

**IDENTIFICATION OF POTENTIAL DRUG TARGETS FOR  
COVID 19 PATIENTS WITH CYTOKINE STORM**



A Thesis Submitted in Partial Fulfillment of the Requirements  
for the Degree of Master of Science in Pharmaceutical Sciences and  
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การวิเคราะห์หาเป้าหมายการออกฤทธิ์ของยาในผู้ป่วยโรคติดเชื้อไวรัสโคโรนา 2019 ที่มีภาวะพายุไซโตไคน์



วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต  
สาขาวิชาเภสัชศาสตร์และเทคโนโลยี ไม่สังกัดภาควิชา/เทียบเท่า  
คณะเภสัชศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย  
ปีการศึกษา 2565  
ลิขสิทธิ์ของจุฬาลงกรณ์มหาวิทยาลัย



บาย จักรรา บัณนา :

การวิเคราะห์หาเป้าหมายการออกฤทธิ์ของยาในผู้ป่วยโรคติดเชื้อไวรัสโคโรนา 2019 ที่มีภาวะพายุไซโตไคน์. ( IDENTIFICATION OF POTENTIAL DRUG TARGETS FOR COVID 19 PATIENTS WITH CYTOKINE STORM)

อ.ที่ปรึกษาหลัก : ผศ. ภก. ดร.ณัฐพล พรพุทธิพงศ์

ผู้ป่วยที่ติดเชื้อ SARS-CoV-2 อาจแสดงอาการของโรคติดเชื้อไวรัสโคโรนา 2019 ที่มี ความ รุน แรง แตก ต่าง กัน ไป ขึ้น อยู่ กับ เพศ วิถี ชี วิ ต และอายุ กลุ่มผู้สูงอายุมีแนวโน้มที่จะมีอาการรุนแรงมากกว่ากลุ่มประชากรอายุน้อย อย่างไรก็ตาม กลุ่มประชากรอายุน้อยหลายคนต้องทนทุกข์ทรมานจากอาการรุนแรงของโรคปอดที่เกิดจากการ หลั่ง ไซ โต ไค น์ ผิด ป ก ทิ หรือ ที่ เรีย ก ว่า "พายุ ไซ โต ไค น์" พายุไซโตไคน์มีความสัมพันธ์กับความรุนแรงและการเสียชีวิตของผู้ป่วย การวิเคราะห์หาเป้าหมายของพายุไซโตไคน์จึงมีความสำคัญต่อการรักษาเพื่อเพิ่มอัตราการรอด ชี วิ ต ข อง ผู้ ป ว ย การวิเคราะห์ทรานสคริปโตมิกของข้อมูลการแสดงออกของยีนที่เกี่ยวข้องกับการทำงานที่ผิดปกติของพายุไซโตไคน์ในผู้ป่วยจากการเก็บรวบรวมจากฐานข้อมูลที่เปิดเผยต่อสาธารณะสามารถ ใช้ เพื่ อ ระ บู ยี น และ วิ ถี ก า ร แ ส ต ง อ อ ก ที่ แ ต ก ต ำ ก ำ ป ก ทิ ผลลัพธ์จากการศึกษาสามารถนำไปใช้เพื่อจำกัดขอบเขตยีนเพื่อระบุเป้าหมายในเครือข่ายการ แสดงออก ร่วม กัน ของ ยี น และ การ วิ เ คราะห์ ชี น ส่ว น ของ เซลล์ ภูมิ คู้ ม กั น ให้ แ ค บ ล ง ได้ ใน การ ศึ ก ษา นี้ ยัง ได้ วิ เ คราะห์ ข้อมูล จาก ฐาน ข้อมูล ของ การ มี ปฏิ สัม พันธ์ ระหว่าง ยา กับ ยี น เพื่อ ระ บู ความ สามารถ ในการ เป็น ยา ที่ มี ความ จำ เ พาะ ต่ อ ภาวะ พายุ ไซ โต ไค น์ ใน โรค ดัง กล่าว จ า ก ผล ก า ร ศึ ก ษา พ บ ว่า ยี น AMHR2 มี ศั ก ย ภาพ ใน การ เป็น เป้ า ห ม า ย เนื่อง จาก การ แ ส ต ง อ อ ก ของ AMHR2 มากเกินไปทำให้กระบวนการส่งสัญญาณของ TGF beta ทำงานมากผิดปกติ ส่งผลให้เกิดการกระตุ้นของมาโครฟาจที่ก่อให้เกิดการอักเสบมากขึ้นและเกิดความล่าช้าในการ ต อ บ ส น อ ง ภูมิ คู้ ม กั น แ บ บ จำ เ พาะ ผลกระทบเชิงระบบนี้เหนี่ยวนำให้พายุไซโตไคน์เกิดขึ้นในปอดบริเวณที่การติดเชื้อกระตุ้นโดย มาโครฟาจที่เหนี่ยวนำให้เกิดการอักเสบและกระตุ้น gamma delta T cell ให้ หลั่ง ไซ โต ไค น์ มาก เ กิ น ไป น อ ก จาก นี้ ยัง ศึ ก ษา พ บ ว่า AMHR2 สามารถถูกยับยั้งการแสดงออกได้ด้วยยา ดังนั้นการยับยั้งกระบวนการส่งสัญญาณของ TGF beta ฝ่ า น ก า ร แ ส ต ง อ อ ก ข อง ยี น AMHR2 อาจเป็นประโยชน์ในการบรรเทาภาวะพายุไซโตไคน์ในผู้ป่วยโรคติดเชื้อไวรัสโคโรนา 2019

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ปีการศึกษา 2565

๑

ลายมือชื่อ อ.ที่ปรึกษาหลัก

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Advisor: Asst. Prof. NATAPOL PORNPUTTAPONG, Ph.D.

The outcome of SARS-CoV-2 infection may vary depending on gender, lifestyle, and age. The elderly is more likely to have the severe condition than the younger population. However, several young people suffer from severe lung diseases caused by cytokine dysregulation, also known as a "cytokine storm." Cytokine storms are associated with Covid-19 severity and mortality. Identification of potential cytokine storm targets is critical for improving patient survival. Transcriptomic analysis of expression data from publicly available databases could be used to identify differentially expressed genes and pathways. The list of both results was used to narrow down the potential candidates in the co-expression network and immune cell fraction analysis. In addition, the drug-gene interaction database was queried for information on the candidate's druggability. According to the findings, AMHR2 is a potential drug target. AMHR2 overexpression may cause the TGF beta signaling pathway to becoming overactive, resulting in the activation of pro-inflammatory macrophages and a delay in the adaptive immune response. This systemic effect may initiate the cytokine storm that the infection has started in the lung, activating pro-inflammatory macrophages and T gamma delta cells that secrete cytokines excessively. Furthermore, AMHR2 has evidence of drug modulation and demonstrates pathway regulatory importance. Therefore, inhibiting the TGF beta signaling pathway via AMHR2 may be beneficial in relieving cytokine storms in Covid 19 patients.

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CHULALONGKORN UNIVERSITY

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# Chapter I

## Introduction

### Background of rationale

Since 2019, the world has been facing a global pandemic caused by the SARS-CoV-2 virus causing 632,953,782 positive cases detected and 6,593,715 death cases in November 2022 (1). The outcome of SARS-CoV-2 infection may vary according to several factors such as sex, lifestyle, and age. The risk of severity is higher with increasing age as older people lack pre-existing T and B cells (2). However, several young people experienced severe conditions characterized by hyperinflammation in the lung and poor oxygen saturation (3,4). The condition was caused by the dysregulation of cytokines release known as Cytokine storm.

The first report of a cytokine storm was in 1993 within the graft versus host disease and many tissues transplantation cases (5). Some studies reported an increasing cytokine level during cytokine storms, such as IL-1, IL-6, CXCL8, CXCL9, CXCL17, and TNF, triggering acute respiratory distress syndrome (ARDS), leading to severe conditions for the patient and submitted to the ICU (6-8). In the ICU, mechanical ventilation and immune-suppressor drugs are used to treat the cytokine storm, but the mortality rate among critically ill COVID-19 patients remains high, at roughly 60% (9,10). Besides, the underlying mechanism of cytokine storm and its specific treatment still need to be investigated (5). Therefore, identifying potential targets that can modulate the cytokine storm is essential to increase the patients' survivability.

Potential drug target identification can be initiated by identifying the genes expressed differently in the specific condition. Genes having changed expression levels, either elevated or downregulated, are thought to play a role in the progression of disease disorders (11). For example, a study utilizing the analysis of a differentially expressed gene identified potential targets for Alzheimer's disease (12). Afterward, a network-based technique can investigate the relationship between the affected genes. The method generates gene-gene networks to reconstruct gene regulatory or interaction networks. Gene co-expression network (GCN) analysis will be suitable for studying gene regulation under specific conditions. GCN estimates the association between genes by calculating their correlation under particular conditions, such as a response to external stimuli or disease. Co-expression analysis has successfully identified drug targets for several infectious diseases, including influenza, tuberculosis, and hepatitis (13).

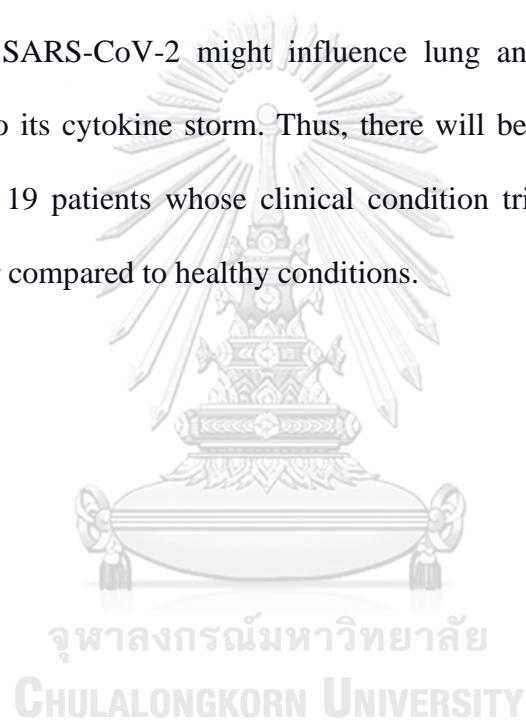
This study utilizes transcriptome data analysis to identify possible therapeutic targets for Covid-19 patients with cytokine storm. Since the cytokine storm is triggered by a lung infection and influences cytokine levels in the blood, determining the mechanism that links the phenomenon in the lung and blood could provide the knowledge needed to develop the potential therapeutic target. Therefore, gene expression and co-expression analysis should be conducted within the blood and lungs, as cytokine dysregulation might disturb lung and blood homeostasis. The potential target should be the upregulated genes in the lung and blood, be a member of immune system-related pathways, and demonstrate regulatory importance.

## Objective

The research aims to investigate the potential drug targets for Covid 19 patients with cytokines storm according to gene expression in the lung and blood using differential expression analysis and gene co-expression network analysis.

## Hypothesis

The infection of SARS-CoV-2 might influence lung and blood gene expression, which is related to its cytokine storm. Thus, there will be differences between gene profiles of Covid 19 patients whose clinical condition triggers cytokine storm and who do not trigger compared to healthy conditions.



## Chapter II

### Literature Review

#### Covid-19

The phase of Covid-19 is distinguished into three clinical stages: asymptomatic state, upper airway and conducting airways response, then progression to acute respiratory distress syndrome (ARDS) (14). During an asymptomatic condition, SARS-CoV-2 starts binding to the epithelial cells within the nasal cavity and is followed by viral replication inside the host cell (15,16). The innate immune responses are present but relatively low since the virus has not given a massive burden to the body. In this stage, the infected person is infectious, and the infection can be detected using a nasal swab by analyzing the sample with RT-PCR (14).

The following stage is the upper airway and conducting airways response. In this stage, the migration of propagated virus along the respiratory tract and conducting airways triggers a more robust innate immune response and initiate the manifestation of the covid-19 clinical condition, which can also be predicted by the level of a cytokine such as CXC chemokine ligand 10 (CXCL10) (14, 17). It triggers the host immune response by activating lymphocytes and accumulating virus-specific T cells around the infected tissue (36) as a mechanism for virus clearance. In the third phase of the disease, diffuse alveolar damages are present. The damage initiates a wound-healing mechanism, and in some cases, the improper process may lead to severe scarring, fibrosis, and ARDS (18,19).

Regarding the severity level of the disease, Yuki et al. (2020) stratify the patient into five groups: asymptomatic, mild, moderate, severe, and critical. Asymptomatic is when a person tests positive for SARS-CoV-2 but does not develop any symptoms, and roughly 40-45% of cases are detected as asymptomatic. In mild conditions, several symptoms such as fever, cough, headache, nausea, and loss of taste and smell are present. Still, breathing difficulty and pneumonia most like have not developed yet. On the other hand, pneumonia is developed in moderate and severe patients with lower oxygen saturation in a patient with severe conditions ( $SpO_2 < 94\%$ ). Furthermore, the infected person with a critical condition develops ADRS, septic shock, and may produce multiple organ dysfunction (20, 21). The human body utilizes immune cells residing in an infected area and other immune system components to overcome the SARS-CoV-2 infection.

#### Immune Response to SARS-CoV-2 Infection and Viral Evasion.

During pathogen invasion, the human body employs a protein known as a pattern recognition receptor (PRR) as a detector for the invader's unique molecular motif known as pathogen-associated molecular patterns (PAMPs). PRRs are classified into several types, including transmembrane proteins, Toll-like receptors (TLR), and cytoplasmic proteins such as the NOD-like receptor (NLR). PRR can detect unmethylated CpG DNA and foreign RNA (25). TLR 3, TLR 7, and TLR 8 are the PRR types that recognize foreign RNA during virus infection (22, 7). These TLRs also detect SARS-CoV-2 RNA molecules during the virus internalization process, as



they appear on the endosome surface when the virus internalizes the host cell via endocytosis (27). The illustration of viral detection by PRR is shown in Figure 1.

The virus RNA detection by PRR initiates a downstream reaction to produce type I interferon, which is vital in antiviral immunity (7, 27,28, 37). Type I interferon activates and recruits several immune cells: natural killer cells, dendritic cells, monocyte, and neutrophils. The activated immune cells migrate to the infected tissue and kill the infected cell (22). Besides inducing the production of type I interferon, the signal from TLR will also upregulate the expression of dendritic cell co-stimulatory molecules. A dendritic cell is an important bridge between innate and adaptive immune responses. It presents the viral antigen molecule and introduces it to the adaptive immune cells (22, 28).

The adaptive immune response takes its role after the stimulation by either antigen-presenting cells (APC) or dendritic cells. The production of type I interferon triggers B cell proliferation to produce antibodies. The antibody is responsible for neutralizing the viral molecules within the extracellular environment. Besides activating B cells, the APC also promotes T cell differentiation. The CD4<sup>+</sup> T cells will be differentiated into several cell types, T<sub>fh</sub> and Th1. The T<sub>fh</sub> will activate the B cell, where Th1 has its cytotoxic activity to eliminate the infected cells. The other virus clearance mechanisms by adaptive immunity are CD8<sup>+</sup> proliferation and naïve cytotoxic T activation. The activated T cell can perform a specific immune response against infected cells. Furthermore, integrating B cell and T cell activity plays an essential

role in overcoming the viral infection for virus clearance and memory to fight against future diseases (29).

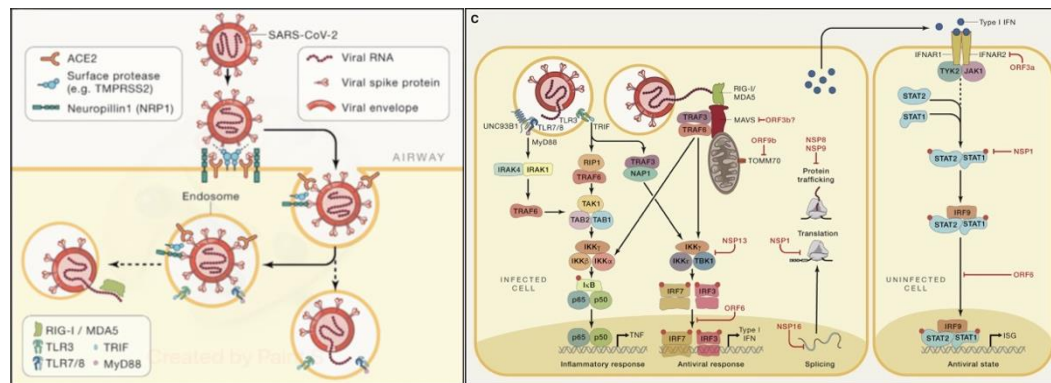


Figure 1. Viral Detection and Evasion (27)

Coronaviruses can manipulate immune responses by perturbing the interferon pathway at multiple stages to avoid immune system responses (30). The viral non-structural proteins (NSP) interfere with the translation of the type I interferon gene and act as an interferon antagonist (31, 32). SARS-CoV-2 NSP 16 inhibits the mRNA splicing, while NSP1 binds the 18S rRNA in the mRNA entry point. In addition, the NSP8 and NSP9 interrupt the protein transportation to the cell membrane. The endpoint of these three mechanisms is reducing type I interferon protein expression of the infected cell (31,33). In the downstream signaling process, phosphorylation of STAT1 and STAT2, and STAT1 nuclear translocation is inhibited by SARS-CoV-2 ORF6 and NSP1. As a result, the number of interferon-stimulated gene expressions is declining, inhibiting antiviral activity, and leading to disease development. (34-36).

## Lung Pathology

The morphological state of the lung with SARS-CoV-2 infection can be divided into four stages: the early stage, the exudative diffuse alveolar damage (DAD) stage, the organizing stage, and the fibrotic stage DAD (45). The first and second stages happen within the first week, while the other steps develop in the following weeks. The last stage mostly correlated with the long duration of severe conditions. Even though the stages will occur orderly, the DAD manifestation may differ between patients (46-48). Most infected patients with severe conditions have pulmonary damage caused by overwhelming virus infection. The effect of SARS-CoV-2 disease on the lung is illustrated shown by Figure 2.

Viral substances and immense lung damage initiate the production of pro-inflammatory mediators (23, 38). A report by Huang et al. (2020) summarizes that there is an increasing number of pro-inflammatory cytokines production such as IL-2, L-7, Tumor Necrosis Factor Alpha (TNF- $\alpha$ ), Granulocyte-Colony Stimulating Factor (G-CSF), Monocyte Chemoattractant Protein-1 (MCP-1), Macrophage Inflammatory Protein 1 alpha (MIP-1 $\alpha$ ), and CXCL-10 when comparing ICU and non-ICU patient. The pro-inflammatory cytokine release triggers the migration of neutrophils into the tissue and macrophage activation (23,39). The neutrophil migration leads to vascular leakage followed by lung edema, reducing gas exchange, facilitating hypoxia condition, and the most severe is respiratory failure. The overpopulated lung tissue environment with migrated neutrophils may induce tissue injury neutrophils to release extracellular traps inducing apoptosis in lung cells (24, 40-44). Furthermore, the

elevation of neutrophils and macrophage activation induces excessive cytokine release, known as cytokine storm (23).

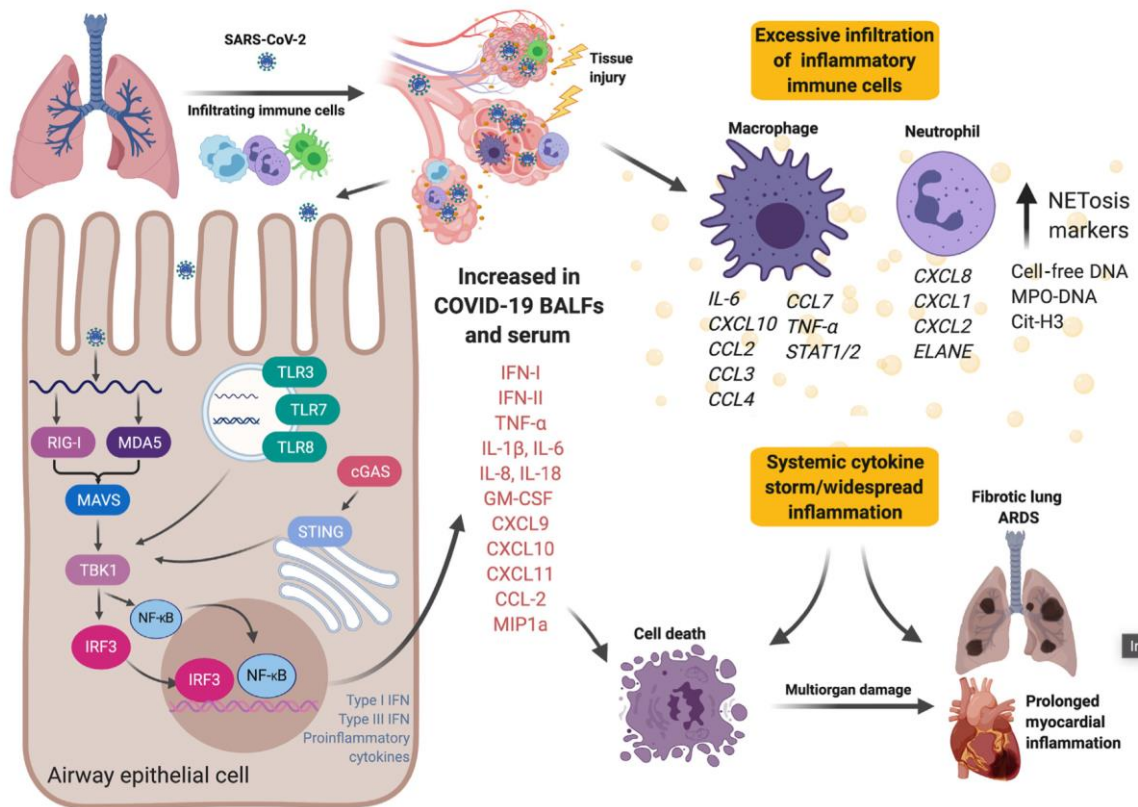


Figure 2. Lung Pathogenesis (38)

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## Cytokine Storm

The term "cytokine storm" refers to a condition in which there is an abnormally high production of cytokines, which causes immunopathological responses (124). The initial role of cytokines in Covid 19 patients are inducing antiviral activity and inflammatory mediators (7). However, severe Covid 19 patients suffer an overwhelming cytokine release such as IL-1, IL-6, CXCL8, CXCL9, CXCL17, and TNF (7,50, 27). SARS-CoV-2's possible pathophysiology of action involves the virus

binding to alveolar epithelial cells, activating the innate and adaptive immune systems, and causing the release of cytokines. These pro-inflammatory markers increase vascular permeability and cause many fluids and blood cells to exude into the alveoli, causing dyspnea, blood clotting, low blood pressure, pneumonia, and, eventually, respiratory failure. (51-53, 125).

Aside from causing lung damage, cytokine storm influences cytokine levels in the blood, which causes systemic effects such as leucocyte overactivation and recruitment to the infected site, resulting in an excessive pro-inflammatory mediated response (123). Blood and BAL Fluid profiling investigation identifies five monocyte/macrophage subpopulations responsible for cytokine release and inflammation. The research shows that macrophage subset macro\_c2-CCL3L1 expressed CCL8, CXCL10/11, and IL-6, while the monocyte subset Mono\_c1-CD14-CCL3 highly expressed IL-1b, CCL20, CXCL2, CXCL3, CCL3, CCL4, and TNFa (49). Modulating cytokine levels to reduce disease severity might be a potential strategy. Still, certain cytokines, such as type I IFN (IFNa/b) and type III IFN (IFNg), are essential in innate antiviral response (54). Therefore, to identify a potential target for cytokine storm in Covid 19 patients, the identification should emphasize the phenomenon that happened in both the blood and the lungs because the systemic effect not only dysregulates cytokine activity in the lungs but also in the blood.

#### Target identification

The completion of the human genome project in the early 21st shifted the drug development strategy considerably from its traditional approach. Before the

publication of the human genome project, drug discovery mainly focused on screening a vast number of natural products or chemical substances to investigate a prospective therapeutic activity. On the other hand, this approach is rather time-consuming yet needs to comprehensively illustrate the interaction between a drug and its target (55). The advancement of omics technology supported genomic insight to elaborate a systematic snapshot perspective of a cell. Potential therapeutic targets can be investigated by comparing omics data of disease and a non-disease group called differential gene expression. The genes with different expression levels, upregulated or downregulated, are assumed to have a role in the progression of disease conditions.

Differential gene expression analysis performs statistical tests based on quantifying expressed genes to determine which genes have a statistically significant difference while providing information related to the expression level and pairwise magnitude of difference for each gene. The analyses can provide considerable insight into the genetic mechanisms in organisms contributing to phenotypic differences (126). Calculated gene expression changes or log fold changes are provided within the analysis result. The positive log fold change value indicates that the genes are highly expressed in the studied condition, while the negative value demonstrates a decreasing gene expression (127). However, the differential expressed genes information alone might not be enough to confirm the therapeutic activity of the target. Some differential expressed genes might be different by chance but not related to the mechanism of the disease.

The network-based analysis is one of the common approaches used to identify a potential target (128,129). A network-based strategy can analyze the relationship between the involved genes by constructing the regulatory or interaction of the genes in the form of gene-gene networks (63). The network comprises nodes for feature representation and the interaction between nodes connected by edges. Nodes can represent proteins in a protein-protein interaction network (64) or genes in a gene co-expression network (65).

In terms of biological networks, there are four categories of it: Protein-Protein Interaction (PPI) networks, metabolic networks, signal transduction networks, and gene co-expression (GCN) networks. PPI, along with the signal transduction networks, represent protein within their nodes, while nodes of the GCN network represent genes and metabolic network nodes correspond to either enzyme or reaction (69-72). To investigate the regulation among genes within a specific condition, GCN will be suitable for carrying out the task. GCN estimates the relationship between genes by calculating their correlation using gene expression value. The correlated genes are assumed to be functionally coordinated within certain conditions, such as a response to external stimuli or disease. It also means that the genes might be pathway members, influencing each other or having the exact perturbation mechanisms (73).

The tissue composition is an essential determinant of phenotypic variation and influences disease outcomes (130). Digital cytometry can be utilized for obtaining the cell composition within the studied tissue as results have been shown to correlate well with the flow cytometric analysis (131). Since digital cytometry utilizes gene

expression data, it might be possible to capture a bigger picture of the possible gene perturbation caused by the diseases to cellular activity. In 2021, Kelly et al. employed digital cytometry to identify tumor-infiltrating lymphocytes in Triple Negative Breast Cancer and integrate the result with gene mutation data. The study demonstrates that digital cytometry could better predict disease-altered mechanisms that are beneficial for predicting the novel therapeutic target (132).

The potential drug target candidates identified should be druggable or can be modulated by drug-like small molecules or biologicals. The druggable potency of target candidates can be predicted based on sequence and any structural similarity to the targets of approved drugs. Several reports have estimated the druggable genes across the genome and compiled them into databases (100). One of the databases that compiled the drug-gene interaction is DGIdb. DGIdb combines information from 13 primary sources, including disease-relevant human genes, drugs, drug-gene interactions, and potential druggability. In addition, the database can query whether the drug target candidates are druggable (101). The druggable potency of candidates will give more evidence of their potency as a drug target.



## Chapter III

### Research Methodology

#### Data Preparation

Lung and blood transcriptomic data from Covid-19 patients were collected from the GEO database with identifiers GSE150316, GSE134692, and GSE183533 for lung, GSE155454, and GSE166424 for blood. The RNA read data from the five sources were aligned to the GRCh38 genome reference. HTSeq-Count then processed the aligned data from GSE150316 to remove low-quality samples and create count tables. GSE183533 aligned data quality was tested by FastQC (version 0.11.9), and the gene count data was estimated using the Feature counts subreads package (version 2.0.1). Gene count data from GSE155454 and GSE166424 were obtained using feature counts on GENCODE v31 (74-77).

The data were assigned to normal, non-trigger, and trigger cytokine storms. The normal group consisted of samples without SARS-CoV-2 infection, while the sample with SARS-CoV-2 infection was assigned to Non-Trigger and Trigger according to the clinical conditions. The positive Covid-19 sample with one or more clinical conditions: pneumonia, edema, dyspnea, hypoxemia, and ARDS, was assigned to the trigger cytokine storm group as these conditions are developed by a cytokine storm (78,5). The Non-Trigger group contains positive Covid-19 samples without any of these clinical conditions.

Blood and lung data were prepared separately during the preparation process. Data set for differential expression gene analysis, differential expression in pathway-level analysis, gene co-expression network analysis, and cell fraction analysis prepared using R Studio utilizing the primary function of R and EdgeR package. The preprocessing step began with low-expressed gene elimination. The gene with a count lower than ten counts per million (CPM) was filtered out (79). Afterward, the batch effect was corrected using Combat seq (106).

The batch correction result was visualized using principal variance component analysis (PVCA). PVCA was utilized to identify the most prominent sources of variability from the corrected batch data and before the batch correction. PVCA can provide quantitative estimation of potential sources of variability in the data by combining principal component analysis (PCA) to reduce the data dimension with maintaining the majority of data variability and variance component analysis to estimate the total variability caused by the factor of interest. Using PCA alone will not provide the quantitative estimation of a potential source of variability compared to other potential sources that may lead to misleading interpretation (138). The analysis was conducted in R studio using PVCA function (139). The batch correction was considered effective when the calculated variance caused by the batch was decreased. The corrected batch data were then normalized using two different methods.

The datasets for differential expression gene analysis, differential expression in pathway-level analysis, and cell fraction analysis were normalized using the trimmed mean of the M-values method by Robinson and Oshlack (2010) provided by the

EdgeR package (80). While the data for the gene co-expression network analysis data set was normalized using reads per kilobase per million (RPKM) by EdgeR function.

#### Differential Expression (DE) Gene Analysis

The DE analysis can investigate genes associated with the disease's condition (81). This study compared the gene expression from the cytokine trigger group sample to the non-trigger cytokine storm and normal groups. The hypothesis used was:

$$\text{"H}_0: (\text{Normal} - \text{Non-Trigger}) - (\text{Normal} - \text{Trigger}) = 0\text{"}$$

The rejected H<sub>0</sub> gene from cytokine trigger samples is defined as a gene with an expression that differs from non-trigger and normal groups.

The prepared data sets were used as the input, and then analysis was conducted using the R-based package: edgeR (82). Since the datasets contained a high level of dispersion caused by the outlier data, either highly or lowly expressed count data, the edgeR method used is edgeR robust. The EdgeR robust weighed the outlier that deviates from model fit. Thus, outliers will not interfere with the analysis (83,84). The results with P-value < 0.01, FDR < 0.05, and absolute value of LFC > 1 were chosen as differentially expressed genes (85,86).

## Differential Expression Analysis at Pathway-Level

The differential expression analysis at the pathway level was conducted to gain more insight into the relationship between differentially expressed genes and biological activity. Firstly, the gene set containing a list of genes and their associated pathway was obtained from the Reactome and the KEGG database (87-91). Afterward, the gene name from the data set prepared for differential expression in the pathway-level analysis was mapped into gene sets from the KEGG and Reactome database to calculate the sample-wise gene set enrichment score for each gene set. The gene set enrichment score was calculated using the R-based package: GSEA (92). The hypothesis was that there are no significantly different enriched pathways in cytokine trigger samples compared to negative and non-trigger models.

$$\text{“}H_0: (\text{Normal} - \text{Non-Trigger}) - (\text{Normal} - \text{Trigger}) = 0\text{”}$$

The rejected  $H_0$  gene set from cytokine trigger samples is defined as a significantly different enriched pathway in the trigger group compared to non-trigger and normal groups. R-based package limma was used to conduct the analysis. The results with P-value  $< 0.05$ , FDR  $< 0.05$ , and an absolute value of LFC  $> 0$  were chosen as significantly different enriched pathways limma (93).

