793
ILMN_1246770	YBX3	1.102889488	0.003494726	0.059081055	0.003012339	0.051552328	0.003584735	0.067314254	0.003165165	0.062746493	0	0.005858095	0.104408326
ILMN_1250135	A930005H10RIK	1.102857125	0.000639896	0.021153497	0.000639896	0.019410925	0.0000434	0.00359485	0.0000827	0.006091257	1	0.000329201	0.021282383
ILMN_3114641	PIK3R1	1.102785193	0.000299498	0.014892062	0.000299498	0.013353714	0.00000126	0.000263891	0.00000119	0.00029799	1	1.47177E-05	0.003531258
ILMN_2677056	LOC100048622	1.102768087	0.002018395	0.042006944	0.002018395	0.039534447	0.002464159	0.054794935	0.002601189	0.055447887	0	0.003774648	0.082954936
ILMN_1243042	LOC381214	1.102758352	0.000299498	0.014892062	0.000299498	0.013353714	0.00000214	0.000401503	0.0000184	0.002263583	1	4.33673E-05	0.006596797
ILMN_2917338	RNF125	1.102623511	0.003733327	0.06184411	0.003253905	0.054324155	0.002100432	0.049831197	0.003394382	0.065464235	0	0.00270263	0.068855671
ILMN_2433964	GIGYF1	1.102596985	0.001760487	0.038593802	0.001496892	0.032842408	0.000471174	0.01946027	0.000359654	0.0162751	1	0.00057968	0.029683566
ILMN_2566477	C730026O12RIK	1.102585731	0.008541654	0.103057212	0.01076004	0.113383658	0.009538032	0.118422719	0.011738911	0.130774947	0	0.012346572	0.151955545

ILMN_2704823	ACAA2	1.102584401	0.001760487	0.038593802	0.001225688	0.028815909	0.000991032	0.031274283	0.000594473	0.022718354	1	0.001104095	0.042298211
ILMN_1249863	SLAMF1	1.102358687	0.001496892	0.034781534	0.000942625	0.024301667	0.000531621	0.021116652	0.000185389	0.010773166	1	0.001686537	0.053258626
ILMN_2617820	PPP3CC	1.10232076	0.000299498	0.014892062	0.000299498	0.013353714	0.000000555	0.000142642	0.000000719	0.000216047	1	1.47177E-05	0.003531258
ILMN_1238109	PP11R	1.102299387	0.000299498	0.014892062	0.000299498	0.013353714	0.000103622	0.006822227	0.0000106	0.001483462	1	3.68613E-05	0.005999236
ILMN_1257463	BCL11A	1.102238843	0.000942625	0.026071536	0.000942625	0.024301667	0.000647324	0.023781354	0.000296444	0.014423405	1	0.001531347	0.050161589
ILMN_2634157	ZFP654	1.102206279	0.000299498	0.014892062	0.000299498	0.013353714	0.00000507	0.000764406	0.0000188	0.002298746	1	3.12891E-05	0.005434371
ILMN_1238869	LOC278666	1.102138175	0.004674836	0.071504777	0.002768024	0.048451528	0.000637697	0.023592972	0.001216774	0.035196389	0	0.00305523	0.073418572
ILMN_1215910	FOXN2	1.102070233	0.000299498	0.014892062	0.000299498	0.013353714	0.000745879	0.026123729	0.00053798	0.021230722	1	0.000438006	0.025077344
ILMN_2621086	FLI1	1.102009965	0.001225688	0.030541554	0.001496892	0.032842408	0.001471072	0.039466269	0.000703549	0.025381142	1	0.000873828	0.037145252
ILMN_2699531	RGS10	1.101989172	0.00227139	0.045458063	0.001496892	0.032842408	0.000519887	0.020807554	0.000412208	0.017749337	1	0.001068077	0.041672924
ILMN_2603187	MECP2	1.101917508	0.000299498	0.014892062	0.000299498	0.013353714	0.00000123	0.000260429	0.00000145	0.000347545	1	5.39498E-06	0.002025163
ILMN_2982781	KCNK5	1.101765886	0.000639896	0.021153497	0.000639896	0.019410925	0.0000223	0.00222523	0.0000282	0.002959627	1	0.000151664	0.013244851
ILMN_1244845	NARF	1.101738476	0.000942625	0.026071536	0.000942625	0.024301667	0.0000508	0.003974909	0.000159623	0.00973796	1	0.000453754	0.02560106
ILMN_2680398	ZC3H12D	1.10146721	0.000299498	0.014892062	0.000299498	0.013353714	0.000001	0.000219086	0.000000952	0.000257701	1	7.03927E-06	0.002307643
ILMN_2605031	E330018D03RIK	1.101463118	0.005600396	0.080174568	0.008318086	0.098004431	0.004537122	0.077076423	0.012645685	0.136133148	0	0.010802479	0.142201077
ILMN_2617477	8030476J24	1.101261776	0.001225688	0.030541554	0.001225688	0.028815909	0.000157886	0.009106733	0.000173663	0.010310561	1	0.00010758	0.010838827
ILMN_2901284	ADD3	1.101189602	0.000299498	0.014892062	0.000299498	0.013353714	0.0000471	0.003800848	0.0000359	0.003445285	1	4.70154E-05	0.006881837
ILMN_2506499	UBE3A	1.101180473	0.002520973	0.048392748	0.002520973	0.046026289	0.000531693	0.021116652	0.001925925	0.046019516	1	0.004924874	0.095356944
ILMN_2605960	RAB19	1.101133403	0.002018395	0.042006944	0.001496892	0.032842408	0.000428022	0.018375605	0.000589526	0.022608846	1	0.001141234	0.042874093
ILMN_2562725	C730013O11RIK	1.101075632	0.000942625	0.026071536	0.000942625	0.024301667	0.000877065	0.028689223	0.001021509	0.031783537	1	0.000504223	0.027322568
ILMN_2567626	PUM1	1.101065176	0.006286464	0.085736353	0.005600396	0.076777595	0.006420983	0.094342641	0.004575698	0.077674245	0	0.012677869	0.153956896
ILMN_2954868	OASL2	1.101052773	0.00227139	0.045458063	0.003012339	0.051552328	0.004951444	0.081231057	0.002127551	0.048753581	0	0.0010331	0.040997434
ILMN_1233894	DTNB	1.100978861	0.000299498	0.014892062	0.000299498	0.013353714	0.000394741	0.017353743	0.001002721	0.0313667	1	0.00057968	0.029683566
ILMN_1229245	INPP4B	1.100970899	0.00227139	0.045458063	0.001760487	0.036357572	0.000446402	0.018841131	0.000624846	0.023550381	1	0.000873828	0.037145252
ILMN_1256639	CD247	1.100911079	0.000639896	0.021153497	0.000299498	0.013353714	0.0000315	0.002856803	0.0000379	0.003587283	1	0.000353739	0.02219068
ILMN_2631192	VPS26B	1.100779486	0.004674836	0.071504777	0.00227139	0.042916604	0.002437285	0.054372505	0.001151219	0.03404972	0	0.006029251	0.106465686
ILMN_2038768	control_ILMN_2038768	1.1007468	0.109264287	0.401166936	0.107213169	0.397349446	0.117598066	0.433296696	0.11009287	0.413665062	0	0.246250128	0.607563618
ILMN_2668977	1500032D16RIK	1.100684878	0.000299498	0.014892062	0.000299498	0.013353714	0.00000386	0.000632356	0.00000566	0.00097714	1	1.1877E-05	0.003141395
ILMN_1248211	SIDT1	1.100585537	0.003012339	0.054401128	0.002018395	0.039534447	0.001158917	0.034271991	0.001607153	0.041193921	0	0.002873882	0.071309138
ILMN_2534151	IRGB10	1.100553681	0.005370369	0.078183323	0.006286464	0.0826602	0.030053192	0.221517959	0.009055427	0.112610992	0	0.007994557	0.121608701
ILMN_1224211	EPB4.1L2	1.100521767	0.005139198	0.076197614	0.006967815	0.088252989	0.007964394	0.107082218	0.015471566	0.152284836	0	0.023367993	0.210226124
ILMN_2771182	H2-Q8	1.100477595	0.002520973	0.048392748	0.001760487	0.036357572	0.000482252	0.019777416	0.000254672	0.01309856	1	0.003246828	0.076021173
ILMN_2890357	2610027C15RIK	1.10037148	0.000639896	0.021153497	0.000639896	0.019410925	0.000448658	0.018899281	0.000401323	0.017418469	1	0.000559888	0.029151118
ILMN_2705732	INADL	1.100280563	0.000942625	0.026071536	0.001225688	0.028815909	0.000260587	0.013056566	0.000223062	0.012129499	1	0.000559888	0.029151118
ILMN_2422023	C330006D17RIK	1.10024538	0.003970394	0.064249	0.005139198	0.07282894	0.005293782	0.084851812	0.006492934	0.093577166	0	0.007351981	0.116676672
ILMN_1239398	LOC100046817	1.100205887	0.020945534	0.169933229	0.023722035	0.179616163	0.010052171	0.122378526	0.025572066	0.198492675	0	0.044021446	0.284999621
ILMN_1256245	RLF	1.100181996	0.005370369	0.078183323	0.007869606	0.095217785	0.003635324	0.067604241	0.008632236	0.109699863	0	0.005373592	0.100089876
ILMN_1243846	NRF1	1.100170193	0.001225688	0.030541554	0.001496892	0.032842408	0.00073562	0.025977764	0.002381707	0.052317743	0	0.001633268	0.052249986
ILMN_1242769	AKAP8L	1.100071536	0.003494726	0.059081055	0.003494726	0.056620496	0.001845509	0.045888316	0.002962195	0.060255548	0	0.002387591	0.063870812
ILMN_2993109	DDIT4	1.100038813	0.000299498	0.014892062	0.000299498	0.013353714	0.00000961	0.001211954	0.000042	0.003865058	1	0.000146035	0.012922953
ILMN_1245987	HNRNPK	1.100037736	0.019659544	0.162924549	0.028394902	0.197371412	0.02738494	0.210925532	0.04211374	0.257862175	0	0.051397104	0.307424957
Probes with |Fold Change| < 1.10 not displayed													
ILMN_2715198	GOLGA2	-1.100056844	0.007194081	0.092947182	0.007644699	0.094076848	0.010940387	0.128401963	0.009461691	0.115200974	0	0.008929411	0.129240455
ILMN_2711045	SIRT5	-1.100175511	0.000639896	0.021153497	0.000942625	0.024301667	0.000484665	0.019858893	0.000269243	0.013583836	1	0.000264806	0.018619193
ILMN_2734856	A930009M04RIK	-1.10024481	0.000299498	0.014892062	0.000299498	0.013353714	0.00000347	0.000586923	0.00000793	0.001243596	1	1.97985E-05	0.004208042
ILMN_1253854	TGIF1	-1.100335725	0.010980731	0.118109454	0.008987421	0.102128981	0.004275639	0.074288225	0.006437968	0.093170157	0	0.017311316	0.180185556

ILMN_2769945	BC014795	-1.10036431	0.000942625	0.026071536	0.000942625	0.024301667	0.0000879	0.006058155	0.000203233	0.011438788	1	0.000522178	0.028002086
ILMN_2954195	SCYL1	-1.100565484	0.00809366	0.100146322	0.006514138	0.084466318	0.003549564	0.066945529	0.006164384	0.090932677	0	0.009177877	0.130483403
ILMN_2988572	EZH2	-1.100604827	0.006286464	0.085736353	0.006058437	0.080759553	0.001631327	0.0423263	0.00517364	0.083183907	0	0.011706901	0.147795262
ILMN_2728118	RRP12	-1.100673522	0.000299498	0.014892062	0.000299498	0.013353714	0.0000058	0.000845189	0.00000976	0.001398167	1	2.34093E-05	0.00450296
ILMN_1235470	HNRNPC	-1.100796556	0.000299498	0.014892062	0.000299498	0.013353714	0.000000028	0.0000148	0.000000142	0.0000709	1	4.50906E-06	0.001809827
ILMN_2774410	STFA1	-1.100797564	0.033675597	0.219136594	0.03956153	0.236732645	0.035070686	0.240476898	0.039755719	0.250087018	0	0.058515334	0.326349541
ILMN_2856095	ZC3H12A	-1.101004577	0.001496892	0.034781534	0.000942625	0.024301667	0.00016088	0.009199591	0.000330427	0.015473218	1	0.001259689	0.045559243
ILMN_2985447	CMTM7	-1.101081672	0.000942625	0.026071536	0.000942625	0.024301667	0.000360066	0.016271848	0.000308751	0.014785413	1	0.000438006	0.025077344
ILMN_2870487	CPNE2	-1.101235208	0.003012339	0.054401128	0.001760487	0.036357572	0.000156883	0.009060097	0.000338388	0.015735209	0	0.002173782	0.060770595
ILMN_2736762	IFRD2	-1.101280587	0.009432307	0.108259469	0.008987421	0.102128981	0.004273519	0.074279126	0.006779044	0.095608851	0	0.021171123	0.199686371
ILMN_2620061	TBCB	-1.101312875	0.000299498	0.014892062	0.000299498	0.013353714	0.0000296	0.002740308	0.0000316	0.003180587	1	9.5799E-05	0.010180718
ILMN_1252016	ABHD2	-1.101327755	0.001760487	0.038593802	0.000639896	0.019410925	0.0000452	0.003705003	0.00013411	0.00874694	1	0.000453754	0.02560106
ILMN_2683802	NUDT9	-1.101534614	0.000299498	0.014892062	0.000299498	0.013353714	0.00000633	0.000915234	0.0000127	0.001692242	1	7.57938E-05	0.008797941
ILMN_2758087	CCNT1	-1.101561438	0.003494726	0.059081055	0.003253905	0.054324155	0.001171168	0.034442996	0.001373589	0.03783222	0	0.003663228	0.081662975
ILMN_1222246	ADFP	-1.101682242	0.009432307	0.108259469	0.008541654	0.099378843	0.002890957	0.060142799	0.005204118	0.083438223	0	0.013017012	0.156039878
ILMN_1250149	DNMT3L	-1.101692032	0.000942625	0.026071536	0.000299498	0.013353714	0.0000385	0.003287434	0.000081	0.006004936	1	0.000135361	0.012427306
ILMN_2855423	UBE3B	-1.101823534	0.004674836	0.071504777	0.004441009	0.066594341	0.000975784	0.0310015	0.00261887	0.055581773	0	0.011096803	0.144280139
ILMN_3093150	NPM3	-1.101881244	0.01076004	0.116961528	0.012078865	0.121464806	0.007488533	0.103432865	0.010780409	0.12447925	0	0.018679697	0.18694557
ILMN_2887208	RAB1B	-1.1018898	0.007419532	0.094878068	0.004674836	0.068774915	0.002114263	0.049983662	0.001621353	0.041443788	0	0.005220076	0.098611557
ILMN_1246622	9130204C11RIK	-1.102206651	0.000942625	0.026071536	0.000639896	0.019410925	0.0000832	0.005824704	0.0000636	0.005055758	1	0.000246108	0.017705716
ILMN_1237507	DLST	-1.102242835	0.000299498	0.014892062	0.000299498	0.013353714	0.0000239	0.0023395	0.0000261	0.002837023	1	4.70154E-05	0.006881837
ILMN_2615739	GM459	-1.102378757	0.017508946	0.15321051	0.021159798	0.168667397	0.019024292	0.174935542	0.028152145	0.207735874	0	0.018679697	0.18694557
ILMN_2605767	REPIN1	-1.102407679	0.000299498	0.014892062	0.000299498	0.013353714	0.000478648	0.019681646	0.0000565	0.004637506	1	0.000120719	0.011491043
ILMN_2675033	SLC9A7	-1.102560823	0.000299498	0.014892062	0.000299498	0.013353714	0.0000189	0.001948172	0.0000376	0.003576126	1	9.5799E-05	0.010180718
ILMN_2531520	GM962	-1.10277933	0.000639896	0.021153497	0.000639896	0.019410925	0.0000441	0.003636842	0.0000899	0.006457872	1	0.000393771	0.023711359
ILMN_2952587	INTS5	-1.102916647	0.014696493	0.139447069	0.012735944	0.125338424	0.006468173	0.094796612	0.00750925	0.101343301	0	0.008450429	0.125387993
ILMN_3162081	WDR6	-1.103000504	0.001496892	0.034781534	0.002018395	0.039534447	0.000474019	0.019543082	0.000886286	0.029245777	1	0.000934606	0.038635069
ILMN_2823778	SC4MOL	-1.103118657	0.000942625	0.026071536	0.000299498	0.013353714	0.000609634	0.022902836	0.000353682	0.016129651	1	0.000176289	0.014446733
ILMN_2637804	4933407P14RIK	-1.103123645	0.027759492	0.197119517	0.028818751	0.199347911	0.033358108	0.234514405	0.027081488	0.204795156	0	0.03192796	0.244754736
ILMN_2944939	CAMK1	-1.103291951	0.000299498	0.014892062	0.000299498	0.013353714	0.0000298	0.002749089	0.0000185	0.002263791	1	3.12891E-05	0.005434371
ILMN_2966386	RCL1	-1.10330649	0.000639896	0.021153497	0.000639896	0.019410925	0.00000151	0.000303563	0.00000531	0.000929895	1	8.86216E-05	0.009822905
ILMN_2721208	MSTO1	-1.103313852	0.007644699	0.096726012	0.005139198	0.07282894	0.000875964	0.028689223	0.001541191	0.04014427	0	0.005531174	0.101481885
ILMN_1243107	CENTD3	-1.103383796	0.000639896	0.021153497	0.000639896	0.019410925	0.0000139	0.001584056	0.0000239	0.002688276	1	0.000204639	0.01592867
ILMN_2491232	USP36	-1.103389463	0.002018395	0.042006944	0.001496892	0.032842408	0.000160026	0.009162023	0.000178437	0.010486465	1	0.003055109	0.073418572
ILMN_1259100	PILRB1	-1.103436708	0.004907577	0.073992984	0.003012339	0.051552328	0.000884632	0.028896103	0.001952301	0.046411523	0	0.002173782	0.060770595
ILMN_1225747	ZNFN1A3	-1.103489414	0.000299498	0.014892062	0.000299498	0.013353714	0.0000072	0.000992417	0.0000278	0.002931426	1	0.000453754	0.02560106
ILMN_2721149	ARL11	-1.103567882	0.003253905	0.056782136	0.003494726	0.056620496	0.000781551	0.026967268	0.000916667	0.029754618	0	0.002620495	0.067689332
ILMN_1244424	ADORA2B	-1.103675196	0.004206115	0.066690827	0.002520973	0.046026289	0.000704457	0.025331453	0.000660708	0.024405921	0	0.00388914	0.084081646
ILMN_1228832	NGP	-1.103786521	0.012954349	0.129730009	0.01076004	0.113383658	0.004145932	0.073302473	0.004001218	0.071825953	0	0.011398229	0.146077469
ILMN_1260456	HSD3B7	-1.103805679	0.000299498	0.014892062	0.000299498	0.013353714	0.000000864	0.000199042	0.00000221	0.000472255	1	2.15311E-05	0.004320203
ILMN_1227235	TIMM10	-1.103984846	0.001225688	0.030541554	0.001225688	0.028815909	0.000353703	0.016125168	0.000567099	0.0219992	1	0.000763113	0.034824155
ILMN_2871749	EAR6	-1.10402136	0.003253905	0.056782136	0.004907577	0.070737293	0.009625128	0.119186174	0.006414918	0.093049294	0	0.005220076	0.098611557
ILMN_2911344	PLSCR1	-1.104115255	0.000299498	0.014892062	0.000299498	0.013353714	0.000551745	0.021563464	0.000115271	0.007776142	1	0.000329201	0.021282383
ILMN_2698494	NFU1	-1.104319371	0.001225688	0.030541554	0.001225688	0.028815909	0.001011866	0.031674068	0.001309443	0.036673066	1	0.001301631	0.046179135
ILMN_2603898	CLEC4B1	-1.104355951	0.001496892	0.034781534	0.000639896	0.019410925	0.000477241	0.01964113	0.000139187	0.008973291	1	0.00042277	0.024660011
ILMN_2749448	PLEKHO2	-1.104536512	0.001496892	0.034781534	0.001496892	0.032842408	0.0000583	0.004418055	0.000178021	0.010475755	1	0.000600091	0.030462238
ILMN_2631014	PIAS3	-1.104655312	0.000299498	0.014892062	0.000299498	0.013353714	0.00000858	0.001133948	0.0000309	0.003134864	1	3.39668E-05	0.00570777

ILMN_2595863	CHST10	-1.10468852	0.000299498	0.014892062	0.000299498	0.013353714	0.000116386	0.007431321	0.000303564	0.01463008	1	0.00022037	0.016464793
ILMN_1231439	AATK	-1.104893386	0.00227139	0.045458063	0.001496892	0.032842408	0.0000541	0.004165288	0.000259313	0.013278569	1	0.003449313	0.078819425
ILMN_2923607	PHLDA3	-1.105141716	0.000639896	0.021153497	0.000299498	0.013353714	0.0000359	0.003145034	0.0000324	0.003223303	1	5.09531E-05	0.007252947
ILMN_2544343	STAB1	-1.105676499	0.000299498	0.014892062	0.000299498	0.013353714	0.00000574	0.000845189	0.0000233	0.002627969	1	0.000176289	0.014446733
ILMN_1238102	IDE	-1.105690099	0.049597708	0.270471422	0.05750633	0.289534001	0.037803431	0.249381564	0.066367866	0.321827801	0	0.059776798	0.328820555
ILMN_2834198	SCN1B	-1.106256844	0.000299498	0.014892062	0.000639896	0.019410925	0.000237665	0.012175724	0.000446487	0.018790822	1	0.000453754	0.02560106
ILMN_1236702	LILRB4	-1.10637923	0.01076004	0.116961528	0.008987421	0.102128981	0.002240682	0.051760317	0.003875331	0.070435395	0	0.017311316	0.180185556
ILMN_2979639	H2-DMB2	-1.106407472	0.00227139	0.045458063	0.002018395	0.039534447	0.001726536	0.043915331	0.000996725	0.031258932	1	0.00270263	0.068855671
ILMN_1256817	SLPI	-1.106517473	0.043959273	0.252131434	0.030087942	0.20371558	0.013221865	0.143251676	0.016541231	0.157798872	0	0.038432634	0.26812964
ILMN_2590350	UBE2F	-1.106602174	0.000942625	0.026071536	0.000942625	0.024301667	0.00030653	0.014534302	0.000065	0.005110515	1	0.000157497	0.013500967
ILMN_1240318	SLC7A7	-1.106705276	0.000299498	0.014892062	0.000299498	0.013353714	0.00037337	0.016697112	0.000524897	0.020878705	1	0.000470028	0.02607676
ILMN_1215893	ALG3	-1.106724214	0.000299498	0.014892062	0.000299498	0.013353714	0.00000791	0.001060486	0.00000859	0.001299233	1	0.000212368	0.016047225
ILMN_2780915	PRMT7	-1.106850835	0.001496892	0.034781534	0.001225688	0.028815909	0.000436629	0.018614041	0.000675195	0.024769672	1	0.002387492	0.063870812
ILMN_2746830	BC022224	-1.106855817	0.003970394	0.064249	0.002018395	0.039534447	0.00012205	0.007605138	0.000874003	0.02899696	0	0.005858907	0.104408326
ILMN_3120014	SRI	-1.106861448	0.008764316	0.104351101	0.010539193	0.112323558	0.012670518	0.139823277	0.013221949	0.139651023	0	0.029744406	0.23776625
ILMN_2959292	UPP1	-1.107047972	0.006741497	0.089431865	0.008318086	0.098004431	0.006166693	0.092231529	0.007371792	0.100219589	0	0.008450429	0.125387993
ILMN_2633457	1110057K04RIK	-1.107066336	0.000639896	0.021153497	0.000639896	0.019410925	0.0002621	0.013118251	0.000180465	0.010552902	1	0.000688785	0.032681842
ILMN_2646209	CDK10	-1.107106695	0.011640032	0.121845949	0.009654071	0.106524046	0.00837294	0.109931638	0.005970714	0.089478328	0	0.004644853	0.093111105
ILMN_2680440	ATP6V1B2	-1.107126066	0.001225688	0.030541554	0.000942625	0.024301667	0.0000173	0.001831837	0.000154786	0.009492492	1	0.00057965	0.029683566
ILMN_2691706	SAC3D1	-1.107157088	0.00227139	0.045458063	0.002018395	0.039534447	0.000594509	0.022658053	0.00187868	0.045262385	1	0.001531347	0.050161589
ILMN_1241909	ATL3	-1.107229662	0.001760487	0.038593802	0.000299498	0.013353714	0.000124699	0.007749516	0.000235699	0.012495554	1	0.001301631	0.046179135
ILMN_2686975	FAM129B	-1.107251043	0.000942625	0.026071536	0.000639896	0.019410925	0.000100156	0.006650425	0.0000642	0.005083088	1	0.000621233	0.03109305
ILMN_2900557	KIF15	-1.107418991	0.005600396	0.080174568	0.002520973	0.046026289	0.000508153	0.020532133	0.000737458	0.02616347	0	0.002314175	0.062958735
ILMN_2745954	1110007L15RIK	-1.107513874	0.000639896	0.021153497	0.000299498	0.013353714	0.000257427	0.012954007	0.000267465	0.013561762	1	0.000284828	0.019439747
ILMN_1226372	RFFL	-1.107562515	0.000942625	0.026071536	0.000639896	0.019410925	0.0000159	0.001744691	0.000055	0.004568149	1	0.000379979	0.02324165
ILMN_3084818	NR2C2AP	-1.107652217	0.00227139	0.045458063	0.001225688	0.028815909	0.000421067	0.018198145	0.000978894	0.030933174	1	0.001797898	0.054876565
ILMN_1248733	PA2G4	-1.107667438	0.001760487	0.038593802	0.002520973	0.046026289	0.002259152	0.051954924	0.003953198	0.071295686	0	0.002787111	0.070087328
ILMN_2630605	FSCN1	-1.107768152	0.00809366	0.100146322	0.006058437	0.080759553	0.0018293	0.045607075	0.002556189	0.054799056	0	0.007351981	0.116676672
ILMN_3003631	PPAP2C	-1.10780952	0.002768024	0.051337774	0.002768024	0.048451528	0.000994427	0.031329141	0.00125441	0.035750241	0	0.000934606	0.038635069
ILMN_2598775	STARD3NL	-1.107943892	0.001760487	0.038593802	0.001496892	0.032842408	0.0000601	0.004524475	0.000153316	0.009469751	1	0.000737547	0.034262098
ILMN_2588995	RAB8B	-1.108140051	0.004674836	0.071504777	0.002018395	0.039534447	0.000610966	0.022924563	0.000681824	0.024911182	0	0.00099904	0.040236595
ILMN_2936468	5730596K20RIK	-1.108252625	0.000299498	0.014892062	0.000299498	0.013353714	0.000000848	0.000196389	0.00000286	0.000576709	1	3.26018E-05	0.005579105
ILMN_2699522	DYRK3	-1.108291839	0.000299498	0.014892062	0.000299498	0.013353714	0.0000346	0.003062528	0.0000326	0.003233591	1	2.65234E-05	0.004803829
ILMN_2611431	PPP3CA	-1.108544093	0.019015163	0.15981086	0.023082193	0.177055003	0.030858102	0.224426141	0.030826222	0.218815938	0	0.043046488	0.281931179
ILMN_2908056	TMBIM1	-1.108696543	0.000299498	0.014892062	0.000299498	0.013353714	0.000355587	0.016178372	0.000702712	0.025381142	1	0.000844832	0.036512914
ILMN_2744909	GMPPB	-1.108708169	0.000639896	0.021153497	0.000639896	0.019410925	0.002181893	0.050984232	0.001601194	0.041131766	0	0.001218998	0.044502503
ILMN_2925281	ABCD3	-1.108715146	0.000299498	0.014892062	0.000299498	0.013353714	0.000000143	0.0000497	0.000000183	0.0000833	1	1.89069E-06	0.001114107
ILMN_2988931	STFA1	-1.108889714	0.014262117	0.136875566	0.016213806	0.144430879	0.0128175	0.140645018	0.014257192	0.145852642	0	0.022800994	0.207572432
ILMN_2819679	TMEM50A	-1.108893575	0.016645639	0.148953717	0.018586049	0.156283296	0.018816881	0.174028972	0.018978511	0.169539906	0	0.032684998	0.247385688
ILMN_2698430	BCL2L1	-1.109012645	0.000942625	0.026071536	0.000942625	0.024301667	0.000842975	0.02806722	0.00013557	0.008801061	1	0.000621233	0.03109305
ILMN_3137980	ZFP41	-1.109014707	0.000299498	0.014892062	0.000299498	0.013353714	0.0000051	0.000765509	0.00000777	0.001225434	1	3.25994E-05	0.005579105
ILMN_2914507	NDUFB6	-1.109148444	0.006286464	0.085736353	0.006286464	0.0826602	0.003234751	0.063747608	0.004757926	0.079602307	0	0.007994557	0.121608701
ILMN_1243329	DAB2	-1.109426935	0.011860136	0.12340942	0.00809366	0.096526955	0.0024452	0.054509936	0.003116238	0.062120568	0	0.029045675	0.234883436
ILMN_2640453	WDR55	-1.109433931	0.000639896	0.021153497	0.000639896	0.019410925	0.0000894	0.006126826	0.000120544	0.008038629	1	0.000237231	0.017362241
ILMN_2867696	CDC42BPB	-1.110032665	0.000299498	0.014892062	0.000299498	0.013353714	0.0000456	0.003724783	0.000110702	0.007522402	1	0.000379979	0.02324165
ILMN_2795412	TMEM176A	-1.110201644	0.000639896	0.021153497	0.000639896	0.019410925	0.0000316	0.002858552	0.0000256	0.002802168	1	8.86334E-05	0.009822905
ILMN_2727273	SWAP70	-1.110366306	0.000299498	0.014892062	0.000299498	0.013353714	0.00000132	0.000271671	0.0000026	0.000530708	1	2.44059E-05	0.00463717

ILMN_2620767	ABHD2	-1.110517436	0.000299498	0.014892062	0.000299498	0.013353714	0.00000256	0.000464931	0.00000565	0.00097714	1	4.33673E-05	0.006596797
ILMN_1221920	PLEKHG3	-1.110664539	0.000299498	0.014892062	0.000299498	0.013353714	0.0000203	0.002081518	0.0000086	0.001299233	1	1.74444E-05	0.003903768
ILMN_2764607	1810009N02RIK	-1.110668063	0.000299498	0.014892062	0.000299498	0.013353714	0.00000473	0.000733297	0.0000076	0.001211113	1	4.89467E-05	0.007053629
ILMN_2842767	NACC1	-1.110682075	0.000639896	0.021153497	0.000639896	0.019410925	0.000238036	0.012175724	0.000226352	0.012236289	1	0.00042277	0.024660011
ILMN_2755399	PPP2R4	-1.110682315	0.002768024	0.051337774	0.00227139	0.042916604	0.002129304	0.050174412	0.00148083	0.039320129	0	0.001531347	0.050161589
ILMN_1256354	GCLM	-1.110765414	0.001496892	0.034781534	0.000942625	0.024301667	0.0000865	0.005995631	0.0000573	0.004664893	1	7.57938E-05	0.008797941
ILMN_2981689	NUP133	-1.11080026	0.000299498	0.014892062	0.000299498	0.013353714	0.000013	0.00149316	0.00000117	0.000296995	1	7.35697E-06	0.002329557
ILMN_2915303	TREM3	-1.110935528	0.000942625	0.026071536	0.001225688	0.028815909	0.000130601	0.007988263	0.000242484	0.012705581	1	0.000228655	0.016840488
ILMN_1215209	CLECSF9	-1.110943822	0.019874198	0.164084265	0.020303308	0.164948412	0.01231585	0.137285353	0.014561252	0.147630924	0	0.016448649	0.176089072
ILMN_2841290	TNFAIP2	-1.110987512	0.000299498	0.014892062	0.000639896	0.019410925	0.000308378	0.014587484	0.000187938	0.010853565	1	0.000212368	0.016047225
ILMN_2959293	UPP1	-1.111007524	0.001496892	0.034781534	0.001496892	0.032842408	0.001009941	0.031635071	0.001351043	0.037410476	1	0.002314272	0.062958735
ILMN_2614563	APOL7C	-1.111021044	0.000299498	0.014892062	0.000299498	0.013353714	0.0000444	0.003643784	0.000141719	0.009037925	1	0.000237231	0.017362241
ILMN_3160203	ZFP213	-1.11102856	0.000639896	0.021153497	0.000639896	0.019410925	0.0000159	0.001744691	0.0000628	0.00500903	1	0.000306263	0.02048222
ILMN_2601379	MGC18837	-1.111045685	0.000299498	0.014892062	0.000299498	0.013353714	0.0000105	0.001281506	0.0000199	0.002370654	1	4.51564E-05	0.006758509
ILMN_1235000	YIF1A	-1.111117156	0.000639896	0.021153497	0.000639896	0.019410925	0.0000128	0.001486029	0.00000478	0.000855756	1	3.83949E-05	0.006099544
ILMN_2640995	SPIRE2	-1.111127251	0.000299498	0.014892062	0.000299498	0.013353714	0.000000143	0.0000497	0.000000559	0.000175929	1	5.39498E-06	0.002025163
ILMN_2884098	GORASP2	-1.111288278	0.000299498	0.014892062	0.000299498	0.013353714	0.00000784	0.001059356	0.0000312	0.003152395	1	7.28705E-05	0.008652811
ILMN_1256142	MARCKS	-1.111356803	0.005370369	0.078183323	0.001760487	0.036357572	0.0000741	0.005348334	0.000261016	0.01332625	0	0.000643034	0.031573087
ILMN_2601147	KDELC1	-1.111368149	0.001760487	0.038593802	0.002018395	0.039534447	0.000534729	0.021219104	0.000786349	0.027233771	1	0.001581552	0.051264971
ILMN_2680549	PIK3CB	-1.111474769	0.000299498	0.014892062	0.000299498	0.013353714	0.000250228	0.012673975	0.000458429	0.01916188	1	0.001686462	0.053258626
ILMN_1218181	IFITM6	-1.111515015	0.001225688	0.030541554	0.001225688	0.028815909	0.000942915	0.030164849	0.000377375	0.0167608	1	0.000643034	0.031573087
ILMN_2550095	6230425C21RIK	-1.111625769	0.001496892	0.034781534	0.001760487	0.036357572	0.000813454	0.027557393	0.001954544	0.046417419	1	0.003149701	0.074838758
ILMN_1224390	1700129I04RIK	-1.111956114	0.000299498	0.014892062	0.000299498	0.013353714	0.00000447	0.000708724	0.0000272	0.002888688	1	0.000189968	0.015089482
ILMN_1240746	MCPT4	-1.111968534	0.004441009	0.0691859	0.001760487	0.036357572	0.000112299	0.007249896	0.000286432	0.014095117	0	0.002173782	0.060770595
ILMN_1230423	SH3PXD2B	-1.111999219	0.000299498	0.014892062	0.000299498	0.013353714	0.0000155	0.001716578	0.00000487	0.000862773	1	7.88278E-05	0.009015226
ILMN_1247468	FTSJ3	-1.112004157	0.000299498	0.014892062	0.000299498	0.013353714	0.0000521	0.004045058	0.0000644	0.005086516	1	6.47271E-05	0.008034278
ILMN_3140913	TBC1D2	-1.112150855	0.000299498	0.014892062	0.000299498	0.013353714	0.0000389	0.00330101	0.00000834	0.001279253	1	0.000111802	0.010979022
ILMN_2519673	VWF	-1.112341924	0.000639896	0.021153497	0.000299498	0.013353714	0.0000321	0.002890742	0.0000414	0.003820132	1	9.21504E-05	0.009952034
ILMN_2617468	CHAC1	-1.112462827	0.001225688	0.030541554	0.000942625	0.024301667	0.001006775	0.031562764	0.000392342	0.017180018	1	0.000665544	0.032069437
ILMN_2450031	SCL0004020.1_31	-1.112588927	0.000942625	0.026071536	0.000942625	0.024301667	0.0000097	0.001217617	0.0000309	0.003134864	1	3.68613E-05	0.005999236
ILMN_2450155	IGLC2_J00595_IG_LAMBDA_CONSTANT_2_14	-1.112608245	0.000299498	0.014892062	0.000299498	0.013353714	0.00000122	0.000258815	0.0000337	0.003292439	1	0.000317448	0.020788254
ILMN_1218104	5630401D24RIK	-1.112744368	0.000299498	0.014892062	0.000299498	0.013353714	0.00000346	0.000586923	0.00000396	0.000746457	1	5.74504E-05	0.007618639
ILMN_1237743	LOC382813	-1.112766578	0.000299498	0.014892062	0.000299498	0.013353714	0.000000654	0.000160103	0.00000198	0.000436891	1	1.08955E-05	0.00300091
ILMN_1222872	WBSCR16	-1.112770151	0.003733327	0.06184411	0.003970394	0.061967633	0.001378275	0.03773799	0.003620373	0.068005458	0	0.004924874	0.095356944
ILMN_2687828	ARID3A	-1.112982962	0.009654071	0.110018185	0.007869606	0.095217785	0.002788554	0.059026289	0.003542367	0.067235737	0	0.011096803	0.144280139
ILMN_2772492	TSR1	-1.11339113	0.000299498	0.014892062	0.000299498	0.013353714	0.0000835	0.00583655	0.0000958	0.0067548	1	0.000146035	0.012922953
ILMN_2868480	EAR4	-1.11346403	0.068288049	0.318497497	0.073665179	0.328827487	0.059774116	0.312050787	0.079523141	0.35376248	0	0.035872649	0.258477426
ILMN_1219168	GPN1	-1.113513745	0.000299498	0.014892062	0.000299498	0.013353714	0.000122008	0.007605138	0.000459126	0.01916188	1	0.000621233	0.03109305
ILMN_1214608	PLXND1	-1.113701478	0.000942625	0.026071536	0.000639896	0.019410925	0.0000167	0.001787628	0.0000626	0.00500138	1	0.000816732	0.036034504
ILMN_2723708	FNBP1	-1.113872343	0.000299498	0.014892062	0.000299498	0.013353714	0.00000754	0.001031824	0.0000151	0.001938491	1	5.09531E-05	0.007252947
ILMN_2806180	CSF3R	-1.11399081	0.001760487	0.038593802	0.001496892	0.032842408	0.000121883	0.007605138	0.000345469	0.015942739	1	0.001977658	0.05767797
ILMN_2652172	NAGK	-1.114167208	0.000942625	0.026071536	0.000942625	0.024301667	0.0000386	0.003287434	0.000106245	0.007284834	1	0.000212368	0.016047225
ILMN_2859847	PYGL	-1.114288643	0.001496892	0.034781534	0.001496892	0.032842408	0.000101181	0.00668036	0.000377902	0.0167608	1	0.001482614	0.049612679
ILMN_2470360	BC037704	-1.11448614	0.000299498	0.014892062	0.000299498	0.013353714	0.00000126	0.000263891	0.00000148	0.000354054	1	9.15833E-06	0.002681086
ILMN_1217040	1300001I01RIK	-1.114584244	0.002768024	0.051337774	0.003494726	0.056620496	0.001718083	0.04381888	0.003497571	0.066721909	0	0.005373592	0.100089876
ILMN_1223285	HSPA2	-1.115046275	0.000299498	0.014892062	0.000299498	0.013353714	0.000000797	0.000185854	0.00000345	0.000677604	1	4.70154E-05	0.006881837

ILMN_2950814	GM962	-1.115047143	0.006741497	0.089431865	0.005370369	0.074974418	0.000814439	0.027570687	0.002319092	0.051476756	0	0.004783009	0.09409752		
ILMN_1214952	CLN3	-1.115097709	0.000299498	0.014892062	0.000299498	0.013353714	0.00000672	0.000954053	0.0000454	0.004033989	1	6.73408E-05	0.00831435		
ILMN_3163504	METTL4	-1.115151964	0.000299498	0.014892062	0.000299498	0.013353714	0.0000174	0.001832586	0.00000733	0.001185124	1	5.09531E-05	0.007252947		
ILMN_2822552	UBTD2	-1.115214016	0.000942625	0.026071536	0.001225688	0.028815909	0.000774556	0.026825337	0.002334851	0.051588335	0	0.00270263	0.068855671		
ILMN_2717678	MUC13	-1.115246667	0.000639896	0.021153497	0.000299498	0.013353714	0.00000878	0.001147985	0.0000157	0.00199766	1	5.97852E-05	0.007773248		
ILMN_2433547	TRP53BP1	-1.115309394	0.000299498	0.014892062	0.000299498	0.013353714	0.00000111	0.000240925	0.00000369	0.000720943	1	3.53859E-05	0.005861598		
ILMN_2788073	HMOX1	-1.115323968	0.006967815	0.091154627	0.003970394	0.061967633	0.001023516	0.0318673	0.001502144	0.039708565	0	0.001977658	0.05767797		
ILMN_1219208	NOL6	-1.115717769	0.000299498	0.014892062	0.000299498	0.013353714	0.00000446	0.000708724	0.0000167	0.00209125	1	0.000146035	0.012922953		
ILMN_1237430	PHLPP	-1.11586422	0.001225688	0.030541554	0.001225688	0.028815909	0.000240626	0.012267717	0.000354258	0.016129651	1	0.000844832	0.036512914		
ILMN_2723483	POLR1B	-1.115874714	0.001225688	0.030541554	0.000639896	0.019410925	0.0000273	0.002563188	0.0000442	0.003965776	1	0.000228655	0.016840488		
ILMN_2958484	NLRX1	-1.115901939	0.000639896	0.021153497	0.000639896	0.019410925	0.00000911	0.001168709	0.0000192	0.002327044	1	0.000157497	0.013500967		
ILMN_2661367	HYOU1	-1.11593221	0.000639896	0.021153497	0.000639896	0.019410925	0.000367579	0.016499233	0.000301016	0.014549744	1	0.000306263	0.02048222		
ILMN_2608145	HDHD3	-1.116104843	0.000299498	0.014892062	0.000299498	0.013353714	0.000037	0.003215513	0.000031	0.003134864	1	0.000228655	0.016840488		
ILMN_2791028	APP	-1.116183137	0.002768024	0.051337774	0.002768024	0.048451528	0.000126272	0.00779232	0.000471577	0.019546304	0	0.000540727	0.028504193		
ILMN_2524865	CHI3L4	-1.11643408	0.005600396	0.080174568	0.004206115	0.064412031	0.001199375	0.034848508	0.00116094	0.034266489	0	0.012346572	0.151955545		
ILMN_1254929	RCL1	-1.116461155	0.000299498	0.014892062	0.000299498	0.013353714	0.000000664	0.000160197	0.00000774	0.001225133	1	9.21504E-05	0.009952034		
ILMN_2939185	BC056474	-1.116523763	0.000299498	0.014892062	0.000299498	0.013353714	0.0000038	0.000630118	0.00000221	0.000472255	1	1.1878E-05	0.003141395		
ILMN_1228613	PYCRL	-1.116634512	0.000299498	0.014892062	0.000299498	0.013353714	0.000141288	0.00855208	0.000044	0.003965776	1	5.74504E-05	0.007618639		
ILMN_2877507	PIGQ	-1.11667927	0.000942625	0.026071536	0.000639896	0.019410925	0.00004468	0.003783616	0.000152378	0.009444363	1	0.000621233	0.03109305		
ILMN_2868131	PIGT	-1.117024219	0.001225688	0.030541554	0.001225688	0.028815909	0.0000929	0.006321664	0.000312052	0.014897503	1	0.0007895	0.035437666		
ILMN_1221943	SDF2L1	-1.117198955	0.003012339	0.054401128	0.002018395	0.039534447	0.000408571	0.017773612	0.000805135	0.027596907	0	0.001389407	0.047728966		
ILMN_2750515	FOS	-1.11747226	0.000299498	0.014892062	0.000299498	0.013353714	0.0000144	0.001623511	0.000053	0.004480844	1	0.000643034	0.031573087		
ILMN_3005873	SORT1	-1.11753372	0.000299498	0.014892062	0.000299498	0.013353714	0.000000428	0.000117851	0.00000534	0.000169129	1	3.83949E-05	0.006099544		
ILMN_2934448	TJAP1	-1.118088782	0.000299498	0.014892062	0.000299498	0.013353714	0.0000041	0.000665171	0.00000738	0.001188627	1	2.54447E-05	0.004756515		
ILMN_1240615	OLFM1	-1.118125635	0.002018395	0.042006944	0.001225688	0.028815909	0.0000124	0.001448455	0.000029	0.003012161	1	0.000284828	0.019439747		
ILMN_2706231	SYNGR2	-1.118544974	0.002018395	0.042006944	0.00227139	0.042916604	0.00192157	0.047050677	0.001553237	0.040345167	1	0.00270263	0.068855671		
ILMN_2776850	GAS7	-1.118567525	0.000639896	0.021153497	0.000639896	0.019410925	0.0000167	0.001789771	0.0000788	0.005900268	1	0.000140602	0.012732723		
ILMN_2815889	GRWD1	-1.118687936	0.000299498	0.014892062	0.000299498	0.013353714	0.0000165	0.001784328	0.0000203	0.002399815	1	3.99889E-05	0.006183935		
ILMN_1258394	AARS	-1.118724378	0.000299498	0.014892062	0.000299498	0.013353714	1.52E-08	0.00000944	3.84E-08	0.0000267	1	2.99936E-06	0.00146959		
ILMN_2685565	TYMP	-1.119134268	0.000299498	0.014892062	0.000299498	0.013353714	0.000000595	0.000148947	0.00000154	0.000360893	1	6.47271E-05	0.008034278		
ILMN_1249313	RABL3	-1.119280075	0.000299498	0.014892062	0.000299498	0.013353714	0.00000837	0.001110274	0.0000181	0.002239201	1	8.19708E-05	0.009306714		
ILMN_2630459	CXCR4	-1.119486645	0.016645639	0.148953717	0.010096998	0.109255622	0.001508456	0.040076536	0.005136611	0.082861032	0	0.009432496	0.132484733		
ILMN_2736690	2210411K11RIK	-1.119517225	0.000299498	0.014892062	0.000299498	0.013353714	0.00000361	0.000603853	0.000000336	0.00012714	1	1.64374E-06	0.001077622		
ILMN_2987863	PER2	-1.119751625	0.002018395	0.042006944	0.001225688	0.028815909	0.000490467	0.0200248	0.000509451	0.020548879	1	0.001389407	0.047728966		
ILMN_2600744	RGS16	-1.119945836	0.000639896	0.021153497	0.000299498	0.013353714	0.0000862	0.005995631	0.0000228	0.002596277	1	5.09531E-05	0.007252947		
ILMN_3091641	DAB2	-1.120084423	0.005600396	0.080174568	0.003494726	0.056620496	0.000315614	0.014869318	0.000664858	0.024504648	0	0.003346676	0.077347433		
ILMN_2684651	MSI2H	-1.120151943	0.000639896	0.021153497	0.000942625	0.024301667	0.000156156	0.009055643	0.000177574	0.010475755	1	0.00036664	0.02284602		
ILMN_2425415	UBE3B	-1.12020859	0.000299498	0.014892062	0.000299498	0.013353714	0.0000000227	0.0000712	0.000000367	0.000134456	1	2.65234E-05	0.004803829		
ILMN_2733735	TLR2	-1.120244381	0.001760487	0.038593802	0.001496892	0.032842408	0.000000662	0.004875363	0.000222439	0.012123944	1	0.000844832	0.036512914		
ILMN_2855261	SLC25A39	-1.120465978	0.000299498	0.014892062	0.000299498	0.013353714	0.000205243	0.011031683	0.000396081	0.017311138	1	0.00042277	0.024660011		
ILMN_2713464	ABHD4	-1.120638738	0.000299498	0.014892062	0.000299498	0.013353714	0.0000249	0.002415508	0.000033	0.003242217	1	2.76455E-05	0.004930329		
ILMN_2574165	SLC7A11	-1.120754955	0.000299498	0.014892062	0.000299498	0.013353714	0.00000981	0.001218839	0.0000519	0.004442214	1	7.0054E-05	0.008469621		
ILMN_1259069	F730003H07RIK	-1.121065354	0.022015007	0.174899503	0.015131078	0.138695553	0.005671089	0.088200282	0.008881288	0.111410421	0	0.019156396	0.190243817		
ILMN_1252157	A330102K04RIK	-1.121227393	0.000639896	0.021153497	0.000639896	0.019410925	0.0000632	0.004700141	0.0000802	0.005962962	1	0.001179468	0.043782528		
ILMN_2935032	FBXL6	-1.121239133	0.000299498	0.014892062	0.000299498	0.013353714	0.000000504	0.000131808	0.00000874	0.00131658	1	0.000120719	0.011491043		
ILMN_1253919	CCL3	-1.121443309	0.009654071	0.110018185	0.009654071	0.106524046	0.003457247	0.065871662	0.005703882	0.08745013	0	0.009432496	0.132484733		
ILMN_1260585	STFA2	-1.121655647	0.000942625	0.026071536	0.000639896	0.019410925	0.000174333	0.009713688	0.000297355	0.01443844	1	0.000816732	0.036034504		

ILMN_3136638	SNCA	-1.121686063	0.007869606	0.098427373	0.003733327	0.059256725	0.000405207	0.017710004	0.001023279	0.031817359	0	0.033458819	0.250266375
ILMN_2936380	SGPL1	-1.121901135	0.000299498	0.014892062	0.000299498	0.013353714	0.0000477	0.003816686	0.0000543	0.004539402	1	6.47271E-05	0.008034278
ILMN_2673211	PFN1	-1.121964524	0.004674836	0.071504777	0.001760487	0.036357572	0.000674697	0.024612146	0.000839348	0.02829048	0	0.005858907	0.104408326
ILMN_1221451	DHRSX	-1.12290417	0.001760487	0.038593802	0.001760487	0.036357572	0.000515563	0.020723594	0.000820604	0.027941947	1	0.0007895	0.035437666
ILMN_2450491	TRFR2	-1.122926835	0.000299498	0.014892062	0.000299498	0.013353714	0.00000472	0.000733297	0.0000173	0.002159478	1	5.74504E-05	0.007618639
ILMN_2790512	1110039B18RIK	-1.123368404	0.000299498	0.014892062	0.000299498	0.013353714	0.00000228	0.000426498	0.0000102	0.001443157	1	9.21504E-05	0.009952034
ILMN_2894450	SNX15	-1.123418502	0.000299498	0.014892062	0.000299498	0.013353714	8.55E-08	0.0000344	0.000000606	0.000186894	1	1.89821E-05	0.004090548
ILMN_1223966	LOC385959	-1.123693602	0.001225688	0.030541554	0.001496892	0.032842408	0.002801542	0.059166678	0.001282138	0.036191446	0	0.001686537	0.053258626
ILMN_2736347	PRMT7	-1.123726664	0.000299498	0.014892062	0.000299498	0.013353714	1.05E-09	0.00000111	1.93E-09	0.00000357	1	2.60834E-07	0.000411872
ILMN_2491099	XPOT	-1.123742439	0.000299498	0.014892062	0.000299498	0.013353714	0.00000196	0.00037186	0.00000128	0.000311058	1	3.43889E-06	0.001569314
ILMN_1232396	EAR2	-1.123772011	0.064974747	0.311316494	0.062694716	0.303540704	0.050318123	0.288348039	0.060497533	0.307739355	0	0.057275046	0.323031815
ILMN_1218602	G6PC3	-1.124251076	0.002768024	0.051337774	0.001760487	0.036357572	0.000278859	0.01369203	0.000345319	0.015942739	0	0.001531347	0.050161589
ILMN_3135781	ANXA3	-1.124627391	0.001225688	0.030541554	0.000639896	0.019410925	0.0000259	0.002476668	0.0000866	0.006296133	1	0.000873828	0.037145252
ILMN_2892376	DHX29	-1.124906344	0.000299498	0.014892062	0.000299498	0.013353714	0.000000949	0.000212379	0.00000258	0.000529628	1	2.384E-06	0.001305507
ILMN_3161878	BID	-1.124973739	0.000299498	0.014892062	0.000299498	0.013353714	0.00000056	0.000143206	0.000000574	0.000179299	1	2.61375E-06	0.001367123
ILMN_2847787	EMR1	-1.125484607	0.004206115	0.066690827	0.002768024	0.048451528	0.0000979	0.00654917	0.000701702	0.025381142	0	0.00388914	0.084081646
ILMN_2646878	BLMH	-1.12551314	0.000299498	0.014892062	0.000299498	0.013353714	0.00000334	0.000570075	0.0000062	0.001053987	1	1.41013E-05	0.003473151
ILMN_2706853	SCAMP1	-1.125532389	0.000299498	0.014892062	0.000299498	0.013353714	0.000000475	0.000127055	0.000000824	0.00022965	1	1.41024E-05	0.003473151
ILMN_2843698	SMARCAL1	-1.125762101	0.000299498	0.014892062	0.000299498	0.013353714	0.00000964	0.001212164	0.0000268	0.002862094	1	2.65234E-05	0.004803829
ILMN_2717366	OASL1	-1.125975138	0.000639896	0.021153497	0.000299498	0.013353714	0.000130514	0.007988263	0.0000663	0.005180373	1	0.000317538	0.020788254
ILMN_2546073	WDR68	-1.126231678	0.000299498	0.014892062	0.000299498	0.013353714	0.000000161	0.0000542	0.000000279	0.000110081	1	2.86522E-06	0.001449644
ILMN_3128907	CD63	-1.126420996	0.001760487	0.038593802	0.001496892	0.032842408	0.000542714	0.021366039	0.000678622	0.02485273	1	0.002387591	0.063870812
ILMN_2678355	AMIGO2	-1.126430355	0.000299498	0.014892062	0.000299498	0.013353714	9.13E-08	0.000036	0.000000185	0.0000834	1	2.65193E-05	0.004803829
ILMN_2655895	AKT2	-1.126825454	0.000299498	0.014892062	0.000299498	0.013353714	0.000000201	0.0000653	0.000000153	0.0000735	1	1.49656E-06	0.00102442
ILMN_2625114	CDKAL1	-1.127010951	0.001225688	0.030541554	0.000942625	0.024301667	0.00000936	0.00118696	0.0000213	0.002477176	1	5.52021E-05	0.007602042
ILMN_2667384	SLC6A9	-1.127361604	0.000299498	0.014892062	0.000299498	0.013353714	0.00000932	0.00118696	0.0000174	0.002159478	1	0.000246108	0.017705716
ILMN_1222988	LOC386268	-1.127498485	0.000942625	0.026071536	0.000299498	0.013353714	0.000586133	0.022426682	0.000199706	0.011313575	1	0.001104095	0.042298211
ILMN_2895557	GFI1B	-1.127535545	0.000639896	0.021153497	0.000299498	0.013353714	0.00000674	0.000954053	0.0000135	0.001778728	1	7.88278E-05	0.009015226
ILMN_2925653	EAR2	-1.127584391	0.047928871	0.265103375	0.046049604	0.257087397	0.027419671	0.210973351	0.043010284	0.260513034	0	0.073688628	0.362080075
ILMN_1216972	CLEC4E	-1.128106489	0.003733327	0.06184411	0.002018395	0.039534447	0.000148782	0.008799713	0.000332204	0.01550964	0	0.007560831	0.117979886
ILMN_2652385	BAZ2A	-1.128274842	0.002018395	0.042006944	0.002018395	0.039534447	0.000862419	0.02851067	0.001249473	0.035680505	1	0.001482614	0.049612679
ILMN_3158659	C230096C10RIK	-1.128382209	0.001496892	0.034781534	0.000942625	0.024301667	0.000220906	0.011671388	0.000139782	0.008999194	1	0.000966442	0.039356938
ILMN_2675223	CD33	-1.128563646	0.000942625	0.026071536	0.000639896	0.019410925	0.00001	0.001236109	0.0000453	0.004030508	1	0.000844832	0.036512914
ILMN_2609073	MGAT4B	-1.128660345	0.000299498	0.014892062	0.000299498	0.013353714	0.0000179	0.001868062	0.000136367	0.008839388	1	0.000204627	0.01592867
ILMN_2588055	ACTB	-1.128864948	0.313064067	0.643080133	0.323948521	0.654115083	0.24448523	0.598658009	0.320992437	0.661760783	0	0.345393797	0.694142958
ILMN_2680686	ALG12	-1.129043435	0.000299498	0.014892062	0.000299498	0.013353714	0.0000444	0.003643784	0.0000134	0.001768921	1	1.29447E-05	0.003328934
ILMN_1219820	1200002N14RIK	-1.129152823	0.000639896	0.021153497	0.000639896	0.019410925	0.00000983	0.001218839	0.0000795	0.0059192	1	9.95836E-05	0.010463471
ILMN_2589893	TBRG4	-1.129261707	0.000639896	0.021153497	0.000639896	0.019410925	0.000177516	0.009836693	0.000246793	0.012817366	1	0.00036664	0.02284602
ILMN_2975312	FCER2A	-1.129737894	0.002520973	0.048392748	0.002018395	0.039534447	0.000293646	0.014134784	0.00040153	0.017418469	1	0.002243019	0.061925158
ILMN_2667033	ZXDC	-1.130679589	0.000299498	0.014892062	0.000299498	0.013353714	0.00000237	0.000439395	0.0000082	0.00127918	1	2.34111E-05	0.00450296
ILMN_2622671	ACSL1	-1.131479516	0.000639896	0.021153497	0.000299498	0.013353714	0.000000366	0.000104618	0.000000801	0.000227328	1	9.15833E-06	0.002681086
ILMN_2674324	THOP1	-1.131537424	0.000639896	0.021153497	0.000639896	0.019410925	0.0000524	0.004058867	0.000133735	0.008742949	1	0.000486846	0.026691654
ILMN_1259290	AKT3	-1.131538979	0.000299498	0.014892062	0.000299498	0.013353714	0.000000064	0.0000271	0.000000238	0.000101599	1	3.28593E-06	0.001544952
ILMN_2932539	RING1	-1.132133147	0.000299498	0.014892062	0.000299498	0.013353714	0.000000686	0.000164623	0.000000768	0.000219738	1	2.15328E-05	0.004320203
ILMN_1253819	PRKAR2B	-1.132148923	0.000299498	0.014892062	0.000299498	0.013353714	2.15E-08	0.0000125	0.000000103	0.0000554	1	5.39498E-06	0.002025163
ILMN_2995688	EG433016	-1.132494728	0.019444821	0.1617544	0.016429772	0.145558421	0.006861309	0.097821135	0.010110344	0.119739224	0	0.023367993	0.210226124
ILMN_1238640	2310003H01RIK	-1.132552815	0.000639896	0.021153497	0.000639896	0.019410925	0.0000179	0.001868062	0.0000445	0.003979315	1	0.000264806	0.018619193

ILMN_2696696	GYPA	-1.132817135	0.002768024	0.051337774	0.001496892	0.032842408	0.0000495	0.003917954	0.000354841	0.016129651	0	0.00270263	0.068855671
ILMN_1225192	NFKBID	-1.133066098	0.000299498	0.014892062	0.000299498	0.013353714	3.36E-10	0.000000504	1.02E-09	0.00000206	1	6.54696E-08	0.000253951
ILMN_1243066	IL1A	-1.133413071	0.020088786	0.165267027	0.014262117	0.13387405	0.006676758	0.096576461	0.007146886	0.098567729	0	0.046032778	0.290967914
ILMN_2937320	SCHIP1	-1.133751669	0.000942625	0.026071536	0.000299498	0.013353714	0.0000122	0.001439713	0.0000348	0.003370933	1	0.000176289	0.014446733
ILMN_2731237	D8ERTD82E	-1.134047583	0.000299498	0.014892062	0.000299498	0.013353714	0.0000214	0.002161787	0.0000762	0.005756583	1	0.00040803	0.024132893
ILMN_2599657	FMNL3	-1.134171185	0.000299498	0.014892062	0.000299498	0.013353714	0.00000477	0.000734844	0.00000943	0.00136995	1	1.81963E-05	0.003995524
ILMN_2731550	BRP17	-1.134397653	0.000299498	0.014892062	0.000299498	0.013353714	0.00000353	0.000593169	0.00000482	0.000858959	1	6.47271E-05	0.008034278
ILMN_2762189	GPATCH1	-1.134466014	0.000299498	0.014892062	0.000299498	0.013353714	3.36E-08	0.0000172	0.000000756	0.000219513	1	9.99092E-06	0.002818469
ILMN_2959291	UPP1	-1.13449718	0.000942625	0.026071536	0.000942625	0.024301667	0.000416306	0.01805945	0.000280609	0.013898949	1	0.001301631	0.046179135
ILMN_2841289	TNFAIP2	-1.134827216	0.000299498	0.014892062	0.000299498	0.013353714	0.00000721	0.000992417	0.00000322	0.00064069	1	3.26018E-05	0.005579105
ILMN_2671411	KLC1	-1.135147123	0.000299498	0.014892062	0.000299498	0.013353714	5.07E-08	0.0000227	0.000000361	0.00013352	1	5.15939E-06	0.002018103
ILMN_2596522	MT1	-1.135343672	0.000299498	0.014892062	0.000299498	0.013353714	0.00000371	0.000617087	0.000000442	0.000148085	1	1.41024E-05	0.003473151
ILMN_2939681	LYZS	-1.136569055	0.005600396	0.080174568	0.004441009	0.066594341	0.001271844	0.036075887	0.001559402	0.040474884	0	0.004644853	0.093111105
ILMN_2964076	TSPAN31	-1.137017412	0.001225688	0.030541554	0.000942625	0.024301667	0.000121309	0.007605138	0.000192578	0.011039321	1	0.000504223	0.027322568
ILMN_2692797	SLC11A1	-1.137029044	0.000942625	0.026071536	0.000299498	0.013353714	0.0000212	0.002151254	0.0000583	0.004702444	1	0.001259689	0.045559243
ILMN_2693124	RAB1B	-1.137428102	0.019659544	0.162924549	0.011420742	0.117507061	0.003534836	0.066748886	0.005131646	0.08285783	0	0.015623977	0.17119804
ILMN_1220769	LMAN2L	-1.138159096	0.000299498	0.014892062	0.000299498	0.013353714	1.01E-08	0.00000691	8.75E-08	0.0000485	1	5.74828E-07	0.000569287
ILMN_2701271	PLSCR1	-1.138607055	0.000299498	0.014892062	0.000299498	0.013353714	0.000000115	0.0000431	5.41E-08	0.0000344	1	5.21457E-07	0.000539384
ILMN_2778289	CXCL2	-1.140544603	0.026486805	0.192885413	0.01404445	0.132649005	0.002207096	0.051341175	0.006003207	0.089676275	0	0.041147128	0.276939586
ILMN_1249362	LOC386298	-1.141212883	0.001225688	0.030541554	0.001225688	0.028815909	0.000225617	0.011813028	0.000591023	0.022623651	1	0.001141234	0.042874093
ILMN_2661287	AKP2	-1.141256855	0.000299498	0.014892062	0.000299498	0.013353714	0.000000401	0.000112548	0.000000715	0.000216027	1	3.59833E-06	0.001580255
ILMN_2846865	ACTB	-1.141333782	0.27330516	0.606575161	0.284413487	0.617844208	0.203970444	0.553566103	0.275551624	0.619558566	0	0.257914169	0.618884979
ILMN_2925711	DUSP6	-1.142932506	0.000639896	0.021153497	0.000299498	0.013353714	0.000000985	0.000217336	0.0000039	0.000746457	1	4.70154E-05	0.006881837
ILMN_2803674	S100A9	-1.1442518	0.002018395	0.042006944	0.000942625	0.024301667	0.000323505	0.015111037	0.000191432	0.01098713	1	0.001633268	0.052249986
ILMN_2866276	CSF2RA	-1.144341375	0.000299498	0.014892062	0.000299498	0.013353714	0.0000165	0.001784328	0.0000775	0.005835203	1	0.00040803	0.024132893
ILMN_2524986	EAR3	-1.144901605	0.017077844	0.151275609	0.018586049	0.156283296	0.015615825	0.157365186	0.022122415	0.183826235	0	0.019643695	0.192333843
ILMN_2479717	PILRA	-1.145002307	0.000299498	0.014892062	0.000299498	0.013353714	0.00000201	0.000379002	0.00000853	0.001297207	1	2.65234E-05	0.004803829
ILMN_2987709	SLC15A3	-1.145009054	0.000299498	0.014892062	0.000299498	0.013353714	0.0000166	0.001784328	0.0000144	0.001881854	1	0.000212368	0.016047225
ILMN_1224736	ZMIZ1	-1.145106147	0.000299498	0.014892062	0.000299498	0.013353714	0.0000174	0.001836085	0.0000098	0.001399019	1	2.34111E-05	0.00450296
ILMN_3155815	9830134C10RIK	-1.145114089	0.000299498	0.014892062	0.000299498	0.013353714	0.000000235	0.0000718	0.00000169	0.000383182	1	6.16514E-06	0.002125696
ILMN_2654754	GP38	-1.146427658	0.008541654	0.103057212	0.005600396	0.076777595	0.005066053	0.082537476	0.003571366	0.067411346	0	0.016875145	0.178845026
ILMN_3104139	RBM12	-1.147016272	0.000299498	0.014892062	0.000299498	0.013353714	1.43E-08	0.00000901	1.38E-08	0.0000126	1	1.15863E-07	0.000299615
ILMN_2712986	CHI3L3	-1.147371605	0.001225688	0.030541554	0.001496892	0.032842408	0.000875122	0.028689223	0.000739816	0.026207168	1	0.004127635	0.087093854
ILMN_2757368	CRELD2	-1.147374056	0.000299498	0.014892062	0.000299498	0.013353714	2.3E-09	0.00000185	1.18E-08	0.0000119	1	2.74304E-07	0.000411872
ILMN_2491202	VNN3	-1.148153174	0.000299498	0.014892062	0.000299498	0.013353714	4.51E-09	0.00000339	8.56E-09	0.0000105	1	2.24455E-07	0.000373132
ILMN_1230766	SCMH1	-1.148605754	0.000299498	0.014892062	0.000299498	0.013353714	4.83E-08	0.0000223	0.000000186	0.0000834	1	4.93323E-06	0.001962625
ILMN_2771380	CD52	-1.149676808	0.008987421	0.105475934	0.007644699	0.094076848	0.002100066	0.049831197	0.006368661	0.092696085	0	0.009693098	0.134605773
ILMN_1230708	CLEC4A1	-1.149760601	0.000299498	0.014892062	0.000299498	0.013353714	0.000000172	0.0000571	0.00000112	0.000290018	1	1.53585E-05	0.003592421
ILMN_2684575	PCYOX1L	-1.149890332	0.001225688	0.030541554	0.000639896	0.019410925	0.0000565	0.004316317	0.000142325	0.009037925	1	0.000438006	0.025077344
ILMN_1218347	MYLK	-1.151233811	0.000299498	0.014892062	0.000299498	0.013353714	1.44E-09	0.00000136	5.7E-09	0.00000758	1	3.34766E-07	0.00044521
ILMN_2601946	5033414K04RIK	-1.151524006	0.000299498	0.014892062	0.000299498	0.013353714	0.00000259	0.000464931	0.00000166	0.000379819	1	0.000317538	0.020788254
ILMN_2835117	CCL7	-1.1516614	0.000299498	0.014892062	0.000299498	0.013353714	0.000000799	0.000185854	0.00000889	0.001330104	1	9.5799E-05	0.010180718
ILMN_2759484	C3	-1.152531108	0.000639896	0.021153497	0.000299498	0.013353714	0.0000685	0.005001847	0.0000487	0.004231895	1	0.000438006	0.025077344
ILMN_1223416	FER1L3	-1.152772279	0.000299498	0.014892062	0.000299498	0.013353714	4.78E-08	0.0000223	0.000000394	0.00013797	1	3.99889E-05	0.006183935
ILMN_2901626	TNFRSF21	-1.153121675	0.000942625	0.026071536	0.000639896	0.019410925	0.00000168	0.000330869	0.0000142	0.001859837	1	0.00010758	0.010838827
ILMN_2693895	ACTA2	-1.153348714	0.000299498	0.014892062	0.000299498	0.013353714	0.00000119	0.000254149	0.00000516	0.00090936	1	0.000151664	0.013244851
ILMN_2777498	IL1B	-1.153646647	0.005600396	0.080174568	0.004206115	0.064412031	0.001354766	0.037413073	0.001755499	0.043416704	0	0.004379328	0.090517125