## Cell Fraction Analysis

The samples' relative percentage of immune cell fraction was identified using digital cytometry by Cibersortx. Cibersortx identifies the cell abundance by comparing the gene expression of the input data set to the single-cell gene signature matrix (94). Analysis using Cibersortx was conducted on the website interface (95). The prepared

data sets were used as input, and LM22 was the signature matrix used for the analysis. LM22 is a signature matrix provided by the developer containing RNA expression data from 22 immune cell types and subtypes. The batch correction was activated in the analysis to remove technical bias between the samples and the signature matrix. The website interface visualized the output of the study. The between group comparison of relative immune cell fraction utilized the permutation multivariate analysis of variance and followed by the post-hoc test. Afterward, the mean comparison of relative fractions from several immune subtypes is compared using the Dunn's test (135 - 137).

#### Gene Co-expression Network Analysis

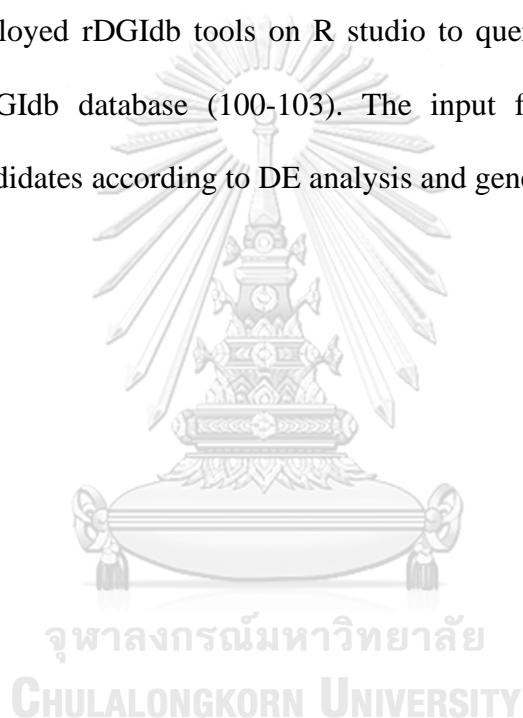
A Gene co-expression network will be utilized to detect the essential genes within a particular biological system in a specific condition. It begins with constructing the network, which represents the gene as a node and its relationship as an edge. The input for constructing the network is the RPKM normalized data of the samples. The data was used to calculate the correlation value between genes. Afterward, network construction commences according to the correlation value (97,98).

Before the analysis commences, gene sets from the Human Molecular Signatures Database were imported as a gene set reference using the GSVAdat library on R studio. The RPKM normalized data sets were then used as the input. The gene co-expression network was calculated using Gene Set Net Correlation Analysis (GSNCA) by GSNCAtest and plotMST2.pathway function (98). GSNCA introduced

weight to each gene according to its cross-correlation with other genes. The essential gene in the network or the hub genes tends to have a high weight value (81,99).

### Druggable Gene Identification

Gene druggability identification was conducted to provide more evidence about the possibility of gene activity being modulated by drug-like molecules. The identification employed rDGIdb tools on R studio to query the existing knowledge data from the DGIdb database (100-103). The input for the identification was potential gene candidates according to DE analysis and gene co-expression analysis.



## Chapter IV

### Results

#### Data Preparation

Gene count of lung tissue RNA expression was obtained from the GEO database with accession numbers GSE150316, GSE134692, and GSE183533, while the data for blood was collected from GSE155454 and GSE166424. There are 80 samples from 3 data sources eligible to be assigned to the groups, along with 96 samples of blood according to the sample clinical condition. The number of samples and their source are described in Table 1. After batch correction, the variance proportion caused by the batch in lung was reduced from 0.486 to 0.207. In blood, the variance proportion caused by the batch was reduced from 0.058 to 0. The variance proportion data visualized in Figure 3 and Figure 4.

Table 1. Sample group composition

Sample Type	Accession Number	Assigned Group	Number of Samples	Batch
Lung	GSE134692	Negative	3	2
		Non-Trigger	15	2
		Trigger	15	2
	GSE134692	Negative	18	1
	GSE183533	Non-Trigger	2	3
		Trigger	29	3
Blood	GSE166424	Negative	2	1
		Non-Trigger	34	1
		Trigger	4	1
	GSE155454	Negative	6	2
		Non-Trigger	18	2
		Trigger	34	2

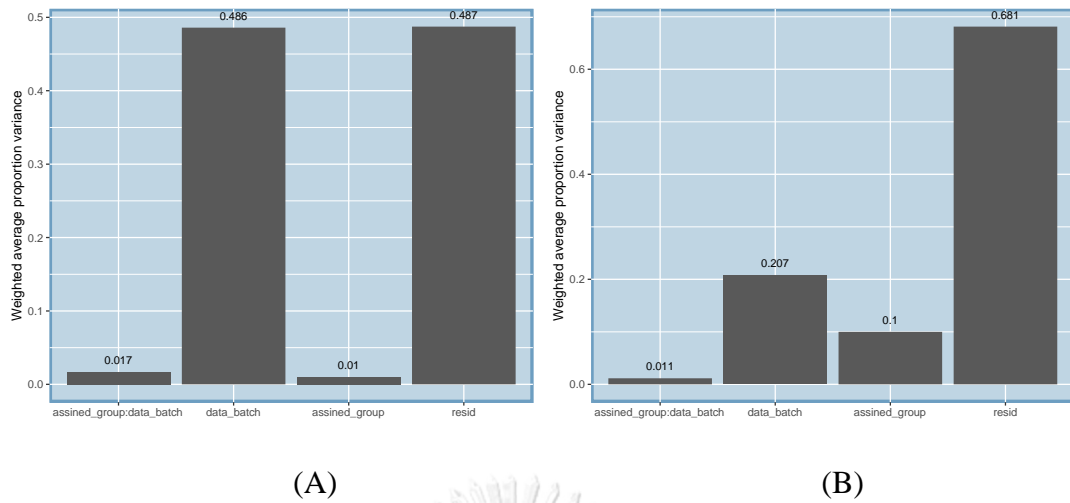


Figure 3. Lung samples sources of data variance. A before batch correction, B after batch correction. The x axis contains information about the cause of data variance within the data whether it is used by the different batch or the group that assigned to the samples.

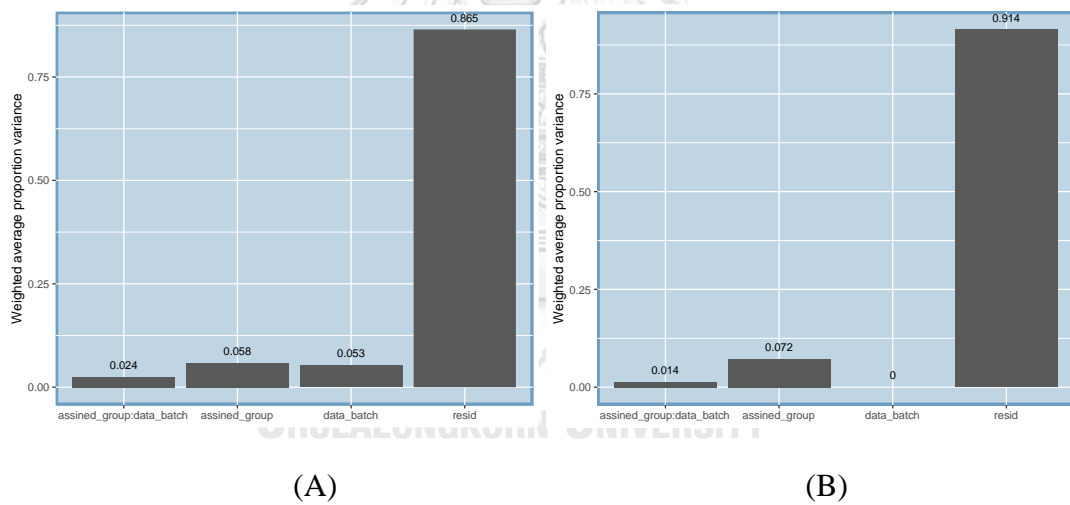


Figure 4. Blood samples sources of data variance. A before batch correction, B after batch correction. The x axis contains information about the cause of data variance within the data whether it is used by the different batch or the group that assigned to the samples.

### Differential Gene Expression Analysis

The differentially expressed genes analysis approach is employed to identify unique genes expressed in cytokine storm conditions in Covid 19 patients. There are 3,131



out of 25,541 differentially expressed genes from lung samples consisting of 2,188 upregulated genes and 943 downregulated genes. On the other hand, 3,337 genes from blood samples were detected as DE genes, with 523 downregulated and 2,814 upregulated genes. Volcano plots in Figure 5 and Figure 6 illustrate the result of the DE analysis. Both DE genes from the lung and blood are overlapped to find the upregulated genes in both tissues. As shown in figure 7, there are 290 intersection genes.

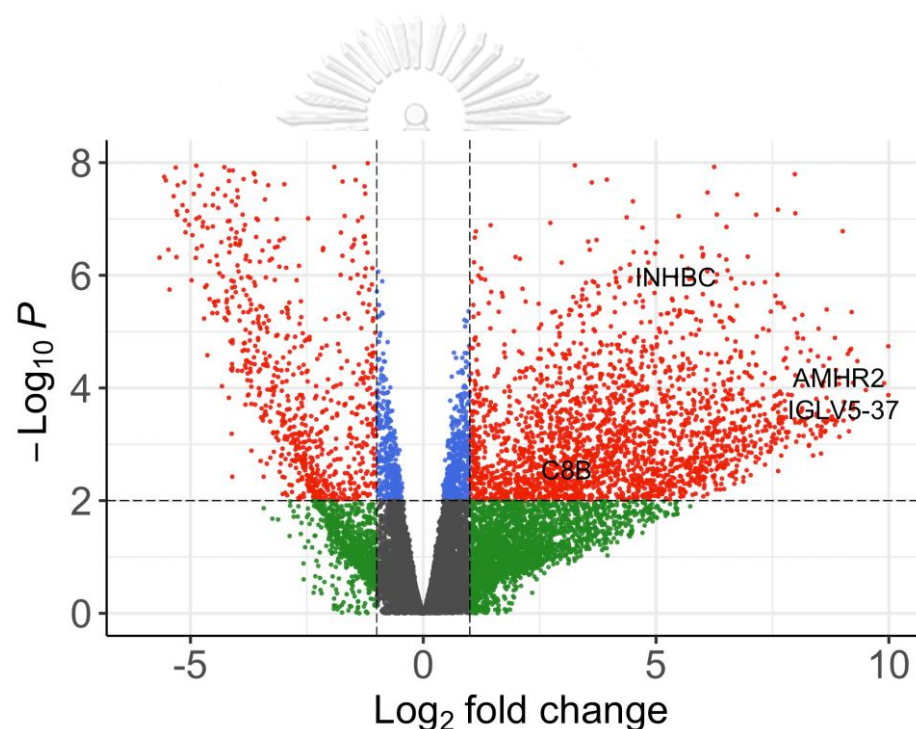


Figure 5. Lung samples volcano plot. The x axis contains information about gene expression change value in log<sub>2</sub> fold change. The DE genes exceeded the log fold change threshold -1 and 1 plotted in red color, while the blue plot shows DE genes that do not satisfy the minimum log fold change values. Other plots below the horizontal black dashed line are non-DE genes, with a p-value higher than 0.01.

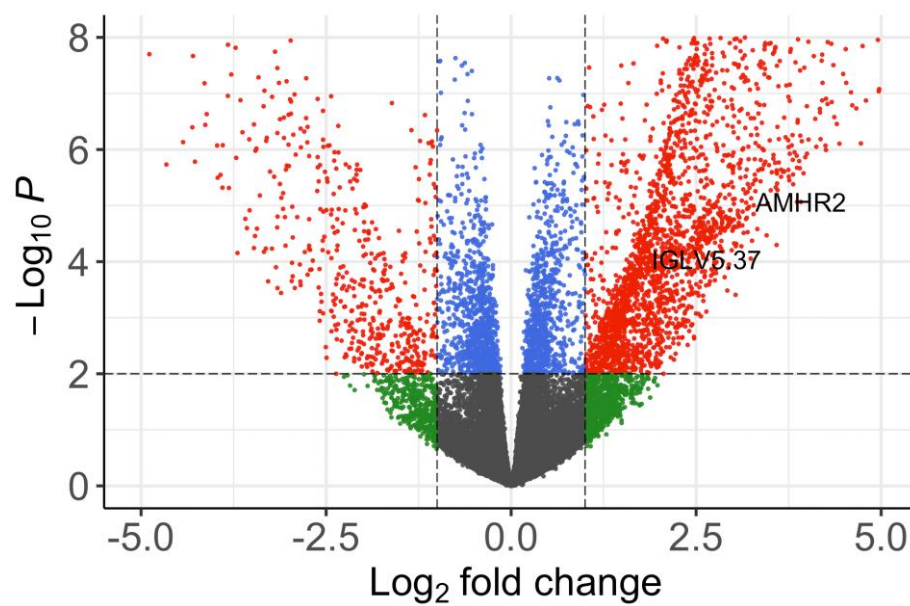


Figure 6. Blood samples volcano plot. The x axis contains information about gene expression change value in log<sub>2</sub> fold change. The DE genes exceeded the log fold2 change threshold -1 and 1 plotted in red color, while the blue plot shows DE genes that do not satisfy the minimum log fold change values. Other plots below the horizontal black dashed line are non-DE genes, with a p-value higher than 0.01.

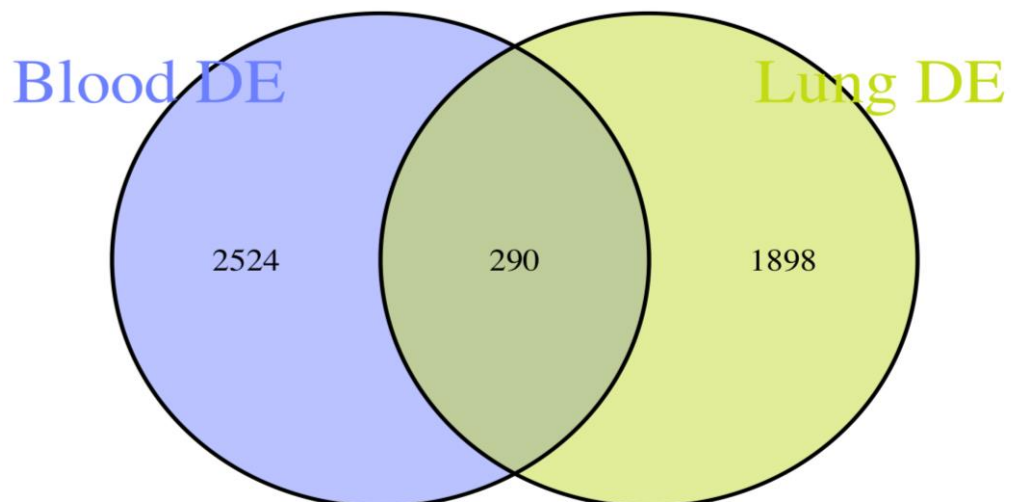


Figure 7. Upregulated genes in lung samples and blood samples with a total of 290 intersection genes, while 1,898 genes are only upregulated in the lungs and 2,524 are upregulated in blood.

The gene set from the cytokine-cytokine receptor interaction pathway curated by the KEGG database was utilized to identify the highly expressed cytokine-related genes in cytokine storm trigger samples. The dataset consists of 265 genes involved in cytokine activity. The analysis detects 23 cytokine genes upregulated in the lung and 33 genes upregulated in the blood, while 3 genes were detected upregulated in both tissues: INHBC, TNFSF11, and AMHR2.

Besides observing the cytokine-cytokine receptor genes activity, genes related to immune system signaling were investigated. The gene set from the Reactome data set was utilized to find genes associated with signaling in the immune system with a total of 354 genes in the gene set. The observation identified 29 lung-upregulated genes associated with immune system signaling and 41 genes upregulated in blood, while there are 2 genes upregulated in both: IGLV5-37 and C8B.

The expression changes of the intersection of lung and blood-upregulated genes related to both pathways are visualized in Figure 8 and Figure 9. Compared to four other genes, AMHR2 has relatively high expression within the lung and blood. The expression changes or log fold change (FC) value of AMHR2 in the lung reaches 9, which is comparable with IGLV5-37. In the blood, the log FC of AMHR2 is the highest among four other genes reaching 4.

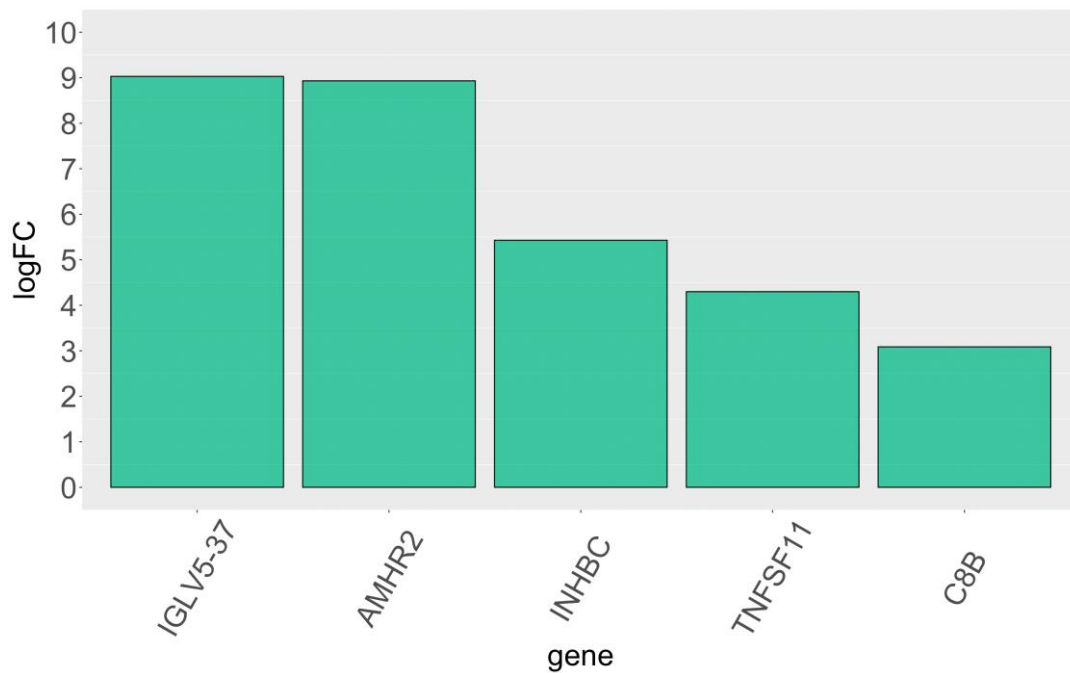


Figure 8. Lung gene expression changes of intersection genes associated with KEGG cytokine-cytokine receptor pathway and Reactome signaling in immune system. The Y axis represents the log Fold Change (FC) and the X axis has the gene name information.

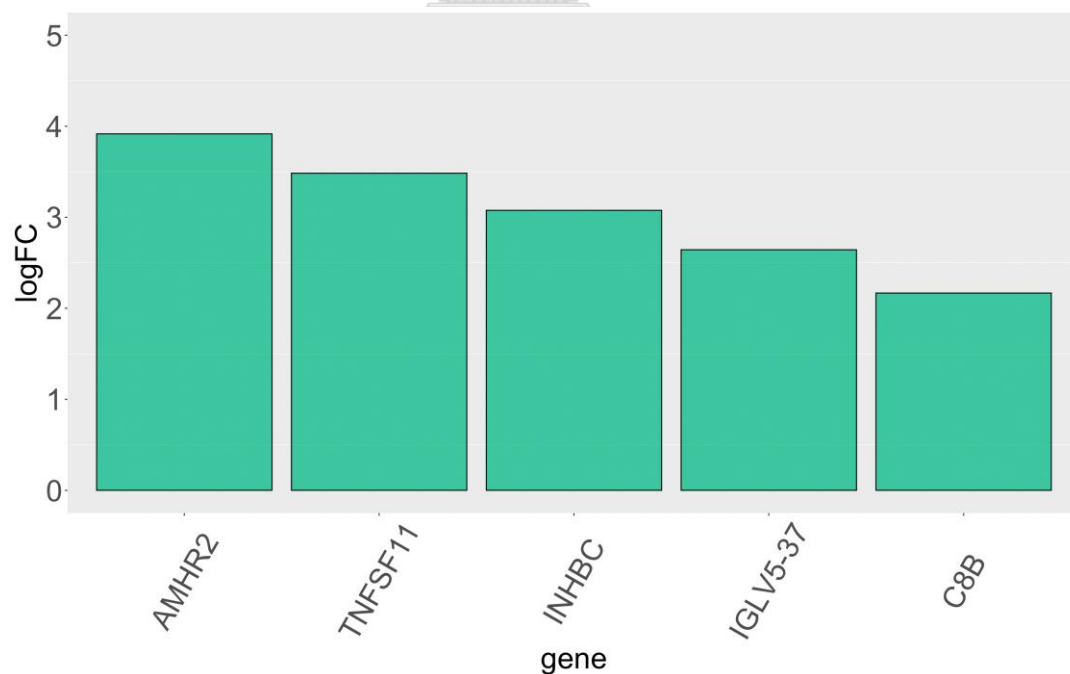


Figure 9. Lung gene expression changes of intersection genes associated with KEGG cytokine-cytokine receptor pathway and Reactome signaling in immune system. The Y axis represents the log Fold Change (FC) and the X axis has the gene name information.

### Differential Pathway Expression Analysis.

The information about pathways gene sets was obtained from the KEGG and Reactome database with 604 pathways included in the analysis. There are 469 upregulated pathways in the lung and 54 pathways in the blood under a p-value lower than 0.05. The analysis of lung and blood samples reveals no significant change in the cytokine-cytokine receptor pathway from the cytokine storm trigger group compared to the two other groups, as shown in Figures 10 and 11. The immune system signaling pathway and the TGF beta signaling pathway were significantly upregulated in lung samples. In addition, the complement system pathway was upregulated in the blood. Furthermore, there is no upregulated pathway in the lung, which is detected as an upregulated pathway in blood.

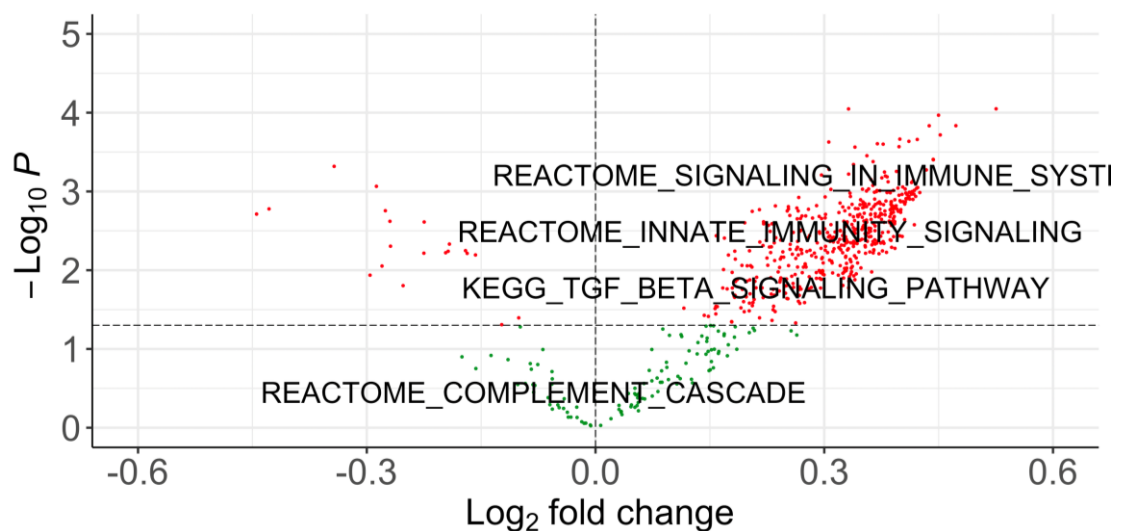


Figure 10. Lung volcano plot of differential pathway expression analysis. Green dots represent non-significant pathways, while red dots represent significantly different ones. Red dots with a Log<sub>2</sub> fold change above zero show increased expression in cytokine trigger samples compared to negative and non-trigger samples.

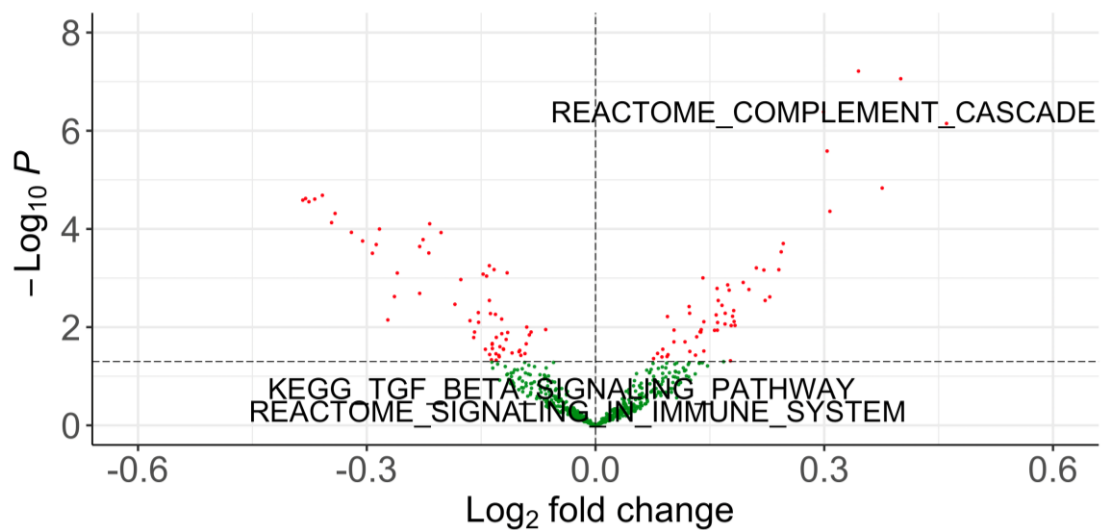


Figure 11. Blood volcano plot of differential pathway expression analysis. Green dots represent non-significant pathways, while red dots represent significantly different ones. Red dots with a Log<sub>2</sub> fold change above zero show increased expression in cytokine trigger samples compared to negative and non-trigger samples.

#### Gene Co-Expression Network Analysis

Gene sets information from the Reactome database, and the KEGG database was utilized to construct the gene co-expression network. There are 351, 85, and 43 genes members of the Reactome immune system signaling pathway, KEGG TGF beta signaling, and Reactome complement cascade, respectively. The low-count gene and gene with a standard deviation value less than 0.01 in each group were filtered out as required by the GSCNA. Following this, 344 genes, as well as 82 genes, were used to construct Reactome immune system signaling pathway and KEGG TGF beta signaling, while the construction of the Reactome complements cascade pathway using 40 genes.

The Reactome immune system signaling pathway and the KEGG TGF beta signaling pathway from lung samples are not significantly different co-expressed when

comparing the gene co-expression pattern from the lung Trigger group to the lung non-trigger group. In the gene co-expression network of the lung trigger Reactome immune system signaling pathway, IGLV5-37 has a higher weight than C8B, 1.005 and 0.917, respectively. In addition, AMHR2 has a higher weight than INHBC in the KEGG TGF beta signaling pathway network of lung trigger samples. Table 2 describes the result of GSCNA. The gene co-expression network of the Reactome complements cascade pathway from blood Trigger shows that the IGLV5-37 weight value is 0.686, while the C8B weight is unavailable since the gene expression cannot meet the data criteria required by GSCNA, and it is excluded before the analysis.

Table 2. Gene Set Net Correlation Analysis

Pathways	Samples	P Value	Genes	GSCNA weight	Rank
Reactome Immune system signaling	Lung	0.504	IGLV5-37	1.005	149 of 344
			C8B	0.917	224 of 344
KEGG TGF beta signaling pathway	Lung	0.77	INHBC	0.885	55 of 82
			AMHR2	1.059	27 of 82
Reactome complement cascade	Blood	0.42	IGLV5-37	0.686	24 of 40
			C8B	NA	NA

#### Cell Fraction Analysis

The major immune cell types detected in the lung are monocyte, macrophage, and dendritic cells. At least 10% (0.1) of the immune cell fraction in the lung is monocyte, while 20% (0.2) of it is macrophages, and the relative fraction of dendritic cells is

10% (0.1). Blood sample analysis found that the immune cell fraction is generally dominated by Neutrophils and monocyte, with a fraction value of around 30% (0.3) and 20% (0.2), respectively. Contrary to lung samples, Dendritic cells and Macrophages are barely detected in the blood samples. The immune cell fraction of the lung and blood is visualized in Figures 12 and 13. The non-parametric multivariate analysis indicates that there is different relative cell fraction mean from lung cytokine storm trigger samples compared to negative and non-trigger group. The significantly different mean also observed when compared the blood cytokine storm trigger samples to compared to negative and non-trigger group, but the mean comparison between blood negative samples and blood non-trigger samples did not show a significant result. The statistical analysis result of immune cell fraction between group described in Appendix C.



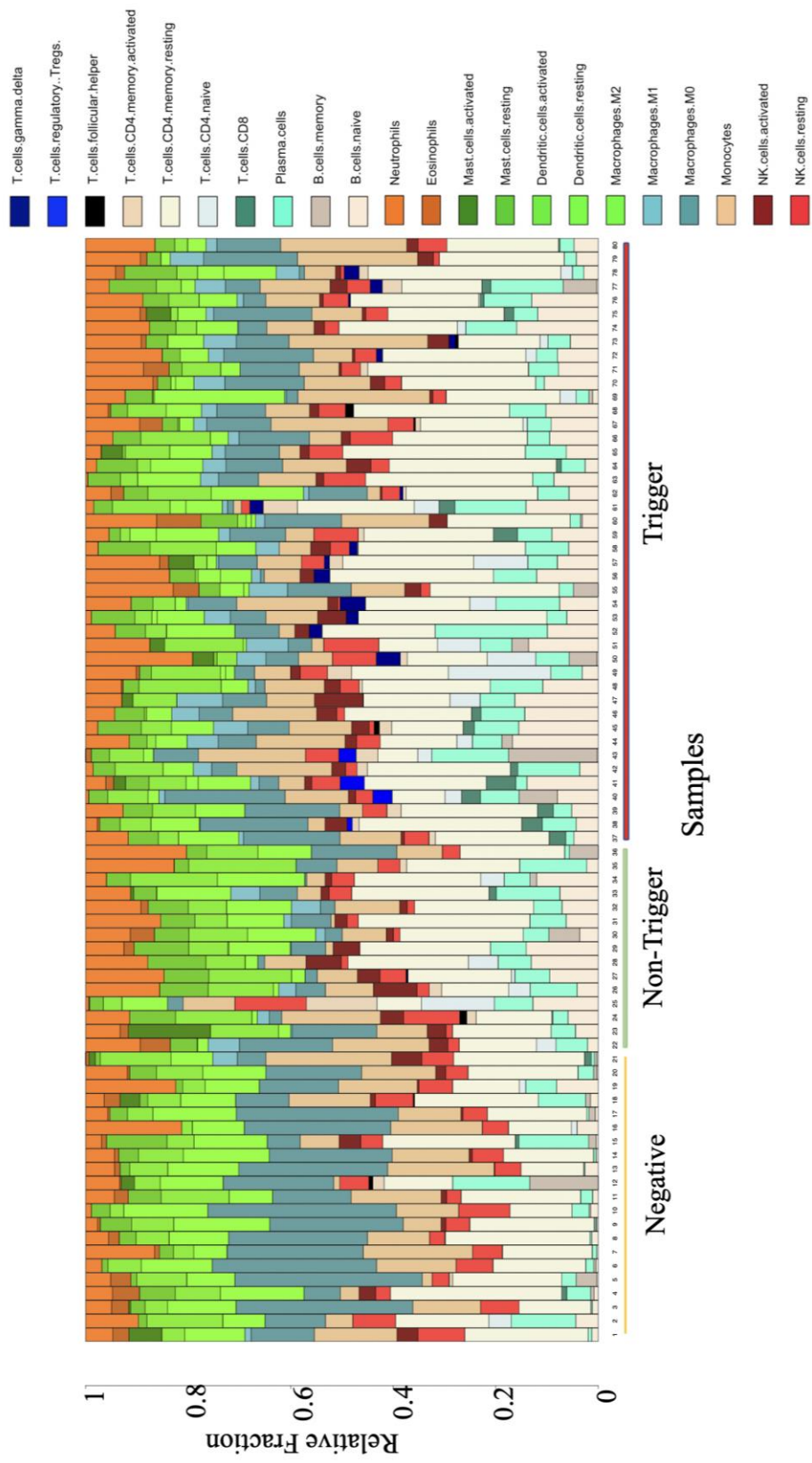


Figure 12. Lung immune cell fraction. The X-axis represents the sample used for immune cell fraction analysis, and Y-axis represents the fraction value. The bar height denotes the relative fraction value, and the bar color represents the immune cell type or subtype.

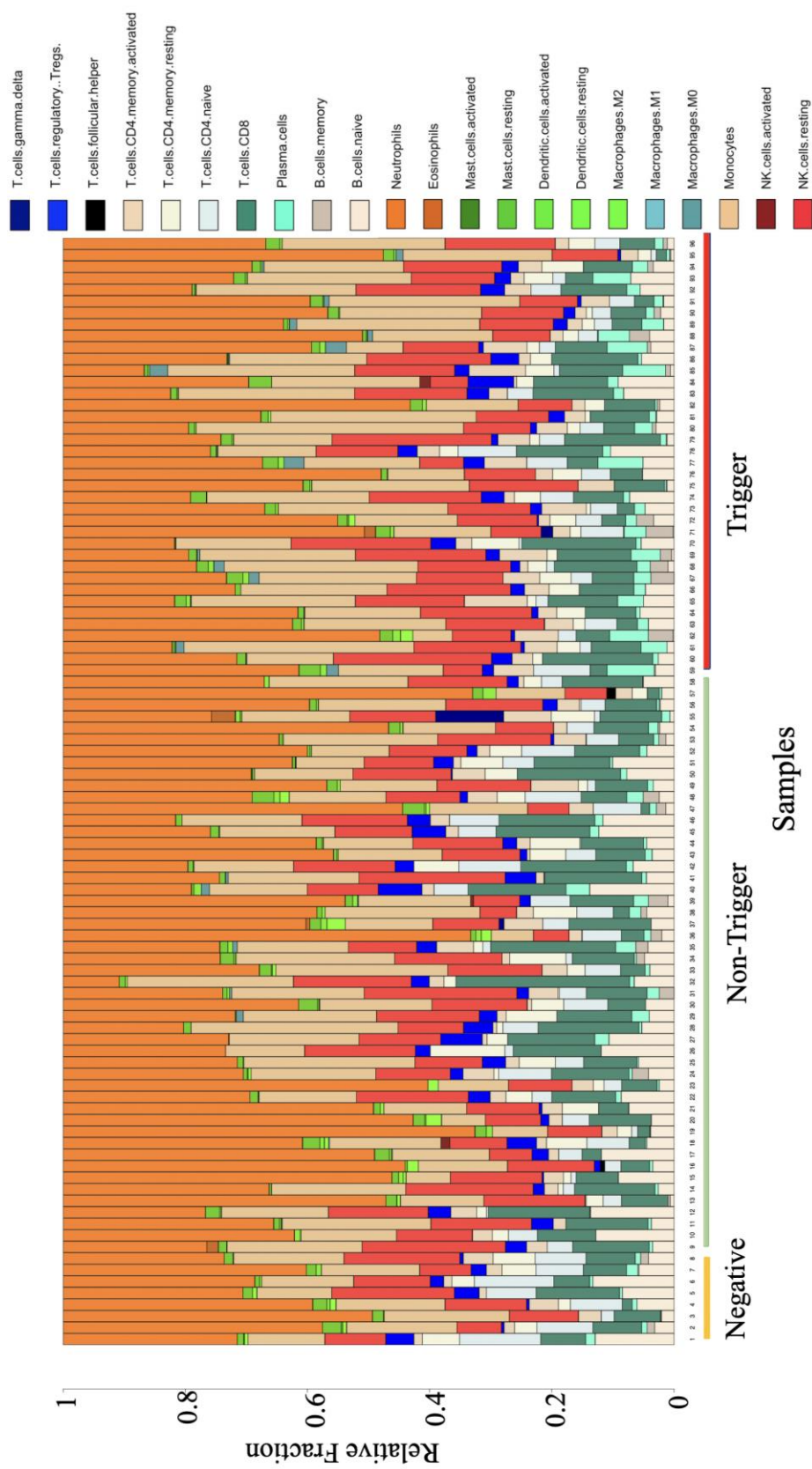


Figure 13. Blood immune cell fraction. The X-axis represents the sample used for immune cell fraction analysis, and Y-axis represents the fraction value. The bar height denotes the relative fraction value, and the bar color represents the immune cell type or subtype.

Under the P value 0.05, lung trigger samples have a significantly lower fraction of macrophage M0 and Macrophage M2 compared to negative samples. In contrast, its macrophage M1, and T cell gamma delta are significantly higher than the negative group. Besides, the lung trigger group has significantly lower activated dendritic cell fraction and higher T cell gamma delta compared to the non-trigger group. The immune cell fraction comparison is illustrated in Figure 18 to Figure 22.

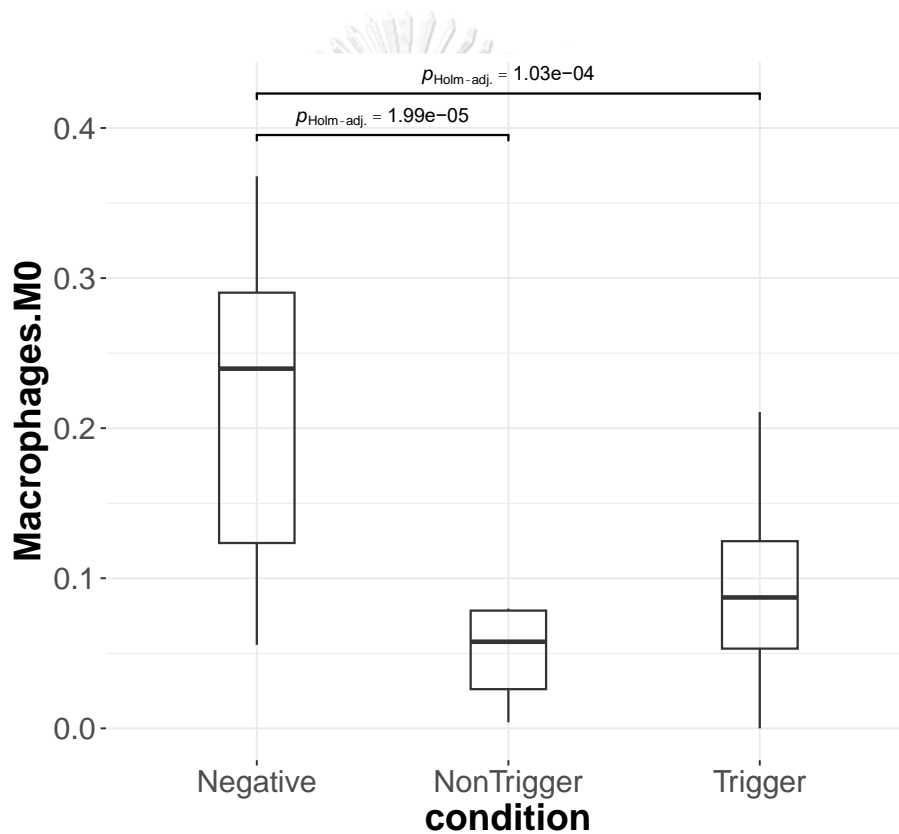


Figure 14. Lung macrophages M0 cell fraction means comparison.

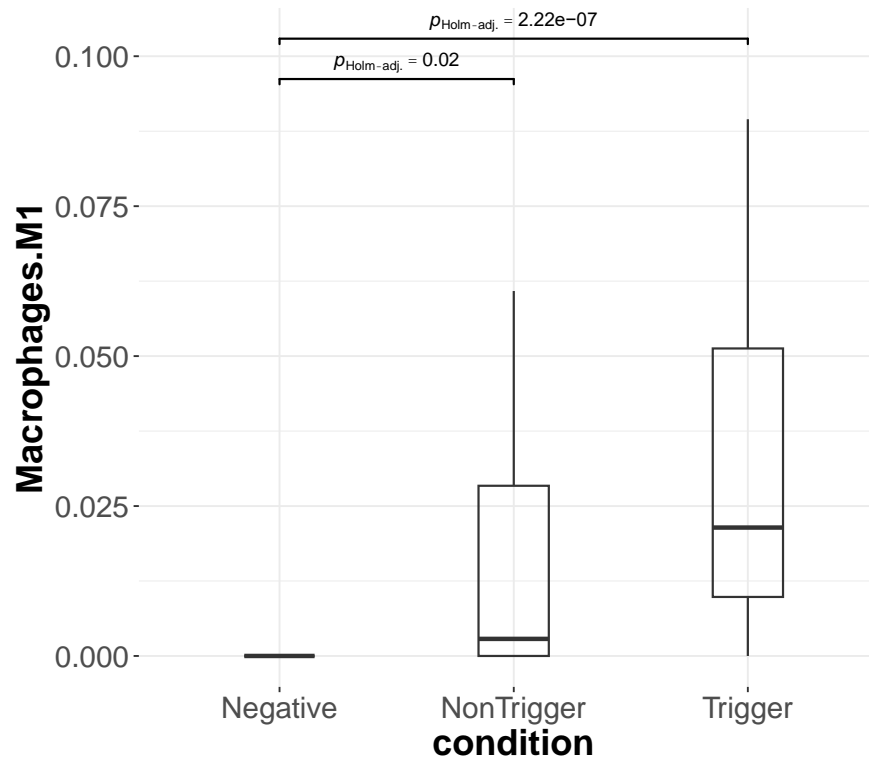


Figure 15. Lung macrophages M1 cell fraction means comparison.

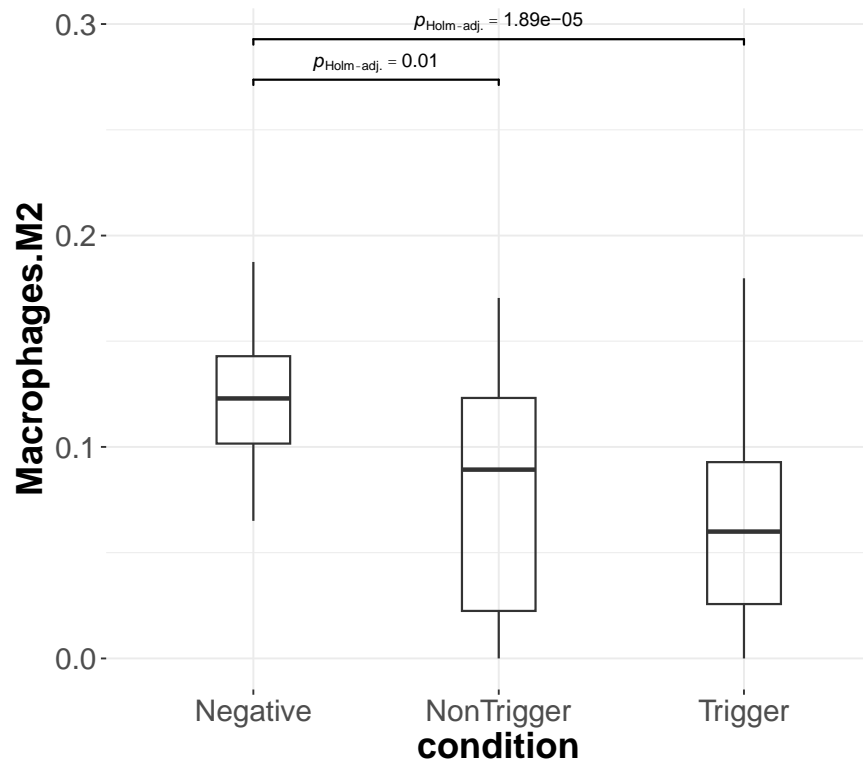


Figure 16. Lung macrophages M2 cell fraction means comparison.

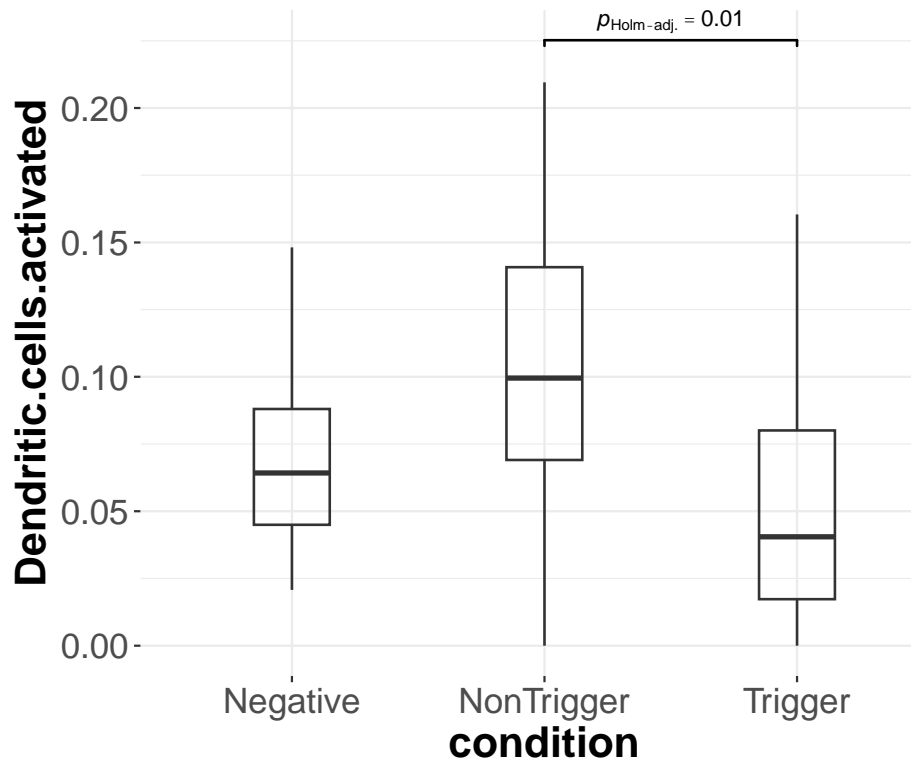


Figure 17. Activated dendritic cell fraction means comparison.

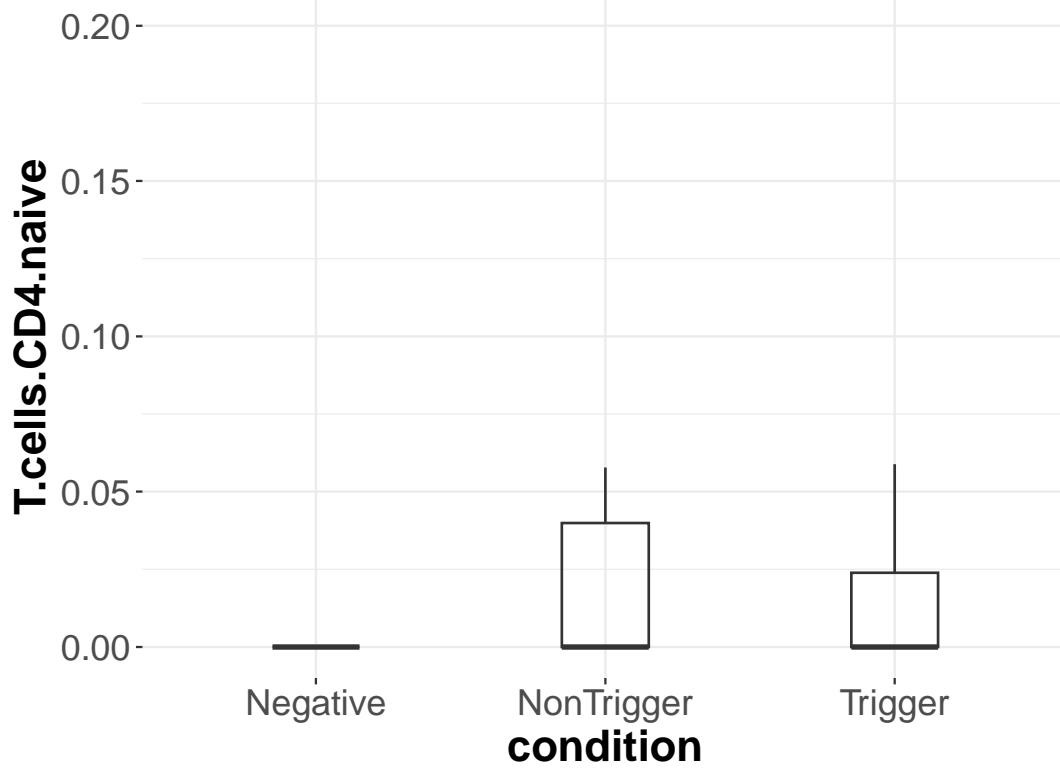


Figure 18. Lung T cells CD4 naive fraction means comparison.

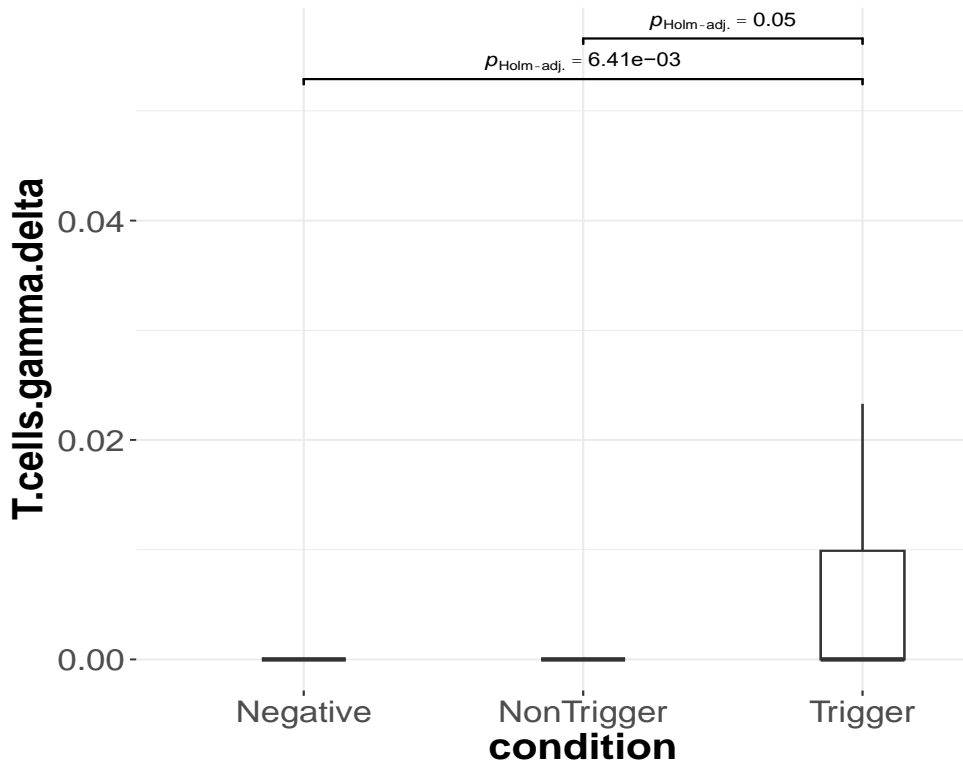


Figure 19. Lung T cell gamma delta fraction means comparison.

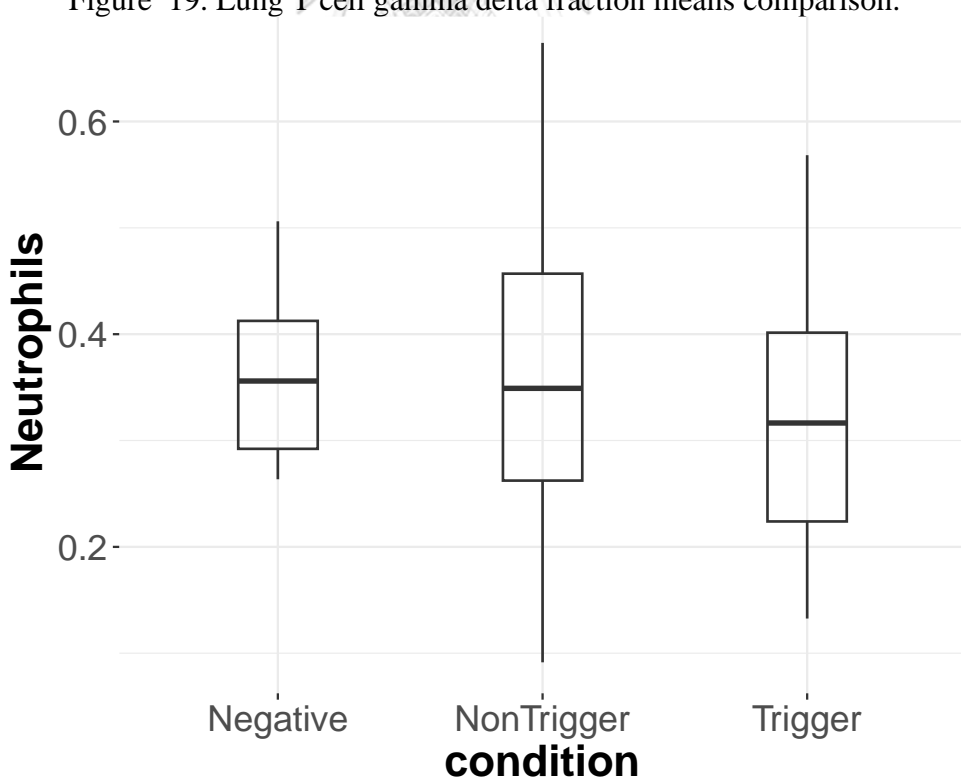


Figure 20. Blood neutrophils cell fraction means comparison.

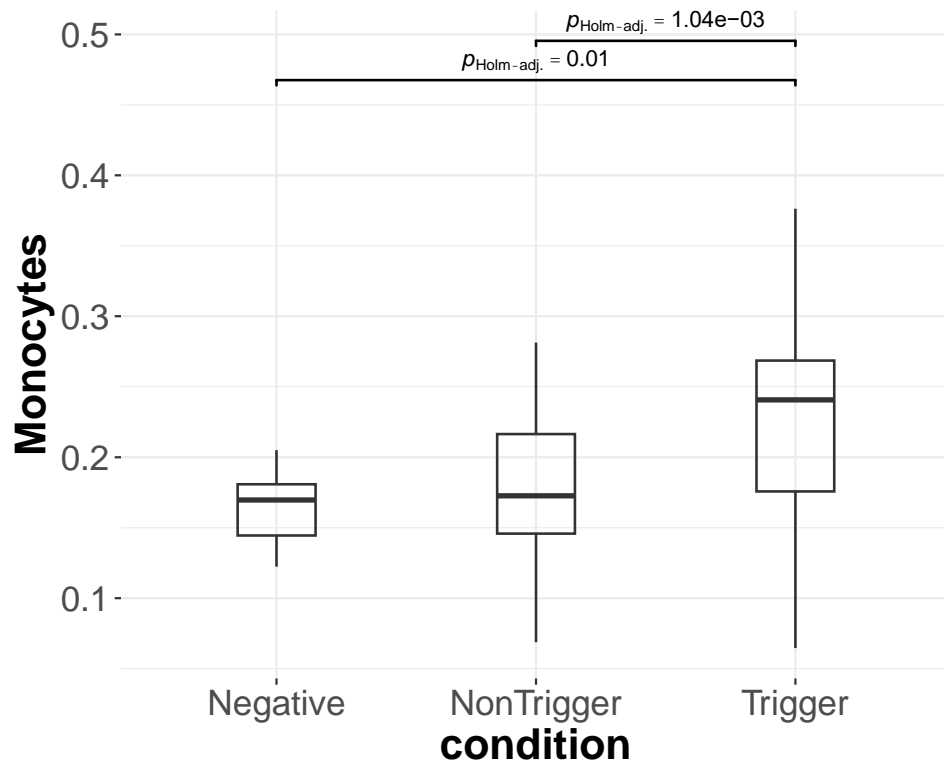


Figure 21. Blood monocyte cell fraction means comparison.

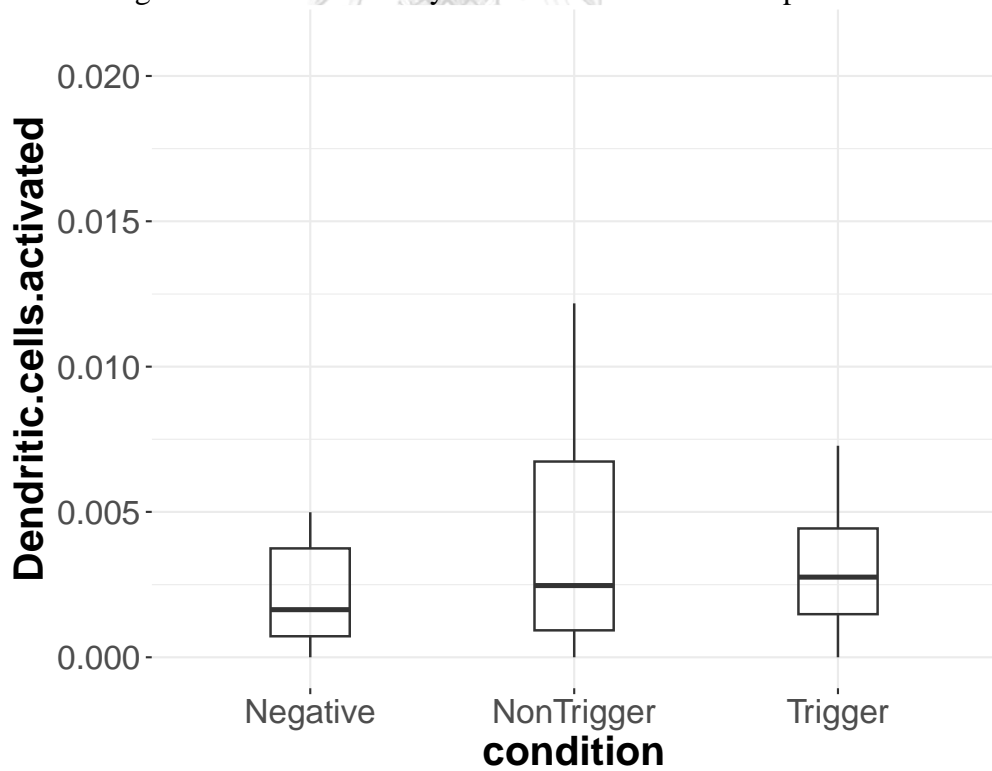


Figure 22. Blood Activated dendritic cell fraction means comparison.

The mean fraction comparison from blood cell fraction analysis is reported in Figure 10. Using the threshold of P-value under 0.05, the analysis reveals that trigger samples have significantly higher monocyte fractions than the negative samples. Monocyte means fraction from the trigger group is also significantly higher compared to the non-trigger group. On the other hand, the mean fraction of blood neutrophils and activated dendritic cells from trigger samples are not significantly different compared to the other groups.

#### Druggable Gene Identification

The prospective genes from the prior analysis, IGLV5-37, C8B, AMHR2, and INHBC, were used as input to the DGIdb. Following this, the information about the number of drugs that can interact with the gene or its product and its druggability categories was obtained and described in Table 3. The results explain that all prospective genes are members of the druggable genome category by Finnan et al. On the hand, only AMHR2 has information about known drug interactions. The summary of potential target identification is illustrated in Figure 23.



Table 3. Selected Genes Druggability Categories

No	Gene	Distinct Drug Count	Druggable Gene Categories
1	AMHR2	1	KINASE, SERINE THREONINE KINASE, DRUGGABLE GENOME, ENZYME
2	C8B	0	DRUGGABLE GENOME
3	IGLV5-37	0	DRUGGABLE GENOME
4	INHBC	0	GROWTH FACTOR, HORMONE ACTIVITY, DRUGGABLE GENOME

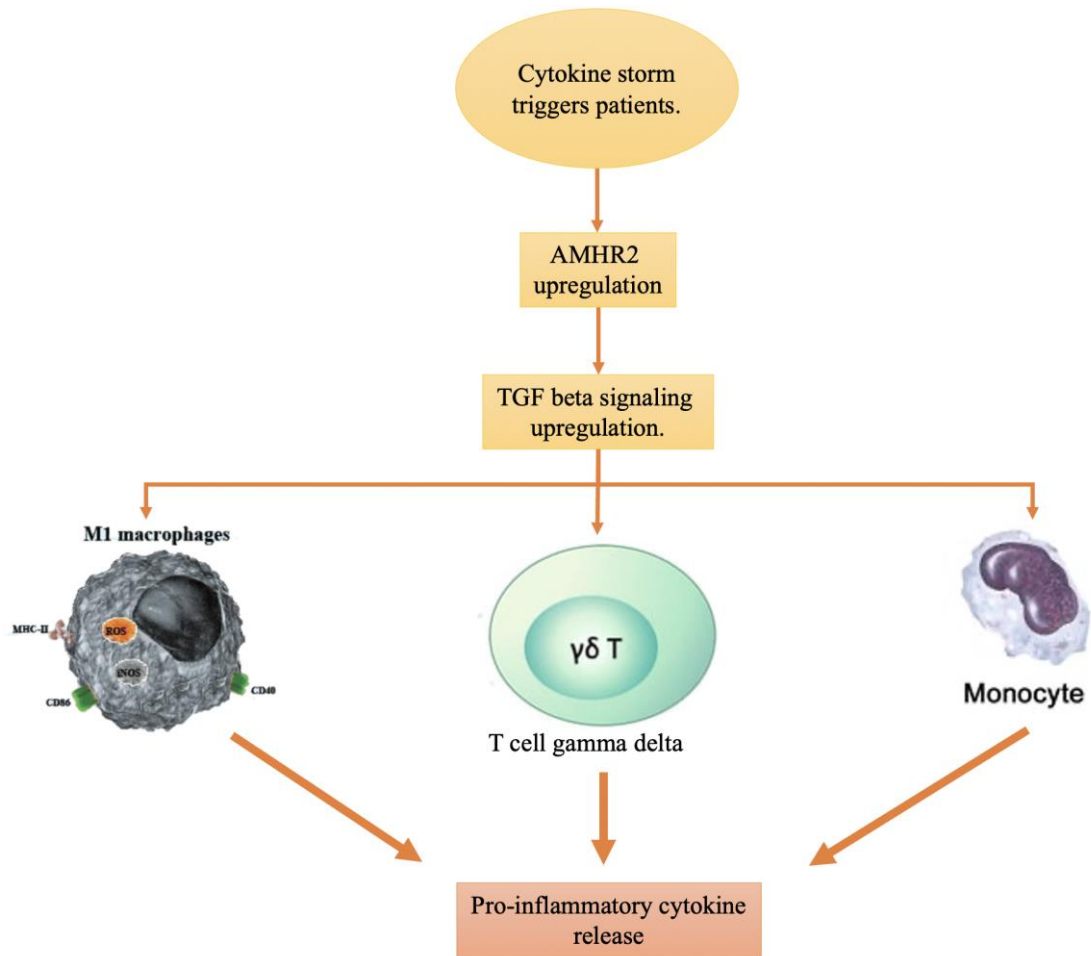


Figure 23. Cytokine storm potential development. The upregulation of AMHR2, a member of the TGF beta signaling pathway, may induce the TGF beta signaling pathway. Upregulation of the TGF beta signaling pathway might trigger M1 macrophages, T cell gamma delta, and monocyte proliferation, then release excessive proinflammatory cytokine.