ILMN_2789900	CD177	-1.154670942	0.000639896	0.021153497	0.000299498	0.013353714	0.00000234	0.000436452	0.00000186	0.000412865	1	1.89821E-05	0.004090548
ILMN_2618423	ZXDC	-1.15475865	0.000299498	0.014892062	0.000299498	0.013353714	9.02E-10	0.000000976	0.000000002	0.00000357	1	1.04496E-07	0.000299615
ILMN_1242457	FPR2	-1.155423301	0.003012339	0.054401128	0.002018395	0.039534447	0.000122008	0.007605138	0.000177435	0.010475755	0	0.00093456	0.038635069
ILMN_2742075	CD14	-1.15645531	0.003253905	0.056782136	0.002520973	0.046026289	0.000386811	0.017128258	0.000499048	0.020287507	0	0.001389407	0.047728966
ILMN_2868220	INHBA	-1.156681552	0.001225688	0.030541554	0.000942625	0.024301667	0.000165236	0.009379559	0.000240793	0.012650343	1	0.000470028	0.02607676
ILMN_2674884	SLC11A1	-1.157414839	0.000942625	0.026071536	0.000942625	0.024301667	0.0000257	0.002473139	0.0000641	0.00508011	1	0.000438006	0.025077344
ILMN_3161601	SNCA	-1.157946415	0.002018395	0.042006944	0.001496892	0.032842408	0.00000758	0.001035225	0.0000792	0.005917903	1	0.007351981	0.116676672
ILMN_2705860	TPSAB1	-1.160383394	0.000942625	0.026071536	0.000639896	0.019410925	0.000013	0.00149316	0.00006	0.004813511	1	0.000934606	0.038635069
ILMN_2710905	S100A8	-1.163713512	0.000639896	0.021153497	0.000299498	0.013353714	0.0000119	0.001426193	0.0000147	0.001907372	1	0.000182986	0.014712435
ILMN_2595732	LOC100046232	-1.165021501	0.000299498	0.014892062	0.000299498	0.013353714	0.000001	0.000219086	0.000000217	0.0000944	1	5.15939E-06	0.002018103
ILMN_2719732	MS4A3	-1.166305486	0.000639896	0.021153497	0.000299498	0.013353714	0.00000901	0.001164448	0.0000212	0.002477176	1	0.000540727	0.028504193
ILMN_1221700	ELA2	-1.167300103	0.000299498	0.014892062	0.000299498	0.013353714	3.27E-09	0.00000253	1.67E-09	0.00000324	1	2.02641E-08	0.000188647
ILMN_1224472	CCL4	-1.167531549	0.000942625	0.026071536	0.000639896	0.019410925	0.00000658	0.000945204	0.0000352	0.003396141	1	0.000255296	0.018170157
ILMN_2728038	ARHGAP24	-1.167825732	0.000299498	0.014892062	0.000299498	0.013353714	4.47E-11	8.33E-08	1.1E-10	0.000000395	1	6.03547E-07	0.000573333
ILMN_1252819	PRMT7	-1.167997376	0.000299498	0.014892062	0.000299498	0.013353714	8.95E-10	0.000000976	7.15E-10	0.00000159	1	4.07147E-08	0.000249449
ILMN_2538531	LOC386360	-1.168408104	0.000299498	0.014892062	0.000299498	0.013353714	0.00012104	0.007605138	0.000511029	0.020559076	1	0.001104095	0.042298211
ILMN_2493826	UGT1A10	-1.169469481	0.000299498	0.014892062	0.000299498	0.013353714	1.33E-08	0.0000087	8.14E-08	0.0000468	1	3.13951E-06	0.001522236
ILMN_2834379	TGFBI	-1.172758284	0.001760487	0.038593802	0.001225688	0.028815909	0.000937725	0.030098764	0.000249034	0.012894089	1	0.001068077	0.041672924
ILMN_1222543	UGT1A10	-1.173528971	0.000299498	0.014892062	0.000299498	0.013353714	1.46E-09	0.00000136	4.37E-08	0.0000295	1	3.59866E-06	0.001580255
ILMN_2983516	SLC11A1	-1.17650384	0.001225688	0.030541554	0.000639896	0.019410925	0.0000123	0.001442533	0.0000539	0.004524583	1	0.000643034	0.031573087
ILMN_2426480	3830612M24	-1.17764975	0.000639896	0.021153497	0.000299498	0.013353714	7.32E-08	0.0000304	0.00000104	0.000275608	1	9.21504E-05	0.009952034
ILMN_2592554	REXO1	-1.182418789	0.000299498	0.014892062	0.000299498	0.013353714	2.19E-09	0.00000179	0.000000029	0.0000218	1	7.3257E-07	0.000681979
ILMN_1220548	LRRC41	-1.183163213	0.000299498	0.014892062	0.000299498	0.013353714	2.09E-08	0.0000125	0.000000374	0.000136	1	9.99092E-06	0.002818469
ILMN_1233336	LOC386199	-1.183990269	0.000639896	0.021153497	0.000639896	0.019410925	0.0000163	0.001773716	0.0000255	0.00279613	1	0.00040803	0.024132893
ILMN_2646985	ATF5	-1.18420231	0.000299498	0.014892062	0.000299498	0.013353714	0.000000122	0.0000454	0.00000123	0.000301817	1	2.15311E-05	0.004320203
ILMN_2925094	MPO	-1.185131735	0.000299498	0.014892062	0.000299498	0.013353714	0.00000078	0.0001843	0.00000115	0.000292494	1	1.89821E-05	0.004090548
ILMN_1252076	LYZ2	-1.187850205	0.003494726	0.059081055	0.001496892	0.032842408	0.0000728	0.005280083	0.000328357	0.015438431	0	0.002314272	0.062958735
ILMN_2948143	SLC7A11	-1.188505133	0.000299498	0.014892062	0.000299498	0.013353714	0.000000544	0.000140657	0.00000159	0.000369569	1	0.000120719	0.011491043
ILMN_1219230	LOC100043402	-1.188859089	0.000299498	0.014892062	0.000299498	0.013353714	0.00000132	0.000271671	0.00000103	0.000274668	1	2.15328E-05	0.004320203
ILMN_1230140	LOC385923	-1.189899209	0.000299498	0.014892062	0.000299498	0.013353714	0.00000304	0.000527536	0.0000057	0.000979318	1	3.53859E-05	0.005861598
ILMN_3162125	GRM6	-1.194679101	0.000299498	0.014892062	0.000299498	0.013353714	0.000000208	0.0000667	0.000000012	0.0000119	1	4.9657E-07	0.000525315
ILMN_2771176	CCL7	-1.196175382	0.000299498	0.014892062	0.000299498	0.013353714	1.02E-11	0.000000025	4.19E-10	0.000000976	1	4.07997E-07	0.000499764
ILMN_2847115	GPR109A	-1.199553298	0.000639896	0.021153497	0.000639896	0.019410925	0.00000482	0.000740299	0.0000154	0.001964139	1	0.00011618	0.011242898
ILMN_2758029	PRTN3	-1.205025411	0.000299498	0.014892062	0.000299498	0.013353714	1.53E-10	0.000000264	3.43E-10	0.00000084	1	5.59305E-08	0.000249449
ILMN_2722996	SIRPA	-1.209776171	0.000299498	0.014892062	0.000299498	0.013353714	1.66E-09	0.00000149	3.18E-09	0.00000462	1	3.28593E-06	0.001544952
ILMN_2657828	RHBDF1	-1.216435604	0.000299498	0.014892062	0.000299498	0.013353714	2.44E-12	9.46E-09	1.36E-10	0.000000429	1	5.89499E-08	0.000249449
ILMN_2712075	LCN2	-1.216711224	0.000639896	0.021153497	0.000299498	0.013353714	0.00000262	0.000466947	0.00000288	0.000577427	1	2.44059E-05	0.00463717
ILMN_2878071	LYZ	-1.22864681	0.000299498	0.014892062	0.000299498	0.013353714	5.41E-08	0.000024	0.00000139	0.000336099	1	7.57938E-05	0.008797941
ILMN_2705628	CLEC4D	-1.228745779	0.000639896	0.021153497	0.000639896	0.019410925	0.00000062	0.000153621	0.0000039	0.000746457	1	7.0054E-05	0.008469621
ILMN_1233982	LOC270589	-1.22932799	0.000299498	0.014892062	0.000299498	0.013353714	0.00000694	0.000978706	0.00000394	0.000746457	1	4.51564E-05	0.006758509
ILMN_1377923	ACTB	-1.230879389	0.076350192	0.337236501	0.050222887	0.269665294	0.009183237	0.115903512	0.030148726	0.215797746	0	0.014835081	0.166562185
ILMN_1249030	MPO	-1.231747939	0.000299498	0.014892062	0.000299498	0.013353714	0.0000017	0.000334725	0.0000195	0.002344998	1	0.00022037	0.016464793
ILMN_2538242	LOC386144	-1.239189285	0.000299498	0.014892062	0.000299498	0.013353714	0.000015	0.001669081	0.0000107	0.001483462	1	0.000135361	0.012427306
ILMN_2993314	CLEC4N	-1.244916169	0.000639896	0.021153497	0.000299498	0.013353714	0.00000115	0.00024883	0.000015	0.001929689	1	0.000163541	0.013740705
ILMN_2750842	2610027L16RIK	-1.245539485	0.000299498	0.014892062	0.000299498	0.013353714	0.00000254	0.00046434	0.00000545	0.000950899	1	6.44447E-06	0.002189569
ILMN_2600421	MPO	-1.29293209	0.000299498	0.014892062	0.000299498	0.013353714	8.09E-10	0.000000934	2.37E-08	0.0000187	1	8.76731E-06	0.002615973
ILMN_2763245	CXCL1	-1.3	0.000639896	0.021153497	0.000299498	0.013353714	0.000000237	0.0000718	0.00000181	0.000406	1	9.95836E-05	0.010463471

ILMN_1253874	SERPINB2	-1.31	0.000299498	0.014892062	0.000299498	0.013353714	6.55E-10	0.000000824	9.01E-09	0.0000105	1	2.38377E-06	0.001305507
ILMN_1215076	F830002E14RIK	-1.32	0.002018395	0.042006944	0.001225688	0.028815909	0.00115136	0.03420847	0.000886	0.0292	1	0.001344859	0.046961097
ILMN_2725259	IL2	-1.37	0.000299498	0.014892062	0.000299498	0.013353714	5.55E-14	6.46E-10	1.82E-11	0.000000121	1	9.40233E-09	0.000122224

Because both FOXP3 and GPR83 are associated with Tregs(47) and both have more consistent and significantly higher expression induced by GA than by PG, we sought to determine on a persample basis whether the same subset of PG samples induced low levels of both genes, or whether FOXP3 was low in some PG samples and GPR83 was low in other PG samples. We confirmed that the same PG samples that were low in FOXP3 were also low in GPR83 (Fig. 6C).

When the genes differentially expressed in response to different medicines are also transcription factors (e.g. FOXP3), we can further test the observation by examining the expression of genes known to be targets of that transcription factor. In this case, we sought to determine whether genes downstream of FoxP3 are upregulated following activation by GA as compared to PG.

Through Gene Set Enrichment Analysis (GSEA),(48) we found that FoxP3 targets genes were enriched in GA samples compared to medium (FDR-adjusted q = 0.008) to a more significant degree than in PG samples compared to medium (FDR-adjusted q = 0.036, Fig. 6D and Fig. 7A).

For the list of genes with significantly higher expression induced by GA than PG by the nonparametric Wilcoxon rank-sum test, we utilized the Molecular Signature Database (MSigDB)(48) to determine that the same list of genes bound by FoxP3 was significantly enriched (adjusted $p < 1.59 \times 10^{-8}$, Table 9).

Table 9: MSigDB enrichment results for the list of genes with significantly different expression between GA and other glatiramoid by the Wilcoxon rank sum test, including FoxP3 targets among the enriched signatures for genes higher in GA than other glatiramoid, and TLR and LPS pathways among the enriched signatures for genes higher in other glatiramoid than GA.

Reference Set	User Set	N	K	n	k	P	BHP_P
BLALOCK_ALZHEIMERS_DISEASE_UP	wilcox_up_in_GA	31847	1691	392	54	0	0
PILON_KLF1_TARGETS_DN	wilcox_up_in_GA	31847	1972	392	80	0	0
MEMBRANE	wilcox_up_in_GA	31847	1994	392	65	0	0
GRAESSMANN_APOPTOSIS_BY_DOXORUBICIN_DN	wilcox_up_in_GA	31847	1781	392	60	0	0
GGGAGGRR_V$MAZ_Q6	wilcox_up_in_GA	31847	2274	392	69	0	0
SIGNAL_TRANSDUCTION	wilcox_up_in_GA	31847	1634	392	60	0	0
TTGTTT_V$FOXO4_01	wilcox_up_in_GA	31847	2061	392	64	0	0
DUTERTRE_ESTRADIOL_RESP	wilcox_up_in_GA	31847	505	392	30	0	0

ONSE_24HR_DN							
GNF2_MATK	wilcox_up_in_GA	31847	25	392	10	0	0
PID_TCR_PATHWAY	wilcox_up_in_GA	31847	66	392	14	3.55E-12	8.55E-10
MEMBRANE_PART	wilcox_up_in_GA	31847	1670	392	53	8.99E-12	1.97E-09
BIOPOLYMER_METABOLIC_PROCESS	wilcox_up_in_GA	31847	1684	392	53	1.10E-11	2.20E-09
PID_CD8TCRDOWNSTREAMPATHWAY	wilcox_up_in_GA	31847	65	392	12	4.02E-11	7.45E-09
REACTOME_TCR_SIGNALING	wilcox_up_in_GA	31847	54	392	13	4.93E-11	8.47E-09
PID_CD8TCRPATHWAY	wilcox_up_in_GA	31847	53	392	12	7.51E-11	1.21E-08
SMID_BREAST_CANCER_NORMAL_LIKE_UP	wilcox_up_in_GA	31847	476	392	48	9.86E-11	1.44E-08
PUJANA_ATM_PCC_NETWORK	wilcox_up_in_GA	31847	1442	392	52	1.02E-10	1.44E-08
GNF2_PTPN4	wilcox_up_in_GA	31847	51	392	11	1.17E-10	1.57E-08
MODULE_64	wilcox_up_in_GA	31847	518	392	28	1.30E-10	1.59E-08
PID_IL12_STAT4PATHWAY	wilcox_up_in_GA	31847	33	392	9	1.37E-10	1.59E-08
ZHENG_BOUND_BY_FOXP3	wilcox_up_in_GA	31847	491	392	56	1.42E-10	1.59E-08
DIAZ_CHRONIC_MEYLOGENOUS_LEUKEMIA_UP	wilcox_up_in_GA	31847	1382	392	51	1.46E-10	1.59E-08
CHEN_METABOLIC_SYNDROM_NETWORK	wilcox_up_in_GA	31847	1210	392	46	1.72E-10	1.79E-08
MODULE_75	wilcox_up_in_GA	31847	399	392	29	1.86E-10	1.80E-08
MODULE_84	wilcox_up_in_GA	31847	549	392	38	1.87E-10	1.80E-08
MARSON_BOUND_BY_FOXP3_UNSTIMULATED	wilcox_up_in_GA	31847	1229	392	66	2.04E-10	1.80E-08
LINDGREN_BLADDER_CANCER_CLUSTER_2B	wilcox_up_in_GA	31847	392	392	29	2.12E-10	1.80E-08
SANSOM_APC_TARGETS_DN	wilcox_up_in_GA	31847	366	392	25	2.16E-10	1.80E-08
MODULE_46	wilcox_up_in_GA	31847	395	392	29	2.27E-10	1.80E-08
SMID_BREAST_CANCER_LUMINAL_B_DN	wilcox_up_in_GA	31847	564	392	30	2.32E-10	1.80E-08
GCACTTT,MIR-17-5P,MIR-20A,MIR-106A,MIR-106B,MIR-20B,MIR-519D	wilcox_up_in_GA	31847	595	392	33	2.46E-10	1.80E-08
NUYTTEN_EZH2_TARGETS_UP	wilcox_up_in_GA	31847	1037	392	44	2.46E-10	1.80E-08
KUMAR_TARGETS_OF_MLL_AF9_FUSION	wilcox_up_in_GA	31847	405	392	26	2.47E-10	1.80E-08
MARSON_BOUND_BY_FOXP3_STIMULATED	wilcox_up_in_GA	31847	1022	392	54	2.65E-10	1.83E-08
GOBERT_OLIGODENDROCYTE_DIFFERENTIATION_DN	wilcox_up_in_GA	31847	1080	392	44	2.67E-10	1.83E-08
REACTOME_IMMUNE_SYSTEM	wilcox_up_in_GA	31847	933	392	51	2.82E-10	1.88E-08
MODULE_45	wilcox_up_in_GA	31847	583	392	33	2.99E-10	1.95E-08
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Reference Set	User Set	N	K	n	k	P	BHP_P
CYTOPLASM	wilcox_up_in_generic	31847	2131	439	68	0	0
BLALOCK_ALZHEIMERS_DISEASE_UP	wilcox_up_in_generic	31847	1691	439	59	0	0
PUJANA_BRCA1_PCC_NETW	wilcox_up_in_generic	31847	1652	439	57	0	0

ORK							
PILON_KLF1_TARGETS_DN	wilcox_up_in_generic	31847	1972	439	81	0	0
GRAESSMANN_APOPTOSIS_BY_DOXORUBICIN_DN	wilcox_up_in_generic	31847	1781	439	68	0	0
DIAZ_CHRONIC_MEYLOGENOUS_LEUKEMIA_UP	wilcox_up_in_generic	31847	1382	439	56	6.56E-11	2.51E-08
KRIGE_RESPONSE_TO_TOSEDOSTAT_6HR_UP	wilcox_up_in_generic	31847	953	439	46	1.20E-10	3.57E-08
KRIGE_RESPONSE_TO_TOSEDOSTAT_24HR_DN	wilcox_up_in_generic	31847	1011	439	51	1.24E-10	3.57E-08
GRAESSMANN_APOPTOSIS_BY_DOXORUBICIN_UP	wilcox_up_in_generic	31847	1142	439	46	2.24E-10	5.64E-08
REACTOME_IMMUNE_SYSTEM	wilcox_up_in_generic	31847	933	439	41	2.48E-10	5.64E-08
KRIGE_RESPONSE_TO_TOSEDOSTAT_6HR_DN	wilcox_up_in_generic	31847	911	439	45	2.74E-10	5.64E-08
CHEN_METABOLIC_SYNDROM_NETWORK	wilcox_up_in_generic	31847	1210	439	48	2.95E-10	5.64E-08
PROTEIN_METABOLIC_PROCESS	wilcox_up_in_generic	31847	1231	439	48	3.86E-10	6.58E-08
LEE_BMP2_TARGETS_DN	wilcox_up_in_generic	31847	882	439	52	4.01E-10	6.58E-08
WEI_MYCN_TARGETS_WITH_E_BOX	wilcox_up_in_generic	31847	795	439	39	5.50E-10	8.42E-08
MODULE_5	wilcox_up_in_generic	31847	434	439	26	6.51E-10	9.34E-08
GGGCGGR_V$SP1_Q6	wilcox_up_in_generic	31847	2940	439	95	7.24E-10	9.78E-08
BYSTRYKH_HEMATOPOIESIS_STEM_CELL_QTL_TRANS	wilcox_up_in_generic	31847	882	439	38	1.16E-09	1.48E-07
ENK_UV_RESPONSE_EPIDERMIS_UP	wilcox_up_in_generic	31847	293	439	21	1.31E-09	1.59E-07
MONNIER_POSTRADIATION_TUMOR_ESCAPE_UP	wilcox_up_in_generic	31847	393	439	24	1.69E-09	1.94E-07
BROWN_MYELOID_CELL_DEVELOPMENT_UP	wilcox_up_in_generic	31847	165	439	16	1.91E-09	2.09E-07
SENESE_HDAC3_TARGETS_UP	wilcox_up_in_generic	31847	501	439	27	2.47E-09	2.58E-07
BIOPOLYMER_METABOLIC_PROCESS	wilcox_up_in_generic	31847	1684	439	55	2.71E-09	2.71E-07
GNF2_CARD15	wilcox_up_in_generic	31847	70	439	11	3.41E-09	3.26E-07
DODD_NASOPHARYNGEAL_CARCINOMA_DN	wilcox_up_in_generic	31847	1375	439	48	4.41E-09	4.05E-07
SCGGAAGY_V$ELK1_02	wilcox_up_in_generic	31847	1199	439	44	4.79E-09	4.23E-07
VERHAAK_AML_WITH_NPM1_MUTATED_UP	wilcox_up_in_generic	31847	183	439	16	6.55E-09	5.57E-07
CAIRO_HEPATOBLASTOMA_CLASSES_UP	wilcox_up_in_generic	31847	605	439	29	8.42E-09	6.91E-07
GNF2_CD1D	wilcox_up_in_generic	31847	45	439	9	9.51E-09	7.53E-07
RUTELLA_RESPONSE_TO_CSF2RB_AND_IL4_UP	wilcox_up_in_generic	31847	338	439	21	1.29E-08	9.69E-07
LI_INDUCED_T_TO_NATURAL_KILLER_UP	wilcox_up_in_generic	31847	307	439	20	1.31E-08	9.69E-07
BOYLAN_MULTIPLE_MYELOMA_C_D_DN	wilcox_up_in_generic	31847	252	439	18	1.73E-08	1.24E-06
KEGG_TOLL_LIKE_RECEPTOR_SIGNALING_PATHWAY	wilcox_up_in_generic	31847	102	439	12	1.83E-08	1.27E-06

MODULE_6	wilcox_up_in_generic	31847	416	439	23	2.30E-08	1.55E-06
RUTELLA_RESPONSE_TO_HGF_UP	wilcox_up_in_generic	31847	418	439	23	2.51E-08	1.65E-06
MODULE_3	wilcox_up_in_generic	31847	385	439	22	2.59E-08	1.65E-06
CHARAFE_BREAST_CANCER_LUMINAL_VS_BASAL_DN	wilcox_up_in_generic	31847	455	439	24	2.78E-08	1.73E-06
MARTENS_BOUND_BY_PML_RARA_FUSION	wilcox_up_in_generic	31847	456	439	24	2.90E-08	1.75E-06
GNF2_CD33	wilcox_up_in_generic	31847	52	439	9	3.62E-08	2.13E-06
NUCLEOBASENUCLEOSIDENUCLEOTIDE_AND_NUCLEIC_ACID_METABOLIC_PROCESS	wilcox_up_in_generic	31847	1244	439	43	3.88E-08	2.23E-06
TONKS_TARGETS_OF_RUNX1_RUNX1T1_FUSION_ERYTHROCYTE_UP	wilcox_up_in_generic	31847	157	439	14	4.29E-08	2.41E-06
FOSTER_KDM1A_TARGETS_DN	wilcox_up_in_generic	31847	211	439	16	4.64E-08	2.54E-06
NUYTTEN_EZH2_TARGETS_UP	wilcox_up_in_generic	31847	1037	439	38	5.75E-08	3.05E-06
MARKEY_RB1_ACUTE_LOF_UP	wilcox_up_in_generic	31847	215	439	16	6.02E-08	3.05E-06
CASORELLI_ACUTE_PROMYELOCYTIC_LEUKEMIA_DN	wilcox_up_in_generic	31847	663	439	29	6.04E-08	3.05E-06
MODULE_16	wilcox_up_in_generic	31847	511	439	25	6.11E-08	3.05E-06
BRUINS_UVC_RESPONSE_LATE	wilcox_up_in_generic	31847	1137	439	40	7.46E-08	3.65E-06
ZHANG_TLX_TARGETS_36HR_UP	wilcox_up_in_generic	31847	221	439	16	8.79E-08	4.21E-06
RODWELL_AGING_KIDNEY_UP	wilcox_up_in_generic	31847	487	439	24	9.84E-08	4.61E-06
SEKI_INFLAMMATORY_RESPONSE_LPS_UP	wilcox_up_in_generic	31847	77	439	10	1.08E-07	4.96E-06
HESS_TARGETS_OF_HOXA9_AND_MEIS1_DN	wilcox_up_in_generic	31847	77	439	10	1.08E-07	4.96E-06
IVANOVA_HEMATOPOIESIS_EARLY_PROGENITOR	wilcox_up_in_generic	31847	532	439	25	1.31E-07	5.77E-06
CELLULAR_PROTEIN_METABOLIC_PROCESS	wilcox_up_in_generic	31847	1117	439	39	1.33E-07	5.77E-06
ACEVEDO_LIVER_TUMOR_VS_NORMAL_ADJACENT_TISSUE_UP	wilcox_up_in_generic	31847	863	439	33	1.69E-07	7.21E-06
WANG_IMMORTALIZED_BY_HOXA9_AND_MEIS1_UP	wilcox_up_in_generic	31847	31	439	7	1.78E-07	7.36E-06
RYTTCCTG_V$ETS2_B	wilcox_up_in_generic	31847	1085	439	38	1.80E-07	7.36E-06
CELLULAR_MACROMOLECULE_METABOLIC_PROCESS	wilcox_up_in_generic	31847	1131	439	39	1.83E-07	7.36E-06
KOINUMA_TARGETS_OF_SMAD2_OR_SMAD3	wilcox_up_in_generic	31847	824	439	32	1.86E-07	7.37E-06
KRIGE_RESPONSE_TO_TOSEDOSTAT_24HR_UP	wilcox_up_in_generic	31847	783	439	31	1.91E-07	7.45E-06
MODULE_45	wilcox_up_in_generic	31847	583	439	26	2.03E-07	7.76E-06
RASHI_RESPONSE_TO_IONIZING_RADIATION_2	wilcox_up_in_generic	31847	127	439	12	2.09E-07	7.88E-06
RESPONSE_TO_STRESS	wilcox_up_in_generic	31847	508	439	24	2.13E-07	7.88E-06
LENAOUR_DENDRITIC_CELL_	wilcox_up_in_generic	31847	128	439	12	2.28E-07	8.31E-06

MATURATION_DN							
MODULE_84	wilcox_up_in_generic	31847	549	439	25	2.37E-07	8.49E-06
GROSS_HYPOXIA_VIA_ELK3_UP	wilcox_up_in_generic	31847	209	439	15	2.48E-07	8.76E-06
GTGCCAA,MIR-96	wilcox_up_in_generic	31847	303	439	18	2.73E-07	9.49E-06
MARTENS_TRETINOIN_RESPONSE_DN	wilcox_up_in_generic	31847	841	439	32	2.92E-07	1.00E-05
MGGAAGTG_V$GABP_B	wilcox_up_in_generic	31847	757	439	30	2.96E-07	1.00E-05
ACEVEDO_LIVER_CANCER_UP	wilcox_up_in_generic	31847	973	439	35	3.01E-07	1.00E-05
NEGATIVE_REGULATION_OF_BIOLOGICAL_PROCESS	wilcox_up_in_generic	31847	677	439	28	3.18E-07	1.04E-05
MODULE_118	wilcox_up_in_generic	31847	410	439	21	3.33E-07	1.08E-05
GAL_LEUKEMIC_STEM_CELL_DN	wilcox_up_in_generic	31847	244	439	16	3.38E-07	1.08E-05
MOOTHA_MITOCHONDRIA	wilcox_up_in_generic	31847	447	439	22	3.44E-07	1.08E-05
LINDSTEDT_DENDRITIC_CELL_MATURATION_A	wilcox_up_in_generic	31847	67	439	9	3.49E-07	1.08E-05
MEMBRANE	wilcox_up_in_generic	31847	1994	439	56	3.55E-07	1.09E-05
TARTE_PLASMA_CELL_VS_PLASMABLAST_DN	wilcox_up_in_generic	31847	309	439	18	3.64E-07	1.10E-05
NEGATIVE_REGULATION_OF_CELLULAR_PROCESS	wilcox_up_in_generic	31847	646	439	27	4.22E-07	1.25E-05
GRAESSMANN_RESPONSE_TO_MC_AND_DOXORUBICIN_DN	wilcox_up_in_generic	31847	770	439	30	4.23E-07	1.25E-05
GNF2_CD14	wilcox_up_in_generic	31847	35	439	7	4.35E-07	1.26E-05
RPS14_DN.V1_UP	wilcox_up_in_generic	31847	192	439	14	5.14E-07	1.47E-05
PUJANA_CHEK2_PCC_NETWORK	wilcox_up_in_generic	31847	779	439	30	5.39E-07	1.53E-05
BERENJENO_TRANSFORMED_BY_RHOA_UP	wilcox_up_in_generic	31847	536	439	24	5.57E-07	1.56E-05
CELL_DEVELOPMENT	wilcox_up_in_generic	31847	577	439	25	5.92E-07	1.64E-05
ONDER_CDH1_TARGETS_2_DN	wilcox_up_in_generic	31847	464	439	22	6.44E-07	1.76E-05
REACTOME_ACTIVATED_TLR4_SIGNALLING	wilcox_up_in_generic	31847	93	439	10	6.52E-07	1.76E-05
MTOR_UP.N4.V1_UP	wilcox_up_in_generic	31847	196	439	14	6.59E-07	1.76E-05
CYTOPLASMIC_PART	wilcox_up_in_generic	31847	1383	439	43	6.89E-07	1.82E-05
NEGATIVE_REGULATION_OF_DEVELOPMENTAL_PROCESS	wilcox_up_in_generic	31847	197	439	14	7.00E-07	1.83E-05
GNF2_HCK	wilcox_up_in_generic	31847	94	439	10	7.21E-07	1.86E-05
COFACTOR_METABOLIC_PROCESS	wilcox_up_in_generic	31847	54	439	8	7.31E-07	1.87E-05
SIGNAL_TRANSDUCTION	wilcox_up_in_generic	31847	1634	439	48	7.57E-07	1.91E-05
PROGRAMMED_CELL_DEATH	wilcox_up_in_generic	31847	432	439	21	7.76E-07	1.94E-05

Example 8

Comparing potential efficacy-related impacts on key immune system cell types: GA induces Tregs more effectively than PG

We wanted to systematically determine how two different medicines differentially impact immune system cells, using gene expression data. We first utilized an ANOVA-based pattern analysis method to identify a list of genes that are significantly downregulated only by PG compared to medium, and not by GA or GA reference standard compared to medium (Table 10, Methods). We then tested this list for immune system cell type enrichment via a novel approach (Methods). The genes downregulated only by PG are enriched in genes specific for a variety of T cells including Tregs (Table 11). From this same approach, genes significantly upregulated by GA and GA reference standard relative to medium, but not by PG relative to medium (Table 10) again yielded T cells, including Tregs, as the most enriched cell types (Table 11). Finally, genes that have significantly higher expression in samples activated by GA than PG as determined by the 4 parametric methods (Table 8) were, again, enriched for T cells, including Tregs (Table 11).

Table 10: Output of the ANOVA pattern matching method utilized to identify genes upregulated or downregulated only in other glatiramoid or only in GA and reference standard.

UP IN generic ONLY															
Gene	ID	Reference Standard pval	Medium vs. GA pval	Medium vs generic pval	Reference Standard vs GA pval	Reference Standard vs generic pval	GA vs. generic pval	AVG Medium	AVG Reference Standard	AVG GA	AVG generic				
2610027L16RIK	ILMN_2750842	0.23316414	0.05994357	2.2727E-07	0.68404036	7.9386E-05	5.4545E-06	7.383123333	7.472973684	7.497494118	7.814259091				
F830002E14RIK	ILMN_1215076	0.61979947	0.97557017	0.00616121	0.54021216	0.00195298	0.00088603	7.757403333	7.689255263	7.754048529	8.152786364				
TPSAB1	ILMN_2705860	0.83999437	0.11090557	1.247E-05	0.0501649	1.8089E-06	5.9979E-05	6.547536667	6.53815	6.616708824	6.831309091				
G6PC3	ILMN_1218602	0.33285147	0.07830635	0.00023432	0.47064847	0.00038093	0.00034532	7.870143333	7.920968421	7.948063235	8.117036364				
MGAT4B	ILMN_2609073	0.16909238	0.10329483	4.5409E-07	0.70114033	1.5084E-05	0.00013637	6.956693333	7.005913158	7.019420588	7.194036364	Pattern Represented by Data:			
GM962	ILMN_2950814	0.46743111	0.08393291	0.00015128	0.28108427	0.00033705	0.00231909	6.877433333	6.909928947	6.952055882	7.109163636				x
SCMH1	ILMN_1230766	0.85825989	0.33943734	6.5209E-07	0.42348626	5.5247E-07	1.8627E-07	7.173013333	7.179326316	7.202801471	7.402677273	x	x	x	
SLC25A39	ILMN_2855261	0.18484613	0.15956452	0.00011055	0.93089164	0.00106198	0.00039608	8.332893333	8.396894737	8.393611765	8.557713636				
OLFM1	ILMN_1240615	0.36817081	0.06923447	2.834E-05	0.38728168	5.0027E-05	2.8991E-05	6.3626	6.397260526	6.422316176	6.583404545	Medium	Reference	GA	generic
SNCA	ILMN_3161601	0.93290826	0.98379277	0.00327405	0.93259129	0.00088412	7.9207E-05	6.82406	6.8204	6.823285294	7.034854545				
SNCA	ILMN_3136638	0.78545931	0.25685494	0.00321945	0.3721799	0.00200127	0.00102328	7.675763333	7.688563158	7.719423529	7.885086364				
2310003H01RIK	ILMN_1238640	0.18266471	0.54629336	0.00036557	0.29689179	0.00239131	4.4523E-05	9.07639	9.134994737	9.099767647	9.279345455				
MARCKS	ILMN_1256142	0.44405514	0.13135479	0.00065458	0.39346098	0.00025084	0.00026102	9.683343333	9.709323684	9.731372059	9.883690909				
LMAN2L	ILMN_1220769	0.37163633	0.74201425	2.6972E-07	0.50497261	8.1904E-06	8.7497E-08	8.09457	8.121555263	8.103702941	8.290409091				
PDHB	ILMN_3116570	0.07045575	0.05490528	0.00253271	0.85039392	0.0383537	0.01276358	6.709056667	6.794373684	6.787814706	6.90445				
1300001I01RIK	ILMN_1217040	0.15361424	0.44508475	0.00155067	0.43305551	0.00992017	0.00349757	7.676173333	7.747807895	7.714445588	7.870945455				
MARCH2	ILMN_2618329	0.32339884	0.05632394	0.00054815	0.34368315	0.00091052	0.00248307	8.727983333	8.768297368	8.797601471	8.922431818				
REPIN1	ILMN_2605767	0.2862285	0.1495528	0.00017256	0.80716971	8.9783E-05	5.6491E-05	6.464103333	6.508721053	6.515754412	6.656413636				
ALG12	ILMN_2680686	0.21188229	0.74975989	0.00035696	0.17840745	0.0038951	1.3377E-05	6.68395	6.743931579	6.696648529	6.871754545				
SMARCAL1	ILMN_2843698	0.38176629	0.68628203	1.6145E-05	0.56081924	0.00043144	2.6809E-05	8.057763333	8.091636842	8.072047059	8.24295				
TRIP10	ILMN_1213117	0.66225544	0.06647558	0.00013871	0.18009813	0.00057389	0.0012161	7.159423333	7.17705	7.219839706	7.344527273				
PHLPP	ILMN_1237430	0.16858802	0.54828321	0.0007711	0.30022427	0.00511473	0.00035426	7.11814	7.179828947	7.143044118	7.301213636				
WDR6	ILMN_3162081	0.52733239	0.29027057	0.00031616	0.05593257	1.6407E-05	0.00088629	8.723316667	8.696534211	8.763451471	8.904881818				
TRIM28	ILMN_1227225	0.27910558	0.10690452	8.3413E-05	0.56274839	0.00027174	0.00119331	11.25953333	11.29731053	11.31465882	11.44073182				
1110039B18RIK	ILMN_2790512	0.91867384	0.71094096	0.00011885	0.77164086	2.3871E-05	1.0231E-05	8.343063333	8.346705263	8.355070588	8.522913636				
CHMP2A	ILMN_2694998	0.09401655	0.06695391	0.0003865	0.83770055	0.00700343	0.02325497	9.846833333	9.916607895	9.924004412	10.02553636				
PIGT	ILMN_2868131	0.76706348	0.5978573	0.00011945	0.38694881	6.7363E-05	0.00031205	8.51204	8.501307895	8.530822059	8.690481818				
LOC100044636	ILMN_2738554	0.07000295	0.11971002	4.2748E-05	0.70497083	0.00053411	0.00036713	6.805556667	6.867765789	6.857189706	6.983836364				
PLEKHO2	ILMN_2749448	0.89586424	0.27980336	0.00031791	0.24578269	9.7685E-06	0.00017802	9.02316	9.027347368	9.057944118	9.201381818				
EHBP1L1	ILMN_1227131	0.95931483	0.11982509	0.00158887	0.09032625	0.00043714	0.00990715	7.960713333	7.962668421	8.019623529	8.138863636				
ACSL1	ILMN_2622671	0.36515697	0.94675499	0.00032721	0.18512077	0.00042494	8.0095E-07	7.0019	7.036060526	6.999769118	7.177977273				
2310016E02RIK	ILMN_1214401	0.22980904	0.05753222	0.00173874	0.36518999	0.00017037	0.0087173	7.304916667	7.353897368	7.379801471	7.479331818				
ZFP42	ILMN_2961604	0.23976525	0.2201366	0.00090477	0.85271007	0.01568753	0.00298353	5.924646667	5.978389474	5.971730882	6.098336364				
LOC100044576	ILMN_2625342	0.10741552	0.11388429	0.0001033	0.95747285	0.00025062	0.00046078	7.004646667	7.055815789	7.054444118	7.175572727				
CLECSF12	ILMN_2663258	0.4492669	0.13165479	0.00075274	0.51444064	0.00247947	0.00173474	6.01422	6.045115789	6.065151471	6.183786364				
RFFL	ILMN_1226372	0.88745005	0.44898582	9.4065E-05	0.54637034	0.00017954	5.4959E-05	6.479006667	6.483426316	6.499788235	6.647177273				
MEIS1	ILMN_1218266	0.13926526	0.13965044	1.4853E-05	0.91158609	0.00036982	0.00106506	6.53368	6.576773684	6.579920588	6.701572727				
EI24	ILMN_2953677	0.20321493	0.08234041	2.761E-05	0.74871296	4.6862E-05	1.1593E-05	8.8673	8.904455263	8.911220588	9.035086364				
DCP1A	ILMN_2783429	0.05690098	0.09598543	9.7175E-05	0.60716706	0.00774639	0.00098125	8.658053333	8.723913158	8.709516176	8.825931818				
9330147J08RIK	ILMN_1250402	0.12066696	0.07131906	8.2607E-05	0.95554097	0.00539206	0.0011467	6.87715	6.936536842	6.934904412	7.044290909				
NFS1	ILMN_2648867	0.07172253	0.05975583	0.00027838	0.99739104	0.01024559	0.00973757	7.170636667	7.236936842	7.236829412	7.337427273				
YWHAG	ILMN_2587515	0.09216541	0.08780164	0.00018528	0.78219017	0.02873252	0.00578034	6.453236667	6.521060526	6.511844118	6.62				
FMNL3	ILMN_2834837	0.61470373	0.20269367	0.00450269	0.4743815	0.00701983	0.00629179	6.104096667	6.130421053	6.1567	6.2686				

ARF3	ILMN_1252195	0.21207941	0.07639583	0.00109093	0.68850593	0.00529829	0.00724286	8.823646667	8.876202632	8.888575	8.987454545					
CSF2RA	ILMN_2866276	0.96707668	0.45619178	0.00685185	0.3656228	0.0020059	7.7473E-05	7.395346667	7.397218421	7.364389706	7.558909091					
DHRSX	ILMN_1221451	0.61770831	0.91533017	0.00390532	0.47911378	0.00439201	0.0008206	7.434513333	7.457857895	7.429736765	7.596972727					
LOC100046035	ILMN_1242144	0.16767262	0.05152435	0.00102156	0.66720065	0.02109269	0.03091744	5.793826667	5.853584211	5.868417647	5.956231818					
2610019A05RIK	ILMN_2731592	0.79476553	0.29710653	0.0087397	0.10987787	0.00043363	0.01092029	7.04731	7.035371053	7.0915	7.209186364					
SCHIP1	ILMN_2937320	0.4365044	0.59674544	0.00264984	0.74203514	2.2135E-05	3.4834E-05	6.35611	6.325936842	6.336330882	6.517436364					
4632417N05RIK	ILMN_2886896	0.33580362	0.17497117	0.00032764	0.70627984	0.00086208	0.00160253	6.254436667	6.288605263	6.299548529	6.415672727					
DORZ1	ILMN_2773286	0.59962186	0.34416286	2.367E-05	0.6534002	4.6104E-05	0.0001166	6.848643333	6.864202632	6.876232353	7.009645455					
CPNE2	ILMN_2870487	0.38065055	0.50555105	0.00050263	0.77488642	0.00133283	0.00033839	6.59805	6.627957895	6.619660294	6.758777273					
GPD1L	ILMN_2991214	0.19977218	0.17841498	0.00423579	0.98352976	0.01760926	0.01036304	5.962863333	6.012323684	6.011677941	6.122713636					
BC018242	ILMN_2757716	0.10342749	0.19440643	0.00100313	0.44846748	0.0133763	0.00063388	6.208366667	6.270368421	6.249745588	6.367659091					
C230090D14	ILMN_2760468	0.13916106	0.13594729	0.00037764	0.78523332	0.00774524	0.00089867	5.947733333	5.998884211	5.99155	6.106377273					
TSPAN31	ILMN_2964076	0.61807439	0.54371572	0.01176236	0.17458608	0.00792563	0.00019258	6.763363333	6.787294737	6.736430882	6.921695455					
POLB	ILMN_2789425	0.21318995	0.16314915	0.00033153	0.84042814	0.00381926	0.00911601	6.965993333	7.0099	7.016457353	7.124222727					
SIAH1B	ILMN_2903734	0.1289666	0.57808488	0.00287843	0.19128214	0.03582191	0.00122466	6.37228	6.436939474	6.393475	6.528490909					
LOC383036	ILMN_2536553	0.1482323	0.07746285	0.000893	0.96068675	0.04314335	0.01082329	6.41209	6.474181579	6.472569118	6.567927273					
LYNX1	ILMN_1258942	0.40779371	0.14162429	0.00156325	0.45570176	0.00147629	0.01113264	6.817296667	6.848018421	6.870923529	6.972218182					
ZFP41	ILMN_3137980	0.26777369	0.85153774	0.00020126	0.22938243	0.00120632	7.7664E-06	7.414063333	7.450618421	7.419467647	7.568736364					
TSPAN33	ILMN_1219904	0.38783856	0.07193258	0.00113399	0.34074726	0.00385296	0.01315553	6.582713333	6.613352632	6.641277941	6.735368182					
MEGF8	ILMN_2685985	0.09269069	0.2228606	0.00018409	0.2853957	0.01005303	2.9717E-05	7.129433333	7.184897368	7.159761765	7.281790909					
GPAA1	ILMN_1255423	0.88572983	0.23730731	0.01102711	0.12664538	0.00224226	0.03362729	7.391883333	7.385360526	7.441967647	7.544040909					
SLC7A8	ILMN_2598877	0.48873112	0.31561566	0.00252821	0.76145739	0.00363316	0.00378227	6.23386	6.259007895	6.268110294	6.384822727					
RHOF	ILMN_2992047	0.78517933	0.06471531	0.00104676	0.06705697	0.00017656	0.00501895	9.890486667	9.899973684	9.947642647	10.04121364					
2810453I06RIK	ILMN_2510771	0.15644308	0.10084472	0.00323679	0.99076785	0.01840457	0.00616129	8.4568	8.506107895	8.506408824	8.607172727					
PCDHAC1	ILMN_2980110	0.05953082	0.23123021	0.00031963	0.30536078	0.01472709	0.00058967	5.65515	5.716521053	5.689845588	5.804577273					
SCN1B	ILMN_2834198	0.82757251	0.93743375	0.00109112	0.86494367	0.00106954	0.00044649	5.966606667	5.975315789	5.969526471	6.115209091					
CDC42BPB	ILMN_2867696	0.2957513	0.93597907	0.00072093	0.26371026	8.89E-06	0.0001107	7.155186667	7.118955263	7.152523529	7.303131818					
BC037704	ILMN_2470360	0.67738795	0.74219179	0.00010224	0.38766078	0.00011316	1.4832E-06	7.20203	7.214631579	7.193013235	7.3494					
ADAR	ILMN_3021272	0.0580027	0.05129306	0.00057444	0.96259525	0.03342987	0.02784855	8.79254	8.859055263	8.857651471	8.939627273					
UACA	ILMN_2492716	0.35331517	0.12247817	0.00031066	0.62798297	0.00213436	0.00120635	6.05639	6.087271053	6.099835294	6.203304545					
HIST2H2AA1	ILMN_1228849	0.08845112	0.10053728	0.00047862	0.93209418	0.01532418	0.0150984	6.169153333	6.226644737	6.224104412	6.315718182					
PRDX2	ILMN_2773554	0.13852822	0.13387457	0.00025021	0.89353019	0.00624836	0.00193576	11.56810333	11.61388947	11.61041618	11.71427273					
TFRC	ILMN_2619848	0.08516202	0.09167884	0.00229294	0.69987579	0.01603902	0.00599974	9.730386667	9.798923684	9.788595588	9.876177273					
MTAP1S	ILMN_2657432	0.6904967	0.20031685	0.00065825	0.05904387	8.8765E-05	0.00206458	8.951766667	8.937260526	8.991608824	9.097072727					
D11WSU47E	ILMN_2700833	0.225963	0.14304693	0.000121	0.86283361	0.00363177	0.00317771	7.024173333	7.063092105	7.067933824	7.168595455					
ADPRHL2	ILMN_2639063	0.68405179	0.3473478	0.00539446	0.11863376	0.00089913	0.00540034	6.74877	6.730905263	6.782579412	6.892372727					
SYMPK	ILMN_1245437	0.71977433	0.59368169	0.00101082	0.891984	0.00600606	0.002917	8.383586667	8.397528947	8.402226471	8.52715					
GYPA	ILMN_2696696	0.73890142	0.36327688	0.02519012	0.4987125	0.00319309	0.00035484	6.934123333	6.9204	6.897686765	7.0776					
KLHDC3	ILMN_2851023	0.78302203	0.24372306	0.00376383	0.26988503	0.00042878	0.00806745	7.81348	7.822594737	7.853058824	7.955713636					
3110070M22RIK	ILMN_2696066	0.10737962	0.20502087	0.00145115	0.48660361	0.0398205	0.00352369	6.120523333	6.180081579	6.160217647	6.262686364					
TRUB1	ILMN_1240735	0.29536566	0.07343895	9.2393E-05	0.56103171	0.00086925	0.00063531	8.182053333	8.2163	8.230364706	8.323472727					
AKT2	ILMN_2655895	0.84429708	0.25772291	4.5462E-05	0.34370849	4.3497E-05	1.5323E-07	5.950246667	5.944173684	5.919175	6.091436364					
RSC1A1	ILMN_1230668	0.68401145	0.05392083	0.00042967	0.0858665	0.00013655	0.00201638	7.647993333	7.659592105	7.697304412	7.787868182					
FRY	ILMN_2623288	0.41843328	0.17162959	0.00085191	0.58088139	0.0035019	0.00563097	5.699756667	5.725107895	5.740185294	5.839477273					
TJAP1	ILMN_2934448	0.46480666	0.48001853	0.0005054	0.10395886	0.0031371	7.3799E-06	8.189586667	8.215047368	8.167745588	8.328781818					
CNGA4	ILMN_2875896	0.41280262	0.838024	0.00421111	0.4856524	0.02626848	0.00310152	5.99744	6.028623684	6.004719118	6.136186364					
SGSM3	ILMN_2987294	0.2852907	0.17993849	0.00055295	0.8524482	0.00238157	0.00201576	7.17779	7.212339474	7.217123529	7.316372727					

9430078K10RIK	ILMN_2500041	0.5504554	0.11642124	0.00175458	0.30830794	0.0041732	0.01656268	6.076453333	6.095631579	6.124530882	6.214954545				
SLC26A6	ILMN_2668261	0.35123184	0.37483965	0.00205543	0.93052826	0.01382185	0.01126309	6.420846667	6.4567	6.453741176	6.5591				
LYSMD4	ILMN_2701435	0.32638926	0.7070625	0.0012552	0.36786548	0.00282183	6.4684E-05	6.801406667	6.835131579	6.812473529	6.939245455				
PCBD2	ILMN_2876775	0.83857904	0.06857342	0.00093677	0.05659279	7.0666E-05	0.0052888	10.26506	10.27223684	10.32058088	10.40271364				
UAP1	ILMN_2502542	0.21657246	0.98541869	0.00090753	0.13404544	0.03188188	0.00024728	8.167053333	8.216581579	8.167673529	8.304695455				
RNF40	ILMN_1242623	0.211788	0.09917397	0.00010844	0.65795314	0.00010746	0.00071064	6.104593333	6.138042105	6.147527941	6.241636364				
LOC277049	ILMN_1240399	0.29345712	0.10601588	0.00032209	0.57559205	0.00299319	0.00566302	5.871153333	5.901181579	5.915414706	6.006836364				
LOC100047603	ILMN_2697057	0.5317771	0.49723284	0.00279969	0.90335285	0.00408611	0.00028596	6.163923333	6.187207895	6.184048529	6.299472727				
BCL2L12	ILMN_2935909	0.4501663	0.15075832	0.00083123	0.54081523	0.00491744	0.00699663	6.95393	6.980221053	6.997483824	7.088572727				
HMGCL	ILMN_1256234	0.29797373	0.38742722	0.00288991	0.87354805	0.01353055	0.02023386	7.923806667	7.963534211	7.958	8.0583				
TRPV4	ILMN_2466284	0.25145055	0.33803647	0.00031314	0.68273446	0.01883637	0.00211203	5.866016667	5.907376316	5.895151471	5.999986364				
9030624J02RIK	ILMN_2872639	0.78200401	0.41703987	0.00011443	0.60307495	0.00035665	0.00031891	9.494316667	9.503005263	9.516620588	9.627690909				
1110020P15RIK	ILMN_3142224	0.12120649	0.0502281	3.9974E-06	0.98580392	0.00101571	5.2276E-05	12.83764667	12.8778	12.87814853	12.97065				
SNCA	ILMN_3059393	0.26266042	0.20886172	4.5363E-05	0.89343173	0.00301563	0.00397248	5.838986667	5.871242105	5.874923529	5.971345455				
9130011J15RIK	ILMN_2593484	0.23649453	0.43542115	0.00079019	0.48432507	0.00494982	0.00016332	8.423743333	8.460226316	8.444064706	8.556095455				
ATP9B	ILMN_1233770	0.82506746	0.1176255	0.00078987	0.14652888	0.00044743	0.00317972	5.876853333	5.884023684	5.920125	6.008981818				
KCNC3	ILMN_2681742	0.372855	0.7150701	0.00180644	0.48590107	0.00820357	0.00055463	5.950906667	5.980818421	5.961808824	6.082136364				
LOC100045460	ILMN_1216433	0.51010123	0.3577678	0.00102881	0.0673625	3.8938E-05	0.00093652	5.620116667	5.600318421	5.645004412	5.749863636				
MAGEE2	ILMN_2477690	0.17108453	0.05934004	0.00118353	0.60110983	0.00727604	0.01024961	5.760393333	5.796631579	5.808379412	5.889972727				
LOC100047194	ILMN_1217481	0.1593328	0.09817286	1.4053E-05	0.93984431	0.01188776	0.0069427	5.874716667	5.918439474	5.920526471	6.00425				
MS4A7	ILMN_3091003	0.57297521	0.48201756	0.01377112	0.89723565	0.02317278	0.02103231	6.47951	6.501352632	6.505692647	6.608881818				
EFCAB6	ILMN_2928498	0.76323421	0.32217211	0.00439564	0.48635484	0.00343022	0.00251696	5.580346667	5.591255263	5.609620588	5.709145455				
CEBPE	ILMN_3029849	0.80783743	0.17328494	0.00307707	0.23187011	0.002828	0.01622655	6.161636667	6.170128947	6.20425	6.289590909				
LOC100046781	ILMN_1249142	0.6583194	0.83343519	0.00149683	0.46895205	0.00385634	0.00039912	6.09563	6.110731579	6.088780882	6.223009091				
C920004C08RIK	ILMN_1222071	0.38502878	0.07005445	0.0038178	0.38809925	0.01253032	0.02259007	11.32737	11.35911842	11.38204412	11.45473636				
TNXB	ILMN_2444411	0.14961479	0.10546876	0.00050175	0.88054682	0.00213799	0.00191327	5.663876667	5.699578947	5.702611765	5.790745455				
ADAL	ILMN_2948663	0.23696542	0.17163928	0.0033817	0.97176484	0.0463896	0.01802189	6.324213333	6.367818421	6.366766176	6.450545455				
INTS7	ILMN_2726174	0.27324071	0.586879	0.00587044	0.41797982	0.0040954	0.00107415	9.293426667	9.331626316	9.311188235	9.41915				
FOXP4	ILMN_2650317	0.74594364	0.56270629	0.01705487	0.75513764	0.00235308	0.00528704	6.264146667	6.276007895	6.284380882	6.389745455				
Ageneric5L	ILMN_1217612	0.83299323	0.9146392	0.00048051	0.69535158	3.7093E-05	1.4826E-05	8.109116667	8.115305263	8.106152941	8.234490909				
CD44	ILMN_2474229	0.26929639	0.14781976	0.00554927	0.92553119	0.04471501	0.01739387	5.908876667	5.950365789	5.953	6.034186364				
ZMAT3	ILMN_2418426	0.25658442	0.86316426	0.00223223	0.09948234	0.02695902	8.304E-05	7.620363333	7.659939474	7.615426471	7.745318182				
PRPF3	ILMN_2941431	0.48039198	0.0666872	0.00191681	0.1846098	0.0003537	0.00722913	9.9884	10.01081053	10.04008088	10.11331818				
RPUSD3	ILMN_1214740	0.2304027	0.23279576	0.00255484	0.83257185	0.01690345	0.00491704	6.720803333	6.761342105	6.755892647	6.845586364				
ZBTB6	ILMN_2525819	0.13087182	0.12258692	0.00141696	0.69934155	0.01954111	0.00144419	5.991976667	6.036765789	6.028576471	6.116695455				
MAGEA9	ILMN_1252512	0.83094731	0.08459744	0.00068872	0.11884211	0.00138663	0.01801554	5.76786	5.7748	5.817098529	5.892554545				
PTPRF	ILMN_1219189	0.21904246	0.08672444	0.00056349	0.5640646	0.00429561	0.0157663	5.6626	5.695144737	5.709207353	5.786977273				
NSF	ILMN_2760629	0.19318587	0.36073604	0.00085745	0.55958345	0.00518866	0.00095739	9.924636667	9.963881579	9.949961765	10.04892273				
SARDH	ILMN_2903455	0.79605022	0.77858591	0.01016045	0.51361001	0.00130347	0.00283633	5.826933333	5.817136842	5.836519118	5.949331818				
XPO5	ILMN_1216198	0.70505686	0.67920197	0.02384337	0.33063911	0.04204905	0.00057367	7.6071	7.625202632	7.592019118	7.729186364				
VGLL2	ILMN_2495753	0.34936137	0.26151967	0.00612462	0.84191343	0.01019352	0.02417299	5.813743333	5.846973684	5.852779412	5.935795455				
HSD3B2	ILMN_1233611	0.38575077	0.84652261	0.00014189	0.19970449	0.00477567	4.8549E-06	5.780146667	5.805763158	5.775658824	5.9017				
CAPZB	ILMN_1230100	0.1875435	0.06034991	0.00217355	0.67582845	0.02773325	0.03238859	5.8003	5.843094737	5.853869118	5.921709091				
PKIB	ILMN_3052870	0.70096129	0.27928246	0.00023369	0.45016594	0.00041464	0.0035889	5.772683333	5.783521053	5.802783824	5.894004545				
A230005A19RIK	ILMN_2564767	0.63802511	0.18917144	2.6475E-05	0.05538688	1.1591E-05	8.0443E-05	5.803403333	5.79155	5.830422059	5.924704545				
USP10	ILMN_1217931	0.79465925	0.83880456	0.00962728	0.93399997	0.00955342	0.00642993	6.42393	6.434371053	6.431577941	6.544827273				
NCDN	ILMN_1231405	0.81698433	0.416902	0.00667762	0.20351527	0.00022093	0.00778456	8.381273333	8.373278947	8.408173529	8.501877273				

SYN1	ILMN_1235133	0.66948488	0.25789954	0.00450181	0.07793351	0.00082228	0.00995117	5.950843333	5.935671053	5.984697059	6.071295455					
ARVCF	ILMN_2573293	0.44694609	0.75666837	0.00102822	0.62945864	0.00334104	0.00086306	5.718253333	5.738763158	5.726697059	5.838531818					
SMG7	ILMN_2953017	0.42587972	0.38068927	0.01889443	0.9166145	0.02184543	0.00802694	9.624156667	9.658326316	9.655355882	9.744204545					
5730472N09RIK	ILMN_2765936	0.40839264	0.60823708	0.00194252	0.6700575	0.01253481	0.00179129	7.63479	7.660244737	7.648992647	7.754604545					
ZMIZ1	ILMN_1224736	0.37634424	0.05504898	0.01366886	0.39849773	0.00224248	9.7983E-06	7.174863333	7.131644737	7.099030882	7.294513636					
ZFP162	ILMN_1251244	0.20140467	0.74349021	0.003566	0.22753522	1.5161E-05	0.00014626	7.66155	7.620365789	7.651876471	7.781118182					
DUS2L	ILMN_1256843	0.85616436	0.44642801	0.0038192	0.27855692	0.00086407	0.00172912	6.93203	6.926063158	6.953073529	7.050854545					
BZRPL1	ILMN_2635718	0.61850682	0.57423004	0.01900537	0.90318112	0.04301692	0.00446837	6.187326667	6.206431579	6.203076471	6.306068182					
ARFGAP2	ILMN_2853409	0.8237825	0.85158881	0.00199602	0.94478983	0.00678872	0.00130004	9.42326	9.430544737	9.428569118	9.541945455					
9330183F02RIK	ILMN_2558866	0.32614679	0.17334775	0.00055707	0.63326394	0.00580031	0.01681826	5.949093333	5.973960526	5.98625	6.067668182					
DBF4	ILMN_2952661	0.62403934	0.83848649	0.01229066	0.39859235	0.01913089	0.00166558	8.57731	8.598042105	8.569597059	8.695836364					
ATG3	ILMN_2595188	0.62133153	0.90315959	0.00841756	0.57722036	0.0012036	0.00020877	5.596373333	5.578073684	5.592863235	5.714631818					
ISCA1	ILMN_2888842	0.35957584	0.78095788	0.00762094	0.43658095	0.03725391	0.00503629	9.365886207	9.401326316	9.377892647	9.484090909					
4930544L04RIK	ILMN_1256258	0.12121171	0.14441762	0.0006835	0.73082687	0.03198867	0.00668889	5.835473333	5.881492105	5.873111765	5.953290909					
2610209A20RIK	ILMN_2744228	0.22225103	0.05035008	0.00386646	0.63077254	0.03886407	0.03001504	5.954303333	5.9957	6.007576471	6.072068182					
2810046M22RIK	ILMN_2714278	0.79325707	0.3413647	0.00690207	0.43065552	0.00213172	0.00722839	5.965796667	5.974528947	5.994625	6.08355					
DHDH	ILMN_1234086	0.74724453	0.59059753	0.00175229	0.86971555	0.00020788	4.2838E-06	7.466183333	7.457073684	7.453639706	7.583509091					
ALOX15	ILMN_2789023	0.49450876	0.53638936	0.00570701	0.91093104	0.00801067	0.00525598	5.948553333	5.970678947	5.967667647	6.065718182					
RNF183	ILMN_2753931	0.26921908	0.18842993	0.00686923	0.88653996	0.02011683	0.02538967	5.951953333	5.990247368	5.994061765	6.069068182					
LOC385989	ILMN_2538010	0.18607303	0.20021422	0.00191936	0.75816273	0.02628028	0.0047078	5.9626	6.003389474	5.996039706	6.079709091					
RBPMS	ILMN_3026557	0.96763167	0.56224954	0.00348847	0.54346053	0.00072125	8.217E-06	6.082373333	6.081173684	6.068086765	6.199422727					
MTRR	ILMN_2969314	0.13801396	0.28082362	0.00274793	0.44877156	0.04540035	0.00332952	6.4451	6.491657895	6.473463235	6.562140909					
5930400G23RIK	ILMN_1252245	0.40467526	0.46528262	0.00347765	0.84652383	0.03143047	0.01143447	5.852196667	5.880894737	5.875044118	5.968995455					
CD151	ILMN_2492403	0.92119216	0.67348082	0.01261715	0.55087141	0.00528279	0.00145378	7.20143	7.205263158	7.185635294	7.318127273					
LOC380636	ILMN_2533773	0.12145288	0.08809138	0.00055433	0.99484243	0.02332253	0.01160268	5.523523333	5.565797368	5.565647059	5.639413636					
ITFG2	ILMN_1252621	0.7616105	0.4091743	0.00122209	0.19592237	0.00020626	0.00083074	8.126836667	8.117552632	8.148073529	8.242622727					
PALM	ILMN_2815626	0.27210377	0.60175917	0.00702535	0.05264141	9.9305E-05	0.00462694	6.404466667	6.3666	6.420661765	6.519804545					
ZFP563	ILMN_2642938	0.193144	0.30579008	0.00389083	0.60583451	0.0392958	0.00644165	5.780793333	5.821705263	5.808876471	5.894754545					
LOC382813	ILMN_1237743	0.32446022	0.13282026	0.00113931	0.66957638	6.7587E-05	1.9804E-06	5.826046667	5.796476316	5.785617647	5.939763636					
BC017612	ILMN_2631514	0.83552119	0.85013235	0.01809313	0.66005927	0.00993053	0.00823769	7.401256667	7.409202632	7.393575	7.514886364					
CBARA1	ILMN_2686513	0.86139711	0.9466614	0.01799514	0.88573743	0.00710622	0.0037732	7.51929	7.512352632	7.516942647	7.632227273					
COQ9	ILMN_2774456	0.59075852	0.13753291	0.00086124	0.34900387	0.00621783	0.02796696	8.24214	8.258726316	8.284261765	8.355045455					
USP36	ILMN_2491232	0.56949259	0.38609624	0.03027487	0.07311196	0.04192555	0.00017844	8.529063333	8.552176316	8.499982353	8.641940909					
1700063H04RIK	ILMN_1244141	0.63515532	0.10809724	0.00890166	0.2270816	0.00885167	0.03437235	5.77347	5.789544737	5.819770588	5.886254545					
JPH1	ILMN_1217728	0.34365308	0.09716164	0.00319925	0.53577226	0.01378973	0.02153318	5.62534	5.656123684	5.671236765	5.737745455					
CLEC4A3	ILMN_3161652	0.11282409	0.62228735	0.04844097	0.11660557	0.00026547	0.00217505	6.565526667	6.496394737	6.547061765	6.6777					
R74862	ILMN_2745522	0.43139805	0.38262131	0.0063334	0.05657433	0.00019849	0.01574341	6.187246667	6.161294737	6.214616176	6.299313636					
LOC332300	ILMN_2531139	0.21628289	0.45088627	0.00051207	0.63201644	0.012255	0.00428559	6.22264	6.254697368	6.24265	6.334690909					
SPEN	ILMN_2592059	0.17066734	0.96706426	0.02340849	0.06264559	0.0001212	0.00366195	6.88912	6.833476316	6.890566176	7.000954545					
CHRM2	ILMN_2971508	0.55099734	0.40333119	0.00143259	0.11974918	0.00255277	5.0378E-05	5.612146667	5.627805263	5.589489706	5.723913636					
PSG22	ILMN_3078396	0.15765766	0.46614787	0.00173384	0.41177633	0.03160967	0.00316651	5.674963333	5.713052632	5.693373529	5.786663636					
E330037I15RIK	ILMN_2584027	0.13994579	0.90103078	0.00116894	0.07547583	0.01568279	7.005E-05	6.253253333	6.295521053	6.256348529	6.364609091					
SCAVENGER RECEPTOR	ILMN_2449412	0.06423164	0.51146019	0.01084533	0.08950745	2.5558E-07	4.5499E-05	6.180263333	6.122484211	6.160936765	6.291545455					
UBE2E2	ILMN_2792485	0.66434328	0.95217738	0.00650482	0.64814483	0.00202822	0.00104592	6.42196	6.408394737	6.420322059	6.533227273					
PALLD	ILMN_1246642	0.16878379	0.27707286	0.00073811	0.68212951	0.03311922	0.00983465	5.6114	5.651594737	5.640960294	5.721868182					
REXO1	ILMN_1245568	0.55805948	0.83302065	0.01440805	0.33571906	0.00192893	0.00692206	6.846273333	6.8226	6.853654412	6.956654545					