## Discussion

### Data Preparation

Before the analysis, low-count and zero-count data should be excluded since the lowly expressed genes may not achieve a biologically meaningful level (104). The raw count data with values less than 10 are technically noise. By filtering the low-count data, the reliability of mean-variance in the data is increased and will improve the statistical power of the analysis (79, 105).

Since the samples are obtained from different data sources, batch correction is necessary. The data from different technical processing batches are prone to produce different statistical distributions. It may impact the downstream analysis since the data variance is more likely caused by the experimental batch rather than the biological impact (106). Batch correction prior to analysis is essential since the batch effect cannot be fully corrected by only performing data normalization (106). The result shows that the data variation caused by batch is reduced. Since the experimental batch might no longer cause the prepared dataset's variance, the data was ready for further analysis.

### Differential Gene Expression Analysis

Cytokine storm is a severe immune reaction in which the body releases too many cytokines into the blood too quickly (78). SARS-CoV-2 infected the lung cell, causing tissue damage and triggering inflammatory cytokines' release. Following this,

monocytes, macrophages, neutrophils, dendritic cells, and natural killer cells were recruited to the situs of infection. The cytokines also activate the adaptive immune cells, CD 8 T cells, and CD4 T cells, causing excessive circulating cytokines that can trigger the perturbation of vascular hemostasis leading to capillary leak syndrome. Besides, the excessively circulated cytokine may initiate macrophages' activation syndrome. The emergence of those events together leads to ARDS and multiorgan failure (38,78). According to the studies, cytokine storm in Covid 19 is a systemic inflammation triggered by a lung infection, and the effect not only disturb lung hemostasis but also blood since it circulates within the blood vessel. Therefore, to investigate the potential drug target for cytokine storm in Covid 19 patients, both lung and blood gene expression should be considered as there could be a unique gene that might be highly expressed in both tissues and involved in either cytokine signaling or immune system signaling.

The detection of genes associated with diseases condition by DE analysis assumes the upregulated genes tend to have higher protein expression and activity within the studied condition. Comparing the gene expression from cytokine storm trigger samples to the non-trigger and negative samples can give information about genes uniquely expressed in the cytokine storm trigger samples. The unique genes are assumed to be associated with the studied condition (81). Besides, since it is easier to inhibit protein activity than activate it, the upregulated genes are the potential as drug target candidates (101). Thus, the DE analysis aims to investigate the DE genes, which are upregulated in the lung and blood resulting in 290 genes upregulated in both tissues.

Since the cytokine storm may be caused by the dysregulation of the immune system signaling and cytokine signaling, the differentially expressed genes related to both signaling should be investigated. Hence, it is important to identify gene-associated with both signaling from 290-intersection lung-blood genes to narrow down the drug target candidates. The result demonstrates that INHBC, IGLV5-37, C8B, and AMHR2 might be potential drug targets as four show high activity in cytokine storm trigger patients' lungs and blood. Since four of them are associated with pathways involved in the immune system, their increasing activity might trigger the dysregulation of the immune system and lead to overactivity of the immune system. Thus, targeting the gene activity might potentially modulate the immune system activity. Furthermore, the differential expression at the pathway level was conducted to investigate whether the upregulated genes influence pathway activity.

#### Differential Pathway Expression Analysis

The differential pathway expression analysis analyzes the differential expression level using a gene set to identify a highly active pathway in cytokine storm trigger samples. Gene sets from KEGG and Reactome are widely used for gene set enrichment analysis since databases are curated databases and provide information about gene function interpretation through the perspective of biological processes (133,134). Gene sets are defined based on criteria such as membership in certain biological pathways, co-expression under a certain condition, shared biological functional properties, or regulation (107). The analysis using a gene set provides a stable and

intuitive context to assess the correlation between gene expression and biological activity(92).

The cytokine-cytokine receptor pathway was detected to have no significant change according to the analysis indicating the pathway might not be highly associated with the cytokine conditions. Even though the cytokine storm was triggered by cytokine signaling dysregulation, the evidence did not reveal that the pathway is more active or less active in certain sample groups. Thus, the cytokine storm in Covid 19 patients may be caused by the other pathways' activity associated with the DE result.

Besides being associated with cytokine-cytokine receptor signaling pathways, INHBC and AMHR2 are also members of the TGF beta family protein, which have a role in the TGF beta signaling pathway (87-89, 108). The analysis shows that the pathway is significantly upregulated in the lung cytokine storm trigger samples. The result is in line with research by Shen et al. (2021), who argue that the cytokine storm in Covid-19 was a consequence of the disequilibrated cytokine network caused by the highly active TGF beta activity. The increased activity of TGF beta suppresses lymphocyte differentiation and proliferation, followed by decreasing circulating lymphocytes. It will delay the adaptive immune response and trigger cytokine storms in Covid 19 patients (109). In addition, the upregulation KEGG TGF beta signaling pathway supports the DE genes result, indicating that the upregulation of IHBC and AMHR2 might trigger the immune system disequilibrium by elevating the KEGG TGF beta signaling pathway.

Another upregulated pathway in the lung trigger cytokine storm is the Reactom signaling in immune system pathway with the gene members including C8B and IGLV5-37, that are upregulated in the lung and blood. In addition, C8B and IGLV5-37 are involved in complement system cascade signaling and innate immune signaling, which are upregulated in cytokine storm trigger blood samples. The results indicate the upregulation of C8B and IGLV5-37 trigger the increasing activity of immune system signaling in the lung and complement system signaling leading to cytokine storm as the highly active complement system may cause cytokine storm (110,111). Furthermore, the following analysis attempts to investigate the importance of gene candidates in their associated pathways.

#### Gene Co-Expression Network Analysis

Gene Co-Expression network is constructed by Gene Set Net Correlations Analysis (GSNCA) to model the correlation between a gene expression to other genes expression. The highly correlated gene within the network will have a higher weight and be indicated as a hub gene. The hub gene can be a top 10% gene with the highest correlation value (97-99). Besides, the tools used in the analysis also attempt to observe the differential co-expression between two conditions. Differential co-expression genes are genes whose correlated expression pattern differs between classes (112).

The lung immune system signaling pathway, lung TGF beta signaling, and blood complement cascade pathway were selected for the gene co-expression analysis since their pathway's expression levels are upregulated in the cytokine storm group, and

some of their gene members are also upregulated in the lung and blood. The result illustrates no significantly different co-expression pattern between trigger samples and non-trigger samples for the pathways indicating the pathways have similar co-expression patterns within the two disease conditions. The significantly different co-expressed pathways can be evidence that the pathways are highly associated with the condition (112). Since there are no significantly different co-expressed networks from the prospective pathways, the identification of the important gene will consider the weight of each gene.

Among the four genes, IGLV5-37, C8B, AMHR2, and INHBC, there are no genes detected as the top 10% highly connected genes within its network. However, AMHR2 has the highest rank and weight relative to the others. The evidence indicates that AMHR2 might be a relatively more important gene in its pathways compared to other genes in their pathways. Thus, inhibiting AMHR2 activity might be more influential in modulating the pathway activity, which is the KEGG TGF beta signaling pathway.

#### Cell Fraction Analysis

The result indicates active inflammation in cytokine storm patients, as shown in higher monocytes detected in blood cytokine storm trigger samples. During inflammation, the monocytes will be recruited into the tissue via the bloodstream and differentiate into macrophages and dendritic cells (113, 114). Besides, macrophage cell presentation indicates active inflammation events in lung trigger cytokine samples compared to negative samples since the M0 and M2 presentation is lower in lung



trigger samples, but the M1 fraction is higher. Macrophages M0 are non-activated macrophages, while M1 and M2 are activated (115). M1 is a pro-inflammatory macrophage employed to eliminate pathogens, infected cells, and cancer cells, while M2 is an anti-inflammatory macrophage promoting tissue repair and cell proliferation (114, 116).

Research by Wang et al. (2021) reveals a positive correlation between M1 macrophage polarization with lung injury and TGF beta activity (117). Interestingly, the result is in line with differential pathway expression analysis and differential expression genes analysis that give evidence about the upregulated genes related to the TGF beta pathway, and it also demonstrated the upregulation of the pathway within the lung trigger samples. Furthermore, Research by Beck et al. (2016) demonstrates TGF beta signaling effectors activity is affected by the AMHR2 activity. Since the AMHR2 was highly upregulated in lung and blood samples, its expression might affect the equilibrium of the TGF beta signaling pathway (118). Besides, a study by Battle and Massagué (2019) describes that TGF beta signaling can inhibit the generation of antigen-presenting dendritic cells, and it is in line with the result of lower activated dendritic cells in lung trigger samples (119). Hence, it might be possible that the overexpression of AMHR2 induces the activity of TGF beta signaling, polarizing M0 macrophages into M1, delaying the adaptive immune response, and then triggering the cytokine storm condition.

The high T gamma delta cell fraction in lung cytokine storm trigger samples supports the indication of TGF beta signaling activity triggering cytokine storm T gamma delta

cells are a subset of T cells with a T-cell receptor (TCR) composed of *gamma* and *delta* chains. It resides in several tissues, including the lungs, to maintain tissue homeostasis. During infection, the T gamma delta cells release cytokine to ease the viral infection (120). The high T gamma delta cell fraction in cytokine storm trigger samples may cause the overly secreted cytokine, which triggers cytokine storm. Research by Peters et al. (2008) demonstrates that TGF beta might enhance the T gamma delta cell cytotoxicity (121). Thus, an increasing number of T gamma delta cells fraction in the lung and upregulated TGF beta pathway activity may cause an overwhelming cytokine release by T gamma delta cells.

Overall, the immune cell infiltration analysis provides supporting insights into the possible effect of upregulating the TGF beta signaling pathway on the immune cells' activity. The following observation attempts to obtain evidence on whether the selected genes: IGLV5-37, C8B, AMHR2, and INHBC, can be potentially used as a drug target according to the existing studies.

#### Druggable Gene Identification

The potential drug target should be a druggable gene that small molecules or biologicals can modulate (100). The results reveal that all prospective genes can potentially be targeted by drugs according to Finnan et al. (2017). The criteria of Finnan et al. druggable gene are the gene encodes a protein target of approved or clinically developed drugs; the encoded protein is closely related to the drug target; it is a gene of extracellular protein and members of key drug-target families (122). However, AMHR2 is the only gene detected to have an interaction with a drug. This

evidence demonstrates that AMHR2 might be more potential to be a drug target compared to the others as its activity has proven can be inhibited by a drug.



## Conclusion

To summarize, the analysis demonstrates that there are 290 genes upregulated in lung and blood samples of Covid-19 patients with cytokine storm, including AMHR2 and INHBC. The upregulation of AMHR2 and INHBC may induce the TGF beta signaling pathway to become overactive, leading to the activation of pro-inflammatory macrophages and delayed adaptive immune response. This systemic effect may trigger the cytokine storm, which the infection has initiated in the lung, then activate pro-inflammatory macrophages and T gamma delta cells that overly secrete cytokine.

Even though AMHR2 and INHBC are upregulated in both tissue samples, AMHR2 has a higher fold change value and weight compared to INHBC. The value indicates that AMHR2 might be more active and important in the TGF beta signaling pathway than INHBC. Besides, the druggable gene identification provides more evidence that AMHR2 activity can be potentially inhibited since it has an interaction with a drug. Therefore, targeting AMHR2 might be beneficial for inhibiting the TGF beta signaling pathway to relieve cytokine storms in Covid 19 patients.

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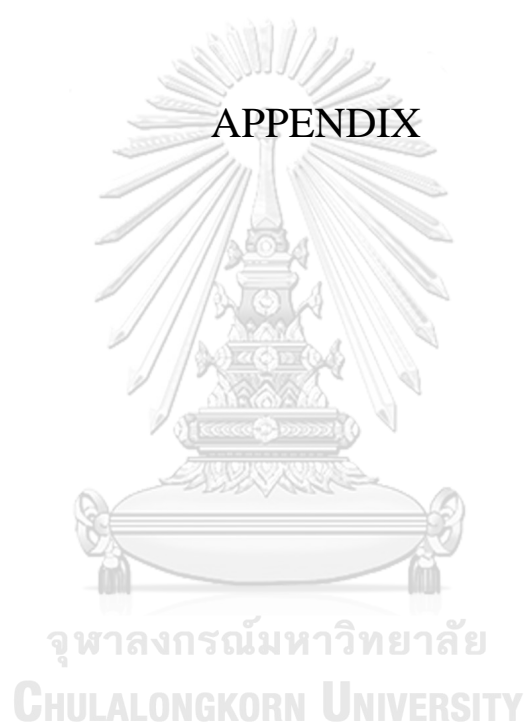
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## Appendix A

Table A.1 Log Fold Change of Lung Differential Gene Expression Analysis

Gene	Log FC	P Value	FDR
SNORD116-27	-9.480154	3.15E-36	8.05E-32
RNU6-14P	-8.9314029	1.05E-32	1.34E-28
RNU2-59P	-8.8836057	3.35E-31	2.44E-27
SNORD36C	-8.0847258	3.81E-31	2.44E-27
RNU4-76P	-8.7807524	5.57E-31	2.44E-27
RNA5SP86	-8.7621621	5.73E-31	2.44E-27
RNA5SP19	-9.2175009	1.55E-30	5.23E-27
SNORD116-23	-9.4417068	1.64E-30	5.23E-27
RNA5SP132	-9.1718712	1.13E-29	3.21E-26
RNU6-1180P	-8.2176474	3.41E-29	8.72E-26
RNU2-36P	-8.0012167	4.98E-29	1.16E-25
RNA5SP366	-9.4059145	1.53E-28	3.25E-25
RNA5SP351	-8.0020071	1.52E-27	3.00E-24
MTND1P23	-6.5816389	2.04E-27	3.73E-24
RNU6-222P	-8.0344059	2.93E-27	4.98E-24
SNORD48	-8.4667183	4.64E-27	7.41E-24
RNA5SP290	-8.1645449	1.61E-26	2.42E-23
SNORD116-18	-10.91302	2.18E-26	3.09E-23
RNU6-30P	-7.7664834	3.55E-26	4.77E-23
RNA5SP122	-8.2955008	4.00E-26	5.11E-23
MT-TL2	-7.7894012	7.60E-26	9.24E-23
RNA5SP444	-8.8726184	1.26E-25	1.46E-22
RNA5SP473	-8.4762858	2.82E-25	3.13E-22
SNORD67	-7.1189382	3.72E-25	3.96E-22
SNORD116-29	-8.5512738	6.13E-25	6.27E-22
RPL23AP64	-7.2197382	9.46E-25	9.29E-22
RNA5SP494	-7.7514235	1.92E-24	1.82E-21
CD99	-7.4760654	2.08E-24	1.90E-21
RNA5SP336	-8.531417	4.46E-24	3.93E-21
SNORD116-25	-8.7739269	6.82E-24	5.67E-21
RNU1-78P	-8.0237657	6.89E-24	5.67E-21
RN7SL8P	-8.1159642	8.66E-24	6.91E-21

MIR4449	-7.7177073	1.05E-23	8.10E-21
RN7SL7P	-8.6806823	1.30E-23	9.77E-21
RNU5F-7P	-7.5917813	1.87E-23	1.36E-20
RNA5SP514	-7.9621053	2.21E-23	1.57E-20
RNA5SP382	-7.5800148	2.70E-23	1.86E-20
MTATP8P1	-7.6777835	3.91E-23	2.63E-20
SNORD116-22	-8.6862902	5.38E-23	3.52E-20
RNA5SP435	-7.2431503	6.25E-23	3.99E-20
PRDX3P4	-6.868617	9.51E-23	5.92E-20
RNU11	-5.9917318	1.58E-22	9.60E-20
RPL7P52	-7.0338216	2.10E-22	1.25E-19
NPM1P26	-7.2754639	8.99E-22	5.22E-19
RNA5SP338	-7.8387177	1.31E-21	7.44E-19
RN7SL107P	-7.6259045	2.44E-21	1.36E-18
RNU1-55P	-7.6213014	2.72E-21	1.48E-18
RNU6-589P	-7.3710847	3.26E-21	1.73E-18
SNORD114-1	-7.3884667	4.11E-21	2.14E-18
RNU6-166P	-7.4838425	5.32E-21	2.72E-18
RPL17P17	-7.0733379	9.20E-21	4.61E-18
RNU6-47P	-7.2749075	1.03E-20	5.06E-18
RNU1-3	-7.5107857	1.45E-20	6.96E-18
SNORA33	-4.3903885	1.63E-20	7.73E-18
SNORA69	-6.6753613	1.75E-20	8.11E-18
RNU5E-4P	-6.7841827	1.86E-20	8.48E-18
PINX1	-7.5236353	2.31E-20	1.04E-17
RNA5SP260	-7.2702737	2.42E-20	1.06E-17
RNU6-595P	-7.5054765	2.82E-20	1.22E-17
SNORD30	-7.9022639	3.61E-20	1.54E-17
RN7SL798P	-6.9688301	5.14E-20	2.15E-17
RNU1-7P	-7.5226194	5.43E-20	2.22E-17
RNA5SP74	-8.9624861	5.47E-20	2.22E-17
RNU6-1145P	-7.217134	6.58E-20	2.63E-17
VTRNA1-2	-8.0586442	1.15E-19	4.52E-17
RN7SL732P	-7.4018307	1.20E-19	4.65E-17
RNU6-707P	-7.725163	1.47E-19	5.60E-17
RNU4-58P	-7.1125736	1.54E-19	5.77E-17
RPL12P39	-5.3124166	1.64E-19	6.05E-17
RNU1-14P	-7.5142613	1.98E-19	7.23E-17
SNORA24	-7.1148695	2.03E-19	7.30E-17
RNVU1-6	-8.2804365	2.56E-19	9.08E-17

PRKCA-AS1	-6.6533693	3.37E-19	1.18E-16
RNU2-50P	-6.9987025	4.63E-19	1.60E-16
SNORD82	-6.1201791	9.42E-19	3.21E-16
RNU2-23P	-7.0345779	1.05E-18	3.53E-16
MX1	-2.5248805	1.11E-18	3.68E-16
SNORD127	-6.7277587	1.34E-18	4.40E-16
RSAD2	-3.5320657	1.40E-18	4.52E-16
FCF1P2	-7.07725	1.61E-18	5.15E-16
HERC6	-2.5732791	1.74E-18	5.47E-16
ZBED1	-6.7528584	2.31E-18	7.20E-16
EEF1DP3	-7.3247008	2.58E-18	7.93E-16
OAS3	-2.6288643	3.02E-18	9.18E-16
VSX2	-5.4789705	3.10E-18	9.33E-16
OR1Q1	-5.0662155	3.58E-18	1.06E-15
RNVU1-17	-6.9696417	4.03E-18	1.18E-15
MAG11-AS1	-6.4255844	4.44E-18	1.29E-15
RNU1-28P	-7.6359006	6.01E-18	1.73E-15
IFIT1	-3.8239816	6.37E-18	1.81E-15
OAS2	-2.4161417	8.67E-18	2.43E-15
RNU6-11P	-6.8317018	9.10E-18	2.50E-15
SCARNA20	-4.8133838	9.12E-18	2.50E-15
BTBD9-AS1	-6.6303684	9.68E-18	2.63E-15
RNU1-98P	-8.0191406	1.03E-17	2.78E-15
SNORD90	-5.5301537	1.58E-17	4.21E-15
ZNF90P1	-6.4720686	3.44E-17	9.07E-15
IFI44L	-3.5244899	3.56E-17	9.27E-15
RNA5SP38	-7.037329	3.75E-17	9.67E-15
SNORA11	-6.6705406	4.02E-17	1.03E-14
TREX1	-7.382484	5.74E-17	1.45E-14
MESTP1	-5.9665118	7.61E-17	1.91E-14
RNU6-144P	-6.1186162	1.09E-16	2.70E-14
RNA5SP256	-7.0765973	1.29E-16	3.17E-14
PRICKLE2-AS1	-6.8102768	1.67E-16	4.07E-14
RN7SL838P	-4.9488629	1.83E-16	4.42E-14
RNA5SP57	-6.8346466	2.64E-16	6.31E-14
IFIT3	-2.8306167	3.29E-16	7.79E-14
DSTNP1	-6.6112882	3.61E-16	8.46E-14
EDN1	-2.9722076	4.32E-16	1.00E-13
SNORD12C	-4.6430703	4.85E-16	1.12E-13
MTND4P23	-6.1668453	7.53E-16	1.72E-13

SNORD70	-3.4326919	8.96E-16	2.02E-13
RNU1-42P	-7.4902506	1.13E-15	2.52E-13
RNU6-496P	-6.7073021	1.14E-15	2.53E-13
RN7SL591P	-4.7107678	1.18E-15	2.61E-13
LINC00161	-4.5678672	1.32E-15	2.87E-13
RNU5D-2P	-7.7962778	1.52E-15	3.28E-13
SNORD59A	-3.7536316	2.23E-15	4.79E-13
RNA5SP101	-6.8838125	2.26E-15	4.80E-13
RNA5SP388	-6.9232396	2.27E-15	4.80E-13
RNA5SP325	-7.7540908	2.71E-15	5.67E-13
HNRNPA1P14	-5.7627319	2.77E-15	5.74E-13
SNORA19	-3.521993	3.04E-15	6.27E-13
GDAP1L1	-5.0309067	3.86E-15	7.88E-13
CMPK2	-2.4297361	4.19E-15	8.48E-13
RNA5SP60	-6.3491352	5.39E-15	1.08E-12
RNU1-65P	-6.7600907	6.05E-15	1.21E-12
SNORD116-26	-7.4959302	7.43E-15	1.47E-12
RNA5SP221	-5.9978789	1.49E-14	2.92E-12
RNU2-48P	-6.0145131	1.67E-14	3.26E-12
RBBP8P1	-6.0615546	2.14E-14	4.14E-12
NME1-NME2	-6.7647473	2.56E-14	4.91E-12
RNU6-1323P	-5.3948883	3.27E-14	6.20E-12
IFI6	-2.4340642	3.28E-14	6.20E-12
RN7SL33P	-6.521808	3.68E-14	6.91E-12
LDHAP4	-6.9583864	3.87E-14	7.21E-12
RNA5SP500	-5.9476743	5.07E-14	9.39E-12
FGF22	-4.3932844	5.89E-14	1.08E-11
SNORD111B	-5.0450262	6.01E-14	1.10E-11
RNU1-138P	-6.3025699	8.57E-14	1.55E-11
IFIT2	-2.5387598	8.96E-14	1.61E-11
SNORD111	-3.9297773	9.28E-14	1.66E-11
RNU1-104P	-6.648677	9.34E-14	1.66E-11
SNORD105	-5.8170925	9.98E-14	1.76E-11
RNU6-1251P	-6.1115979	1.15E-13	2.02E-11
IFI44	-2.2165355	1.40E-13	2.43E-11
RNA5SP497	-6.5171902	1.71E-13	2.95E-11
EN1	-4.5312573	1.92E-13	3.27E-11
LINC00685	-6.6534525	1.92E-13	3.27E-11
RNA5SP121	-5.9712833	2.15E-13	3.64E-11
CPSF1P1	-6.4790482	2.27E-13	3.81E-11

ISG15	-2.6688606	2.35E-13	3.92E-11
RNA5SP62	-6.4118295	2.41E-13	4.00E-11
RNA5SP215	-5.7282446	3.61E-13	5.93E-11
C8orf17	-5.5333745	3.62E-13	5.93E-11
VTRNA2-1	-7.4811167	4.12E-13	6.70E-11
RNA5SP355	-6.307957	4.61E-13	7.46E-11
RNA5SP469	-5.7765309	5.35E-13	8.59E-11
RNA5SP450	-6.6869688	8.32E-13	1.33E-10
RNU6-1329P	-5.7616331	8.61E-13	1.37E-10
CLIP1-AS1	-5.484217	8.89E-13	1.40E-10
RNA5SP119	-6.3348033	9.44E-13	1.48E-10
DDX58	-1.7462757	9.84E-13	1.53E-10
PRRX2-AS1	-4.8373789	1.02E-12	1.57E-10
NCAPD2P1	-5.790567	1.06E-12	1.63E-10
RN7SL709P	-5.9146895	1.32E-12	2.02E-10
RNY4P25	-5.2318971	1.86E-12	2.83E-10
RN7SKP107	-5.5960072	2.02E-12	3.05E-10
RNA5SP387	-6.4745074	2.38E-12	3.57E-10
CACNA1C-AS4	-5.1283462	2.74E-12	4.09E-10
GPR79	-5.7085137	3.03E-12	4.49E-10
RNU1-83P	-5.9824589	3.69E-12	5.45E-10
MPRIP-AS1	-5.0150604	3.96E-12	5.81E-10
LINC01164	-5.4203999	3.98E-12	5.81E-10
RNU5F-4P	-5.2004578	4.01E-12	5.81E-10
RNA5SP302	-5.8818545	4.36E-12	6.29E-10
RNU1-148P	-6.1623848	4.43E-12	6.36E-10
SNORD38A	-6.4240522	4.97E-12	7.10E-10
RNU1-136P	-6.3413577	5.53E-12	7.84E-10
DMBX1	-4.2630434	6.64E-12	9.32E-10
RNU6-994P	-5.1105938	6.64E-12	9.32E-10
RN7SL426P	-5.9846104	9.93E-12	1.39E-09
IGKV1D-43	-4.1407078	1.10E-11	1.52E-09
RNA5SP502	-6.7605348	1.20E-11	1.65E-09
OAS1	-1.8945979	1.24E-11	1.70E-09
RN7SL277P	-5.0713974	1.25E-11	1.71E-09
MX2	-2.3028915	1.48E-11	2.01E-09
SNORD63	-6.3946196	1.55E-11	2.09E-09
MTND5P28	-5.3242443	1.98E-11	2.66E-09
RN7SL147P	-5.0970803	2.20E-11	2.94E-09
RNA5SP277	-4.8382935	2.31E-11	3.07E-09

RNA5SP211	-6.3029238	2.46E-11	3.25E-09
RNU1-32P	-6.6958856	2.99E-11	3.94E-09
EIF4EP1	-5.8119111	3.14E-11	4.12E-09
LILRP2	-4.5614061	3.38E-11	4.41E-09
RNU6-620P	-4.7393396	3.42E-11	4.43E-09
CELP	-4.490293	4.86E-11	6.27E-09
RNU6-44P	-4.9310319	5.64E-11	7.24E-09
MARCKSL1P1	-3.9835644	6.40E-11	8.17E-09
RNA5SP283	-5.2680862	6.92E-11	8.79E-09
RNU6-958P	-6.3687976	7.26E-11	9.18E-09
SNORD15A	-5.327147	7.36E-11	9.26E-09
RNA5SP214	-5.2009545	9.28E-11	1.16E-08
RN7SKP163	-5.8773531	9.39E-11	1.17E-08
RN7SL494P	-4.7708388	9.47E-11	1.17E-08
IGSF10	-2.4534865	9.50E-11	1.17E-08
SNORD42B	-5.9175925	1.13E-10	1.39E-08
CER1	-4.1058041	1.17E-10	1.43E-08
IGKV3D-20	-4.7917465	1.38E-10	1.67E-08
OR1E1	-4.1398368	1.52E-10	1.84E-08
RNU6-7	-5.4574174	1.59E-10	1.92E-08
FOXN3-AS2	-5.251066	1.65E-10	1.97E-08
KRT18P57	-4.7335726	1.81E-10	2.15E-08
RNU6-738P	-4.6780113	2.03E-10	2.40E-08
RNA5S9	-5.9097217	2.03E-10	2.40E-08
RNA5SP513	-4.6825072	2.60E-10	3.07E-08
RNA5SP252	-4.6385995	2.72E-10	3.19E-08
ALDH4A1	4.09369874	3.95E-10	4.60E-08
PRSS1	-5.1875312	3.96E-10	4.60E-08
COX7BP2	-4.4842679	4.00E-10	4.62E-08
RNU1-88P	-6.1158185	4.39E-10	5.05E-08
RN7SL479P	-4.9586335	4.87E-10	5.58E-08
SNORA51	-6.0646179	5.15E-10	5.87E-08
FTH1P4	-4.8164609	5.36E-10	6.08E-08
RN7SL15P	-4.6517125	5.76E-10	6.51E-08
RNA5SP403	-4.6270791	5.79E-10	6.52E-08
SCARNA21	-2.3501954	5.95E-10	6.66E-08
SCARNA11	-5.5584362	6.16E-10	6.87E-08
HMGCS2	10.2881966	6.65E-10	7.39E-08
SNORA63	-5.7268438	7.54E-10	8.34E-08
RNU1-21P	-5.7306651	7.95E-10	8.75E-08

RNU1-75P	-4.3032074	8.24E-10	9.03E-08
ATP11A-AS1	-5.3053793	8.49E-10	9.27E-08
KRT79	-3.6990859	9.00E-10	9.78E-08
RNU1-18P	-6.1615518	9.20E-10	9.95E-08
PCNPP3	-3.7968589	9.26E-10	9.98E-08
DEPDC7	4.95620069	1.50E-09	1.60E-07
RBM5-AS1	-4.7689436	1.50E-09	1.60E-07
RN7SKP36	-5.1541866	1.55E-09	1.65E-07
SNORA31	-4.3057298	1.61E-09	1.71E-07
RNA5SP99	-6.1159803	1.70E-09	1.79E-07
SCN7A	-2.0007567	1.70E-09	1.79E-07
MDP1	-3.5025876	1.84E-09	1.93E-07
SNORA58	-4.5161522	1.86E-09	1.93E-07
CYP2A6	6.8546474	1.87E-09	1.95E-07
SNORA40	-5.5481166	2.07E-09	2.14E-07
COL6A4P2	4.84241133	2.08E-09	2.14E-07
WASH6P	-5.4523229	2.11E-09	2.16E-07
SAMD9	-1.6897838	2.15E-09	2.20E-07
RNU5B-2P	-5.8461368	2.21E-09	2.24E-07
RNA5SP519	-4.5073491	2.23E-09	2.26E-07
IL17A	-3.774017	2.27E-09	2.29E-07
RNA5SP442	-5.9380211	2.39E-09	2.40E-07
SNORA35	-5.5797146	2.56E-09	2.56E-07
NCLP1	-4.715306	2.56E-09	2.56E-07
RNU6-1104P	-4.7584194	2.65E-09	2.64E-07
RNA5SP374	-4.607037	2.71E-09	2.68E-07
EIF2AK2	-1.3968759	2.84E-09	2.80E-07
TOP3B	3.03117303	2.98E-09	2.93E-07
TPM3P1	-4.5262844	3.02E-09	2.95E-07
RNU6-826P	-4.3742976	3.08E-09	3.00E-07
B3GNT3	4.79877535	3.42E-09	3.32E-07
CRP	9.51109715	3.47E-09	3.36E-07
LRRC31	5.98684083	3.73E-09	3.59E-07
ENPP7P1	-4.0506347	4.10E-09	3.94E-07
PDCL3P4	5.78809252	4.14E-09	3.96E-07
GRB14	4.60800663	4.50E-09	4.29E-07
RN7SL520P	-4.2422934	4.87E-09	4.62E-07
RNA5-8SP2	-5.7726692	5.37E-09	5.08E-07
RNU1-20P	-5.4676414	6.37E-09	6.00E-07
MT-TG	-5.5217071	6.78E-09	6.35E-07



CCNJP2	-4.7235582	6.79E-09	6.35E-07
RNU6-646P	-4.9392857	6.98E-09	6.50E-07
RNY4P13	-4.7966733	7.10E-09	6.59E-07
RNU6-743P	-4.2824112	7.67E-09	7.10E-07
HES7	-4.3513854	8.20E-09	7.56E-07
RPL10AP1	-4.6290832	8.42E-09	7.73E-07
IFIH1	-1.1922185	1.02E-08	9.38E-07
GPR174	3.25632321	1.12E-08	1.02E-06
RNU2-20P	-4.8759778	1.13E-08	1.03E-06
APOM	6.24808012	1.19E-08	1.08E-06
PKIA	-1.9099362	1.19E-08	1.08E-06
RNA5SP399	-4.2721255	1.20E-08	1.08E-06
HSD3BP5	-5.317954	1.22E-08	1.10E-06
MED4-AS1	-4.0909276	1.38E-08	1.23E-06
LINC01262	-4.1706957	1.38E-08	1.23E-06
INGX	-3.641805	1.52E-08	1.35E-06
ITIH4	7.98046935	1.60E-08	1.42E-06
SNORD88A	-3.6246136	1.61E-08	1.42E-06
RNU6-31P	-4.7610674	1.64E-08	1.44E-06
RNA5SP199	-5.5639373	1.79E-08	1.56E-06
UQCRBP1	-3.8592788	1.96E-08	1.71E-06
BTBD16	3.94280373	2.01E-08	1.74E-06
DDX60	-1.4523654	2.03E-08	1.76E-06
RNU1-89P	-5.5285686	2.07E-08	1.78E-06
RNU6-253P	-4.1751936	2.12E-08	1.82E-06
LRRIQ4	-3.6039669	2.16E-08	1.85E-06
USP18	-1.7328159	2.17E-08	1.85E-06
RN7SL38P	-5.1344642	2.24E-08	1.91E-06
TMEM92-AS1	3.61987008	2.25E-08	1.91E-06
MT-TT	-2.9839471	2.42E-08	2.04E-06
RNU4-7P	-5.2737405	2.52E-08	2.12E-06
WFDC5	-3.3299439	2.52E-08	2.12E-06
SCARNA15	-4.8113339	2.58E-08	2.16E-06
DDX60L	-1.2596586	2.63E-08	2.20E-06
RNU1-52P	-4.4161754	2.91E-08	2.42E-06
OR1E2	-3.9943443	3.10E-08	2.57E-06
TMEM72-AS1	6.10532311	3.40E-08	2.81E-06
EPSTII	-1.2456785	3.56E-08	2.93E-06
RNA5SP191	-4.9292028	3.59E-08	2.95E-06
HNRNPA1P49	-4.5099709	3.60E-08	2.95E-06

XBP1	6.7398121	3.69E-08	3.01E-06
RNU1-115P	-4.2527495	3.83E-08	3.12E-06
RNA5SP267	-5.3611054	3.95E-08	3.20E-06
RPS15AP1	-3.9829113	4.12E-08	3.33E-06
TMEM151B	-3.3992646	4.50E-08	3.63E-06
SNORA12	-4.1119429	4.85E-08	3.89E-06
NHEJ1	4.50360197	4.86E-08	3.89E-06
RNU1-130P	-4.0255792	5.67E-08	4.52E-06
RNU2-61P	-5.1697951	5.68E-08	4.52E-06
IGLV1-41	-4.6837508	5.72E-08	4.54E-06
NAV2-AS4	-4.5195893	5.74E-08	4.54E-06
RNU5A-8P	-4.4050015	6.36E-08	5.02E-06
APOH	7.6171602	6.82E-08	5.36E-06
RNA5SP263	-5.0709017	7.21E-08	5.65E-06
RNA5SP515	-5.3011687	7.28E-08	5.68E-06
ABCB11	7.99138974	7.93E-08	6.18E-06
APCS	6.30456385	8.35E-08	6.48E-06
SNORD121B	-3.8796196	8.38E-08	6.49E-06
NETO1	7.15063495	8.40E-08	6.49E-06
RNA5SP48	-5.2805943	8.47E-08	6.51E-06
VGLL3	-1.6877442	8.86E-08	6.80E-06
GCKR	5.48478077	8.93E-08	6.83E-06
RN7SL218P	-4.8091557	9.30E-08	7.08E-06
SLC39A8	-1.3143909	9.32E-08	7.08E-06
LRRIQ3	4.36779187	9.37E-08	7.10E-06
MYL3	-2.472958	9.82E-08	7.42E-06
MRGPRES	-3.5818317	9.85E-08	7.42E-06
RAD17P2	-4.8729845	9.90E-08	7.43E-06
LINC00970	-3.1440838	1.01E-07	7.55E-06
RNVU1-3	-3.5510103	1.05E-07	7.82E-06
ASMTL-AS1	-5.1161378	1.06E-07	7.87E-06
IFITM1	-1.4015366	1.08E-07	7.98E-06
GABARAPL3	-4.1608339	1.08E-07	7.98E-06
YWHAQP5	-4.197431	1.10E-07	8.13E-06
HNRNPA1P15	-4.7287917	1.14E-07	8.38E-06
PON3	2.72897133	1.17E-07	8.61E-06
PYURF	-5.0307573	1.27E-07	9.28E-06
RN7SL454P	-3.8284441	1.28E-07	9.31E-06
TYSND1	1.44682848	1.29E-07	9.41E-06
MARK2P8	-4.7390913	1.36E-07	9.84E-06

AK3P5	-4.5194885	1.36E-07	9.84E-06
UGT1A4	6.51266911	1.39E-07	1.00E-05
CIDEB	4.70931929	1.42E-07	1.02E-05
QRSL1P3	-4.6319037	1.44E-07	1.03E-05
GAPDHP51	-4.1214187	1.51E-07	1.08E-05
SNORD114-12	-3.85586	1.56E-07	1.11E-05
PNOC	9.00793274	1.65E-07	1.17E-05
STRADA	1.13022207	1.66E-07	1.18E-05
RNA5SP259	-5.1062132	1.73E-07	1.22E-05
RN7SL564P	-4.0101504	1.73E-07	1.22E-05
BMP5	-1.7681017	1.74E-07	1.23E-05
RN7SL513P	-4.9578443	1.94E-07	1.36E-05
CAV1	-1.256552	2.03E-07	1.42E-05
CAB39L	-1.2808341	2.07E-07	1.44E-05
TMA16P2	-3.5886409	2.09E-07	1.45E-05
CTC1	1.10664214	2.14E-07	1.49E-05
RNU1-140P	-4.0310023	2.17E-07	1.50E-05
RN7SL124P	-2.9970224	2.20E-07	1.52E-05
SRP72P2	-4.1755648	2.22E-07	1.53E-05
STEAP2	-1.4741897	2.32E-07	1.59E-05
CETP	3.72143795	2.36E-07	1.62E-05
RN7SL519P	-3.9298447	2.40E-07	1.64E-05
RNU5D-1	-3.0845029	2.40E-07	1.64E-05
OR7E117P	-3.3137846	2.49E-07	1.69E-05
SLC9B1	3.54277284	2.52E-07	1.71E-05
DMGDH	5.01653995	2.54E-07	1.72E-05
TMSB10P1	-4.3384101	2.58E-07	1.74E-05
TSEN15	-1.2450875	2.70E-07	1.82E-05
BACH1-AS1	-4.0317838	2.72E-07	1.82E-05
RNU6-373P	-3.937201	2.75E-07	1.84E-05
RPL7P11	-4.0291111	2.80E-07	1.87E-05
FGF2	-1.4916859	2.86E-07	1.90E-05
PTPRJ-AS1	-3.9593666	2.91E-07	1.93E-05
BEND3P3	-4.1408269	2.95E-07	1.95E-05
SNORD60	-4.7549457	3.01E-07	1.99E-05
AWAT2	-3.1271118	3.10E-07	2.04E-05
ITGA2	-1.5341324	3.19E-07	2.10E-05
MIOX	-3.185382	3.20E-07	2.10E-05
GC	5.98014092	3.26E-07	2.13E-05
AQP4	-2.1488912	3.28E-07	2.14E-05

RNA5SP161	-4.861323	3.35E-07	2.18E-05
LINC00106	-5.4723979	3.51E-07	2.27E-05
CC2D2B	3.57714728	3.53E-07	2.28E-05
ESM1	-2.1561312	3.57E-07	2.30E-05
LY6H	-3.4536505	3.62E-07	2.33E-05
SGK2	4.51825121	3.87E-07	2.49E-05
RNU6-25P	-4.1655217	3.92E-07	2.51E-05
CTAGE3P	4.78788623	3.94E-07	2.51E-05
FLRT3	-1.1972001	3.94E-07	2.51E-05
AMDHD1	4.97468796	4.11E-07	2.61E-05
SERPINA6	6.01100963	4.23E-07	2.68E-05
PNPLA3	6.35894107	4.46E-07	2.82E-05
RNA5SP358	-3.8014469	4.48E-07	2.82E-05
ANGPT1	-1.7347893	4.50E-07	2.83E-05
RNA5SP452	-4.4415255	4.52E-07	2.83E-05
ADORA2A-AS1	5.55192823	4.62E-07	2.89E-05
AHSG	6.00252853	4.65E-07	2.90E-05
FGF	6.97019353	4.67E-07	2.91E-05
MXD3	1.98063972	4.74E-07	2.94E-05
BLOC1S5-TXNDC5	-5.3008842	4.76E-07	2.95E-05
SNORD113-6	-5.6640335	4.86E-07	3.00E-05
RNA5SP225	-4.8850977	4.91E-07	3.03E-05
SPACA3	-3.2519915	5.08E-07	3.13E-05
SLC22A18	2.07657567	5.10E-07	3.13E-05
DLL3	-3.8149389	5.17E-07	3.17E-05
TM4SF4	6.50809708	5.24E-07	3.20E-05
ARPC4-TTLL3	-3.2997831	5.44E-07	3.32E-05
SAMD9L	-1.5171257	5.50E-07	3.34E-05
RNA5SP356	-3.724805	5.66E-07	3.43E-05
RNA5SP425	-4.5871435	5.67E-07	3.43E-05
RNU1-19P	-3.5108354	5.75E-07	3.47E-05
TRIM11	1.09084621	5.88E-07	3.54E-05
LUC7L2	4.8327057	5.94E-07	3.57E-05
ENPP3	2.97132026	5.96E-07	3.57E-05
RPL3P6	-4.4180211	6.43E-07	3.85E-05
BNC1	4.43424098	6.45E-07	3.85E-05
KRTAP3-1	-3.9902779	6.67E-07	3.97E-05
ARPC3P1	-2.6690613	6.78E-07	4.03E-05
RN7SL44P	-3.0896458	7.02E-07	4.16E-05

OTOF	-2.9434199	7.34E-07	4.34E-05
BAG2	-1.091656	7.47E-07	4.41E-05
PPP1R16B	1.24514974	7.54E-07	4.43E-05
PLGLB2	5.68642873	7.56E-07	4.43E-05
IFI27	-1.236284	7.57E-07	4.43E-05
JSRP1	4.23677933	7.59E-07	4.44E-05
LINC00377	6.53697678	8.18E-07	4.77E-05
IGHV1-3	6.10225389	8.51E-07	4.95E-05
ATP6V0CP3	-3.9687295	8.53E-07	4.95E-05
SLC28A3	4.11630458	8.69E-07	5.02E-05
RNA5SP395	-4.3771954	9.20E-07	5.30E-05
API5P2	6.31241458	9.63E-07	5.54E-05
KITLG	-1.4112745	9.76E-07	5.59E-05
SLC39A5	7.607144	9.77E-07	5.59E-05
CHRD1	-1.7739715	9.84E-07	5.62E-05
FITM2	1.18380784	1.01E-06	5.76E-05
NEBL	-1.254623	1.04E-06	5.93E-05
OR7E12P	-4.3060073	1.05E-06	5.94E-05
B3GNTL1P1	4.63472192	1.06E-06	5.96E-05
RNU6-116P	-3.7609577	1.06E-06	5.96E-05
INHBC	5.42863374	1.07E-06	6.01E-05
PRR35	-3.380181	1.09E-06	6.13E-05
RNASE4	4.13951677	1.11E-06	6.22E-05
DUXAP7	-3.7124293	1.11E-06	6.22E-05
KRT18P60	-3.9060079	1.12E-06	6.22E-05
DHH	4.45593304	1.12E-06	6.22E-05
RNU1-4	-6.5660457	1.12E-06	6.25E-05
KIT	-1.561856	1.13E-06	6.30E-05
APOC2	6.614062	1.14E-06	6.30E-05
EVL	1.23951328	1.14E-06	6.30E-05
AKR1C4	5.79321271	1.15E-06	6.33E-05
KIF12	4.91231574	1.16E-06	6.37E-05
FYTTD1P1	5.71402188	1.16E-06	6.38E-05
SEC31B	1.32975494	1.19E-06	6.55E-05
SOHLH2	-3.1883128	1.21E-06	6.62E-05
SNORD1B	-2.7204587	1.22E-06	6.67E-05
ECE2	-4.9760375	1.23E-06	6.68E-05
ZDHHC4P1	-4.1189281	1.24E-06	6.72E-05
CBX3P2	4.43645234	1.26E-06	6.84E-05
CLDN10	3.63956435	1.27E-06	6.88E-05

SF3A3P1	-4.0716086	1.29E-06	6.96E-05
ACOT12	6.28454512	1.30E-06	6.97E-05
ACAD10	1.04269723	1.30E-06	6.97E-05
PTRH1	4.14343048	1.31E-06	6.99E-05
F2	7.34059743	1.33E-06	7.07E-05
AQP7	4.15241109	1.33E-06	7.07E-05
UBE2CP3	-3.6282492	1.33E-06	7.07E-05
ADIRF	3.67624484	1.34E-06	7.09E-05
HTR7	3.49262178	1.36E-06	7.21E-05
HNF4A	6.90097012	1.37E-06	7.22E-05
SOX9-AS1	4.86345464	1.37E-06	7.22E-05
CAPN11	7.07482559	1.41E-06	7.41E-05
DUSP6	-1.1030355	1.45E-06	7.63E-05
CLEC18B	3.98603827	1.47E-06	7.71E-05
RNA5SP134	-4.653357	1.50E-06	7.87E-05
RNU6-855P	-3.6096252	1.52E-06	7.95E-05
ARMC12	3.7515393	1.55E-06	8.08E-05
RNU6-1201P	-4.0473188	1.60E-06	8.32E-05
FHL1	-1.3193644	1.60E-06	8.33E-05
XKR9	4.20934833	1.61E-06	8.35E-05
RNA5SP481	-4.6836549	1.63E-06	8.40E-05
VTRNA1-3	-4.1040797	1.66E-06	8.56E-05
SLC28A1	6.71524017	1.72E-06	8.85E-05
TRPV4	2.13161775	1.73E-06	8.90E-05
EIF2S2P3	3.42006956	1.78E-06	9.15E-05
HNRNPCP1	-5.4496162	1.79E-06	9.17E-05
TMEM47	-1.1608811	1.79E-06	9.17E-05
RPS4XP14	-3.8576735	1.81E-06	9.24E-05
SNORA26	-4.2258366	1.93E-06	9.80E-05
TMEM86A	1.45966946	1.97E-06	9.96E-05
RPL13AP6	-4.027314	2.00E-06	0.00010105
GFI1	1.68666678	2.05E-06	0.00010342
LINC00092	4.96632304	2.06E-06	0.00010377
PDE5A	-1.3840391	2.06E-06	0.00010377
C6orf226	3.7665094	2.08E-06	0.00010458
ALLC	6.00588536	2.16E-06	0.00010824
GK-AS1	-3.7992358	2.25E-06	0.00011256
C8G	4.64557771	2.27E-06	0.00011305
OR2A9P	3.41299915	2.27E-06	0.00011305
F9	7.5602969	2.31E-06	0.00011466

SDAD1P1	1.70509644	2.39E-06	0.00011843
STRCP1	3.22213173	2.42E-06	0.00011965
NAP1L1P3	-4.1017703	2.44E-06	0.00012046
GDA	5.65348518	2.46E-06	0.00012123
AKR7A3	4.11528762	2.49E-06	0.00012233
ABCB4	5.34075169	2.61E-06	0.00012823
ZBTB20-AS4	-4.5884394	2.65E-06	0.00012959
GRM8	3.50331287	2.65E-06	0.00012959
SNORA75	-4.2155263	2.69E-06	0.00013159
SMIM6	3.40689178	2.71E-06	0.00013206
RPL7P25	-3.7250332	2.72E-06	0.0001323
TRGV3	5.35531909	2.78E-06	0.00013515
RNU1-139P	-4.4046865	2.86E-06	0.00013847
TMEM74	4.71582039	2.86E-06	0.00013847
SOD2P1	-2.6278189	2.89E-06	0.00013954
FOLR2	2.19916125	2.93E-06	0.00014102
KIR3DL3	-4.4787496	2.94E-06	0.00014144
ABHD1	4.56750891	2.97E-06	0.00014267
MRPS17P1	-4.4972328	3.01E-06	0.00014429
RNU2-14P	-4.2263856	3.02E-06	0.00014461
ACMSD	6.20148044	3.03E-06	0.00014464
IGKV1-27	-2.8784521	3.04E-06	0.00014494
EMC6	3.28611628	3.05E-06	0.00014515
MTTP	7.60698465	3.09E-06	0.0001465
TMCO6	1.40879778	3.10E-06	0.00014701
GSDMA	7.68842285	3.13E-06	0.00014817
HBEGF	-1.2922162	3.16E-06	0.00014942
RPS4XP1	4.32443875	3.17E-06	0.00014958
ICAM3	2.47846365	3.21E-06	0.00015087
SNORA79	-3.6938046	3.28E-06	0.00015415
LGALS4	6.21252011	3.30E-06	0.00015445
TM4SF1	-1.1603891	3.34E-06	0.00015622
ZNF211	1.07585788	3.36E-06	0.00015701
WDR83OS	-4.4684659	3.46E-06	0.00016074
FABP1	6.36884497	3.47E-06	0.00016074
CYP2C8	6.7369932	3.47E-06	0.00016074
RNU4-40P	3.55790377	3.48E-06	0.00016082
RNA5SP37	-3.5015592	3.52E-06	0.00016274
E2F3P1	-3.9469712	3.57E-06	0.00016419
HSPA8P4	3.36533161	3.57E-06	0.00016419

LINC01160	4.71760367	3.64E-06	0.00016717
AKR1B10	7.7473202	3.67E-06	0.00016812
KCTD9P4	3.77772051	3.71E-06	0.00016974
TMEM235	-3.4543777	3.73E-06	0.00017053
SERPINH1P1	-2.9362969	3.74E-06	0.00017065
SNORA84	-4.2111277	3.79E-06	0.00017266
MEIS1-AS3	-2.9304702	3.82E-06	0.00017352
LINC00944	3.7808785	4.02E-06	0.00018235
MYCT1	-1.0297445	4.03E-06	0.00018235
RN7SL278P	-3.5835057	4.04E-06	0.00018264
C3P1	8.66554677	4.05E-06	0.00018264
UBE2SP1	-3.7054892	4.08E-06	0.00018383
COL19A1	3.14639538	4.09E-06	0.00018387
RPS10P16	-2.9115247	4.10E-06	0.00018392
DDX25	5.38830055	4.14E-06	0.00018529
LGSN	5.50647646	4.17E-06	0.00018616
GDF9	3.18010771	4.17E-06	0.00018616
SPOCK3	5.65116446	4.31E-06	0.00019227
CECR7	2.83192024	4.37E-06	0.0001942
CFHR2	7.46557713	4.40E-06	0.0001952
PDSS1P1	-4.1927578	4.43E-06	0.00019588
PYROXD2	1.61997314	4.44E-06	0.0001962
XAF1	-1.1971451	4.45E-06	0.0001962
CD1C	9.20057996	4.49E-06	0.00019714
ZBED2	-3.0345826	4.50E-06	0.00019714
AGT	4.11482631	4.50E-06	0.00019714
FAM205A	-3.7562537	4.51E-06	0.00019714
CLRN3	5.7216173	4.51E-06	0.00019714
SNORD41	-3.862916	4.52E-06	0.00019714
SLC25A47	5.78214255	4.55E-06	0.0001985
GNAO1	2.77186379	4.57E-06	0.00019878
COL9A3	3.71891189	4.62E-06	0.00020051
DRD5	-4.426097	4.68E-06	0.0002024
RNA5SP242	-4.5298248	4.69E-06	0.0002024
RN7SKP271	-4.1776914	4.69E-06	0.0002024
LINC00539	5.26076718	4.71E-06	0.00020279
ALB	5.5126571	4.72E-06	0.00020304
SLC2A2	5.23748081	4.73E-06	0.00020314
LBX1	-2.913718	4.78E-06	0.00020432
TXNDC5	1.18625562	4.79E-06	0.00020432



FCGR3B	-1.6836774	4.79E-06	0.00020432
DDX55P1	3.64628154	4.95E-06	0.00021017
APOC3	5.1052191	4.95E-06	0.00021017
SPP2	5.49898487	4.96E-06	0.0002106
LINC01358	3.12834014	5.05E-06	0.00021381
SLCO1B1	8.14039183	5.06E-06	0.00021418
HMGB1P41	3.36786758	5.13E-06	0.00021651
LINC00526	3.39354565	5.14E-06	0.00021656
PDE6A	6.27588527	5.17E-06	0.00021742
MFSD1P1	-3.373274	5.31E-06	0.00022257
NUDT10	5.46158401	5.35E-06	0.000224
ABO	-1.821666	5.36E-06	0.00022413
RNU6-1077P	-3.5359387	5.39E-06	0.00022474
TBC1D16	1.07897105	5.44E-06	0.00022654
BCL2L2- PABPN1	2.94239522	5.45E-06	0.00022654
HSPB2	-2.6206277	5.53E-06	0.00022912
VCX	-2.8897993	5.64E-06	0.00023322
MLIP	6.58117076	5.64E-06	0.00023322
RNA5SP335	-4.2655011	5.72E-06	0.00023593
NXT1	-1.0742582	5.78E-06	0.00023822
RNVU1-19	-4.7072419	5.86E-06	0.00024113
TMEM100	-1.6139156	5.87E-06	0.00024117
ITIH1	6.61411416	5.97E-06	0.00024464
CHODL	7.97727229	5.98E-06	0.00024464
ADAMTS8	-2.1004402	6.00E-06	0.00024538
RPL21P12	-3.5498102	6.04E-06	0.00024643
GPR55	5.86131924	6.06E-06	0.00024695
RN7SL665P	-4.2241294	6.27E-06	0.00025448
SCARNA18	-3.3175713	6.32E-06	0.00025627
PLA2G12B	6.65556726	6.36E-06	0.00025726
LARGE-AS1	-3.9440054	6.37E-06	0.00025726
NR2F1	-1.0834406	6.42E-06	0.00025897
GALNTL6	5.96203327	6.47E-06	0.00026065
PAH	6.36673238	6.61E-06	0.00026547
CDC20P1	6.40862862	6.63E-06	0.00026565
GPT	4.87249432	6.71E-06	0.00026861
GOLGA6A	4.68466719	6.88E-06	0.00027518
RBMS3-AS2	-3.6496108	6.91E-06	0.00027564
RNU5E-8P	-3.540091	7.03E-06	0.00028014

RNA5SP174	-3.4214287	7.07E-06	0.00028137
GLOD5	3.4375634	7.15E-06	0.00028385
ITGAD	5.33575195	7.26E-06	0.00028748
DPPA5P2	-2.6560835	7.26E-06	0.00028748
LINC01376	2.96127244	7.33E-06	0.00028976
WFDC3	2.53370951	7.47E-06	0.00029473
KREMEN1	4.03017753	8.07E-06	0.00031825
BNIP3P40	-3.5096735	8.17E-06	0.00032114
BEST3	10.1092519	8.19E-06	0.00032148
FAR2P2	2.88721816	8.23E-06	0.00032244
FMO6P	6.44829742	8.37E-06	0.00032745
SCARNA16	-3.360627	8.57E-06	0.00033465
MAOB	-1.3318232	8.68E-06	0.0003384
GLYCK	2.48625195	8.71E-06	0.0003393
EEPD1	1.44193172	8.76E-06	0.00034054
EIF4E2P1	-3.4964814	8.80E-06	0.00034155
CYP27C1	5.06223153	8.85E-06	0.00034267
EMX2OS	8.49030721	8.85E-06	0.00034267
AFM	7.29787336	8.88E-06	0.00034309
LINC00639	3.65974477	9.11E-06	0.00035156
PLG	5.92360991	9.22E-06	0.00035537
RPL9P32	-3.8154391	9.26E-06	0.00035623
TMPRSS6	7.42072397	9.53E-06	0.00036592
CYP4Z1	3.68815455	9.82E-06	0.00037596
RGPD1	3.42889559	9.82E-06	0.00037596
HSD17B14	1.94835394	9.86E-06	0.00037685
GPAA1P2	5.08376256	1.01E-05	0.00038552
RNU6-1188P	-3.3491554	1.02E-05	0.00038739
CLEC4GP1	5.21574273	1.03E-05	0.0003926
IFIT5	-1.0325548	1.04E-05	0.00039702
OR52B6	-3.7210052	1.05E-05	0.00039927
UBE2V1P1	2.92541305	1.06E-05	0.00040047
B4GALNT2	8.02785785	1.06E-05	0.00040047
C1orf147	-2.5891163	1.07E-05	0.00040279
SIRPG	4.31788013	1.07E-05	0.00040299
GDNF-AS1	5.74967292	1.10E-05	0.00041447
TNNI3	-3.1311348	1.14E-05	0.00042925
PACIN1	5.85335672	1.14E-05	0.00042925
MTCO1P4	-2.9136495	1.19E-05	0.00044454
RNA5SP207	-3.1577247	1.19E-05	0.00044511

ETNPPL	4.22393715	1.21E-05	0.00045291
F13B	7.1635346	1.22E-05	0.00045442
LINC01169	2.92656943	1.23E-05	0.00045564
RETN	-2.7524318	1.23E-05	0.00045846
OR2T10	-2.4425737	1.24E-05	0.00046145
USH2A	4.58746296	1.26E-05	0.00046495
UBE2QL1	5.00785498	1.26E-05	0.00046595
KCNMA1	1.12277329	1.27E-05	0.00046837
LINC01431	8.04405977	1.29E-05	0.00047444
KCNK2	8.8419247	1.29E-05	0.00047502
ANGPTL6	5.576411	1.30E-05	0.0004762
SLC25A39P1	-3.54708	1.30E-05	0.00047767
INSM2	-2.9427805	1.32E-05	0.00048479
OR51B2	8.15981629	1.33E-05	0.00048596
FOXRED1	1.10038758	1.34E-05	0.00049133
MBL2	6.52348116	1.36E-05	0.00049555
LYPLA2P1	-2.5087399	1.38E-05	0.00050268
TKTL1	-2.4450515	1.39E-05	0.00050435
HNRNPA1P76	-3.5477618	1.40E-05	0.0005099
SLC15A1	4.52193842	1.41E-05	0.0005099
CYB561D1	1.10574979	1.41E-05	0.0005099
SNORD116-14	-4.0960131	1.41E-05	0.00051052
ITPK1-AS1	-3.7244267	1.44E-05	0.00051916
DKK1	-2.5429202	1.46E-05	0.00052611
LINC01370	4.73009613	1.46E-05	0.00052674
SNORA36B	-4.1392678	1.49E-05	0.00053749
SLC38A3	6.70589047	1.50E-05	0.00054
FCN2	4.53591424	1.52E-05	0.00054438
FAM99A	5.30800885	1.54E-05	0.00055032
URAHP	3.80599131	1.55E-05	0.00055263
FAM209B	3.23477819	1.58E-05	0.00056121
MTND4P26	-3.8339105	1.58E-05	0.00056278
TTL9	3.80856761	1.59E-05	0.00056511
RNA5SP226	-4.096573	1.60E-05	0.00056885
AMZ2P2	-3.8529127	1.61E-05	0.00057195
AXDND1	3.3870477	1.64E-05	0.0005796
PLN	-1.829876	1.66E-05	0.00058537
TTC36	4.04838808	1.69E-05	0.00059624
LINC01220	5.02048826	1.70E-05	0.00059624
HSF4	1.74631826	1.70E-05	0.00059624

SMCO2	2.85286119	1.70E-05	0.00059624
SULF2	1.18161842	1.71E-05	0.00059855
LINC01500	4.15981543	1.72E-05	0.00060122
ZGLP1	3.83641907	1.72E-05	0.00060244
CASC19	4.19648953	1.73E-05	0.00060349
VIPR2	3.94683222	1.76E-05	0.00061236
HDC	-2.0759957	1.77E-05	0.00061682
DNAJA1P3	-3.609494	1.79E-05	0.00062208
IFI35	-1.0915509	1.79E-05	0.00062208
RNU1-63P	-2.6113593	1.82E-05	0.00062904
SLC7A14	9.98763445	1.82E-05	0.00062904
SAMD13	4.89914738	1.82E-05	0.00063002
TRGV4	4.72910379	1.83E-05	0.00063188
OR10J5	5.01147974	1.86E-05	0.00064016
RN7SL817P	-2.7678857	1.91E-05	0.00065855
RPS18P13	-2.1769168	1.94E-05	0.00066855
SGSM2	1.06308545	1.97E-05	0.00067403
RNF123	1.01076982	1.97E-05	0.00067403
SOX21-AS1	7.80669841	1.98E-05	0.00067689
LINC01564	4.18499092	1.98E-05	0.00067787
RASEF	-1.2100874	2.00E-05	0.00068225
TOX4P1	4.92214828	2.01E-05	0.00068645
ATP1B4	9.18883099	2.02E-05	0.00068786
HSPA8P15	2.5165157	2.08E-05	0.00070785
DLG5-AS1	3.50246319	2.09E-05	0.00071129
SNORA36A	-3.8390805	2.11E-05	0.00071549
EPO	4.76508186	2.12E-05	0.00071844
MTND1P32	2.70272269	2.12E-05	0.00071885
FBXO15	3.12741358	2.14E-05	0.00072184
CYP4F26P	8.31891288	2.14E-05	0.00072184
ODCP	-3.7678704	2.15E-05	0.00072333
XG	4.36374214	2.15E-05	0.00072333
CUX2	6.70019705	2.15E-05	0.00072333
GGTA2P	9.15773057	2.16E-05	0.00072376
TM4SF5	4.77819192	2.20E-05	0.00073616
SNORA55	-3.8809942	2.20E-05	0.00073616
RNA5SP456	-3.5614327	2.20E-05	0.00073616
HEATR9	3.7961084	2.21E-05	0.00073631
FGFBP2	4.25535561	2.22E-05	0.00074089
LRRC29	2.06086126	2.23E-05	0.00074322