9330104G04RIK	ILMN_1255975	0.39302814	0.05223332	0.00019054	0.27198445	0.0027408	0.01737767	5.66529	5.685615789	5.709814706	5.775472727
PKIA	ILMN_2674122	0.67293267	0.4629903	0.00556462	0.1917034	0.00108801	0.01215542	6.33296	6.318071053	6.356127941	6.442677273
1200003C05RIK	ILMN_2943319	0.59622266	0.14302272	0.01192579	0.29485229	0.00853701	0.04235168	9.058593333	9.076478947	9.102913235	9.168109091
C130040D06RIK	ILMN_2746366	0.80272538	0.22751982	0.00284699	0.36441676	0.00995222	0.01576115	5.67662	5.685352632	5.710569118	5.78585
MOCOS	ILMN_2906489	0.75542925	0.32906964	0.00350144	0.49760379	0.00128916	6.2052E-05	6.452413333	6.442544737	6.424154412	6.561495455
PCOLN3	ILMN_2847502	0.66324539	0.50606993	0.04235283	0.15162103	0.00125839	0.03154406	7.14645	7.129347368	7.171211765	7.2555
DACH1	ILMN_3072197	0.33621604	0.35503485	0.00110316	0.91837597	0.00900515	0.00666164	5.84774	5.876168421	5.873570588	5.956586364
B930062B16RIK	ILMN_1220808	0.32790334	0.08497289	0.00217034	0.4370566	0.00723409	0.02820519	5.9928	6.020252632	6.038070588	6.1015
UGP2	ILMN_1244631	0.79817532	0.5705628	0.00365856	0.76237104	0.00489094	0.00380639	7.75135	7.759273684	7.767085294	7.859927273
RALGPS2	ILMN_2884869	0.83773462	0.64566493	0.00759159	0.77764494	0.00171812	0.00212375	8.849346667	8.85575	8.862479412	8.957890909
MFSD7A	ILMN_2766105	0.60693902	0.58513362	0.03367774	0.9448507	0.03040298	0.01214659	5.942556667	5.962721053	5.960813235	6.050986364
KREMEN2	ILMN_2951946	0.97572697	0.86706274	0.0142853	0.82630834	0.01010007	0.00233333	6.228356667	6.229486842	6.222888235	6.336777273
LOC223628	ILMN_1216043	0.2465434	0.88909294	0.00156273	0.23866081	0.00952059	0.00085508	5.593906667	5.627542105	5.597889706	5.702259091
RASAL2	ILMN_1233634	0.13878571	0.21684543	0.00076632	0.66394521	0.01748223	0.00333495	5.9777	6.015571053	6.006291176	6.085986364
OLFR1155	ILMN_1226210	0.60008585	0.26727264	0.00046584	0.56713115	0.00163827	0.00230214	5.764156667	5.776971053	5.789191176	5.872309091
1700021P22RIK	ILMN_1237313	0.72320123	0.43628571	0.00836603	0.6174392	0.00399991	0.01898456	6.012316667	6.023542105	6.037217647	6.120245455
9430088N01RIK	ILMN_1251471	0.18310252	0.16561225	0.0028294	0.96478484	0.00932456	0.01549275	6.635966667	6.672292105	6.673269118	6.743536364
MKNK1	ILMN_2547867	0.33749491	0.3062801	0.01310828	0.88788853	0.03685846	0.01320064	6.082133333	6.116702632	6.113097059	6.189422727
FAHD1	ILMN_1218891	0.60928218	0.65335483	0.00558641	0.95628689	0.00626434	0.00627596	7.16378	7.178176316	7.176764706	7.270995455
4930432K21RIK	ILMN_2672745	0.64921947	0.86232486	0.01529869	0.69522914	0.02043091	0.00321814	6.587463333	6.603065789	6.592614706	6.694659091
KRTCAP2	ILMN_2605694	0.48175968	0.26514408	0.00107793	0.72772374	0.0009224	0.0005065	12.50929	12.52731053	12.5338	12.61621818
LY96	ILMN_2743003	0.60240232	0.37156798	0.02495881	0.1045283	0.00420396	0.038316	7.739873333	7.721665789	7.768026471	7.846718182
TAF3	ILMN_3160989	0.42511261	0.87443846	0.00506607	0.27553271	0.01219759	0.00149854	7.20446	7.230068421	7.199411765	7.310913636
1200011M11RIK	ILMN_3105117	0.80288013	0.67937454	0.01906433	0.46899481	0.03049915	0.00367463	6.336033333	6.345536842	6.321513235	6.442459091
4930430K04RIK	ILMN_1250290	0.37545277	0.72073779	0.00762228	0.38313585	0.01192779	0.00035218	5.489846667	5.518073684	5.499239706	5.596013636
FGR	ILMN_1244821	0.95106768	0.41582138	0.00561853	0.44221591	0.01073639	0.02742569	6.94495	6.947236842	6.971538235	7.051018182
5830457O10RIK	ILMN_2697766	0.361932	0.53781105	0.02816252	0.69991901	6.469E-05	0.00086576	9.167493333	9.133463158	9.144754412	9.273427273
FBXL21	ILMN_2518214	0.1497671	0.07565383	0.00162512	0.86714862	0.02552817	0.02051226	5.61257	5.652573684	5.656242647	5.718277273
BC031853	ILMN_2764549	0.05063828	0.64726274	0.00431543	0.09295443	4.8105E-06	0.00071839	6.96577	6.904671053	6.951757353	7.071477273
LOC546088	ILMN_2533350	0.72822666	0.44487114	0.00928651	0.688774	0.01706508	0.01512498	5.760926667	5.771278947	5.781745588	5.866559091
control_ILMN_1378661	ILMN_1378661	0.58288344	0.56218964	0.00115548	0.98721187	0.00064345	0.00022549	5.73423	5.717705263	5.718148529	5.839836364
HTATIP2	ILMN_2603834	0.47453234	0.27654833	0.00141767	0.76406644	0.00210299	0.00161854	8.76101	8.781044737	8.787325	8.866609091
CENTD3	ILMN_1243107	0.30658868	0.18469695	0.0070268	0.90534006	0.00051431	2.391E-05	7.796676667	7.763389474	7.760257353	7.902195455
DNAHC17	ILMN_1215848	0.78560788	0.94735885	0.00042695	0.7754273	0.00104722	2.0647E-05	5.836333333	5.843681579	5.837757353	5.941763636
5330403O16RIK	ILMN_1241724	0.23088372	0.14548399	0.00380189	0.90437295	0.04190745	0.02609541	5.679523333	5.713576316	5.716461765	5.784904545
CCL2	ILMN_1245710	0.68115941	0.35160796	0.0180609	0.15481728	0.00601552	0.04458017	5.806643333	5.794926316	5.833814706	5.911954545
C230062L16RIK	ILMN_2582211	0.79458172	0.83053644	0.00735606	0.91122432	0.01026268	0.00140343	6.18329	6.191994737	6.189144118	6.288490909
1700029G01RIK	ILMN_1250435	0.76182257	0.97237019	0.01032863	0.68682607	0.01011578	0.0025475	6.738916667	6.749055263	6.737847059	6.844031818
9330158H04RIK	ILMN_2660943	0.64512593	0.5227084	0.00152554	0.95365122	0.00750219	0.00088507	5.684246667	5.697526316	5.698854412	5.789281818
ENAH	ILMN_2636853	0.06868458	0.33056646	0.00163374	0.34847938	0.04629448	0.00818286	5.894096667	5.941060526	5.919310294	5.999045455
SLC13A5	ILMN_1229923	0.94509976	0.60925235	0.01845312	0.49303532	0.004652	0.00701722	5.689653333	5.687397368	5.704489706	5.794518182
6720407G21RIK	ILMN_1245282	0.8866404	0.40188413	0.00068075	0.46800238	0.00022872	1.8039E-06	5.56161	5.557984211	5.543336765	5.666440909
BTRC	ILMN_3100042	0.34472936	0.67810519	0.01282088	0.52994813	0.00029857	0.00143989	7.959056667	7.927918421	7.945702941	8.063472727
COTL1	ILMN_2915232	0.79492031	0.55583484	0.00718325	0.77390032	0.01512099	0.00754377	12.2261	12.23490263	12.24276029	12.33050455
NEK4	ILMN_2634859	0.91526202	0.19311108	0.00578328	0.12445123	0.00292968	0.03295181	5.931456667	5.927926316	5.968935294	6.035831818
6430709H04RIK	ILMN_2609850	0.89780111	0.41535609	0.00121402	0.50801567	0.0039779	0.00293725	5.620953333	5.625018421	5.641717647	5.725077273

TCEAL5	ILMN_2630772	0.97219594	0.442065	0.00556045	0.36220998	0.00150024	0.01076635	5.74579	5.744702632	5.768248529	5.849777273					
NFE2L1	ILMN_1251729	0.35151102	0.88469349	0.00095891	0.3619295	0.00731206	0.00040477	9.749116667	9.772821053	9.752560294	9.852936364					
THOC1	ILMN_2850527	0.83855663	0.48870524	0.01990776	0.61754068	0.01368403	0.01084815	8.791263333	8.7994	8.813451471	8.894681818					
CTNNA3	ILMN_2834525	0.35364536	0.37546314	0.01198092	0.8661483	0.0305254	0.01046438	5.677696667	5.704381579	5.700572059	5.780836364					
9430003J03RIK	ILMN_1258022	0.65571138	0.28190997	0.00195284	0.48961492	0.00186634	0.00713957	6.223606667	6.235028947	6.250230882	6.326727273					
NAPRT1	ILMN_2799590	0.96014189	0.33076081	0.00799053	0.26651831	0.00616399	0.00032339	6.49092	6.492510526	6.460433824	6.593895455					
SYNGR1	ILMN_3101732	0.9391257	0.35082575	0.00984298	0.30041757	0.01328617	0.03036858	5.925626667	5.922781579	5.953997059	6.028540909					
LOC380723	ILMN_1243160	0.37740932	0.67618749	0.00143845	0.516955	0.00779308	0.00029654	5.8033	5.824481579	5.811860294	5.906168182					
D130017N08RIK	ILMN_1247385	0.16667108	0.48307406	0.01019145	0.42178833	0.04400345	0.01404355	6.040376667	6.081463158	6.061413235	6.142936364					
LOC677528	ILMN_2656362	0.47982841	0.94578199	0.00715636	0.41450757	0.00026806	0.00103661	9.500013333	9.476392105	9.497989706	9.602481818					
BCL2L2	ILMN_2551387	0.22818583	0.21524422	0.00473619	0.97372329	0.01300616	0.01597522	5.758356667	5.792813158	5.792060294	5.86055					
ZEB2	ILMN_1227793	0.65765685	0.57181172	0.00049367	0.92187971	0.00195583	0.00109947	5.58955	5.600247368	5.602375	5.691709091					
UBE2A	ILMN_2476804	0.81778966	0.95000461	0.01743581	0.74057972	0.01722272	0.01181808	7.649666667	7.640873684	7.651729412	7.751495455					
BC040758	ILMN_3034303	0.28931872	0.37692576	0.00522104	0.79818174	0.03721202	0.01925994	6.051266667	6.083378947	6.076677941	6.153059091					
FOXE1	ILMN_3163279	0.84308178	0.94893077	0.01799077	0.74930041	0.0116943	0.00509161	5.774953333	5.767334211	5.776966176	5.876681818					
BCKDK	ILMN_1249301	0.21758878	0.92229557	0.01550038	0.11873778	8.6233E-05	0.00580959	9.482256667	9.443044737	9.485333824	9.583913636					
TRIM15	ILMN_1246816	0.68974946	0.12959121	0.00201966	0.23014116	0.00229519	0.01771175	5.583353333	5.593910526	5.620164706	5.684890909					
HOXC10	ILMN_2836885	0.89837669	0.70710511	0.03140007	0.59043209	0.04308878	0.00589081	6.14456	6.149455263	6.131916176	6.246045455					
NFKB1	ILMN_2592476	0.76898705	0.95041769	0.00295371	0.63790578	0.00790483	6.3164E-05	11.57260667	11.58177368	11.57118529	11.67374091					
OLFR228	ILMN_2818216	0.27737328	0.61973791	0.00249111	0.06119513	6.1572E-05	0.00291443	5.64159	5.606563158	5.655326471	5.742690909					
CLCN1	ILMN_2802672	0.49446288	0.9550135	0.00484028	0.46793233	0.04129309	0.00345529	5.78522	5.807239474	5.786810294	5.886245455					
6330579M01RIK	ILMN_1256365	0.37596201	0.83897985	0.00183326	0.22227265	0.00759449	0.00017292	5.81892	5.839239474	5.814498529	5.919422727					
SFRS2IP	ILMN_2713448	0.73748419	0.41559133	0.01633789	0.15302115	0.00738233	7.5446E-05	9.258286667	9.270178947	9.233055882	9.358495455					
4930543G11RIK	ILMN_1233640	0.82294632	0.6641014	0.00221225	0.43702216	0.00151109	1.1977E-05	5.784193333	5.789855263	5.775158824	5.88425					
2900090M10RIK	ILMN_1260170	0.28438878	0.10514918	0.00066848	0.70176192	0.02144135	0.02098325	5.65543	5.685610526	5.694514706	5.755240909					
LOC100048331	ILMN_1242041	0.58901281	0.84782172	0.02603217	0.37387194	0.02981401	0.00389063	5.8999	5.918623684	5.893625	5.999568182					
TFIP11	ILMN_2661666	0.90213352	0.16019485	0.00593209	0.07447876	0.00064179	0.04218803	8.054953333	8.051084211	8.095283824	8.154390909					
TTC4	ILMN_1220820	0.50583431	0.99873725	0.01579862	0.45381957	0.0009629	0.00593889	8.308693333	8.288452632	8.308645588	8.408109091					
CAMK1	ILMN_2944939	0.10460814	0.15798962	0.02459022	0.52801525	5.1199E-05	1.8481E-05	6.459003333	6.399568421	6.416069118	6.557886364					
2600005J22RIK	ILMN_1246515	0.84043545	0.16470974	0.00930877	0.15062039	0.00127562	0.04579512	5.692316667	5.698397368	5.732252941	5.790959091					
P5CD2	ILMN_1251874	0.34994684	0.4129054	0.00566457	0.77170559	0.00091644	0.00017891	6.155033333	6.126615789	6.134001471	6.253527273					
control_ILMN_1378911	ILMN_1378911	0.32667688	0.42471309	0.00428809	0.8607028	0.01345908	0.00757724	5.681283333	5.703731579	5.700030882	5.779386364					
F830116E18RIK	ILMN_2905525	0.48967608	0.31908374	0.01678449	0.90510364	0.00993299	0.0076042	5.922473333	5.896713158	5.892973529	6.020572727					
ATPBD3	ILMN_2783557	0.75585531	0.88699079	0.01683452	0.81877079	0.02746112	0.00722026	6.565073333	6.575857895	6.569377941	6.663122727					
SLC22A21	ILMN_1234533	0.17026988	0.82540457	0.00925147	0.09451465	0.03706086	0.00051334	5.769	5.808589474	5.774551471	5.867009091					
FBXL15	ILMN_2792047	0.42348825	0.52124517	0.01450012	0.85818541	0.00084336	0.0015336	7.304583333	7.278686842	7.283870588	7.402495455					
4930481A15RIK	ILMN_1248737	0.61289473	0.6812972	0.00651844	0.88723651	0.00423683	0.00330588	5.86779	5.882173684	5.878910294	5.965627273					
E030016N13RIK	ILMN_1235317	0.73525443	0.36765944	0.01795379	0.58316034	0.01007815	0.00114404	6.23018	6.217034211	6.198725	6.328004545					
PDGFB	ILMN_2618714	0.95021682	0.63736944	0.01466175	0.6615403	0.00915126	0.0067522	6.229823333	6.231968421	6.243358824	6.327645455					
4933437N03RIK	ILMN_2774580	0.59904062	0.40840008	0.03995368	0.72366676	0.02244034	0.04125272	6.072506667	6.089789474	6.098586765	6.169759091					
2310046A06RIK	ILMN_2700344	0.09693427	0.3378204	0.00361157	0.40525941	9.8372E-06	2.6431E-05	5.654603333	5.617594737	5.633589706	5.7515					
MAK10	ILMN_2828599	0.57524627	0.99831228	0.00462742	0.4325795	3.7751E-05	8.2705E-05	9.515693333	9.500657895	9.515651471	9.612581818					
LOC277236	ILMN_2530354	0.74572568	0.6674914	0.00507727	0.97771727	0.01683661	0.00305436	5.9668	5.976176316	5.976830882	6.063481818					
TMEM43	ILMN_2700505	0.08359427	0.06267175	0.00363649	0.72501753	0.04936703	0.00890644	9.091776667	9.138781579	9.132544118	9.1884					
CAMK1	ILMN_2671721	0.44365063	0.55451755	0.01324093	0.75702043	0.0275119	0.01087233	5.496296667	5.521871053	5.513919118	5.592581818					
SPIN2	ILMN_2934522	0.63405541	0.99500552	0.02510773	0.54232848	0.02921252	0.00445866	6.355673333	6.370976316	6.355486765	6.451927273					

V1RC23	ILMN_3004978	0.87375928	0.74179796	0.01065243	0.86417002	0.01983656	0.018027	5.68207	5.686805263	5.691661765	5.777972727
ZFP239	ILMN_3127381	0.58169905	0.66161311	0.0039776	0.24080108	0.00012244	0.0024932	7.216716667	7.201723684	7.227942647	7.312536364
COQ6	ILMN_2766720	0.06092969	0.17676374	0.00051581	0.56433332	0.02938357	0.01500906	9.932686667	9.977407895	9.965157353	10.02839545
CLCNKB	ILMN_2757283	0.52418848	0.77111416	0.00944684	0.32960104	0.0020966	0.02196419	5.946433333	5.926278947	5.955783824	6.042031818
2310051M13RIK	ILMN_1237270	0.96654677	0.77123524	0.01036298	0.71444946	0.00836162	0.00059521	5.616203333	5.617539474	5.608520588	5.7118
RHOT1	ILMN_1242500	0.08801159	0.11586897	0.00211474	0.74329166	0.03708177	0.01498654	9.741433333	9.783013158	9.776666176	9.836890909
GPR106, LGR8, GPCR	ILMN_1232852	0.65598321	0.19431475	0.00488593	0.37987832	0.00751158	0.01854805	5.783516667	5.794997368	5.813719118	5.878945455
OLFR907	ILMN_2598615	0.80860498	0.15586787	0.0060448	0.07493401	0.00331944	0.03561223	5.608323333	5.601023684	5.643789706	5.703095455
TRABD	ILMN_2978533	0.99327612	0.62026479	0.02986947	0.57568866	0.01868526	0.00703553	8.528336667	8.528678947	8.508880882	8.623013636
BLCAP	ILMN_2705802	0.20007345	0.91664338	0.00728425	0.06692845	4.6061E-05	0.00060719	8.161383333	8.124126316	8.163920588	8.255986364
GM628	ILMN_3160644	0.5486986	0.37399695	0.0198613	0.8226972	0.04707652	0.04340188	5.719166667	5.740194737	5.746419118	5.813490909
DNM3	ILMN_2482131	0.25766404	0.2129101	0.0029941	0.95020206	0.02525937	0.02711162	5.678993333	5.708965789	5.710380882	5.771918182
MCPT6	ILMN_3161036	0.30757692	0.33380968	0.01639779	0.91289935	0.00191872	0.00123825	5.812683333	5.779026316	5.782316176	5.905395455
MAPKAPK2	ILMN_2614212	0.34056978	0.97898611	0.01443653	0.22707081	0.00026851	0.00363695	10.01880333	9.9891	10.01956471	10.11131818
FAM123A	ILMN_2456075	0.40994995	0.98420717	0.00554166	0.33936861	0.01613788	0.00116246	5.86123	5.882305263	5.861704412	5.953740909
SAMD10	ILMN_2656359	0.12270684	0.75105295	0.03336925	0.07397494	0.00084455	0.00232642	6.993723333	6.932505263	6.984454412	7.085995455
ZFP748	ILMN_3083372	0.95058107	0.72301296	0.01522827	0.75282482	0.01128098	0.0166564	5.80429	5.806384211	5.815305882	5.896513636
MLANA	ILMN_2624504	0.83660637	0.97173682	0.03425913	0.77240455	0.00945458	0.01168146	5.76753	5.760731579	5.768636765	5.8595
ITGA2B	ILMN_2911123	0.55235292	0.8240584	0.02808366	0.67671548	0.00633087	0.01162745	6.458176667	6.438010526	6.450829412	6.550131818
CYGB	ILMN_2801891	0.79708364	0.57972409	0.02849663	0.37389718	0.01698838	0.04977838	6.101066667	6.091292105	6.119488235	6.193004545
ATP13A1	ILMN_1250382	0.50488802	0.53042647	0.01377508	0.95673298	0.02788979	0.02618921	8.999603333	9.019186842	9.017792647	9.091486364
TRIM2	ILMN_1234848	0.86351136	0.72585714	0.04803533	0.56904864	0.03649278	0.02843863	5.767873333	5.761813158	5.777947059	5.859163636
A230084A06RIK	ILMN_1230144	0.43821397	0.79086678	0.01774597	0.58223073	0.00086964	0.0054444	5.812173333	5.788897368	5.803954412	5.903431818
CXCL14	ILMN_2659426	0.36725785	0.69848984	0.0227136	0.53631317	0.00146481	0.00400454	5.63365	5.604478947	5.621769118	5.724809091
TTC15	ILMN_2502614	0.94781161	0.2793105	0.01461194	0.22510276	0.0204812	0.0003816	7.225596667	7.227939474	7.191466176	7.316681818
TG737RPW	ILMN_2772847	0.76933501	0.54089135	0.01256087	0.3251282	0.00548678	0.032187	6.282606667	6.273515789	6.300575	6.372831818
AMBRA1	ILMN_3048294	0.4436924	0.34743176	0.00444928	0.89777595	0.0232608	0.02156983	5.725223333	5.745826316	5.748851471	5.815154545
control_ILMN_1378677	ILMN_1378677	0.98344376	0.42084023	0.0119587	0.36340616	0.00643593	0.0105893	5.97326	5.972618421	5.993672059	6.063127273
PEF1	ILMN_2643723	0.31905619	0.34992403	0.00231363	0.90266633	0.04569681	0.03244548	9.281666667	9.310060526	9.306907353	9.371368182
D0HXS9928E	ILMN_2856628	0.9868439	0.24303218	0.01198026	0.19472258	0.0068983	0.0411307	9.81716	9.816639474	9.848302941	9.90685
9/2/2013	ILMN_2756696	0.40369443	0.70675778	0.00624248	0.64127315	0.03249199	0.0116011	5.95884	5.979671053	5.968436765	6.048472727
OLFR519	ILMN_2854265	0.64872481	0.83069642	0.04414921	0.43977727	0.00884027	0.04391917	5.661136667	5.643110526	5.669105882	5.750636364
OLFR312	ILMN_3161363	0.37093621	0.91228316	0.03416177	0.23883472	0.00061546	0.02052641	5.722203333	5.691555263	5.725964706	5.811631818
AMBRA1	ILMN_3124160	0.13009972	0.35347259	0.01710139	0.38735501	2.9826E-05	0.00021116	8.782346667	8.732421053	8.754764706	8.87175
COL4A1	ILMN_2621643	0.42605115	0.74102405	0.02262109	0.58544953	0.00057902	0.00372274	6.219506667	6.194963158	6.209345588	6.308686364
AI844366	ILMN_2684007	0.82679825	0.75408665	0.01586452	0.95461649	0.00217068	0.00033328	5.80145	5.794457895	5.793163235	5.890395455
CAR6	ILMN_1257323	0.61781612	0.3420742	0.01289426	0.0987578	0.00113957	0.0434174	5.65408	5.63995	5.680355882	5.743022727
PLD1	ILMN_2595408	0.6933796	0.45988626	0.02618266	0.18486916	0.00313609	0.04170925	5.90579	5.893855263	5.927305882	5.994177273
C230092H20RIK	ILMN_1233960	0.66357239	0.84781674	0.01253768	0.4360673	0.00394059	0.00171891	5.8978	5.885568421	5.901997059	5.986186364
GSTK1	ILMN_2792924	0.40324013	0.70122688	0.02551463	0.55062775	0.00123964	0.00331843	8.39841	8.369881579	8.386477941	8.48635
EPM2A	ILMN_2920454	0.87947439	0.80615461	0.01324935	0.95931201	0.0124013	0.00118461	5.76621	5.761413158	5.760173529	5.853804545
LOC383439	ILMN_2539543	0.2952126	0.97743522	0.00256872	0.18462931	0.00013459	0.00034559	5.70715	5.681865789	5.707725	5.794672727
C730048C13RIK	ILMN_2685022	0.28523072	0.20002172	0.00272924	0.97974436	0.03668703	0.01734854	5.911796667	5.940139474	5.940685294	5.9992
2210010L05RIK	ILMN_2599306	0.79628945	0.72354551	0.01038968	0.94152678	0.00883444	0.0059479	5.589083333	5.596602632	5.598317647	5.676368182
NAPA	ILMN_2865822	0.76548601	0.73543964	0.02191549	0.98861148	0.01018714	0.00217666	8.002653333	7.993915789	7.994260294	8.089840909
GABRG1	ILMN_1245521	0.81668262	0.70824678	0.0148667	0.87351206	0.01204321	0.01541948	5.539946667	5.546115789	5.549933824	5.626995455

4930471I01RIK	ILMN_1249396	0.28392524	0.5667521	0.0059659	0.54397727	0.00849713	0.00420644	5.840526667	5.865676316	5.854005882	5.927468182
COBLL1	ILMN_2782634	0.97106923	0.21183965	0.02557545	0.11963643	0.00505788	4.6218E-05	7.115376667	7.116502632	7.080435294	7.202304545
CNTLN	ILMN_1240584	0.30681489	0.15860006	0.00774266	0.77825855	0.03721531	0.0339742	5.61508	5.641421053	5.647154412	5.701913636
TSNAXIP1	ILMN_2881498	0.9924676	0.90236003	0.00711635	0.9143399	0.02610378	0.00620682	5.814843333	5.814523684	5.811405882	5.901509091
A4GALT	ILMN_3009373	0.81161526	0.56933321	0.01848828	0.73650404	0.021082	0.02579472	5.785286667	5.792531579	5.801111765	5.871859091
CHGA	ILMN_2814927	0.34839125	0.7266219	0.00963393	0.13811361	0.00058241	0.00918276	5.746556667	5.719539474	5.755676471	5.832945455
SOX7	ILMN_1234505	0.60939645	0.3749197	0.02100105	0.097519	0.02547775	0.0002976	6.187313333	6.202473684	6.163425	6.273668182
KIF17	ILMN_2704842	0.39249283	0.70164439	0.01483827	0.51020186	0.04422883	0.00779006	5.8875	5.912607895	5.897030882	5.973745455
CDCA1	ILMN_2755241	0.9154914	0.53536925	0.0386027	0.38918589	0.00874238	0.04952584	5.64207	5.638189474	5.662566176	5.727986364
TCF7L2	ILMN_1231177	0.63686152	0.72325508	0.00931152	0.7890029	0.00503728	0.00048916	5.724723333	5.710573684	5.716716176	5.810431818
OLFR506	ILMN_2813771	0.21856348	0.1278011	0.02579809	0.93435701	0.00023607	2.4239E-05	5.67991	5.637868421	5.635769118	5.765595455
WNK2	ILMN_1214402	0.93200737	0.63584187	0.03080328	0.66221401	0.01413717	0.03245347	5.703856667	5.706834211	5.718935294	5.789340909
8030455F02RIK	ILMN_2551098	0.59853823	0.19179375	0.0111058	0.41266041	0.01530089	0.04820028	5.73374	5.748163158	5.765951471	5.819077273
D430013G08RIK	ILMN_1241865	0.43949079	0.78980418	0.01370026	0.59445861	0.01747993	0.01248718	5.650593333	5.670342105	5.657922059	5.735872727
NRXN1	ILMN_2550623	0.44702512	0.62430211	0.00957581	0.70622754	0.00016695	0.00035354	5.979573333	5.959471053	5.967466176	6.064813636
WIZ	ILMN_3095005	0.34305317	0.72411765	0.04555793	0.3711582	0.00166479	0.00306706	7.21713	7.182071053	7.206314706	7.301809091
BPHL	ILMN_2747284	0.73416126	0.61908049	0.00715923	0.36850034	0.01213128	0.00125811	5.726646667	5.735092105	5.714341176	5.811322727
EG665903	ILMN_2624523	0.86741803	0.99754893	0.01300844	0.82056514	0.00237114	0.00123216	5.54671	5.541965789	5.546788235	5.631263636
GPSN2	ILMN_2606579	0.63692646	0.67878781	0.04674093	0.28470328	0.01272112	0.03760584	11.36477667	11.34527632	11.37852794	11.44931364
V1RG5	ILMN_2838831	0.82420699	0.98410461	0.01305096	0.80810588	0.01528723	0.00551877	5.585696667	5.592194737	5.586235294	5.669590909
LOC668779	ILMN_1248416	0.63537512	0.79619365	0.01938043	0.35121412	0.00881697	0.00113919	5.82907	5.841984211	5.822419118	5.91275
AW538212	ILMN_2688996	0.11535762	0.09428521	0.00400603	0.99292399	0.00010643	3.4806E-05	5.662	5.618852632	5.619076471	5.745609091
D930029H24RIK	ILMN_1228871	0.47418638	0.47124874	0.00667883	0.98628298	0.00111202	0.00087401	5.586836667	5.5675	5.567926471	5.670409091
control_ILMN_1379309	ILMN_1379309	0.77544733	0.60565037	0.01677348	0.81891206	0.03391372	0.04121776	5.740433333	5.749018421	5.755252941	5.823736364
MF5D7C	ILMN_1248190	0.92106898	0.27325909	0.01727267	0.21669597	0.01901116	0.04929275	5.92774	5.924468421	5.955697059	6.011031818
EFNA5	ILMN_2662536	0.3652588	0.55707841	0.00997123	0.10898185	0.00165732	0.04020568	5.71599	5.688497368	5.732614706	5.799154545
DMXL1	ILMN_2429071	0.54914197	0.90451948	0.01438616	0.52202365	0.01177167	0.00187623	5.96065	5.975723684	5.963417647	6.043718182
LOC276803	ILMN_2534316	0.16603663	0.54844716	0.0219723	0.27511942	0.00077337	0.00151001	5.940693333	5.897260526	5.924936765	6.02375
2810043G13RIK	ILMN_2705440	0.81391852	0.24793276	0.00983154	0.32660096	0.00712057	0.01713054	5.881486667	5.887989474	5.907816176	5.964436364
ABCF3	ILMN_2677696	0.08078576	0.63645224	0.00192925	0.17132711	3.6728E-05	0.0011514	9.548456667	9.504076316	9.536877941	9.6311
9830166F08RIK	ILMN_2586977	0.70658027	0.80333134	0.03743203	0.87975176	0.01119986	0.01679319	5.70739	5.718118421	5.714625	5.789945455
PDE4B	ILMN_2574417	0.89763789	0.76767464	0.00644131	0.62596315	0.00122135	0.00391131	5.75419	5.751107895	5.761052941	5.836522727
GM378	ILMN_1240049	0.61467321	0.42169273	0.02436088	0.82522224	0.03723516	0.02019999	5.619333333	5.633768421	5.638488235	5.701636364
B230378H13RIK	ILMN_1237858	0.90912207	0.39640679	0.00978906	0.27459465	0.0053004	0.00011913	5.648293333	5.651236842	5.628592647	5.730445455
9530031H08RIK	ILMN_1246046	0.61512983	0.5241143	0.01321792	0.20960741	0.00438466	0.01828874	5.732286667	5.718855263	5.747191176	5.814431818
4930433I11RIK	ILMN_2599632	0.80008845	0.68076611	0.03193614	0.44763312	0.03817964	0.00324431	5.615196667	5.622955263	5.604207353	5.697304545
CEBPE	ILMN_1220301	0.88001941	0.92607613	0.04789021	0.92909894	0.01339264	0.00930316	6.23217	6.227065789	6.229376471	6.314113636
MTA2	ILMN_2595774	0.8956106	0.62296468	0.02801356	0.66195344	0.0018644	0.00226556	9.862493333	9.858439474	9.847454412	9.943504545
APOC1	ILMN_1228469	0.36613491	0.67118282	0.00583924	0.16428966	0.00159729	0.0193149	5.5881	5.564128947	5.598686765	5.669086364
NLRP5	ILMN_2696556	0.36196978	0.72545148	0.02078351	0.48866047	0.00489731	0.00610399	5.79998	5.772057895	5.790597059	5.880922727
CYP2D26	ILMN_2642975	0.79493857	0.70665534	0.00707043	0.49784891	0.00548722	0.01609651	5.73149	5.724460526	5.741060294	5.812322727
control_ILMN_1378609	ILMN_1378609	0.98545756	0.69651186	0.01644739	0.64839753	0.00782567	0.01140479	5.733256667	5.732771053	5.742875	5.814027273
OLFR524	ILMN_3160809	0.33912579	0.91057333	0.01465568	0.28077782	0.00233463	0.00521563	5.86197	5.829492105	5.858877941	5.942722727
LOC384689	ILMN_1227050	0.56288345	0.91665544	0.0099089	0.49080727	0.00087983	0.00029031	5.639723333	5.6252	5.637626471	5.72035
ADAT1	ILMN_2977193	0.77440211	0.79237391	0.03035926	0.52872893	0.04858275	0.00661794	6.339843333	6.349155263	6.332338235	6.420336364

CCDC15	ILMN_1250884	0.62096729	0.78093474	0.02391441	0.36804853	0.00388307	0.01532034	5.833546667	5.819647368	5.840797059	5.913731818				
3/8/2013	ILMN_1242531	0.63936758	0.58731039	0.04723339	0.25275305	0.04544519	0.00757755	5.87245	5.886128947	5.855538235	5.952545455				
C230094L10RIK	ILMN_1230165	0.95745392	0.97889682	0.01504046	0.97306341	0.00060298	0.00282531	5.776726667	5.778110526	5.777417647	5.856627273				
E130113E03RIK	ILMN_1235043	0.70634431	0.51296982	0.01980686	0.85243749	0.04411905	0.01857234	5.561873333	5.574134211	5.578641176	5.641704545				
C730029N23RIK	ILMN_1255622	0.64943846	0.80900421	0.00804317	0.41298409	0.00077399	0.00622362	5.84567	5.8332	5.851813235	5.925118182				
3/6/2013	ILMN_1242572	0.99421937	0.32189222	0.00830051	0.26400586	0.00342651	0.00011776	7.65466	7.654852632	7.630813235	7.734104545				
LOC384155	ILMN_2537186	0.94055232	0.89077988	0.04055628	0.94171882	0.02177121	0.0246912	5.67926	5.681310526	5.683101471	5.758663636				
MTMR6	ILMN_2687053	0.23687388	0.23005672	0.02671623	0.82719079	0.00086376	0.00122935	5.577	5.549068421	5.543748529	5.656304545				
9790357_3511_RC	ILMN_2468115	0.50561161	0.55877521	0.03120211	0.16503585	0.00745488	0.04042447	5.689263333	5.670352632	5.704086765	5.768504545				
OLFR11	ILMN_2619903	0.51966823	0.94983798	0.01570607	0.44153907	0.03630561	0.00269795	5.660956667	5.678615789	5.662433824	5.740054545				
2510025K24RIK	ILMN_1235980	0.17034456	0.21438208	0.00229738	0.83886259	0.04982748	0.03586444	5.582343333	5.614260526	5.610119118	5.661422727				
SLC7A14	ILMN_2679229	0.4024276	0.96217122	0.03248261	0.38012554	0.0048549	0.02265882	5.839583333	5.813355263	5.838160294	5.918436364				
5830448L21RIK	ILMN_1254606	0.303375	0.1374351	0.01415928	0.8176851	0.00040346	7.2625E-06	5.74232	5.713471053	5.708772059	5.821154545				
4631434O19RIK	ILMN_1251169	0.82857753	0.44925318	0.03758512	0.25668358	0.01215362	0.03312515	6.00784	6.001673684	6.026148529	6.086531818				
C230011P08RIK	ILMN_1258653	0.71366618	0.51631216	0.02426504	0.27992668	0.0156805	0.03212297	5.752406667	5.742231579	5.767427941	5.831013636				
OLFR483	ILMN_2590828	0.44925085	0.80622851	0.04494222	0.24324882	0.0073063	0.02821443	5.625586667	5.602889474	5.632177941	5.704077273				
LOC382853	ILMN_2536029	0.77875408	0.96843977	0.00975939	0.75198581	0.02163595	0.00272992	5.963353333	5.971465789	5.964307353	6.041727273				
SETD6	ILMN_1223358	0.57200419	0.74787399	0.01611525	0.66034764	0.00494207	0.00089435	8.83772	8.819034211	8.829725	8.916090909				
CBFA2T2	ILMN_2752204	0.5662482	0.8989732	0.03228542	0.38785964	0.00475069	0.01302043	6.07727	6.059334211	6.080733824	6.1556				
LOC100045448	ILMN_2776734	0.62132159	0.87870784	0.02123329	0.40374113	0.00294499	0.00314533	5.673983333	5.660994737	5.677317647	5.752286364				
OLFR535	ILMN_2535079	0.32862437	0.16201386	0.00778611	0.8088199	0.03555645	0.02237539	5.571573333	5.596031579	5.600444118	5.649868182				
ATP2C1	ILMN_1252963	0.49094217	0.65961812	0.04863474	0.17018373	0.00333117	0.04316958	6.559026667	6.536521053	6.572148529	6.637072727				
KLHDC8B	ILMN_1216669	0.97040393	0.74111168	0.02322535	0.70203261	0.02834159	0.02936116	5.822313333	5.821168421	5.831194118	5.899663636				
ADAMDEC1	ILMN_1246807	0.94590728	0.9293539	0.02644931	0.98373974	0.01436855	0.00982324	5.72808	5.726289474	5.725811765	5.80525				
UNK	ILMN_2509928	0.17478517	0.75419036	0.03873043	0.05085358	0.00109399	0.03337033	8.188016667	8.146186842	8.196697059	8.2651				
5730460C07RIK	ILMN_1249562	0.87299005	0.36607511	0.0246919	0.26042351	0.03627524	0.00068321	6.136043333	6.140568421	6.114717647	6.213077273				
KLHL26	ILMN_2647313	0.97277378	0.71962893	0.0261983	0.75480755	0.03900189	0.00295382	9.295173333	9.293997368	9.285769118	9.371863636				
LIG3	ILMN_2828819	0.73599318	0.67552336	0.04595186	0.92486784	0.01276389	0.0118872	8.005243333	7.995089474	7.992510294	8.081459091				
PAM	ILMN_2626294	0.86894834	0.51715949	0.02535361	0.63556371	0.03167733	0.02768712	5.65448	5.659834211	5.671320588	5.730622727				
V2R15	ILMN_1242397	0.41219979	0.11478823	0.04367205	0.42360691	0.00428178	0.00027849	5.637346667	5.614844737	5.596172059	5.713459091				
6430605C03RIK	ILMN_2733534	0.85400928	0.88098485	0.01949348	0.67075129	0.01064616	0.00103457	5.550003333	5.554918421	5.54665	5.625927273				
8430429K09RIK	ILMN_2441482	0.55336159	0.58108107	0.03598349	0.16703822	0.00189341	0.04391611	6.45922	6.441084211	6.474969118	6.535031818				
C430004E15RIK	ILMN_2625047	0.36977921	0.98259491	0.01796861	0.26363911	0.00458685	0.00601476	8.70302	8.674578947	8.702492647	8.778827273				
LOC244335	ILMN_1238450	0.79674679	0.33065039	0.02094599	0.49108577	0.03096123	0.03299965	5.711056667	5.718365789	5.732983824	5.786463636				
DOXL2	ILMN_2987657	0.26405581	0.09177888	0.03796562	0.65443938	0.00268763	0.00024394	5.788483333	5.74895	5.735679412	5.863831818				
4930554K12RIK	ILMN_2549226	0.90045387	0.71090699	0.04425982	0.79924246	0.03725714	0.03943207	5.8731	5.877186842	5.883825	5.948418182				
TGFBR2	ILMN_1215171	0.80798761	0.44351108	0.03785897	0.60339963	0.01263689	0.00070953	6.004693333	5.996826316	5.984408824	6.079877273				
HPX	ILMN_2830333	0.66945363	0.4208039	0.03817863	0.80551597	0.02434854	0.00174409	5.89602	5.880847368	5.874075	5.971186364				
2900052P03RIK	ILMN_1240268	0.43061293	0.79115638	0.01876921	0.56971594	0.03696311	0.01723125	6.166873333	6.185847368	6.173483824	6.241986364				
CPXCR1	ILMN_2846457	0.86371414	0.9550009	0.03160792	0.77261816	0.01244667	0.00593288	5.67251	5.677502632	5.671010294	5.747422727				
TAS2R106	ILMN_2702928	0.91870736	0.6724644	0.01538494	0.58288995	0.01697577	0.02506084	5.694626667	5.691915789	5.704780882	5.769118182				
4632404B13RIK	ILMN_1217530	0.81072013	0.83717324	0.03950811	0.96627929	0.04664843	0.04118925	5.94389	5.950968421	5.949844118	6.018218182				
1600012K10RIK	ILMN_1254674	0.95232816	0.60856678	0.00698531	0.53982436	0.00863333	0.00050927	5.759546667	5.761076316	5.748283824	5.833790909				
OLFR121	ILMN_2979343	0.8832505	0.84790399	0.03234808	0.95369607	0.03233233	0.03873644	5.667883333	5.671623684	5.673066176	5.741809091				
6130401J04RIK	ILMN_2604105	0.66759244	0.60660871	0.01258625	0.98036948	0.04634306	0.01250912	5.64243	5.654536842	5.653991176	5.716331818				
CLPTM1L	ILMN_2681221	0.86491157	0.72209661	0.02504523	0.84097511	0.01423494	0.02311428	11.29636667	11.30115	11.30577794	11.36985				
4732490P12	ILMN_2453810	0.73774373	0.55857679	0.01338967	0.30618633	0.00541023	0.03370137	5.554813333	5.5452	5.569813235	5.628077273				

LOC545289	ILMN_1260380	0.94161903	0.60753873	0.02230898	0.51778884	0.01321341	0.04916193	6.18028	6.178142105	6.194416176	6.253086364					
ATP6V0D1	ILMN_2928320	0.69000763	0.72891399	0.0443055	0.38067515	0.01511458	0.02354026	10.56093333	10.54983158	10.56906471	10.63357727					
EG433144	ILMN_2755355	0.87566173	0.80969571	0.04438241	0.95591322	0.04188234	0.01561656	5.7232	5.727760526	5.728964706	5.795736364					
RAB11FIP5	ILMN_3139693	0.99906414	0.21262481	0.04413508	0.17973027	0.03519113	0.0007083	6.24462	6.244602632	6.211269118	6.316795455					
OLFR94	ILMN_3160479	0.97600983	0.48305323	0.03747655	0.43339546	0.04591135	0.01129534	5.866656667	5.867705263	5.842164706	5.938768182					
LOC245453	ILMN_1258169	0.98143674	0.59765716	0.04422655	0.53963945	0.02651704	0.01742043	5.83364	5.832957895	5.845691176	5.905668182					
V1RD7	ILMN_2446884	0.99095541	0.80565487	0.01895399	0.775485	0.01137664	0.00300505	5.525103333	5.525413158	5.519311765	5.597113636					
ANKRD35	ILMN_1248776	0.70174763	0.15464086	0.03786988	0.28227631	0.01573414	0.00060094	5.805983333	5.794584211	5.766820588	5.877945455					
SETD6	ILMN_2983669	0.33252567	0.83314552	0.04795023	0.29627711	0.00036932	0.00512599	8.39426	8.365178947	8.388533824	8.466163636					
SQLE	ILMN_2573600	0.93659847	0.88539347	0.03256569	0.8004337	0.01646469	0.02425755	5.744813333	5.742528947	5.748705882	5.816636364					
A330004N04RIK	ILMN_1217986	0.67141686	0.41019524	0.02744773	0.72871997	0.01111549	0.00135098	5.65038	5.638315789	5.630204412	5.722040909					
USP22	ILMN_2494618	0.47531038	0.218617	0.02422803	0.65853923	0.00221926	0.00016059	8.500313333	8.479518421	8.469433824	8.571968182					
control_ILMN_1378808	ILMN_1378808	0.79181076	0.79149038	0.02044898	0.98505154	0.03587143	0.02032572	5.613206667	5.619639474	5.619225	5.684513636					
AK122498	ILMN_2524245	0.85736966	0.94151199	0.02377537	0.77239483	0.01378398	0.01117137	5.750016667	5.754710526	5.748085294	5.821009091					
LOC381546	ILMN_1248921	0.79668012	0.70699032	0.04506863	0.43926623	0.00829223	0.02767371	5.912206667	5.904615789	5.922085294	5.983063636					
ATP7B	ILMN_2731102	0.6249321	0.37736846	0.0129853	0.77700164	0.01386252	0.00133534	5.68384	5.670181579	5.663311765	5.754631818					
RBM41	ILMN_2719569	0.93448297	0.64047478	0.04161783	0.52393995	0.02134418	0.00399331	5.543303333	5.5455	5.531645588	5.613786364					
0610007L01RIK	ILMN_1232042	0.85594071	0.43791688	0.02856732	0.28912266	0.02809339	0.00264701	5.754013333	5.758968421	5.733432353	5.82365					
2610528H13RIK	ILMN_1212831	0.39305556	0.95996982	0.03970997	0.30048283	0.00369356	0.00979345	5.603936667	5.579705263	5.602720588	5.673463636					
D030018H12RIK	ILMN_1215334	0.84407243	0.81541907	0.03183662	0.98023643	0.04253257	0.03735335	5.641683333	5.647418421	5.648041176	5.711190909					
CDH12	ILMN_1253923	0.59433128	0.77701969	0.04166861	0.32554775	0.04535074	0.00743212	5.66794	5.682739474	5.660370588	5.737386364					
E430014N10RIK	ILMN_1240823	0.34359038	0.61481686	0.02121754	0.53341668	0.0009554	0.00206857	5.662576667	5.636118421	5.650170588	5.731740909					
LRRC17	ILMN_2511456	0.95514688	0.83357486	0.02908474	0.76599237	0.01433455	0.02248209	5.906216667	5.904839474	5.911247059	5.975331818					
4931417G12RIK	ILMN_2710573	0.91281571	0.38909731	0.02420117	0.28646512	0.02132946	0.00096049	5.614283333	5.617	5.594630882	5.683309091					
OLFR615	ILMN_1231317	0.54364931	0.80154308	0.0273447	0.32662044	0.01457818	0.02687296	5.721326667	5.703034211	5.727417647	5.790331818					
LOC631010	ILMN_1240227	0.94686881	0.26102934	0.03305513	0.26204501	0.02373213	0.00072505	5.73648	5.73475	5.710307353	5.805286364					
PPP1CA	ILMN_2691613	0.09795108	0.59506137	0.02504734	0.20664497	0.00014769	0.00232552	12.43433667	12.39944474	12.42297941	12.50304545					
E130009J12RIK	ILMN_2985193	0.47477677	0.81044479	0.03110782	0.63617091	0.00487679	0.02678105	5.743916667	5.723594737	5.736714706	5.812536364					
CD209A	ILMN_2617210	0.22035646	0.46771383	0.04211656	0.51778746	0.00339062	0.00413649	5.65628	5.624876316	5.639332353	5.724654545					
TFPI	ILMN_2691522	0.47180301	0.91902103	0.03419503	0.43496331	0.00859842	0.01560756	5.627863333	5.604692105	5.625113235	5.696140909					
5730530J16RIK	ILMN_1249981	0.5888761	0.67822628	0.01711406	0.84804259	0.04732222	0.02349276	5.65864	5.672378947	5.668261765	5.726768182					
EG666609	ILMN_2742647	0.46040682	0.48129977	0.02438815	0.91160425	0.03812319	0.03481446	13.11461333	13.13349737	13.13128971	13.18201818					
VPS13D	ILMN_1230695	0.99703152	0.92779661	0.02251575	0.93072108	0.02874602	0.00736329	5.825393333	5.825310526	5.823529412	5.892627273					
BCL11A	ILMN_1234185	0.54620214	0.57922704	0.0125649	0.92397804	0.00460099	0.00387138	5.64446	5.628544737	5.630797059	5.711472727					
PVRL2	ILMN_1218242	0.77166479	0.49252111	0.03288426	0.25489684	0.01005689	0.03917443	5.80492	5.796597368	5.821182353	5.87185					
GM392	ILMN_1240780	0.48222112	0.81340913	0.02162921	0.28763551	0.00084466	0.01753709	5.49587	5.480410526	5.501230882	5.562286364					
3110012M05RIK	ILMN_1219662	0.97368985	0.64870795	0.03780242	0.64874884	0.027784	0.0075749	5.661996667	5.661102632	5.650423529	5.728168182					
6330437I11RIK	ILMN_1228346	0.54055553	0.42081215	0.0385954	0.84463922	0.01048267	0.00565422	5.88513	5.868713158	5.863848529	5.950863636					
4921537F17RIK	ILMN_1247508	0.61998523	0.86883509	0.04136706	0.46063606	0.00876015	0.03457809	5.829483333	5.817065789	5.833544118	5.894563636					
MAK10	ILMN_2612403	0.10085284	0.78633106	0.03440787	0.09093	6.9925E-05	0.00808975	8.8104	8.765121053	8.803444118	8.874963636					
FT5	ILMN_1219649	0.25096355	0.50514838	0.02634812	0.5904826	0.00373255	0.00641831	5.683446667	5.655231579	5.667736765	5.747927273					
PHXR5	ILMN_2669458	0.17900286	0.17469022	0.02196101	0.95767368	0.00036712	0.00086747	5.872406667	5.83705	5.835738235	5.936231818					
genericLS	ILMN_2563949	0.17385044	0.22134332	0.04986018	0.71296708	0.0003577	0.00036446	6.13706	6.099334211	6.107116176	6.200122727					
DEFCR-RS1	ILMN_2524936	0.43135334	0.94370885	0.04067994	0.39706896	0.00628876	0.02257305	5.621336667	5.599907895	5.619592647	5.683168182					
TSSK6	ILMN_2650022	0.74044916	0.8955475	0.02682062	0.82887811	0.0195886	0.02870796	5.885473333	5.876747368	5.882098529	5.946995455					
LOC100044218	ILMN_1245604	0.62060671	0.93959659	0.03808725	0.61900798	0.00370233	0.01736491	5.70159	5.688944737	5.699707353	5.762777273					

GULO	ILMN_2631948	0.0975262	0.91952112	0.04013288	0.05534954	0.00032512	0.01308216	5.675643333	5.633252632	5.673354412	5.736640909				
LOC381636	ILMN_1232330	0.42177934	0.26930523	0.04263458	0.76923218	0.00561836	0.00181091	5.679483333	5.660081579	5.653820588	5.740377273				
1810019D21RIK	ILMN_1227679	0.28059575	0.2048988	0.04144693	0.89865913	0.0049656	0.00175637	5.926816667	5.899373684	5.896448529	5.987313636				
LOC100039649	ILMN_1215436	0.90624752	0.99641741	0.04630688	0.89063302	0.03849951	0.03837077	5.650293333	5.647105263	5.650401471	5.710781818				
2900097C17RIK	ILMN_1227592	0.56873815	0.42250402	0.03414773	0.83287881	0.00673111	0.00353241	5.539346667	5.523955263	5.519045588	5.599572727				
SEC11A	ILMN_2652936	0.65017753	0.19928299	0.04565721	0.3753999	0.00777675	0.00041973	11.49351	11.48228158	11.46473971	11.55365909				
BOC	ILMN_1227184	0.83379882	0.63931653	0.04618015	0.42702865	0.01169619	0.04374422	6.039113333	6.034384211	6.049230882	6.099004545				
EG224576	ILMN_1215517	0.14284265	0.38836352	0.04273586	0.59084228	0.00181023	0.00657723	5.743756667	5.712397368	5.723908824	5.802577273				
E030045A12RIK	ILMN_2572276	0.7533502	0.25562274	0.03987607	0.39803578	0.03931825	0.00635341	5.811073333	5.802289474	5.779011765	5.86955				
TCF7L2	ILMN_2704212	0.40659811	0.2024417	0.0385675	0.7023388	0.00714442	0.00123425	5.820176667	5.799102632	5.790647059	5.877909091				
3732412D22RIK	ILMN_1216840	0.81984654	0.70192537	0.03267402	0.91525163	0.03935182	0.01007019	5.46195	5.456131579	5.453826471	5.518868182				
SCL0002508.1_73	ILMN_2460618	0.07304885	0.40335908	0.03500519	0.24340242	0.00064943	0.00332745	5.615476667	5.575942105	5.598632353	5.671372727				
D030002E05RIK	ILMN_2443894	0.98716805	0.30863962	0.04412443	0.27596309	0.04853151	0.00225048	5.522803333	5.523189474	5.500327941	5.577595455				
DOWN IN generic ONLY															
Gene	ID	Medium vs. Reference Standard pval	Medium vs. GA pval	Medium vs generic pval	Reference Standard vs GA pval	Reference Standard vs generic pval	GA vs. generic pval	AVG Medium	AVG Reference Standard	AVG GA	AVG generic				
SATB1	ILMN_1240428	0.07911534	0.37144914	1.8348E-08	0.32081734	1.2391E-06	3.3523E-08	8.554353333	8.466363158	8.510626471	8.184818182				
ANKRD37	ILMN_2595857	0.85603343	0.11987312	5.0602E-05	0.1157346	2.4144E-06	1.2346E-08	7.88428	7.8945	7.976713235	7.532354545				
PDK1	ILMN_1229318	0.05253197	0.2345219	3.0177E-07	0.32074143	7.3944E-06	5.6956E-08	7.99527	7.908131579	7.945248529	7.658463636				
A830055I09RIK	ILMN_1252200	0.11618297	0.49076503	1.6533E-05	0.27282917	0.00185251	3.3438E-05	9.037106667	8.940439474	8.998422059	8.727586364	Pattern Represented by Data:			
CD2	ILMN_2753697	0.27081402	0.2043282	1.1319E-07	0.98324628	7.8638E-08	1.0361E-10	10.80060333	10.76561316	10.76611912	10.51960455				
IFIT3	ILMN_2944666	0.4738633	0.81801934	4.5724E-05	0.18790987	1.54E-09	2.8447E-08	10.83471	10.87340526	10.82387647	10.55753636	x	x	x	
TMSB10	ILMN_3145331	0.21029649	0.97008239	5.9274E-07	0.11049461	4.1908E-06	1.5861E-10	11.75164	11.70039474	11.75035	11.47584545				x
PELI1	ILMN_1239770	0.86490877	0.09870079	7.6688E-08	0.10384766	7.9696E-09	6.2297E-08	8.998133333	8.992394737	8.946526471	8.738936364	Medium	Reference	GA	generic
LOC665425	ILMN_1213664	0.23297648	0.25120955	3.1475E-05	0.78597257	0.00061167	2.1866E-05	8.158676667	8.102307895	8.112635294	7.902613636				
5830468F06RIK	ILMN_1247281	0.3090019	0.17260429	6.0433E-07	0.87028716	1.9117E-05	7.5927E-07	7.97065	7.928986842	7.923582353	7.718622727				
BCL11B	ILMN_2611022	0.61541666	0.16410668	0.00078873	0.34999007	4.7031E-05	1.3983E-07	10.96429667	10.98868158	11.02490882	10.71570909				
SAMHD1	ILMN_1232707	0.05814465	0.1358425	0.00017313	0.21061544	0.00020723	2.7253E-07	10.10535667	10.01243684	10.04689412	9.859695455				
IGFBP4	ILMN_1258988	0.82474932	0.2971467	0.0024654	0.31582363	0.00028207	0.00175534	9.80274	9.791734211	9.751577941	9.567136364				
OTTMUSG00000007855	ILMN_3123441	0.11070867	0.08547026	0.00200816	0.9832071	0.04667215	0.04859397	8.43207	8.3223	8.323457353	8.198613636				
A530024C08RIK	ILMN_1243902	0.41733897	0.23521863	5.8513E-05	0.77449484	0.00148812	0.00088129	7.640853333	7.602289474	7.590460294	7.425509091				
D330001F19RIK	ILMN_1259917	0.54143382	0.24928554	2.5408E-05	0.59607246	0.00011785	0.00034508	7.24253	7.214571053	7.194076471	7.031618182				
C230075M21RIK	ILMN_1215649	0.20048573	0.66752912	0.00200298	0.36009335	8.7673E-06	0.00041343	9.102993333	9.175807895	9.128044118	8.894036364				
TERF2IP	ILMN_2986458	0.17591671	0.1139061	0.00015309	0.91082142	0.00299315	0.00025266	9.187036667	9.121160526	9.125073529	8.978186364				
ARID5B	ILMN_3031781	0.48039514	0.63560294	0.00015248	0.19905299	0.00015866	0.00037839	7.844363333	7.88215	7.823404412	7.636695455				
VPS13A	ILMN_2561533	0.17374866	0.05433989	8.7726E-05	0.63593438	0.00069405	0.00131973	7.34862	7.289765789	7.273944118	7.143786364				
PPM1B	ILMN_2729953	0.21539059	0.40196624	0.0040908	0.57702572	0.01403207	0.00503541	6.483146667	6.413578947	6.438429412	6.27875				
ZFP281	ILMN_1220893	0.14622272	0.17820672	7.192E-06	0.6818773	3.0398E-05	8.1174E-07	9.17416	9.124147368	9.134429412	8.976263636				
2610027C15RIK	ILMN_2890357	0.17393869	0.10511917	0.00018625	0.8704277	0.0003711	0.00040132	7.341113333	7.286360526	7.281451471	7.143454545				
BC031575	ILMN_2703242	0.05104096	0.0844921	0.00065581	0.72788898	0.01360668	0.00718183	6.823543333	6.739026316	6.751310294	6.626427273				

PELI1	ILMN_2627441	0.69993334	0.62839012	0.00014024	0.94889436	4.6366E-06	1.1293E-06	9.126876667	9.144215789	9.146523529	8.930227273				
RNF125	ILMN_2917338	0.71751754	0.21101594	0.00081812	0.30322086	0.00017849	0.00339438	6.7446	6.727952632	6.689019118	6.548077273				
1500005K14RIK	ILMN_1217606	0.10066065	0.26627278	0.00078516	0.30239173	0.01326166	0.00024226	6.298223333	6.218907895	6.253997059	6.102204545				
1110059E24RIK	ILMN_2846731	0.0550847	0.29416851	4.4207E-06	0.15740767	0.00036598	1.4474E-07	10.46984	10.40856579	10.44254265	10.27383636				
GSN	ILMN_2605645	0.11878006	0.10970834	0.00341431	0.71650151	0.0173612	0.00330019	6.616233333	6.532494737	6.545022059	6.421909091				
ARL6IP5	ILMN_1241924	0.1994807	0.50995839	0.00036067	0.39437768	0.00142205	0.00010627	10.5927	10.53820789	10.56679853	10.39869545				
NOTCH1	ILMN_1241915	0.18364872	0.94760135	0.00072539	0.07628277	1.4502E-06	3.3341E-06	8.46399	8.526157895	8.466470588	8.270063636				
9130422G05RIK	ILMN_2633062	0.07359432	0.05531104	0.00010494	0.83711906	0.02159426	0.00415836	8.094413333	8.017089474	8.024388235	7.903022727				
LOC333818	ILMN_1244672	0.14738668	0.17882651	0.0016716	0.83534848	0.01963961	0.00965869	6.493086667	6.426	6.434104412	6.302809091				
PTPRC	ILMN_1212836	0.60662184	0.2797467	0.00865581	0.51601654	0.00367386	0.02465436	7.315573333	7.284710526	7.254329412	7.125622727				
KMO	ILMN_1224155	0.19403001	0.13773846	0.00016815	0.75603238	0.00118003	0.00579415	7.087556667	7.038618421	7.02755	6.898859091				
WIPF1	ILMN_1257209	0.51865115	0.38594682	0.00038569	0.84119617	1.8977E-05	2.1965E-05	10.24916333	10.22402105	10.21850441	10.06097727				
FOXK1	ILMN_3059798	0.22146888	0.35931982	8.7596E-05	0.69209323	0.00128851	0.00028068	7.912773333	7.866897368	7.879917647	7.726354545				
2310032M22RIK	ILMN_2550291	0.59008093	0.37289744	0.00020033	0.1046556	3.0638E-05	0.00012106	7.250013333	7.273057895	7.21885	7.0662				
RPS25	ILMN_2887619	0.34627656	0.77685937	0.03034502	0.15501605	0.00438895	0.03226412	11.92878333	12.00342368	11.90966324	11.74598636				
LOC665446	ILMN_1257496	0.19329193	0.11013072	0.00503496	0.81016026	1.097E-05	1.8517E-06	8.40817	8.473381579	8.482916176	8.2254				
LOC237512	ILMN_2533952	0.10185041	0.06643866	0.00038583	0.99416409	0.00426908	0.00145306	12.71109333	12.65093947	12.65114265	12.53201364				
LOC386068	ILMN_1214874	0.08141757	0.46236733	0.00027129	0.14381003	0.02213701	0.0001023	6.033483333	5.962060526	6.008877941	5.856231818				
ZFP429	ILMN_1254717	0.07332322	0.14675334	0.00015711	0.57011156	0.01213883	0.00151289	7.935246667	7.8677	7.885716176	7.758968182				
BCL2L11	ILMN_2590638	0.30446502	0.40049526	0.00017608	0.6930002	0.00060191	4.8156E-05	7.933673333	7.893531579	7.905207353	7.758081818				
CUGBP2	ILMN_2594575	0.87267521	0.1578596	0.00606795	0.1445108	0.00117238	0.02174746	8.703653333	8.694839474	8.636048529	8.528254545				
SLFN1	ILMN_2663930	0.39293473	0.51218967	0.00170587	0.70949257	4.9201E-05	8.3548E-06	10.68426	10.72121053	10.70865294	10.50982727				
KLHDC1	ILMN_2649635	0.84189965	0.07760558	0.00155996	0.08479279	0.00098869	0.03185451	7.695726667	7.686955263	7.622123529	7.521354545				
CRAMP1L	ILMN_1247318	0.20143537	0.23644921	0.00101289	0.95893024	0.00078111	0.00112658	8.978753333	8.936526316	8.937939706	8.805404545				
CTSE	ILMN_1228235	0.99911127	0.41065532	0.00070458	0.36116375	0.0002081	0.00018402	9.17455	9.174597368	9.144792647	9.003390909				
CGGBP1	ILMN_2668387	0.57946818	0.88874843	8.6419E-05	0.54605077	2.2894E-05	1.6764E-07	10.34921667	10.33062895	10.34524412	10.17924545				
A130075K23RIK	ILMN_1217850	0.81537177	0.32245027	0.00051066	0.16564844	3.4193E-05	0.00308157	7.857343333	7.866847368	7.817598529	7.687945455				
CDKN1B	ILMN_2923960	0.12950768	0.13195636	2.6887E-06	0.89753459	0.00042167	0.00010697	5.826616667	5.781607895	5.784983824	5.658118182				
HLTF	ILMN_2604086	0.10435469	0.0745037	0.00087569	0.96981342	0.01569298	0.01190867	6.093073333	6.029134211	6.027913235	5.924654545				
FNBP4	ILMN_1260410	0.83081352	0.24441759	0.00263707	0.30109811	0.00158996	0.00944233	7.02603	7.015605263	6.975920588	6.858595455				
LOC623121	ILMN_2526938	0.11929339	0.36859146	0.0126513	0.32751281	6.5544E-05	0.0001654	7.308336667	7.396323684	7.352626471	7.142136364				
3300001P08RIK	ILMN_2798797	0.26036986	0.09061791	0.00118783	0.72277312	0.00256883	0.0005881	10.70506	10.66184211	10.65289118	10.53989545				
LOC100048622	ILMN_2677056	0.8875675	0.61503938	0.00618713	0.43247407	0.00034098	0.00260119	9.917543333	9.924692105	9.894410294	9.753277273				
C430005L07RIK	ILMN_1231989	0.05812598	0.06291277	0.00060981	0.8300766	0.01375588	0.00724939	6.22569	6.156028947	6.162217647	6.062545455				
ZFP654	ILMN_2634157	0.06904386	0.45768661	7.3775E-06	0.21584233	0.00045141	1.8816E-05	7.83237	7.779128947	7.811010294	7.670627273				
E030040J04RIK	ILMN_2582659	0.6078898	0.94589189	0.0006524	0.59757263	1.5494E-05	5.6983E-05	6.016863333	5.998997368	6.014388235	5.85555				
ARL4C	ILMN_1232537	0.74119045	0.12627286	0.00222578	0.05116615	0.00522971	3.7098E-06	8.98283	8.969447368	9.037364706	8.822018182				
ARID4A	ILMN_1249368	0.63477844	0.22538884	0.01297411	0.45126135	0.01447908	0.02906182	7.24665	7.221260526	7.191375	7.086068182				
LOC546629	ILMN_2514130	0.1422128	0.11491335	0.00013948	0.84250699	0.00317588	0.00678748	6.201816667	6.155281579	6.149257353	6.041940909				
TDP1	ILMN_1222101	0.20471786	0.21603931	0.00042705	0.76601877	0.00953396	0.00159959	7.001043333	6.9467	6.956392647	6.841454545				
CUL1	ILMN_1226323	0.09343825	0.06890272	0.0020377	0.76141825	0.04176493	0.00665118	8.832946667	8.763292105	8.772133824	8.675431818				
D030041G07RIK	ILMN_1242969	0.18864709	0.06254915	0.00099329	0.61432768	0.00800136	0.01658998	7.062546667	7.013210526	6.998004412	6.907159091				
E130014H08RIK	ILMN_2680388	0.06694365	0.06110366	6.3688E-05	0.9737956	0.01184346	0.01143026	6.120063333	6.056794737	6.057810294	5.964904545				
TRAF5	ILMN_2440604	0.52455627	0.24011296	0.00690509	0.52721633	0.00289499	0.02142899	6.81995	6.790965789	6.768398529	6.664904545				
PPP2R5C	ILMN_2742461	0.11379206	0.08222043	0.00037899	0.92947841	0.01165728	0.00335504	6.077013333	6.021755263	6.024205882	5.922486364				
MTF2	ILMN_2703913	0.20036311	0.29858647	0.00375869	0.69841001	0.03389861	0.01319182	10.53759667	10.48152632	10.49541324	10.38590909				
WDR20B	ILMN_1235032	0.23781394	0.47851722	0.00019242	0.45624566	6.383E-05	6.7883E-06	5.85008	5.813589474	5.830157353	5.698718182				