RBM11	-1.8	2.23E-05	0.00074322
HORMAD2	4.69403082	2.27E-05	0.00075551
ANGPT4	6.82216412	2.28E-05	0.0007568
HES5	-2.8660155	2.28E-05	0.0007568
LINC00504	4.45778682	2.29E-05	0.00075795
VSX1	8.10565052	2.30E-05	0.00076159
ZAP70	1.73802537	2.34E-05	0.00077357
HSPA2	-1.0580573	2.36E-05	0.00077715
CCDC178	7.08508876	2.37E-05	0.00077715
RN7SKP96	5.96226697	2.37E-05	0.00077715
NOXRED1	2.75485914	2.37E-05	0.00077715
TMEM105	4.02219823	2.38E-05	0.0007795
EDARADD	3.77428277	2.39E-05	0.00078029
BMP6	-1.0846427	2.39E-05	0.00078029
EEF1B2P7	-3.4096637	2.40E-05	0.00078215
HELZ2	-1.0830854	2.42E-05	0.00078504
RELN	2.12511783	2.45E-05	0.00079383
GJB1	5.57154638	2.45E-05	0.00079383
ABCC6P1	3.65793718	2.48E-05	0.00080141
PRDX2P3	2.99314615	2.48E-05	0.00080229
YWHAEP7	9.11808687	2.49E-05	0.00080243
LRRC37A7P	4.91912441	2.50E-05	0.0008052
APOF	6.1195543	2.51E-05	0.00080694
SIAH2-AS1	3.14828541	2.51E-05	0.00080728
TERT	6.29204357	2.52E-05	0.00080851
FIGNL2	2.77954211	2.54E-05	0.00081273
SLIT2	-1.150455	2.54E-05	0.00081386
BACH1-IT3	3.0564319	2.57E-05	0.0008207
MS4A2	-2.2126193	2.57E-05	0.00082188
RN7SL67P	3.05701047	2.58E-05	0.00082313
ENPP7	5.57436739	2.59E-05	0.00082497
TTR	6.8155432	2.60E-05	0.00082773
TERC	-4.6377118	2.63E-05	0.00083423
LETM1P2	-3.2971516	2.72E-05	0.00086272
MIR4500HG	8.47517507	2.75E-05	0.00086997
EMP1	-1.0922581	2.75E-05	0.00087169
CYP2A7	4.69808923	2.76E-05	0.00087304
CPN2	5.39487274	2.79E-05	0.00088039
LGI1	6.82119728	2.80E-05	0.00088401
TCEAL3-AS1	3.45714146	2.82E-05	0.0008876

HAAO	1.7598507	2.84E-05	0.00089328
NRBF2P5	-3.6357423	2.86E-05	0.00089807
ITIH2	6.61085712	2.87E-05	0.00090148
ETV3L	-3.0091463	2.88E-05	0.00090201
FSBP	3.02080359	2.92E-05	0.00091253
LINC00605	7.77554975	2.95E-05	0.00091968
CASR	6.59581123	2.96E-05	0.00092121
ADAMTS18	8.72245349	2.98E-05	0.00092796
OR7E14P	2.46681456	3.01E-05	0.00093401
ASPRV1	2.52320542	3.02E-05	0.00093608
CRTC3-AS1	3.0658478	3.02E-05	0.00093652
FMN2	5.09886063	3.03E-05	0.00093846
LINC01018	5.68269975	3.04E-05	0.00094001
DMBT1	-2.2755856	3.05E-05	0.00094146
RNA5SP198	-3.3823154	3.07E-05	0.0009468
SCGN	5.13917792	3.14E-05	0.00096538
WDR38	4.43627318	3.17E-05	0.0009722
FAM149A	1.14137266	3.17E-05	0.0009722
CYP1A2	7.74071493	3.21E-05	0.00098312
PROC	4.91609484	3.26E-05	0.00099734
RNU6-487P	-3.7884127	3.26E-05	0.00099734
RNVU1-18	-3.8036667	3.27E-05	0.0009982
LINC01559	8.27323324	3.30E-05	0.00100504
MYOM2	-1.6368712	3.33E-05	0.00101346
UNGP3	9.32295077	3.34E-05	0.00101633
PLGLA	4.21772731	3.35E-05	0.00101686
MEIS3P1	-1.2113813	3.37E-05	0.00102234
CA5A	5.12301173	3.40E-05	0.00102684
PCAT7	4.45542671	3.42E-05	0.00103026
RNU2-3P	-3.7579745	3.43E-05	0.0010345
BEND7P1	6.55361369	3.47E-05	0.00104433
SLC25A30-AS1	6.40387121	3.48E-05	0.00104679
GABRG2	6.38171189	3.51E-05	0.00105303
BTF3P10	-3.1431034	3.53E-05	0.00105913
HRG	5.72584823	3.58E-05	0.00107129
LINC01151	3.35247251	3.59E-05	0.00107441
VAMP7	-3.6998	3.64E-05	0.00108725
HRH3	-3.3655067	3.64E-05	0.00108725
RNVU1-15	-2.8844695	3.67E-05	0.00109261
LINC01023	4.69768699	3.74E-05	0.00111168

COL18A1-AS1	-4.1073297	3.75E-05	0.00111368
GLS2	3.62257216	3.76E-05	0.00111527
HMG1P24	3.55146081	3.77E-05	0.00111661
MKNK1-AS1	-3.6209254	3.79E-05	0.00112029
CFHR5	5.57697026	3.79E-05	0.00112029
CABP1	4.03092224	3.80E-05	0.00112162
DKK3	-1.1148685	3.82E-05	0.00112635
SERPINA11	6.99348682	3.84E-05	0.00113046
GPC3	-1.3839673	3.85E-05	0.0011315
CWH43	7.14718724	3.85E-05	0.0011315
LY6G5C	4.01385986	3.86E-05	0.0011315
PIGFP2	-3.4362178	3.86E-05	0.0011315
RBM22P2	-2.5710803	3.89E-05	0.00113835
UGT2B10	4.39407406	3.91E-05	0.00114339
SNORD116-6	-3.8277056	3.94E-05	0.00115068
HMG2P46	3.73104544	3.96E-05	0.00115574
UGT3A2	7.15208224	3.97E-05	0.00115651
SNORD7	-3.385193	4.00E-05	0.00116423
EEF1A1P30	3.27758187	4.02E-05	0.00117044
RIMBP3	8.59492366	4.05E-05	0.00117763
C4BPB	3.66370443	4.07E-05	0.00118232
RNU6-15P	-3.3404796	4.10E-05	0.00118748
CNN2P9	2.83410292	4.10E-05	0.00118801
CYP2E1	4.9812295	4.14E-05	0.00119785
ALDOB	5.84319233	4.15E-05	0.00119955
HGD	4.8378212	4.20E-05	0.00121018
BNIP1	2.66336002	4.20E-05	0.00121018
TRPM8	5.49936793	4.21E-05	0.00121195
UGT1A9	5.27397523	4.23E-05	0.00121581
METTL21EP	3.4735389	4.23E-05	0.00121608
STAB2	3.33154355	4.29E-05	0.00123169
ZBED3-AS1	2.31589316	4.32E-05	0.00123676
RN7SL864P	4.67489664	4.33E-05	0.00123778
TRIM31	4.09591443	4.33E-05	0.00123778
ARL17A	-1.0936044	4.36E-05	0.00124456
DEFA3	-2.6664386	4.37E-05	0.00124456
SERPINA7	5.57029979	4.37E-05	0.00124456
MLANA	-3.8141908	4.39E-05	0.00124791
DDX18P5	-4.1002973	4.40E-05	0.00124791
FAM170B	-3.1817691	4.40E-05	0.00124791

CLCA4	7.80937593	4.40E-05	0.00124791
CTNND2	2.93539392	4.42E-05	0.00125152
ACTBP2	-1.7578942	4.43E-05	0.00125417
ABCC2	3.13968591	4.47E-05	0.00126253
CCR1	-1.0201055	4.49E-05	0.00126528
LINC00239	4.42534365	4.50E-05	0.00126615
OGDHL	5.55514919	4.50E-05	0.00126617
IGFLR1	2.21976852	4.52E-05	0.00126891
SNORD116-16	-3.7154443	4.54E-05	0.00127324
ARHGEF7-IT1	4.10938017	4.54E-05	0.00127324
LINC00900	5.79675265	4.56E-05	0.00127622
AKR1C5P	4.49462554	4.59E-05	0.0012834
NR0B2	5.70237758	4.61E-05	0.00128949
ORAI3	1.60723361	4.63E-05	0.00129227
HSP90AA4P	-4.127597	4.63E-05	0.00129227
PRICKLE2-AS3	-3.5043952	4.67E-05	0.00130105
DSG3	4.26038028	4.68E-05	0.00130147
CDC20B	3.46223277	4.72E-05	0.00131197
PABPC5-AS1	-3.1358713	4.75E-05	0.00131884
FUOM	2.21394828	4.76E-05	0.00131884
CD274	-1.118308	4.76E-05	0.00131933
SOWAHA	6.10115024	4.77E-05	0.00131967
PAX7	8.86425847	4.79E-05	0.00132386
LINC01537	-2.9227764	4.79E-05	0.00132386
CYP2G1P	2.37389842	4.82E-05	0.00133078
BMP10	5.52644736	4.84E-05	0.00133324
LINC01293	-3.0468267	4.88E-05	0.00133885
SCARNA4	-4.1076645	4.90E-05	0.00134364
LINC01393	5.30339304	4.91E-05	0.00134644
SNORA60	-3.9868673	4.94E-05	0.00135189
YWHAEP1	-2.4863096	4.94E-05	0.00135189
AMBP	5.21293792	4.96E-05	0.00135495
RNA5SP150	-3.8935638	4.98E-05	0.00135842
ZBED5-AS1	2.06761525	5.03E-05	0.0013712
ZNF563	1.15999736	5.08E-05	0.00138249
ARGFXP2	-3.5354468	5.10E-05	0.00138744
IL3RA	-3.709031	5.18E-05	0.00140679
NPIP9	-2.5060432	5.19E-05	0.00140894
ABCA11P	2.14047176	5.20E-05	0.00140894
SALL1	4.97243613	5.20E-05	0.00140894



OR2IIP	4.53043764	5.24E-05	0.00141441
NCKAP5-IT1	4.49863653	5.25E-05	0.00141441
CYP4F2	6.90108072	5.25E-05	0.00141441
GPX8	-1.1242214	5.25E-05	0.00141441
AGXT2	6.62937626	5.27E-05	0.00141874
FAM99B	5.20290893	5.30E-05	0.00142527
DIRC3-AS1	2.9386914	5.31E-05	0.00142578
NDNF	-1.2909698	5.33E-05	0.00142728
RN7SL834P	-1.5015743	5.36E-05	0.00143601
ADHFE1	1.59262227	5.38E-05	0.00143713
SORCS3	6.95259122	5.38E-05	0.00143713
NFIA-AS2	7.33835094	5.41E-05	0.00144496
LCN12	4.95634895	5.44E-05	0.00145155
IGHD	-2.6079392	5.46E-05	0.00145216
IGHV6-1	3.48601514	5.48E-05	0.00145739
RNA5SP370	-3.7704286	5.52E-05	0.00146598
DHRS1	1.02807982	5.54E-05	0.00146879
HEPACAM2	6.34628162	5.56E-05	0.00147249
KBTBD11-OT1	4.55843716	5.60E-05	0.00148233
TUBBP5	3.80339024	5.61E-05	0.00148254
FAM225A	5.80344892	5.65E-05	0.00149146
CCDC38	3.84155047	5.71E-05	0.00150699
SDR42E1	1.18071419	5.72E-05	0.00150699
SDCBPP1	-2.7896546	5.78E-05	0.00152111
CLEC19A	3.97823092	5.79E-05	0.00152149
RANP4	2.52578463	5.79E-05	0.00152149
NPBWR1	7.99181722	5.95E-05	0.00156052
LINC01285	4.06514536	5.96E-05	0.00156198
UQCRC2P1	-3.2063981	5.98E-05	0.001566
VTN	4.23064337	6.06E-05	0.00158497
RNASE13	7.00746902	6.11E-05	0.00159401
MPPED1	5.70320979	6.12E-05	0.0015955
RPS26P47	4.70973921	6.14E-05	0.00159755
ST3GAL6-AS1	2.53238228	6.15E-05	0.00159926
RFNG	1.53331666	6.17E-05	0.00160249
EPHA6	3.8054594	6.22E-05	0.00161315
PRSS3	4.30606127	6.23E-05	0.00161315
IL12A-AS1	8.35339469	6.23E-05	0.00161315
NBEAP1	4.04170817	6.31E-05	0.00162838
SLC27A5	2.19350695	6.36E-05	0.00164082

CICP14	-3.1170671	6.38E-05	0.00164357
PDE3A	-1.074316	6.41E-05	0.00165072
HERC5	-1.2456925	6.42E-05	0.001651
AK8	3.61313367	6.46E-05	0.00165868
MTND6P3	5.50336826	6.46E-05	0.00165868
SEC14L5	3.35120681	6.48E-05	0.00166221
SLC26A3	6.77951463	6.50E-05	0.00166642
RGS7	7.05448231	6.52E-05	0.00166902
AMHR2	8.93151773	6.53E-05	0.00166902
FOXA3	4.2046098	6.56E-05	0.00167466
SFRP5	5.30766286	6.57E-05	0.00167653
GCHFR	2.08113198	6.59E-05	0.00167938
MLF1	-1.1829154	6.64E-05	0.00169032
UGT2A1	7.53804814	6.65E-05	0.00169075
MT1JP	2.93221233	6.66E-05	0.00169262
LRRC9	7.51444995	6.70E-05	0.0017008
CASS4	-1.3236672	6.72E-05	0.00170421
MYEOV	3.54225509	6.80E-05	0.00172272
ZBTB9	2.66117725	6.84E-05	0.00173002
DPP10-AS1	7.4908736	6.85E-05	0.00173063
CABP4	1.96993658	6.87E-05	0.00173282
APOA5	6.61278182	6.89E-05	0.00173663
HDAC1P1	3.80324369	6.91E-05	0.00174037
PKD2L1	2.6531304	6.92E-05	0.00174173
ACAT2	-1.2979206	7.01E-05	0.00176027
SNORA71B	-1.3494191	7.01E-05	0.00176027
BEX1	-2.0455428	7.02E-05	0.00176027
URB1-AS1	2.44351727	7.05E-05	0.00176578
LINC00992	6.06993438	7.12E-05	0.00177865
NR1I2	5.58853481	7.12E-05	0.00177865
TCERG1L	6.55117427	7.15E-05	0.00178524
SLC30A10	5.46452557	7.16E-05	0.00178524
ADAMTS7P4	4.69212932	7.20E-05	0.00179382
IL21	6.59863547	7.23E-05	0.00180025
TRIM66	1.0030212	7.25E-05	0.00180309
TEX21P	2.5559359	7.28E-05	0.00180718
RNA5SP298	-3.7763147	7.28E-05	0.00180718
GOLGA2P8	3.19481321	7.30E-05	0.00180956
FAM53B-AS1	-3.701319	7.47E-05	0.00184885
NBPF8	1.10590109	7.53E-05	0.00186137

Clorf100	-2.9365691	7.56E-05	0.00186799
ELOVL3	-2.4847907	7.65E-05	0.0018877
CCDC116	4.3869004	7.72E-05	0.00190381
ENHO	8.59588247	7.77E-05	0.00191349
SLCO1B7	6.44443863	7.84E-05	0.00192855
LINC00596	5.07778512	7.85E-05	0.00192864
SAMM50P1	-3.2400047	7.89E-05	0.00193654
RNU5F-1	-3.0283936	7.91E-05	0.00193966
ADPRHL1	4.08569016	7.92E-05	0.00194236
HNF4A-AS1	4.36617941	7.94E-05	0.00194236
A1BG	3.09072021	7.94E-05	0.00194236
CLNK	4.48465884	8.01E-05	0.00195782
SLC22A16	2.51647422	8.03E-05	0.00196121
OVCH1-AS1	2.86851631	8.06E-05	0.00196724
A2ML1	4.13645901	8.09E-05	0.00197131
CNGB3	9.23276424	8.10E-05	0.00197249
KRT42P	9.89851031	8.22E-05	0.002
RGCC	-1.2785235	8.23E-05	0.002
CNBD2	2.95687223	8.35E-05	0.00202493
FGGY	1.12671687	8.45E-05	0.00204843
LINC00648	8.93040213	8.50E-05	0.00205687
SFTA1P	-1.7739681	8.51E-05	0.00205729
CCL14	3.17093021	8.59E-05	0.0020755
EYA4	-1.4253473	8.65E-05	0.00208745
PRSS21	6.24641353	8.68E-05	0.00209297
WT1	4.63006015	8.73E-05	0.00210253
LINC01206	8.56823848	8.76E-05	0.00210612
COL22A1	3.884985	8.76E-05	0.00210612
CTCFL	7.28437686	8.82E-05	0.00211776
NFAM1	1.12225833	8.83E-05	0.00211776
LINC01234	6.45185492	8.83E-05	0.00211776
RPSAP55	4.43301521	8.87E-05	0.00212412
IGF2	-1.8635113	9.02E-05	0.00215918
LINC01135	2.67276548	9.07E-05	0.00216952
KLHL33	4.28127813	9.08E-05	0.00217002
UNC80	4.41297562	9.10E-05	0.00217032
CDH9	8.14131089	9.12E-05	0.00217402
SERPINB13	4.3534824	9.19E-05	0.00218841
KCNJ1	5.34519019	9.20E-05	0.00218841
CRTAC1	-2.3004665	9.24E-05	0.00219624

LINC01435	8.57556378	9.26E-05	0.00219911
SKP1P1	-4.3230644	9.29E-05	0.00220422
ACY3	3.70748115	9.30E-05	0.00220461
APOA4	4.53465196	9.33E-05	0.00220633
RNU6-702P	-3.1664858	9.33E-05	0.00220633
SFT2D3	2.7720649	9.34E-05	0.00220633
LIFR-AS1	1.83401514	9.43E-05	0.00222492
CPO	3.50355741	9.45E-05	0.00222809
HNF1A	4.81474296	9.48E-05	0.00223452
RNA5SP389	-3.6935919	9.50E-05	0.00223523
LINC01558	3.61445268	9.54E-05	0.00224413
ZIC1	4.71332222	9.56E-05	0.00224555
TNNT2	-1.9284621	9.62E-05	0.00225849
LYPD6B	3.57525648	9.76E-05	0.00228876
DCST2	3.18883601	9.82E-05	0.00229359
CHKB	1.36163032	9.82E-05	0.00229359
SALRNA3	-3.2282507	9.84E-05	0.00229506
NUDT8	3.50967904	9.86E-05	0.00229734
SMLR1	3.97253982	9.88E-05	0.00229916
CLIC5	-1.146003	9.98E-05	0.00231938
SHBG	4.19609021	9.99E-05	0.00231938
DPP10	3.52783968	0.00010047	0.00233065
AP4B1-AS1	-3.5314324	0.00010076	0.00233528
LIPT1P1	-3.2049883	0.00010122	0.00234383
ITGA10	1.24996237	0.00010164	0.00235142
RWDD4P2	2.38759683	0.0001021	0.00235991
SMOC1	3.6103422	0.00010262	0.00236972
SLC17A3	4.58605378	0.00010327	0.00238275
APOA1	4.80063662	0.00010383	0.00239355
PNCK	5.50037725	0.00010397	0.00239386
LINC01352	5.07218406	0.00010404	0.00239386
SERPINA10	3.62758775	0.00010541	0.00242328
OTC	4.80002513	0.00010614	0.00243724
MIEN1	1.10573723	0.00010621	0.00243724
MTND1P5	-3.3456851	0.00010669	0.00244609
TMEM8B	1.23345456	0.0001069	0.00244875
RGSL1	6.85635679	0.00010707	0.00245044
NPNT	-1.2011133	0.00010739	0.00245556
CCR3	6.59643203	0.00010782	0.00246309
RNA5SP52	-3.2806102	0.0001082	0.0024697

IGFBP1	5.81435317	0.00010834	0.00247054
CCDC26	6.07611678	0.00010859	0.00247422
CA10	9.50506113	0.00010897	0.0024805
SLC13A5	4.70083757	0.00010924	0.00248218
C12orf42	6.48659465	0.00011159	0.00253345
AKR1B15	5.2586978	0.00011179	0.00253561
CDR1	-3.0382414	0.00011194	0.0025369
UGT3A1	4.63293767	0.00011235	0.00254394
CREB3L3	4.32039977	0.0001129	0.00255265
GNMT	6.26377326	0.00011294	0.00255265
CXCL9	1.86308813	0.00011329	0.00255842
SCARNA23	-3.2072479	0.00011353	0.0025616
VN1R42P	5.82567828	0.00011372	0.00256359
RUNDC3B	3.12050366	0.0001142	0.00257204
NANOG	4.63070583	0.0001143	0.00257218
CD1A	7.65960453	0.00011597	0.00260738
THEM6	1.74411034	0.00011611	0.00260817
LINC00707	3.5239403	0.00011716	0.00262717
CASP5	-2.0623023	0.00011817	0.00264758
SLC25A13	1.00028907	0.00011873	0.00265779
GPA33	4.56757959	0.00012031	0.0026884
RN7SL169P	-3.5079061	0.00012155	0.00271125
ID2	-1.0163632	0.00012175	0.00271353
NDUFS5P1	3.7009401	0.00012189	0.00271429
LINC00323	6.09330315	0.00012249	0.0027252
RPL37AP1	3.4652629	0.00012507	0.00277543
LPA	5.69318034	0.00012527	0.00277732
OFCC1	6.79381676	0.00012562	0.00277913
NR1H4	5.0962195	0.00012566	0.00277913
NDST3	6.5493932	0.00012568	0.00277913
REEP6	3.00814001	0.00012606	0.00278286
CELF5	5.70260793	0.00012628	0.00278515
LAMP5	5.93976323	0.00012668	0.00279161
SLC7A10	6.83703578	0.00012685	0.00279304
ARPP21	4.13165462	0.00012721	0.0027985
KCNJ3	7.69243493	0.00012738	0.00279986
SOWAHC	-1.094742	0.00012913	0.00283352
ABCC3	1.20487569	0.00013009	0.00284635
TUBB2B	2.61619492	0.00013016	0.00284635
RPL7P23	3.05710571	0.00013025	0.00284635

SYT4	7.59604851	0.00013028	0.00284635
C9orf163	4.06761418	0.00013048	0.00284815
SNORD116-15	-3.7519848	0.00013076	0.00284901
NCR3	6.57580478	0.00013086	0.00284901
OXLD1	1.14204723	0.00013106	0.00284901
ZEB2P1	7.83535258	0.00013107	0.00284901
SLCO1A2	4.44978278	0.00013161	0.00285834
CACNA1F	3.10220451	0.00013264	0.00287632
HNF4G	4.486304	0.00013266	0.00287632
FABP5P2	-3.2178629	0.000133	0.00288132
EGR4	-2.6493837	0.00013359	0.00288582
ANKRD18B	2.94339485	0.00013372	0.00288582
MTHFD2P1	7.9142151	0.00013383	0.00288582
OR51E2	9.98994003	0.00013383	0.00288582
GPR22	-2.6038319	0.00013388	0.00288582
LY6G6F	-2.6363515	0.00013389	0.00288582
HTR1DP1	-3.5225538	0.00013505	0.00290696
OIT3	5.22982182	0.0001351	0.00290696
EDNRB-AS1	4.03959952	0.00013544	0.00291192
RPL23AP23	-3.7680687	0.00013582	0.00291749
PPP1R26-AS1	2.4191631	0.00013597	0.00291835
KRT17P4	5.17196079	0.00013657	0.00292768
ZNF683	6.64418156	0.00013664	0.00292768
HIF1AP1	4.25028388	0.00013681	0.00292897
UBE2MP1	-2.2968881	0.00013832	0.00295629
RN7SL664P	-2.9113763	0.0001389	0.00296425
SLC4A10	2.75761692	0.00013892	0.00296425
OR5A1	7.54344722	0.0001393	0.00296482
MIXL1	6.22190742	0.0001401	0.00297704
RRH	2.27560695	0.00014049	0.00298038
ARRDC1-AS1	1.19584254	0.00014152	0.00299968
FAM30A	3.67275354	0.00014324	0.00303353
MAGIX	1.84787148	0.00014419	0.00305121
HEPACAM	5.37177391	0.00014482	0.00306189
AQP6	6.19162549	0.00014583	0.003077
SLC26A11	1.17862407	0.00014597	0.003077
LDHD	2.69422534	0.00014601	0.003077
LINC00683	3.30553675	0.00014815	0.0031195
LY6G6E	-4.1752386	0.00014984	0.00314599
TNFRSF11B	-1.5249682	0.00014989	0.00314599

UGT1A6	4.1144083	0.00014991	0.00314599
CALML3-AS1	8.6631812	0.00015001	0.00314599
PTPRH	3.43391578	0.00015025	0.00314599
ACTN3	5.30964465	0.00015026	0.00314599
SLC22A1	4.28352054	0.00015027	0.00314599
RTKN2	-1.562132	0.00015051	0.00314768
LINC00574	5.99995916	0.0001506	0.00314768
RANP8	3.95711504	0.00015077	0.00314862
CD19	4.09372845	0.00015152	0.00315769
PXT1	6.50378863	0.00015157	0.00315769
KCNF1	-2.5838035	0.0001517	0.00315769
RGS13	-2.3233493	0.00015281	0.00317626
TRIM15	5.18602371	0.00015284	0.00317626
TOB1-AS1	3.55744378	0.00015313	0.00317794
SNORA13	-2.1349876	0.00015317	0.00317794
KCNG2	-2.7139568	0.00015356	0.00318353
PROKR1	7.30015631	0.00015375	0.00318484
TCL6	6.86555535	0.00015492	0.00320648
PLA2G4E-AS1	8.43968862	0.0001562	0.00322782
TBX15	3.30492012	0.00015688	0.00323913
RPL7P49	2.35508953	0.00015759	0.00325118
SETP20	6.55057195	0.00015836	0.00326328
OR2A20P	3.21903223	0.00015843	0.00326328
SULT2A1	6.6400351	0.00015896	0.00326892
SLC25A41	5.12532453	0.00015896	0.00326892
ALDH8A1	3.26362037	0.00015921	0.00327133
CTNNA3	4.22474062	0.00015966	0.00327674
GABRR3	6.52139491	0.00015972	0.00327674
GAPDHP23	6.43535419	0.00016035	0.00328699
MYO7A	1.298399	0.00016245	0.00332716
NKAIN2	5.79352266	0.00016257	0.00332716
ERICH6	3.79018325	0.00016313	0.00333597
CSPG4P13	4.42486571	0.00016392	0.0033479
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DCT	3.60399514	0.00016411	0.0033479
SCARNA8	-1.9813199	0.00016581	0.00337696
GATA4	4.45820129	0.00016602	0.00337696
CAPN12	2.58682792	0.00016606	0.00337696
CNDP1	4.1787381	0.00016621	0.00337728
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ANXA10	3.72603924	0.00016731	0.00339141
LOH12CR2	2.93223615	0.00016753	0.00339242
GET4	2.01226638	0.00016917	0.00341824
PCYOX1L	1.05948432	0.00017061	0.00344469
SIAH3	7.76250061	0.00017086	0.00344668
NKAIN3	3.99950653	0.00017111	0.00344668
MIR3609	3.16254144	0.0001715	0.00345126
SCTR	2.47310563	0.00017277	0.00346903
NPIP8	3.59384119	0.00017301	0.00347125
MT-TH	-3.2545465	0.0001737	0.00348231
ACSM2A	5.21939998	0.00017473	0.00349746
TEX22	3.32479536	0.00017521	0.00350268
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CXorf58	5.8185407	0.00017547	0.00350268
POTEKP	5.96271995	0.00017554	0.00350268
CPN1	5.1378839	0.00017691	0.00352693
LINC00917	9.03168231	0.00017703	0.00352693
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OR13C1P	7.16677058	0.00017997	0.00356594
PRSS53	2.05850424	0.00018053	0.00357256
KIR2DS4	6.11680925	0.00018058	0.00357256
EFNA3	2.87412212	0.00018131	0.0035842
LY86-AS1	4.30176939	0.00018196	0.00359439
PLEKHF1	1.20895781	0.0001823	0.00359682
FTCD	4.13951483	0.00018237	0.00359682
RNU2-6P	-2.6165081	0.0001832	0.00361035
SLC30A8	6.28514406	0.00018368	0.00361712
GLIPR1L2	3.79684627	0.0001845	0.00363039
LRRC2-AS1	7.6717237	0.0001849	0.00363552
KRT18P37	4.73397573	0.00018528	0.00363633
CHI3L2	-1.8195925	0.00018531	0.00363633
CYP4F22	4.79962948	0.00018537	0.00363633
LINC00939	5.48917427	0.00018563	0.00363786
CRHBP	3.3561704	0.00018573	0.00363786
IGHV4-4	4.68572642	0.00018633	0.0036468
GRHL3	3.29966015	0.00018679	0.00365025



IL23R	5.5379356	0.00018679	0.00365025
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CYP2D8P	3.27955878	0.00018937	0.00368651
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ILF2P1	-3.6901627	0.00019181	0.00372477
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MIR5687	2.63099143	0.00019251	0.00373258
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TRAV14DV4	6.11124984	0.0001935	0.00374687
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FEM1A	1.28590052	0.00019513	0.00376425
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VTRNA1-1	-3.8186728	0.00019726	0.00379654
SCARNA22	-3.609903	0.0001974	0.00379654
DTX1	2.64038189	0.00019772	0.00379988
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EPPIN	7.09476412	0.00019958	0.00382425
TRAV19	5.8145954	0.00020121	0.00384955
CATSPER2P1	1.54873044	0.00020227	0.00385979
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OPRM1	7.62068118	0.00020509	0.00389265
ADAMTS20	7.20845759	0.00020514	0.00389265
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SNORA2B	-2.0838648	0.00024289	0.00440286
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DPEP3	6.8498173	0.00024346	0.0044049
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EYA2	1.54972315	0.00024372	0.0044054
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KCND3-IT1	2.98343871	0.00024642	0.0044416
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CDHR2	4.99184313	0.00024866	0.00446799
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F12	3.98095669	0.00024889	0.00446799
EEF1DP4	5.7766954	0.00024893	0.00446799
CSPG4P11	3.74888378	0.00024968	0.00447821
LINC01320	5.64378487	0.00025226	0.00452014
PKHD1	3.67786079	0.00025237	0.00452014
PDIA2	6.75366113	0.00025323	0.00452503
KCNJ10	4.39412448	0.00025326	0.00452503
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MMP7	2.95361088	0.00025789	0.00458314
PRODH2	4.72942809	0.00025819	0.00458314
CES2	1.02478329	0.00025842	0.00458346
PLCXD2	1.42365975	0.00026004	0.00460905
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ADCK1	1.09123096	0.00026065	0.00461043
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PINK1-AS	1.09849616	0.00026252	0.00463049
OSTN	6.7445918	0.00026303	0.00463633
ASPDH	3.08679225	0.00026399	0.00464683
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MT1H	4.08623765	0.00027891	0.00482717
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HCG14	5.69148519	0.00027989	0.00483902
OVGP1	1.88452089	0.00028002	0.00483902
VWCE	3.31047124	0.00028087	0.00485036
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KCNH1	5.36104737	0.00028475	0.00490743
ABCC12	5.38603768	0.00028506	0.0049095
FSHR	8.44518688	0.00028537	0.00491156
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TSLP	-1.4257598	0.0002913	0.00498995
LINC01222	7.33109643	0.00029225	0.00500294

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SETP2	5.53986032	0.00029739	0.00506805
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C20orf202	3.38151214	0.00029791	0.00507265
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C2CD4D	-2.5393627	0.00030925	0.0052343
SIRT4	2.1030351	0.00031036	0.00524188
SLC17A7	3.61624745	0.00031054	0.00524188
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TSPEAR	5.87166506	0.00032126	0.00538757
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SIGLEC8	3.19018367	0.00032823	0.00548639
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TESC-AS1	6.90868718	0.00033215	0.00553035
TMEM262	-3.4826672	0.00033242	0.00553123
GALNT8	2.74127803	0.00033408	0.0055536
DUSP9	2.88096114	0.00033568	0.00557094
ZNRF2P2	2.20917336	0.00033772	0.00560107
TDRD1	3.57350443	0.00033806	0.00560304

SNORA77	-1.9540349	0.00033861	0.00560866
TRAV8-3	6.33808821	0.00033974	0.00562367
CYP4F3	2.32455871	0.00034091	0.00563942
GNGT1	8.24566716	0.00034159	0.00564699
LMF1-AS1	-2.606948	0.00034233	0.00565185
ANKS4B	3.94620427	0.00034325	0.00566344
RNA5SP39	-2.7727141	0.00034399	0.00567192
MROH2A	5.70169051	0.00034537	0.0056874
TSACC	6.44654492	0.00034937	0.00574821
MYRFL	3.28392195	0.00034952	0.00574821
CES3	2.93019082	0.00035077	0.00576511
CYP4F10P	3.5866706	0.00035153	0.00577251
PWRN1	2.52133108	0.00035167	0.00577251
UPF3AP2	-2.5746298	0.00035264	0.00577718
RNA5SP126	-3.0116939	0.00035324	0.00577718
SERPINF2	2.00281935	0.00035331	0.00577718
KLK3	9.22719947	0.00035401	0.00578491
LINC00326	8.73422771	0.0003556	0.00580717
OSR1	-1.21008	0.0003566	0.00581968
UMODL1-AS1	6.44072948	0.00035872	0.00585061
IGFL4	7.97407859	0.00035963	0.00586164
STC2	-1.0627569	0.00036112	0.0058821
ASGR1	2.75290934	0.00036134	0.0058821
HSPA6	-2.2954017	0.00036178	0.00588404
ZMAT4	7.63182815	0.00036209	0.00588404
MAST1	3.90824083	0.00036215	0.00588404
LMX1A	7.72247957	0.0003637	0.00589214
PACRG-AS1	6.90328507	0.00036375	0.00589214
GMNC	3.99820377	0.00036422	0.00589214
GRIK1-AS1	3.4323141	0.00036426	0.00589214
GCGR	5.04467374	0.00036471	0.00589562
GEMIN8P2	6.86716452	0.00036589	0.00590235
KIF28P	7.36052397	0.00036594	0.00590235
PLCH2	1.80371128	0.00036595	0.00590235
KRTAP5-9	4.10721191	0.00036605	0.00590235
LYPD8	8.78128531	0.00036666	0.00590841
RBP2	5.84641641	0.00036693	0.00590911
PDE6G	3.12486047	0.00036732	0.00591154
LINC01360	8.82660436	0.00036832	0.00591941
CELF6	3.90532303	0.0003685	0.00591941

RN7SL19P	2.99207449	0.00036925	0.00592767
CBLN1	5.63336926	0.00037261	0.00597209
ISCA2P1	-2.8627167	0.00037271	0.00597209
PAQR9	4.86451557	0.00037412	0.00599089
LINC01342	6.27926524	0.00037454	0.00599389
RNA5-8SP6	-3.4451346	0.00037612	0.00601163
OR5A2	8.11613492	0.00037704	0.00601937
DNAJC9-AS1	3.89112172	0.00037708	0.00601937
OR10AB1P	5.98339328	0.00037764	0.00602315
C6orf52	4.29777398	0.00037779	0.00602315
KRT24	9.02742262	0.00037864	0.00603299
SLC31A2	1.02678804	0.00038064	0.00605537
NYX	8.59605069	0.00038065	0.00605537
BARX2	6.86695483	0.00038195	0.0060705
ANKRD66	5.31116413	0.00038247	0.00607161
HMGB3	1.30677064	0.00038278	0.00607161
RNU6-570P	3.3248235	0.00038297	0.00607161
CROCCP2	1.06693944	0.00038341	0.00607192
LINC00320	6.36653684	0.00038357	0.00607192
RN7SL362P	2.53803485	0.00038394	0.00607197
RCBTB2P1	7.38332936	0.00038462	0.006079
LINC01581	8.09675211	0.00038497	0.00608076
UROC1	5.17080125	0.00038747	0.00611258
HSPD1P7	8.88144062	0.0003886	0.0061267
FRMPD1	4.9438286	0.00038949	0.00613343
OR56A4	8.18554433	0.0003899	0.00613586
RNU6-4P	-3.0334453	0.0003908	0.00614625
FOLH1B	3.97001913	0.00039249	0.00616903
AOX3P	2.88450705	0.00039317	0.00617375
RHEBP2	2.55783687	0.0003933	0.00617375
PRKAG3	8.6697069	0.00039352	0.00617375
VWC2L	7.20073135	0.00039443	0.00618145
RNA5SP429	-3.2899126	0.00039468	0.00618145
AGXT	5.11339231	0.00039474	0.00618145
GJD3	2.54004121	0.00039543	0.0061885
FITM1	2.44460355	0.00039743	0.00621226
ABHD11-AS1	4.39756957	0.00039938	0.00623006
CYP2D6	3.26419522	0.00039952	0.00623006
HPCAL4	3.84996178	0.00039968	0.00623006
OXCT2	3.24732102	0.00039998	0.00623006

ANTXRL	6.17420254	0.00040004	0.00623006
AMACR	1.82958133	0.00040084	0.00623498
SNORD114-14	-2.9638235	0.00040288	0.00626297
DLGAP1-AS3	4.52683917	0.00040425	0.00628035
MFSD3	2.19377814	0.00040485	0.00628593
HSPH1	-1.3171278	0.00040833	0.00633223
DDC	4.77027365	0.00041184	0.00637893
SLC18A1	7.99231421	0.00041264	0.0063822
RGR	7.6363854	0.00041292	0.0063822
ZBED1P1	8.07837337	0.00041338	0.0063822
IGKV2D-24	8.64277061	0.00041347	0.0063822
IAPP	5.28584613	0.00041355	0.0063822
CTXN2	7.70321939	0.00041516	0.0064007
SDR9C7	6.22376284	0.00041553	0.0064007
MMP11	2.93765505	0.00041588	0.0064007
TRAV4	4.99708506	0.00041591	0.0064007
IGKV1D-12	5.70603173	0.000416	0.0064007
MYLK-AS2	-2.9752904	0.00041979	0.00644727
LINC01551	6.66951355	0.00042103	0.00645861
GAPDHP37	6.62497795	0.0004218	0.00646646
LINC01310	7.66160548	0.00042658	0.00653196
HAMP	4.09284749	0.00042693	0.00653346
NUTM1	7.43355414	0.00042913	0.00655581
CD300E	-1.117535	0.00042917	0.00655581
LBP	3.66280713	0.00042963	0.00655896
GADD45G	1.73049548	0.00043062	0.00656823
ANTXRLP1	3.16388852	0.00043075	0.00656823
PGLYRP2	5.59538464	0.00043283	0.00659437
CFHR4	3.88985168	0.00043298	0.00659437
CCDC63	-2.6013656	0.00043489	0.00661016
KCNQ2	6.29922839	0.00043505	0.00661016
DNAJB1	-1.1654408	0.00043621	0.00662383
FAM83A-AS1	4.44263801	0.00043752	0.00663978
CNTN5	5.63638875	0.0004392	0.00666133
CD244	1.56867099	0.00044034	0.00667457
UGT1A7	4.83123742	0.00044184	0.00669335
CLCA3P	7.42866511	0.0004431	0.00670851
CD5L	4.9099873	0.00044607	0.0067495
SNHG9	-1.1902303	0.00044661	0.00675301
ACVR2B-AS1	2.05390026	0.0004471	0.00675301



ANKRD26P4	2.44060309	0.00044886	0.00677206
FAM21FP	2.72942046	0.00044889	0.00677206
BAAT	3.43470167	0.00045018	0.00678722
LINC01095	8.8397516	0.00045043	0.00678722
EFNA2	3.57434288	0.00045115	0.00679407
TRDN	5.5477774	0.00045221	0.00680375
LEF1-AS1	4.34277822	0.00045232	0.00680375
NLRP13	8.21045441	0.00045632	0.00685457
OR4M1	7.16575487	0.00045651	0.00685457
RYR2	-1.114937	0.00045795	0.00687168
POU4F1	5.61239364	0.00045818	0.00687168
METTL15P1	2.44086705	0.00046053	0.00689842
PPIL1P1	-2.5264027	0.00046078	0.00689842
RPL26P9	-3.0285261	0.0004613	0.00690227
ACADS	1.64387197	0.00046181	0.00690575
LINC01186	3.78662746	0.00046242	0.00691084
ABCG8	5.6085165	0.00046279	0.00691235
CFHR1	3.63458107	0.00046464	0.00693555
RIMBP2	4.22657125	0.00046489	0.00693555
HMGN2P47	3.81467144	0.00046547	0.00694023
SMARCE1P6	3.50302392	0.0004676	0.00696232
OR13A1	4.85487719	0.00046777	0.00696232
SORD	1.44709082	0.00046865	0.00697141
CBLN2	8.4660362	0.00046919	0.00697535
GRIA2	4.98453979	0.00047159	0.00700694
GAPDHP62	3.61537197	0.00047387	0.00703256
RN7SKP154	2.86508069	0.00047557	0.00704971
ZNF571-AS1	2.27877001	0.0004764	0.00705784
LINC01102	7.45099758	0.00048153	0.00712558
FRAT1	1.3352613	0.00048207	0.00712943
REG4	7.3464222	0.00048406	0.00715472
MDS2	4.13707891	0.00048502	0.00716476
NDST4	6.81093373	0.00048586	0.0071721
RPSAP8	-2.7740416	0.00048618	0.0071721
CNTNAP4	6.71017911	0.00048684	0.0071721
LINC01204	6.25160189	0.00048693	0.0071721
ZIC5	8.55696199	0.0004872	0.0071721
LINC01449	4.30715911	0.00048751	0.00717246
SALL4P7	6.99879157	0.00049002	0.00720148
DHRS3	1.07430966	0.00049068	0.00720263

OCM	3.42956766	0.00049168	0.0072131
TNNT1	-2.0704083	0.00049229	0.00721786
CALR3	7.54993068	0.0004942	0.0072418
MST1	2.22107657	0.00049543	0.00725555
ELFN1	2.53667363	0.00050105	0.00732951
ACBD4	1.2112152	0.00050134	0.00732951
ST3GAL1P1	-2.8539066	0.00050282	0.00734697
FABP7	6.13599783	0.0005048	0.00737163
ITLN1	2.72048374	0.00050659	0.00739358
WDR72	3.09044902	0.0005077	0.00740563
SERPINC1	3.73892477	0.00050881	0.00741336
RHBDL1	3.19931135	0.00050919	0.00741454
NYAP1	2.91073692	0.00051078	0.00742954
HK2P1	-2.0976697	0.0005108	0.00742954
SLC22A25	6.08703137	0.0005125	0.00744577
HAO1	4.60705548	0.00051293	0.00744777
SLC17A2	4.36427178	0.00051425	0.00745965
CRISP1	7.71373608	0.00051501	0.00746537
MYZAP	-1.5695563	0.00051566	0.00747049
RN7SL12P	3.55399188	0.00051689	0.00747977
PIGZ	1.54858165	0.00051796	0.007491
SHPK	1.47316508	0.00051978	0.00751306
HAND2	3.75589585	0.00052076	0.00752306
PTCD1	1.04094858	0.00052222	0.00753993
GYS2	4.34680674	0.00052296	0.00754053
ETF1P3	-2.3943563	0.00052315	0.00754053
PCNPP5	4.77945157	0.00052376	0.00754497
CARD17	5.1613291	0.00052576	0.00756719
LRRC37A5P	6.81999337	0.00052603	0.00756719
TMC3-AS1	3.39037103	0.00052737	0.00757561
RN7SL297P	3.01757306	0.00052809	0.00758176
RPS3P1	3.47537642	0.00052883	0.00758819
GABRB1	6.91094058	0.00053238	0.00763477
AMPD1	4.30058948	0.00053367	0.00764449
NBPF17P	6.58787131	0.00053383	0.00764449
GGTLC1	-2.0704528	0.00053396	0.00764449
ADAM29	6.80445302	0.00053558	0.00766344
CDH13	-1.0236256	0.00053635	0.00767016
PSMC1P1	-1.5756489	0.0005382	0.00769225
RN7SL472P	-2.8799838	0.00053944	0.00770567

HID1-AS1	4.66754056	0.00054115	0.00772582
SNAP91	6.64139011	0.00054228	0.00773512
FCAMR	4.28006809	0.00054241	0.00773512
BAK1P1	2.97682683	0.00054389	0.00774756
ADAMTSL1	1.1186524	0.00054782	0.00779922
ROBO2	-1.0814959	0.00054888	0.00781
KLK15	6.68317666	0.00055024	0.00782503
SLC6A19	4.53772223	0.00055088	0.00782973
CYP2C19	4.72832747	0.00055127	0.00783088
SLC25A45	1.15213408	0.00055232	0.00784144
KCNK9	6.26580611	0.00055505	0.0078759
TRGV2	6.71134827	0.00055576	0.00788151
C3orf80	2.97541684	0.00055658	0.0078888
OR2L1P	8.32074263	0.00055714	0.00789233
CPA4	4.68810419	0.00055765	0.00789526
TCEA1P4	2.13045653	0.00055843	0.00790008
C4orf17	8.53927293	0.00055861	0.00790008
WNT10B	4.00663247	0.00055973	0.00791143
SEC1P	5.31172679	0.00056225	0.00794275
PURG	3.30183815	0.00056511	0.00797869
FMO9P	7.36622573	0.00056547	0.00797935
SLC6A13	4.82912801	0.00056798	0.0080104
ASN3P3	4.31486286	0.00056865	0.00801537
RALYL	4.44145715	0.00056947	0.00802247
SLC17A1	3.96150573	0.00057004	0.00802611
MIR762HG	1.48280867	0.00057066	0.00803036
GLYAT	5.58151852	0.00057316	0.00805229
LINC00242	4.22121892	0.00057384	0.00805398
LHX8	6.46782983	0.00057391	0.00805398
LINC01588	1.65280219	0.00057552	0.00807208
FAM217A	8.63658736	0.00057868	0.00811207
IL22RA2	7.29120064	0.00057924	0.00811543
RN7SL735P	2.13686673	0.00058041	0.00812733
TIFAB	6.11312729	0.00058338	0.00816447
PGK1P2	3.81312518	0.0005843	0.0081728
SPATA31D5P	9.14263796	0.00058676	0.00820271
LINC00547	7.63329292	0.00058721	0.00820383
POU3F4	6.35927057	0.00058748	0.00820383
C9	3.95444965	0.00058839	0.00821203
LINC00968	2.93032735	0.00058998	0.0082297

PDZRN4	2.94482656	0.00059101	0.00823639
MROH9	-2.1913046	0.00059137	0.00823639
GUCY1B2	-2.4164299	0.00059142	0.00823639
KLHL10	5.38273458	0.00059255	0.00824579
RN7SKP245	4.17958644	0.00059274	0.00824579
LINC00426	1.69668931	0.00059492	0.00827153
SALL4	3.09278588	0.00059693	0.00829159
MLIP-IT1	4.7685384	0.00059701	0.00829159
UGT2B15	6.29350924	0.00059786	0.00829886
UGT2A3P7	5.77032286	0.00060315	0.00836068
GOLGA6L6	8.62032668	0.00060354	0.00836068
RFPL4B	7.79015827	0.00060366	0.00836068
C21orf62-AS1	1.58302032	0.00060395	0.00836068
NCLP2	7.1808985	0.00060574	0.00838092
HMGB3P1	7.84477627	0.00060643	0.00838591
TCL1A	4.75278298	0.00060747	0.00839583
PIGHP1	-2.5340722	0.00060983	0.00842387
RNU7-195P	2.31590948	0.00061077	0.00842657
GOT2P1	4.3536782	0.0006109	0.00842657
CTNNA2	6.32570152	0.00061116	0.00842657
SRRM1P3	-3.2186702	0.00061191	0.00842657
CBX8	1.06958833	0.00061191	0.00842657
SNORD116-1	-3.1331282	0.00061201	0.00842657
CCDC73	2.74631351	0.0006136	0.00844396
SLC26A4	-2.2184405	0.00061458	0.00845283
PDE6H	6.86364158	0.00061528	0.008458
OR2X1P	-2.6608298	0.00061628	0.00846718
SOAT2	3.97361902	0.00061675	0.008469
GTF2IP1	1.33355878	0.00061715	0.00847004
SNORD8	-3.1494335	0.0006179	0.0084757
HECW1-IT1	6.24333521	0.00061857	0.0084803
LINC01289	7.81646762	0.00062202	0.00851995
ACTC1	4.05083395	0.00062213	0.00851995
CRHR2	5.91800658	0.00062254	0.00852108
LINC01483	6.02316375	0.00062485	0.00854807
PRR18	4.24311433	0.00062692	0.00856034
DAZAP2P1	2.6059539	0.00062709	0.00856034
MMP13	4.22098759	0.00062882	0.0085749
NELL1	5.82404824	0.00062918	0.00857522
C10orf62	4.98819049	0.00062976	0.00857851

SLC17A6	7.64378738	0.00063017	0.00857953
GRID2	6.21436042	0.00063126	0.00858979
SNORD116-8	-3.2266715	0.00063296	0.00860405
STEAP2-AS1	2.83771733	0.00063437	0.00861827
GCG	6.58152005	0.000636	0.00863002
AGER	-1.0867739	0.00063602	0.00863002
RNU6ATAC18P	3.16157396	0.00063624	0.00863002
HOXD4	5.56294975	0.00063844	0.00865522
LCE3D	-2.6600406	0.00063994	0.008671
TAS2R10	2.53269707	0.00064201	0.00869405
USP29	8.53309605	0.00064274	0.00869498
CTAGE12P	4.24086923	0.00064445	0.00871111
VWDE	2.22504306	0.00064792	0.00874948
MST1P2	3.92132898	0.00064814	0.00874948
UBE2F-SCLY	4.79997571	0.00064889	0.00875506
FTH1P1	-2.6195949	0.00064995	0.00875898
SCARNA12	-4.1153207	0.00065029	0.00875898
UGT2B17	5.03655923	0.00065076	0.00875898
PAX3	4.77900139	0.00065333	0.00878713
CDK5R2	-2.7370858	0.00065415	0.00879353
LINC01152	5.38038784	0.00065595	0.00880838
FSCN1P1	-2.784251	0.00065675	0.00881456
OR2M4	8.36309987	0.00065782	0.00882427
GJA1P1	-2.2748807	0.00066094	0.00884861
ADCY5	1.07133434	0.0006612	0.00884861
CDH7	6.10341653	0.00066123	0.00884861
AZGP1P2	4.53796483	0.00066137	0.00884861
LINC00920	3.37190991	0.00066182	0.00885009
ZIC3	7.52680456	0.00066375	0.00887121
ZIC4	4.34471442	0.00066587	0.00889024
CLECL1	3.15107568	0.00066669	0.00889651
SHISA3	-1.57894	0.0006682	0.00890738
GPR87	5.86813335	0.00066868	0.00890909
RPL7AP66	3.03866604	0.00067084	0.00893324
RPL7L1P2	2.34619516	0.0006714	0.00893608
CHRNA4	5.13355013	0.00067336	0.00895742
CYP3A43	4.08873252	0.00067599	0.0089877
SPECC1L-ADORA2A	2.7963563	0.00067746	0.00900255
UBD	2.70231312	0.00067884	0.00901331

TMEM215	6.49304944	0.00067897	0.00901331
LINC00943	6.14035446	0.00067987	0.00902053
RPS26P3	-2.6028464	0.00068098	0.0090301
ZNF831	1.39083736	0.0006813	0.0090301
UMODL1	4.13558963	0.00068328	0.00905164
SETP5	-2.8343042	0.00068468	0.0090655
GAD2	6.14054289	0.00068503	0.0090655
FARP1-AS1	4.51832544	0.00068553	0.00906738
SPHK2	1.124853	0.00068633	0.00907333
CD300LD	-2.4627929	0.00068967	0.00911271
RPL21P7	-2.6579874	0.0006911	0.00912684
CLEC3B	-1.0050471	0.00069431	0.00916451
WT1-AS	4.33581871	0.00069492	0.0091678
DHODH	1.03369389	0.00069835	0.00920838
PHKA1P1	2.93836965	0.00069901	0.00920838
RFPL4A	5.87770371	0.00069907	0.00920838
TMEM53	1.09897371	0.0007025	0.00923299
PAX1	7.03202807	0.00070288	0.00923299
TET1P1	8.06709672	0.00070346	0.00923299
RNF165	1.52040948	0.00070599	0.00925827
G6PC2	5.76930865	0.00070733	0.00926932
RN7SL623P	4.6680282	0.00070983	0.00929737
RNU7-45P	2.46318815	0.00071064	0.00930312
MC4R	8.16716137	0.00071138	0.00930808
CTXN3	8.53906738	0.00071293	0.00931883
ELAVL4	5.65425581	0.00071424	0.00932633
NSUN5P1	1.00327869	0.00071555	0.00933432
TMCO5A	5.3985301	0.00071558	0.00933432
ZNF365	-1.596482	0.00071615	0.00933676
C12orf56	6.21053517	0.0007165	0.00933676
MAST4-IT1	3.34748761	0.00071712	0.00934005
CHORDC1	-1.0526426	0.00071891	0.00935865
RLIMP1	-2.9664913	0.00071977	0.00936508
HABP2	3.79574995	0.00072197	0.00938889
LINC01182	4.65123728	0.00072235	0.0093891
SIRPD	4.85505856	0.00072349	0.0093976
ABCA17P	3.10239554	0.00072376	0.0093976
CA3	-1.1897391	0.00072643	0.00941343
PMS2P4	1.20221448	0.00072872	0.00943524
ESPN	3.12766524	0.00072886	0.00943524

OR2F1	5.17097073	0.00073101	0.00945835
LINC01579	6.55972851	0.00073212	0.00946789
DSG2-AS1	4.53517584	0.00073403	0.00948774
LILRA4	6.53173429	0.00073577	0.00950045
RN7SL555P	-2.9044348	0.00073594	0.00950045
MRM1	1.61213587	0.00073684	0.00950045
LRFN2	8.93791642	0.00073687	0.00950045
C14orf180	3.7513119	0.00074197	0.00956069
CCT4P2	2.25083102	0.00074229	0.00956069
RGPD4	2.3566659	0.00074506	0.00959158
RAET1L	7.49676675	0.00074615	0.00960069
EQTN	3.16697841	0.00074853	0.0096217
FASN	1.20624132	0.00075013	0.00963319
RNU6-1	-3.157766	0.00075086	0.00963319
NKAIN4	5.54860609	0.00075104	0.00963319
MACROD2-IT1	2.24034636	0.00075131	0.00963319
CLCN3P1	2.71334635	0.00075382	0.00966045
CPB2	3.53106591	0.00075692	0.0096905
ZNF962P	7.81263517	0.00075892	0.00970819
TBX18	1.83032227	0.00076106	0.00971797
OR7E115P	5.49417801	0.00076161	0.00971797
FAM177B	2.20572418	0.0007619	0.00971797
LINC00645	6.70915825	0.00076555	0.00974981
L1TD1	-1.5240389	0.00076575	0.00974981
ARHGAP36	8.43290645	0.00077587	0.00986882
LYG1	1.74133558	0.00077709	0.00987668
RN7SKP2	4.19900244	0.00077765	0.00987668
TOPAZ1	6.89124462	0.0007782	0.00987873
MYOM1	1.52985685	0.00077929	0.00988763
SPSB3	1.81785102	0.00078018	0.00989406
CMTM2	2.79452204	0.00078122	0.00990236
ATF4P4	3.01479908	0.00078211	0.00990379
ZSCAN4	6.20727924	0.00078271	0.00990639
ABCG5	4.40155623	0.00078341	0.00991036
OR9K1P	5.97950519	0.00078536	0.00992525
TMEM151A	6.43307111	0.00079363	0.01002477
RPL5P28	7.59618178	0.00079634	0.0100491
FIBIN	-1.4303224	0.00079711	0.01005384
SNORD93	-1.8704647	0.00079811	0.0100615
EIF4BP5	-2.9790724	0.00080371	0.01012587

PSMA8	7.52642707	0.00080401	0.01012587
CICP11	-2.7871879	0.00080447	0.01012669
RNU6-853P	1.81577779	0.00080727	0.01015686
SLC5A12	4.01444238	0.00080871	0.01016934
LINC00303	-2.6993693	0.0008095	0.01016934
CD27	2.92618332	0.00081141	0.01018243
AKR1C6P	3.29877618	0.0008122	0.01018374
HNF1A-AS1	4.0015455	0.00081355	0.01019567
MIR5690	2.54634383	0.00081437	0.01019739
ENTPD2	3.26188735	0.00081502	0.01019908
MIR3173	4.20068607	0.00081613	0.01020796
ATP8A2P2	-2.9256354	0.00082266	0.01028464
MTND1P14	7.24041935	0.00082496	0.01030833
RDH16	3.26622269	0.0008277	0.01033749
XYLB	1.06332512	0.00083209	0.01038736
WFIKKN2	7.70093246	0.00083277	0.0103907
TRDC	3.45054384	0.0008339	0.0103997
LGALS8-AS1	4.06535012	0.0008354	0.01041231
SNORD66	-2.2143987	0.00083572	0.01041231
DEFB4B	-2.4474724	0.00084131	0.01046288
TARDBPP2	6.913389	0.00084169	0.01046288
DGCR5	3.23549269	0.00084183	0.01046288
UPP2	3.57672571	0.00084275	0.01046916
IGKV2D-40	4.9780638	0.00084346	0.01047136
HYAL4	6.31977663	0.00084374	0.01047136
DHRXS	-3.1107172	0.00084663	0.01050204
TICAM2	1.98083555	0.00084785	0.01050703
RN7SL333P	3.77043434	0.00084973	0.01052524
TLR8-AS1	5.49614877	0.0008539	0.01056976
LINC01087	6.41756635	0.00085904	0.01061477
LINC00558	6.77533356	0.00086131	0.01063369
RXFP2	5.73705917	0.0008614	0.01063369
ASIC2	4.36702999	0.00086335	0.01064741
DSC3	2.28009605	0.00086682	0.01068512
SLC5A11	3.80753198	0.00086871	0.01070321
LINC01120	6.8727047	0.00087004	0.0107144
LINC00525	4.19398025	0.00087075	0.01071801
ZPLD1	3.465197	0.00087159	0.01072311
RN7SKP26	2.54750066	0.00087202	0.01072328
NRBP2	1.01422668	0.00087422	0.01073162



MOGAT3	4.13736752	0.00087424	0.01073162
DCTN1-AS1	-2.7596974	0.00087438	0.01073162
RPSAP6	2.76324892	0.00087606	0.01074714
OR6B1	4.49815048	0.00088019	0.01078044
CLCNKB	4.40989323	0.00088047	0.01078044
TBCAP1	-2.3160395	0.00088238	0.01079875
PLXDC1	1.29864308	0.0008837	0.01080673
CAMK2B	3.04561599	0.00088388	0.01080673
RIMBP3B	-2.7917254	0.00088476	0.01081227
C9orf153	2.02558846	0.0008852	0.01081243
TAT-AS1	3.1023477	0.00089087	0.01087648
DSG1	5.00629903	0.00089311	0.01089078
UGT1A12P	6.66495063	0.00089332	0.01089078
LINGO2	4.88693445	0.00089391	0.01089281
PGAM4P1	-2.3641937	0.00089472	0.01089748
MIMT1	8.0117528	0.00089725	0.01091784
OR7D4	7.05442723	0.0008986	0.01092907
FBXO44	1.07653662	0.00090287	0.0109758
RNU6-107P	1.7657992	0.00090365	0.01097924
RNU6-1089P	-2.5300545	0.00090401	0.01097924
THEMIS	1.20485378	0.0009054	0.01099085
TPD52L3	7.47793492	0.00090845	0.01102268
SLC35E1P1	2.38893915	0.00091128	0.01105173
RNU6-1123P	-2.567778	0.00091371	0.01107595
SEC16B	3.34486094	0.00091463	0.01107928
XCL2	3.99983008	0.00091485	0.01107928
RAB5CP2	3.37661639	0.00091623	0.01108764
GOT2P3	4.85112087	0.00091641	0.01108764
MARK2P13	4.95421499	0.00092199	0.01114457
RBMS3-AS3	2.31057285	0.00092541	0.01117006
TNC	-1.287637	0.00093097	0.01122657
PSD2	2.93884122	0.00093463	0.01126546
LINC01089	1.08334983	0.00093626	0.01127976
RPS20P15	-2.6522151	0.0009376	0.01128831
ACSM2B	5.31744752	0.00094189	0.01132617
SLCO1B3	4.31327384	0.00094189	0.01132617
NOP56P1	-2.1848567	0.00094346	0.01133975
RPTN	7.13130629	0.00094608	0.01136583
NXNL2	4.53155086	0.00094722	0.01137421
RNU6-42P	-2.8399946	0.00094977	0.01139408