RNF125	ILMN_1232600	0.9821989	0.0966035	0.00041169	0.09549517	0.00113953	5.261E-07	7.012443333	7.011668421	7.063036765	6.861245455					
9330168G06RIK	ILMN_1246293	0.54190202	0.48310219	0.00024149	0.94557713	0.00139303	0.00147706	6.250186667	6.227921053	6.225692647	6.100836364					
LAMP2	ILMN_2577206	0.81917654	0.05394462	0.00083459	0.07901609	0.00135313	0.01849123	6.187146667	6.178439474	6.124277941	6.037936364					
JMJD1A	ILMN_3043245	0.31845749	0.65249285	0.00020808	0.07212806	0.00038958	5.2342E-07	8.215583333	8.183889474	8.228458824	8.066877273					
ST8SIA4	ILMN_2784230	0.13498007	0.47574935	0.00103374	0.26063235	0.02824889	0.00078328	9.773773333	9.715015789	9.749726471	9.625213636					
LRBA	ILMN_2659960	0.17994841	0.13393498	0.00174452	0.93977444	0.00204093	0.00098864	9.108856667	9.059176316	9.061001471	8.960695455					
TDE2	ILMN_2775381	0.95693713	0.13126573	0.00315917	0.09028776	0.00042239	0.02374199	9.271143333	9.2688	9.211947059	9.123181818					
9/6/2013	ILMN_2681293	0.63762827	0.24964088	0.01397803	0.4764143	0.0147676	0.04238798	7.035323333	7.010981579	6.982983824	6.888654545					
D830015B12RIK	ILMN_1234367	0.30565462	0.07227944	0.00022702	0.52306092	0.00800972	0.0113831	6.263736667	6.227584211	6.208301471	6.117745455					
PARD6G	ILMN_1237631	0.67588419	0.678385	0.00086841	0.96479588	0.00052187	0.00012651	7.15756	7.144507895	7.145636765	7.011668182					
4933400A11RIK	ILMN_1250324	0.19354888	0.49469851	0.0004042	0.34066981	0.01872749	0.00029194	5.711286667	5.661910526	5.690280882	5.565481818					
2210016L21RIK	ILMN_1251123	0.06841243	0.16045005	0.00035392	0.64566996	0.00449141	0.00251111	5.983086667	5.929236842	5.940947059	5.837568182					
MDM1	ILMN_2754667	0.25199431	0.24519798	0.00035648	0.87341123	0.00675749	0.00112085	5.990166667	5.953171053	5.957473529	5.8456					
CDC37L1	ILMN_1242724	0.43296504	0.76183799	0.00182347	0.50487916	0.00996967	0.00041643	6.163896667	6.133318421	6.153929412	6.019554545					
B230215E14RIK	ILMN_1229011	0.59291696	0.19530417	0.00010561	0.48368188	0.00096959	0.00112415	6.061116667	6.044002632	6.024869118	5.917009091					
POM121	ILMN_1232596	0.42663271	0.8235093	0.00231014	0.21790859	5.4061E-05	0.0005903	7.310896667	7.342360526	7.30295	7.167040909					
FOXN3	ILMN_2844097	0.26359703	0.20440307	0.00466812	0.89339493	0.01751217	0.00321484	8.376153333	8.329744737	8.333529412	8.232445455					
A130021K16RIK	ILMN_1251811	0.81955148	0.44269848	8.6977E-05	0.27630522	6.7923E-05	1.3989E-05	5.984683333	5.9924	5.964948529	5.84155					
DAG1	ILMN_2853957	0.42523807	0.06023444	0.00579353	0.24060178	0.00467159	0.02119796	7.180286667	7.147947368	7.115838235	7.037163636					
BIRC6	ILMN_1249233	0.45362784	0.33538866	0.00037832	0.83092547	0.00198776	0.00308862	6.940266667	6.915202632	6.908766176	6.797263636					
4930529C04RIK	ILMN_2725583	0.06986766	0.17113468	0.0008444	0.33339434	0.02333411	0.00058033	6.085303333	6.024965789	6.048104412	5.942704545					
SLC16A6	ILMN_1258950	0.2276815	0.18533844	0.00175895	0.91408667	0.03596058	0.04740725	7.43912	7.390255263	7.386244118	7.296981818					
LRRC40	ILMN_2647476	0.46464479	0.06010376	0.00055192	0.24061743	0.00071114	0.00227639	6.164913333	6.141073684	6.113097059	6.023013636					
BC051070	ILMN_1231143	0.21162255	0.64642365	0.00131092	0.3151572	0.00760443	0.00044444	5.77394	5.731926316	5.759560294	5.632954545					
LOC100045804	ILMN_1234370	0.33824884	0.17904072	0.00022809	0.87467054	0.00400187	0.00073379	6.080636667	6.046034211	6.041739706	5.939822727					
HSH2D	ILMN_1239119	0.14711922	0.54294216	0.01243575	0.22836928	0.03227864	0.00413834	7.86715	7.806244737	7.842983824	7.726418182					
VPS26B	ILMN_2631192	0.48773509	0.96099036	0.03419795	0.30653981	0.04809562	0.00115122	6.30113	6.266228947	6.299214706	6.160686364					
ST6GAL2	ILMN_2593002	0.95583357	0.65485319	0.00328931	0.63896784	0.00013997	9.6793E-06	5.81399	5.816073684	5.828707353	5.674245455					
TMPRSS11A	ILMN_2890069	0.28670671	0.07813886	0.00838506	0.57793371	0.03312193	0.04134015	5.94694	5.900107895	5.882957353	5.808109091					
RAB27A	ILMN_2614966	0.3536785	0.84760602	4.1275E-05	0.14171169	0.00031821	2.3052E-08	9.618303333	9.593155263	9.622351471	9.480636364					
LOC674087	ILMN_1227317	0.74280813	0.5889824	0.03565042	0.85184119	0.04321284	0.04850425	8.063523333	8.043044737	8.033966176	7.926122727					
1600012H06RIK	ILMN_2718861	0.8735272	0.68824217	0.0058169	0.80100365	0.00306695	0.00319401	7.32814	7.321276316	7.312647059	7.190854545					
4733401O04RIK	ILMN_1241389	0.06778378	0.39528806	0.00147672	0.23116877	0.04814609	0.00361635	6.47715	6.413797368	6.449102941	6.340095455					
OLFR504	ILMN_3161078	0.79013139	0.33133578	0.00059741	0.1655799	9.368E-05	0.00131063	5.77475	5.783405263	5.745994118	5.638240909					
ADRA1B	ILMN_2606415	0.05675631	0.28864518	0.00073372	0.16483949	0.04210999	0.00042662	5.788323333	5.726486842	5.760369118	5.652722727					
RAB6B	ILMN_2761430	0.47741529	0.1361146	1.3855E-05	0.45580546	0.00087661	0.00243207	5.805626667	5.7864	5.766961765	5.670081818					
HBB-B1	ILMN_2545963	0.46626213	0.31620323	0.0349087	0.86663622	0.04746168	0.03081781	13.32452667	13.28905789	13.28345588	13.18936818					
ARHGAP12	ILMN_1227256	0.48174007	0.34807939	0.00021055	0.85729833	0.00076744	0.0003831	5.6783	5.657913158	5.653547059	5.543509091					
TYKI	ILMN_1240864	0.75891365	0.23842313	0.03489891	0.05197847	0.00364412	0.01758943	7.718213333	7.733778947	7.673405882	7.583704545					
LOC100048616	ILMN_1241963	0.71621729	0.39548918	0.00603366	0.63958983	0.00574245	0.00430463	6.623486667	6.608734211	6.594576471	6.489290909					
2600011C06RIK	ILMN_1220104	0.86806699	0.36310064	0.00494841	0.21110047	0.00042852	0.01324941	6.318883333	6.324634211	6.286382353	6.185263636					
BIRC6	ILMN_1246660	0.06729015	0.10473405	0.00131141	0.76878822	0.01213217	0.01538146	6.316916667	6.256421053	6.264130882	6.184036364					
RGS19	ILMN_2752044	0.33869851	0.05136737	0.00179044	0.46155141	0.03845813	0.04785331	6.648676667	6.608102632	6.584333824	6.516268182					
C130064E22RIK	ILMN_1221892	0.27374297	0.29078426	0.00085236	0.77212634	0.02887937	0.00455809	7.445486667	7.401763158	7.410882353	7.313245455					
ITK	ILMN_2613422	0.24265705	0.19958443	0.00336477	0.90260442	0.00011044	5.597E-05	10.31404333	10.35670789	10.36085	10.18205455					
LCP2	ILMN_1216191	0.92201403	0.37692413	0.00376734	0.28934791	0.00267784	0.01298147	6.589333333	6.593478947	6.556810294	6.45785					
RBM18	ILMN_2978585	0.8463194	0.33897524	0.03431259	0.14448539	0.00400462	0.02407365	7.331313333	7.341076316	7.292019118	7.200204545					

ZAP70	ILMN_1223542	0.90443065	0.70542805	0.0456215	0.54050797	0.01054876	0.01882925	7.124003333	7.130486842	7.106404412	6.993336364
control_ILMN_1378612	ILMN_1378612	0.97371919	0.46606042	0.00089929	0.41724356	0.00081739	0.00168715	5.722833333	5.724013158	5.700172059	5.592318182
MAT2A	ILMN_1258415	0.93943282	0.94206707	0.03519559	0.85852182	0.01473593	0.0087062	8.35585	8.352134211	8.359186765	8.225568182
2210018M11RIK	ILMN_2521686	0.42671565	0.29390195	0.00476184	0.94616909	0.02497546	0.00791973	6.638536667	6.604639474	6.602507353	6.508409091
ASH1L	ILMN_1245687	0.97479233	0.11885674	0.00538089	0.06492972	0.00097574	0.02416363	5.996946667	5.998094737	5.946575	5.8675
LOXL3	ILMN_2665272	0.09179491	0.31274257	0.0005144	0.24542621	0.04425972	0.0005322	5.826726667	5.771368421	5.800639706	5.697527273
UTX	ILMN_2506528	0.47882605	0.36686461	0.0141063	0.84515672	0.00358262	0.00949066	9.849873333	9.822334211	9.816958824	9.722554545
A730082L10RIK	ILMN_1220032	0.40329585	0.06661184	0.0020628	0.32206538	0.0062779	0.02207392	6.309363333	6.281157895	6.255379412	6.182745455
ITGA6	ILMN_1223670	0.4066823	0.4327231	0.0030597	0.99948811	0.0018074	0.00453858	6.613506667	6.588739474	6.588763235	6.48725
control_ILMN_1378679	ILMN_1378679	0.78763578	0.05260707	0.00353159	0.07175941	0.0028401	0.03376404	5.660046667	5.650981579	5.603908824	5.534195455
4930449I04RIK	ILMN_1238088	0.20517346	0.23262472	3.0723E-05	0.89759905	0.00106926	0.00087064	5.92482	5.89145	5.894451471	5.800354545
TSC1	ILMN_2423383	0.67101795	0.22949592	0.00458673	0.40105382	0.00459241	0.01816998	6.022403333	6.007705263	5.983791176	5.898672727
MSH3	ILMN_3068452	0.9862047	0.38859095	0.00291834	0.30992825	0.00038421	0.01016092	6.317296667	6.317907895	6.287680882	6.193777273
9330171B01RIK	ILMN_1234726	0.05502213	0.46148029	0.00133591	0.12649278	0.04508408	0.001052	5.83447	5.777323684	5.814472059	5.710968182
UGT2A1	ILMN_2434333	0.71050586	0.72182397	0.00431801	0.41667972	0.00069414	0.00299609	5.621583333	5.633452632	5.610448529	5.498127273
C130078D09RIK	ILMN_1244755	0.12786041	0.32508824	0.00313825	0.47915751	0.00181499	0.0022079	6.053696552	6.004831579	6.019788235	5.930827273
RHBDF2	ILMN_1221129	0.84184754	0.5974591	0.02089328	0.79562913	0.04903139	0.01622124	6.356373333	6.346123684	6.336120588	6.233854545
INPP4B	ILMN_1226239	0.08450582	0.20237327	0.03058425	0.55690542	8.8074E-05	0.00041	9.272156667	9.351981579	9.328983824	9.149936364
NIPSNAP1	ILMN_2619861	0.52904018	0.46136801	0.00116519	0.11378299	7.689E-05	0.00076877	9.28918	9.308102632	9.269794118	9.167031818
LPIN2	ILMN_1220680	0.82909927	0.4643068	0.01188671	0.62183234	0.01800377	0.01376318	7.60717	7.597921053	7.581547059	7.485290909
4833420G17RIK	ILMN_1242705	0.11058607	0.9985108	0.00140036	0.05589185	0.02982991	0.00016301	6.1815	6.133973684	6.181452941	6.059827273
NT5C	ILMN_1223097	0.96869979	0.15110506	0.00503984	0.0966739	0.0004879	0.04828357	10.14017667	10.13889474	10.09159412	10.0186
D730033A03RIK	ILMN_1237794	0.10532816	0.07934958	0.00111308	0.99661081	0.01929895	0.01590843	5.94283	5.894176316	5.894086765	5.821409091
1700011H14RIK	ILMN_1240624	0.42648881	0.31978764	0.00264882	0.99210061	0.00666403	0.00118018	5.766446667	5.738492105	5.738245588	5.645190909
4921505C17RIK	ILMN_2552030	0.32607023	0.09618019	0.00231432	0.55575949	0.0192574	0.02775372	6.429206667	6.39755	6.381835294	6.309031818
ZSCAN2	ILMN_2481127	0.10166694	0.50491577	0.00258406	0.19200936	0.04933246	0.0019485	5.832116667	5.778686842	5.812569118	5.711959091
ATL1	ILMN_2689284	0.0990851	0.09092134	0.00228633	0.97929005	0.04918349	0.04782988	5.71863	5.665681579	5.666389706	5.5989
COPZ1	ILMN_1223544	0.55643832	0.21087121	0.00791367	0.4514929	0.00949234	0.04313591	6.3019	6.281852632	6.259785294	6.182704545
4921506M07RIK	ILMN_1226012	0.76721403	0.18679607	0.00499298	0.28451218	0.00614653	0.0237657	5.789413333	5.778978947	5.748717647	5.670604545
4921506J03RIK	ILMN_2541863	0.05819601	0.23888611	0.00023403	0.37181927	0.01993083	0.00337236	9.92524	9.871423684	9.893135294	9.807481818
GADD45GIP1	ILMN_2830860	0.74738281	0.3343774	0.00653881	0.16616339	0.00330039	0.03565601	5.926886667	5.9394	5.892926471	5.809209091
RDH1	ILMN_1230677	0.81344903	0.29787461	0.00081047	0.36612833	0.00024803	0.00234843	5.70993	5.703157895	5.681833824	5.592604545
IKZF5	ILMN_2963412	0.43992194	0.44291872	0.01647085	0.85895934	0.02490897	0.00712778	7.25512	7.225368421	7.230170588	7.138109091
LOC385046	ILMN_2541806	0.430148	0.14005669	0.00103041	0.47036209	0.00129615	0.00684371	5.73528	5.711797368	5.694930882	5.618386364
BC057371	ILMN_2676745	0.31452008	0.53428622	0.00259007	0.48069658	0.00015576	1.2165E-05	5.73612	5.768484211	5.751522059	5.619290909
9830118G07RIK	ILMN_1214091	0.19061978	0.17683894	0.00599888	0.84461581	0.03266526	0.01003646	6.56715	6.525489474	6.530077941	6.450931818
MRPS31	ILMN_2723162	0.15887557	0.32092643	0.00083416	0.41732792	0.04866787	0.00166947	5.696653333	5.649865789	5.670588235	5.580590909
1600029O10RIK	ILMN_2546461	0.09970313	0.9814076	0.0169889	0.05149958	8.1725E-05	0.01304123	7.692803333	7.769444737	7.691802941	7.576986364
OLFR125	ILMN_2730288	0.1313929	0.58003222	0.00034065	0.29296729	0.03092837	0.00139305	5.710643333	5.670455263	5.696926471	5.594827273
SPCS2	ILMN_2762956	0.17612194	0.31317607	0.01153661	0.60798628	6.6576E-05	0.00013104	5.935356667	5.986028947	5.970344118	5.819986364
BCL10	ILMN_1215785	0.51502954	0.34312715	0.00677667	0.8020252	0.02353642	0.02396163	6.291966667	6.268534211	6.260922059	6.176790909
BCL11B	ILMN_1223119	0.19781849	0.24316803	0.02507492	0.69495974	0.00053035	0.00012873	6.466986667	6.517447368	6.505741176	6.351922727
control_ILMN_1379152	ILMN_1379152	0.21753703	0.09233443	0.00229732	0.61920876	0.01662501	0.04338819	5.677653333	5.641942105	5.629272059	5.562736364
DPPA4	ILMN_3155408	0.1739081	0.27023281	0.00088072	0.42732509	0.02642421	0.00022883	5.814133333	5.774526316	5.790995588	5.699431818

D12WSU95E	ILMN_1224518	0.2458634	0.98949799	0.00168946	0.17924317	2.6261E-05	0.00064458	9.425403333	9.463215789	9.425804412	9.310904545				
1700045I19RIK	ILMN_2967255	0.15347028	0.2851101	0.00069864	0.54346097	0.03092325	0.00360935	5.913596667	5.870136842	5.885326471	5.799536364				
MKI67	ILMN_1222340	0.21845008	0.10582609	0.00151794	0.68757688	0.01387908	0.02193469	5.71464	5.682371053	5.672839706	5.600581818				
HIRA	ILMN_1255703	0.69502846	0.47705474	0.00269556	0.18889994	0.00151539	1.6418E-05	5.71061	5.698692105	5.730233824	5.596768182				
BC016608	ILMN_2652989	0.50834338	0.24075668	0.00729255	0.54626521	0.00290472	0.01379723	5.873616667	5.852886842	5.838388235	5.7599				
HIVEP3	ILMN_3151547	0.6221573	0.5784284	0.00634728	0.98211123	0.02065996	0.00807037	5.8143	5.795202632	5.795891176	5.700604545				
CDKN1B	ILMN_2638428	0.91702502	0.26092228	0.00094434	0.19107268	0.00076633	0.00462198	6.319963333	6.323197368	6.290032353	6.206463636				
TMEM146	ILMN_1234738	0.55963286	0.26050993	0.01041221	0.53892459	0.00804008	0.02955068	6.1685	6.148844737	6.132217647	6.056054545				
ELF2	ILMN_1251296	0.62852774	0.99139746	0.01720939	0.55818707	0.01304328	0.00355372	6.475283333	6.457747368	6.474922059	6.362845455				
LOC100046343	ILMN_1230976	0.92488823	0.46854285	0.01627632	0.46306215	0.0043081	0.01785105	8.632353333	8.628797368	8.607308824	8.521077273				
INSL6	ILMN_2677859	0.64124773	0.60509358	0.01766838	0.95477043	0.00589193	0.00152369	9.453976667	9.436828947	9.438182353	9.34275				
TSSC1	ILMN_2457324	0.53469154	0.41014601	0.01120204	0.10387728	0.03441062	0.00068122	7.696453333	7.670657895	7.728852941	7.585313636				
APOM	ILMN_2769418	0.74805362	0.11640957	0.00163087	0.16942969	0.00116604	0.01142575	6.10942	6.101231579	6.071398529	5.998286364				
BCORL1	ILMN_2755424	0.50645326	0.13061814	0.00575317	0.4880663	0.02438683	0.0204965	6.14217	6.119342105	6.101613235	6.031768182				
KAT2B	ILMN_1215305	0.8074212	0.6843084	0.01496102	0.43543792	0.00254275	0.00647192	6.576886667	6.58595	6.563575	6.466563636				
DPPA1	ILMN_2656079	0.72920745	0.96338302	0.00390382	0.72649151	0.0030607	0.00151247	5.75981	5.748876316	5.758391176	5.649590909				
LOC675899	ILMN_1225187	0.69924634	0.55758262	0.00127133	0.94007528	0.00022169	7.6949E-07	11.88372667	11.89631579	11.89802353	11.77363636				
CDH23	ILMN_1252019	0.50144466	0.43078095	0.00496081	0.98607056	0.03043863	0.01548972	5.970186667	5.945952632	5.945426471	5.860313636				
LOC384240	ILMN_1231241	0.29257752	0.12197511	0.00135437	0.67015825	0.0059351	0.00826965	5.845473333	5.816294737	5.807029412	5.735695455				
PHIP	ILMN_1234202	0.05926837	0.35209449	0.03524732	0.20922543	1.6474E-05	0.00134681	8.148903333	8.24305	8.191986765	8.039681818				
ZCCHC11	ILMN_1231967	0.78809208	0.53552748	0.01222134	0.73732649	0.01180064	0.00751158	5.953363333	5.943892105	5.934814706	5.844218182				
C030004B10RIK	ILMN_1259439	0.73560437	0.81617257	0.00489393	0.8086789	0.01130307	0.00021935	5.714183333	5.7017	5.707923529	5.605068182				
SH3BP2	ILMN_1255766	0.62892589	0.10607381	0.00059545	0.22397233	0.00085081	0.01131408	10.99547	10.98236842	10.95497941	10.88651364				
9030003C19RIK	ILMN_2556478	0.36127662	0.22661649	0.00179321	0.79494852	0.01247801	0.01956102	6.30629	6.278178947	6.271342647	6.197777273				
PTP4A2	ILMN_2647282	0.34162233	0.6921419	0.04955706	0.0973134	0.00263027	0.0369895	8.967936667	9.012752632	8.951845588	8.859495455				
B230120H23RIK	ILMN_2595189	0.71928651	0.77212428	0.00553884	0.45416911	0.00849838	0.00055156	5.60376	5.592065789	5.612216176	5.495790909				
LOC630421	ILMN_1221849	0.05975928	0.20542135	0.00176669	0.40946695	0.04439239	0.00652537	6.025783333	5.977681579	5.995302941	5.917995455				
MYO5C	ILMN_1236641	0.77528015	0.09581598	0.00217533	0.18810176	0.01064048	0.04887721	5.774123333	5.765497368	5.730282353	5.666459091				
A130027D22RIK	ILMN_1233685	0.23873662	0.57185217	0.00277257	0.40997221	0.01542638	0.00142541	6.198296667	6.165173684	6.183789706	6.090895455				
TMPO	ILMN_1220051	0.52568721	0.50670076	0.01053137	0.1571467	0.00556007	0.03891587	8.557416667	8.585160526	8.533298529	8.450218182				
HSD3B2	ILMN_1214838	0.30154913	0.39666725	0.01337088	0.8320674	0.02765843	0.0232042	5.771093333	5.73905	5.744586765	5.663945455				
NDRG1	ILMN_1250195	0.73937451	0.84400648	0.01386421	0.87075519	0.01268743	0.01261537	7.336333333	7.323686842	7.329026471	7.229204545				
RAB4A	ILMN_1212902	0.62659465	0.84220089	0.02522608	0.73571467	0.00865626	0.00969784	6.843623333	6.862610526	6.850907353	6.736786364				
RPL32	ILMN_1232890	0.54424722	0.25994974	5.3471E-05	0.59562394	0.00027184	0.00061433	13.83211333	13.81921842	13.80899412	13.72541364				
A930025D01RIK	ILMN_1223523	0.55763739	0.65238929	0.01400344	0.1994279	0.02193567	0.00036436	6.41673	6.396328947	6.430195588	6.310840909				
NUFIP2	ILMN_2498813	0.5694042	0.12320942	0.00296033	0.37058243	0.01470444	0.03032341	6.071443333	6.053294737	6.030458824	5.966290909				
LOC236831	ILMN_1253568	0.83421389	0.46981547	0.00142476	0.24689239	5.1009E-05	9.813E-05	12.44257667	12.44817105	12.42664118	12.33750455				
GPR12	ILMN_1221410	0.37347225	0.17901589	0.00278232	0.72161404	0.01551884	0.01787435	5.7837	5.755857895	5.747101471	5.679290909				
GLRA1	ILMN_2657254	0.11641736	0.06158031	0.0008728	0.73302621	0.02180023	0.04600658	5.690036667	5.6508	5.643054412	5.585631818				
TRPM1	ILMN_3162921	0.51796388	0.33174608	0.00451316	0.06945752	0.01007648	5.2368E-05	5.66866	5.650436842	5.694383824	5.564486364				
MIS12	ILMN_2592174	0.68936945	0.60943265	0.03114273	0.92834338	0.00618323	0.00248934	5.971716667	5.986276316	5.988970588	5.867713636				
USP47	ILMN_2455217	0.28202846	0.08191755	0.00143635	0.46809707	0.01035733	0.04837869	6.113853333	6.0853	6.068192647	6.010090909				
DEFB14	ILMN_3161733	0.215456	0.4928357	0.00668588	0.48780438	0.03891838	0.00874542	5.79444	5.758081579	5.775191176	5.690909091				
1600032L17RIK	ILMN_2524058	0.40281611	0.6061978	0.00612329	0.11938154	0.0179857	0.00027915	6.07718	6.053210526	6.091069118	5.97365				
HEATR5B	ILMN_2625626	0.57432396	0.27672303	0.0046491	0.64747954	0.01455003	0.01327886	6.279636667	6.262047368	6.250626471	6.176159091				
EP400	ILMN_2575376	0.74679581	0.23641976	0.0061003	0.35341519	0.00094587	2.3443E-05	5.911806667	5.921736842	5.944972059	5.808472727				
C130075H21RIK	ILMN_1217814	0.43726261	0.82726663	0.00295087	0.24660914	0.03098716	0.0004333	5.863153333	5.838913158	5.868792647	5.76005				

MYB	ILMN_2683910	0.33490693	0.61439991	0.00604983	0.58510712	0.0408895	0.00954837	5.96478	5.935865789	5.950458824	5.861781818				
2810402E24RIK	ILMN_1251628	0.10197727	0.1865506	0.00195351	0.64165857	0.03115129	0.01413344	6.330663333	6.285539474	6.296026471	6.227672727				
DLGAP2	ILMN_2937486	0.76423206	0.74161064	0.0200202	0.47956738	0.01007235	0.014501	5.728533333	5.739528947	5.718060294	5.625627273				
COL23A1	ILMN_2650447	0.77008033	0.99756857	0.00908151	0.71339762	0.00054938	0.00097296	7.128406667	7.137160526	7.128491176	7.025504545				
FAAH	ILMN_1233816	0.36353308	0.09357489	0.00697197	0.44021147	0.02065744	0.04644015	5.98956	5.964115789	5.946645588	5.886959091				
DLC1	ILMN_2648569	0.49025965	0.5212585	0.02576423	0.8837077	0.04649944	0.022319	5.824196667	5.799747368	5.803795588	5.721713636				
E230016F22RIK	ILMN_2571134	0.09802162	0.08109814	0.00164278	0.99182353	0.04202661	0.04124821	5.729066667	5.684757895	5.684539706	5.627031818				
1700073E17RIK	ILMN_2449074	0.71043718	0.5882121	0.00122957	0.87952092	0.00052112	0.00048588	5.641803333	5.631934211	5.628777941	5.539877273				
MDM2	ILMN_1250774	0.10703695	0.11493835	0.00154672	0.85678339	0.03934319	0.02735387	10.50170333	10.45636579	10.46051324	10.39990909				
E530016P10RIK	ILMN_1224376	0.2990389	0.74009471	0.00935998	0.29803596	0.04887577	0.0016525	6.104856667	6.070465789	6.095805882	6.003086364				
ZFP212	ILMN_2521753	0.9554209	0.63285824	0.01285328	0.58371449	0.02154317	0.0014743	6.38679	6.384781579	6.401176471	6.285086364				
IFI204	ILMN_2623314	0.23940539	0.14068119	0.00361273	0.8595867	0.01870633	0.01379322	5.521196667	5.489834211	5.486161765	5.420104545				
TRPV3	ILMN_2817797	0.24026546	0.25625841	0.00702167	0.96495267	0.0241875	0.03204151	5.62817	5.598486842	5.597452941	5.527354545				
SEC1	ILMN_2733335	0.74073227	0.89973033	0.04917371	0.76623156	0.03756973	0.01264343	5.754276667	5.740523684	5.749694118	5.653522727				
9330133O14RIK	ILMN_2511527	0.87674031	0.31891103	0.01968785	0.46751448	0.04850705	0.03441428	6.23197	6.226260526	6.205191176	6.131222727				
GALNT1	ILMN_2625681	0.97148689	0.29753676	0.02327234	0.23909677	0.01812026	0.00037454	7.85888	7.857452632	7.895080882	7.758145455				
FOXJ3	ILMN_2650040	0.73644097	0.46665735	0.01420096	0.71064114	0.01271294	0.01178948	8.670526667	8.657994737	8.647885294	8.569918182				
1810005K13RIK	ILMN_1246137	0.40557109	0.15106784	0.00714496	0.58012458	0.0198345	0.033473	5.77925	5.75325	5.740070588	5.678704545				
CLASP1	ILMN_1254008	0.73119804	0.51506113	0.00177943	0.3022383	0.00176344	0.02302094	6.05413	6.064752632	6.034072059	5.95395				
6030408K21RIK	ILMN_1218028	0.90502039	0.19355048	0.0009579	0.21228952	0.00084542	0.00383444	5.669393333	5.666268421	5.640398529	5.569368182				
A930008A22RIK	ILMN_2423730	0.08033924	0.65885651	0.00745835	0.12081829	8.1722E-06	0.00049256	8.380963333	8.430597368	8.393158824	8.281059091				
1810007M14RIK	ILMN_2681311	0.98677383	0.32645363	0.01530257	0.27924789	0.01050978	0.04980064	6.890543333	6.891115789	6.859664706	6.790654545				
BC003331	ILMN_2719794	0.25471202	0.58753271	0.01201949	0.54135948	0.02244509	0.01816724	7.384963333	7.351997368	7.367855882	7.285531818				
LOC382061	ILMN_1245034	0.94469843	0.36699273	0.02143868	0.35145396	0.0090476	0.00143379	10.37113	10.37368684	10.40468824	10.27182273				
NAT12	ILMN_2623754	0.73683778	0.14851426	0.01555081	0.25009623	0.01447008	0.02936269	8.314633333	8.302757895	8.275223529	8.215740909				
OLFR782	ILMN_3161983	0.45044811	0.92625836	0.00590041	0.27142014	0.0111752	0.00024954	5.737763333	5.716676316	5.74	5.639059091				
CPEB2	ILMN_1236346	0.75490198	0.71925691	0.00281149	0.46304434	0.00069739	0.0044823	5.658066667	5.666544737	5.648361765	5.559427273				
2510049I19RIK	ILMN_2778799	0.91464963	0.41628174	0.00811012	0.43802335	0.00553053	0.02647587	6.335453333	6.332197368	6.311452941	6.236859091				
LCN3	ILMN_1236379	0.39628467	0.40563118	0.00857505	0.92702367	0.03849304	0.02718766	5.884476667	5.856815789	5.859325	5.786277273				
9930021J03RIK	ILMN_2626694	0.84731035	0.41953277	0.00968591	0.28164636	0.00505829	0.0227078	5.63169	5.637307895	5.609635294	5.53385				
LOC268939	ILMN_1215666	0.97166046	0.23740673	0.01049384	0.14453449	0.00091119	0.04187746	6.025216667	6.026355263	5.989661765	5.928159091				
IGHV1453_X03573$M12991X03573_IG_HEAVY_VARIABLE_14S3_203	ILMN_2453303	0.22474706	0.1772146	0.01131447	0.96094783	9.7043E-05	1.9202E-05	6.005066667	6.045584211	6.044322059	5.908227273				
4930524L23RIK	ILMN_2610591	0.97633163	0.44405621	0.00316642	0.44146577	0.00327003	0.00507241	5.51084	5.509984211	5.492057353	5.414113636				
NANP	ILMN_2629922	0.4439226	0.33542528	0.00272161	0.86697218	0.01347946	0.01328289	5.710083333	5.689892105	5.685992647	5.613513636				
PCSK2	ILMN_1244247	0.98271261	0.5580062	0.01718032	0.54541442	0.01222075	0.01500895	5.669273333	5.668607895	5.653467647	5.572977273				
C87414	ILMN_1243166	0.83011253	0.58061946	0.02051233	0.38781839	0.00492303	0.03676842	5.990493333	5.997397368	5.972451471	5.8942				
TMEFF2	ILMN_2518100	0.5540378	0.30736402	0.00549964	0.67788762	0.02123168	0.03470806	5.677973333	5.660439474	5.649566176	5.581804545				
MIA3	ILMN_2600646	0.86291188	0.50022412	0.01001686	0.619891	0.00607289	0.00032584	5.843996667	5.849473684	5.862173529	5.747836364				
EG546913	ILMN_2531690	0.83003528	0.83407704	0.00102345	0.96611446	0.00064849	0.00010015	5.761706667	5.767334211	5.766423529	5.665590909				
A630040J04RIK	ILMN_1252015	0.48378882	0.87063997	0.00320099	0.52722591	0.00042433	0.00089277	5.993063333	6.012613158	5.997267647	5.897040909				
HARS	ILMN_2769030	0.48614677	0.31401417	0.01130818	0.80919235	0.01327593	0.01178117	6.238436667	6.216931579	6.211557353	6.142640909				
HRK	ILMN_1229407	0.2096328	0.12231789	0.00288475	0.89534884	0.03224908	0.02746623	5.75883	5.723236842	5.720327941	5.6631				
LOC100045437	ILMN_1228965	0.75055515	0.92688503	0.01007045	0.79290195	0.00777848	0.00618076	5.742806667	5.732802632	5.739961765	5.647127273				
AFMID	ILMN_2702894	0.73491375	0.50553765	0.01521108	0.77275529	0.04804283	0.04613881	6.246823333	6.234655263	6.225633824	6.151559091				

PMS1	ILMN_1250517	0.63673516	0.71973317	0.02227416	0.89567579	0.02348795	0.02254558	5.817356667	5.801978947	5.805682353	5.722281818				
ID2	ILMN_2887239	0.87028953	0.47511409	0.02798367	0.54217128	0.0158696	0.04312451	6.11898	6.112697368	6.094567647	6.024290909				
FABP2	ILMN_2706493	0.80337467	0.78665036	0.01344875	0.98455719	0.00177294	0.00177906	5.574673333	5.581957895	5.582427941	5.48005				
ATG12	ILMN_2663570	0.27659474	0.66933767	0.00221969	0.41535757	0.02996064	0.00364526	8.973293333	8.94255	8.962186765	8.87895				
FBXW13	ILMN_2625152	0.55067562	0.60422372	0.01436917	0.88202557	0.03730302	0.01508965	5.958916667	5.941	5.944770588	5.864777273				
TDH	ILMN_1244724	0.29912682	0.22027664	0.00109699	0.86469091	0.02808824	0.03722901	5.632846667	5.605236842	5.600979412	5.538713636				
CALCRL	ILMN_1235390	0.61928835	0.95951597	0.03885534	0.51870583	0.03448207	0.0042841	5.57102	5.552502632	5.569420588	5.476895455				
IL1F9	ILMN_2658704	0.95996795	0.36258599	0.0027602	0.32615103	0.00456295	0.01073443	5.66582	5.667273684	5.643604412	5.571768182				
SYT10	ILMN_2724250	0.36728496	0.72200844	0.01447158	0.43001287	0.04043248	0.0041577	5.726353333	5.6979	5.716591176	5.632418182				
MEX3A	ILMN_2479681	0.33800926	0.69572258	0.02090267	0.48891534	0.02248677	0.01516916	6.931541379	6.896444737	6.913239706	6.837772727				
PRICKLE2	ILMN_3015864	0.84678228	0.78740959	0.02091569	0.96913695	0.01472913	0.00345005	5.850416667	5.857647368	5.858801471	5.756763636				
5830415L20RIK	ILMN_1257675	0.976909	0.94073976	0.01481662	0.90901729	0.02131485	0.00256728	7.799203333	7.800326316	7.79705	7.705868182				
GAPVD1	ILMN_1238871	0.63675362	0.13555767	0.00544842	0.27193364	0.00501968	0.02911601	9.875493333	9.862042105	9.838317647	9.782222727				
LOC381770	ILMN_2539337	0.42759367	0.73766238	0.0151302	0.56396291	0.03833058	0.01488009	6.123156667	6.095863158	6.112223529	6.03				
TATDN3	ILMN_2647204	0.77448651	0.23572372	0.00130565	0.29300657	0.00044483	0.02435293	5.724313333	5.717452632	5.693994118	5.631331818				
KRT32	ILMN_2895346	0.83250256	0.51569874	0.00650346	0.63950501	0.00114191	0.00010869	5.993876667	5.999742105	6.010070588	5.901004545				
LRRC18	ILMN_2728504	0.89493152	0.59100111	0.00523404	0.66901961	0.00317902	0.00079243	5.526923333	5.530942105	5.542358824	5.434140909				
NIN	ILMN_2778195	0.68032543	0.98972382	0.00937265	0.58827183	0.00170877	0.00140829	8.5343	8.546615789	8.533970588	8.442313636				
5830411J07RIK	ILMN_2679267	0.91687524	0.57076878	0.00800807	0.63502177	0.00951029	0.01081438	5.85217	5.849081579	5.837338235	5.760313636				
EEFSEC	ILMN_2587281	0.78972673	0.9248816	0.01022288	0.67206418	0.0051822	0.00327079	5.65683	5.664715789	5.654432353	5.565031818				
SPDYB	ILMN_2756787	0.41881968	0.32985568	0.01273211	0.93027948	0.0425628	0.0364783	5.668073333	5.642892105	5.640694118	5.576868182				
RNF150	ILMN_3032501	0.10404093	0.24949732	0.02284489	0.34832122	8.5477E-05	7.2293E-05	5.896763333	5.955207895	5.930469118	5.805768182				
SYNGR4	ILMN_3070294	0.58603374	0.74678443	0.01678942	0.77844292	0.04810332	0.01950989	5.656433333	5.638892105	5.646776471	5.565595455				
6030408B16RIK	ILMN_3125764	0.37545518	0.38985728	0.00402912	0.88443972	0.03648602	0.01495938	6.25216	6.227231579	6.230682353	6.161786364				
C130039E17RIK	ILMN_2494727	0.2570242	0.94446193	0.00747845	0.19657178	0.0186735	0.00127309	5.731136667	5.703355263	5.729467647	5.640990909				
KRIT1	ILMN_2701155	0.29754524	0.12428278	0.01525668	0.66355969	0.00094451	8.5201E-05	5.64008	5.672247368	5.683764706	5.549959091				
control_ILMN_1378774	ILMN_1378774	0.93075559	0.28610953	0.03628321	0.20533938	0.02992914	0.00197571	5.669826667	5.666792105	5.707342647	5.580013636				
PAPPA	ILMN_2630646	0.37572351	0.24694961	0.0127078	0.79497675	0.03130728	0.04376852	5.948626667	5.924163158	5.918261765	5.858904545				
1700016L04RIK	ILMN_2499229	0.90685361	0.3496515	0.00372799	0.28777419	0.00681981	0.03561193	5.716706667	5.719863158	5.692752941	5.627036364				
C130072C03RIK	ILMN_1233936	0.80838551	0.83984442	0.01171633	0.62099255	0.00449699	0.01414307	6.081323333	6.089007895	6.075160294	5.992027273				
OLFR564	ILMN_2771303	0.60592345	0.36175661	0.00386213	0.7522095	0.00850738	0.00363427	5.610586667	5.597744737	5.591648529	5.521359091				
1700016G05RIK	ILMN_2637903	0.70654921	0.58625198	0.03809295	0.89807309	0.00870429	0.00246756	5.763153333	5.776560526	5.780139706	5.674022727				
RgenericRIP1	ILMN_2681694	0.52726949	0.44369673	0.0030417	0.9475417	0.02276766	0.01581923	5.954443333	5.936397368	5.934783824	5.865727273				
K20D4	ILMN_1240743	0.96207944	0.43763372	0.00162244	0.38849163	0.00191142	0.00558935	5.705186667	5.706357895	5.688022059	5.616690909				
4922502D21RIK	ILMN_2593944	0.4155873	0.26085025	0.00141644	0.80943674	0.02878727	0.03578821	5.802656667	5.779581579	5.773558824	5.714322727				
GM949	ILMN_2531100	0.75549241	0.57398859	0.02584055	0.812046	0.02768367	0.02515704	5.67855	5.668557895	5.662460294	5.590413636				
DLG4	ILMN_2710764	0.88945477	0.63134593	0.00987864	0.71949702	0.00922123	0.01399519	6.05743	6.053318421	6.044314706	5.969368182				
PTPN22	ILMN_2766313	0.89147187	0.39788189	0.00599815	0.2959911	0.0071583	0.00020474	5.784923333	5.781565789	5.804307353	5.697240909				
MED1	ILMN_2695175	0.69784662	0.3155412	0.00611454	0.51360092	0.01261526	0.04895724	5.69954	5.688523684	5.672022059	5.612195455				
HPN	ILMN_1240252	0.70375464	0.84003357	0.02512481	0.46934315	0.01165401	0.00317289	5.78737	5.775389474	5.793452941	5.700045455				
USP47	ILMN_1256774	0.8866563	0.08427609	0.00149343	0.06085008	0.00993913	2.7829E-05	6.331733333	6.327818421	6.377101471	6.24445				
CTDSPL2	ILMN_3154869	0.87357331	0.45992752	0.01471252	0.56168486	0.01511923	0.00170494	6.688386667	6.693771053	6.710814706	6.601177273				
PARP11	ILMN_1221241	0.89036915	0.66385821	0.00113541	0.56321863	0.00478319	0.01014818	5.620256667	5.624031579	5.609260294	5.533118182				
LOC381561	ILMN_2536925	0.17237484	0.21686297	0.00759509	0.64649338	0.04390595	0.00930537	13.19958667	13.16311842	13.17164853	13.1126				
V1RD9	ILMN_2959825	0.97881914	0.13175262	0.00690149	0.09799273	0.00570138	5.8945E-06	5.658806667	5.657992105	5.697108824	5.572222727				
SPN	ILMN_1255969	0.55964734	0.71117142	0.00751623	0.85787049	0.00950215	0.01371046	5.89838	5.884368421	5.888555882	5.811963636				

KCNK4	ILMN_2625370	0.6927491	0.86587608	0.04472393	0.50165892	0.00640631	0.02599097	5.664273333	5.677852632	5.658711765	5.577881818				
PAX6	ILMN_2504978	0.69025478	0.25190942	0.01354257	0.08344413	0.00354709	0.0395486	5.669473333	5.681165789	5.640964706	5.583190909				
COPS3	ILMN_1218678	0.51693211	0.63688322	0.02373088	0.20247631	0.00501893	0.02654163	6.04268	6.063476316	6.029414706	5.956536364				
OLFR894	ILMN_2631775	0.55832722	0.99847092	0.04395964	0.42135784	0.00330976	0.00792789	5.7664	5.789839474	5.766469118	5.6803				
9530053H22	ILMN_2617639	0.41889249	0.35405494	0.00357814	0.05425697	0.00030686	0.01195699	5.551996667	5.571878947	5.531242647	5.465995455				
5830472H07RIK	ILMN_2755293	*0.36501638*	*0.66607508*	*0.02046626*	*0.1182634*	*0.00039784*	*0.02746328*	*6.253593333*	*6.282686842*	*6.240239706*	*6.167636364*				
D930007M19RIK	ILMN_2581178	0.76339543	0.60604606	0.02241012	0.33537703	0.00451539	0.01729312	6.347126667	6.356386842	6.333030882	6.261340909				
D130078K04RIK	ILMN_2569683	0.66636721	0.25734967	0.04135106	0.05132471	0.02878696	0.00014926	5.92102	5.905407895	5.957402941	5.835468182				
LOC384287	ILMN_1226110	0.54388276	0.58141105	0.00333332	0.19201685	0.01748532	0.00017648	5.600046667	5.584278947	5.612377941	5.514790909				
LOC100048049	ILMN_2708610	0.95218128	0.25590685	0.01148101	0.21123154	0.0108032	0.04933477	5.83809	5.839768421	5.810255882	5.752986364				
1700112H15RIK	ILMN_2743541	0.64861495	0.3201502	0.0108812	0.10933982	0.02115428	0.00027934	5.602223333	5.589636842	5.628055882	5.517240909				
RNF17	ILMN_2741929	0.71345974	0.30390726	0.00557822	0.17470226	0.01156905	0.02734088	5.560576667	5.571157895	5.537982353	5.475609091				
NARF	ILMN_1244845	0.32813687	0.07214624	0.01761269	0.41766052	0.00279047	0.00015962	7.168896667	7.19995	7.223792647	7.084013636				
HSPA1B	ILMN_2530672	0.77146596	0.98054272	0.0373104	0.70191869	0.01984534	0.017804	5.990493333	6.0012	5.989733824	5.905659091				
B930071N01RIK	ILMN_1247868	0.96323283	0.64426691	0.00627488	0.65225828	0.00409529	0.00147182	5.752686667	5.753815789	5.764302941	5.668054545				
SEMA3E	ILMN_1228525	0.63039278	0.32434364	0.00681	0.60546066	0.00583882	0.00908435	5.622603333	5.610747368	5.600951471	5.538277273				
GALNT6	ILMN_2627386	0.81446882	0.7918429	0.02845447	0.54047129	0.02603685	0.00196729	5.865516667	5.857652632	5.872851471	5.781409091				
NCOA2	ILMN_2573793	0.8386801	0.97919008	0.04731113	0.81134649	0.03878777	0.01017342	5.96424	5.957523684	5.963505882	5.880186364				
LOC385027	ILMN_1255900	0.65753886	0.48289369	0.00956486	0.22419555	0.02822087	0.0016544	5.646326667	5.633852632	5.665861765	5.562377273				
SPRR2K	ILMN_2990390	0.46106991	0.19883289	0.02020776	0.5001156	0.00077923	0.000363	5.623606667	5.644615789	5.662151471	5.539818182				
STAT4	ILMN_2792599	0.90331319	0.92233814	0.01253158	0.81432899	0.00936326	0.01566569	5.838816667	5.842352632	5.836001471	5.755045455				
1700006H02RIK	ILMN_1253202	0.71958726	0.49588584	0.00439927	0.77777038	0.02141138	0.01990318	5.87839	5.868286842	5.861352941	5.794681818				
OLFR463	ILMN_2702643	0.941253	0.95422277	0.04609905	0.87367146	0.02446877	0.01626319	5.806456667	5.809223684	5.804622059	5.722768182				
LOC637082	ILMN_1233896	0.97759418	0.77459971	0.02442676	0.72223266	0.01332385	0.0034332	5.796636667	5.795723684	5.804989706	5.712972727				
CHMP7	ILMN_2588610	0.72596566	0.6457792	0.01639739	0.9779851	0.00470516	0.00044208	9.48094	9.490673684	9.491242647	9.397440909				
AGPAT5	ILMN_1250939	0.96146142	0.57031058	0.02382884	0.57463699	0.01575584	0.01665907	5.9402	5.938721053	5.925610294	5.856831818				
GPRIN3	ILMN_2722319	0.71936877	0.40942604	0.0162081	0.17317377	0.00482278	0.02236757	5.649423333	5.661078947	5.627986765	5.566109091				
R3HDM1	ILMN_2759868	0.51275284	0.82741759	0.01392116	0.30805784	0.04307204	0.0024589	6.22318	6.204939474	6.228605882	6.140118182				
GM239	ILMN_2814357	0.85644322	0.36077622	0.01078965	0.2673967	0.01257121	0.02139083	5.75041	5.755331579	5.730616176	5.667736364				
genericC	ILMN_2606088	0.36934443	0.14213324	0.00634593	0.62058965	0.00072505	4.2492E-05	5.638906667	5.663857895	5.675654412	5.556236364				
GUCY2C	ILMN_2911551	0.93114386	0.6791989	0.02669526	0.72742603	0.01922554	0.01909273	5.75101	5.748381579	5.739895588	5.668413636				
DNAJC28	ILMN_2592571	0.79527431	0.92289593	0.02298836	0.66107013	0.00609899	0.00449318	5.995306667	5.987768421	5.998058824	5.912995455				
A630057J21RIK	ILMN_1222357	0.23149645	0.69829606	0.0121469	0.05686233	0.00045583	0.01158149	5.72068	5.759102632	5.710363235	5.638481818				
PDK2	ILMN_2737658	0.91074165	0.61606209	0.04487631	0.491808	0.02485846	0.04404716	5.95138	5.955163158	5.936645588	5.869513636				
1110032A03RIK	ILMN_1215043	0.60423819	0.77153705	0.00539919	0.77634877	0.01693617	0.00576525	5.859373333	5.846365789	5.852595588	5.777881818				
2310016E02RIK	ILMN_1254063	0.70483626	0.65410085	0.01083083	0.95255869	0.01467721	0.02001851	5.7544	5.743484211	5.742011765	5.672968182				
C330011J12RIK	ILMN_2615978	0.85869838	0.92011073	0.01561237	0.7486874	0.0019331	0.00520559	5.719083333	5.714607895	5.721825	5.637795455				
JRKL	ILMN_1255837	0.94272483	0.80292788	0.04124635	0.84524612	0.02315801	0.01944571	5.823186667	5.821102632	5.816498529	5.741981818				
ZFP120	ILMN_2456317	0.86261706	0.86740893	0.01075473	0.98911924	0.00926091	0.00636258	5.540176667	5.535910526	5.536211765	5.459018182				
KISS1	ILMN_2735829	0.76581773	0.21618646	0.00727701	0.11170053	0.02023543	0.00019085	5.697123333	5.689555263	5.726642647	5.6162				
RTN3	ILMN_2572492	0.5310507	0.71969456	0.02242047	0.73699268	0.0375872	0.019464	5.90647	5.888605263	5.896657353	5.825581818				
AW822252	ILMN_2744956	0.91107588	0.66282674	0.02595894	0.48769444	0.00148654	0.01190856	5.76074	5.763905263	5.74905	5.679863636				
LRRC39	ILMN_1230043	0.78452833	0.88892882	0.01360738	0.88972638	0.00158734	0.00430995	5.708436667	5.715042105	5.711988235	5.627659091				
SCNN1B	ILMN_2618383	0.89820542	0.82246064	0.03437774	0.66818803	0.01921091	0.00309561	5.610303333	5.606213158	5.616464706	5.529563636				
DLX6	ILMN_1213404	0.98659216	0.69950278	0.01383192	0.69768922	0.01328586	0.00162742	5.75542	5.755936842	5.765739706	5.674818182				
GM438	ILMN_1248574	0.29999719	0.55050151	0.0105011	0.65192125	0.04085148	0.02498608	5.745906667	5.720597368	5.730714706	5.665440909				
LOC236397	ILMN_1239998	0.68197029	0.82258913	0.02341937	0.46093245	0.0237734	0.00558543	5.832173333	5.820278947	5.838497059	5.751754545				

LOC381448	ILMN_2528515	0.78623555	0.33559508	0.0078061	0.517919	0.0070339	0.00022804	12.88779333	12.89468947	12.90875882	12.80749091					
CCDC104	ILMN_2643580	0.55123773	0.70680186	0.0074226	0.2389928	0.00245492	0.00360147	5.84063	5.859457895	5.831667647	5.760527273					
LOC279638	ILMN_2588075	0.64349514	0.82890664	0.01900655	0.43850016	0.00446086	0.0166619	6.0283	6.041955263	6.022392647	5.948613636					
MADD	ILMN_1256376	0.88413835	0.5873814	0.00493436	0.69788059	0.01748976	0.02498916	5.59808	5.593768421	5.583701471	5.518418182					
LOC333749	ILMN_2530361	0.9961254	0.94549994	0.00891057	0.94341468	0.01926402	0.0087053	5.940406667	5.940531579	5.938926471	5.860786364					
AGT	ILMN_1227398	0.98389935	0.71082852	0.03176339	0.68226388	0.03100151	0.03795007	5.643776667	5.644352632	5.633804412	5.564418182					
C77370	ILMN_1218340	0.6355803	0.74538896	0.00808846	0.35934138	0.00339863	0.00443228	5.701306667	5.713702632	5.694325	5.621972727					
LOC382454	ILMN_1255829	0.96588171	0.73772708	0.01511148	0.75778174	0.01698715	0.02638877	5.770946667	5.769571053	5.761170588	5.692477273					
9130601C02RIK	ILMN_1216153	0.41100887	0.94744117	0.00520864	0.26716372	0.04481248	0.00079179	5.722513333	5.701268421	5.723889706	5.644172727					
B230216G23RIK	ILMN_2481643	0.57384028	0.48180684	0.00610837	0.16323616	0.00056974	0.02624308	5.642603333	5.6564	5.625255882	5.56435					
BMPR1B	ILMN_1219486	0.46145933	0.66822667	0.013751	0.69879477	0.00500677	0.00545184	5.720253333	5.742613158	5.732064706	5.642009091					
LOC100046568	ILMN_1258903	0.3199598	0.56576602	0.04571049	0.50062543	0.00563038	0.00431517	5.87139	5.907021053	5.888016176	5.793381818					
A130003P22RIK	ILMN_1257646	0.71247927	0.82191867	0.0033766	0.85251926	0.00438661	0.00210537	6.037656667	6.046863158	6.042676471	5.959827273					
CFL2	ILMN_1249976	0.6912082	0.47018116	0.01946891	0.77798251	0.04355008	0.0357747	6.263776667	6.252907895	6.246395588	6.18595					
control_ILMN_1378775	ILMN_1378775	0.24499389	0.26320839	0.03290204	0.81180565	0.00164824	0.00063354	5.630993333	5.667786842	5.661682353	5.553213636					
TCFAP2C	ILMN_2783225	0.76201807	0.94087475	0.02807743	0.80847181	0.01136225	0.02645559	5.818516667	5.827960526	5.820864706	5.740859091					
BHLHB3	ILMN_2759227	0.59822063	0.90684222	0.01459628	0.46655189	0.02520291	0.00413327	5.618706667	5.606023684	5.621429412	5.541054545					
UGDH	ILMN_1253090	0.80637062	0.91996988	0.00850688	0.86603197	0.02134136	0.00948229	5.862666667	5.856173684	5.860194118	5.78535					
control_ILMN_1379205	ILMN_1379205	0.76025905	0.98196255	0.02374306	0.71823575	0.04033738	0.01453797	5.71972	5.711386842	5.720311765	5.642781818					
CRLF1	ILMN_2747811	0.79797247	0.28989628	0.00239399	0.1858294	0.00732642	0.03905401	5.672033333	5.679189474	5.647736765	5.595127273					
SOX2	ILMN_1248711	0.77498	0.64492465	0.02193392	0.86465206	0.02410687	0.03050535	5.68709	5.678613158	5.674401471	5.610327273					
LOC229152	ILMN_1240991	0.75807476	0.52647195	0.00704108	0.84498087	0.03417437	0.0058696	5.61709	5.608715789	5.604654412	5.540372727					
2210008F06RIK	ILMN_2429915	0.91583231	0.97857251	0.04923649	0.87185551	0.03416033	0.01793713	5.65113	5.654563158	5.650383824	5.574586364					
9530013H16RIK	ILMN_2559067	0.57713891	0.32076174	0.01677346	0.72134189	0.04932107	0.04860174	5.806686667	5.790413158	5.782267647	5.730295455					
MACROD2	ILMN_1226796	0.71709711	0.44062902	0.02055885	0.71708219	0.02601735	0.01654778	5.871886667	5.861818421	5.854417647	5.795531818					
ZBTB44	ILMN_2589136	0.48704466	0.63544273	0.01313125	0.75239037	0.04857492	0.01537547	5.652506667	5.634860526	5.641651471	5.576604545					
LOC209474	ILMN_1245275	0.79098578	0.95793058	0.01722142	0.72365671	0.01473191	0.0078102	5.677973333	5.671436842	5.679282353	5.602077273					
OLFR1158	ILMN_1254931	0.77110867	0.89502054	0.02695462	0.61488634	0.03490769	0.00534404	5.90849	5.900489474	5.911680882	5.832872727					
LOC383612	ILMN_1245739	0.96088752	0.49445505	0.0133369	0.51403628	0.01234276	0.00789858	5.58247	5.581242105	5.568833824	5.506859091					
NFAT5	ILMN_2732123	0.72207089	0.63730457	0.01379799	0.37553032	0.00519688	0.03425991	5.82748	5.836571053	5.815392647	5.751886364					
IGHV5S15_AF290966_IG_HEAVY_VARIABLE_5S15_49	ILMN_2432375	0.23326177	0.59391903	0.00827536	0.05248274	0.00034004	0.0201746	5.96497	5.996957895	5.952066176	5.889468182					
ELMO2	ILMN_3058341	0.12486628	0.24567253	0.03204461	0.65701953	0.00045446	0.00128682	5.873053333	5.918702632	5.906870588	5.79765					
3110079O15RIK	ILMN_2598181	0.69113605	0.35355466	0.00161013	0.17857553	0.00258872	0.01840637	5.66052	5.669471053	5.641986765	5.585468182					
GFRA3	ILMN_3029078	0.62264403	0.92745727	0.01762037	0.65173589	0.03892889	0.02104455	5.61845	5.603889474	5.615789706	5.543463636					
OSBPL6	ILMN_1219286	0.42124404	0.42368156	0.01623477	0.93862005	0.00172301	0.0008632	5.831956667	5.852805263	5.8511	5.757227273					
DLG1	ILMN_2763839	0.73896101	0.80437453	0.04979664	0.87479492	0.0096557	0.00635505	5.726496667	5.737444737	5.733544118	5.652140909					
D130063P19RIK	ILMN_1238936	0.94809579	0.84171066	0.02702422	0.89126407	0.0207869	0.0134556	5.772983333	5.771063158	5.767867647	5.698895455					
EG634762	ILMN_1214492	0.26319253	0.79259245	0.01735231	0.10089143	0.0003285	0.00958642	5.778483333	5.806255263	5.772413235	5.704395455					
4833419K08RIK	ILMN_1250504	0.90497419	0.74215973	0.02042767	0.81072135	0.0042437	0.00196065	5.580176667	5.582989474	5.587622059	5.506263636					
D130061E05RIK	ILMN_2573307	0.70946172	0.61405852	0.0316363	0.97138412	0.03799442	0.00999837	5.734043333	5.723581579	5.722885294	5.660136364					
TMEM219	ILMN_2689569	0.2764255	0.72626184	0.03771418	0.43175872	0.00116995	0.00879276	6.148696667	6.176007895	6.157932353	6.074918182					
OA1	ILMN_1242255	0.48716604	0.64452628	0.02998572	0.13614133	0.0012152	0.0120236	5.56251	5.581981579	5.551513235	5.488740909					
OLFR1180	ILMN_2649883	0.82220384	0.65018321	0.03332559	0.83964329	0.04497682	0.03216904	5.670083333	5.663052632	5.658069118	5.5964					

EFCAB1	ILMN_2917280	0.40779353	0.73175186	0.00740283	0.59835212	0.00516637	0.01054621	5.710406667	5.73445	5.719770588	5.636781818
control_ILMN_1378664	ILMN_1378664	0.73998782	0.57317844	0.04875388	0.84376255	0.03733169	0.01335162	5.725506667	5.737144737	5.743244118	5.652136364
BRPF1	ILMN_2800859	0.10317996	0.45657197	0.01871488	0.159891	0.00037443	0.00052146	8.94028	8.991239474	8.957891176	8.866990909
CORO1B	ILMN_2788546	0.61023246	0.91171296	0.01479403	0.48331453	0.0055325	0.01554437	11.35823333	11.37271842	11.35536912	11.28498636
LOC235971	ILMN_1247372	0.52222184	0.34554539	0.01442529	0.7525038	0.02629384	0.04443921	5.526783333	5.511610526	5.505255882	5.453613636
LOC383940	ILMN_2536510	0.77825561	0.94255106	0.04170942	0.6416792	0.00535638	0.01023982	5.806973333	5.816121053	5.804944118	5.733954545
RNF207	ILMN_1237330	0.15249074	0.74859334	0.03681339	0.20400522	0.00054508	0.00924396	5.854813333	5.893897368	5.863382353	5.781881818
1700081L16RIK	ILMN_2426180	0.4254824	0.3879785	0.02017245	0.97625438	0.03680693	0.04755114	5.581866667	5.561147368	5.560519118	5.509463636
OLFR750	ILMN_2773535	0.99805882	0.34741304	0.00424471	0.37021352	0.01764381	0.03092697	5.666133333	5.666073684	5.646426471	5.593809091
LOC385626	ILMN_1244702	0.86191682	0.90550993	0.02123738	0.74013397	0.01979016	0.0142778	6.048793333	6.053842105	6.045866176	5.977095455
LOC384513	ILMN_1230132	0.9775506	0.78321033	0.03643822	0.78378945	0.01961725	0.01792928	5.711216667	5.710447368	5.704545588	5.639831818
LOC385059	ILMN_2542073	0.83322545	0.64867558	0.01307523	0.81791118	0.02015499	0.01508891	5.548423333	5.543284211	5.538563235	5.477331818
4930571C24RIK	ILMN_1228034	0.8721725	0.44826867	0.03700555	0.54621985	0.03758677	0.03673126	5.43153	5.426878947	5.413977941	5.360531818
PPP1R14D	ILMN_1253015	0.8287285	0.44941136	0.0208985	0.25160589	0.00295591	0.03600523	5.628493333	5.633902632	5.610638235	5.557659091
GJA7	ILMN_1253346	0.80834514	0.75164716	0.02893306	0.94686025	0.04593948	0.04219593	5.87617	5.869497368	5.867842647	5.8054
OLFR1085	ILMN_1248151	0.61996214	0.86465087	0.04986154	0.69712713	0.03196955	0.03620173	5.636943333	5.654255263	5.642222059	5.566422727
NEUROD4	ILMN_2766939	0.94689433	0.9900661	0.01556886	0.95536905	0.01714781	0.01308462	5.671153333	5.669668421	5.670869118	5.60065
LTBP1	ILMN_1224967	0.90429089	0.60644319	0.04980213	0.6815483	0.04443474	0.01511683	5.68037	5.683613158	5.694298529	5.610181818
control_ILMN_1378571	ILMN_1378571	0.99545055	0.73862332	0.04751979	0.72098434	0.04519215	0.02180431	5.820813333	5.820989474	5.812435294	5.750686364
PIK3R4	ILMN_2543088	0.75550272	0.7071606	0.03348288	0.45137917	0.01998057	0.04492477	5.89115	5.900139474	5.881458824	5.821327273
2210003I03RIK	ILMN_2710359	0.70593469	0.85165753	0.02261457	0.86900023	0.03307202	0.03281985	5.69808	5.689707895	5.693454412	5.628409091
2900003A17RIK	ILMN_2449674	0.96480497	0.60371744	0.04840899	0.6149156	0.03532408	0.00511049	6.01923	6.020481579	6.032035294	5.949854545
EZH2	ILMN_2606429	0.88387031	0.652619	0.04909333	0.77133926	0.03376462	0.00590324	5.613896667	5.618357895	5.625351471	5.544813636
BTF3L4	ILMN_2658543	0.92055293	0.79662617	0.02408994	0.86240269	0.01294046	0.01870436	5.68815	5.685586842	5.681852941	5.619090909
LOC676672	ILMN_1236130	0.79366788	0.42669627	0.0324377	0.5855754	0.01847081	0.00319123	5.804406667	5.811518421	5.824616176	5.735581818
control_ILMN_1379333	ILMN_1379333	0.12888566	0.9453906	0.03593319	0.10594139	7E-05	0.01310016	5.61851	5.653657895	5.620225	5.549695455
B230323D24RIK	ILMN_1213297	0.74482804	0.95530433	0.02591804	0.61767759	0.03216558	0.00373812	5.808683333	5.799486842	5.809979412	5.739909091
3110052M02RIK	ILMN_2463970	0.85112691	0.54323523	0.02464873	0.37974163	0.01307558	0.02624936	5.663506667	5.668044737	5.650769118	5.595422727
ENSMUSG00000071316	ILMN_1231109	0.87211247	0.98926339	0.04433271	0.85279003	0.0362554	0.01867314	5.765793333	5.770668421	5.766132353	5.697813636
LOC384215	ILMN_2537640	0.17703635	0.72581643	0.02350565	0.16159152	0.0009221	0.00298547	5.820696667	5.862371053	5.829138235	5.752890909
D530031C13RIK	ILMN_1217757	0.98471016	0.67782315	0.04540006	0.6685376	0.03616971	0.04868737	5.739493333	5.738907895	5.728495588	5.672031818
LOC277422	ILMN_2527881	0.89433054	0.75733563	0.02984326	0.86561313	0.04122515	0.03448776	5.73676	5.733102632	5.729133824	5.669509091
A530088H08RIK	ILMN_2601705	0.73111733	0.39411525	0.04498969	0.65159504	0.03093272	0.00356921	5.813696667	5.825318421	5.837829412	5.746622727
HEATR5A	ILMN_2694279	0.7621217	0.78255045	0.04556355	0.92636041	0.02912756	0.01002533	5.68794	5.696721053	5.694547059	5.621004545
6430527G18RIK	ILMN_2754183	0.13974324	0.66424425	0.02858616	0.17640457	0.00030636	0.00397781	5.60759	5.649342105	5.618372059	5.540731818
TRPC6	ILMN_2446212	0.92191975	0.71619721	0.02563041	0.62175009	0.03298053	0.0056644	5.624033333	5.621573684	5.632232353	5.557395455
GM362	ILMN_1222972	0.66428504	0.44599883	0.0342508	0.77150163	0.01049321	0.00192869	5.620813333	5.632378947	5.638714706	5.554177273
PCDHGA8	ILMN_2705452	0.86448939	0.97817948	0.03578371	0.83418737	0.03307592	0.03874447	5.78089	5.776236842	5.781673529	5.714854545
LOC620009	ILMN_2635082	0.46415035	0.22663146	0.03446288	0.52707304	0.00033295	0.00025567	5.591003333	5.607339474	5.618951471	5.525318182
LOC100043389	ILMN_1256414	0.33651119	0.7213683	0.01170848	0.42963795	0.00178557	0.00209377	5.668326667	5.691036842	5.675438235	5.602663636
SMARCA2	ILMN_1252932	0.68251403	0.88059928	0.01160248	0.53929361	0.01209175	0.02064582	5.619723333	5.630702632	5.616189706	5.554095455
A230066D03RIK	ILMN_2694557	0.74782694	0.6233261	0.03082403	0.87425008	0.03790339	0.032595	5.923233333	5.915707895	5.912572059	5.857631818
UTX	ILMN_2579537	0.89905619	0.98414172	0.04612245	0.85931279	0.02447713	0.01442723	5.6994	5.696263158	5.699866176	5.633977273

OLFR1230	ILMN_2662149	0.91334388	0.68532674	0.02142457	0.58031462	0.03000352	0.00449387	5.64594	5.643160526	5.655157353	5.580931818					
CREBZF	ILMN_1220787	0.64191023	0.56581421	0.03441167	0.23558574	0.00434827	0.04992517	5.673313333	5.683676316	5.660316176	5.608613636					
RARRES1	ILMN_2605971	0.95750188	0.51989413	0.04960964	0.43597227	0.0341128	0.00522452	5.584843333	5.583405263	5.601169118	5.52025					
D130050A01RIK	ILMN_1215837	0.85818244	0.65897013	0.00758375	0.79388925	0.01433698	0.01656402	5.641893333	5.638021053	5.632995588	5.577468182					
LOC382783	ILMN_1258648	0.79545382	0.83993882	0.02696047	0.91754593	0.01942506	0.00864141	5.531793333	5.538615789	5.536345588	5.467895455					
C430020E23RIK	ILMN_1221998	0.34147765	0.6328869	0.04174783	0.61859671	0.00272655	0.01621384	5.892203333	5.918694737	5.905788235	5.829490909					
ADAMTSL3	*ILMN_1239668*	*0.33183121*	*0.75723625*	*0.01454444*	*0.46400486*	*0.00409622*	*0.01295871*	*5.798876667*	*5.823873684*	*5.806304412*	*5.736231818*					
SCL0070954.1_214	ILMN_2425193	0.83860572	0.63897727	0.04612875	0.42983495	0.03311454	0.00513378	5.810163333	5.804763158	5.821651471	5.747618182					
PTCHD2	ILMN_1239751	0.98881206	0.86022771	0.04418891	0.85733836	0.0257898	0.01624929	5.826433333	5.826802632	5.830785294	5.763954545					
CNTN2	ILMN_1249156	0.66466561	0.52521167	0.02574904	0.83385971	0.00534851	0.00370346	5.713903333	5.724568421	5.729119118	5.651654545					
6720487G11RIK	ILMN_2649435	0.96481458	0.72365037	0.03056654	0.73355765	0.01492367	0.00837893	5.956016667	5.954921053	5.948966176	5.895059091					
SERPINB3D	ILMN_3009747	0.75326559	0.83609816	0.0413928	0.51010543	0.00875595	0.01225013	5.745123333	5.752734211	5.740894118	5.685531818					
CRAT	ILMN_1220786	0.40829488	0.94468035	0.04796514	0.39169148	0.01052467	0.0423267	5.918913333	5.942655263	5.92075	5.859636364					
4921522P10RIK	ILMN_1218156	0.55741306	0.51678788	0.04020993	0.90899286	0.02851827	0.0058245	5.777803333	5.795607895	5.792822059	5.719963636					
A830021M18	ILMN_2595299	0.84943491	0.92235962	0.04522046	0.8981181	0.02975733	0.01580216	5.659886667	5.664492105	5.661938235	5.602090909					
RTN2	ILMN_1250904	0.09150444	0.43211752	0.03209568	0.29505476	0.00103809	0.00721221	5.9209	5.963881579	5.939469118	5.864890909					
RPL10A	ILMN_2902115	0.82821072	0.71019462	0.00906988	0.87798018	0.01490853	0.01824741	14.66292333	14.65870789	14.65606176	14.60712273					
LOC382760	ILMN_2535747	0.925786	0.74325413	0.04228212	0.65721189	0.04681705	0.0425333	5.657563333	5.659857895	5.650822059	5.601886364					
4930543E05RIK	ILMN_2584057	0.63273143	0.91424409	0.03208089	0.64543484	0.02010738	0.01645552	5.678906667	5.690528947	5.681104412	5.6236					
5730599A22RIK	ILMN_1212946	0.44726235	0.9680857	0.04285622	0.410001	0.01256541	0.02652421	5.674163333	5.691197368	5.674958824	5.620590909					
UP IN GA AND REF ONLY																
Gene	ID	Medium vs. Reference Standard pval	Medium vs. GA pval	Medium vs generic pval	Reference Standard vs GA pval	Reference Standard vs generic pval	GA vs. generic pval	AVG Medium	AVG Reference Standard	AVG GA	AVG generic					
C130079K02RIK	ILMN_2568571	1.0414E-12	1.1619E-10	0.12810055	0.7257423	9.9884E-07	2.0124E-05	7.22574	7.544463158	7.531626471	7.306454545					
ALS2CL	ILMN_1240592	1.6747E-05	7.0707E-06	0.25292734	0.97285087	0.01087249	0.00804871	7.116023333	7.394581579	7.392775	7.205686364					
2810410P22RIK	ILMN_2692986	1.1279E-08	1.3379E-09	0.08032716	0.34642833	9.0516E-05	0.00016472	7.714383333	8.011573684	7.979019118	7.8124	Pattern Represented by Data:				
HNRNPK	ILMN_1245987	4.2889E-05	0.0002067	0.14135617	0.62563128	0.00414261	0.04211374	9.7988	10.07715	10.05100735	9.913459091					
TRAT1	ILMN_2652867	1.0482E-09	5.4608E-10	0.69415784	0.50002267	1.2723E-07	3.2593E-08	7.813176667	8.078084211	8.055941176	7.793545455		x	x		
LSG1	ILMN_1248340	2.0393E-05	7.6022E-07	0.82592388	0.63417702	0.00012591	1.5794E-05	7.035183333	7.257968421	7.277522059	7.047777273	x			x	
RAB6	ILMN_1242802	0.00019668	7.5901E-09	0.07535627	0.36917367	0.04400013	0.00031887	7.261916667	7.466060526	7.498622059	7.357177273	Medium	Reference	GA	generic	
ARLSA	ILMN_1221102	9.1695E-07	2.1307E-06	0.13976302	0.11920964	0.00069199	0.00618297	7.797843333	8.091231579	8.028401471	7.893445455					
OTTMUSG00000005523	ILMN_2847773	3.7941E-06	7.5561E-08	0.51643402	0.81925798	2.0548E-05	4.1116E-06	6.737806667	6.952839474	6.959511765	6.774009091					
RN18S	ILMN_2638923	3.9291E-05	0.00064196	0.43982461	0.09151301	4.1387E-05	0.00794885	9.738126667	10.04179474	9.958561765	9.800913636					
A830083H19RIK	ILMN_2565089	3.7726E-08	4.6077E-07	0.323377	0.13061191	3.8159E-07	5.705E-05	7.416416667	7.6885	7.635472059	7.464036364					
FYB	ILMN_1236105	6.7827E-06	3.1373E-05	0.4465201	0.88460871	0.00041176	0.00246862	8.031866667	8.256457895	8.250267647	8.0774					
PUM2	ILMN_2607160	1.8336E-07	1.0301E-10	0.36542615	0.56693674	7.7372E-05	1.2081E-06	8.49848	8.733373684	8.716505882	8.539704545					
SCL0002368.1_75	ILMN_1214650	0.00616283	0.0005403	0.80188852	0.60020322	4.8757E-05	2.2172E-05	8.83479	9.028768421	9.052716176	8.814618182					
COX7A1	ILMN_1240857	0.00033563	4.3239E-08	0.31458743	0.06118139	0.00565176	1.0553E-05	6.94444	7.100284211	7.161101471	6.989281818					
NPC2	ILMN_2744380	2.7328E-06	6.5811E-08	0.08296152	0.660283	0.00657288	0.00181981	9.368056667	9.561731579	9.575010294	9.4518					
SAMHD1	ILMN_1221736	1.42E-06	6.4508E-07	0.12355081	0.38603934	0.00010214	0.001305	11.84208667	12.07217895	12.04837794	11.93060909					

CLCN3	ILMN_1221919	1.3015E-06	1.9688E-06	0.16718214	0.93533936	0.00079195	0.00298329	8.224926667	8.427963158	8.430619118	8.2973					
PTPN1	ILMN_1222917	3.5773E-07	1.0659E-05	0.2605158	0.09805243	0.00013636	0.00362761	9.086276667	9.362913158	9.291763235	9.143836364					
CBFB	ILMN_2671644	4.8743E-05	9.4186E-07	0.09254946	0.5793726	0.00990408	0.00230623	6.44466	6.629710526	6.648410294	6.525068182					
58304S7O10RIK	ILMN_1249269	0.00519153	0.00019135	0.32586613	0.62425128	0.03910471	0.00652554	6.626373333	6.803589474	6.824932353	6.691472727					
HIST1H2AG	ILMN_2981801	0.00142037	4.2764E-06	0.50917287	0.18961423	0.01065852	0.00020154	9.87061	10.02252105	10.067625	9.906631818					
LOC383706	ILMN_2535779	0.0002793	1.6795E-06	0.19304026	0.25442323	0.01245228	0.00070261	8.164186667	8.320342105	8.360444118	8.219022727					
TPM4	ILMN_1223539	6.0659E-06	2.6052E-05	0.09185367	0.13528198	0.00233641	0.03571863	7.28479	7.536536842	7.481042647	7.387468182					
CYB5	ILMN_2775098	1.3396E-08	6.2407E-13	0.11624921	0.12052557	0.00013728	3.9171E-07	11.01746667	11.17962895	11.21147353	11.06824091					
TOP2A	ILMN_1255436	7.8911E-10	1.5724E-08	0.09369235	0.2373449	3.8714E-05	0.0009104	6.89295	7.115813158	7.084679412	6.964609091					
DCUN1D5	ILMN_1238285	4.1989E-06	1.8741E-06	0.38085229	0.37503555	0.00014453	0.00028909	9.349493333	9.563021053	9.534638235	9.392522727					
PPP1CB	ILMN_2647628	1.2809E-05	1.1607E-05	0.15887686	0.18184827	0.00454368	0.01745784	7.532633333	7.763778947	7.717295588	7.616245455					
PJA1	ILMN_2516312	4.7542E-05	5.5089E-05	0.13308991	0.46093695	0.00820313	0.03011249	6.55579	6.763297368	6.736463235	6.640472727					
CD247	ILMN_1256639	9.0935E-07	6.4865E-10	0.31335383	0.66967268	0.00164992	3.7917E-05	7.05133	7.215657895	7.226701471	7.088009091					
RNF8	ILMN_1214110	0.00010135	2.7576E-05	0.13291607	0.87304591	0.01603417	0.01952903	6.676843333	6.857478947	6.852086765	6.755077273					
TRMT2A	ILMN_2682887	0.00340732	0.00028594	0.4813778	0.79961073	0.02046512	0.00569351	6.52321	6.684289474	6.694272059	6.565359091					
ARL1	ILMN_1219577	2.543E-06	5.3093E-06	0.06285512	0.25217896	0.00175704	0.01808582	9.743456667	9.9474	9.913035294	9.828659091					
4930539E08RIK	ILMN_1238069	3.2079E-08	9.7942E-09	0.46735317	0.79033315	4.0625E-05	2.1668E-05	6.088663333	6.262042105	6.255341176	6.113204545					
CXCR6	ILMN_1221846	0.00019423	3.5807E-05	0.36711411	0.85413772	0.00840588	0.00451855	6.669376667	6.827515789	6.833716176	6.712486364					
TMPO	ILMN_2471359	0.00015384	1.421E-06	0.14493158	0.81398681	0.01799086	0.00261013	8.46599	8.623305263	8.629933824	8.530504545					
IRF1	ILMN_2649068	0.01825352	0.00874502	0.94796386	0.90430421	0.00483582	0.00588889	10.31889	10.48616842	10.48073382	10.32447727					
ACTN4	ILMN_1242390	0.00434152	0.00106316	0.92917511	0.91918226	0.00736922	0.00310551	6.448333333	6.604534211	6.608894118	6.453640909					
WDR45L	ILMN_1242852	0.00013965	1.0141E-05	0.43961482	0.89370272	0.00725724	0.00195908	7.205136667	7.360331579	7.364545588	7.240713636					
ZFP281	ILMN_2477243	1.384E-06	4.3216E-06	0.31887263	0.18984517	0.00017162	0.00180339	8.814456667	9.007431579	8.973852941	8.863868182					
D6WSU163E	ILMN_1224433	1.1635E-07	2.4898E-06	0.07027231	0.16479956	0.00204457	0.02558607	6.423556667	6.621960526	6.581777941	6.499395455					
NUDCD2	ILMN_2751228	0.00217462	0.00235538	0.48810666	0.50655725	0.0233342	0.0387743	6.944946667	7.134152632	7.101964706	6.987381818					
H2-T23	ILMN_1223179	0.00482755	0.00049264	0.38544903	0.66476091	0.02352203	0.01043158	10.62381	10.76490263	10.77933382	10.67458636					
LOC667005	ILMN_1217929	0.0009143	0.0005654	0.74360086	0.73765156	0.00089637	0.00061251	6.864946667	7.033302632	7.019588235	6.847404545					
EIF3B	ILMN_1233746	0.00075977	0.00017974	0.33823268	0.86933151	0.01259048	0.00993988	6.22973	6.388731579	6.382969118	6.276936364					
ELAC2	ILMN_1255921	0.00132668	0.00012916	0.6032269	0.9503948	0.00866596	0.00232593	6.199506667	6.348668421	6.350842647	6.22455					
GTL7	ILMN_2753314	3.0675E-06	4.5499E-06	0.25763463	0.16521499	8.345E-05	0.00064529	7.284363333	7.47345	7.434189706	7.326722727					
LOC100046320	ILMN_1243283	0.00063385	0.00074976	0.29556725	0.41378961	0.01538515	0.03606488	7.5542	7.737257895	7.703685294	7.607563636					
PARP14	ILMN_2825803	9.76E-07	3.9082E-06	0.37203432	0.48900922	9.7791E-05	0.00095472	10.98116	11.14566053	11.12864853	11.01771364					
PK3	ILMN_1236323	5.8275E-05	1.9145E-06	0.16833572	0.7021492	0.02913291	0.00742425	6.16902	6.306352632	6.316370588	6.225122727					
ZZZ3	ILMN_2432040	0.00149654	5.4024E-06	0.37814398	0.23151332	0.04634003	0.00172821	6.03378	6.146386842	6.180801471	6.068531818					
LOC100041450	ILMN_1242660	0.00015681	1.4503E-06	0.39312239	0.21407306	0.00499112	0.00029809	6.805983333	6.921857895	6.952891176	6.835990909					
WAPAL	ILMN_1242714	3.611E-05	3.0184E-05	0.15289192	0.67266295	0.00959341	0.02197082	6.27658	6.434936842	6.423070588	6.340836364					
8030402P03RIK	ILMN_2585137	0.00222271	7.3726E-05	0.58637315	0.43338243	0.0221549	0.00251287	7.633246667	7.750686842	7.775892647	7.655845455					
A630098G22RIK	ILMN_2582171	0.00029974	0.00015681	0.1752775	0.42699241	0.02148483	0.03714721	6.98317	7.150939474	7.12385	7.044545455					
CSF1	ILMN_1254561	1.5202E-07	5.7675E-06	0.11168983	0.10721403	0.00070307	0.01305309	6.24299	6.430692105	6.383498529	6.296836364					
FBXO33	ILMN_3162369	0.00013886	5.8078E-07	0.32151153	0.50625039	0.01673252	0.00095505	8.757316667	8.881023684	8.897601471	8.793440909					
SLCO3A1	ILMN_1235635	0.00091878	0.00020402	0.73099413	0.98590452	0.00492862	0.00245818	6.011396667	6.150071053	6.150582353	6.029604545					
PDLIM1	ILMN_1234072	0.00441381	3.9934E-05	0.85438667	0.23205806	0.00405604	7.2635E-05	9.389206667	9.494944737	9.528047059	9.380759091					
2810008M24RIK	ILMN_2486600	0.00019745	8.1149E-06	0.35285462	0.83709923	0.00372931	0.0008125	9.577263333	9.719655263	9.714169118	9.612672727					
1700025G04RIK	ILMN_2669982	7.5215E-06	1.3381E-05	0.11339445	0.35621273	0.00115884	0.01167827	7.13209	7.290965789	7.268439706	7.1935					
BCL11B	ILMN_2443624	0.00151871	0.00185206	0.07205	0.62583244	4.592E-06	2.4442E-06	7.475326667	7.627081579	7.608722059	7.374281818					
D630022O22RIK	ILMN_1223311	2.8672E-05	3.4869E-05	0.34002484	0.8660441	0.00303608	0.00610448	6.197413333	6.334594737	6.330180882	6.235186364					
DMBT1	ILMN_2629239	2.5255E-05	9.8683E-06	0.1748778	0.87879249	0.02845532	0.02205192	5.65465	5.791228947	5.787077941	5.706268182					

MAD2L1BP	ILMN_2815222	0.00121644	1.3699E-06	0.44549374	0.28915968	0.00745121	4.4145E-05	9.83867	9.946563158	9.970585294	9.864663636					
IRF1	ILMN_2649067	0.03891771	0.02683732	0.92833492	0.67341484	0.01119362	0.01531716	10.39029333	10.53875526	10.52146618	10.39822727					
ETS1	ILMN_2770739	0.00142024	0.00354497	0.73817964	0.38828425	0.00409338	0.01680685	7.680986667	7.843268421	7.811420588	7.700831818					
1810013L24RIK	ILMN_1260569	2.4971E-08	2.6034E-06	0.12129405	0.12545508	0.00010235	0.00816545	7.528863333	7.691768421	7.658367647	7.581836364					
TQR1A	ILMN_2631144	0.00079779	4.7212E-05	0.26557048	0.55002378	0.04165822	0.01080278	7.383143333	7.495473684	7.511541176	7.425604545					
TRAT1	ILMN_1229005	0.00316669	0.00029995	0.61937322	0.72738376	0.00275379	0.00019498	6.647076667	6.785913158	6.773917647	6.622813636					
PA8PC1	ILMN_1259769	0.0022435	0.01046226	0.93750313	0.16988432	0.00195638	0.01372953	6.85638	7.040826316	6.981691176	6.861254545					
H2AFZ	ILMN_3074985	0.00047158	0.00010411	0.11786485	0.88692979	0.04992566	0.04165536	11.80579667	11.93475	11.93059412	11.86225909					
ZDHHC21	ILMN_2780619	0.00667387	0.00033365	0.79075136	0.49723618	0.01966091	0.00240347	8.437696667	8.5418	8.562170588	8.449168182					
ZNF24	ILMN_2518828	0.02139095	0.00040401	0.60212275	0.12398231	0.00488301	0.00018603	6.048016667	6.124986842	6.171314706	6.028518182					
ZWILCH	ILMN_1247268	0.00055985	0.00060993	0.30541403	0.63014295	0.0312265	0.04621727	6.168553333	6.305978947	6.289795588	6.210068182					
AP1B1	ILMN_1244906	4.3529E-05	2.9383E-06	0.12513979	0.80871339	0.02329204	0.01323394	10.82644667	10.95238421	10.94691618	10.87835					
2500002A22RIK	ILMN_1255902	9.8228E-05	0.00127233	0.74738135	0.31074683	0.00087637	0.01057522	6.55427	6.705039474	6.673707353	6.569454545					
LOC380707	ILMN_1252450	0.00124251	0.00177855	0.96350441	0.79424307	0.00145428	0.00344935	9.90633	10.03282105	10.02428529	9.90435					
TNP2	ILMN_1224330	7.3765E-05	0.00016167	0.33030804	0.23292724	0.00444441	0.01925874	5.844083333	5.988826316	5.958627941	5.884845455					
GTF3C5	ILMN_1222243	0.00595051	0.00011146	0.62796493	0.40463604	0.04041016	0.00293892	5.814863333	5.905071053	5.927685294	5.83125					
HIST1H2AK	ILMN_2847144	0.00191935	0.00510824	0.88061755	0.40918381	0.00262265	0.00692814	12.67005667	12.80842105	12.78147206	12.66135909					
RNGTT	ILMN_2750669	0.01282445	0.00231609	0.92980705	0.74261519	0.01661577	0.00521343	6.190413333	6.291310526	6.301817647	6.194254545					
VPS37B	ILMN_2681670	0.00743656	0.00177168	0.27175517	0.93678492	8.9645E-05	1.7425E-05	10.44526333	10.55398421	10.55639412	10.39754091					
F830048D03RIK	ILMN_2584985	0.03575523	0.00171988	0.63764888	0.39373185	0.0150219	0.00078959	6.689073333	6.771521053	6.799188235	6.670236364					
USF1	ILMN_2435505	0.01387975	0.00989901	0.65814913	0.85098378	0.04125975	0.04710474	6.804973333	6.921971053	6.914854412	6.826927273					
HEATR3	ILMN_2590644	0.00803221	0.00032825	0.79171755	0.61386053	0.0146601	0.00098646	5.744316667	5.838378947	5.853311765	5.734418182					
STIL	ILMN_2654075	0.03620021	0.00033133	0.81325368	0.13467102	0.04079275	0.00081181	5.61879	5.685102632	5.726732353	5.610486364					
FEM1C	ILMN_2724409	0.00034431	6.9389E-05	0.25027131	0.50109871	0.01172099	0.01132166	7.96895	8.091639474	8.076245588	8.010295455					
EG666756	ILMN_1214902	9.4507E-05	0.00038474	0.46314729	0.26744158	0.0047458	0.01824865	10.67756	10.81662632	10.78483529	10.70416364					
PI8F1	ILMN_3115640	5.5587E-05	0.00037181	0.24993336	0.14445566	0.00447915	0.04489547	6.849893333	6.993676316	6.956576471	6.895045455					
MX2	ILMN_1239219	0.00686125	0.01088913	0.85986592	0.67417553	0.00478334	0.01069715	7.97713	8.098521053	8.082936765	7.968677273					
CHIC2	ILMN_2548974	0.00042825	0.00015318	0.26003101	0.55024362	0.0254452	0.02958371	8.378606667	8.498828947	8.484154412	8.42045					
EIF4E3	ILMN_1254878	6.5566E-05	0.00250945	0.62069091	0.07082806	2.8753E-06	0.00041643	8.776916667	8.931847368	8.881707353	8.754254545					
RPL37	ILMN_1236446	0.00025435	0.00033519	0.28168683	0.5589165	0.01021126	0.02406462	5.6613	5.780355263	5.765086765	5.696131818					
ELF1	ILMN_2659380	0.01484891	0.00118441	0.71387567	0.90392318	0.00695924	0.0003911	10.33958333	10.43980263	10.44328824	10.32341818					
BAT2D	ILMN_1221890	0.00153674	0.00016834	0.83076219	0.57605882	0.01061237	0.00260791	5.830226667	5.947547368	5.932069118	5.837931818					
4930404F20RIK	ILMN_1222969	0.03606049	0.00017185	0.74319886	0.13910106	0.01617178	7.3937E-05	6.658073333	6.724336842	6.759348529	6.646877273					
LOC100044190	ILMN_1214731	2.7461E-05	0.00181642	0.98810296	0.06033325	0.00020412	0.00651301	10.56954667	10.72565263	10.67076618	10.57017273					
EPSTI1	ILMN_2707865	0.00714158	0.00148007	0.54805412	0.6847784	0.03639476	0.01986918	8.180176667	8.271594737	8.281332353	8.206504545					
GPI1	ILMN_2692845	3.3041E-06	0.00011199	0.15411737	0.19309211	0.00293692	0.04703852	11.68305667	11.81179474	11.7829	11.72728182					
4930422G04RIK	ILMN_1243091	8.401E-05	6.9798E-05	0.15352672	0.77267008	0.0350024	0.04869989	5.690713333	5.795713158	5.789577941	5.735836364					
RBM14	ILMN_1245292	0.00183636	0.00193788	0.68916475	0.4886926	0.02807555	0.03388096	6.059196667	6.178389474	6.157111765	6.07645					
4932413O14RIK	ILMN_2620757	0.01270668	0.0007843	0.99548386	0.49086007	0.02165455	0.00245108	5.634773333	5.714357895	5.731648529	5.634990909					
CD247	ILMN_2828172	0.00958744	0.00201477	0.45933339	0.79127474	0.00553886	0.0007173	6.427023333	6.531918421	6.523489706	6.396290909					
CCR4	ILMN_2753620	0.00177622	0.00061868	0.4406932	0.73586934	0.01810352	0.01615626	5.72549	5.829228947	5.821095588	5.752877273					
ZFP800	ILMN_2760387	0.04480805	0.00759965	0.96768543	0.66232646	0.0439818	0.01013543	6.687236667	6.769447368	6.782586765	6.685263636					
PABPC1	ILMN_1259482	0.0051572	0.01388147	0.65525326	0.32541653	0.00273095	0.00614701	11.55015	11.68038684	11.64491176	11.52837273					
D230021E06RIK	ILMN_2569706	0.00010271	0.01070314	0.9348866	0.06633293	0.00010871	0.01978193	7.510763333	7.665360526	7.605245588	7.514104545					
SELP	ILMN_1236889	0.01406867	0.00584443	0.93796259	0.92591209	0.01055048	0.00863713	6.475836667	6.566694737	6.569254412	6.479186364					
TSPAN14	ILMN_1257666	0.00061062	0.00216339	0.99188664	0.60003335	0.00126308	0.00571973	9.755656667	9.861615789	9.848317647	9.756059091					
V1RD18	ILMN_2996714	0.00099989	0.0004902	0.37184256	0.6093331	0.03905787	0.03999169	5.599066667	5.703860526	5.691057353	5.629445455					

CD226	ILMN_1239753	0.02617792	0.0085975	0.67900654	0.92593282	0.01934392	0.00559696	6.903246667	6.998228947	6.995114706	6.884318182				
Mgeneric	ILMN_2600747	0.00319955	0.00125226	0.58571513	0.92151197	0.01556138	0.01370846	6.73558	6.829271053	6.826967647	6.755563636				
2310016C16RIK	ILMN_2625854	3.9344E-05	0.00163272	0.43628849	0.21148103	0.00116785	0.03547309	5.732096667	5.854347368	5.823288235	5.757786364				
DCK	ILMN_1227664	0.00517605	0.01848588	0.33692279	0.39324205	0.00049553	0.00171677	6.626113333	6.746452632	6.716342647	6.582109091				
PCDHGC5	ILMN_1216284	0.01210252	0.00288881	0.98226502	0.82693245	0.01542338	0.00581701	5.98469	6.068434211	6.074589706	5.985395455				
UBE2Z	ILMN_2774701	0.00426506	0.00357869	0.89775508	0.80203901	0.022089	0.01972205	6.080933333	6.175294737	6.168729412	6.086440909				
PLXNC1	ILMN_2756855	0.01321326	0.00998082	0.78883167	0.86528989	0.04381295	0.04278646	6.419863333	6.511336842	6.506238235	6.43105				
PSEN2	ILMN_1213684	0.01895622	0.00566864	0.83989169	0.98646115	0.04301241	0.01934652	5.908983333	5.994313158	5.994827941	5.915718182				
STAT3	ILMN_2698046	0.00095336	0.01157294	0.81522619	0.3037877	0.00344755	0.03930058	10.98784	11.10429737	11.07339706	10.99688182				
LOC628101	ILMN_1213707	0.00453303	0.01110885	0.64564729	0.49430888	0.00478312	0.0087798	6.481883333	6.588642105	6.566361765	6.46445				
GREM2	ILMN_2610565	0.00346819	0.01123909	0.95978367	0.56150385	0.01144908	0.03120142	5.9519	6.052036842	6.035844118	5.954177273				
INPP4B	ILMN_2854354	0.00012106	0.00458166	0.83008294	0.21443605	0.00079144	0.02082426	6.231216667	6.344565789	6.313639706	6.238772727				
NEO1	ILMN_2579266	0.01189531	0.00236594	0.71275327	0.7455244	0.00354704	0.00090115	6.07765	6.151984211	6.158933824	6.063904545				
1700027N10RIK	ILMN_2775220	0.00878236	0.00099032	0.9594418	0.72932359	0.00772044	0.0015392	6.36718	6.440963158	6.448286765	6.3687				
ZFP277	ILMN_3123889	0.04468996	0.00408357	0.39928703	0.45621364	0.00600161	0.00041052	9.87083	9.932757895	9.951282353	9.841213636				
GNL3L	ILMN_2628122	0.00429356	0.01688285	0.85338166	0.39327272	0.00793186	0.04103683	7.609203333	7.714147368	7.689342647	7.616795455				
LOC100047009	ILMN_1246359	0.00164613	0.00453357	0.61582849	0.52198033	0.00057928	0.00211572	5.947723333	6.043807895	6.027170588	5.933				
PPP2R5C	ILMN_3121851	0.01210035	0.02598793	0.95302246	0.32515628	0.00682318	0.02551996	9.96416	10.07191842	10.04338529	9.967009091				
LOC235279	ILMN_1231838	0.00223763	0.00052051	0.81148295	0.91497115	0.01510458	0.00593565	5.738703333	5.820126316	5.817807353	5.745463636				
PLEKHF2	ILMN_1237736	0.00350806	0.01090006	0.9737767	0.27106774	0.00144929	0.0102796	8.16861	8.274002632	8.246895588	8.169977273				
IL1F10	ILMN_2776687	0.02678693	0.01379049	0.98525412	0.8846595	0.04957327	0.02966918	5.98729	6.069436842	6.065126471	5.986545455				
3202002H23RIK	ILMN_1236031	0.012129	0.00929094	0.48343497	0.66619054	0.00157159	0.00099074	6.4492	6.538394737	6.526935294	6.422209091				
LOC381093	ILMN_2530674	0.00372577	0.0023124	0.52468466	0.96763521	0.00230893	0.00130578	5.809203333	5.883715789	5.884635294	5.790786364				
KRT25	ILMN_1216096	0.01355793	0.01365971	0.87932854	0.63501661	0.04168391	0.04618658	5.72627	5.813852632	5.800451471	5.73225				
VMN2R81	ILMN_2628699	0.02332927	0.00229665	0.93674625	0.54937737	0.03453944	0.00528818	5.918906667	5.979321053	5.992120588	5.916390909				
FERD3L	ILMN_2724181	0.03286624	0.03206173	0.70598361	0.75164834	0.01726187	0.01719805	5.81418	5.896818421	5.887038235	5.798140909				
TELO2	ILMN_2734797	0.0108678	0.04103188	0.55549441	0.40519113	0.00323971	0.01260482	5.800226667	5.898847368	5.872701471	5.773190909				
9430077D24RIK	ILMN_2524699	0.00316978	0.0424885	0.63122432	0.12110196	0.00016075	0.00868908	7.0186	7.135728947	7.091011765	6.99615				
SLC30A8	ILMN_2686369	0.0253593	0.01188287	0.80331462	0.70604595	0.01856982	0.01145844	5.580283333	5.643439474	5.652214706	5.570672727				
TRAPPC2	ILMN_2438032	0.01282766	0.01676372	0.99034693	0.79056547	0.01686696	0.02889083	5.7618	5.839247368	5.832552941	5.76225				
C920025C15RIK	ILMN_1242664	0.02515697	0.04181796	0.12481528	0.5543993	0.00096575	0.00086594	6.85869	6.949318421	6.929292647	6.796427273				
KLRA1	ILMN_1228875	0.02104319	0.01529111	0.93569553	0.61116955	0.02579361	0.01955059	5.763913333	5.846684211	5.833513235	5.760622727				
EG386506	ILMN_1225532	0.04437272	0.01953425	0.73579779	0.72119617	0.03362092	0.01716204	5.675066667	5.7339	5.743238235	5.663213636				
LOC383306	ILMN_1235357	0.00064604	0.02120781	0.95855356	0.08386092	0.00135323	0.04001091	5.85391	5.963960526	5.920935294	5.8559				
VMN2R89	ILMN_3151786	0.03333773	0.04372519	0.84476292	0.56837775	0.03041009	0.03866243	6.176576667	6.259428947	6.242405882	6.168013636				
LOC244219	ILMN_2525856	0.04252735	0.01750244	0.53751488	0.82500131	0.01480124	0.00572124	5.892636667	5.952907895	5.958372059	5.870513636				
2610017G09RIK	ILMN_1226459	0.04624861	0.02993806	0.9979677	0.97839313	0.03804994	0.03562141	5.774383333	5.840123684	5.839426471	5.774468182				
LOC386161	ILMN_1257961	0.01004863	0.01316793	0.8190764	0.81316945	0.03227347	0.04815364	5.588033333	5.657231579	5.651886765	5.595286364				
NCDN	ILMN_2664579	0.03426609	0.01693101	0.92950627	0.99318281	0.04983082	0.02838848	5.806293333	5.869863158	5.869651471	5.803568182				
SLFN9	ILMN_2688948	0.03258343	0.02920921	0.83629845	0.65028956	0.03356424	0.04711832	5.536233333	5.60855	5.597972059	5.544027273				
LOC331243	ILMN_1253944	0.00105068	0.00696807	0.97390244	0.58001583	0.00537133	0.02036766	5.580336667	5.652857895	5.641372059	5.5795				
RAB33A	ILMN_3161828	0.04160855	0.04651985	0.29324892	0.9090289	0.00477561	0.00425553	6.031763333	6.095615789	6.092541176	5.987954545				
DTYMK	ILMN_2485787	0.00312723	0.00303143	0.72728489	0.54586584	0.01398598	0.01946506	10.10785	10.17909737	10.16820147	10.11717727				
LOC100040244	ILMN_1260579	0.0088602	0.02095795	0.5320051	0.32021835	0.00502459	0.00671978	7.19639	7.280847368	7.256533824	7.172322727				
OS9	ILMN_1246758	0.00188503	0.02323417	0.95367604	0.08759446	0.00146045	0.02295013	9.561276667	9.660952632	9.621010294	9.559304545				
D630011N09RIK	ILMN_2580554	0.04588181	0.01333751	0.76433191	0.86628684	0.03089735	0.00916026	5.565416667	5.621328947	5.624910294	5.555445455				
A930014D08RIK	ILMN_2519658	0.04862709	0.01498476	0.74061877	0.7386258	0.0170917	0.00652842	5.644493333	5.696589474	5.703229412	5.633840909				

MYNN	ILMN_1213772	0.00589596	0.01126549	0.76960806	0.4883202	0.01670393	0.04081575	5.760286667	5.832828947	5.818648529	5.768645455				
SPNB2	ILMN_2681429	0.03267873	0.0349451	0.49423396	0.92906641	0.01836448	0.01653158	5.695196667	5.750415789	5.752666176	5.672931818				
RNF19A	ILMN_2424138	0.0259662	0.04860412	0.53804451	0.25096391	0.00393592	0.00418054	5.905073333	5.992334211	5.962323529	5.879622727				
ARHGAP25	ILMN_3155245	0.02952979	0.01730665	0.60251038	0.38148931	0.02198482	0.00694113	10.10459	10.18453947	10.16155	10.08619091				
LOC383433	ILMN_2539526	0.00473651	0.0187802	0.91590057	0.64902958	0.02373968	0.04650456	5.61099	5.677026316	5.666641176	5.608054545				
MIER2	ILMN_2671319	0.03613669	0.02398398	0.47986764	0.80556556	0.00582487	0.00297359	5.829166667	5.889905263	5.884575	5.805927273				
PDIA2	ILMN_1215125	0.0186685	0.04238035	0.70955857	0.4244174	0.02026283	0.03357452	5.79263	5.866986842	5.846214706	5.779913636				
LOC384990	ILMN_1218114	0.01136297	0.03540832	0.83208315	0.45193952	0.003319	0.02169003	5.856243333	5.924778947	5.908864706	5.849868182				
LOC100043391	ILMN_2740432	0.00959432	0.04663032	0.43800025	0.3030988	0.00112178	0.00605758	14.24296667	14.31736842	14.29466324	14.21495				
LOC100040854	ILMN_1217820	0.03261636	0.03232909	0.2727063	0.8371501	0.00291635	0.00500885	5.568043333	5.614126316	5.618561765	5.542736364				
PIGN	ILMN_2547482	0.03645627	0.02601854	0.55141309	0.68930771	0.01330125	0.00653214	5.77965	5.838668421	5.830154412	5.7613				
BAZ1B	ILMN_1246235	0.01404517	0.02132842	0.89259619	0.42310216	0.02518395	0.03234624	5.625716667	5.692768421	5.676020588	5.621545455				
TTLL4	ILMN_1251995	0.00921362	0.04352022	0.7539064	0.30450795	0.00888912	0.03336755	5.922753333	5.996405263	5.973054412	5.912381818				
DHX32	ILMN_2643150	0.00899502	0.04951511	0.90818198	0.19188292	0.00936406	0.04943437	8.92933	9.010481579	8.979463235	8.9256				
D4ERTD22E	ILMN_3129206	0.00192543	0.01707086	0.94525616	0.21973825	0.0067388	0.03501916	11.32444333	11.39864211	11.37389118	11.32272727				
LOC100048816	ILMN_1253242	0.00639681	0.04549597	0.78877209	0.13429775	0.01189648	0.04792802	5.880436667	5.965505263	5.928376471	5.871918182				
GPC3	ILMN_1223663	0.01242117	0.04025834	0.88584774	0.46797688	0.01128409	0.04270041	5.648313333	5.711607895	5.695651471	5.644954545				
LOC384585	ILMN_1243863	0.00455984	0.03457727	0.86533679	0.20462142	0.00645194	0.03772185	5.716866667	5.787997368	5.764117647	5.711304545				
OLFR701	ILMN_2652694	0.01859231	0.04898341	0.71727788	0.20308366	0.01606462	0.02786974	5.69437	5.76715	5.738292647	5.683054545				
FANCA	ILMN_1220189	0.01861672	0.04654276	0.80570207	0.33726393	0.01436508	0.03325718	5.56208	5.625584211	5.605772059	5.55515				
DOWN IN GA AND REF ONLY															
Gene	ID	Medium vs. Reference Standard pval	Medium vs. GA pval	Medium vs generic pval	Reference Standard vs GA pval	Reference Standard vs generic pval	GA vs. generic pval	AVG Medium	AVG Reference Standard	AVG GA	AVG generic				
LOC386360	ILMN_2538531	0.00181273	1.3056E-06	0.24179742	0.0610866	0.04766182	0.00051103	9.76067	9.543934211	9.445438235	9.669977273				
CLEC4E	ILMN_1216972	2.3876E-08	1.7989E-08	0.29133177	0.07208954	0.00010585	0.0003322	7.003983333	6.697260526	6.759897059	6.9338				
LOC385923	ILMN_1230140	0.00232668	9.8497E-06	0.8804496	0.35734588	0.00115913	5.7017E-06	7.89017	7.690592105	7.650747059	7.901590909	Pattern Represented by Data:			
CSF3R	ILMN_2806180	2.7194E-06	2.4676E-08	0.19435996	0.76560322	0.0026131	0.00034547	6.042593333	5.823492105	5.813885294	5.969613636				
CD33	ILMN_2675223	2.2572E-09	2.9811E-09	0.33332323	0.1662516	1.4979E-05	4.5287E-05	6.606853333	6.339052632	6.381583824	6.556072727	x			x
CD63	ILMN_3128907	9.5785E-05	4.5504E-06	0.45437477	0.96599518	0.00297745	0.00067862	7.70484	7.482515789	7.484204412	7.655954545		x	x	
CXCR4	ILMN_2630459	4.1663E-07	2.3331E-05	0.45822739	0.18369107	0.00035307	0.00513661	9.36576	9.097465789	9.153819118	9.316654545	Medium	Reference	GA	generic
AA536749	ILMN_1219077	3.0901E-09	1.3456E-08	0.05492684	0.82199671	0.00023116	0.00109256	8.959366667	8.7437	8.750286765	8.878977273				
LOC386268	ILMN_1222988	0.01901637	8.0896E-05	0.68455591	0.20419658	0.03236315	0.00019971	6.859343333	6.705134211	6.655375	6.828495455				
genericLS	ILMN_1250635	3.8814E-05	9.224E-09	0.20940988	0.18069393	0.04229329	0.00085164	6.407056667	6.252378947	6.211517647	6.348690909				
GAS7	ILMN_2776850	2.885E-06	1.1438E-06	0.57560127	0.92740131	3.9705E-05	7.8795E-05	6.87571	6.687760526	6.685158824	6.846809091				
KLC4	ILMN_1251301	3.9151E-08	6.9555E-10	0.11394085	0.84620847	0.00191252	0.00057061	7.976776667	7.781668421	7.786357353	7.905563636				
LOC386288	ILMN_1257784	0.00018847	2.9332E-05	0.10460219	0.96832317	0.04254328	0.04594179	7.19565	7.004444737	7.005695588	7.089990909				
TMEM38B	ILMN_2795791	7.3219E-07	5.9395E-09	0.11760121	0.64020611	0.00382771	0.00044923	8.486633333	8.312155263	8.299532353	8.423818182				
GPR97	ILMN_2666492	1.0298E-05	1.0795E-06	0.21424248	0.68491315	0.00420588	0.00173932	6.329983333	6.156044737	6.1434	6.272113636				
1100001G20RIK	ILMN_2651743	7.7433E-06	9.2446E-06	0.22896225	0.53871344	0.00090228	0.003214	6.425286667	6.217157895	6.238989706	6.366827273				
APP	ILMN_2597532	1.7379E-06	1.9127E-07	0.05632768	0.77600634	0.00436728	0.00412349	7.13296	6.940878947	6.949335294	7.052945455				
4930572J05RIK	ILMN_3065373	0.00456602	2.5099E-05	0.4441944	0.51657983	0.04071292	0.00142629	10.59237333	10.43747105	10.41293676	10.54924091				

TGIF1	ILMN_1253854	0.00085305	0.0001751	0.50991015	0.83268919	0.01215416	0.00643797	8.40255	8.232644737	8.224369118	8.362318182					
LOC243025	ILMN_1252253	2.0739E-06	5.102E-08	0.06597363	0.73849896	0.00691368	0.00206398	6.799403333	6.631713158	6.622926471	6.726436364					
SEC16A	ILMN_1225772	0.00012188	2.5231E-08	0.05001367	0.22328973	0.04852839	0.00083133	10.14415	10.00321316	9.968227941	10.07729545					
BC014795	ILMN_2769945	1.4506E-06	1.478E-07	0.35494542	0.92186409	0.00060141	0.00020323	8.22279	8.047292105	8.050194118	8.188168182					
CFB	ILMN_1230853	6.1942E-05	0.00013352	0.2759896	0.2823461	0.00114292	0.01184922	6.413743333	6.207484211	6.243664706	6.349068182					
TMEM63A	ILMN_2798340	0.00011542	4.0037E-06	0.07854127	0.31886993	0.02885688	0.00527756	7.836176667	7.698636842	7.666680882	7.774609091					
DNMT3L	ILMN_1250149	0.00021396	7.511E-08	0.48180823	0.13801656	0.01177344	8.1017E-05	6.21078	6.081707895	6.041905882	6.181622727					
ACBD4	ILMN_3150296	0.00022203	1.2757E-06	0.18507885	0.38884459	0.02730026	0.00201988	9.321576667	9.179684211	9.154017647	9.266631818					
ORF19	ILMN_3158633	5.1394E-07	1.0611E-06	0.06272749	0.28478638	0.00249543	0.01548046	7.046476667	6.849634211	6.879329412	6.964309091					
CREG1	ILMN_1239638	8.3906E-06	1.5062E-07	0.37545788	0.90170705	0.00119168	0.0001639	6.78207	6.618634211	6.615505882	6.743304545					
IRAK3	ILMN_1253972	0.00018087	8.6222E-05	0.25300401	0.72925351	0.01665379	0.01352798	9.18481	9.031655263	9.019070588	9.132704545					
BC065397	ILMN_2869654	5.8289E-06	2.9074E-06	0.05466237	0.80709989	0.01166877	0.01821551	6.624853333	6.452586842	6.459883824	6.546759091					
ARHGAP22	ILMN_2672380	8.7659E-06	5.3864E-07	0.05463559	0.27068336	0.02221169	0.03255185	6.35587	6.161063158	6.192420588	6.264263636					
GAA	ILMN_1254199	1.1907E-06	3.8671E-07	0.14151281	0.70576013	0.00943593	0.00878139	8.179186667	8.011515789	8.021354412	8.115145455					
LOC386117	ILMN_1218079	0.00217917	2.8431E-05	0.31341623	0.75826076	0.03529147	0.00332384	7.206693333	7.060794737	7.051636765	7.15335					
5031414D18RIK	ILMN_2615575	2.2017E-05	3.7127E-05	0.24787785	0.9464672	0.00974156	0.01414106	8.621983333	8.465123684	8.467298529	8.571345455					
IRF3	ILMN_1229320	8.0674E-05	1.5322E-05	0.40245934	0.38917543	0.00154207	0.00103721	7.902646667	7.720826316	7.748907353	7.866604545					
IGLC2_J00595_IG_LAMBDA_CONSTANT_2_14	ILMN_2450155	8.1454E-07	7.2825E-07	0.98555987	0.93707531	5.8297E-05	3.3669E-05	13.84993333	13.69477895	13.69675147	13.85070455					
BRD2	ILMN_3154409	0.00021378	1.1794E-06	0.09233986	0.62874756	0.04587142	0.00585275	11.40748667	11.26870789	11.25570735	11.342					
SRGAP2	ILMN_1222560	6.0142E-09	4.0425E-08	0.05538136	0.10209811	0.00051292	0.00630075	7.94865	7.758986842	7.797158824	7.879281818					
ZFP36L1	ILMN_2780424	6.2241E-05	2.4506E-07	0.63044859	0.30875858	0.0058726	0.00015962	13.96748	13.84238684	13.81608971	13.94897273					
MYO7A	ILMN_1251839	8.979E-06	6.8094E-06	0.06035726	0.44757884	0.01254915	0.02940651	6.819533333	6.64505	6.668164706	6.745968182					
LOC382163	ILMN_1237356	2.9941E-05	2.225E-05	0.06972901	0.30757834	0.00973088	0.03865672	6.892846667	6.712444737	6.742497059	6.811872727					
LOC238836	ILMN_2527694	2.3899E-06	1.1057E-08	0.13215153	0.90529614	0.00214514	0.00019416	13.98839	13.84113421	13.83827941	13.94409091					
HRSP12	ILMN_2610706	0.00047897	0.0002885	0.19803657	0.65976628	0.02506249	0.04300314	8.18713	8.021755263	8.037048529	8.120886364					
GPS2	ILMN_2730784	0.00044751	1.5958E-06	0.43507479	0.41816214	0.00636587	0.00016543	9.44959	9.323986842	9.303297059	9.419718182					
DLG3	ILMN_2993836	0.00012475	9.253E-05	0.32562186	0.49309223	0.00131486	0.00415595	7.168773333	7.001178947	7.022592647	7.125568182					
2810402K13RIK	ILMN_2455390	6.7186E-08	2.1923E-05	0.09137556	0.16734358	0.00163011	0.03908702	8.3151	8.126965789	8.169489706	8.250713636					
SHC1	ILMN_2957070	9.8671E-06	9.7326E-08	0.23663892	0.32993882	0.00455799	0.00031763	11.17267667	11.05177105	11.02947353	11.13645					
GALNT10	ILMN_2750011	0.0001616	4.0314E-07	0.10401598	0.51819834	0.02877232	0.002004	8.239243333	8.110673684	8.096067647	8.178859091					
IVD	ILMN_2728379	1.8778E-05	5.595E-07	0.09791528	0.53580705	0.01166027	0.00610671	9.353073333	9.195634211	9.211955882	9.293895455					
RING1	ILMN_2932539	0.01663431	1.0512E-05	0.38029272	0.07141046	0.00232036	7.68E-07	8.797403333	8.707202632	8.656370588	8.835413636					
LOC100048105	ILMN_2588050	0.00093834	7.7352E-08	0.45732595	0.10557183	0.02315411	5.6826E-05	13.31449667	13.21344474	13.17428971	13.29137273					
CLEC4B1	ILMN_2603898	0.0006499	8.9002E-05	0.94435951	0.53125306	0.00090627	0.00013919	6.123163333	5.964173684	5.98355	6.126754545					
TYROBP	ILMN_2867147	4.9902E-05	0.00081337	0.32419201	0.08239071	0.00092921	0.03726523	7.546993333	7.352484211	7.408191176	7.491804545					
6230425C21RIK	ILMN_2550095	3.3729E-05	0.00116327	0.76744952	0.22348849	0.00010401	0.00195454	7.159243333	6.973836842	7.021026471	7.173704545					
2810422O20RIK	ILMN_2625188	0.00633296	2.9442E-05	0.8078838	0.43902164	0.01516821	0.00017634	7.155133333	7.041215789	7.017935294	7.145077273					
RFFL	ILMN_3048689	0.00218426	9.0051E-05	0.94688198	0.44926206	0.00755097	0.00070131	7.346986667	7.233876316	7.211079412	7.344081818					
CEPT1	ILMN_2762334	0.00015346	3.5027E-06	0.15126391	0.26301395	0.03160959	0.00446217	10.36051667	10.25173158	10.22485441	10.31255909					
NEURL	ILMN_2625940	1.9427E-05	2.9768E-06	0.07989839	0.51820005	0.03331221	0.0413976	6.091016667	5.940726316	5.956220588	6.018363636					
ZFP317	ILMN_2481799	0.00040842	2.0466E-05	0.17421304	0.79274798	0.03686878	0.01298618	7.35243	7.224565789	7.217720588	7.297					
SRGAP3	ILMN_2648098	0.00426435	4.0797E-06	0.56745573	0.07122742	0.0457434	0.00043579	6.20861	6.119747368	6.074486765	6.187718182					
RARG	ILMN_3132660	0.0002313	0.0001074	0.09611017	0.45644909	0.02491514	0.04816853	6.253086667	6.097884211	6.120816176	6.186990909					
PI4KB	ILMN_2689259	0.00018335	0.00028206	0.90417538	0.56122401	0.00104389	0.00184457	9.675126667	9.524628947	9.544104412	9.670277273					
GALGT1	ILMN_1241182	0.00356	0.00022666	0.96380465	0.62431225	0.00456971	0.00057373	7.578576667	7.461855263	7.448160294	7.576309091					

PIK3R6	ILMN_3160107	0.00075434	0.00095933	0.98018626	0.73529845	0.00190195	0.00317502	6.473133333	6.331334211	6.342902941	6.471927273					
MREG	ILMN_2976159	0.01151117	0.00121879	0.97052355	0.5417462	0.00767257	0.00149091	9.009966667	8.899078947	8.880347059	9.012027273					
1200002N14RIK	ILMN_1219820	0.00016287	0.00089278	0.3547823	0.72280221	6.7964E-06	7.9454E-05	7.02541	6.885213158	6.896238235	7.071472727					
2610028H07RIK	ILMN_1256792	6.3456E-06	0.00044627	0.53405371	0.17875439	8.3178E-05	0.00823961	10.22659	10.05706053	10.09811029	10.20060909					
TGFBI	ILMN_2727663	9.3229E-05	0.00506724	0.69685832	0.07915194	0.00018689	0.02386499	6.317396667	6.125718421	6.189858824	6.294936364					
NOS3	ILMN_2788593	0.00014498	3.6426E-05	0.14285813	0.8181436	0.0230466	0.01665852	5.930473333	5.810139474	5.804051471	5.8815					
USP11	ILMN_2802244	0.00084451	0.00039723	0.54734927	0.57435118	0.004636	0.00658528	6.548856667	6.408394737	6.422813235	6.516695455					
FOS	ILMN_2750515	0.01415452	0.00059588	0.50543321	0.28725213	0.00125985	5.3042E-05	6.999393333	6.903897368	6.874805882	7.035045455					
LOC636818	ILMN_2434512	0.00038393	1.1401E-05	0.1989409	0.6183528	0.03774769	0.00837987	6.108246667	5.997428947	5.985791176	6.062581818					
SCL0004023.1_57	ILMN_1232512	0.00026729	3.1473E-05	0.71431891	0.74464801	0.00278043	0.00081738	6.11199	5.997631579	5.989891176	6.097618182					
P2RX4	ILMN_2620122	0.00081634	0.00083088	0.37867114	0.71855317	0.01190731	0.03061122	7.48024	7.348384211	7.358327941	7.436886364					
DGKQ	ILMN_2972541	0.00048918	0.00052041	0.26951773	0.52599589	0.021019	0.04778715	7.016946667	6.876660526	6.895120588	6.966136364					
SNX15	ILMN_2894450	0.00937026	4.6424E-05	0.24248379	0.08593987	0.00016008	6.0629E-07	9.416226667	9.335971053	9.294445588	9.462340909					
SLC11A1	ILMN_2692797	0.00396693	0.00197835	0.26220177	0.83242628	0.00024944	5.8292E-05	6.549723333	6.422	6.429011765	6.614281818					
TLR13	ILMN_2735961	2.3186E-06	5.5483E-05	0.23133935	0.05270935	0.00140451	0.02725246	6.13844	5.968510526	6.018579412	6.089945455					
MKL1	ILMN_2630120	0.0001341	0.00013031	0.2256236	0.65497127	0.01485918	0.02734326	6.422093333	6.290807895	6.302858824	6.376204545					
EG633640	ILMN_2977390	0.00216317	1.0488E-05	0.37060957	0.13026635	0.02334582	0.00084582	6.2549	6.167321053	6.135855882	6.224536364					
RASGRF1	ILMN_1233146	6.1989E-05	1.7706E-05	0.18251154	0.69726381	0.04139695	0.03867404	5.882463333	5.754576316	5.763907353	5.8296					
TRP53	ILMN_2466845	0.0016928	0.00286906	0.99232057	0.79140758	0.01079811	0.01310186	9.81586	9.688071053	9.697814706	9.816331818					
1300010F03RIK	ILMN_1249480	0.00209035	0.00024475	0.95901568	0.59454853	0.00174019	0.00055466	6.72106	6.618107895	6.603588235	6.719240909					
RNF123	ILMN_2975900	0.00197116	0.00673377	0.68791146	0.54822315	0.00955467	0.04052037	7.61357	7.475247368	7.4966	7.591468182					
LOC386085	ILMN_1258858	0.00703699	0.00244792	0.99310015	0.67180078	0.02342162	0.00991139	6.32579	6.223992105	6.209532353	6.326190909					
TIMM8A2	ILMN_2983631	0.00047977	7.984E-05	0.26017033	0.9288078	0.0408017	0.02577468	5.952686667	5.835228947	5.837423529	5.907509091					
CLEC4A1	ILMN_1230708	6.3099E-05	0.00068046	0.07959173	0.13896852	6.2919E-07	1.1215E-06	6.377756667	6.218557895	6.262733824	6.464059091					
SGPL1	ILMN_2936380	0.00442525	0.00431832	0.24420322	0.83977453	1.1989E-05	5.4288E-05	7.595083333	7.473997368	7.480830882	7.646777273					
TMUB1	ILMN_2932660	3.6767E-06	2.8669E-06	0.55854301	0.18294726	9.6006E-05	0.00016686	8.66402	8.519415789	8.549851471	8.647472727					
LOC383099	ILMN_1230327	1.0292E-05	3.4316E-05	0.19353408	0.35776115	0.00264846	0.01315147	13.25080333	13.11434737	13.13688529	13.20990455					
HMOX1	ILMN_2788073	0.00144202	0.01360724	0.52592266	0.11915799	0.00012857	0.00150214	6.674133333	6.506121053	6.561204412	6.718672727					
ERCC4	ILMN_1259904	2.9635E-05	7.1893E-06	0.3072808	0.39378835	0.00204008	0.00190429	8.262506667	8.1301	8.150180882	8.232518182					
SOLH	ILMN_2508416	4.9529E-05	0.00037941	0.39198068	0.1710492	0.00514359	0.0319132	8.064173333	7.913865789	7.952263235	8.027909091					
PREP	ILMN_2549494	8.777E-06	7.1078E-06	0.0728319	0.94699085	0.03196963	0.03975814	8.029716667	7.916678947	7.918044118	7.973690909					
LOC100048105	ILMN_1220172	0.00525336	5.0233E-06	0.65150836	0.10450442	0.03793765	0.00030515	13.58104	13.50723421	13.47030735	13.56905					
GSTM2	ILMN_1251449	1.0736E-06	0.00042941	0.62871915	0.0626658	0.000349	0.01622081	6.0557	5.898139474	5.945163235	6.033840909					
EPB4.1L3	ILMN_1244272	0.00042364	0.00026884	0.97622105	0.75352508	0.00234329	0.00159748	6.005856667	5.903615789	5.895541176	6.006977273					
USP22	ILMN_2990220	0.00047972	7.2178E-05	0.6311193	0.73294117	0.00010901	2.9959E-05	9.1675	9.065165789	9.057348529	9.184159091					
1700073E17RIK	ILMN_2790902	0.0009735	0.00100707	0.33186085	0.79236551	0.02728985	0.04433204	5.778756667	5.660986842	5.668639706	5.740490909					
1110014N23RIK	ILMN_2737979	0.00032186	6.9718E-05	0.24350554	0.9731238	0.01647809	0.01029025	9.78732	9.676873684	9.677741176	9.754181818					
RCCD1	ILMN_2838629	0.00854494	0.0014522	0.9523493	0.72271895	0.00298628	0.00110827	8.2828	8.183665789	8.173695588	8.285281818					
ANKRD13A	ILMN_2613696	0.00484825	0.00169963	0.63330234	0.63720453	0.01182324	0.01176163	10.35183	10.25657632	10.24345	10.33284091					
SP2	ILMN_2464693	0.00076915	0.00052171	0.61547888	0.86375881	0.02190281	0.01541189	6.97502	6.871657895	6.866919118	6.955763636					
CENTG3	ILMN_2754596	0.00085388	0.00664359	0.76336296	0.26483929	0.0048462	0.03241858	6.891463333	6.743584211	6.784157353	6.877472727					
3110004L20RIK	ILMN_3142391	0.00493059	0.00089782	0.8322505	0.86075865	0.00118759	0.00038595	6.040683333	5.938431579	5.933769118	6.049186364					
6430526N21RIK	ILMN_2556989	3.6563E-06	0.0030831	0.80628337	0.05397035	0.00012243	0.02050435	7.338353333	7.170902632	7.231635294	7.327745455					
2310067B10RIK	ILMN_1245489	0.00010947	0.00212062	0.70454808	0.14966703	0.00188647	0.0207657	7.60857	7.454689474	7.501908824	7.593022727					
1810030N24RIK	ILMN_1246756	0.00033142	0.0001049	0.25777434	0.77317879	0.02651017	0.02535251	6.94621	6.833397368	6.840070588	6.905022727					
RBM15	ILMN_2945275	0.00020165	1.1186E-05	0.76256535	0.62608556	0.00114438	0.00015067	8.00761	7.891310526	7.901594118	7.997504545					
WWP2	ILMN_1226970	0.00131633	1.9694E-05	0.51815406	0.17548469	0.0010361	2.5328E-05	8.939	8.862852632	8.833398529	8.9579					

2610024M03RIK	ILMN_1255611	0.00075119	1.9877E-05	0.27695778	0.62454234	0.03720414	0.0073064	6.12332	6.027731579	6.018229412	6.085745455
C430003P19RIK	ILMN_2864393	0.02500932	0.00010247	0.73622573	0.12973571	0.03837532	0.0003539	9.67627	9.606163158	9.571339706	9.665418182
BC066107	ILMN_2903889	0.00138848	0.00115874	0.52290823	0.66118654	0.00022804	0.00020897	6.6825	6.565544737	6.577964706	6.707777273
3110082D06RIK	ILMN_2512770	0.00081263	0.00024591	0.41914414	0.87896906	0.01838394	0.01157934	6.0938	5.993510526	5.989636765	6.068118182
LYNX1	ILMN_1256369	0.00420568	0.00073274	0.49989346	0.74691395	0.02527485	0.01173162	8.635493333	8.522728947	8.531370588	8.607563636
PRKCZ	ILMN_1221045	0.00086771	0.00805577	0.81684994	0.14017939	0.00011414	0.00316194	7.069753333	6.920815789	6.966716176	7.081818182
IGK-V33	ILMN_1248308	0.01900936	0.04300612	0.83572809	0.70534644	0.00693678	0.03160553	10.09401333	9.976852632	9.992255882	10.10707727
SLC11A1	ILMN_2674884	0.00451734	0.03091521	0.12502748	0.13605457	1.7865E-05	6.4065E-05	6.997713333	6.838144737	6.896435294	7.107336364
CBLC	ILMN_2738699	0.00012903	0.00348477	0.53465768	0.1576133	0.00041268	0.02925041	5.966836667	5.825323684	5.865586765	5.941622727
B930049N04RIK	ILMN_2567282	0.00828515	0.00041872	0.71325464	0.62136789	0.03141276	0.00412999	5.693346667	5.604668421	5.592219118	5.679722727
CASP1	ILMN_1247592	0.03654543	0.00027824	0.98550996	0.15134683	0.03489466	0.00041029	11.61187333	11.54446316	11.51241912	11.61258182
MBD1	ILMN_2893081	0.00069041	0.00098846	0.93417844	0.49518718	0.00116956	0.00263867	9.107946667	8.991671053	9.009091176	9.104772727
2510022D24RIK	ILMN_2431257	0.00054235	0.00054186	0.66212847	0.85551939	0.00963869	0.01053503	8.239006667	8.136547368	8.141229412	8.224509091
FRMPD1	ILMN_2625610	0.00784766	8.5488E-05	0.68969527	0.17557898	0.04875253	0.00220945	5.682146667	5.613552632	5.584472059	5.669695455
USP54	ILMN_2418324	0.00955473	0.00040156	0.98851966	0.3747777	0.00989274	0.00081425	7.069403333	6.990452632	6.971775	7.068827273
FA2H	ILMN_2746783	0.00471864	0.00063209	0.45770422	0.98284131	0.03293531	0.01311008	6.074253333	5.976113158	5.976633824	6.047031818
EG434402	ILMN_2546510	0.00012823	5.5232E-05	0.13563773	0.2699795	0.00957843	0.01855157	9.268486667	9.145802632	9.171463235	9.227836364
SLC9A4	ILMN_2732246	0.00212409	0.00012482	0.38428076	0.89045568	0.02745037	0.00681249	5.812063333	5.718157895	5.715114706	5.784231818
ATP6V1B2	ILMN_2680440	0.03317358	0.00264861	0.22712659	0.23499064	0.00205645	0.00015479	10.49800333	10.43401842	10.40123971	10.54807273
2310079N02RIK	ILMN_2635801	0.00127502	7.9145E-05	0.60004293	0.90855532	0.01442916	0.00298576	9.192623333	9.095097368	9.097661765	9.17595
ZFPL1	ILMN_1217262	0.01031094	0.01048771	0.44196462	0.87815982	0.00112726	0.00145406	7.48469	7.385313158	7.390122059	7.521240909
NISCH	ILMN_1237959	0.00048874	0.00222847	0.99479624	0.13624642	0.00139578	0.00540912	7.18114	7.045213158	7.087505882	7.181422727
FCMD	ILMN_2514924	0.00842949	0.00389628	0.94954546	0.62918162	0.0175612	0.01017213	6.566743333	6.486473684	6.473394118	6.569354545
1810009N02RIK	ILMN_2764607	0.01347776	0.00127083	0.13924507	0.56903812	0.00021877	7.5976E-06	8.202653333	8.123931579	8.109642647	8.261063636
6720486H14RIK	ILMN_1232302	0.01362645	0.00042467	0.86679528	0.54436584	0.04220789	0.00336882	5.675496667	5.599039474	5.583961765	5.670122727
AW011738	ILMN_1248890	0.02108937	0.00240422	0.7444499	0.25784546	0.04664972	0.01260325	6.340756667	6.277447368	6.2494	6.329786364
COgeneric	ILMN_2596412	0.00282433	0.00222355	0.6376439	0.47806652	0.01544423	0.01993856	8.195383333	8.085518421	8.104542647	8.177086364
PCBP2	ILMN_2599777	0.00077848	0.00010227	0.31573395	0.74194527	0.01637766	0.00940386	12.72348667	12.62733947	12.63373235	12.69256364
C330019G07RIK	ILMN_1256807	0.01890697	0.00450636	0.95648663	0.87352749	0.01770155	0.00587318	6.827063333	6.742765789	6.738351471	6.829163636
SMARCE1	ILMN_2880246	0.00235369	0.00147137	0.52242213	0.4944281	0.02542484	0.03273696	9.420046667	9.316405263	9.331558824	9.392968182
ABCC4	ILMN_2621708	0.00334186	0.00235984	0.86637873	0.882039	0.00962734	0.00964223	7.844656667	7.752781579	7.756655882	7.838990909
GTPBP1	ILMN_2510196	0.00949724	0.01637229	0.86230464	0.53566936	0.00830264	0.01603778	9.273093333	9.164928947	9.185194118	9.281127273
SLC25A42	ILMN_2810937	0.0030623	0.00384662	0.86265789	0.50922403	0.00769803	0.00804271	6.299283333	6.193821053	6.212104412	6.306677273
5B30415F09RIK	ILMN_1223695	1.3138E-05	0.00043694	0.26584773	0.15351078	0.00205106	0.04059407	7.08473	6.966402632	6.997625	7.052472727
PEO1	ILMN_2913845	0.00020698	0.00377613	0.64758251	0.27928463	0.00324238	0.03643575	7.222113333	7.107710526	7.1356	7.205309091
CRTAC1	ILMN_2764112	0.03144975	0.00505976	0.48157758	0.34439961	0.00865001	0.00180081	6.011773333	5.950531579	5.925355882	6.037995455
CLEC5A	ILMN_3045984	4.5951E-05	0.00236436	0.99526109	0.06516797	0.00013986	0.00584053	5.95908	5.828018421	5.873202941	5.958854545
ZFP704	ILMN_1225146	0.01579789	0.00229856	0.43616799	0.40602963	0.0051091	0.00081793	5.9147	5.849613158	5.828823529	5.941309091
TNS4	ILMN_1236029	0.04473469	0.00352156	0.61562326	0.40661935	0.03355411	0.0029568	5.844593333	5.780189474	5.758717647	5.866986364
2310040G07RIK	ILMN_1232245	0.00146763	0.00364402	0.9801709	0.53388414	0.00181963	0.00649554	5.79773	5.696360526	5.712151471	5.798627273
KRTAP5-4	ILMN_2817498	0.01183825	0.0033168	0.78482862	0.60473247	0.03649514	0.01754729	5.736486667	5.664107895	5.651308824	5.727004545
D030051N19RIK	ILMN_2760593	0.01767242	0.00883238	0.76269636	0.95269059	0.00352646	0.00288209	8.371213333	8.285613158	8.287195588	8.383390909
A430043M19RIK	ILMN_2553758	0.01537231	0.00153703	0.87017812	0.70000022	0.02160036	0.00379348	6.192146667	6.116665789	6.108377941	6.186131818
9030025P20RIK	ILMN_2716783	0.02550031	0.00104391	0.91013697	0.5226017	0.02473964	0.00134412	8.676186667	8.607128947	8.592552941	8.680018182
GAS7	ILMN_2924831	0.00028142	0.01557949	0.48907458	0.14508923	7.41E-05	0.00413119	6.734093333	6.607315789	6.6505	6.764486364
TBC1D25	ILMN_2722583	0.00017407	0.00060187	0.75083046	0.17257444	0.00034842	0.00076554	8.04817	7.934818421	7.965151471	8.058922727
LOC193563	ILMN_1234524	0.02030144	0.00211946	0.49373358	0.37536915	0.00983473	0.0011714	5.841313333	5.780481579	5.758816176	5.863127273

PAPSS2	ILMN_2466809	0.00071141	0.01063233	0.59693082	0.1975621	0.00013054	0.00289354	6.744143333	6.628768421	6.661655882	6.768309091				
ELL	ILMN_2751304	0.00438741	0.00218513	0.56711519	0.94783093	0.03459302	0.0297732	9.71715	9.633271053	9.634791176	9.697881818				
SHKBP1	ILMN_2734334	0.00530952	0.04351038	0.45812368	0.22916899	0.00016389	0.00459412	8.369346667	8.246628947	8.287191176	8.407618182				
RNF10	ILMN_2789888	0.00279888	0.00046885	0.95665835	0.91048263	0.00981439	0.00260664	11.53589	11.45141053	11.45382206	11.53415455				
FBXL20	ILMN_2729097	0.02354414	0.00902699	0.98436722	0.99571993	0.03787074	0.01902513	7.886646667	7.80505	7.804917647	7.885722727				
TEAD4	ILMN_3157399	0.01416372	0.00278621	0.95542857	0.71344982	0.04664746	0.01378693	6.07582	6.003681579	5.99445	6.073868182				
5031439G07RIK	ILMN_1252809	0.03621453	0.00540906	0.75844219	0.7313907	0.02073207	0.0032499	8.046333333	7.975907895	7.966855882	8.056904545				
LOC100046003	ILMN_2427178	0.00182928	0.00129669	0.7160404	0.98258458	0.03364079	0.02435778	8.814313333	8.735331579	8.734867647	8.801768182				
B130002B06RIK	ILMN_1231100	0.002085	0.00090773	0.62757755	0.91550262	0.01276374	0.01060191	5.813043333	5.732515789	5.7347	5.7991				
EPN3	ILMN_1239908	0.00812622	0.00185569	0.60868186	0.71301205	0.04085733	0.02008862	5.787266667	5.702681579	5.710923529	5.770054545				
ZC3H12A	ILMN_2856095	0.02389199	0.01529772	0.10411233	0.95791165	0.0012163	0.00033043	8.291086667	8.213755263	8.215352941	8.354177273				
2900079J23RIK	ILMN_2458967	0.00069102	0.00591699	0.8841941	0.25987594	0.00345581	0.02181717	5.841546667	5.736136842	5.765825	5.837059091				
CLEC4B1	ILMN_2959372	0.00498803	0.00566592	0.11687934	0.73202329	9.3941E-05	5.1484E-05	5.798906667	5.716681579	5.724957353	5.853954545				
1300010F03RIK	ILMN_2688415	0.01113164	0.00445109	0.62501012	0.90306096	0.04178098	0.03179851	6.837643333	6.766381579	6.763723529	6.82175				
KRT39	ILMN_2699061	0.00024569	0.00320691	0.66536592	0.16397925	0.0044085	0.03601225	5.62461	5.520444737	5.551114706	5.6101				
4930519F16RIK	ILMN_2812960	0.01504358	0.01195164	0.71174978	0.86229548	0.01286921	0.0100083	5.689996667	5.611807895	5.616554412	5.702931818				
RHBDD1	ILMN_2680086	0.00195624	0.02653141	0.7428231	0.15361303	0.00049567	0.01251011	7.70038	7.587589474	7.627182353	7.714345455				
GDPD1	ILMN_2683528	0.02520471	0.01422595	0.97421843	0.97690298	0.02916103	0.02183014	6.465226667	6.393168421	6.392429412	6.466463636				
ACP2	ILMN_2513205	0.02589288	0.04801525	0.87836357	0.51944157	0.00908429	0.02984164	6.88359	6.791065789	6.810866176	6.8907				
SETD1A	ILMN_1247099	0.02914101	0.01802935	0.28928564	0.80168731	0.00238613	0.0009068	9.028223333	8.94825	8.955577941	9.065645455				
OLFR516	ILMN_2975511	0.00584534	0.0065686	0.63189054	0.84803924	0.00463061	0.00502368	5.832843333	5.755394737	5.760235294	5.846913636				
REN1	ILMN_2620114	0.00859008	0.00352545	0.51945187	0.91893522	0.04593342	0.03987798	5.670936667	5.596518421	5.598602941	5.650036364				
5330417C22RIK	ILMN_3160472	0.00392981	0.01665235	0.81830592	0.32937105	0.01239845	0.02860146	5.710553333	5.612434211	5.640252941	5.719795455				
AGAP1	ILMN_3086136	0.00130122	0.01428369	0.21779185	0.14376273	0.00028029	0.00083298	6.059153333	5.948686842	5.989294118	6.109681818				
DUSP6	ILMN_2701321	0.04196105	0.02077271	0.65641691	0.76670145	0.01513408	0.00532881	5.8376	5.760176316	5.768070588	5.856759091				
CTSL	ILMN_2904703	0.00823647	0.03369871	0.68853105	0.39471797	0.00332489	0.01721775	5.81264	5.718744737	5.743730882	5.827822727				
SLCO6C1	ILMN_2672845	0.00366169	0.00342522	0.82980707	0.5075665	0.00935595	0.00734696	5.686233333	5.602471053	5.617510294	5.693277273				
TBC1D2	ILMN_3140913	0.00915868	0.02707865	0.07761914	0.11615683	5.3058E-05	8.3442E-06	6.907116667	6.793013158	6.838802941	6.992163636				
OPHN1	ILMN_1218910	0.00705623	0.01676055	0.9612701	0.52677431	0.0127471	0.02924277	5.778693333	5.693957895	5.710407353	5.780409091				
B930048N13RIK	ILMN_1228496	0.0258409	0.02319307	0.9459577	0.68607919	0.03246647	0.03648165	5.961773333	5.883607895	5.894567647	5.95935				
MBL1	ILMN_1238266	0.01949167	0.01875506	0.6216545	0.95383414	0.0038567	0.00703776	5.619243333	5.55345	5.552047059	5.635831818				
A730017D01RIK	ILMN_2448591	0.03514439	0.02508309	0.27718742	0.97892995	0.00287396	0.00217489	6.58584	6.519621053	6.518897059	6.621677273				
SNX33	ILMN_1212693	0.00128354	0.03546496	0.75931824	0.07681982	0.00178637	0.03039622	7.0541	6.931763158	6.987372059	7.065340909				
E330023P07RIK	ILMN_1240762	0.04039212	0.01005134	0.90042083	0.69958318	0.04258642	0.01766006	5.836216667	5.778460526	5.770314706	5.832118182				
9330152L17	ILMN_2726288	0.00684962	0.00996086	0.82186542	0.65140859	0.003115	0.00702013	5.81598	5.740573684	5.750429412	5.823040909				
PCDH19	ILMN_2696829	0.00978932	0.01311307	0.97263701	0.97027419	0.01574332	0.02508658	5.694973333	5.629565789	5.630432353	5.695972727				
CAGE1	ILMN_2861743	0.00027029	0.0145488	0.78092466	0.06716972	0.00063126	0.01592406	5.926	5.816742105	5.861688235	5.935345455				
TMEM56	ILMN_2966162	0.04621081	0.01848064	0.41053319	0.64039374	0.00912994	0.00384627	5.612496667	5.559673684	5.548541176	5.640304545				
ACTR3B	ILMN_2933346	0.02450319	0.02824142	0.89846354	0.89324469	0.01546771	0.02801535	6.533076667	6.4662	6.469547059	6.5374				
ADAM11	ILMN_2629383	0.00262479	0.00955767	0.96020583	0.32052216	0.01364716	0.03389781	5.691363333	5.605971053	5.628829412	5.689736364				
CD151	ILMN_2836710	0.0193575	0.02521425	0.95832059	0.57385692	0.027328	0.04202571	8.090336667	8.015257895	8.028898529	8.088440909				
A930014P08RIK	ILMN_1258114	0.01653191	0.02263524	0.79892253	0.95914953	0.02026464	0.02963791	5.6155	5.555547368	5.554239706	5.621622727				
SLC35E4	ILMN_1225229	0.01200013	0.03647823	0.21422706	0.58229293	0.00060842	0.00210222	5.867336667	5.791586842	5.806241176	5.91005				
PARD3B	ILMN_2860656	0.02213623	0.02424764	0.78712766	0.35731602	0.01804729	0.01466449	5.96533	5.880542105	5.904663235	5.975636364				
OLFR586	ILMN_2600115	0.02629307	0.03005413	0.44544663	0.51258989	0.01126709	0.00747311	5.601076667	5.522747368	5.541236765	5.627940909				
D030072B18RIK	ILMN_2611773	0.0121881	0.01382966	0.70420004	0.55203728	0.00481466	0.00551134	5.61957	5.547055263	5.559957353	5.631459091				
STARD3	ILMN_2769734	0.03250946	0.04372938	0.71591427	0.61539387	0.02634594	0.02932626	8.494313333	8.422068421	8.435257353	8.509754545				

SFXN3	ILMN_1216734	0.0084465	0.0369416	0.33324991	0.43156506	0.00046311	0.00271253	6.08399	6.006510526	6.025077941	6.121263636				
6430511F03	ILMN_2420209	0.01059293	0.02963372	0.59561896	0.68298302	0.00511949	0.01419095	6.304863333	6.2371	6.246623529	6.322872727				
PROM	ILMN_1238150	0.00398623	0.00815465	0.46628964	0.43952028	0.00060491	0.00106285	5.928333333	5.855444737	5.870188235	5.950177273				
NTE	ILMN_2777668	0.00220455	0.02337669	0.82551283	0.1273946	0.00093989	0.01435096	8.366106667	8.27475	8.3088	8.373113636				
OLFR150	ILMN_2541702	0.02058614	0.00863685	0.8151015	0.77184185	0.03584112	0.02222814	5.682813333	5.620110526	5.625554412	5.675772727				
2010001M09RIK	ILMN_2613601	0.01200127	0.02267285	0.06308598	0.38262456	1.2109E-05	6.3313E-06	13.25162667	13.17815526	13.19607647	13.31843636				
KCNC4	ILMN_2771095	0.01571387	0.04231651	0.52445469	0.4022856	0.00077199	0.00451424	5.88774	5.814560526	5.832483824	5.911813636				
GM498	ILMN_1247100	0.04366672	0.00882859	0.49722158	0.70284119	0.02936346	0.00526776	5.727336667	5.681271053	5.673501471	5.744981818				
LOC327767	ILMN_2533815	0.00758783	0.03702409	0.37817812	0.30514982	0.00251604	0.00697011	6.031383333	5.952915789	5.978073529	6.061031818				
B930097H17RIK	ILMN_2573844	0.00260747	0.02509722	0.45261455	0.1224496	0.00074893	0.00496039	5.844733333	5.755813158	5.792060294	5.865090909				
BMP3	ILMN_1235433	0.02468219	0.04851172	0.54373792	0.92906248	0.01978256	0.02850556	5.675396667	5.620692105	5.622867647	5.694827273				
PLEKHB2	ILMN_2731769	0.00137797	0.02875588	0.93502443	0.09916793	0.00137931	0.04515583	9.05776	8.97335	9.006016176	9.055263636				
A630038P11RIK	ILMN_1233452	0.01134274	0.04302029	0.69787853	0.50924822	0.00488697	0.02393866	5.602433333	5.537278947	5.551530882	5.614654545				
6720480F11RIK	ILMN_1255586	0.03422994	0.03724736	0.83913074	0.56351111	0.04057142	0.03869267	5.689046667	5.629671053	5.641458824	5.696195455				
CNTNAP3	ILMN_1219653	0.03377393	0.04485233	0.20111585	0.63592426	0.00304714	0.00211903	5.841703333	5.786078947	5.796410294	5.878831818				

To further examine the impact of each medicine on specific immune system cells, we generated a list of genes with high cell-type specificity for Tregs, and utilized GSEA to determine the extent to which these Treg-specific genes were overrepresented at the top of the ranked list of genes differentially expressed between the two medicines. We confirmed that these Treg-specific genes were overrepresented at the top of the ranked list with higher expression in GA-activated samples than PG-activated samples (FDR-adjusted q = 0.00, Fig. 6E).

Taken together, these findings emphasize that GA upregulates FoxP3+ Tregs more consistently and to a higher level than PG. This finding has implications for efficacy.

Example 9

Comparing potential safety-related impacts on key immune system cell types: PG may upregulate myeloid lineage cells to a greater extent than GA

Using the ANOVA-based pattern analysis (Methods), we identified a list of genes that are significantly upregulated only by PG compared to medium, and not by GA or GA reference standard compared to medium (Table 11). Cell type enrichment yielded a variety of stromal cells, macrophages, and monocytes (Table 11). Similarly, genes that were significantly downregulated by GA and GA reference standard relative to medium, but not by PG relative to medium (Table 10) were most enriched for macrophages, monocytes, and granulocytes (Table 11). Finally, genes that have significantly higher expression in samples activated by PG than in samples activated by GA by 4 different parametric methods (Table 8) were enriched primarily in macrophages and monocytes (Table 11).

Table 11: Outputs of cell-type enrichment analyses for various lists of genes.

	4-method_up GA				4-method_up generic		
Sample ID	Score	p-value	adjusted p-value	Sample ID	Score	p-value	adjusted p-value
T.8Nve.Sp.OT1.rnk	78.0167172	1.30E-93	3.14E-92	MF.Lu.rnk	52.3659832	4.74E-19	5.33E-18
T.4FP3.25..LN.rnk	77.2585738	4.58E-92	9.88E-91	MF.BM.rnk	52.1676734	8.50E-27	4.12E-25
CD4Control.rnk	74.7924284	5.10E-82	4.95E-81	Mo.6C.II..BM.rnk	51.5668819	3.63E-25	1.41E-23
CD4TESTCJ.rnk	74.3049572	7.18E-100	3.48E-98	SC.GMP.BM.rnk	51.5587442	7.77E-33	7.53E-31
T.4Nve.Sp.rnk	74.1176116	6.71E-104	6.51E-102	MF.11cloSer.SI.rnk	46.9677757	2.67E-16	1.56E-15
T.8SP24..Th.rnk	73.1331042	6.90E-91	1.34E-89	MLP.FL.rnk	46.519979	7.74E-32	5.01E-30
T.8Nve.LN.rnk	72.6081647	2.84E-97	7.86E-96	MF.Thio5.II.480int.PC.rnk	46.0938609	1.84E-18	1.55E-17
T.4SP24..Th.rnk	70.7668281	3.66E-98	1.18E-96	MF.Thio5.II.480hi.PC.rnk	45.2029355	2.74E-16	1.56E-15
T.8Nve.MLN.rnk	69.029666	2.66E-98	1.03E-96	MF.103.11b..SI.rnk	45.1219289	6.17E-10	1.93E-09
T.8SP24int.Th.rnk	64.9653532	5.23E-76	4.06E-75	MF.II.480hi.PC.rnk	42.2591115	5.29E-17	3.66E-16
T.4Nve.LN.rnk	63.6821853	1.43E-100	9.23E-99	MF.11cloSer.Salm3.SI.rnk	40.7916014	2.09E-15	1.04E-14
CD4TESTJS.rnk	60.5711373	1.45E-90	2.56E-89	MF.II.480lo.PC.rnk	39.3484707	1.11E-20	1.66E-19
Tgd.vg2..Sp.rnk	59.521782	1.14E-81	1.05E-80	MF.103.11b..Salm3.SI.rnk	37.9163065	4.52E-12	1.79E-11
T.4Mem.Sp.rnk	58.4053995	1.28E-74	9.20E-74	MF.Thio5.II.480lo.PC.rnk	37.2951887	6.98E-16	3.87E-15
T.4Mem44h62l.Sp.rnk	57.6060554	1.08E-73	6.98E-73	DC.8..Th.rnk	36.1076603	1.28E-16	8.46E-16

	4-method_up GA			4-method_up generic			
Cell type	**Score**	**p-value**	**adjusted p-value**	**Cell type**	**Score**	**p-value**	**adjusted p-value**
CD8+ T-cell	78.0167172	1.30E-93	3.14E-92	Macrophage Cell	52.3659832	4.74E-19	5.33E-18
CD4+ T-cell (FOXP3+)	**77.2585738**	**4.58E-92**	**9.88E-91**	Macrophage Cell	52.1676734	8.50E-27	4.12E-25
CD4+ T-cell	74.7924284	5.10E-82	4.95E-81	***MONOCYTE CELL***	**51.5668819**	**3.63E-25**	**1.41E-23**
CD4+ T-cell	74.3049572	7.18E-100	3.48E-98	**Stromal Cell**	**51.5587442**	**7.77E-33**	**7.53E-31**
CD4+ T-cell	74.1176116	6.71E-104	6.51E-102	Macrophage Cell	46.9677757	2.67E-16	1.56E-15
CD8+ T-cell	73.1331042	6.90E-91	1.34E-89	**Multi-lineage Progenitor**	**46.519979**	**7.74E-32**	**5.01E-30**
CD8+ T-cell	72.6081647	2.84E-97	7.86E-96	Macrophage Cell	46.0938609	1.84E-18	1.55E-17
CD4+ T-cell	70.7668281	3.66E-98	1.18E-96	Macrophage Cell	45.2029355	2.74E-16	1.56E-15
CD8+ T-cell	69.029666	2.66E-98	1.03E-96	Macrophage Cell	45.1219289	6.17E-10	1.93E-09
CD8+ T-cell	64.9653532	5.23E-76	4.06E-75	Macrophage Cell	42.2591115	5.29E-17	3.66E-16
CD4+ T-cell	63.6821853	1.43E-100	9.23E-99	Macrophage Cell	40.7916014	2.09E-15	1.04E-14
CD4+ T-cell	60.5711373	1.45E-90	2.56E-89	Macrophage Cell	39.3484707	1.11E-20	1.66E-19
Gamma Delta T-Cell	59.521782	1.14E-81	1.05E-80	Macrophage Cell	37.9163065	4.52E-12	1.79E-11
CD4+ T-cell	58.4053995	1.28E-74	9.20E-74	Macrophage Cell	37.2951887	6.98E-16	3.87E-15
CD4+ T-cell	57.6060554	1.08E-73	6.98E-73	**Dendritic Cell**	**36.1076603**	**1.28E-16**	**8.46E-16**

	UP_in_GA				DOWN_in_GA		
Sample ID	Score	p-value	adjusted p-value	Sample ID	Score	p-value	adjusted p-value
Tgd.vg2.24ahi.e17.Th.rnk	55.3001141	9.65E-11	2.27E-09	MF.Thio5.II.480int.PC.rnk	78.3629937	7.87E-13	6.06E-11
Tgd.vg1.vd6.24ahi.Th.rnk	51.6590126	1.41E-11	5.31E-10	MF.103.11b..SI.rnk	70.6792182	1.05E-05	5.38E-05
T.8Eff.Sp.OT1.d5.VSVOva.rnk	49.3859076	3.58E-15	3.37E-13	MF.11cloSer.SI.rnk	70.0561042	8.81E-09	6.46E-08
Tgd.vg3.24alo.e17.Th.rnk	48.4433864	1.36E-10	2.57E-09	MF.Thio5.II.480hi.PC.rnk	69.920643	4.45E-10	7.61E-09
T.8Eff.Sp.OT1.d6.LisOva.rnk	44.7876477	5.19E-11	1.39E-09	MF.11cloSer.Salm3.SI.rnk	66.6852735	3.26E-12	1.25E-10
NKT.44.NK1.1..Th.rnk	44.3537644	5.06E-07	3.07E-06	MF.103.11b..Salm3.SI.rnk	62.9428165	1.69E-09	1.63E-08
T.8SP24int.Th.rnk	42.865925	4.45E-08	4.92E-07	GN.BM.rnk	60.9658676	3.15E-10	6.06E-09
T.DPbl.Th.rnk	42.1959412	7.68E-10	1.31E-08	MF.Lu.rnk	58.3863313	8.60E-11	2.21E-09
Tgd.vg5.24ahi.Th.rnk	40.9919756	3.97E-12	1.86E-10	MF.II.480hi.PC.rnk	55.6976908	9.43E-10	1.25E-08
T.8Eff.Sp.OT1.48hr.LisOva.rnk	40.8339989	8.39E-07	4.78E-06	GN.Thio.PC.rnk	53.404852	8.61E-11	2.21E-09
T.4FP3.25..LN.rnk	40.0931912	1.51E-05	5.06E-05	GN.Arth.BM.rnk	53.1486978	1.07E-09	1.26E-08
T.4Mem.Sp.rnk	40.034017	6.10E-06	2.39E-05	MF.RP.Sp.rnk	50.2823835	1.63E-09	1.63E-08
T.8SP24..Th.rnk	39.3976068	1.32E-07	1.25E-06	MF.Thio5.II.480lo.PC.rnk	50.1672897	6.62E-09	5.10E-08
T.4SP24..Th.rnk	37.6453635	1.91E-09	2.56E-08	Mo.6C.II..LN.rnk	49.3947395	9.73E-10	1.25E-08
T.4Mem44h62l.Sp.rnk	36.1232657	2.52E-06	1.21E-05	Mo.6C.II..BM.rnk	49.2230681	1.60E-08	1.07E-07

	UP_in_GA			DOWN_in_GA			
	Score	p-value	adjusted p-value		Score	p-value	adjusted p-value
Gamma Delta T-Cell	55.3001141	9.6483E-11	2.2674E-09	Macrophage	78.3629937	7.8734E-13	6.0625E-11
Gamma Delta T-Cell	51.6590126	1.4116E-11	5.3077E-10	Macrophage	70.6792182	1.0481E-05	5.3801E-05
CD8+ T-cell	49.3859076	3.5806E-15	3.3658E-13	Macrophage	70.0561042	8.8126E-09	6.4626E-08
Gamma Delta T-Cell	48.4433864	1.3645E-10	2.5653E-09	Macrophage	69.920643	4.4492E-10	7.613E-09
CD8+ T-cell	44.7876477	5.1879E-11	1.3933E-09	Macrophage	66.6852735	3.2569E-12	1.2539E-10
Natural Killer T-Cell	44.3537644	5.056E-07	3.0662E-06	Macrophage	62.9428165	1.6887E-09	1.6254E-08
CD8+ T-cell	42.865925	4.4494E-08	4.9205E-07	**Granulocytes**	**60.9658676**	**3.1455E-10**	**6.055E-09**
CD4+ CD8+ T-cell blast	42.1959412	7.6762E-10	1.3119E-08	Macrophage	58.3863313	8.6018E-11	2.2088E-09
Gamma Delta T-Cell	40.9919756	3.967E-12	1.8645E-10	Macrophage	55.6976908	9.4261E-10	1.2492E-08
CD8+ T-cell	40.8339989	8.3853E-07	4.7771E-06	**Granulocytes**	**53.404852**	**8.6056E-11**	**2.2088E-09**
*****CD4+ T-cell (FOXP3+)*****	**40.0931912**	**1.5074E-05**	**5.0605E-05**	**Granulocytes**	**53.1486978**	**1.0674E-09**	**1.2645E-08**
CD4+ T-cell	40.034017	6.104E-06	2.3907E-05	Macrophage	50.2823835	1.6276E-09	1.6254E-08
CD8+ T-cell	39.3976068	1.3248E-07	1.2453E-06	Macrophage	50.1672897	6.6206E-09	5.0979E-08
CD4+ T-cell	37.6453635	1.9101E-09	2.565E-08	*****MONOCYTE CELL*****	**49.3947395**	**9.7339E-10**	**1.2492E-08**
CD4+ T-cell	36.1232657	2.5163E-06	1.213E-05	*****MONOCYTE CELL*****	**49.2230681**	**1.6009E-08**	**1.0719E-07**

	UP_in_generic				DOWN_in_generic		
Sample ID	Score	p-value	adjusted p-value	Sample ID	Score	p-value	adjusted p-value
FRC.MLN.rnk	52.3529309	3.50E-12	1.89E-10	CD4Control.rnk	27.1284452	2.16E-11	8.40E-10
FRC.SLN.rnk	50.8630857	4.71E-10	9.54E-09	T.4SP24..Th.rnk	25.7039936	2.33E-10	3.70E-09
Fi.Sk.rnk	50.4164564	5.96E-11	1.61E-09	CD4TESTCJ.rnk	25.0483208	4.40E-11	1.22E-09
LEC.SLN.rnk	50.3428482	8.82E-07	6.81E-06	T.8Nve.Sp.OT1.rnk	23.8378135	6.69E-10	7.63E-09
MF.Thio5.II.480hi.PC.rnk	46.6144241	2.72E-12	1.89E-10	T.4FP3.25..LN.rnk	23.8306189	3.47E-09	2.59E-08
LEC.MLN.rnk	43.3239454	4.18E-07	3.57E-06	T.4Nve.Sp.rnk	23.5977064	3.09E-10	4.28E-09
St.31.38.44..SLN.rnk	41.8497581	1.77E-08	2.60E-07	T.4SP69..Th.rnk	22.6133145	4.58E-13	2.22E-11
BEC.SLN.rnk	39.0754963	5.58E-06	3.62E-05	T.8SP24int.Th.rnk	22.2048891	2.66E-08	1.47E-07
BEC.MLN.rnk	38.2587882	1.37E-05	8.55E-05	T.8SP24..Th.rnk	21.8317119	1.02E-08	6.17E-08
MF.Thio5.II.480int.PC.rnk	38.1519547	1.13E-11	4.56E-10	T.4SP24int.Th.rnk	21.5886147	7.01E-14	6.80E-12
Fi.MTS15..Th.rnk	34.64529	4.61E-05	2.34E-04	T.8Eff.Sp.OT1.d6.LisOva.rnk	20.6215407	9.85E-07	3.61E-06
MF.BM.rnk	32.9364965	6.48E-08	7.50E-07	Tgd.vg2.24ahi.e17.Th.rnk	20.3901357	6.79E-04	0.0016877
MF.103.11b..SI.rnk	32.8779969	1.54E-05	9.22E-05	T.4Mem44h62l.LN.rnk	20.1582351	4.92E-09	3.41E-08
MF.II.480lo.PC.rnk	31.9112677	9.99E-09	1.62E-07	T.8Nve.LN.rnk	19.5000548	8.43E-10	9.09E-09
MF.II.480hi.PC.rnk	31.7857177	6.25E-07	5.06E-06	T.4Mem.Sp.rnk	19.2816021	1.35E-09	1.25E-08

	UP_in_generic				DOWN_in_generic		
	Score	p-value	adjusted p-value		Score	p-value	adjusted p-value
fibroblastic reticular cell	**52.3529309**	**3.4974E-12**	**1.8886E-10**	CD4+ T-cell	27.1284452	2.16E-11	8.40E-10
fibroblastic reticular cell	**50.8630857**	**4.7108E-10**	**9.5394E-09**	CD4+ T-cell	25.7039936	2.33E-10	3.70E-09
fibroblast	**50.4164564**	**5.9643E-11**	**1.6104E-09**	CD4+ T-cell	25.0483208	4.40E-11	1.22E-09
lymphatic endothelial cell	**50.3428482**	**8.823E-07**	**6.8063E-06**	CD8+ T-cell	23.8378135	6.69E-10	7.63E-09
Macrophages	46.6144241	2.72E-12	1.89E-10	***CD4+ T-cell (FOXP3+)***	**23.8306189**	**3.4675E-09**	**2.5873E-08**
lymphatic endothelial cell	**43.3239454**	**4.1832E-07**	**3.5667E-06**	CD4+ T-cell	23.5977064	3.09E-10	4.28E-09
Stromal Cell	**41.8497581**	**1.7724E-08**	**2.6032E-07**	CD4+ T-cell	22.6133145	4.58E-13	2.22E-11
blood endothelial cell	**39.0754963**	**5.5806E-06**	**3.6162E-05**	CD8+ T-cell	22.2048891	2.66E-08	1.47E-07
blood endothelial cell	**38.2587882**	**1.3722E-05**	**8.5496E-05**	CD8+ T-cell	21.8317119	1.02E-08	6.17E-08
Macrophages	38.1519547	1.13E-11	4.56E-10	CD4+ T-cell	21.5886147	7.01E-14	6.80E-12
fibroblast	**34.64529**	**4.6126E-05**	**0.00023351**	CD8+ T-cell	20.6215407	9.85E-07	3.61E-06
Macrophages	32.9364965	6.48E-08	7.50E-07	Gamma Delta T-Cell	20.3901357	6.79E-04	0.0016877
Macrophages	32.8779969	1.54E-05	9.22E-05	CD4+ T-cell	20.1582351	4.92E-09	3.41E-08
Macrophages	31.9112677	9.99E-09	1.62E-07	CD8+ T-cell	19.5000548	8.43E-10	9.09E-09
Macrophages	31.7857177	6.25E-07	5.06E-06	CD4+ T-cell	19.2816021	1.35E-09	1.25E-08

To illustrate the cell-type specificity among the genes differentially expressed between GA and PG, we created a heat map of the differentially expressed genes showing the relative expression of Treg-specific genes, macrophage-specific genes, and monocyte-specific genes in samples activated by GA compared to samples activated by PG (Fig. 8 and Table 12). Consistent with our findings, PG appears to upregulate macrophage and monocyte-related genes while GA appears to upregulate T cell related genes including Tregs.

Table 12: List of genes depicted in the heat map in Figure 8.

Row	Gene	Probe	FoxP3+T Cells
1	RASGRP1	ILMN_1214318	FoxP3+T Cells
2	IL6RA	ILMN_1216057	FoxP3+T Cells
3	CAMK2D	ILMN_1216561	FoxP3+T Cells
4	PRKCH	ILMN_1216897	FoxP3+T Cells
5	ITK	ILMN_1217899	FoxP3+T Cells
6	IQGAP2	ILMN_1218051	FoxP3+T Cells
7	PTPN22	ILMN_1220975	FoxP3+T Cells
8	ZAP70	ILMN_1223542	FoxP3+T Cells
9	ST8SIA4	ILMN_1223948	FoxP3+T Cells
10	SKAP1	ILMN_1224032	FoxP3+T Cells
11	SMPDL3A	ILMN_1224116	FoxP3+T Cells
12	FAM102A	ILMN_1225348	FoxP3+T Cells
13	ITGB7	ILMN_1227434	FoxP3+T Cells
14	RCAN3	ILMN_1227610	FoxP3+T Cells
15	TRAT1	ILMN_1229005	FoxP3+T Cells
16	FAAH	ILMN_1229163	FoxP3+T Cells
17	PDK1	ILMN_1229318	FoxP3+T Cells
18	DDB2	ILMN_1229502	FoxP3+T Cells
19	ECM1	ILMN_1229746	FoxP3+T Cells
20	CEP97	ILMN_1230717	FoxP3+T Cells
21	LEF1	ILMN_1231087	FoxP3+T Cells
22	ZNRF1	ILMN_1232073	FoxP3+T Cells
23	SAMHD1	ILMN_1232707	FoxP3+T Cells
24	IRF9	ILMN_1233461	FoxP3+T Cells
25	DTNB	ILMN_1233894	FoxP3+T Cells
26	PPP3CC	ILMN_1233999	FoxP3+T Cells
27	P4HA1	ILMN_1234565	FoxP3+T Cells
28	FXYD5	ILMN_1235493	FoxP3+T Cells
29	PROS1	ILMN_1235499	FoxP3+T Cells
30	FYB	ILMN_1236105	FoxP3+T Cells
31	CD3E	ILMN_1238847	FoxP3+T Cells
32	NOTCH1	ILMN_1241915	FoxP3+T Cells
33	CST7	ILMN_1244891	FoxP3+T Cells
34	IL18R1	ILMN_1244895	FoxP3+T Cells
35	CD84	ILMN_1245754	FoxP3+T Cells
36	SSBP2	ILMN_1246193	FoxP3+T Cells
37	TBXA2R	ILMN_1248837	FoxP3+T Cells

38	SLAMF1	ILMN_1249863	FoxP3+T Cells
39	RAPGEF6	ILMN_1254088	FoxP3+T Cells
40	MS4A6B	ILMN_1254692	FoxP3+T Cells
41	STK17B	ILMN_1255834	FoxP3+T Cells
42	MCOLN3	ILMN_1256430	FoxP3+T Cells
43	SIT1	ILMN_1258509	FoxP3+T Cells
44	SP6	ILMN_1258571	FoxP3+T Cells
45	TMEM66	ILMN_1258965	FoxP3+T Cells
46	IGFBP4	ILMN_1258988	FoxP3+T Cells
47	TNFRSF18	ILMN_2419490	FoxP3+T Cells
48	TRIB2	ILMN_2432550	FoxP3+T Cells
49	TNIK	ILMN_2470251	FoxP3+T Cells
50	SLA2	ILMN_2474239	FoxP3+T Cells
51	ZFP281	ILMN_2477243	FoxP3+T Cells
52	INADL	ILMN_2490495	FoxP3+T Cells
53	EMB	ILMN_2547873	FoxP3+T Cells
54	SATB1	ILMN_2561103	FoxP3+T Cells
55	SPN	ILMN_2574982	FoxP3+T Cells
56	CD28	ILMN_2589871	FoxP3+T Cells
57	IL27RA	ILMN_2591156	FoxP3+T Cells
58	RNF125	ILMN_2594109	FoxP3+T Cells
59	GIMAP7	ILMN_2595918	FoxP3+T Cells
60	DNAHC8	ILMN_2602341	FoxP3+T Cells
61	BCL11B	ILMN_2611022	FoxP3+T Cells
62	ARHGEF18	ILMN_2612125	FoxP3+T Cells
63	MGST2	ILMN_2613832	FoxP3+T Cells
64	RAB27A	ILMN_2614966	FoxP3+T Cells
65	DPP4	ILMN_2615096	FoxP3+T Cells
66	SOCS3	ILMN_2618176	FoxP3+T Cells
67	A630033H20 RIK	ILMN_2622363	FoxP3+T Cells
68	CMAH	ILMN_2626252	FoxP3+T Cells
69	PELI1	ILMN_2627441	FoxP3+T Cells
70	TMEM71	ILMN_2631610	FoxP3+T Cells
71	THY1	ILMN_2644350	FoxP3+T Cells
72	BZW2	ILMN_2644587	FoxP3+T Cells
73	4632428N05 RIK	ILMN_2651297	FoxP3+T Cells
74	SESN1	ILMN_2654074	FoxP3+T Cells
75	ITGAE	ILMN_2656090	FoxP3+T Cells
76	DGKA	ILMN_2658961	FoxP3+T Cells
77	LRBA	ILMN_2659960	FoxP3+T Cells
78	LAT	ILMN_2660551	FoxP3+T Cells
79	SCML4	ILMN_2661185	FoxP3+T Cells
80	SLFN1	ILMN_2663930	FoxP3+T Cells
81	PRKCQ	ILMN_2667829	FoxP3+T Cells
82	KIF1B	ILMN_2670778	FoxP3+T Cells
83	KLK8	ILMN_2675232	FoxP3+T Cells
84	ZC3H12D	ILMN_2680398	FoxP3+T Cells
85	IL7R	ILMN_2680827	FoxP3+T Cells
86	BCL2	ILMN_2682162	FoxP3+T Cells
87	ARID5B	ILMN_2684638	FoxP3+T Cells

88	PHF11	ILMN_2696491	FoxP3+T Cells
89	CD3D	ILMN_2697415	FoxP3+T Cells
90	RGS10	ILMN_2699531	FoxP3+T Cells
91	ADK	ILMN_2702471	FoxP3+T Cells
92	CRLF3	ILMN_2706803	FoxP3+T Cells
93	GPR83	ILMN_2707941	FoxP3+T Cells
94	TIMP2	ILMN_2712867	FoxP3+T Cells
95	LASS4	ILMN_2718499	FoxP3+T Cells
96	CTSW	ILMN_2721399	FoxP3+T Cells
97	CD3G	ILMN_2722784	FoxP3+T Cells
98	FAM134B	ILMN_2745614	FoxP3+T Cells
99	CD2	ILMN_2753697	FoxP3+T Cells
100	ARHGAP15	ILMN_2759756	FoxP3+T Cells
101	PIK3IP1	ILMN_2769772	FoxP3+T Cells
102	CYB5	ILMN_2775098	FoxP3+T Cells
103	LTA	ILMN_2780247	FoxP3+T Cells
104	NT5E	ILMN_2813830	FoxP3+T Cells
105	SELPLG	ILMN_2820893	FoxP3+T Cells
106	1600014C10RIK	ILMN_2822842	FoxP3+T Cells
107	CD247	ILMN_2828172	FoxP3+T Cells
108	KLHL6	ILMN_2840514	FoxP3+T Cells
109	ACTN1	ILMN_2844996	FoxP3+T Cells
110	INPP4B	ILMN_2854354	FoxP3+T Cells
111	ANXA6	ILMN_2878060	FoxP3+T Cells
112	ZBP1	ILMN_2879614	FoxP3+T Cells
113	IL2RG	ILMN_2886646	FoxP3+T Cells
114	ADD3	ILMN_2901283	FoxP3+T Cells
115	FOXP3	ILMN_2917180	FoxP3+T Cells
116	GBP3	ILMN_2918002	FoxP3+T Cells
117	ARHGEF1	ILMN_2920753	FoxP3+T Cells
118	ARL5C	ILMN_2943057	FoxP3+T Cells
119	DDIT4	ILMN_2993109	FoxP3+T Cells
120	OBFC2A	ILMN_2996904	FoxP3+T Cells
121	NDRG2	ILMN_3001650	FoxP3+T Cells
122	ABHD8	ILMN_3002505	FoxP3+T Cells
123	SELL	ILMN_3009860	FoxP3+T Cells
124	CD27	ILMN_3052501	FoxP3+T Cells
125	GLIPR2	ILMN_3053593	FoxP3+T Cells
126	TMSB10	ILMN_3067068	FoxP3+T Cells
127	GIMAP8	ILMN_3088269	FoxP3+T Cells
128	GRAP2	ILMN_3113787	FoxP3+T Cells
129	CD6	ILMN_3117602	FoxP3+T Cells
130	A430078G23RIK	ILMN_3163163	FoxP3+T Cells
131	Blank		
132	AMPD3	ILMN_1212698	Macrophages
133	YDJC	ILMN_1213274	Macrophages
134	GRWD1	ILMN_1215755	Macrophages
135	CAMK1	ILMN_1216632	Macrophages
136	IFITM6	ILMN_1218181	Macrophages
137	PRMT7	ILMN_1220228	Macrophages

138	CD177	ILMN_1225233	Macrophages
139	TIMM10	ILMN_1227235	Macrophages
140	PYCRL	ILMN_1228613	Macrophages
141	SLC43A1	ILMN_1229667	Macrophages
142	GSTZ1	ILMN_1229964	Macrophages
143	CLEC4A1	ILMN_1230708	Macrophages
144	TACSTD2	ILMN_1231513	Macrophages
145	RCL1	ILMN_1237527	Macrophages
146	RAI12	ILMN_1238130	Macrophages
147	CREG1	ILMN_1239638	Macrophages
148	CSF3R	ILMN_1241302	Macrophages
149	CNPY2	ILMN_1242881	Macrophages
150	PLRG1	ILMN_1244226	Macrophages
151	KDELC1	ILMN_1249999	Macrophages
152	MS4A3	ILMN_1250529	Macrophages
153	FBXW8	ILMN_1251236	Macrophages
154	1110008F13RIK	ILMN_1252407	Macrophages
155	PRKAR2B	ILMN_1253819	Macrophages
156	GCLM	ILMN_1256354	Macrophages
157	HSD3B7	ILMN_1260456	Macrophages
158	TNFRSF21	ILMN_2464573	Macrophages
159	DAD1	ILMN_2471534	Macrophages
160	TNFAIP2	ILMN_2474858	Macrophages
161	PILRA	ILMN_2479717	Macrophages
162	MRPS27	ILMN_2588199	Macrophages
163	MT1	ILMN_2596522	Macrophages
164	REPIN1	ILMN_2605767	Macrophages
165	PYGL	ILMN_2615015	Macrophages
166	GART	ILMN_2622163	Macrophages
167	ACSL1	ILMN_2622671	Macrophages
168	POMP	ILMN_2625352	Macrophages
169	FZR1	ILMN_2629971	Macrophages
170	WDR55	ILMN_2640453	Macrophages
171	NUP133	ILMN_2654013	Macrophages
172	LIG1	ILMN_2657356	Macrophages
173	NDUFA9	ILMN_2657694	Macrophages
174	GSTT3	ILMN_2665715	Macrophages
175	SLC6A9	ILMN_2667384	Macrophages
176	JOSD2	ILMN_2667614	Macrophages
177	SLC39A11	ILMN_2668706	Macrophages
178	TBRG4	ILMN_2670230	Macrophages
179	THOP1	ILMN_2674324	Macrophages
180	SLC11A1	ILMN_2674884	Macrophages
181	MGAT4B	ILMN_2684268	Macrophages
182	PCYOX1L	ILMN_2684575	Macrophages
183	SORT1	ILMN_2685772	Macrophages
184	BCS1L	ILMN_2691345	Macrophages
185	DYRK3	ILMN_2699522	Macrophages
186	PLSCR1	ILMN_2701271	Macrophages
187	SYNGR2	ILMN_2706231	Macrophages
188	SCAMP1	ILMN_2706853	Macrophages

189	S100A8	ILMN_2710905	Macrophages
190	LCN2	ILMN_2712075	Macrophages
191	CHI3L3	ILMN_2712986	Macrophages
192	ABHD4	ILMN_2713464	Macrophages
193	MUC13	ILMN_2717678	Macrophages
194	MPO	ILMN_2719256	Macrophages
195	POLR1B	ILMN_2723483	Macrophages
196	INTS7	ILMN_2726174	Macrophages
197	RRP12	ILMN_2728118	Macrophages
198	SIRPA	ILMN_2744683	Macrophages
199	FPGS	ILMN_2747070	Macrophages
200	2610027L16RIK	ILMN_2750842	Macrophages
201	PRTN3	ILMN_2758029	Macrophages
202	GFI1B	ILMN_2772930	Macrophages
203	TMEM176A	ILMN_2795412	Macrophages
204	S100A9	ILMN_2803674	Macrophages
205	0610007P14RIK	ILMN_2808939	Macrophages
206	MED24	ILMN_2818189	Macrophages
207	TGFBI	ILMN_2834379	Macrophages
208	CD151	ILMN_2836710	Macrophages
209	SLC25A39	ILMN_2855261	Macrophages
210	PIGQ	ILMN_2877507	Macrophages
211	TMBIM1	ILMN_2908056	Macrophages
212	TREM3	ILMN_2915303	Macrophages
213	CTPS	ILMN_2932964	Macrophages
214	ANXA4	ILMN_2935012	Macrophages
215	FBXL6	ILMN_2935032	Macrophages
216	TRAPPC1	ILMN_2943661	Macrophages
217	RASSF4	ILMN_2956095	Macrophages
218	TSPAN31	ILMN_2964076	Macrophages
219	PARP1	ILMN_2971744	Macrophages
220	CMTM7	ILMN_2985447	Macrophages
221	ASNS	ILMN_3006123	Macrophages
222	CD63	ILMN_3052430	Macrophages
223	UNG	ILMN_3056503	Macrophages
224	NAIP5	ILMN_3059557	Macrophages
225	ATIC	ILMN_3070951	Macrophages
226	RBPMS	ILMN_3099398	Macrophages
227	FTSJ1	ILMN_3135668	Macrophages
228	ANXA3	ILMN_3135781	Macrophages
229	WDR6	ILMN_3162081	Macrophages
230	Blank		
231	AMPD3	ILMN_1212698	Monocytes
232	PLXND1	ILMN_1214608	Monocytes
233	CLN3	ILMN_1214952	Monocytes
234	CAMK1	ILMN_1216632	Monocytes
235	AIFM2	ILMN_1216842	Monocytes
236	IFITM6	ILMN_1218181	Monocytes
237	TM9SF4	ILMN_1220640	Monocytes
238	LMAN2L	ILMN_1220769	Monocytes

239	PLEKHG3	ILMN_1221920	Monocytes
240	ROGDI	ILMN_1222821	Monocytes
241	CD177	ILMN_1225233	Monocytes
242	SCAMP2	ILMN_1226985	Monocytes
243	ZEB2	ILMN_1227793	Monocytes
244	PIAS3	ILMN_1227889	Monocytes
245	PYCRL	ILMN_1228613	Monocytes
246	CLEC4A1	ILMN_1230708	Monocytes
247	CREG1	ILMN_1239638	Monocytes
248	SLC7A7	ILMN_1240318	Monocytes
249	CSF3R	ILMN_1241302	Monocytes
250	OLFM1	ILMN_1241371	Monocytes
251	SGPL1	ILMN_1245609	Monocytes
252	CASP1	ILMN_1247592	Monocytes
253	NQO2	ILMN_1247930	Monocytes
254	DUSP6	ILMN_1248537	Monocytes
255	KDELC1	ILMN_1249999	Monocytes
256	MS4A3	ILMN_1250529	Monocytes
257	FBXW8	ILMN_1251236	Monocytes
258	1110008F13RIK	ILMN_1252407	Monocytes
259	HSD3B7	ILMN_1260456	Monocytes
260	TYK2	ILMN_2455701	Monocytes
261	TNFRSF21	ILMN_2464573	Monocytes
262	DAD1	ILMN_2471534	Monocytes
263	TNFAIP2	ILMN_2474858	Monocytes
264	PILRA	ILMN_2479717	Monocytes
265	VNN3	ILMN_2491202	Monocytes
266	GM962	ILMN_2531520	Monocytes
267	TMEM51	ILMN_2589741	Monocytes
268	UBE2F	ILMN_2590350	Monocytes
269	PYGL	ILMN_2615015	Monocytes
270	GART	ILMN_2622163	Monocytes
271	ACSL1	ILMN_2622671	Monocytes
272	POMP	ILMN_2625352	Monocytes
273	FZR1	ILMN_2629971	Monocytes
274	NUP133	ILMN_2654013	Monocytes
275	LIG1	ILMN_2657356	Monocytes
276	STXBP2	ILMN_2657728	Monocytes
277	SLC39A11	ILMN_2668706	Monocytes
278	SLC11A1	ILMN_2674884	Monocytes
279	ATP6V1B2	ILMN_2680440	Monocytes
280	MGAT4B	ILMN_2684268	Monocytes
281	PCYOX1L	ILMN_2684575	Monocytes
282	SORT1	ILMN_2685772	Monocytes
283	FAM129B	ILMN_2686975	Monocytes
284	MTMR14	ILMN_2689062	Monocytes
285	CD44	ILMN_2697830	Monocytes
286	SYNGR2	ILMN_2706231	Monocytes
287	NLRX1	ILMN_2708222	Monocytes
288	S100A8	ILMN_2710905	Monocytes
289	LCN2	ILMN_2712075	Monocytes

290	1810033B17RIK	ILMN_2712151	Monocytes
291	CHI3L3	ILMN_2712986	Monocytes
292	ABHD4	ILMN_2713464	Monocytes
293	MPO	ILMN_2719256	Monocytes
294	MAPK14	ILMN_2721809	Monocytes
295	TLR2	ILMN_2733733	Monocytes
296	WWP2	ILMN_2744245	Monocytes
297	SIRPA	ILMN_2744683	Monocytes
298	PLEKHO2	ILMN_2749448	Monocytes
299	2610027L16RIK	ILMN_2750842	Monocytes
300	BID	ILMN_2757287	Monocytes
301	PRTN3	ILMN_2758029	Monocytes
302	LRRC8D	ILMN_2766455	Monocytes
303	TMEM38B	ILMN_2795791	Monocytes
304	S100A9	ILMN_2803674	Monocytes
305	HMGCL	ILMN_2822131	Monocytes
306	TGFBI	ILMN_2834379	Monocytes
307	CD151	ILMN_2836710	Monocytes
308	SLC25A39	ILMN_2855261	Monocytes
309	COPZ1	ILMN_2862093	Monocytes
310	CSF2RA	ILMN_2866276	Monocytes
311	CDC42BPB	ILMN_2867696	Monocytes
312	MOCOS	ILMN_2906489	Monocytes
313	TMBIM1	ILMN_2908056	Monocytes
314	TREM3	ILMN_2915303	Monocytes
315	ANXA4	ILMN_2935012	Monocytes
316	FBXL6	ILMN_2935032	Monocytes
317	IRAK2	ILMN_2937735	Monocytes
318	TRAPPC1	ILMN_2943661	Monocytes
319	RASSF4	ILMN_2956095	Monocytes
320	TSPAN31	ILMN_2964076	Monocytes
321	CMTM7	ILMN_2985447	Monocytes
322	SLC15A3	ILMN_2987709	Monocytes
323	NAIP5	ILMN_3059557	Monocytes
324	RBPMS	ILMN_3099398	Monocytes
325	PTPN6	ILMN_3113420	Monocytes
326	ANXA3	ILMN_3135781	Monocytes
327	TBC1D2	ILMN_3140913	Monocytes

To further investigate discrepant cell type activation between the GA and PG, we utilized the non-parametric Wilcoxon rank-sum test to determine which genes had significantly higher expression from PG than from GA, and performed an enrichment using MSigDB (Methods). The TLR signaling pathway was significantly enriched (adjusted $p < 1.27 \times 10^{-6}$, Table 9). Among the overlap genes significant by Wilcoxon and present in this pathway were CD14, a monocyte marker, and TLR2. Kernel density plots (Fig. 10A), which can be likened to a

smoothed histogram, show the differences in expression between PG and GA for these two genes. The boxplots for these two genes can be found in Figure 9.

Hypothesizing that both CD14 and TLR2 are associated with the same cell type (monocytes), we confirmed that the same PG samples had unusually high expression of both CD14 and TLR2 (Fig. 10B).

Example 10

Investigating the mechanisms underlying observed differences: why does PG upregulate Tregs less effectively than GA?

Because monocytes may play a role in the mechanisms by which GA induces Tregs,(49) we sought to compare the expression of FOXP3 and CD14 in individual samples. PG samples with low FOXP3 also have high CD14 (Fig. 10C). This suggested that the differential impact on monocytes may be one mechanism by which GA and PG differentially impact Tregs.

Another mechanism by which GA and PG may differentially impact Tregs involves interferon gamma, which is known to induce FOXP3 expression(50) and to be necessary for GA-induced FOXP3 expression.(51) IFNG is upregulated dramatically by GA compared to PG: probes for IFNG are the #1 and #3 ranked probes by fold change for higher expression from GA (Table 8 and Fig. 11). Indeed, those PG samples with unusually low in FOXP3 are also unusually low in IFNG (Fig. 11).

Example 11

Investigating the mechanisms underlying observed differences: why does PG upregulate monocytes?

GA is known to reduce CD40 expression levels on monocytes,(49) which is consistent with our observation that CD40 is among the list of genes with significantly lower expression (Wilcoxon, Methods) following activation by GA than following activation by PG (Fig. 12). GA has a different impact on monocytes stimulated by T cell contact versus LPS: in the former case GA causes a decrease in monocyte IL1B production while in the latter case GA causes its increase.(52) This was notable because performing an MSigDB enrichment (Methods) on genes with higher expression from PG

(Wilcoxon, Methods) also yielded significant enrichment in an LPS response pathway (adjusted p < 4.96 x 10-6, Table 9). Moreover, we show that those PG samples with low levels of FOXP3 also have high levels of IL1B (Fig. 10D). GSEA analysis indicated that genes specific to monocytes and macrophages were significantly enriched among those genes with higher expression in PG than GA (Fig. 9E). IL1B also appears to be associated with monocytes, as it is highly correlated with CD14 (Fig. 13). Finally, IL1B levels are significantly higher in PG than GA both by ANOVA (adjusted p < 0.043) and LIMMA with background subtraction (adjusted p < 0.037)(Table 8).

In order to determine if GA and PG were influencing different subtypes of monocytes, we performed a GSEA analysis using gene lists from literature examining human CD16+ and CD16dim monocytes.(53) We found that among the genes upregulated by PG relative to medium, there was a significant enrichment in CD16dim monocytes (FDR q = 0.132, where the significance threshold is 0.25). Among the genes upregulated by GA relative to medium, there was a significant enrichment in CD16+ monocytes (FDR q = 0.052, where the significance threshold is 0.25)(Fig. 14).

Methods - Examples 5-11

Experimental Design, Data Collection, and Pre-Processing

The experimental design, data collection, and pre-processing steps have been previously described.*(15)* In brief, (Balb/c x SJL) F1 mice were injected with GA reference standard in order to induce GA-reactive T cells. After 3 days the mice were sacrificed, their splenocytes were isolated, and these splenocytes were mixed with activator solutions for 24 hours. The activator solutions include multiple batches of GA, as well as glatiramer acetate reference standard, and multiple batches of PG (Glatimer, Natco Pharma, Ltd., Hyderabad, India). Then the RNA was extracted and gene expression characterized by microarray using an Illumina WG-6_V2 chip. Illumina's BeadStudio software was utilized for image processing, quantification of signal intensity per bead, and background signal correction. The microarray data have been deposited in the Gene Expression Omnibus, under accession number GSE40566.

Data processing steps

We quantile normalized the extracted data for all 214 samples across all 46,547 probes via the "preprocessCore" package in R*(29)*. We then corrected for batch variation with ComBat*(30)* as implemented in the SVA package of R*(62)*. Each microarray's chip designation was supplied a batch label; there were 18 batches in all. The labels for the treatments (i.e. drug product, reference standard…) were added as covariates.

Variability Analysis Method

In order to identify probes with variability induced specifically by activation (as opposed to experimental noise), we sought to identify probes that were significantly more variable when activated with either GA or PG than medium. Using an F-test, we compared GA against Medium for each probe and compared PG against Medium. We then took the set of probes where either treatment comes up to be more variable than medium (union, passes in at least at least one). For those set of probes only, we compared the variability of GA to PG, utilizing an Ftest to measure significance of the differences between the probes.

Tolerance Method for Assessing Process Variability:

The goal of large scale industrial processing is to produce a large quantity of product which is of the same quality as that produced on a small scale. To assess the process consistency of GA and PG, we needed a standard of comparison. This standard of comparison was constructed by first identifying the top 1000 probes by absolute fold change of reference standard compared to the medium (**Table 13**). The list includes both upregulated and downregulated probes compared to medium. Probes were filtered such that ones upregulated by reference standard needed to have an average reference standard expression of 6.00 or higher and ones downregulated by reference standard needed to have an average medium expression of 6.00 or higher. This ensured that the list of 1000 probes were both significantly affected by reference standard and were sufficiently expressed to avoid noise associated with lowly expressed probes.

Table 13: Genes utilized for the tolerance method illustrated in Figure 4B.

ID	Gene	AVG Medium	AVG Reference Standard	AVG GA	AVG generic
ILMN_2685712	IFNG	7.151943333	11.25528947	11.16330882	10.66788182
ILMN_1247309	IL3	5.823283333	9.406355263	9.384125	9.421563636
ILMN_2791459	IFNG	6.636043333	9.829173684	9.710919118	9.303940909
ILMN_1215862	CXCL9	7.341613333	9.816544737	9.756617647	9.524722727
ILMN_2595732	LOC100046232	9.24871	11.50916579	11.54660147	11.76695
ILMN_2931334	IL4	6.171636667	8.367486842	8.425076471	8.496068182
ILMN_2718330	CISH	9.18378	11.37349211	11.34956176	11.42528636
ILMN_2445789	TNFRSF9	6.794626667	8.943107895	8.962886765	8.867340909
ILMN_1235499	PROS1	6.8909	8.894226316	8.934763235	8.691490909
ILMN_1236588	CAR1	7.761993333	9.729336842	9.793017647	9.715413636
ILMN_2588216	IL8RA	8.623573333	6.726942105	6.682098529	6.572263636
ILMN_2680827	IL7R	10.26270333	8.408492105	8.445019118	8.336627273
ILMN_3103746	TNFRSF9	6.92238	8.764752632	8.744404412	8.737481818
ILMN_2606162	PDLIM4	7.95422	9.731202632	9.727291176	9.501227273
ILMN_1213954	SGK1	11.41363	9.661723684	9.666986765	9.421709091
ILMN_1216042	APOE	9.313533333	7.564486842	7.5268	7.541936364
ILMN_2507761	7530404M11RIK	5.58119	7.321434211	7.426433824	7.179863636
ILMN_3142803	CXCL10	6.9917	8.700381579	8.707408824	8.518177273
ILMN_1249030	MPO	9.78357	8.174247368	8.410351471	8.711063636
ILMN_1214841	IL24	6.20973	7.810955263	7.762489706	7.504672727
ILMN_2744890	GADD45G	8.972466667	10.57273421	10.65257941	10.53536818
ILMN_2742861	SERPINA3F	8.155613333	9.724289474	9.630060294	9.550477273
ILMN_1217389	PKIB	9.656156667	11.20944737	11.18970735	11.08776818
ILMN_2749412	CSF2	6.444243333	7.991860526	7.939511765	7.916009091
ILMN_2426853	UBD	6.649816667	8.167139474	8.137648529	7.952622727
ILMN_2725927	SERPINA3G	12.45885667	13.95378947	13.90402647	13.98564545
ILMN_3094853	PKIB	7.606836667	9.100334211	9.029398529	9.009122727
ILMN_1220788	GM590	6.52345	8.002165789	8.021569118	7.660568182
ILMN_2780247	LTA	7.175613333	8.633663158	8.581783824	8.382890909
ILMN_2600421	MPO	8.83189	7.385586842	7.594448529	7.965109091
ILMN_2947526	ECM1	8.577696667	10.02243947	10.05155441	9.810595455
ILMN_2772264	IGH-VJ558	11.98722333	10.55665789	10.57623824	10.44005909
ILMN_1229804	LTA	6.55449	7.963042105	8.009302941	7.831009091
ILMN_2506039	A130090K04RIK	9.575673333	8.169478947	8.136902941	7.924245455
ILMN_2762983	TBX21	7.060853333	8.465081579	8.480467647	8.371186364
ILMN_2756046	FFAR2	7.936103333	9.323384211	9.336789706	9.122636364
ILMN_2903945	GADD45G	11.30813	12.65795526	12.67639853	12.61029091
ILMN_2878071	LYZ	11.69561333	10.38226579	10.50047647	10.79755909
ILMN_2460094	WNT10A	8.443006667	7.148705263	7.098610294	7.211363636
ILMN_1252076	LYZ2	9.709593333	8.418768421	8.645485294	8.893840909
ILMN_1224336	SPSB1	7.674476667	8.962918421	8.950477941	8.84225
ILMN_2446559	TNFRSF4	9.380393333	10.65664474	10.65343824	10.55523636
ILMN_2717176	RGL1	8.882566667	7.607873684	7.561447059	7.5231
ILMN_2741201	IL17F	7.970356667	9.233218421	9.281625	9.150545455
ILMN_3090207	CYP4F18	9.138546667	7.882936842	7.951694118	7.8979
ILMN_2546272	GNG12	8.461113333	9.715955263	9.731457353	9.698468182
ILMN_2548681	4930426D05RIK	8.374753333	7.133186842	7.100458824	7.092509091
ILMN_2664224	EPHX1	11.05266667	9.821181579	9.83665	9.763663636
ILMN_1235926	A630072M18RIK	7.662946667	8.890823684	8.780570588	8.808022727

ILMN_1227900	IL12RB1	6.848926667	8.074565789	8.071257353	8.030231818
ILMN_1259075	NME7	9.56043	8.337597368	8.301139706	8.096959091
ILMN_2770066	LOC100044439	10.47755333	9.276686842	9.229413235	9.231372727
ILMN_1227434	ITGB7	11.00959333	9.814152632	9.885063235	9.683159091
ILMN_1233474	IL2RA	6.869136667	8.061205263	8.134330882	7.977345455
ILMN_2906430	ICOS	8.19493	9.379094737	9.444848529	9.41605
ILMN_1221819	FCGRT	9.812453333	8.634481579	8.525132353	8.270463636
ILMN_2767615	ATP1B1	8.774563333	7.597357895	7.592442647	7.479663636
ILMN_2707941	GPR83	8.052503333	9.212121053	9.204789706	8.896509091
ILMN_1233987	1110014O20RIK	8.7487	9.906276316	9.906113235	9.809395455
ILMN_2758720	SYPL	10.40974667	11.56390526	11.58090735	11.63484091
ILMN_2522750	TRIO	9.803086667	8.660626316	8.588198529	8.569590909
ILMN_2703182	LGALS7	5.84539	6.982352632	6.931479412	6.807209091
ILMN_2729252	5830431A10RIK	8.978433333	7.842484211	7.881010294	7.62365
ILMN_1249366	LOC100046608	8.23407	9.368084211	9.364801471	9.143586364
ILMN_2670778	KIF1B	9.548573333	8.416486842	8.422280882	8.337918182
ILMN_1254669	SYPL	9.745053333	10.87525263	10.84873088	10.82055
ILMN_2706514	LOC100046608	7.5095	8.634492105	8.612260294	8.444136364
ILMN_2618148	C330008K14RIK	8.92018	10.04062895	10.14341765	9.885018182
ILMN_2634796	SOCS1	6.6267	7.742844737	7.681489706	7.639990909
ILMN_2467190	BAMBI-PS1	8.600723333	7.486402632	7.445139706	7.239054545
ILMN_2917497	FCGRT	8.608183333	7.498360526	7.495925	7.383177273
ILMN_3130403	BC004728	8.17928	9.286213158	9.314702941	9.245672727
ILMN_2758264	CYP2S1	7.54357	6.441436842	6.418064706	6.3116
ILMN_2725259	IL2	6.447773333	7.549121053	7.490217647	7.949609091
ILMN_1247198	BC004728	9.205513333	10.29546842	10.36407941	10.27191818
ILMN_2612125	ARHGEF18	11.20628	10.12344737	10.09455882	9.868472727
ILMN_1218240	CD69	10.80300333	11.88487105	11.83365882	11.85055909
ILMN_2510694	NME7	8.52766	7.449481579	7.434319118	7.279186364
ILMN_2706232	SYNGR2	9.92304	10.98201579	11.08668088	11.19834545
ILMN_2754364	LTF	9.291486667	8.233002632	8.257197059	8.373727273
ILMN_2844996	ACTN1	10.95206667	9.899202632	9.844863235	9.639622727
ILMN_2596596	RGS1	7.544413333	8.596763158	8.683054412	8.546304545
ILMN_1234706	IGHA_J00475$V00785_IG_HEAVY_CONSTANT_ALPHA_135	8.30976	7.263773684	7.221332353	7.160227273
ILMN_1244874	SYNGR2	9.75433	10.79814737	10.86721029	10.9914
ILMN_2724465	CCR8	5.868983333	6.910739474	6.962161765	6.952495455
ILMN_2890515	NSG2	7.526546667	6.487660526	6.466486765	6.366909091
ILMN_2690241	PKIB	6.76308	7.799152632	7.745076471	7.7524
ILMN_2731237	D8ERTD82E	7.88429	8.912992105	8.974445588	9.155922727
ILMN_1218037	TMIE	7.753076667	8.776018421	8.751725	8.420295455
ILMN_2740407	PDE2A	7.706153333	6.685718421	6.704382353	6.679877273
ILMN_2799452	IL12RB1	6.439253333	7.457005263	7.404963235	7.448872727
ILMN_2678724	DUSP10	7.155803333	8.172573684	8.260263235	8.096786364
ILMN_2669714	CTSA	8.099546667	9.113136842	9.205033824	9.180018182
ILMN_2636536	PLA2G12A	8.84106	9.8543	9.883701471	9.88105
ILMN_1224116	SMPDL3A	8.557293333	7.546207895	7.587558824	7.453181818
ILMN_2625377	RGS1	8.738546667	9.746213158	9.769272059	9.687659091
ILMN_2635272	IGH-VJ558	14.29845	13.29094737	13.22015294	13.18095
ILMN_2534151	IRGB10	8.701546667	9.704373684	9.691323529	9.5531
ILMN_1239797	6030400N17RIK	7.333296667	6.331097368	6.341064706	6.274213636
ILMN_1249021	BCL2	7.82453	8.822494737	8.747633824	8.542981818
ILMN_2987709	SLC15A3	9.175186667	10.16891579	10.19635147	10.39172273
ILMN_2717975	TCF7	9.211256667	8.222889474	8.215898529	8.083790909

ILMN_2706231	SYNGR2	10.31389	11.30210263	11.42013235	11.58176364
ILMN_2769772	PIK3IP1	8.618043333	7.649376316	7.746248529	7.440986364
ILMN_2944824	HP	8.98318	8.016268421	8.174917647	8.30705
ILMN_2947234	CBX7	8.6477	7.682768421	7.728530882	7.684054545
ILMN_1242308	TCF7	9.232466667	8.26825	8.260585294	8.138781818
ILMN_3053593	GLIPR2	10.08712	11.04892632	11.06006324	10.93565455
ILMN_2658501	IFITM3	10.38816667	11.34819474	11.42799853	11.42086818
ILMN_2668333	PRG4	6.984513333	6.026434211	5.988755882	5.921604545
ILMN_1247893	CGEF2-PENDING	9.050576667	8.096818421	8.110351471	7.883945455
ILMN_1248843	GATA3	7.34306	8.294652632	8.224369118	8.104072727
ILMN_2773900	GLIPR2	9.729866667	10.68112895	10.63013088	10.46443182
ILMN_2873750	GLDC	5.92132	6.870686842	6.770875	6.741440909
ILMN_2699898	ITGAE	8.418296667	7.469634211	7.501901471	7.236572727
ILMN_1217629	ITGAE	8.464196667	7.527947368	7.552825	7.319981818
ILMN_2897891	RGS1	7.728746667	8.660318421	8.707230882	8.614995455
ILMN_2806549	PRM1	5.990036667	6.916326316	6.894220588	6.788813636
ILMN_1229827	ST7	6.727336667	7.649644737	7.737477941	7.809095455
ILMN_1254634	ACPL2	8.50204	7.581063158	7.572779412	7.580222727
ILMN_2925094	MPO	7.105436667	6.185805263	6.332797059	6.577845455
ILMN_2687652	PRM1	5.935833333	6.854623684	6.849060294	6.777136364
ILMN_3047389	GBP2	7.03435	7.947555263	7.887723529	7.679313636
ILMN_2659739	IL7R	7.364306667	6.458986842	6.442688235	6.261427273
ILMN_1246543	SIAT7C	9.223836667	8.320423684	8.378747059	8.210077273
ILMN_2818964	DUSP10	7.31253	8.215365789	8.287358824	8.062272727
ILMN_2600928	OVGP1	7.453986667	6.557389474	6.540479412	6.507018182
ILMN_2631752	CTLA4	7.81105	8.706171053	8.619783824	8.483668182
ILMN_2663249	SLAMF9	9.11594	8.222615789	8.243369118	8.1212
ILMN_2614889	B3GNT8	9.81282	8.920905263	8.953698529	8.841236364
ILMN_2939681	LYZS	7.795363333	6.9062	6.970098529	7.154781818
ILMN_2696492	PHF11	8.6652	9.553802632	9.454427941	9.271490909
ILMN_1230045	4933437K13RIK	8.913463333	9.798655263	9.824382353	9.735468182
ILMN_2996904	OBFC2A	6.96731	7.850726316	7.798394118	7.615513636
ILMN_2513451	1110046J11RIK	11.05034	10.16700789	10.15531618	10.12564091
ILMN_1217180	IFITM1	10.89041667	11.77217632	11.84941765	11.83110455
ILMN_1259174	SCIN	8.775283333	9.655794737	9.640454412	9.632631818
ILMN_2481117	1700052O22RIK	10.66834667	9.788118421	9.815542647	9.722204545
ILMN_1234539	IRGM1	10.58084333	11.46092105	11.438425	11.37995455
ILMN_2611755	SERPINB6B	7.277453333	8.156736842	8.188377941	8.19805
ILMN_1233293	GBP1	10.84405667	11.71913684	11.66407353	11.49095455
ILMN_2646625	JUN	7.34434	8.218031579	8.291385294	8.082372727
ILMN_2761720	LOC100041103	8.500646667	7.629236842	7.612494118	7.366713636
ILMN_1237871	AMPD1	7.304966667	6.433939474	6.446288235	6.283995455
ILMN_2789650	CSRP3	6.64884	7.517015789	7.601960294	7.724718182
ILMN_2682162	BCL2	7.844683333	8.709405263	8.674883824	8.569540909
ILMN_2932359	TPI1	10.31272	11.17369737	11.19473235	10.92615455
ILMN_1214071	IFITM1	10.60328	11.4639	11.54568971	11.61521364
ILMN_1242622	CREM	7.411453333	8.271910526	8.247942647	8.217618182
ILMN_1237338	DDX25	7.421036667	6.560686842	6.532476471	6.45865
ILMN_1218525	IL18R1	8.817636667	7.958268421	7.945545588	7.754745455
ILMN_2636403	AXUD1	9.995656667	10.85401842	10.84707206	10.69045909
ILMN_2578341	B930094H08RIK	7.454906667	6.597310526	6.497302941	6.428463636
ILMN_2658878	TG	6.5678	7.422852632	7.479155882	7.382472727
ILMN_2726471	EN2	5.743626667	6.598660526	6.582991176	6.530154545
ILMN_1214294	SNX29	6.848423333	7.702268421	7.713407353	7.705336364

ILMN_2646322	SAMSN1	10.94873	11.79982368	11.86731176	11.88902273
ILMN_2777019	SPO11	7.814436667	6.967128947	6.908411765	6.728213636
ILMN_2678726	RASGRP2	7.477166667	6.636023684	6.733875	6.734577273
ILMN_2700689	IBRDC3	8.3528	9.193568421	9.290398529	9.354804545
ILMN_1244866	GBP5	8.2183	9.058268421	9.012258824	8.881472727
ILMN_2765759	ASB2	8.020873333	8.860181579	8.794510294	8.691077273
ILMN_1239878	PRSS34	7.13797	6.298813158	6.278086765	6.330131818
ILMN_2689401	MCOLN2	8.4654	7.62645	7.5921	7.59695
ILMN_2447712	IBRDC3	6.955663333	7.792826316	7.789882353	7.901122727
ILMN_1223600	INDO	6.495596667	7.332621053	7.296913235	7.166577273
ILMN_2751603	PHXR4	9.941726667	9.109602632	8.973426471	8.817872727
ILMN_1221516	LOC100048841	6.434853333	7.2654	7.302933824	7.260995455
ILMN_2419494	TNFRSF18	9.906223333	10.73479474	10.79889559	10.57273636
ILMN_1214783	A530050E01RIK	8.485986667	7.659539474	7.615842647	7.62025
ILMN_1239729	KIF1B	8.392053333	7.567934211	7.516839706	7.370368182
ILMN_1233501	C530027B15RIK	9.48782	8.663984211	8.683922059	8.504722727
ILMN_1253182	HS3ST1	8.033893333	8.855842105	8.805114706	8.860563636
ILMN_2638491	SLAMF7	7.82434	8.644642105	8.627872059	8.595940909
ILMN_2592953	SCG5	7.77508	6.956702632	6.960557353	6.79455
ILMN_1218036	SCO1	8.34345	9.161613158	9.071594118	9.090790909
ILMN_1229840	FCRLA	10.64000667	9.823918421	9.907154412	9.789463636
ILMN_1260046	SFT2D2	9.51672	10.33144474	10.2783	10.18119545
ILMN_2662097	RAB35	10.63486	11.44911053	11.42574559	11.5381
ILMN_2696491	PHF11	8.4808	9.294965789	9.237983824	9.094609091
ILMN_1249824	IGF1R	7.569356667	6.755618421	6.779692647	6.7302
ILMN_2789900	CD177	7.385106667	6.571739474	6.62825	6.835731818
ILMN_2665545	RIN3	9.836286667	9.024592105	9.014795588	8.852218182
ILMN_3122961	GBP2	12.90305333	13.71437895	13.71902353	13.60109545
ILMN_2602899	CREM	6.903246667	7.7135	7.713844118	7.7371
ILMN_1258965	TMEM66	11.24646333	10.43824474	10.41262794	10.26992273
ILMN_1238725	C130086J11RIK	6.425446667	7.233239474	7.187627941	7.029145455
ILMN_2855315	HIST1H1C	9.337553333	8.530276316	8.505617647	8.621104545
ILMN_2658961	DGKA	11.82494	11.01769737	11.06722353	10.9061
ILMN_1217723	STAU2	7.913883333	8.719473684	8.736936765	8.7426
ILMN_2431237	XBP1	11.49460333	12.30005789	12.26956618	12.30432273
ILMN_2619200	ERAF	7.865656667	8.669657895	8.714435294	8.671418182
ILMN_1234698	TSPAN2	6.670486667	7.473368421	7.425954412	7.439659091
ILMN_2795178	RFTN2	8.005233333	7.209273684	7.217733824	7.237681818
ILMN_1258283	LTB	11.83477333	11.04274211	11.03906324	10.91391364
ILMN_2643513	ASNS	9.04453	9.835744737	9.741755882	9.861822727
ILMN_1258357	DOK3	12.26605	11.47897632	11.44765	11.44477727
ILMN_2491741	TRIO	7.336273333	6.549247368	6.611138235	6.557227273
ILMN_2492284	AA536717	7.253643333	6.468510526	6.484120588	6.349872727
ILMN_3128992	CD27	11.71615	10.93310263	10.95738971	10.65876364
ILMN_2742068	CSRP3	6.410026667	7.191834211	7.259801471	7.395309091
ILMN_2419490	TNFRSF18	10.22464333	11.00578158	11.07498088	10.83858636
ILMN_2650953	SLC12A7	7.512276667	6.731831579	6.744029412	6.646413636
ILMN_2749063	DOCK10	7.141206667	7.920371053	7.865589706	7.847540909
ILMN_2807084	ACOT7	8.594826667	9.372	9.352392647	9.372054545
ILMN_2473692	1110059G02RIK	7.65595	6.880018421	6.850135294	6.816413636
ILMN_1237695	PFKP	9.860906667	10.63633421	10.65613824	10.56410455
ILMN_2592486	genericLYRP1	8.485243333	7.710365789	7.785183824	7.734190909
ILMN_2630993	PPAP2B	8.248056667	7.473742105	7.506554412	7.530063636
ILMN_3006767	MLKL	7.866353333	8.638142105	8.575160294	8.697018182

ILMN_1244343	B230369L08RIK	10.64261667	9.871126316	9.899548529	9.819563636
ILMN_2888191	CCR5	7.154613333	7.925273684	7.880173529	7.807190909
ILMN_1248413	FASL	6.024673333	6.795171053	6.780129412	6.697140909
ILMN_2803674	S100A9	11.68038333	10.91212105	11.05074559	11.24515455
ILMN_2691014	KLHL14	7.10078	6.333918421	6.30465	6.381831818
ILMN_2725448	SYTL3	6.27369	7.040426316	7.029935294	6.914209091
ILMN_2666272	HEMK1	8.380666667	9.14595	9.173805882	9.25
ILMN_2540103	LOC666559	9.92083	10.68557895	10.7199	10.70793636
ILMN_2488997	2010005O13RIK	9.116286667	9.880084211	9.797192647	9.668695455
ILMN_3137287	LIF	5.682976667	6.44575	6.403722059	6.416013636
ILMN_2668510	HP	8.153523333	7.391392105	7.507407353	7.527177273
ILMN_2646891	CENTD1	10.04395333	10.80583684	10.76900441	10.81540909
ILMN_2614161	LSS	8.567596667	9.328973684	9.397113235	9.497386364
ILMN_2976440	BLK	10.83170333	10.07106842	10.05113971	10.12329545
ILMN_2654074	SESN1	11.24036667	10.47988947	10.44926176	10.32896818
ILMN_2593143	DOCK10	10.52829667	11.28851579	11.30300882	11.33595
ILMN_1239397	LOC100047934	9.405073333	10.16416842	10.16762353	10.09550909
ILMN_2668509	HP	7.943053333	7.184218421	7.287372059	7.381036364
ILMN_1232621	ANK	7.856653333	7.099386842	7.122891176	7.169036364
ILMN_1221700	ELA2	7.074613333	6.318086842	6.367277941	6.59045
ILMN_2734391	RAMP1	7.914883333	7.158755263	7.212301471	6.993427273
ILMN_1230137	TPI1	11.74445667	12.50032895	12.51968382	12.25161818
ILMN_1234746	AI790298	7.578593333	6.822742105	6.873454412	6.792159091
ILMN_2648454	SIGLECG	10.3029	9.547089474	9.551536765	9.551795455
ILMN_2716622	MAPK11	9.600273333	8.844921053	8.852513235	8.744913636
ILMN_2685023	HMHA1	12.16146	11.40637895	11.42380441	11.32649091
ILMN_1231814	CCL5	9.356793333	8.602223684	8.662139706	8.673418182
ILMN_2818246	CPNE4	7.812076667	7.057652632	7.052097059	6.961063636
ILMN_1254685	EG240327	6.397796667	7.151681579	7.153916176	7.099763636
ILMN_2940446	DGKA	11.23734667	10.48404737	10.49755588	10.33128182
ILMN_2862379	RHOD	7.05575	6.304131579	6.303676471	6.307731818
ILMN_2733778	IL4I1	12.624	13.37522368	13.390125	13.45152273
ILMN_2545445	HIPK2	6.55741	7.308373684	7.332480882	7.280054545
ILMN_2700168	CCND2	10.03954667	10.79047632	10.82301765	10.75205455
ILMN_2618918	SLC2A6	9.982256667	10.73254211	10.75579118	10.77306364
ILMN_2881296	TMEM66	10.33295333	9.5849	9.557625	9.396040909
ILMN_2700166	CCND2	10.59667667	11.34464211	11.37600588	11.32170909
ILMN_2696609	MSCP	8.963526667	8.215607895	8.264191176	8.327386364
ILMN_1234973	A630004K05RIK	6.210026667	6.954189474	6.972236765	6.985181818
ILMN_2492264	WISP1	5.968076667	6.711328947	6.711036765	6.729045455
ILMN_2606180	ACOT7	8.450883333	9.193897368	9.205269118	9.229513636
ILMN_1233589	CD27	8.96667	8.224807895	8.296473529	8.010390909
ILMN_2459899	ADAMTSL4	7.314856667	8.055031579	8.038655882	7.792595455
ILMN_2617468	CHAC1	7.318223333	8.0581	8.051151471	8.204913636
ILMN_1225730	FDPS	11.93995	12.67975	12.64576029	12.72600455
ILMN_1239632	NG23	9.102366667	8.364705263	8.462726471	8.421986364
ILMN_2833243	C330023M02RIK	9.257843333	9.993915789	9.987714706	9.956754545
ILMN_3131478	BCAT1	8.48867	9.224363158	9.234775	9.319163636
ILMN_2734212	CD1D1	8.991273333	8.255613158	8.262241176	8.221804545
ILMN_2615096	DPP4	10.40495	9.669584211	9.690317647	9.540363636
ILMN_1258864	BC106179	8.446476667	7.711865789	7.749288235	7.574309091
ILMN_1229197	OTTMUSG00000016644	8.368543333	7.633965789	7.618216176	7.357127273
ILMN_1255743	IL6RA	8.160456667	7.426255263	7.478202941	7.268536364

ILMN_2560567	A630006E02RIK	10.59341	9.863042105	9.936775	9.685986364
ILMN_2619107	LGALS1	9.918706667	10.6487	10.70566324	10.63135
ILMN_2619316	PRNP	9.040923333	9.770686842	9.719486765	9.604395455
ILMN_2960108	CYP27A1	6.88932	6.160155263	6.166485294	6.144959091
ILMN_3153982	NACC2	7.91061	7.181697368	7.109570588	7.017036364
ILMN_2695047	PNPLA7	8.31495	7.586323684	7.637077941	7.563486364
ILMN_2976441	BLK	11.54462667	10.81708684	10.82114853	10.89478636
ILMN_3136744	SESN1	10.62493	9.897607895	9.837792647	9.802745455
ILMN_2710905	S100A8	13.23183	12.50617368	12.62048529	12.83921818
ILMN_1256644	SLC6A12	7.60547	6.879828947	6.942016176	7.050290909
ILMN_2639036	HSPD1	8.82105	9.546586842	9.439136765	9.368622727
ILMN_2490076	PKIB	6.435753333	7.161171053	7.095933824	7.160954545
ILMN_1232668	MAD	7.291183333	8.015381579	7.986783824	7.835204545
ILMN_2828768	USP28	8.408456667	7.685742105	7.665252941	7.660695455
ILMN_2860649	GBP6	7.584156667	8.306197368	8.263667647	8.019059091
ILMN_2517611	7530408C15RIK	7.806793333	7.085144737	7.035369118	6.93015
ILMN_2865016	CD83	11.44668667	12.16742368	12.24165294	12.34662273
ILMN_1220101	EBI2	10.51159667	11.23125263	11.28764265	11.27350909
ILMN_2715042	SDC3	8.413436667	9.132221053	9.146326471	9.056245455
ILMN_2860645	GBP6	8.79986	9.517697368	9.558605882	9.364745455
ILMN_1248028	EMP3	10.66351333	9.946255263	10.05402647	10.04704545
ILMN_1220236	CTSG	8.164396667	7.447392105	7.593658824	7.725227273
ILMN_2774537	HIST1H1C	8.914876667	8.198747368	8.165147059	8.258654545
ILMN_2678127	RNF144A	8.33433	7.618615789	7.589805882	7.484554545
ILMN_3162239	PRR7	7.936	7.221010526	7.209419118	7.151090909
ILMN_1255860	KLRD1	9.2035	8.489178947	8.505567647	8.348959091
ILMN_1212653	RFTN2	7.837833333	7.125721053	7.108895588	7.111963636
ILMN_2457437	A830080H07RIK	10.58319667	9.872428947	9.842497059	9.785954545
ILMN_2852672	TSPAN32	10.27871	9.570586842	9.543492647	9.500654545
ILMN_1254314	4931429I11RIK	7.49642	6.788428947	6.757355882	6.756540909
ILMN_2696610	SLC25A37	8.959986667	8.252265789	8.278280882	8.350490909
ILMN_2712986	CHI3L3	8.252926667	7.545768421	7.58855	7.786881818
ILMN_1227277	D9ERTD392E	10.15505	9.448323684	9.413408824	9.290313636
ILMN_3005441	PPA1	11.77690333	12.47936316	12.44846176	12.45698636
ILMN_2553041	A130093I21RIK	8.614756667	7.912957895	7.931957353	7.739868182
ILMN_2457571	MAML2	9.231806667	8.530407895	8.504491176	8.382118182
ILMN_3103896	TIMP1	6.028073333	6.728947368	6.733719118	6.625322727
ILMN_2758029	PRTN3	7.127993333	6.427576316	6.471620588	6.740686364
ILMN_1221048	PSAT1	9.916976667	10.61730789	10.49174706	10.59564545
ILMN_2757569	ENO3	9.369076667	8.668905263	8.710376471	8.733259091
ILMN_2804559	TMEM108	8.12613	7.426189474	7.472713235	7.367513636
ILMN_2690460	JAKMIP1	10.34174667	9.644271053	9.597117647	9.541822727
ILMN_2883326	PIRA3	8.234013333	7.537413158	7.603591176	7.675386364
ILMN_2675922	2310047A01RIK	8.327533333	7.632757895	7.605654412	7.557727273
ILMN_1228804	A430106G13RIK	7.31336	6.618973684	6.595263235	6.54365
ILMN_1239055	XDH	6.36512	7.058510526	7.064069118	6.989463636
ILMN_2650739	ARHGAP9	9.78214	9.089992105	9.140601471	9.032004545
ILMN_2500370	9430080K19RIK	10.87341	10.18259737	10.17046471	10.11225
ILMN_2611532	SLC25A19	8.19492	8.885142105	9.008430882	9.032790909
ILMN_2735615	ISG20	7.518246667	8.208171053	8.139072059	8.239459091
ILMN_3156343	WARS	8.263773333	8.951560526	8.995901471	8.8753
ILMN_3157081	SYTL3	6.38456	7.070873684	7.083748529	7.023881818
ILMN_2632264	ACOT7	10.69470667	11.38071053	11.36450147	11.44196818
ILMN_2631610	TMEM71	7.29944	6.615542105	6.536094118	6.333768182

ILMN_2754158	TGTP	7.284873333	7.967889474	7.893519118	7.793495455
ILMN_3018445	CYP4F18	7.031773333	6.349197368	6.342822059	6.333136364
ILMN_1258364	5430434G16RIK	9.318306667	8.636010526	8.610383824	8.485986364
ILMN_2660182	ACOT7	7.83013	8.510831579	8.549666176	8.507154545
ILMN_2971142	AMPD1	6.766323333	6.086144737	6.075851471	6.011377273
ILMN_1244516	RASGRP2	7.476703333	6.7969	6.799802941	6.836954545
ILMN_2703829	FCRLA	12.25565	11.57618421	11.55282353	11.51362273
ILMN_2629191	CPM	9.91393	9.234957895	9.169702941	9.147559091
ILMN_2979248	TMED8	8.15378	8.831739474	8.811263235	8.855245455
ILMN_1221530	ADCY7	9.032993333	8.355923684	8.271894118	8.166209091
ILMN_1236111	FCRLA	12.55218	11.87590263	11.88261912	11.83079091
ILMN_1213609	TXNIP	12.58893667	11.91322368	11.88612353	11.75423182
ILMN_2816180	LBH	11.77342667	11.09807368	11.09418676	11.01050455
ILMN_2606072	AGFG1	8.354076667	9.028615789	9.006667647	8.942363636
ILMN_2751111	4931429I11RIK	7.654283333	6.980063158	6.943754412	6.948795455
ILMN_1234054	TMED8	7.90326	8.575631579	8.518032353	8.587863636
ILMN_2766875	OCIAD2	6.029033333	6.699218421	6.716430882	6.700781818
ILMN_2524763	4930597A21RIK	8.344646667	7.674497368	7.673958824	7.653013636
ILMN_3006123	ASNS	7.223503333	7.891473684	7.884744118	7.997090909
ILMN_2628174	ACSS1	10.95242667	10.28503158	10.25702794	10.11349091
ILMN_1233402	LOC100045981	10.00150667	9.334863158	9.334583824	9.159545455
ILMN_1237074	SLC25A19	11.00412333	11.66939737	11.67991765	11.73784545
ILMN_2852034	HIF1A	7.287836667	7.951565789	7.906245588	7.818386364
ILMN_1250410	EIF2AK2	9.431796667	10.09508684	10.06052647	9.927563636
ILMN_2837493	EG634650	5.993646667	6.656815789	6.735947059	6.467818182
ILMN_2754698	CD84	10.28207333	9.619726316	9.660651471	9.608509091
ILMN_1256356	PML	10.07259	10.73383421	10.68198088	10.62860455
ILMN_1239472	CEACAM2	7.422096667	6.760892105	6.785801471	6.778659091
ILMN_2421220	BRWD1	8.272236667	7.614028947	7.590058824	7.579027273
ILMN_1233999	PPP3CC	8.017933333	8.674994737	8.723741176	8.655763636
ILMN_1245731	HHEX	10.25222333	9.595684211	9.542633824	9.5176
ILMN_2656854	MYO6	7.86478	8.521181579	8.467532353	8.266945455
ILMN_2731760	MYO1F	9.27305	8.617213158	8.592685294	8.631081818
ILMN_2642462	GTF2I	12.18328	11.52754211	11.51643971	11.44292727
ILMN_1218533	A630054M16RIK	8.19438	8.849878947	8.827914706	8.862331818
ILMN_3115917	HSD11B1	9.131606667	8.476536842	8.515530882	8.443059091
ILMN_2945940	RAgenericEF4	7.861843333	7.20755	7.202657353	7.017481818
ILMN_2433990	LOC100048346	8.55353	9.207039474	9.203336765	9.144786364
ILMN_2752436	2210010N04RIK	7.966906667	7.314218421	7.364426471	7.283672727
ILMN_1258197	D230004N01RIK	7.73881	8.391144737	8.361938235	8.371745455
ILMN_1218181	IFITM6	6.918566667	6.268265789	6.280010294	6.432531818
ILMN_2742042	NUPR1	6.801553333	7.451723684	7.512701471	7.494413636
ILMN_3112873	TXNIP	11.50670667	10.85741053	10.80823824	10.65764545
ILMN_1254405	LMNA	8.1473	8.796184211	8.835444118	8.852681818
ILMN_2705878	LIMD2	8.693046667	8.044581579	8.037157353	7.890031818
ILMN_2594525	NSDHL	7.7064	8.354552632	8.365227941	8.322163636
ILMN_2606825	CMAH	8.312323333	7.6647	7.634252941	7.396363636
ILMN_2522460	3010031K01RIK	8.543816667	9.191336842	9.234385294	9.170268182
ILMN_3132898	YPEL3	13.39026333	12.74307368	12.76953824	12.67990455
ILMN_1243621	A130026C10RIK	9.7118	9.064681579	9.029929412	8.839186364
ILMN_2751037	SPATA13	11.19429	10.54886053	10.48956912	10.47108636
ILMN_1232235	THADA	9.334693333	8.690102632	8.651617647	8.673077273
ILMN_1254157	WARS	9.735603333	10.37886316	10.35691912	10.27182273
ILMN_2777769	H2-DMA	11.86790667	12.51002368	12.53100441	12.56078636

ILMN_1228832	NGP	8.59455	7.952828947	8.124844118	8.267295455
ILMN_1219896	LOC623121	9.744836667	9.106268421	9.038876471	8.866836364
ILMN_1255510	LMNA	8.915643333	9.554178947	9.570432353	9.583027273
ILMN_1230546	CLIC4	10.53869333	11.17695526	11.15126618	11.20304091
ILMN_2724570	MAPK12	7.503686667	6.865684211	6.859533824	6.8399
ILMN_2977791	MAN2A2	7.365183333	6.727613158	6.778547059	6.671459091
ILMN_2722784	CD3G	11.37494	10.73794474	10.74789559	10.50351818
ILMN_3137291	LIF	5.86542	6.499805263	6.54505	6.506213636
ILMN_2983525	D12ERTD553E	9.794036667	9.160018421	9.136989706	9.133836364
ILMN_1243249	2810410A03RIK	10.7807	10.14750789	10.12662647	10.07005
ILMN_3141048	SEPP1	7.432253333	6.799544737	6.843607353	6.697863636
ILMN_2769918	TIMP1	5.969726667	6.602010526	6.577436765	6.519463636
ILMN_1237567	IL7R	6.91826	6.286176316	6.243760294	6.260904545
ILMN_1257803	A130095K04RIK	6.768486667	6.137434211	6.146425	6.027690909
ILMN_1241171	ANXA3	8.77009	8.140389474	8.239335294	8.327272727
ILMN_2993314	CLEC4N	8.155996667	7.526681579	7.760479412	8.076522727
ILMN_1231204	LOC270152	7.684566667	8.313434211	8.328936765	8.274381818
ILMN_2758878	TMEM66	8.604496667	7.976713158	8.059894118	7.877477273
ILMN_2661185	SCML4	9.284993333	8.657247368	8.584035294	8.341754545
ILMN_1239346	KLRE1	6.16771	6.795257895	6.804683824	6.700913636
ILMN_2520264	2010016I18RIK	8.114473333	7.487081579	7.539891176	7.383822727
ILMN_3014674	FAM169B	11.03242333	10.40547895	10.41317206	10.31021364
ILMN_2743902	MATK	7.576503333	6.950942105	6.954210294	6.817622727
ILMN_2757807	BC031353	9.67076	9.045855263	9.010575	9.019727273
ILMN_1236245	RAB11FIP4	7.012513333	6.387965789	6.419583824	6.470972727
ILMN_2591342	BC021614	8.086576667	7.463065789	7.519083824	7.435113636
ILMN_2697415	CD3D	12.02597333	11.40273947	11.44940588	11.19695909
ILMN_2581681	D530007E13RIK	9.03998	8.417405263	8.385516176	8.304936364
ILMN_2601453	A130092J06RIK	11.47359667	10.85129211	10.81008529	10.56360455
ILMN_2642913	EMP1	7.33474	7.956981579	7.96035	7.996531818
ILMN_2524865	CHI3L4	8.01563	7.393626316	7.45365	7.612545455
ILMN_1256219	LOC100047261	11.70327667	11.08238158	11.13535147	11.07144545
ILMN_2903169	GM484	6.439876667	7.060573684	7.045426471	7.021390909
ILMN_3004864	UNC84B	11.49079	10.87096579	10.87125294	10.75787727
ILMN_2648669	GPNMB	7.951466667	7.331673684	7.401155882	7.527768182
ILMN_1216313	STIM1	8.977736667	8.359431579	8.348152941	8.196377273
ILMN_3139253	BTBD11	7.22281	6.604578947	6.573738235	6.500940909
ILMN_2728270	B4GALNT1	10.79857333	10.18042632	10.25875294	10.24815
ILMN_1236507	5830496L11RIK	10.00914667	9.393421053	9.308585294	9.088395455
ILMN_1221820	FAIM3	14.32124333	13.70555526	13.69330147	13.7856
ILMN_2766604	CAMP	8.722323333	8.106676316	8.175870588	8.264754545
ILMN_2444984	MACF1	8.425146667	7.809781579	7.706641176	7.701818182
ILMN_3131679	USP18	9.363286667	9.978313158	9.931382353	9.806536364
ILMN_2692615	TGM2	7.39533	8.009855263	8.055310294	8.010068182
ILMN_2449150	MAP4K2	9.819663333	9.205721053	9.206395588	9.199613636
ILMN_1249975	IGHG	9.61923	9.005610526	8.89495	8.797990909
ILMN_2571414	NDR3	6.860516667	6.247115789	6.288842647	6.190795455
ILMN_2923865	CASP6	8.833286667	9.446118421	9.522104412	9.610272727
ILMN_3121891	LMNA	7.756683333	8.369328947	8.354533824	8.464245455
ILMN_2619408	ATF3	6.142813333	6.755302632	6.790607353	6.803554545
ILMN_2964185	H2-M2	7.242236667	6.630168421	6.649022059	6.640009091
ILMN_2685393	CCR5	6.59509	7.20655	7.201767647	7.132563636
ILMN_2856926	GPR114	9.017556667	9.628647368	9.590291176	9.239136364
ILMN_1221311	TTYH3	8.409613333	7.799102632	7.858344118	7.778395455

ILMN_3034877	KIF1B	7.821043333	7.211271053	7.208664706	7.2898
ILMN_1258587	LOC100044376	9.9625	9.352865789	9.335433824	9.182454545
ILMN_1218717	LOC385615	8.83002	8.220628947	8.213408824	7.985740909
ILMN_2594521	NSDHL	7.481536667	8.090739474	8.077933824	8.035827273
ILMN_2919411	OSM	9.0134	9.622018421	9.631194118	9.557322727
ILMN_2573826	GAD1	6.285003333	6.893271053	6.891225	6.819222727
ILMN_1253354	DAPP1	7.88621	8.494418421	8.474091176	8.498481818
ILMN_2476452	CPM	7.303943333	6.69575	6.678776471	6.617622727
ILMN_2834573	BRWD1	8.29335	7.685668421	7.683051471	7.642636364
ILMN_2591754	QPRT	7.878863333	7.271292105	7.245197059	7.181613636
ILMN_2738433	IL4RA	6.239963333	6.846697368	6.896517647	6.838059091
ILMN_2695158	KIFC2	7.343773333	6.737642105	6.732835294	6.713495455
ILMN_2685392	CCR5	6.51683	7.122668421	7.051832353	7.004754545
ILMN_1229746	ECM1	6.132986667	6.738778947	6.806132353	6.615786364
ILMN_2984744	EMP3	12.08539	11.47984474	11.51957794	11.52749091
ILMN_2652500	LRG1	6.716696667	6.111805263	6.120491176	6.114954545
ILMN_2518483	PLA2G12A	6.280293333	6.883357895	6.955323529	6.928695455
ILMN_2845272	KLHDC2	11.45535	12.05764211	12.05591029	12.03670455
ILMN_3105936	CETN4	6.688636667	7.2909	7.333645588	7.254654545
ILMN_3117876	CHI3L3	8.021693333	7.419489474	7.418464706	7.543572727
ILMN_2971171	FCRLA	11.14227667	10.54146579	10.48822647	10.40451818
ILMN_1225132	4930519L02RIK	6.88778	7.488065789	7.525252941	7.638254545
ILMN_2774410	STFA1	8.846636667	8.247494737	8.3801	8.518636364
ILMN_3002095	IL27RA	11.1748	10.57675	10.51693824	10.35572273
ILMN_2543417	AUH	7.760993333	8.358818421	8.450914706	8.496777273
ILMN_1257771	LOC638301	10.25393667	9.656502632	9.600141176	9.438890909
ILMN_2692960	ERO1LB	9.701216667	10.29802105	10.31935588	10.34075909
ILMN_2673233	PFKP	7.466366667	8.062705263	8.096848529	7.994904545
ILMN_1244891	CST7	7.014076667	7.610355263	7.708827941	7.532645455
ILMN_2651886	genericK1	10.80276	11.39885	11.35615735	11.28045455
ILMN_1228917	C330023M02RIK	9.177703333	9.773615789	9.762547059	9.792254545
ILMN_3135781	ANXA3	8.453543333	7.858018421	7.964625	8.134063636
ILMN_2454823	6720418B01RIK	8.454683333	7.859492105	7.843507353	7.601404545
ILMN_1244853	LOC100044948	10.73101	11.32439474	11.35923971	11.16399545
ILMN_1254577	AI607873	6.892946667	7.486244737	7.533180882	7.504613636
ILMN_1222543	UGT1A10	6.93978	6.34705	6.38325	6.614104545
ILMN_2458765	AHNAK	9.03018	8.437463158	8.463539706	8.512445455
ILMN_2777696	GCAT	8.453923333	9.046523684	8.955386765	8.900027273
ILMN_2591156	IL27RA	9.22076	8.628213158	8.582977941	8.52225
ILMN_2676543	GRIFIN	6.82902	6.237215789	6.233313235	6.192986364
ILMN_2589401	PLTP	6.6056	7.196813158	7.226439706	7.17085
ILMN_2641360	AK2	9.80652	10.39720263	10.39346912	10.44981818
ILMN_2678431	MNS1	7.623163333	8.211194737	8.219722059	8.216736364
ILMN_1252496	WDR9	8.256553333	7.668823684	7.624570588	7.593372727
ILMN_2919259	SCD2	6.989606667	7.577144737	7.493097059	7.432013636
ILMN_2960114	CYP27A1	7.016623333	6.429744737	6.441141176	6.38235
ILMN_2628178	SOCS2	9.017703333	9.604081579	9.548186765	9.538022727
ILMN_2716511	SLC12A6	10.52652333	9.940578947	9.952173529	9.941263636
ILMN_2609813	CHI3L1	9.720116667	9.134286842	9.338616176	9.407072727
ILMN_1226514	GAB3	8.101403333	7.515847368	7.562842647	7.41685
ILMN_2699531	RGS10	10.51234667	9.926992105	9.937233824	9.797122727
ILMN_1217899	ITK	6.49019	7.075144737	7.055417647	7.021372727
ILMN_2964986	CREM	6.63287	7.216378947	7.199739706	7.17265
ILMN_1245300	F730045P10RIK	7.17087	7.754107895	7.741594118	7.777690909

ILMN_3007862	ABHD14B	8.3503	7.767239474	7.744358824	7.750127273
ILMN_1222036	PAQR7	7.079483333	6.496497368	6.448283824	6.485727273
ILMN_1214998	HSD11B1	8.95546	8.372778947	8.421463235	8.356695455
ILMN_2645275	MVD	8.810396667	9.392594737	9.422547059	9.527990909
ILMN_1217102	TPCN1	9.111683333	8.529544737	8.543391176	8.474540909
ILMN_2692554	9330186A19RIK	7.414916667	6.833423684	6.748882353	6.802618182
ILMN_2605858	AI646023	6.66345	6.082005263	6.04915	6.055072727
ILMN_2652857	IFI47	11.22192333	11.80331316	11.72213676	11.57583636
ILMN_1257444	SLC37A1	7.32784	7.907944737	7.907548529	7.987254545
ILMN_2450767	DUSP4	8.0951	8.675071053	8.696419118	8.827554545
ILMN_2611450	IFT172	9.435683333	8.855721053	8.856341176	8.830854545
ILMN_1242769	AKAP8L	10.58592	10.00616053	9.970663235	9.833063636
ILMN_2756438	D7BWG0611E	7.023296667	6.444452632	6.424191176	6.389677273
ILMN_1219017	5031436O03RIK	8.368066667	7.789578947	7.810842647	7.816740909
ILMN_2493030	2310043N10RIK	9.993046667	9.414568421	9.383005882	9.301872727
ILMN_1217913	D230007K08RIK	9.815053333	9.236857895	9.225373529	8.991240909
ILMN_1256430	MCOLN3	7.33355	6.755771053	6.748322059	6.62405
ILMN_2650255	MAN2A2	7.403953333	6.826876316	6.818861765	6.736995455
ILMN_1248714	CD55	8.813533333	8.236618421	8.2139	8.190377273
ILMN_2740628	NDRG3	7.83159	7.255418421	7.260383824	7.269290909
ILMN_2761109	CLIC4	11.06524333	11.64044474	11.625275	11.63201364
ILMN_1230605	GM336	7.11325	7.687934211	7.6587	7.673177273
ILMN_1219860	LTK	8.006776667	7.432202632	7.398382353	7.413186364
ILMN_2810882	PPIC	9.265503333	8.691218421	8.651352941	8.542872727
ILMN_2807335	3110001A13RIK	9.544203333	8.970439474	8.958279412	8.976627273
ILMN_2504447	EG330070	7.050706667	6.477302632	6.498975	6.470545455
ILMN_2864309	OTTMUSG00000000971	8.49457	7.921613158	7.999452941	8.111331818
ILMN_1234020	SCL0002007.1_97	9.443223333	8.870315789	8.903952941	8.853154545
ILMN_1228213	IFI30	11.57212333	12.14438947	12.18978676	12.1859
ILMN_1247199	LOC100046770	8.874063333	8.301918421	8.328780882	8.228481818
ILMN_3077377	WARS	7.11178	7.6835	7.700954412	7.649859091
ILMN_1252295	LOC100038894	6.395856667	6.966326316	6.988614706	6.970359091
ILMN_2644350	THY1	10.65563333	11.22597105	11.23514412	11.07841364
ILMN_1253008	ACAT2	8.73794	9.308271053	9.341198529	9.285022727
ILMN_2629112	ASAH3L	6.420043333	6.989957895	6.995489706	6.845595455
ILMN_2693679	CCDC125	7.619536667	7.050602632	7.065383824	7.088504545
ILMN_3149776	B3GNT8	7.61935	7.050542105	7.034622059	7.055154545
ILMN_2823778	SC4MOL	9.339616667	9.908247368	9.800502941	9.942090909
ILMN_2733185	CDC42EP3	8.85545	8.286834211	8.258167647	8.201140909
ILMN_2725402	NSDHL	7.48332	8.050342105	8.035323529	8.0115
ILMN_2833248	C330023M02RIK	8.10134	8.667568421	8.672432353	8.655227273
ILMN_2774160	HSD11B1	8.706833333	8.140992105	8.175951471	8.124913636
ILMN_2711948	LOC100047619	10.43146667	10.99716842	10.94898088	11.03114545
ILMN_2763739	BC032203	10.80728	10.24174474	10.17495441	10.13608636
ILMN_2593554	IGTP	12.18893	12.75399474	12.77557059	12.59678636
ILMN_2733733	TLR2	8.649903333	8.085921053	8.190616176	8.354554545
ILMN_2605453	RANBP10	10.22959667	9.666002632	9.65415	9.647813636
ILMN_2919263	SLC25A1	9.166143333	9.728544737	9.787044118	9.847804545
ILMN_1220397	TTC28	7.667103333	7.1052	7.127416176	7.132168182
ILMN_1249740	TSSC6	7.490173333	6.929126316	6.912072059	6.813518182
ILMN_1245754	CD84	7.52019	6.959386842	6.929688235	6.729927273
ILMN_2930552	9130211I03RIK	6.768166667	7.327544737	7.359879412	7.235159091
ILMN_2698519	HIST1H3H	7.513023333	8.071597368	8.014075	8.023959091

ILMN_2721571	SLAMF1	8.52409	9.082347368	9.069436765	8.967859091
ILMN_2900462	ATP2A3	10.93327	10.37553947	10.34407206	10.38361364
ILMN_2883267	LRRK2	9.364593333	9.921984211	9.942058824	9.879545455
ILMN_1248651	C330023M02RIK	8.314133333	8.871386842	8.864563235	8.889795455
ILMN_2531737	LOC240672	7.56991	8.125805263	8.094517647	8.219213636
ILMN_1215796	LOC100046608	6.529113333	7.084997368	7.035101471	6.976813636
ILMN_2703563	STAC2	7.38922	6.834084211	6.875988235	6.836763636
ILMN_2599719	SLC44A2	11.92352	11.36847105	11.35597647	11.30884091
ILMN_1227570	LOC386545	8.743896667	8.189294737	8.230036765	7.990959091
ILMN_1222821	ROGDI	8.786446667	8.232284211	8.291411765	8.395709091
ILMN_2493826	UGT1A10	7.023866667	6.470215789	6.490170588	6.716004545
ILMN_1230143	BATF2	5.85682	6.409157895	6.445595588	6.382068182
ILMN_1229193	MSN	10.28875	9.737642105	9.735795588	9.645190909
ILMN_2483811	2210408F11RIK	11.01110667	10.46008421	10.42315588	10.34929091
ILMN_2660837	ST6GALNAC4	7.92546	8.476447368	8.480754412	8.539186364
ILMN_2767918	IFI30	10.28789667	10.83849737	10.96806324	11.00708182
ILMN_2725414	CD9	9.422196667	8.872436842	8.904213235	8.970577273
ILMN_1231447	TPI1	7.384893333	7.934492105	7.937911765	7.839004545
ILMN_2700354	DENND5B	8.391203333	7.842021053	7.911129412	7.785286364
ILMN_1224945	E130113K22RIK	8.219303333	7.670147368	7.685198529	7.493963636
ILMN_1226755	E030007N04RIK	9.077833333	8.528928947	8.625920588	8.525272727
ILMN_1225214	CDKN2D	8.793143333	8.244407895	8.240169118	8.105931818
ILMN_1212982	ZFP318	10.27203	9.723307895	9.703748529	9.6047
ILMN_1254218	NISCH	10.79873	10.25001842	10.28934265	10.102
ILMN_2474052	5830411I20	9.479836667	10.02834474	10.04819559	9.973677273
ILMN_1226901	MAN2A2	7.381073333	6.832571053	6.870908824	6.774418182
ILMN_2684600	NALP6	5.683113333	6.230942105	6.205075	6.286981818
ILMN_1217408	PRKACB	12.42386	11.87606842	11.88194706	11.79191818
ILMN_1241610	ADRB2	9.541823333	8.994415789	8.973683824	8.949086364
ILMN_2928599	SIGLECH	7.47144	6.924655263	6.936369118	6.803009091
ILMN_2712867	TIMP2	7.230993333	6.684518421	6.748505882	6.6003
ILMN_2593787	KCNK13	5.92443	6.470689474	6.479725	6.553636364
ILMN_1243150	A130010J15RIK	9.42285	8.876610526	8.875494118	8.746018182
ILMN_2957862	NOC4L	9.10952	9.6555	9.677673529	9.723059091
ILMN_2846865	ACTB	10.15901333	9.613102632	9.645202941	9.835927273
ILMN_1218799	EMB	10.10022333	9.554318421	9.501319118	9.343713636
ILMN_3054914	USP18	7.713743333	8.259573684	8.224657353	8.138522727
ILMN_1238547	AREG	6.01426	6.559955263	6.514355882	6.508963636
ILMN_2711172	IRGM1	6.705733333	7.251423684	7.156748529	7.172445455
ILMN_2845080	PSAP	12.3915	11.84617895	11.88253382	11.91787727
ILMN_1239411	6430510M02RIK	9.146923333	8.603228947	8.535841176	8.503222727
ILMN_3079919	AHNAK	7.987826667	7.444255263	7.509125	7.546490909
ILMN_1251984	C730026J16	8.910436667	9.453307895	9.458835294	9.488
ILMN_1242794	D630014A15RIK	8.913583333	8.370760526	8.378547059	8.273154545
ILMN_3163572	ADCY7	8.611366667	8.068673684	8.002292647	7.965472727
ILMN_2537948	LOC624610	8.479553333	9.02185	8.960245588	8.972936364
ILMN_1246895	C78339	10.46701333	9.924855263	9.913516176	9.792804545
ILMN_1249014	TBX6	7.509416667	6.967384211	6.934380882	6.88865
ILMN_2988931	STFA1	8.375453333	7.83345	7.962795588	8.1119
ILMN_2863390	FCER1A	6.565336667	7.107023684	7.149798529	7.251063636
ILMN_1257107	LOC100043821	11.29150333	10.74987368	10.77962353	10.63337727
ILMN_1228937	CYHR1	8.615836667	8.074321053	8.140413235	8.088863636
ILMN_2729958	HIST1H3D	9.276753333	9.817342105	9.843720588	9.779963636
ILMN_2664726	3110013H01RIK	7.524233333	8.064392105	8.045011765	8.076427273

ILMN_2662387	LMNA	7.710816667	8.250452632	8.270158824	8.388381818
ILMN_2944601	4933439C20RIK	10.40494	9.865452632	9.853114706	9.903972727
ILMN_1224473	LOC380797	8.568663333	8.029181579	8.096419118	7.870022727
ILMN_1225085	PRKCB	11.67589	11.13770789	11.13858382	11.04082273
ILMN_2604029	KLF2	11.83327	11.29523421	11.33738088	11.20542727
ILMN_2443164	SCL0002069.1_48	7.571263333	8.109255263	8.113289706	8.152909091
ILMN_1227907	GMFG	11.43036667	10.89250526	10.94621176	10.78452727
ILMN_1225764	MFSD2	7.970076667	8.507844737	8.490097059	8.5117
ILMN_2967266	FXYD5	12.00867333	11.47132632	11.60679559	11.49645
ILMN_1236354	E130302P19RIK	7.808183333	7.271594737	7.243542647	7.254131818
ILMN_3115796	CD40	11.16950667	11.70592105	11.66586912	11.74807727
ILMN_2597710	LMNA	6.945293333	7.481457895	7.527360294	7.643618182
ILMN_1236256	ARHGEF1	10.30117333	9.765702632	9.777082353	9.565368182
ILMN_1231146	AGFG1	10.03638	10.57182895	10.54505441	10.58565
ILMN_2689731	DUSP4	7.44453	7.979928947	7.960576471	8.077036364
ILMN_2476329	WHRN	8.198216667	7.662876316	7.624944118	7.688081818
ILMN_3149680	FBXL12	9.55774	9.022781579	8.979083824	8.911004545
ILMN_2891245	RHBDL2	11.17166667	10.63687632	10.66231765	10.44623636
ILMN_3109491	6430527G18RIK	10.69194667	10.15745	10.05446765	9.996531818
ILMN_1251713	CAR12	6.303143333	6.837231579	6.808888235	6.762877273
ILMN_2516221	TCRB-V8.2	8.713246667	8.179173684	8.227629412	7.963136364
ILMN_1234988	GAD1	6.138176667	6.672023684	6.655942647	6.64945
ILMN_2737713	EDN1	6.211046667	6.744673684	6.792708824	6.801963636
ILMN_1220739	NSG2	6.515793333	5.982639474	5.980491176	5.877881818
ILMN_2615739	GM459	10.43873667	9.905744737	9.871022059	10.01163636
ILMN_1228330	PLCL2	9.758736667	9.225823684	9.202452941	9.242722727
ILMN_3160842	BC087945	11.48216667	12.01505526	11.98382206	11.96960909
ILMN_1249637	PEG13	7.152553333	6.619871053	6.594275	6.661804545
ILMN_2620326	CYP27A1	6.618803333	6.086228947	6.130180882	6.038081818
ILMN_1247823	LRP8	6.931496667	7.464068421	7.458729412	7.48775
ILMN_2722996	SIRPA	8.616523333	8.084239474	8.143004412	8.417745455
ILMN_2914010	DMWD	6.59818	7.130428947	7.099555882	7.121695455
ILMN_1231858	FCRL1	9.11691	8.584847368	8.649417647	8.543518182
ILMN_2684515	SRPK3	11.26210333	10.73063158	10.67311765	10.63067727
ILMN_3160218	AMICA1	7.86067	8.392005263	8.426604412	8.322131818
ILMN_2469253	VPREB3	8.61418	8.083365789	8.268382353	8.165345455
ILMN_2616989	KCTD17	7.071666667	7.602447368	7.611333824	7.592340909
ILMN_2725595	THRA	6.775176667	6.244463158	6.252422059	6.26795
ILMN_1217406	1110013L07RIK	8.25656	7.726518421	7.709145588	7.483686364
ILMN_1233545	LBH	9.173483333	8.643457895	8.585191176	8.667568182
ILMN_2502346	SAMSN1	6.83519	7.365021053	7.424139706	7.413554545
ILMN_1245924	MAP3K8	8.41872	8.948184211	8.970817647	8.893895455
ILMN_2760765	BC021381	8.589116667	8.059802632	8.060226471	8.142354545
ILMN_2664686	CHAF1B	8.82029	9.349602632	9.297583824	9.275677273
ILMN_2424721	PDGFA	6.399903333	6.928989474	6.853522059	6.927486364
ILMN_2502136	CD40	10.06332667	10.59213684	10.70311912	10.74522273
ILMN_3116935	BTLA	10.49572	9.967563158	9.945167647	9.868113636
ILMN_2925711	DUSP6	9.465566667	8.938113158	8.877455882	9.070204545
ILMN_2770119	ZBTB32	10.86225333	11.38918947	11.30878824	11.42603182
ILMN_1256702	S100A10	9.221003333	8.694873684	8.738216176	8.63095
ILMN_2833441	TRAFD1	10.66275667	11.18868947	11.17483971	11.16915455
ILMN_2522571	SETD7	8.49144	7.965744737	7.900425	7.745868182
ILMN_2448404	SCL0002975.1_346	8.533736667	8.008318421	8.116742647	7.919968182
ILMN_2561749	A630072I12RIK	6.90215	6.376881579	6.363104412	6.256609091

ILMN_2992653	MSH5	7.365693333	6.840486842	6.806542647	6.832295455
ILMN_3068231	MAX	7.004783333	7.529568421	7.488708824	7.388690909
ILMN_2775202	RRAGD	7.19449	7.719044737	7.690863235	7.569304545
ILMN_1253601	AACS	9.945826667	10.47036053	10.46929412	10.52398636
ILMN_2694170	CD97	9.80694	9.283168421	9.352319118	9.337640909
ILMN_1222471	GMFG	11.24841667	10.72540789	10.77340735	10.59015
ILMN_2923864	CASP6	8.035723333	8.557984211	8.620341176	8.727013636
ILMN_2497190	BMF	6.99474	6.472515789	6.411789706	6.365568182
ILMN_2750062	ARHGAP24	7.191523333	6.669510526	6.721417647	6.661459091
ILMN_2776952	TMEM55B	8.84177	9.363155263	9.356698529	9.371772727
ILMN_2880536	UCK2	10.53304667	11.05398684	11.00229706	11.02895909
ILMN_2694175	CD97	9.902043333	9.381402632	9.428180882	9.414463636
ILMN_1253851	HIST2H2BE	8.37224	8.892865789	8.900198529	8.836145455
ILMN_2756439	GRAMD1A	7.12322	6.602613158	6.640825	6.581772727
ILMN_1214703	NME7	6.773053333	6.252663158	6.253341176	6.174459091
ILMN_3151503	C130032J12RIK	8.786306667	9.305681579	9.304608824	9.324440909
ILMN_2621901	BC004022	9.374146667	9.893202632	9.914832353	9.842027273
ILMN_2657685	AASS	6.827346667	7.346360526	7.374670588	7.304227273
ILMN_1221568	CDCA7	10.56978333	11.08840526	11.05373088	11.14640455
ILMN_1246270	GINS2	7.822786667	8.340892105	8.295725	8.257509091
ILMN_2688236	ATP2A3	12.58813	12.07048684	12.02009118	11.99795455
ILMN_2792601	P2RY5	10.28267667	9.765228947	9.736329412	9.777036364
ILMN_2760979	TGFBR2	12.03852	11.52211316	11.50930147	11.44098182
ILMN_1213483	FLCN	10.64120333	10.12503947	10.09291765	10.15793636
ILMN_2705628	CLEC4D	8.82084	8.305036842	8.482082353	8.779268182
ILMN_1214318	RASGRP1	6.667076667	7.182584211	7.145963235	6.966668182
ILMN_2771349	0610007P14RIK	9.340376667	9.855694737	9.816160294	9.903672727
ILMN_2681601	SLC44A2	8.348826667	7.834094737	7.856692647	7.706281818
ILMN_1246609	RASGRP1	11.33855	11.85307105	11.85594265	11.60770455
ILMN_2508626	PEX11C	6.693453333	6.179115789	6.188005882	6.216986364
ILMN_2617820	PPP3CC	10.23106667	10.74528684	10.718925	10.57838182
ILMN_2433964	GIGYF1	9.174583333	8.660778947	8.685676471	8.544772727
ILMN_1229458	PRKCB	9.352536667	8.83875	8.763423529	8.807190909
ILMN_2945694	HIST1H3A	8.371906667	8.885407895	8.898982353	8.834895455
ILMN_1231309	LY9	10.57010333	10.05668158	10.06185147	10.05565
ILMN_2510383	TNFRSF25	8.859573333	8.346544737	8.361252941	8.340177273
ILMN_2711075	MMP9	7.191016667	6.678302632	6.702389706	6.812577273
ILMN_1249378	BHLHB2	9.07604	9.588647368	9.570416176	9.578259091
ILMN_2506012	TRP53INP1	10.08522	9.572681579	9.5451	9.469318182
ILMN_2509340	FOXO1	8.654366667	8.141878947	8.104170588	8.069745455
ILMN_1221703	ABCA7	10.62202667	10.11	10.13834265	10.13358636
ILMN_2665087	KLF1	6.577006667	7.0889	7.095722059	7.126468182
ILMN_2689307	SPNB2	8.52137	8.010315789	8.029977941	7.859663636
ILMN_1226261	FAM158A	7.96853	7.457605263	7.488210294	7.446190909
ILMN_1245354	TLR7	9.301983333	9.812560526	9.875805882	9.876613636
ILMN_2615672	PRELID2	6.108273333	6.618676316	6.652044118	6.542881818
ILMN_2418957	5930418K15RIK	9.004963333	8.495173684	8.470373529	8.374686364
ILMN_2639012	CCR6	10.53305333	10.02367368	10.09640441	10.09141818
ILMN_1233917	LOC100041463	6.175063333	6.684076316	6.631039706	6.519009091
ILMN_2645208	ARHGEF3	12.13058667	11.62189474	11.58621324	11.50325909
ILMN_1252488	CLEC2I	7.829716667	7.321136842	7.3058	7.242727273
ILMN_2925008	SFT2D2	6.48672	6.995207895	6.920232353	6.906186364
ILMN_2421246	TCRB-V8.3	8.367016667	7.858584211	7.941542647	7.684159091
ILMN_2742928	FXYD5	10.26460667	9.756181579	9.868969118	9.726668182

ILMN_2604556	PDE7A	7.412516667	6.904297368	6.839942647	6.878745455
ILMN_1260323	AKR1C18	5.69947	6.207665789	6.194161765	6.198459091
ILMN_2883268	LRRK2	9.31324	9.821171053	9.822963235	9.761345455
ILMN_2480682	TMEM23	8.860773333	8.353092105	8.289407353	8.190659091
ILMN_2748164	HIST1H3F	8.912953333	9.420621053	9.416923529	9.431840909
ILMN_1224034	PDE1B	9.389363333	8.881973684	8.900580882	8.945822727
ILMN_2712075	LCN2	11.52582333	11.01917105	11.18763088	11.47061818
ILMN_3125814	ACSL6	5.60918	6.115702632	6.077122059	6.127881818
ILMN_2790357	SEMA7A	8.332696667	8.839102632	8.841805882	8.810909091
ILMN_2416460	TRBV8_AE000663_T_CELL_RECEPTOR_BETA_VARIABLE_8_270	8.769396667	8.263507895	8.351523529	8.056295455
ILMN_2568028	IL2RG	9.496336667	8.990715789	9.037976471	8.851422727
ILMN_1247377	MPEG1	8.820523333	9.325578947	9.300376471	9.23945
ILMN_3153753	CACNB3	7.98161	7.476615789	7.583061765	7.606531818
ILMN_2588055	ACTB	9.934683333	9.429810526	9.439613235	9.614481818
ILMN_2880346	RRP1B	8.254853333	8.759510526	8.699454412	8.764309091
ILMN_2540344	LOC381889	7.8252	8.329739474	8.275372059	8.279772727
ILMN_1237625	FAM113B	8.187733333	7.683394737	7.662777941	7.734872727
ILMN_1214800	RNF167	9.872936667	9.368607895	9.405135294	9.303831818
ILMN_2519313	TMOD4	8.734043333	8.229944737	8.188375	8.138731818
ILMN_2724545	SBK	11.35983333	10.85581316	10.80280588	10.82701818
ILMN_2874816	CDC14B	7.573256667	7.069355263	7.069520588	7.048240909
ILMN_1224770	GPRASP1	9.77645	9.2726	9.234861765	9.250504545
ILMN_2681516	SLC39A6	8.814913333	9.318736842	9.304892647	9.30945
ILMN_1237990	GALE	6.785393333	7.288428947	7.329561765	7.342213636
ILMN_1228783	LOC100043986	6.91082	6.407823684	6.473876471	6.429927273
ILMN_1237114	TMEM154	8.138643333	7.636152632	7.585944118	7.646022727
ILMN_2828916	FRMD6	8.007456667	8.509536842	8.570277941	8.408954545
ILMN_2824002	FRAT2	7.71096	7.208939474	7.178638235	7.178854545
ILMN_2687744	RNF167	9.199576667	8.697613158	8.739005882	8.606045455
ILMN_2920849	PIRA4	7.654663333	7.1527	7.232370588	7.233395455
ILMN_2718453	ARID5A	7.283676667	7.785302632	7.793682353	7.815790909
ILMN_2970532	MCM10	9.424043333	9.925539474	9.829147059	9.9184
ILMN_1235795	LOC675594	7.448003333	7.948989474	7.910132353	7.82655
ILMN_2524667	4833427B12RIK	7.739353333	8.240297368	8.256905882	8.22985
ILMN_2673889	MCM7	8.074	8.574697368	8.487373529	8.401995455
ILMN_1259566	ST6GALNAC4	7.177983333	7.678428947	7.679841176	7.755468182
ILMN_1246473	CCND3	7.324866667	7.825297368	7.841207353	7.725622727
ILMN_2830898	CDC25B	7.01245	6.512081579	6.527039706	6.583763636
ILMN_3071764	1200015F23RIK	7.43188	7.931826316	7.960994118	7.896445455
ILMN_2628900	ITGAE	6.657026667	6.157218421	6.219135294	6.113486364
ILMN_1224472	CCL4	8.713336667	9.212842105	9.305651471	9.529104545
ILMN_2552490	6720463L11RIK	10.58386333	10.08456579	10.07292353	9.899459091
ILMN_2635132	FOXP3	8.401456667	8.900668421	8.910723529	8.765727273
ILMN_1260585	STFA2	7.616773333	7.117684211	7.219723529	7.385345455
ILMN_2625035	SFT2D2	6.582473333	7.08145	7.109589706	7.160159091
ILMN_1237580	KLRA3	6.114223333	6.612936842	6.616825	6.557209091
ILMN_1244211	LOC238943	7.880973333	8.379628947	8.359485294	8.234081818
ILMN_2811263	ZXDA	10.18303333	9.684407895	9.719638235	9.468354545
ILMN_2661971	GM2A	11.28908333	10.79073421	10.82771912	10.73904545
ILMN_2730926	LSM12	8.963933333	9.462136842	9.368045588	9.434645455
ILMN_1247942	MGEA5	7.989676667	7.492289474	7.497663235	7.336986364
ILMN_1242024	SETD4	7.181716667	6.684497368	6.698276471	6.780113636

ILMN_2929896	PBK	8.14347	8.640523684	8.593113235	8.659018182
ILMN_2476733	1200016E24RIK	8.391553333	7.895302632	7.857470588	7.77645
ILMN_2543929	2610036L11RIK	9.511626667	10.00778421	10.03502353	10.05321364
ILMN_2456216	5330403D14RIK	8.630133333	8.134192105	8.131176471	7.9148
ILMN_2727546	D930048N14RIK	8.084543333	7.5889	7.561372059	7.503077273
ILMN_3059476	SESN1	7.46764	6.972268421	7.001925	6.872913636
ILMN_2834379	TGFBI	7.914363333	7.419384211	7.540954412	7.770859091
ILMN_1247704	HMGN3	11.16247667	11.65745263	11.61625	11.68214091
ILMN_1249888	ADCY6	7.810496667	7.315673684	7.367497059	7.301754545
ILMN_1229534	RNF167	9.146563333	8.651771053	8.652933824	8.584977273
ILMN_1244123	SLC38A2	10.97275	10.47811316	10.44468824	10.36232273
ILMN_1229957	IL11RA1	8.82848	8.334539474	8.307539706	8.341713636
ILMN_2757966	CXCL4	7.484453333	6.99065	7.080525	7.048609091
ILMN_2915951	D13ERTD608E	7.322256667	6.828815789	6.840588235	6.650377273
ILMN_2986605	PDSS1	7.05284	7.54625	7.506525	7.626577273
ILMN_1257631	APOBEC1	8.986086667	8.492778947	8.517795588	8.435559091
ILMN_1256025	LOC100041137	6.884853333	6.391676316	6.44335	6.474904545
ILMN_2750725	PIGZ	5.767723333	6.260307895	6.21195	6.156859091
ILMN_2848828	CEP97	7.650426667	7.157897368	7.149170588	7.033681818
ILMN_2730293	PDE1B	9.44438	8.951897368	8.937267647	9.015109091
ILMN_2918002	GBP3	10.33665333	10.82889474	10.80859559	10.65228636
ILMN_2428252	RASA2	7.455803333	7.947894737	7.939733824	8.004595455
ILMN_1248837	TBXA2R	7.84156	7.349494737	7.354123529	7.182513636
ILMN_2866856	H2-DMA	12.52671	13.01846053	13.07551324	13.17113636
ILMN_1226555	5430417L22RIK	9.897846667	9.406210526	9.400447059	9.308795455
ILMN_1212938	AIF1	6.576943333	7.068328947	7.123913235	7.142572727
ILMN_2484707	TYMS	9.133346667	9.624002632	9.627598529	9.622622727
ILMN_3148489	FURIN	10.46270667	10.95335	10.90541324	10.89725909
ILMN_2808485	GBP10	6.781303333	7.271921053	7.213405882	7.041513636
ILMN_1226143	RABGEF1	10.34694667	9.856457895	9.845116176	9.860609091
ILMN_2684563	CLDND1	8.172773333	8.663239474	8.625180882	8.674740909
ILMN_2670398	EIF4EBP1	9.293236667	9.783623684	9.711872059	9.773036364
ILMN_2977535	D930015E06RIK	9.695646667	9.205305263	9.291123529	9.344186364
ILMN_1256257	LOC100038882	10.10456	10.59481842	10.55595588	10.57585
ILMN_2613832	MGST2	9.044613333	8.554489474	8.546391176	8.333404545
ILMN_2646834	D11LGP2E	8.081966667	8.571726316	8.579542647	8.546236364
ILMN_1242399	HIST1H2BC	6.873676667	6.384471053	6.383308824	6.379063636
ILMN_2428798	5031439G07RIK	8.838863333	8.350186842	8.323948529	8.293472727
ILMN_2644140	PANK4	10.61254	10.12393684	10.18636176	10.05719545
ILMN_3163044	OLA1	8.91342	9.401918421	9.352347059	9.322536364
ILMN_1227814	SRR	11.62509	11.13730526	11.21078088	11.00605909
ILMN_2644719	HMGN3	10.94508667	11.43285263	11.41632206	11.48374545
ILMN_2600348	SQLE	8.251303333	8.738868421	8.748764706	8.667427273
ILMN_2769971	LINCR	7.524023333	7.036918421	7.068355882	6.961972727
ILMN_2630328	PSMA7	11.52430333	12.01132105	12.01410294	12.02497727
ILMN_3006990	EG622339	12.98081	13.46777632	13.46261471	13.36065455
ILMN_2915060	DGKZ	9.53046	9.043510526	9.038536765	9.060131818
ILMN_2606693	INSIG1	7.262293333	7.748865789	7.678260294	7.641254545
ILMN_2728118	RRP12	9.71417	10.20048684	10.15763088	10.29602273
ILMN_2683811	GALE	6.75883	7.245031579	7.267663235	7.272968182
ILMN_2733524	NRM	11.53344	11.04740263	11.00323971	10.99424091
ILMN_2660551	LAT	9.573943333	9.088315789	9.004679412	8.757095455
ILMN_1241225	DCTD	7.73365	8.219268421	8.183508824	8.209872727
ILMN_1259564	IIGP2	10.87997667	11.36546316	11.33019118	11.20709545

ILMN_1214498	CYP2D22	8.11384	7.6284	7.634107353	7.595440909
ILMN_3148550	GOLM1	8.432583333	7.947163158	7.913177941	7.917890909
ILMN_1260512	MIF	11.02496667	11.51028421	11.51826471	11.4299
ILMN_1248389	INPP5K	12.04935667	11.56430789	11.54765294	11.48464091
ILMN_2547942	GINS2	7.60201	8.087055263	8.042544118	8.018609091
ILMN_1223257	CCL4	11.14475	11.62975263	11.75993824	11.86287727
ILMN_2622780	5530601I19RIK	7.999706667	7.515147368	7.602066176	7.569886364
ILMN_2974064	OSBPL3	7.03954	7.523976316	7.509626471	7.605709091
ILMN_1228333	PRF1	6.592786667	7.077028947	7.063494118	6.897177273
ILMN_2915059	DGKZ	10.26964333	9.785439474	9.7872	9.816468182
ILMN_2721360	GALK1	9.165806667	9.649981579	9.677827941	9.563363636
ILMN_2608151	FCRL1	9.303546667	8.819431579	8.865113235	8.792713636
ILMN_2417174	UBE2H	7.774013333	7.291031579	7.304219118	7.268663636
ILMN_2901283	ADD3	10.85499	10.37201579	10.37048824	10.28376818
ILMN_2508001	CLTC	7.302493333	7.785318421	7.737447059	7.817286364
ILMN_2697615	MAPK12	7.052833333	6.570236842	6.618429412	6.654509091
ILMN_1230696	IGL-V1	12.40741667	11.92506842	12.00315735	12.03508182
ILMN_1237978	9930005O13RIK	7.786423333	7.304186842	7.242588235	7.192336364
ILMN_1233141	KLRA22	5.737783333	6.220013158	6.217479412	6.088368182
ILMN_2597255	CDC6	7.808103333	8.289960526	8.186636765	8.23955
ILMN_1214578	CRTC3	8.313713333	7.832310526	7.893926471	7.840259091
ILMN_2878548	MTHFD2	8.144953333	8.626257895	8.628497059	8.6541
ILMN_2671738	IL16	10.34373	9.862731579	9.813888235	9.759777273
ILMN_2755021	CHKB	9.912793333	9.432428947	9.525319118	9.472736364
ILMN_1249217	LOC380763	8.500983333	8.020868421	8.019075	7.913895455
ILMN_2623536	GOLM1	8.876253333	8.396268421	8.368392647	8.371622727
ILMN_1257097	CNP	8.4583	8.937923684	8.996055882	8.950890909
ILMN_3142573	MAPK1IP1	8.969603333	8.490186842	8.481775	8.445359091
ILMN_1220284	PSMD7	9.257483333	9.736878947	9.752014706	9.74925
ILMN_3067831	ZFP187	9.802603333	9.323465789	9.313083824	9.315436364
ILMN_2665131	IHPK1	10.7729	10.29377105	10.30605147	10.30897273
ILMN_2600744	RGS16	6.451433333	6.930547368	6.940605882	7.104027273
ILMN_1220595	IL17A	6.454306667	6.933336842	6.982905882	6.86355
ILMN_2641793	DTX1	9.060943333	8.582018421	8.668863235	8.689840909
ILMN_2880529	UCK2	7.70306	8.181926316	8.224991176	8.167672727
ILMN_2819380	BC030476	11.90582667	11.42737895	11.43873382	11.16817727
ILMN_1232093	LOC386330	10.13935	9.660942105	9.652973529	9.685572727
ILMN_1242013	UCK2	9.413536667	9.891402632	9.895961765	9.882868182
ILMN_2899599	DDX3Y	9.722653333	9.245560526	9.202622059	9.122063636
ILMN_1242466	PSMB9	8.003013333	8.479313158	8.365239706	8.325395455
ILMN_2901284	ADD3	11.49975333	11.02383684	10.98140147	10.84233636
ILMN_2589477	DARS	8.916623333	9.392265789	9.302201471	9.310081818
ILMN_1255416	LY6A	14.19523333	14.67078421	14.64110735	14.66443636
ILMN_1236517	IL18	6.902506667	6.427465789	6.373588235	6.419559091
ILMN_2470564	IGHV1S120_AF025443_IG_HEAVY_VARIABLE_1S120_8	9.692856667	9.217965789	9.226329412	9.119081818
ILMN_1240702	ATP1B3	12.44345333	11.96903947	11.89987059	11.84145455
ILMN_1242046	AQR	8.068703333	7.594457895	7.619404412	7.522959091
ILMN_1220972	IL16	7.42725	6.953173684	6.940511765	6.881495455
ILMN_3154810	SMARCA2	11.02438	10.55043684	10.50354265	10.53565909
ILMN_1255664	LOC100046905	7.896743333	7.422971053	7.463869118	7.464240909
ILMN_2951691	HIST1H3E	9.41995	9.893715789	9.930129412	9.921827273
ILMN_1247832	CD74	10.73217667	11.20577895	11.29666471	11.35442273
ILMN_2918114	APEX1	8.05855	8.53215	8.552566176	8.5933

ILMN_1216386	CD86	8.408796667	8.882105263	8.877667647	8.874636364
ILMN_2663604	FIGNL1	8.27945	8.752171053	8.647223529	8.705381818
ILMN_2778122	PDCD4	11.32195333	10.84939211	10.88932794	10.78596818
ILMN_2565835	B930008G03RIK	11.46631667	10.99378421	10.96833235	10.91645
ILMN_3020240	HBP1	10.99606333	10.52378947	10.556525	10.49137273
ILMN_1246339	6330403E01RIK	9.15174	8.679492105	8.702944118	8.593131818
ILMN_2467429	D6MIT97	11.45000333	10.97782632	10.98452206	11.02852727
ILMN_1258394	AARS	10.25052333	10.72222632	10.64604118	10.8079
ILMN_2804166	IGSF9	7.72168	7.250102632	7.209426471	7.318354545
ILMN_1255750	IL7R	6.3964	5.925234211	5.865013235	5.894859091
ILMN_2737710	TIAM1	8.273783333	8.744307895	8.661008824	8.648690909
ILMN_2595814	A630082K20RIK	10.71696667	10.24649474	10.22477353	10.16600909
ILMN_1214486	TK2	10.35887333	9.888563158	9.842289706	9.781713636
ILMN_2432255	LOC630337	9.698646667	9.228815789	9.138663235	9.038581818
ILMN_1248439	ST6GALNAC4	8.2337	8.703436842	8.618572059	8.675536364
ILMN_2623056	CLSPN	8.064613333	8.534094737	8.475572059	8.56605
ILMN_2979639	H2-DMB2	11.28671667	11.75598684	11.78886176	11.93475455
ILMN_2869312	FBXO4	10.21257	10.68178421	10.61175	10.58898182
ILMN_2513781	A130038J17RIK	7.070466667	6.601365789	6.61995	6.578772727
ILMN_1247762	RASAL1	7.21572	6.746647368	6.816261765	6.937468182
ILMN_1232667	IFITM2	10.14822	10.6172	10.71305735	10.73515909
ILMN_2918479	HSPA8	12.24956	12.71828947	12.60738235	12.47838636
ILMN_1251178	HS3ST3B1	7.42913	6.960407895	6.955142647	6.921104545
ILMN_3000080	1110038D17RIK	10.41259667	9.943955263	9.934307353	9.923922727
ILMN_1230599	ADAM23	6.62476	6.156160526	6.138545588	6.24995
ILMN_2644092	AASS	7.530816667	7.999257895	7.906854412	8.041690909
ILMN_2668319	HSP90AA1	8.8777	9.345960526	9.299935294	9.217740909
ILMN_2723860	PKM2	8.854423333	9.322594737	9.358717647	9.247309091
ILMN_1214634	AQP9	6.903756667	7.371810526	7.386388235	7.409309091
ILMN_2866185	BTG1	13.71557333	13.24755263	13.26201324	13.26215
ILMN_2660466	EG433229	7.618856667	7.150876316	7.158276471	7.124095455
ILMN_2431398	2810001G20RIK	7.20617	6.738457895	6.759751471	6.705422727
ILMN_2859847	PYGL	7.790936667	7.3233	7.422495588	7.578627273
ILMN_2883952	1810015A11RIK	8.104256667	8.571594737	8.509154412	8.564577273
ILMN_1232989	EHD3	8.013176667	7.546005263	7.554476471	7.601840909
ILMN_2499056	IGKV2-137_AJ231263_IG_KAPPA_VARIABLE_2-137_15	11.41894333	10.95204211	10.96605441	10.97854091
ILMN_1233116	MAP4K4	7.267023333	6.800147368	6.785232353	6.852222727
ILMN_2477221	CITED2	9.57618	10.04302895	10.01740882	10.04663636
ILMN_2933431	INPP5K	9.374156667	8.907313158	8.987426471	8.93495
ILMN_1224942	SHMT2	8.329433333	8.795918421	8.750304412	8.834072727
ILMN_2464474	9430029L20RIK	9.4229	8.95645	8.990469118	8.856822727
ILMN_3130350	GLIPR2	6.38496	6.850863158	6.813057353	6.812659091
ILMN_1225733	LOC677643	10.39900333	9.9334	9.931026471	9.857759091
ILMN_1252202	TNFAIP3	8.73625	9.200576316	9.205004412	9.258704545
ILMN_1252481	FOSL2	7.555466667	8.019776316	8.056545588	8.1423
ILMN_1228653	ZBP1	6.948423333	7.412642105	7.444173529	7.299622727
ILMN_1231168	H3F3B	9.362493333	8.898360526	8.812038235	8.781254545
ILMN_2858359	CLSPN	8.452636667	8.916521053	8.857144118	8.940954545
ILMN_2574982	SPN	7.25949	6.7957	6.822661765	6.698304545
ILMN_2600022	HEG1	8.128633333	7.664915789	7.681570588	7.608509091
ILMN_2593774	1190002H23RIK	8.001166667	7.537692105	7.583389706	7.431922727
ILMN_2892856	RNF167	9.68891	9.225528947	9.181063235	9.116222727

ILMN_2899863	TNF	8.296036667	8.759357895	8.846445588	8.912131818
ILMN_2619846	SLC25A1	7.50881	7.971526316	8.031520588	8.062972727
ILMN_2804103	BC038822	7.910843333	7.448302632	7.379916176	7.437740909
ILMN_2469743	LOC100046793	12.45598333	11.99356316	11.99824265	12.05897727
ILMN_2660596	RUNDC3B	6.71609	7.178071053	7.1822	7.121272727
ILMN_2431619	UBE2L6	8.088856667	8.550692105	8.561057353	8.579322727
ILMN_2688075	CYP51	9.241013333	9.702565789	9.707444118	9.776145455
ILMN_1255256	SGCB	6.903226667	7.364521053	7.292351471	7.317954545
ILMN_3133748	GAB3	7.71051	7.249381579	7.207739706	7.064881818
ILMN_2769567	F2RL1	6.789253333	6.328434211	6.311585294	6.318131818
ILMN_2927131	IL13	6.278206667	6.738778947	6.699602941	6.664881818
ILMN_2889832	SERPINA3H	7.487796667	7.948363158	7.94995	8.069
ILMN_2793946	CSNK1G3	10.25665333	9.796518421	9.729845588	9.704345455
ILMN_2770917	BLVRB	8.54669	9.006694737	9.003377941	8.950313636
ILMN_2631259	IGK-V5	11.67123	11.21130789	11.21311029	11.28002727
ILMN_2784272	IFNGR2	10.17693333	9.717152632	9.806033824	9.636736364
ILMN_2467365	PEX11C	6.63978	6.1805	6.161683824	6.187445455
ILMN_3093089	TARDBP	8.83852	8.379476316	8.366308824	8.351659091
ILMN_2599018	CLIC4	6.676103333	7.134968421	7.206091176	7.233940909
ILMN_2772920	FBXO4	9.511573333	9.970065789	9.933588235	9.823972727
ILMN_2814847	SCN4A	6.732753333	7.191044737	7.299491176	7.273713636
ILMN_1240153	UCHL5	8.30777	8.765928947	8.739652941	8.759190909
ILMN_1250135	A930005H10RIK	10.44449	9.986555263	10.03557794	9.894318182
ILMN_2587761	KIF1B	6.898756667	6.440939474	6.393510294	6.337227273
ILMN_3026397	CHKA	12.51251667	12.05482368	12.07835147	11.87520909
ILMN_2888448	CCR6	11.8719	11.41442368	11.42346618	11.433
ILMN_1258600	LOC100043671	9.537613333	9.99505	9.958407353	10.02151818
ILMN_2917180	FOXP3	7.212343333	7.669513158	7.709433824	7.612072727
ILMN_1248891	CRTC3	8.721226667	8.2641	8.262083824	8.305422727
ILMN_2612448	NFAT5	10.1261	9.669371053	9.617407353	9.650840909
ILMN_3149143	ENTPD5	7.866756667	7.41035	7.433564706	7.419763636
ILMN_1248824	C230082I21RIK	9.24562	8.789247368	8.743510294	8.73275
ILMN_1229263	LOC100046496	10.91076	10.45446316	10.498725	10.60142727
ILMN_2677876	ARHGAP4	11.83005333	11.37396842	11.37664706	11.29995909
ILMN_3118584	BEX4	6.290316667	6.745934211	6.717019118	6.743859091
ILMN_2469190	B230345P09RIK	9.48775	9.032318421	8.997217647	8.814136364
ILMN_2753149	AVIL	5.968846667	6.424028947	6.406513235	6.338922727
ILMN_2514723	1110067B18RIK	8.664656667	8.209513158	8.227560294	8.173459091
ILMN_1239601	LOC637711	7.591996667	8.047021053	8.053213235	8.032568182
ILMN_2686132	ADA	7.039233333	7.494160526	7.524789706	7.525754545
ILMN_1235493	FXYD5	10.50235333	10.04759737	10.05027206	9.985063636
ILMN_1244857	RABAC1	11.18026333	10.72565526	10.79111324	10.75775455
ILMN_1257965	LDHA	12.56264333	13.01716842	12.98936765	12.88280455
ILMN_2597030	SMOX	7.755666667	8.210173684	8.189514706	8.309086364
ILMN_1241923	MSH5	7.286276667	6.83185	6.818532353	6.777359091
ILMN_1239607	DGKZ	8.896886667	8.442460526	8.459808824	8.481786364
ILMN_2522495	C130078N17RIK	9.92795	10.38224737	10.34155441	10.21982727
ILMN_1232144	A130087I02RIK	6.94611	6.491957895	6.482135294	6.369822727
ILMN_2695217	2810485I05RIK	10.85201	10.39787632	10.37109853	10.27317273
ILMN_1249864	A630077B13RIK	8.645473333	9.099492105	9.099207353	8.909022727
ILMN_1221943	SDF2L1	9.424183333	9.878152632	9.842982353	10.00285909
ILMN_1218934	RDM1	9.691513333	9.237818421	9.296355882	9.263672727
ILMN_1225932	CCND2	7.983533333	8.437152632	8.424633824	8.339681818
ILMN_2538029	LOC386005	11.26105	10.80766316	10.76714265	10.68383636

ILMN_2571616	C430002D13RIK	8.354466667	7.901107895	7.951077941	7.801709091
ILMN_2891506	TBCD	9.07411	9.527063158	9.515958824	9.499972727
ILMN_2516348	VAMP4	8.802203333	8.349344737	8.311704412	8.185272727
ILMN_2624938	PEA15	8.426816667	7.973960526	8.031760294	7.905472727
ILMN_2484838	UBAC2	9.095233333	8.642694737	8.613807353	8.500886364
ILMN_2673369	IRF8	10.46650667	10.91894737	10.92003235	10.8755
ILMN_2663230	SLCO3A1	7.528683333	7.980968421	8.006858824	7.821268182
ILMN_1213645	AI467606	10.8157	10.36356316	10.381575	10.31484545
ILMN_1224390	1700129I04RIK	6.254066667	6.706015789	6.752007353	6.905109091
ILMN_2672091	HTT	7.075923333	7.527834211	7.447980882	7.573559091
ILMN_2705097	DEADC1	8.784596667	9.236284211	9.246120588	9.286304545
ILMN_2417863	TNIP1	10.67977667	10.22862895	10.33654118	10.3292
ILMN_2630605	FSCN1	9.264746667	8.813610526	8.879035294	9.026695455
ILMN_2710229	CCNG1	8.237643333	8.688307895	8.719710294	8.740531818
ILMN_2602597	SH3RF1	6.97383	7.424310526	7.302129412	7.306981818
ILMN_1227018	IL1A	7.508863333	7.959210526	8.102714706	8.221045455
ILMN_2727235	ANKRD11	10.3901	9.939768421	9.97785	9.793654545
ILMN_2759484	C3	8.713386667	8.263144737	8.351541176	8.556345455
ILMN_2814484	IFITM1	6.603923333	7.054015789	7.066145588	7.122472727
ILMN_2526739	BATF3	6.226883333	6.676947368	6.730197059	6.660731818
ILMN_1215825	LOC100047316	9.10279	8.652736842	8.764692647	8.732336364
ILMN_1219978	APPL2	8.213966667	7.764534211	7.741592647	7.672322727
ILMN_2751948	HIST2H2AA1	7.52977	7.080352632	7.127307353	7.225190909
ILMN_1225769	CLASP1	8.361373333	7.912028947	7.920219118	7.866618182
ILMN_1218547	DLM1-PENDING	6.341386667	6.79065	6.869138235	6.909118182
ILMN_2974737	BC065085	7.958643333	7.509571053	7.581791176	7.586068182
ILMN_2655571	B3GNT7	6.033913333	6.482823684	6.563373529	6.687959091
ILMN_2585533	LY78	8.423283333	7.974515789	7.950780882	7.901995455
ILMN_3138439	DYRK2	7.370266667	6.921794737	6.905360294	6.828077273
ILMN_2524861	CHD3	8.387586667	7.939173684	7.977804412	7.910968182
ILMN_2995688	EG433016	9.116706667	8.66845	8.852829412	9.032322727
ILMN_3004142	STK4	11.51383	11.06564474	11.06916765	11.10165
ILMN_1217855	NKG7	9.221053333	9.669168421	9.689545588	9.423554545
ILMN_2543834	RFC3	6.905386667	7.353431579	7.309782353	7.283140909
ILMN_1236304	HAMP	5.92571	6.373726316	6.455057353	6.366813636
ILMN_1223697	CD44	9.625953333	10.07376842	10.11732941	10.10371364
ILMN_2700848	ARRB2	9.449236667	9.001426316	9.048977941	9.081027273
ILMN_2949605	UBAC2	10.55435	10.10654737	10.07797647	9.933981818
ILMN_2743503	E2F3	7.260286667	7.707805263	7.726333824	7.720931818
ILMN_2546073	WDR68	7.13092	7.577952632	7.545673529	7.717172727
ILMN_2595973	GRN	11.08555667	10.63854737	10.66243382	10.77950909

For each of the 1000 probes, the maximum and minimum expression observed by any reference standard sample was recorded. The range between the maximum and minimum expression observed for the reference standard served as the acceptable tolerance range for each probe. We then counted the number of samples for GA and PG with expression that fell within the acceptable tolerance range and converted the results to a percentage of samples within range for all 1000 probes. These percentages were then sorted from smallest to largest separately for PG and GA and plotted against the integers,

1-1000. The net result was a plot that allowed for the determination for either drug of how many probes would fail to meet a given processing specification on the number of samples required to fall within the acceptable tolerance range for each probe. A visual representation of the method can be observed in Fig. 16, which depicts scatter plots for Gpr83 vs. FoxP3 for both GA and PG. The red square in both plots is the acceptable tolerance range defined by the maximum and minimum reference standard expression for both probes. Five probes fall outside the acceptable tolerance range for GA, while twelve probes fall outside the range for PG.

Variance Ratio Method

To measure relative differences in the variability among PG and GA samples, we utilized the sample variance as an unbiased estimate for the population variance for each set of treatments (GA and PG). Briefly, we computed the ratio of the variance in PG samples divided by the variance in the GA samples for each probe in the Illumina microarray. The measure provided an intuitive comparison of the variance in each probe between treatments and this ratio is basic statistic computed by the F-test *(63)*. We then sorted the probes from higher than 1 ratio (more variability in PG compared to GA) to lower than 1 (more variable in GA compared to PG).

Variability analysis over time plots

To analyze and compare the variability of PG and GA treated samples, we narrowed the list of probes to those with high expression (top 10% highest expression by rank) and a high coefficient of variation (CV, top 10% highest CV by rank). The combined criteria yield a set of 315 probes that are both highly expressed (mean log2 intensity >= 9) and highly variable (mean CV >= 2%).

To measure the distance between any two categories/batches, we simply counted the number of differentially variable probes by F-test with FDR-adjusted $P < 0.05$ between those categories, collapsing technical replicates using the mean for each probe to minimize the effects of technical variation *(64)*. We plotted the number of differentially variable probes between each PG batch and the reference standard (RS) and GA. We also noted the percent of probes

(out of the total 315) that were differentially variable between GA and RS in the horizontal green line for comparison.

Coefficient of Variation plots

To measure the relationship between probe intensity and probe variation, we calculated the log2 intensity of each probe after normalization/batch correction (averaging technical replicates to focus on biological variability rather than variability introduced by technical issues *(64)*). We also calculated the coefficient of variation, denoted CV, by dividing the standard deviation of each probe by its mean log2 intensity. We then plotted the relationship for all probes using the log2 intensity of the probe on the X-axis and the CV on the y-axis. The plots show a bias of probes with higher intensity to have lower CV and vice versa. Despite this bias, we still see that, as a class, PG-treated samples exhibit overall significantly higher variability (measure by F-test) compared to GA treated samples based on the number of probes that were highly variable between the two treatments and medium.

Identification of differentially expressed genes using multiple parametric tests (ANOVA, LIMMA with background subtraction, comparative marker selection with SNR and t-test)

To find differentially expressed probes between PG and GA, we utilized various statistical tests at the probe level and merged the results across the different methods. First, we computed the statistical significance of differential expression between treatments using the Analysis of Variance (ANOVA) method for each probe*(65)*, adjusting for multiple hypothesis testing using the Benjamini-Hochberg False Discovery Rate (FDR) correction*(66)*. Next, we utilized Linear Models for Microarray (LIMMA) data analysis*(67, 68)* R package, part of the Bioconductor framework*(69)*, to compare PG and GA samples, fitting a linear model that adjusts for fixed effect from medium (Effect = (GA-PG) - (PG-Medium)). The coefficients for the linear model were tested for significance using a modified t-test (taking into account standard deviation) and the p-values for each probe were adjusted using FDR.*(66)* In parallel, we used Comparative Marker Selection as implemented in GenePattern*(70)* to directly compare probes between PG and GA. We applied two separate

techniques within this framework; a traditional T-test and a Signal-to-Noise Ratio test (SNR). For each of these two tests, we adjusted the nominal p-values via FDR. For all four tests described, we used an adjusted threshold that was less than or equal to 0.05.

Non-parametric/Wilcoxon

Because of natural variations of the distributions of probe expression in samples of PG and GA, we sought to identify differences via a non-parametric approach. For this, we used the Wilcoxon Rank Sum Test*(71)* as implemented in R (R version 2.15.1 (2012-06-22)) for each probe.

Nominal p-values were FDR adjusted and only probes that were less than or equal to 0.05 were considered.

GSEA with FoxP3 target gene lists

In order to examine how genes downstream of the FoxP3 transcription factor were modulated by the two treatments, we utilized gene sets constructed by Zheng et al.*(72)* from FoxP3+ T-cells isolated from human thymus and periphery comprising genes that had FoxP3 binding sites by ChIP (Chromatin-Immuniprecipitation) and are differentially expressed relative to FoxP3- T-cells. Orthology mapping from human to mouse was conducted using a map provided by the Mouse Genome Database.*(73)* We then utilized the Gene Set Enrichment Algorithm (GSEA)(48) to measure the enrichment of FoxP3 targets in genes upregulated in GA relative to Medium, and PG relative to Medium. Briefly, GSEA takes as input a gene set (in this case, the set of FoxP3 targets) and an expression matrix (the set of samples treated with either PG or GA or untreated/Medium), then it ranks genes based on their expression in the expression matrix for each class/treatment. GSEA then calculates an enrichment score for each geneset based on how overrepresented each geneset is at the extremes of expression (high or low expression) for each treatment.

ANOVA-based Pattern Identification Method:

We sought to identify probes matching specific patterns of expression across experimental conditions using a technique that referred to as the ANOVA-based Pattern Identification Method.

For instance, one pattern of interest was where probes are only significantly affected by PG. In this pattern, the expression for a given probe should not be statistically different among cells treated by GA, reference standard, or Medium. In statistical terms, probes matching this pattern should have p-values for the comparisons between PG and GA (pGA-PG), PG and reference standard (pPG-reference standard), and PG and Medium (pPG-Medium) less than 0.05 and p-values for the comparisons between GA and Medium (pGA-Medium), GA and reference standard (pGA-reference standard), and reference standard and Medium (preference standard-Medium) greater than 0.05.

To carry out the analysis in a general manner, we computed the 6 p-values required to do pairwise comparisons of all 4 conditions for all probes using the ANOVA1 function in MATLAB. We then identified sets of probes matching the desired pattern. In the example above, probes were identified as being only affected by PG if their 6 pairwise comparison pvalues matched the following pattern (pGA-PG <0.05, pPG-reference standard<0.05, pPG-Medium<0.05, pGAMedium> 0.05, pGA-reference standard>0.05, preference standard-Medium>0.05).

Cell type enrichment

To measure cell-type specificity in gene sets, we utilized Benita et al.'s enrichment tool*(74)* to calculate specificity scores relating each gene to each cell type in IMMGEN (Immunological Genome Project). *(75)* We then utilize a hyper-geometric test to calculate the significance of the summed specificity scores for the geneset across each cell type. Finally, we adjusted each pvalue output by the hypergeometric enrichment using the Benjamini-Hochberg False Discovery Rate correction for multiple hypothesis testing.*(66)*

Functional enrichment with MSigDB

To assess the functional significance of lists of genes (test set), we used version 3.1 of the database of MSigDB*(17)* as our reference set. We implemented a standard hypergeometic enrichment test with the additional criterion that at least three genes from our test set be in the reference set. We then applied the Benjamini-Hochberg correction procedure and used a significance threshold of 0.05.

Discussion - Examples 5-11

We have developed a set of computational methods for comparing the immunological impact of an innovative medicine with that of a PG.

The first set of methods involves comparing the variability of samples in expression of certain genes. We applied a broad range of computational methods including a variance ratio analysis that identifies specific genes for which one medicine is very consistent and the other is highly variable. We compared variability for individual genes directly using an F-test, plotted the coefficient of variation as a function of intensity to determine the relationship between variability and probe intensity, and investigated variability across batches. We also developed a new method using principles from chemical/process engineering to determine variability using acceptable ranges defined by a reference standard.

These methods produced multiple lines of evidence suggesting that PG has a significantly more variable biological impact than either GA reference standard or GA. For instance, different GA batches were found to be highly consistent and similar to GA reference standard. In contrast, more probes have higher variability in expression following stimulation with different PG batches. This variability itself is cause for concern among physicians and regulators, since the batch-to-batch variability of the product could manifest itself in ways that are harmful to patients. One possibility is that a patient could experience benefit from a particular batch of PG but not from a subsequent batch, preventing the patient from achieving the maximum benefit possible. Another, more disconcerting, possibility is that the variability could lead to a particular batch of PG causing adverse events. Due to PG's heterogeneity, such adverse events could be intermittent and therefore difficult to detect, monitor, and report.

The next set of methods involved identifying immunological impacts that differ between two medicines. We identified differentially expressed genes using a variety of methods (multiple parametric tests, non-parametric tests, and an ANOVA-based pattern matching method). We then explored the immunological relevance of these

differentially expressed genes using a newly developed method for determining enrichment in genes specific to particular immune cell types. We further investigated the resulting hypotheses using established methods including hypergeometric enrichment with MSigDB*(17)* and GSEA*(17)* on lists of cell-type specific genes and transcription-factor target genes.

These methods identified specific genes and immune cell types that are upregulated significantly more by the GA than by PG. In this case, there is a preponderance of evidence suggesting that GA upregulates FoxP3+ Tregs more consistently and more effectively than PG. We have shown that the expression of FoxP3 itself, genes downstream of FoxP3, other known Treg markers, and Treg specific genes are all enriched from activation by GA relative to PG. This dramatic difference in biological impact on Tregs is certainly of note to physicians and regulators. It is well established that FoxP3+ Tregs induce beneficial tolerance in MS patients by suppressing harmful myelin reactive T cells,*(54)* so the more variable and reduced Treg induction raises questions about the potential efficacy of PG especially given recent findings demonstrating Copaxone's impact on Tregs*(51)* and linking Tregs to clinical response in MS patients.*(55)* These methods also identified specific genes and immune cell types that are upregulated significantly more by PG than by GA. In this case, PG had a significantly higher impact on cells of the myeloid lineage such as monocytes and macrophages than GA did. Genes with significantly higher expression in PG than in GA include key monocyte markers such as CD14, enrich to macrophage and monocyte cell types, and are enriched in related pathways such as TLR signaling. The stronger upregulation of monocyte-specific genes warrants further investigation by physicians and regulators, especially given that monocytes are "prominent contributors" to neuroinflammation in MS*(56)* and given recent reports that one of GA's mechanisms of action involves its impact on monocytes.*(52)*

The potential safety concerns stemming from PG's impact on monocytes were heightened by our GSEA analysis finding that the gene expression patterns following activation by PG more closely resemble the gene expression patterns of CD16dim monocytes, while the

expression patterns following GA activation more closely resemble the gene expression patterns associated with CD16+ monocytes. This is consistent with literature reports showing that Copaxone positively impacts CD16+ monocytes,*(57)* and is particularly concerning from a safety perspective because the CD16dim monocytes favored by PG are known to play a different biological role.

The difference in impact on monocytes could also help explain the observed differences in Treg upregulation, since GA-treated monocytes are known to upregulate FoxP3 expression.*(49)* GA had an opposite impact on monocytes stimulated by LPS (resulting in increased IL1B production) as opposed to monocytes stimulated by T cell contact (resulting in decreased IL1B production).*(52)* The same PG samples that have unusually high levels of IL1B also have unusually low FoxP3. PG also shows upregulation in LPS response pathways. Together, these findings suggest that some component of PG, either deliberate or due to contamination, may trigger an LPS response pathway in monocytes leading to excessive IL1B production and unusually low induction of FoxP3+ Tregs. This possibility warrants further investigation with regard to safety.

One clear caveat to any gene expression study in mice lies in the inherent differences between healthy mouse models and human MS patients. Yet, there are clear differences in biological impact of GA and PG. One step to further address this lies in linking the differentially impact genes to markers and processes known to be linked to Copaxone response in humans with MS.*(27, 28)*

In these studies, we have sought to develop a broadly applicable set of computational methods for comparing innovative medicines to PGs (Fig. 15A). We found higher variability in gene expression following activation by PG compared to GA, and the significant differences in impact on key biological processes including Tregs and monocytes (Fig. 15B). These differences raise questions for physicians and regulators seeking safe and effective treatments for MS patients, and suggest that clinical studies are warranted, using appropriate safety and efficacy endpoints to comparing PG to GA. More generally, the data analysis methods described here can be utilized in a variety of situations to compare the immunological impact of two

purportedly similar therapies, in order to ensure that patients receive the best possible medicines.

References:

1. Noseworthy JH, Lucchinetti C, Rodriguez M, Weinshenker BG. Multiple sclerosis. N Engl J Med 2000; 343:938-52.
2. Guideline on clinical investigation of medicinal products for the treatment of multiple sclerosis EMEA, London 16 September 2006.
3. Bjartmar C, Fox RJ. Pathological mechanisms and disease progression of multiple sclerosis: therapeutic implications. Drugs of Today 2002; 38:17-29.
4. Fleming JO. Diagnosis and management of multiple sclerosis. 1st ed. New York: Professional communications, Inc., 2002.
5. Anderson DW, Ellenberg JH, Leventhal CM et al. Revised estimate of the prevalence of multiple sclerosis in the United States. Ann Neurol 1992; 31:333-36.
6. Compston A, Lassmann H, McDonald I. The story of multiple sclerosis. In: Compston A, Confavreux C, Lassman H, Mcdonald I, Miller D, Noseworthy JH, Smith K, Wekerle H, editors. McAlpine's Multiple Sclerosis. London: Churchill Livingstone; 2006. p. 3-68.
7. Revel M., Pharmacol. Ther., 100(1):49-62 (2003).
8. Copaxone® (glatiramer acetate injection) (2012) *Teva Pharmaceutical Industries, Ltd* Petach-Tikva, Israel:Rev-2/209.
9. Varkony H, et al. (2009) The glatiramoid class of immunomodulator drugs. *Expert Opin Pharmacother* 10:657-668.
10. Filippi M, et al. (2001) Glatiramer acetate reduces the proportion of new MS lesions evolving into "black holes". *Neurology* 57:731-733.
11. Kipnis J, Schwartz M (2002) Dual action of glatiramer acetate (Cop-1) in the treatment of CNS autoimmune and neurodegenerative disorders. *TRENDS in Molecular Medicine* 8:319-323.
12. Teitelbaum D, Aharoni R, Arnon R, Sela M (1988) Specific inhibition of the T-cell response to myelin basic protein by the synthetic copolymer Cop 1. *Proc Natl Acad Sci U S A* 85:9724-9728.
13. Putheti P, Soderstrom M, Link H, Huang YM (2003) Effect of glatiramer acetate (Copaxone) on CD4+CD25high T regulatory

cells and their IL-10 production in multiple sclerosis. *J Neuroimmunol* 144:125-131.

14. Stadelmann C, et al. (2002) BDNF and gp145trkB in multiple sclerosis brain lesions: neuroprotective interactions between immune and neuronal cells? *Brain* 125:75-85.
15. Ford C, et al. (2010) Continuous long-term immunomodulatory therapy in relapsing multiple sclerosis: results from the 15-year analysis of the US prospective open-label study of glatiramer acetate. *Mult Scler* 16:342-350.
16. Aharoni R, Teitelbaum D, Arnon R, Sela M (1999) Copolymer 1 acts against the immunodominant epitope 82-100 of myelin basic protein by T cell receptor antagonism in addition to major histocompatibility complex blocking. *Proc Natl Acad Sci U S A* 96:634-639.
17. Arnon R, Aharoni R (2004) Mechanism of action of glatiramer acetate in multiple sclerosis and its potential for the development of new applications. *Proc Natl Acad Sci U S A* 101 Suppl 2:14593-14598.
18. Teitelbaum D, Aharoni R, Sela M, Arnon R (1991) Cross-reactions and specificities of monoclonal antibodies against myelin basic protein and against the synthetic copolymer 1. *Proc Natl Acad Sci U S A* 88:9528-9532.
19. Webb C, Teitelbaum D, Arnon R, Sela M (1973) In vivo and in vitro immunological cross-reactions between basic encephalitogen and synthetic basic polypeptides capable of suppressing experimental allergic encephalomyelitis. *Eur J Immunol* 3:279-286.
20. Duda PW, et al. (2000) Human and murine CD4 T cell reactivity to a complex antigen: recognition of the synthetic random polypeptide glatiramer acetate. *J Immunol* 165:7300-7307.
21. Duda PW, et al. (2000) Glatiramer acetate (Copaxone) induces degenerate, Th2-polarized immune responses in patients with multiple sclerosis. *J Clin Invest* 105:967-976.
22. Brenner T, et al. (2001) Humoral and cellular immune responses to Copolymer 1 in multiple sclerosis patients treated with Copaxone. *J Neuroimmunol* 115:152-160.
23. Aharoni R, Teitelbaum D, Sela M, Arnon R (1997) Copolymer 1

induces T cells of the T helper type 2 that crossreact with myelin basic protein and suppress experimental autoimmune encephalomyelitis. *Proc Natl Acad Sci U S A* 94:10821-10826.

24. Wiesemann E, et al. (2003) Correlation of serum IL-13 and IL-5 levels with clinical response to Glatiramer acetate in patients with multiple sclerosis. *Clin Exp Immunol* 133:454-460.

25. Aharoni R, Teitelbaum D, Sela M, Arnon R (1998) Bystander suppression of experimental autoimmune encephalomyelitis by T cell lines and clones of the Th2 type induced by copolymer 1. *J Neuroimmunol* 91:135-146.

26. Aharoni R, et al. (2003) Glatiramer acetate-specific T cells in the brain express T helper 2/3 cytokines and brain-derived neurotrophic factor in situ. *Proc Natl Acad Sci U S A* 100:14157-14162.

27. Miller A, et al. (1998) Treatment of multiple sclerosis with copolymer-1 (Copaxone): implicating mechanisms of Th1 to Th2/Th3 immune-deviation. *J Neuroimmunol* 92:113-121.

28. Neuhaus O, et al. (2000) Multiple Sclerosis: Comparison of copolymer-1-reactive T cell Lines from treated and untreated subjects reveals cytokine shift From T helper 1 to T helper 2 cells. *Proceedings of the National Academy of Sciences* 97:7452-7457.

29. Venken K, et al. (2008) Natural naive CD4+CD25+CD127low regulatory T cell (Treg) development and function are disturbed in multiple sclerosis patients: recovery of memory Treg homeostasis during disease progression. *J Immunol* 180:6411-6420.

30. Haas J, et al. (2009) Glatiramer acetate improves regulatory T-cell function by expansion of naive CD4(+)CD25(+)FOXP3(+)CD31(+) T-cells in patients with multiple sclerosis. *J Neuroimmunol* 216:113-117.

31. Hong J, et al. (2005) Induction of CD4+CD25+ regulatory T cells by copolymer-I through activation of transcription factor Foxp3. *Proc Natl Acad Sci U S A* 102:6449-6454.

32. Weber MS, et al. (2007) Type II monocytes modulate T cell-mediated central nervous system autoimmune disease. *Nat Med*

13:935-943.

33. Xu D, et al. (1998) Selective expression and functions of interleukin 18 receptor on T helper (Th) type 1 but not Th2 cells. *J Exp Med* 188:1485-1492.

34. Jee Y, et al. (2007) CD4(+)CD25(+) regulatory T cells contribute to the therapeutic effects of glatiramer acetate in experimental autoimmune encephalomyelitis. *Clin Immunol* 125:34-42.

35. Windhagen A, et al. (1998) Cytokine secretion of myelin basic protein reactive T cells in patients with multiple sclerosis. *J Neuroimmunol* 91:1-9.

36. Neuhaus O, et al. (2000) Multiple sclerosis: comparison of copolymer-1- reactive T cell lines from treated and untreated subjects reveals cytokine shift from T helper 1 to T helper 2 cells. *Proc Natl Acad Sci U S A* 97:7452-7457.

37. Chen M, et al. (2001) Glatiramer acetate induces a Th2-biased response and crossreactivity with myelin basic protein in patients with MS. *Mult Scler* 7:209-219.

38. Franciotta D, et al. (2003) Interferon gamma and interleukin 4 producing T cells in peripheral blood of multiple sclerosis patients undergoing immunomodulatory treatment. *J Neurol Neurosurg Psychiatry* 74:123-126.

39. Weder C, et al. (2005) Clinical and immune responses correlate in glatiramer acetate therapy of multiple sclerosis. *Eur J Neurol* 12:869-878.

40. Sanna A, et al. (2006) Glatiramer acetate reduces lymphocyte proliferation and enhances IL-5 and IL-13 production through modulation of monocyte-derived dendritic cells in multiple sclerosis. *Clin Exp Immunol* 143:357-362.

41. Kipnis J, Avidan H, Caspi RR, Schwartz M (2004) Dual effect of CD4+CD25+ regulatory T cells in neurodegeneration: a dialogue with microglia. *Proc Natl Acad Sci U S A* 101 Suppl 2:14663-14669.

42. Tennakoon DK, et al. (2006) Therapeutic induction of regulatory, cytotoxic CD8+ T cells in multiple sclerosis. *J Immunol* 176:7119-7129.

43. Praksova P, et al. (2012) Immunoregulatory T cells in multiple

sclerosis and the effect of interferon beta and glatiramer acetate treatment on T cell subpopulations. *J Neurol Sci* 319:18-23.

44. Achiron A, et al. (2009) Molecular profiling of glatiramer acetate early treatment effects in multiple sclerosis. Dis Markers. 27(2):63-73.

45. Dunning MJ, Smith ML, Ritchie ME, Tavare S (2007) beadarray: R classes and methods for Illumina bead-based data. *Bioinformatics* 23:2183-2184.

46. Sharan R, Maron-Katz A, Shamir R (2003) CLICK and EXPANDER: a system for clustering and visualizing gene expression data. *Bioinformatics* 19:1787-1799.

47. Sugimoto N (2006) Foxp3-dependent and -independent molecules specific for CD25+CD4+ natural regulatory T cells revealed by DNA microarray analysis. *International Immunology* 18:1197-1209.

48. Subramanian N, et al. (2005) Gene set enrichment analysis: A knowledge-based approach for interpreting genome-wide expression profiles. *Proc Natl Acad Sci USA* 102:15545-15550.

49. Weber M. S. et al. (2007) Type II monocytes modulate T cell-mediated central nervous system autoimmune disease. *Nature Medicine* 13:935-943.

50. Wang Z. (2006) Role of IFN-g in induction of Foxp3 and conversion of CD4+CD25- f cells to CD4+ Tregs. *Journal of Clinical Investigation*. doi:10.1172/JCI25826.

51. Hong J. et al. (2005) Induction of CD4+CD25+ regulatory T cells by copolymer-I through activation of transcription factor Foxp3. *Proc Natl Acad Sci USA* 102:6449-6454.

52. Burger D. et al. (2009) Glatiramer acetate increases IL-1 receptor antagonist but decreases T cell-induced IL-lp in human monocytes and multiple sclerosis. *Proceedings of the National Academy of Sciences* 106:4355-4359.

53. Ingersoll M. A. et al. (2010) Comparison of gene expression profiles between human and mouse monocyte subsets. *Blood* 115, e10-el9.

54. Nylander A. and Hafler D. A. (2012) Multiple sclerosis. *Journal of Clinical Investigation* 122:1180-1188.

55. Dhib-Jalbut S. et al. (2012) in *ECTRIMS.*

56. Bar-Or A. et al. (2003) Analyses of all matrix metalloproteinase members in leukocytes emphasize monocytes as major inflammatory mediators in multiple sclerosis. *Brain* 126:2738-2749.

57. Pul R. et al. (2012) Glatiramer Acetate Increases Phagocytic Activity of Human Monocytes In Vitro and in Multiple Sclerosis Patients. *PLoS ONE* 7, e51867.

58. Anis S. et al. (2013) in *AAN.*

59. Anis S. et al. (2010) in *ECTRIMS.*

60. Bolstad B. M., *preprocessCore: A collection of pre-processing functions.*

61. Johnson W. E. et al. (2007) Adjusting batch effects in microarray expression data using empirical Bayes methods. *BiostatS* 118-127.

62. Leek J. T. et al., *sva: Surrogate Variable Analysis.*

63. Ho J. W. K. et al. (2008) Differential variability analysis of gene expression and its application to human diseases. *Bioinformatics* 24:i390–398.

64. Quackenbush J. (2002) Microarray data normalization and transformation. *Nature Genetics* 32:496-501.

65. Pavlidis P. (2003) Using ANOVA for gene selection from microarray studies of the nervous system. *Methods* 31:282-289.

66. Benjamini Y. and Hochberg Y. (1995) Controlling the false discovery rate: a practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society. Series B (Methodological)* 289-300.

67. Smyth G. K. (2004) Linear models and empirical bayes methods for assessing differential expression in microarray experiments. *StatAppl Genet Mol Biol* 3, Article3.

68. Smyth G. K. (2005) In *Bioinformatics and Computational Biology Solutions Using R and Bioconductor,* R. Gentleman, V. Carey, S. Dudoit, R. Irizarry, W. Huber, Eds. (Springer, New York) 397-420.

69. Gentleman R. C. et al. (2004) Bioconductor: Open software development for computational biology and bioinformatics. *Genome Biology* 5, R80.

70. Reich M. et al. (2006) GenePattern 2.0, *Nature Genetics* 38:500-501.

71. Saeys Y. et al. (2007) A review of feature selection techniques in bioinformatics. *Bioinformatics* 23:2507-2517.

72. Zheng Y. et al. (2007) Genome-wide analysis of Foxp3 target genes in developing and mature regulatory T cells. *Nature* 445:936-940.

73. Eppig J. T. et al. (2012) The Mouse Genome Database (MGD): comprehensive resource for genetics and genomics of the laboratory mouse. *Nucleic Acids Res* 40:D881-D886.

74. Benita Y. et al. (2010) Gene enrichment profiles reveal T-cell development, differentiation, and lineage-specific transcription factors including ZBTB25 as a novel NF-AT repressor. *Blood* 115:5376-5384.

75. Painter M. W. et al. (2011) Transcriptomes of the B and T lineages compared by multi-platform microarray profiling. *Immunol* 186:3047-3057.

What is claimed:

1. A process for characterizing a glatiramer acetate related drug substance or drug product comprising the steps of:

a) obtaining a batch of the glatiramer acetate related drug substance or drug product;

b) immunizing a mammal with a predetermined amount of a glatiramer acetate related drug substance or drug product;

c) preparing a culture of cells from the mammal of step b) at a predetermined time after immunization;

d) incubating cells from the culture of step c) with a predetermined amount of the glatiramer acetate drug related substance or drug product of step a); and

e) determining the level of expression of at least one gene selected from the group consisting of genes regulated by glatiramer acetate drug substance or drug product in Gene Expression Omnibus accession number GSE40566; determining the level of expression of at least one gene selected from the group consisting of Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247, Igfbp4, Oas2, Bcl11b, Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1, Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, Ccl3, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4; determining the level of expression of at least one gene selected from the group consisting of CD40, CD86, GATA3, HLA-DMA, HLA-DMB, ICOS, IFNG, IFNGR2, IL2, IL13, IL4, IL18, IL12RB1, IL17A, IL17F, IL18R1, IL2RA, IL2RG, IL4R,

IL6R, TBX21, TGFBR2, TNF, FOXP3, IL10RB, KLRD1, CD69, LTB, CD83, PRF1, CAMK2D, LTA, FSCN1, TLR7, CSF2, CCR7, FASLG, IL1A, CCL5, CD8B, CXCL10, TLR2, CCL4, TLR7, IGHA1, IL24, SOCS1, OAS1, JAK1, PTPN2, IFITM1, IFI35, STAT2, BCL2, MVD, FDPS, SQLE, NSDHL, DHCR24, Acat2/Acat3, MSMO1, LSS, CYP51A1, NFKBIE, PIK3R1, PPP3CC, CD3D, IL2RB, PTEN, CD3G, ICOS, CAMK2D, NFAT5, LAT, ITK, H2-M2, FASLG, LIF, IGHA1, PRKACB, SGK1, MAPK11, TSC22D3, JUN, FKBP5, ADRB2, MAP3K1, MAPK12, POU2F1, SMARCA2, CDKN1A, TGFB3, HSP90AA1, DHCR24, CCR5, and CXCL9; determining the level of expression of at least one gene selected from the group consisting of Foxp3, Il2, Il1a, Il1b, C3, S100a8, S100a9, Cxcl2, Cxcl3, Ccl4, Ccl3 and Cd14; determining the level of expression of at least one gene selected from the group consisting of the genes presented in Table 8; determining the level of expression of at least one gene selected from the group consisting of the genes presented in Table 10; determining the level of expression of at least one gene selected from the group consisting of FoxP3, GPR83, CD14, TLR2, IFNG, CD40 and IL1B; determining the level of expression of at least one gene selected from the group consisting of the genes presented in Table 12; or determining gene set enrichment analysis for genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells, CD4+ CD8+ T cells, macrophage cells, monocyte cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes,

thereby characterizing the glatiramer acetate related drug substance or drug product of step a).

2. A process for characterizing a glatiramer acetate related drug substance or drug product comprising the steps of:

a) obtaining a batch of the glatiramer acetate related drug substance or drug product;

b) immunizing a mammal with a predetermined amount of a glatiramer acetate related drug substance or drug product;

c) preparing a culture of cells from the mammal of step b) at a predetermined time after immunization;

d) incubating cells from the culture of step c) with a predetermined amount of the glatiramer acetate related drug substance or drug product of step a); and

e) determining the level of biological activity of the cells of step c) selected from the group consisting of, immune response to antigen presenting cells, differentiation of effector lymphocytes, suppression of T lymphocytes, activation of Foxp3 positive regulatory T cells, expansion of mononuclear leukocytes, proliferation of T lymphocytes, expansion of lymphocytes, differentiation of naïve lymphocytes, inflammatory response, adhesion of immune cells, cell movement, migration of cells, chemotaxis of cells, cell movement of phagocytes, chemotaxis of monocytes, cell movement of monocytes and fever,

thereby characterizing the glatiramer acetate related drug substance or drug product of step a).

3. A process for discriminating between glatiramer acetate related drug substances or drug products comprising the steps of:

i) characterizing two or more glatiramer acetate related drug substances or drug products according to the process of claim 1 or claim 2 to obtain characteristics of each of the glatiramer acetate related drug substances or drug products; and

ii) comparing the characteristics of the glatiramer acetate related drug substances or drug products obtained in step i),

thereby discriminating between the glatiramer acetate related drug substances or drug products.

4. The process of any one of claims 1-3, wherein the mammal is a rodent.

5. The process of any one of claims 1-4, wherein the culture of step c) is a primary culture.

6. The process of any one of claims 1-5, wherein the glatiramer acetate related drug substance or drug product of step a) is glatiramer acetate drug substance or drug product.

7. The process of any one of claims 1-5, wherein the glatiramer acetate related drug substance or drug product of step a) is a glatiramer acetate related drug substance or drug product other than glatiramer acetate drug substance or drug product.

8. The process of any one of claims 1-7, wherein the glatiramer acetate related drug substance or drug product of step b) is glatiramer acetate drug substance or drug product.

9. The process of any one of claims 1-7, wherein the glatiramer acetate related drug substance or drug product of step b) is a glatiramer acetate related drug substance or drug product other than glatiramer acetate drug substance or drug product.

10. The process of any one of claims 1-7, wherein the glatiramer acetate related drug substance or drug product of step b) is the same glatiramer acetate related drug substance or drug product of step a).

11. The process of any one of claims 1-7, wherein the glatiramer acetate related drug substance or drug product of step b) is a different glatiramer acetate related drug substance or drug product than the glatiramer acetate related drug substance or drug product of step a).

12. In a process for producing a drug product comprising a glatiramer acetate related drug substance, the improvement comprising the steps of:

    i) characterizing the glatiramer acetate related drug substance according to the process of claim 1, wherein step e) comprises determining the level of expression of one or more genes selected from the group consisting of

Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247, Igfbp4, Oas2, Bcl11b, Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1, Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, Ccl3, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 8; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 10; determining the level of expression of one or more genes selected from the group consisting of FoxP3, GPR83, CD14, TLR2, IFNG, CD40 and IL1B; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 12; or determining gene set enrichment analysis for genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells, CD4+ CD8+ T cells, macrophage cells, monocyte cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes; and;

ii) discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if the level of expression of a gene selected from the group consisting of Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3,

LOC667370, Klhdc1, Cd247, Igfbp4, Oas2 Bcl11b, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4 is decreased relative to a reference standard or if the level of expression of a gene selected from the group consisting of Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1, Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, and Ccl3, is increased relative to a reference standard; discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if the level of expression of a gene selected from the group consisting of the genes presented in Table 8 is not substantially identical to the level of expression of a reference standard; discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if the level of expression of a gene selected from the group consisting of the genes presented in Table 10 is not substantially identical to the level of expression of a reference standard; discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if the level of expression of a gene selected from the group consisting of GPR83, IFNG and Foxp3 is decreased or if the level of expression of a gene selected from the group consisting of CD14, CD40, TLR2 and IL1B is increased; discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if the level of expression of a gene selected from the group consisting of the genes identified in Table 12 as FoxP3+ T cell genes is decreased or if the level of expression of a gene selected from the group consisting of the genes identified in Table 12 as macrophage genes and the genes

identified in Table 12 as monocyte genes is increased; or discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if gene set enrichment analysis indicates downregulation or a lack of upregulation for genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells and CD4+ CD8+ T cells or if gene set enrichment analysis indicates upregulation or a lack of downregulation for genes associated with at least one cell type selected from the group consisting of macrophage cells, monocyte cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes.

13. In a process for producing a drug product comprising a glatiramer acetate related drug substance, the improvement comprising the steps of:

i) characterizing the glatiramer acetate related drug substance according to the process of claim 1, wherein step e) comprises determining the level of expression of at least one gene selected from the group consisting of Foxp3, Il2, Il1a, Il1b, C3, S100a8, S100a9, Cxcl2, Cxcl3, Ccl4, Ccl3 and Cd14;

ii) discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if the level of expression of FoxP3 is decreased relative to a reference standard or if the level of expression of at least one gene selected from the group consisting of Il2, Il1a, Il1b, C3, S100a8, S100a9, Cxcl2, Cxcl3, Ccl4, Ccl3 and Cd14 is increased relative to a reference standard.

14. In a process for producing a drug product comprising a glatiramer acetate related drug substance, the improvement comprising the steps of:

i) characterizing the glatiramer acetate related drug

substance according to the process of claim 2, wherein step e) comprises determining the level of biological activity of the cells of step c) selected from the group consisting of, immune response to antigen presenting cells, differentiation of effector lymphocytes, suppression of T lymphocytes, activation of Foxp3 positive regulatory T cells, expansion of mononuclear leukocytes, proliferation of T lymphocytes, expansion of lymphocytes, differentiation of naïve lymphocytes, inflammatory response, adhesion of immune cells, cell movement, migration of cells, chemotaxis of cells, cell movement of phagocytes, chemotaxis of monocytes, cell movement of monocytes and fever;

ii) discarding the batch of the glatiramer acetate related drug substance as unacceptable for inclusion in the drug product if the level of biological activity selected from the group consisting of immune response to antigen presenting cells, differentiation of effector lymphocytes, suppression of T lymphocytes and activation of Foxp3 positive regulatory T cells is decreased relative to a reference standard or if the level of biological activity selected from the group consisting of expansion of mononuclear leukocytes, proliferation of T lymphocytes, expansion of lymphocytes, differentiation of naïve lymphocytes, inflammatory response, adhesion of immune cells, cell movement, migration of cells, chemotaxis of cells, cell movement of phagocytes, chemotaxis of monocytes, cell movement of monocytes and fever is increased relative to a reference standard.

15. In a process for releasing a drug product comprising a glatiramer acetate related drug substance, the improvement comprising the steps of:

i) characterizing the glatiramer acetate related drug product according to the process of claim 1, wherein step e) comprises determining the level of expression of one or more genes selected from the group consisting of Ecm1,

Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247, Igfbp4, Oas2, Bcl11b, Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1, Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, Ccl3, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 8; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 10; determining the level of expression of one or more genes selected from the group consisting of FoxP3, GPR83, CD14, TLR2, IFNG, CD40 and IL1B; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 12; or determining gene set enrichment analysis for genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells, CD4+ CD8+ T cells, macrophage cells, monocyte cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes; and;

ii) discarding the batch of the glatiramer acetate related drug product as unacceptable for release if the level of expression of a gene selected from the group consisting of Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247,

Igfbp4, Oas2 Bcl11b, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4 is decreased relative to a reference standard or if the level of expression of a gene selected from the group consisting of Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1, Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, and Ccl3, is increased relative to a reference standard; discarding the batch of the glatiramer acetate related drug product as unacceptable for release if the level of expression of a gene selected from the group consisting of the genes presented in Table 8 is not substantially identical to the level of expression of a reference standard; discarding the batch of the glatiramer acetate related drug product as unacceptable for release if the level of expression of a gene selected from the group consisting of the genes presented in Table 10 is not substantially identical to the level of expression of a reference standard; discarding the batch of the glatiramer acetate related drug product as unacceptable for release if the level of expression of a gene selected from the group consisting of GPR83, IFNG and Foxp3 is decreased or if the level of expression of a gene selected from the group consisting of CD14, CD40, TLR2 and IL1B is increased; discarding the batch of the glatiramer acetate related drug product as unacceptable for release if the level of expression of a gene selected from the group consisting of the genes identified in Table 12 as FoxP3+ T cell genes is decreased or if the level of expression of a gene selected from the group consisting of the genes identified in Table 12 as macrophage genes and the genes identified in Table 12 as monocyte genes is increased; or discarding the batch of the glatiramer acetate related

drug product as unacceptable for release if gene set enrichment analysis indicates downregulation or a lack of upregulation for genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells and CD4+ CD8+ T cells or if gene set enrichment analysis indicates upregulation or a lack of downregulation for genes associated with at least one cell type selected from the group consisting of macrophage cells, monocyte cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes.

16. In a process for releasing a drug product comprising a glatiramer acetate related drug substance, the improvement comprising the steps of:

i) characterizing the glatiramer acetate related drug product according to the process of claim 1, wherein step e) comprises determining the level of expression of at least one gene selected from the group consisting of Foxp3, Il2, Il1a, Il1b, C3, S100a8, S100a9, Cxcl2, Cxcl3, Ccl4, Ccl3 and Cd14;

ii) discarding the batch of the glatiramer acetate related drug product as unacceptable for release if the level of expression of FoxP3 is decreased relative to a reference standard or if the level of expression of at least one gene selected from the group consisting of Il2, Il1a, Il1b, C3, S100a8, S100a9, Cxcl2, Cxcl3, Ccl4, Ccl3 and Cd14 is increased relative to a reference standard.

17. In a process for releasing a drug product comprising a glatiramer acetate related drug substance, the improvement comprising the steps of:

i) characterizing the glatiramer acetate related drug product according to the process of claim 2, wherein step e) comprises determining the level of biological activity of the cells of step c) selected from the group consisting of, immune response to antigen presenting

cells, differentiation of effector lymphocytes, suppression of T lymphocytes, activation of Foxp3 positive regulatory T cells, expansion of mononuclear leukocytes, proliferation of T lymphocytes, expansion of lymphocytes, differentiation of naïve lymphocytes, inflammatory response, adhesion of immune cells, cell movement, migration of cells, chemotaxis of cells, cell movement of phagocytes, chemotaxis of monocytes, cell movement of monocytes and fever;

ii) discarding the batch of the glatiramer acetate related drug product as unacceptable for release if the level of biological activity selected from the group consisting of immune response to antigen presenting cells, differentiation of effector lymphocytes, suppression of T lymphocytes and activation of Foxp3 positive regulatory T cells is decreased relative to a reference standard or if the level of biological activity selected from the group consisting of expansion of mononuclear leukocytes, proliferation of T lymphocytes, expansion of lymphocytes, differentiation of naïve lymphocytes, inflammatory response, adhesion of immune cells, cell movement, migration of cells, chemotaxis of cells, cell movement of phagocytes, chemotaxis of monocytes, cell movement of monocytes and fever is increased relative to a reference standard.

18. A method of identifying suboptimal activity of a glatiramer acetate related drug substance or drug product comprising the steps of:

a) administering a glatiramer acetate related drug substance or drug product to a rodent;

b) determining the level of biological activity of the rodent selected from the group consisting of, immune response to antigen presenting cells, differentiation of effector lymphocytes, suppression of T lymphocytes, activation of Foxp3 positive regulatory T cells, expansion of mononuclear leukocytes, proliferation of T

lymphocytes, expansion of lymphocytes, differentiation of naïve lymphocytes, inflammatory response, adhesion of immune cells, cell movement, migration of cells, chemotaxis of cells, cell movement of phagocytes, chemotaxis of monocytes, cell movement of monocytes and fever; and

c) identifying the glatiramer acetate related drug substance or drug product as causing a suboptimal activity if the level of biological activity selected from the group consisting of immune response to antigen presenting cells, differentiation of effector lymphocytes, suppression of T lymphocytes and activation of Foxp3 positive regulatory T cells is decreased relative to a reference standard or if the level of biological activity selected from the group consisting of expansion of mononuclear leukocytes, proliferation of T lymphocytes, expansion of lymphocytes, differentiation of naïve lymphocytes, inflammatory response, adhesion of immune cells, cell movement, migration of cells, chemotaxis of cells, cell movement of phagocytes, chemotaxis of monocytes, cell movement of monocytes and fever is increased relative to a reference standard,

thereby identifying suboptimal activity of a glatiramer acetate related drug substance or drug product.

19. A method of identifying suboptimal activity of a glatiramer acetate related drug substance or drug product comprising the steps of:

a) administering a glatiramer acetate related drug substance or drug product to a rodent

b) determining the level of expression in the rodent of one or more genes selected from the group consisting of Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247, Igfbp4, Oas2, Bcl11b, Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1,

Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, Ccl3, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 8; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 10; determining the level of expression of one or more genes selected from the group consisting of FoxP3, GPR83, CD14, TLR2, IFNG, CD40 and IL1B; determining the level of expression of one or more genes selected from the group consisting of the genes presented in Table 12; or determining gene set enrichment analysis for genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells, CD4+ CD8+ T cells, macrophage cells, monocyte cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes; and

c) identifying the glatiramer acetate related drug substance or drug product as causing a suboptimal activity if the level of expression of a gene selected from the group consisting of Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247, Igfbp4, Oas2 Bcl11b, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4 is decreased relative to a reference standard or if the level of expression of a gene selected from the group consisting of Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1,

Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, and Ccl3, is increased relative to a reference standard; identifying the glatiramer acetate related drug substance or drug product as causing a suboptimal activity if the level of expression of a gene selected from the group consisting of the genes presented in Table 8 is not substantially identical to the level of expression of a reference standard; identifying the glatiramer acetate related drug substance or drug product as causing a suboptimal activity if the level of expression of a gene selected from the group consisting of the genes presented in Table 10 is not substantially identical to the level of expression of a reference standard; identifying the glatiramer acetate related drug substance or drug product as causing a suboptimal activity if the level of expression of a gene selected from the group consisting of GPR83, IFNG and Foxp3 is decreased or if the level of expression of a gene selected from the group consisting of CD14, CD40, TLR2 and IL1B is increased; identifying the glatiramer acetate related drug substance or drug product as causing a suboptimal activity if the level of expression of a gene selected from the group consisting of the genes identified in Table 12 as FoxP3+ T cell genes is decreased or if the level of expression of a gene selected from the group consisting of the genes identified in Table 12 as macrophage genes and the genes identified in Table 12 as monocyte genes is increased; or identifying the glatiramer acetate related drug substance or drug product as causing a suboptimal activity if gene set enrichment analysis indicates downregulation or a lack of upregulation for genes associated with at least one cell type selected from the group consisting of

FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells and CD4+ CD8+ T cells or if gene set enrichment analysis indicates upregulation or a lack of downregulation for genes associated with at least one cell type selected from the group consisting of macrophage cells, monocyte cells stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes,

thereby identifying suboptimal activity of the glatiramer acetate related drug substance or drug product.

20. The method of any one of claims 18-19, wherein the level of expression is determined in the blood.

21. The method of claim 20, wherein the level of expression is determined in PBMCs.

22. The method of any one of claims 18-19, wherein the reference standard is the level of expression prior to administration of the glatiramer acetate related drug substance or drug product.

23. The method of any one of claims 18-19, wherein the reference standard is the level of expression after administration of glatiramer acetate drug substance or drug product.

24. The process of claim 4, claim 18 or claim 19, wherein the rodent is a mouse.

25. The process of claim 24, wherein the mouse is a female (SJL X BALB/C) F1 mouse.

26. The process of claim 24 or claim 25, wherein the mouse is about 8 to about 12 weeks old.

27. The process of claim 1 or claim 2, wherein the primary culture is a culture of spleen cells.

28. The process of claim 1 or claim 2, wherein the primary culture is a culture of lymph node cells.

29. The process of claim 28, wherein the primary culture of spleen cells is prepared about 3 days after immunization.

30. The process of any one of claims 1-14, wherein the incubation of step d) is for about 24 hours.

31. The process or method of any one of claims 1-30, wherein the glatiramer acetate related drug substance is a glatiramoid or wherein the glatiramer acetate related drug product comprises a glatiramoid.

32. The process or method of any one of claims 1-30, wherein the glatiramer acetate related drug substance is a glatiramoid other than glatiramer acetate drug substance or wherein the glatiramer acetate related drug product comprises a glatiramoid other than glatiramer acetate drug substance.

33. The process or method of any one of claims 1, 12, 15 or 19 comprising the step of determining the level of expression of at least one gene selected from the group consisting of Ecm1, Pres1, Pdlim4, Gpr83, Ifng, Il24, LOC100046608, Gm590, Gpr114, Tmie, Rasgrp1, Myo6, Pfkp, Usp18, Arl4c, Als2cl, 2810410P22Rik, Arl5a, Gbp2, Rasgrp1, Ankrd37, Tpi1, 4930583H14Rik, Ifit3, LOC667370, Klhdc1, Cd247, Igfbp4, Oas2, Bcl11b, Fscn1, Ctsg, Mpo, Prtn3, Lyzs, Emr1, Chi3l1, Anxa3, Hp, Lyz2, Lyz, Fer1l3, Sirpa, Cd63, Clec4n, Clec4d, EG433016, Stfa1, Chi3l3 Ngp, S100a8, S100a9, Clecsf9, Saa3, 5033414K04Rik, Slc7a11, Slpi, Cd14, Fpr2, Fcgr3, F10, Gpnmb, Tgfbi, Mmp14, Slc11a1, C3, Gpr84, Acta2, Lcn2, Hmox1, Tpsab1, Ccl4, Il2, Inhba, Cxcl1, Serpinb2, Upp1, Gpr109a, Gp38, Il1b, Cxcl2, Il1a, Ccl3, 6720418B01Rik, 5830496L11Rik, Cd8b1, Fcgrt, LOC385615 and Scml4.

34. The process of claim 1 comprising the step of determining the level of expression of at least one gene selected from the group consisting of Foxp3, Il2, Il1a, Il1b, C3, S100a8, S100a9, Cxcl2, Cxcl3, Ccl4, Ccl3 and Cd14.

35. The process of claim 1 comprising the step of determining the level of expression of at least one gene selected from the group consisting of genes regulated by glatiramer acetate drug substance or drug product in Gene Expression Omnibus accession number GSE40566.

36. The process of claim 1 comprising the step of determining the level of expression of at least one gene selected from the group consisting of CD40, CD86, GATA3, HLA-DMA, HLA-DMB, ICOS, IFNG, IFNGR2, IL2, IL13, IL4, IL18, IL12RB1, IL17A, IL17F, IL18R1, IL2RA, IL2RG, IL4R, IL6R, TBX21, TGFBR2, TNF, FOXP3, IL10RB, KLRD1, CD69, LTB, CD83, PRF1, CAMK2D, LTA, FSCN1, TLR7, CSF2, CCR7, FASLG, IL1A, CCL5, CD8B, CXCL10, TLR2, CCL4, TLR7, IGHA1, IL24, SOCS1, OAS1, JAK1, PTPN2, IFITM1, IFI35, STAT2, BCL2, MVD, FDPS, SQLE, NSDHL, DHCR24, Acat2/Acat3, MSMO1, LSS, CYP51A1, NFKBIE, PIK3R1, PPP3CC, CD3D, IL2RB, PTEN, CD3G, ICOS, CAMK2D, NFAT5, LAT, ITK, H2-M2, FASLG, LIF, IGHA1, PRKACB, SGK1, MAPK11, TSC22D3, JUN, FKBP5, ADRB2, MAP3K1, MAPK12, POU2F1, SMARCA2, CDKN1A, TGFB3, HSP90AA1, DHCR24, CCR5, and CXCL9.

37. The process or method of any one of claims 1, 12, 15 or 19 comprising the step of determining the level of expression of at least one gene selected from the group consisting of the genes presented in Table 8.

38. The process or method of any one of claims 1, 12, 15 or 19 comprising the step of determining the level of expression of at least one gene selected from the group consisting of the genes presented in Table 10.

39. The process or method of any one of claims 1, 12, 15 or 19 comprising the step of determining the level of expression of at least one gene selected from the group consisting of FoxP3, GPR83, CD14, TLR2, IFNG, CD40 and IL1B.

40. The process or method of any one of claims 1, 12, 15 or 19 comprising the step of determining the level of expression of at least one gene selected from the group consisting of the genes presented in Table 12.

41. The process or method of any one of claims 1, 12, 15 or 19 comprising the step of determining gene set enrichment analysis for genes associated with at least one cell type selected from the group consisting of FoxP3+ CD4+ T cells, CD4+ T cells CD8+ T cells, gamma delta T cells, natural killer T cells, CD4+ CD8+ T cells, macrophage cells, monocyte cells

stromal cells, multi-lineage progenitor cells, dendritic cells, fibroblastic reticular cells, fibroblasts and granulocytes.

42. The process or method of claim 41, wherein determining gene set enrichment analysis comprises the step of evaluating the level of expression of at least one gene selected from the group consisting of genes present in one or more of the rank list files presented in Table 11.

43. The process of any of claims 12-17 wherein the reference standard is medium.