TMEM82	3.11133868	0.00095472	0.01144816
KRT9	7.5653117	0.00095589	0.0114568
RAF1P1	-2.7620978	0.0009573	0.0114671
ACOT4	1.74417554	0.00095765	0.0114671
BDKRB2	-1.54846	0.00096286	0.01151788
WDR64	4.68606539	0.00096324	0.01151788
AK3P3	3.30087621	0.00096705	0.01155803
PLCZ1	4.74152234	0.00097604	0.0116491
C1QTNF9B	5.36570821	0.00097949	0.01168475
MUC7	6.03887764	0.00098413	0.01172925
LILRA5	-1.2347091	0.00098972	0.01179033
PRAMENP	5.94460388	0.00099061	0.01179458
SYT14	4.96433748	0.00099664	0.01183959
IMPG2	1.6825742	0.00099986	0.01187241
RNU6-658P	4.15703667	0.00100482	0.01192569
PNPLA7	1.12330217	0.00101323	0.01201437
TPD52L1	1.26791562	0.00101779	0.01205169
ARHGDIG	5.4729859	0.00101894	0.01205969
SLC22A7	4.61636631	0.00102258	0.01208591
FXD7	3.85497708	0.0010236	0.01209243
TRIM40	3.82520669	0.00102575	0.01211221
ZP2	8.2880798	0.00102675	0.01211836
SGCZ	5.76003327	0.0010291	0.01213599
HLA-K	-1.2124211	0.0010296	0.01213599
NEUROD4	6.8807108	0.00102967	0.01213599
HTR5A	7.36703349	0.00103089	0.01214481
OR7E122P	6.32043919	0.00103846	0.01222838
GAP43	4.65671202	0.00104425	0.0122795
LAMP3	-1.370372	0.0010479	0.01230754
SERPINB11	6.97729985	0.00104808	0.01230754
EFCAB3	6.4109411	0.00105228	0.01234558
SKAP1	1.0639132	0.00105533	0.01237055
ACSM5P1	3.94364356	0.00105538	0.01237055
MAPT-IT1	4.26850241	0.00105667	0.01237995
MYT1L	3.42720717	0.00105741	0.01238302
HSPA8P6	7.11708255	0.00106001	0.01240781
PATE3	8.2824647	0.00106083	0.01241172
KLRC4-KLRK1	2.94113061	0.00106677	0.01247544
BHMT	2.89198292	0.00107268	0.01253305
TSKS	4.07440399	0.00107448	0.0125466

CYP1D1P	6.24520616	0.00107484	0.0125466
PRAP1	3.0591956	0.00107564	0.0125466
HHLA1	5.94938073	0.00107581	0.0125466
GGT3P	4.09303886	0.00107671	0.0125466
OLFM3	6.50302649	0.00107678	0.0125466
OR52B1P	6.5624017	0.00107896	0.01256623
ULBP1	-1.440778	0.00108146	0.0125896
ABCC6	1.08376874	0.00108246	0.01259068
DRAXIN	-2.2187539	0.00108254	0.01259068
SLC2A4	1.96232577	0.00108309	0.01259138
KCNH5	3.74686469	0.00108497	0.01260179
IZUMO2	7.10863532	0.00108982	0.01264616
USP50	2.28357789	0.00109028	0.01264616
RNU1-70P	4.33965022	0.00109162	0.01265598
RNU6-98P	-2.7119227	0.00109407	0.01267865
KCNIP2-AS1	3.01661466	0.00109466	0.01267973
HSP90B3P	-2.6909721	0.00109752	0.01270706
ANKRD20A1	2.65626362	0.00110441	0.01276844
OR4A47	-2.7270037	0.00110501	0.01276844
LINC00575	6.74251148	0.00110516	0.01276844
LINC00486	4.86606757	0.00110532	0.01276844
OR1S2	7.4646649	0.00110841	0.01279789
RN7SKP137	3.97872139	0.00110937	0.01279789
SYT9	3.32395898	0.00111655	0.01286908
LINC01571	7.78714042	0.00111809	0.01288097
FOXO6	-2.2907642	0.00111867	0.01288188
C9orf24	2.77521282	0.00112017	0.0128933
ENGASE	1.19384638	0.00112188	0.01290715
PIWIL1	3.91282531	0.00112362	0.01292138
RN7SKP92	2.78249307	0.00112427	0.01292298
GPR37	2.34050112	0.00112583	0.01292938
OR2M3	4.17796836	0.00112881	0.01295513
RPL24P2	-2.5745425	0.00112909	0.01295513
DNAJA4	-1.3135519	0.00113025	0.01296265
KRT89P	6.9001366	0.00113344	0.01298915
CCL22	3.11757062	0.00114224	0.01308251
FER1L6	2.99981118	0.00114658	0.01312064
MAP10	1.32327255	0.0011466	0.01312064
SLC35F3	3.3013466	0.00114831	0.01313438
LINC00221	6.06598338	0.00115439	0.01318752

TRAV12-3	5.89480544	0.00115451	0.01318752
PTX3	-1.6360353	0.00115626	0.01320162
SYT3	3.11456135	0.00115952	0.01323296
OSBPL7	1.148164	0.00116441	0.01326499
RNU1-17P	-2.6527311	0.00116642	0.01327697
CLEC18C	6.41811244	0.00116999	0.01330374
OLIG2	-2.4410432	0.00117041	0.01330374
IGLV3-21	2.07966406	0.00117297	0.01332093
CCND2P1	3.35141882	0.00117454	0.01332697
GLTPD2	4.10609207	0.00117538	0.01333059
FGF7	-1.0662847	0.00118217	0.01338185
OR52N5	4.22187462	0.00118302	0.01338185
HOXA9	3.64852716	0.00118305	0.01338185
KIR3DL1	3.85137402	0.0011854	0.01340251
CLTCL1	1.14184674	0.00118729	0.01341799
OR8A1	7.25088581	0.00118831	0.01342358
POTEJ	-3.0223605	0.00119095	0.01344743
ONECUT1	3.10804826	0.00119389	0.01347466
RN7SL280P	4.55264136	0.00119491	0.0134802
ATP13A4-AS1	-1.8806385	0.00119723	0.01350037
DYTN	4.87606755	0.00119857	0.01350746
OPRK1	6.19278384	0.00120159	0.01353161
RAB37	1.2036493	0.00120666	0.0135828
GABRA5	5.52841884	0.0012082	0.01359416
RN7SL378P	2.10963018	0.00121528	0.01366173
WNT3	1.94576847	0.00121739	0.01367658
GOLGA6D	7.47242777	0.00121767	0.01367658
S100A7A	6.24398829	0.00122066	0.01370412
TNNI3K	4.24977904	0.00122651	0.01375767
FGF21	3.74963499	0.00122934	0.01376795
KLRB1	1.7832414	0.00123033	0.01376795
SLC6A12	2.17271677	0.00123064	0.01376795
TCP11	4.37569998	0.00123073	0.01376795
HNRNPA1P74	6.60178654	0.00123125	0.01376795
PDCD4-AS1	2.56439168	0.00123174	0.01376795
OTOGL	2.64980188	0.00123953	0.01383894
NEUROD2	-2.4940709	0.00123978	0.01383894
MMP23A	-2.7424455	0.0012408	0.01383894
LINC01257	5.86083891	0.00124718	0.01390409
RPL39P40	2.58300315	0.00124874	0.01391312

SLC36A3	6.73088342	0.00124931	0.01391312
RNU6-298P	-2.161726	0.00124963	0.01391312
OR8B9P	6.89431533	0.00125047	0.01391645
CYP1B1-AS1	2.08467789	0.00126201	0.01401815
RTCA-AS1	2.49348508	0.00126235	0.01401815
GSTA2	4.14131373	0.00126317	0.01402115
OR2J3	6.88996872	0.00126813	0.01406397
PRG2	2.75020911	0.00126883	0.01406566
MT1CP	4.84454124	0.00127164	0.01409063
LINC01163	6.06622455	0.00127401	0.01409795
RNU6-1016P	1.77809761	0.00127483	0.01409795
HSD17B2	2.59211976	0.00127526	0.01409795
FAM9B	3.28704387	0.00127561	0.01409795
OR56B2P	4.87986263	0.00127905	0.01412985
HCRTR1	6.74918431	0.00128056	0.01413606
HOXB-AS1	2.19763569	0.00128329	0.01415835
RPS3AP54	2.71789322	0.00128407	0.01416085
CIDEC	3.26128433	0.00128554	0.01417088
MEGF10	3.45110963	0.00128771	0.0141826
DUXAP1	4.94798618	0.00129067	0.01420902
LINC01119	2.26685047	0.00129282	0.01422658
MMP20	6.50286297	0.00129447	0.01423865
NDUFAF4P1	3.56272739	0.00129631	0.01425274
PMEL	1.79825561	0.00129919	0.01427706
RNU1-112P	-3.6890947	0.00129964	0.01427706
DAOA-AS1	6.60481588	0.00130197	0.01429649
LINC01124	3.29733476	0.00130286	0.01430008
PPM1AP1	6.62734389	0.00131249	0.01439338
RN7SL448P	4.12615786	0.00131551	0.01442037
MOBP	3.51065203	0.00131644	0.01442222
HLA-DMB	1.05455249	0.00131681	0.01442222
CDC14C	6.25982035	0.0013278	0.01453639
RNU6-130P	1.97284469	0.00132922	0.01454434
C3orf22	5.39419179	0.00132975	0.01454434
UBASH3A	1.68116885	0.00133138	0.01455061
LINC01210	6.4801373	0.00133332	0.01455653
SLC17A4	5.12699531	0.00133342	0.01455653
UGT2A3	3.94886129	0.00133363	0.01455653
MYCBP2-AS1	-1.9732259	0.00134211	0.01463659
IL1RAPL2	4.1315486	0.00134302	0.0146402

HMGB1P18	7.41008198	0.00134555	0.01466152
GRK1	5.83706808	0.00134727	0.01467109
OR2T1	7.44641179	0.00134861	0.01467109
GDF2	4.13950819	0.00134894	0.01467109
HNRNPA3P14	4.24942214	0.00134947	0.01467109
LRRC37A4P	1.13323433	0.00134978	0.01467109
LINC01322	4.72946762	0.00135068	0.01467109
TEX11	4.12127696	0.00135304	0.01468055
GABRG1	6.08988707	0.00135659	0.01470549
KIRREL2	4.53877537	0.00135707	0.01470549
RNA5SP141	-3.2088209	0.00135951	0.01472568
HCG27	1.33028057	0.00136145	0.01474044
LINC00544	4.53295721	0.00136992	0.01482587
BBS10	-1.1160967	0.00137783	0.0149044
APOBEC3H	3.58297721	0.00137834	0.0149044
CDCP2	5.10280749	0.00138401	0.01495308
POTEI	6.98564018	0.00138971	0.01500825
FCRLA	2.97434813	0.00139508	0.01504969
CALY	3.75314061	0.00139571	0.01504969
RPS4XP5	4.04887963	0.0013959	0.01504969
CD81-AS1	2.16051138	0.00139779	0.01506116
TRPM1	5.23167068	0.00139869	0.01506116
RDH5	2.36724017	0.00139892	0.01506116
YWHAZP3	2.65276256	0.00139932	0.01506116
PLCB1-IT1	2.72582245	0.00140059	0.01506208
SDC4P	4.85574238	0.00140265	0.01507788
EPHX4	4.41200577	0.0014076	0.01512474
GLP2R	2.27097389	0.0014083	0.01512593
KNOP1P5	7.04958163	0.00140917	0.01512892
TRAV23DV6	5.3884528	0.00141427	0.01517721
STAP2	1.12275153	0.00141599	0.01518934
SH2D6	3.50815229	0.00141674	0.01519095
LINC00629	5.8781215	0.00142097	0.01522331
KRT78	5.83117696	0.00142549	0.01525279
PEBP4	-1.3925264	0.0014287	0.01528075
UCP3	2.12306109	0.00143329	0.01531392
MYBPC1	4.94187939	0.00143403	0.01531392
LINC01305	5.42839896	0.00143409	0.01531392
PCAT6	2.34996041	0.0014342	0.01531392
VWA5B2	4.09603934	0.00144079	0.01537788

HRK	3.91956844	0.001442	0.01537842
AIPL1	7.25293578	0.00144205	0.01537842
GPR6	-2.5560396	0.00144388	0.01539149
RPL30P13	2.63084796	0.00146119	0.01555785
MYH4	5.12533124	0.00146139	0.01555785
LINC00703	8.54346814	0.00146192	0.01555785
TAGLN2P1	-2.0326944	0.00146647	0.01559331
MDGA2	4.33812895	0.00147039	0.01562849
NPM1P30	-2.8876423	0.00148007	0.01570522
ALDH1L2	-1.0560306	0.00148202	0.01571943
LDHAL6DP	3.69911227	0.00148624	0.01575105
HSPA8P9	-2.1808542	0.00150179	0.01588293
ITGB4	1.03325214	0.00150395	0.01589916
DCX	4.53355878	0.00151053	0.01596209
TMCC1P1	6.78092473	0.00151594	0.01600316
CREG2	3.58288278	0.00151629	0.01600316
CA9	3.02790596	0.00152074	0.01603686
TTBK1	3.64218203	0.00152621	0.01608789
C20orf144	-2.5319222	0.00153178	0.01613995
KLHDC8A	3.9709962	0.00153242	0.01613999
FCRL1	2.05505798	0.00153308	0.01614031
GULOP	3.31246735	0.00153703	0.01616742
ANKRD34C	4.8941788	0.00153775	0.01616742
DOCK4-AS1	-3.0347764	0.00153882	0.01616742
NEPNP	5.41774537	0.00154043	0.01617102
RNA5SP330	-2.6976478	0.00154123	0.01617276
RN7SKP110	2.14131652	0.00154341	0.01618896
C10orf82	6.40667352	0.00154797	0.01623022
LINC01170	3.51963183	0.00155089	0.01625411
SNORA20	-2.7304521	0.00155583	0.01629916
FSD1	3.36994159	0.00155977	0.01633379
HMGB1P17	6.83444325	0.00156304	0.01636131
STX1B	1.6071315	0.00156453	0.01637025
EGFLAM-AS4	-2.5570228	0.00156971	0.01641772
PDX1	4.60382279	0.00157318	0.01644233
AHNAK2	1.0474947	0.00157335	0.01644233
GAPDHP47	4.08167327	0.0015749	0.01645179
RHBDL3	3.59656173	0.0015786	0.01647015
AACSP1	6.42857103	0.00158003	0.01647048
ANKRD33	3.29509561	0.00158078	0.01647048

OVCH2	3.73163684	0.00158147	0.01647048
KRT18P22	8.37294945	0.00158151	0.01647048
TXNDC2	3.4852784	0.00158185	0.01647048
TREX2	2.74850219	0.00158627	0.01650306
OR2AK2	6.3458442	0.00158853	0.01651327
ACTR3BP4	7.68914804	0.00158861	0.01651327
FBP1	1.02200071	0.00158922	0.01651327
C10orf53	6.09870231	0.00159929	0.01659789
MCCD1P1	3.03894201	0.00160647	0.01665737
NOG	3.26867308	0.0016074	0.01665737
SYNJ2BP-COX16	-3.0541256	0.00161065	0.01668193
PHYHIPL	3.47766386	0.00161763	0.01673282
AKAP17BP	6.29467299	0.00161818	0.01673282
LINC01108	4.33274473	0.0016287	0.0168211
NLRC3	1.00930339	0.00163224	0.01684444
EDAR	3.63393778	0.00163228	0.01684444
MT1DP	3.24138382	0.00163687	0.01688335
JPH3	4.70172358	0.00163803	0.01688335
BRDTP1	6.20679681	0.00164319	0.01692157
MROH3P	3.52180604	0.00164373	0.01692157
MID1IP1-AS1	-2.2694209	0.00166439	0.01711358
CASC23	7.14180476	0.00166724	0.01713598
ROPN1B	3.69726227	0.00166857	0.0171428
PKDREJ	3.09218586	0.00167176	0.0171686
TAF7L	2.52159553	0.00167328	0.017173
LINC00967	6.9421732	0.00167721	0.01719889
BRWD1-IT1	2.34620252	0.00167871	0.01720341
RNA5SP88	-2.6206488	0.00167945	0.01720341
CKM	4.7219989	0.00167986	0.01720341
LINC00461	6.18404952	0.001684	0.01723885
CFP	1.07781184	0.00168485	0.01724066
OR8H2	6.36357728	0.00168855	0.01726867
LINC01085	5.82377509	0.00168894	0.01726867
PAQR9-AS1	4.01341448	0.00169156	0.01728595
RBMX2P1	2.81405951	0.00169198	0.01728595
VGLL2	4.56207065	0.00169627	0.01732282
TMPRSS11B	5.82173911	0.00170069	0.01734954
FGF23	3.99848756	0.00170092	0.01734954
ROPN1	6.24505602	0.00170197	0.01735261



ADCY10	2.1601221	0.001704	0.01736012
HS3ST5	5.34423667	0.00170622	0.01736891
DSCAM	3.4890758	0.00170822	0.01738237
LINC00410	5.7294173	0.00171161	0.01740993
LINC01168	-2.4198857	0.00171332	0.01742034
B4GALT1-AS1	2.50799962	0.0017155	0.01743558
ADAM7	5.88896419	0.0017202	0.01746453
CXCR3	2.76275956	0.0017204	0.01746453
MT-ND6	1.30990277	0.00172207	0.01747204
ANKRD53	2.26457421	0.00172251	0.01747204
RNA5SP145	-3.2848379	0.00172836	0.01751048
OR52K1	3.44828366	0.00172984	0.0175186
HSPE1P18	2.36654163	0.00173167	0.0175302
LINC00879	6.04992399	0.0017331	0.01753767
UNC93A	3.50743661	0.00173522	0.01755214
OR52A1	5.99627705	0.00173793	0.0175698
TRAV1-2	4.04378929	0.00173874	0.0175698
OR51B3P	5.85301476	0.00173903	0.0175698
RNU6-2	-1.3113559	0.00174704	0.01763681
KIFC2	1.18100662	0.00175024	0.01766019
SLC25A48	3.02086866	0.00175074	0.01766019
FBXO10	1.14952463	0.00175287	0.01767094
GPLD1	2.79367472	0.00175319	0.01767094
FAM47E-STBD1	-2.3848777	0.00176272	0.01776005
IGLV4-60	3.26311967	0.00177634	0.01787941
CYP2A13	3.90621406	0.00177667	0.01787941
ARSF	3.18900431	0.0017782	0.01788777
OR2A5	5.79101799	0.00178916	0.01798386
ZCCHC12	4.83464989	0.00179251	0.01801042
FSTL5	6.16142463	0.00179676	0.01804599
HBG2	-2.6449858	0.00179826	0.01805396
OR4Q3	7.20619521	0.00180068	0.01807123
COX7A1	-1.0488343	0.00180672	0.01812472
NDUFV2P1	2.06066356	0.00180869	0.01813732
HCG22	4.70980641	0.00181275	0.01816205
BPIFA3	6.69354334	0.00181435	0.01816205
CALM1P1	-2.5344915	0.00181471	0.01816205
CXCL5	-1.4834677	0.00181662	0.01817407
OR51B5	2.2605617	0.0018177	0.01817776

SNORD37	-1.774511	0.00182066	0.01820014
CRB2	3.64010264	0.00182316	0.0182093
OR51A7	5.56212506	0.00182377	0.0182093
PHACTR2P1	-2.9579891	0.00182453	0.0182093
HOXB8	5.72397452	0.00182514	0.0182093
LINC01149	5.51759396	0.00183258	0.01826535
SNORA38B	-1.8411341	0.0018326	0.01826535
MATN1	3.26061554	0.00183325	0.01826535
ANKRD20A5P	2.07231915	0.00183361	0.01826535
ZNRF3-IT1	2.52904966	0.00183892	0.01830387
SLC1A6	5.5616012	0.00184451	0.01833816
UTP14C	-2.7321553	0.0018462	0.0183478
RASA4CP	1.66200221	0.00184784	0.01835691
GFAP	3.11071439	0.00186061	0.0184694
OR13C9	5.54024485	0.00186513	0.01850706
CRYBB1	3.81292816	0.00186735	0.01851555
DGKK	4.5320064	0.0018694	0.01852793
MTND2P4	-2.6301277	0.00187353	0.01855659
RNA5SP114	-2.658752	0.00187684	0.01858001
GUCY2F	5.44853797	0.00188062	0.01859577
FOXN4	4.61552665	0.00188734	0.01865504
IGKV1OR2-108	2.56018394	0.00188881	0.01866236
CARD11	1.13135709	0.00189151	0.01868181
LINC01541	6.51508511	0.00189681	0.01872687
PRUNEP1	5.51703324	0.00189759	0.01872731
LHX1	6.62050517	0.00190226	0.0187662
SLC35G3	6.77934027	0.00190823	0.01881066
CEACAM5	-1.9129352	0.00190824	0.01881066
LY6D	5.68867399	0.00191114	0.01882215
RN7SL753P	-2.815911	0.00191267	0.01882215
FNDC9	-2.5503518	0.00191309	0.01882215
LINC01566	5.38799459	0.0019146	0.01882795
SLC17A8	4.94018764	0.00191516	0.01882795
CD207	5.16073507	0.00192169	0.01887393
GPR15	3.6057066	0.00192205	0.01887393
MROH2B	3.87489171	0.00192653	0.01890335
OR2S1P	3.23782275	0.00192804	0.01891097
RNU1-27P	-2.6198671	0.00192911	0.01891413
PABPC1P1	-2.5898117	0.00194344	0.01904006
OLIG1	-2.3747086	0.00195244	0.01912093

SYTL5	2.32738441	0.00195434	0.01913101
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MZB1	1.69837295	0.00195746	0.01914801
FSCB	4.77636954	0.0019603	0.01916848
LYST-AS1	-2.7794465	0.00196654	0.01921476
RPL7P32	-3.4933188	0.0019712	0.01924561
LINC00538	3.21242999	0.00197207	0.01924669
KLHL34	4.18496983	0.00197342	0.01925251
MYPN	4.03771368	0.00198158	0.01931002
PLA2G3	2.9572635	0.00198434	0.01932949
HLX-AS1	3.67268606	0.00198557	0.01933409
OR2L9P	5.55639239	0.00198709	0.01934153
CAMSAP3	1.0874954	0.00198785	0.01934161
GHRLOS	1.04166801	0.00198948	0.01934598
PFKFB1	3.6493804	0.00199128	0.01934598
DOC2GP	2.81560943	0.00199199	0.01934598
ZG16B	3.60289317	0.00199209	0.01934598
ANKRD26P3	3.91202538	0.00199331	0.01935045
KCNIP4-IT1	4.4343072	0.00199552	0.01936462
LINC01440	5.6605275	0.00199683	0.0193699
DPRXP1	6.29385848	0.0019976	0.01937008
PGAM1P8	1.77763386	0.002006	0.0194367
TTC21B-AS1	-2.7427981	0.0020185	0.01953558
MTND6P17	5.69459757	0.00202407	0.01957984
TXNDC8	5.97669078	0.00203521	0.0196633
SLC10A6	2.21883905	0.00203554	0.0196633
TRGV5	2.64643871	0.00204534	0.0197505
NAMA	3.04847383	0.0020478	0.01976677
FOXL2NB	6.15665563	0.002061	0.01987919
ISL1	6.47302071	0.00207299	0.01997195
DPPA2P3	2.32247521	0.00207326	0.01997195
IGLV5-52	1.97100824	0.00207375	0.01997195
SLC5A5	3.37575108	0.00207949	0.02000819
TNP2	6.06719581	0.00208035	0.02000819
DBX2	5.82338297	0.00208065	0.02000819
HNRNPA1P21	4.92225957	0.00208181	0.02001189
LINC00658	7.13833597	0.00208398	0.02002163
ABCC6P2	1.87549156	0.00208643	0.02002163
UGT1A10	5.33423515	0.0020866	0.02002163
KLK7	4.77893493	0.00208753	0.02002163

BHLHB9P1	5.71509468	0.00208851	0.02002355
PKP1	-1.299762	0.00209171	0.02004665
LINC00466	4.76594901	0.00209418	0.02006279
RN7SL390P	3.20469181	0.00210276	0.02012986
CALCR	4.88569452	0.00210385	0.02013027
FGFR3	1.09138053	0.00210437	0.02013027
GABRQ	4.22387328	0.00210899	0.02015928
RNY1P16	2.16762046	0.00211256	0.0201859
GRM2	3.17579054	0.00211654	0.0202164
MTND6P9	5.69389405	0.00211757	0.0202186
CYP4F24P	4.13255113	0.00212335	0.02026628
OR8G1	5.11778722	0.00213114	0.02033298
IL1RAPL1	3.94651311	0.00213558	0.02036413
KRT12	6.3988468	0.002136	0.02036413
HCN4	-2.4172228	0.0021376	0.02037182
RAB11FIP1P1	-2.6037657	0.00214911	0.02045901
JAZF1-AS1	4.61187967	0.00214915	0.02045901
PKD1P1	2.62148464	0.00215022	0.02046153
RNA5SP273	-2.593272	0.00215935	0.02054079
MESP2	4.49227642	0.00216843	0.02061949
CNIH3	1.6177554	0.00217387	0.02066354
TCF23	5.02640435	0.00217496	0.02066614
FAM222A-AS1	4.07375197	0.00217736	0.02067406
OR4K2	5.33293895	0.00217741	0.02067406
IL31RA	3.4890635	0.00218146	0.02070477
RNF224	-2.5151651	0.00219432	0.02080862
GNG12-AS1	2.38786068	0.00219484	0.02080862
NPC1L1	3.44350725	0.00220329	0.02087322
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FMO8P	6.13204172	0.00220885	0.0209104
PTGES3P3	-3.3616214	0.00221088	0.02092187
CNTNAP2	1.93229215	0.00221355	0.02093938
SGMS1-AS1	1.17748374	0.00221535	0.02094859
TTC39C-AS1	3.0592526	0.00221853	0.02097094
GPR83	2.74851249	0.00222274	0.02100293
SLC6A11	3.97967476	0.00224529	0.02120823
LINC00324	1.10511836	0.00224646	0.02121144
ADRB3	6.54195779	0.00225298	0.02126101
CRYGN	3.97625294	0.00225432	0.02126205
PHEX	-1.3613246	0.00225713	0.02128069

NEFL	5.62494677	0.00226667	0.02136273
MYH6	4.7616045	0.00227019	0.02138016
NGF	2.7387121	0.0022713	0.0213827
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ZNF80	2.80081217	0.00227633	0.02140636
KIR2DL3	3.5668154	0.00228023	0.0214352
CCDC74B	2.47404579	0.00228535	0.02146752
MIR548V	1.85743047	0.00229064	0.02150133
OXCT1-AS1	5.13663013	0.00229846	0.02155318
LINC00330	7.33998006	0.0023012	0.02156882
MIR570	1.81498959	0.00230226	0.0215708
RNA5SP44	-2.543682	0.00230897	0.02162573
BTG4	5.60256959	0.00231207	0.02164685
ABCC11	2.78580014	0.00231493	0.0216577
LINC00562	2.12918039	0.00231727	0.02167171
TRAV21	5.31476558	0.0023202	0.02168319
HLA-W	2.88488634	0.00232199	0.02168409
CT62	-1.9910101	0.00233299	0.02177881
LINC00494	3.83622972	0.0023417	0.02182826
LINC00581	5.95453276	0.00234397	0.0218414
PRB4	-2.8559562	0.00234852	0.02187588
CYP2C18	2.31140884	0.00235456	0.02191143
RNU11-3P	3.90218905	0.00235491	0.02191143
DCDC2C	4.07245573	0.00235762	0.02192097
CDH22	5.75131355	0.00235948	0.02192193
UGT1A8	4.39173453	0.00237252	0.02202706
BARX1	-2.2811964	0.0023738	0.022031
SAMD7	6.34011878	0.00237503	0.02203435
NPFRR2	6.44764558	0.00237706	0.02204523
NCAM2	-1.0100352	0.00238597	0.02210929
LINC01485	3.44746875	0.00238743	0.02210929
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SV2A	-1.0695251	0.0023925	0.02212409
HMGB3P13	6.4782179	0.00239366	0.02212684
LINC01513	3.26960038	0.00239613	0.02213681
LHCGR	3.67540372	0.00239814	0.02213681
FBP2	5.65660453	0.00239879	0.02213681
RNA5SP507	-2.5782248	0.00239907	0.02213681
LINC01280	6.73387964	0.00241045	0.02223375
TMEM92	1.46284333	0.00241383	0.02224891

LINC01554	2.57247501	0.00242077	0.02230479
EIF4A1P7	6.39331545	0.00242437	0.02232989
RPS26P11	2.84872681	0.00242768	0.02234432
CD3G	1.4907498	0.00243007	0.02235825
OR6J1	5.5209509	0.00243612	0.02240585
PRSS55	3.96932107	0.00244144	0.02244664
NPHP3- ACAD11	2.08688884	0.0024484	0.02250255
OR56A1	3.95147803	0.00244988	0.02250805
RNU6-653P	2.3166182	0.00245135	0.02251127
ANKRD26P1	4.20742024	0.00245199	0.02251127
ANXA13	3.78101668	0.00245383	0.02252002
TF	3.03786067	0.00245658	0.02252908
EIF3FP3	2.5000386	0.00245907	0.02253576
OR14J1	4.57166471	0.00246419	0.02257453
LINC01555	5.99470859	0.00246885	0.022601
STX18-AS1	1.15857517	0.00247296	0.0226264
C1QTNF1-AS1	3.69139523	0.00247339	0.0226264
ADAM2	5.99735674	0.00248872	0.02275033
DHRS13	1.17142219	0.00249201	0.02277227
RN7SKP103	2.03045799	0.00249495	0.02279095
CCNT2-AS1	1.38157749	0.00249599	0.02279234
MEIKIN	-2.4103642	0.00250135	0.02283307
TLX2	6.32744856	0.00250266	0.02283689
RNU6-1053P	1.96509888	0.00250393	0.02283949
IL23A	-1.5997226	0.00250473	0.02283949
SNORD3B-2	-2.0336704	0.00251791	0.02293509
ANKRD30BL	6.32679423	0.00251885	0.02293543
ASL	1.01091037	0.00252142	0.02295066
FRG2DP	6.01058785	0.0025246	0.02297146
PGPEP1L	3.75748888	0.00252717	0.02297156
AGKP1	2.59901504	0.00253041	0.02299154
OR10J6P	3.8947757	0.00253599	0.02303407
GFRAL	5.45293985	0.0025462	0.02311168
RNF152P1	3.15207444	0.00254702	0.02311168
RNU4-56P	4.65673529	0.00254884	0.02311538
RN7SL123P	3.21607836	0.00254947	0.02311538
FAM72D	2.85917523	0.00255119	0.02312272
GOLGA8K	2.38917898	0.00255593	0.02315383
CPS1-IT1	3.69883018	0.00255879	0.02315383

BMS1P8	2.93347105	0.00255929	0.02315383
RANP6	-2.528701	0.00255933	0.02315383
LINC01354	3.14556751	0.00256096	0.02315383
NXF4	6.34692002	0.00256426	0.02315906
GSTA7P	5.70388436	0.00256679	0.02317366
SYCP1	3.85560023	0.00256982	0.02317821
CPA5	6.46988358	0.00257487	0.02321383
HMGNI1P2	-2.5788449	0.00257711	0.02322586
ADAMTS17	1.18726609	0.00258027	0.02324608
KCNJ18	5.64065713	0.0025824	0.02325707
LINC01229	2.2973335	0.00258341	0.02325799
HCG20	3.43905999	0.00261259	0.02346283
OR4A18P	5.19440574	0.00261489	0.02346697
SLC25A3P1	6.31889028	0.00261489	0.02346697
DUX4L19	-2.7327984	0.00261702	0.02347779
RAB11B-AS1	1.33144268	0.00261933	0.02349029
MIR511	2.43020892	0.00262283	0.02350519
MT-TD	4.15774011	0.00262932	0.02355509
IFITM4P	1.76916556	0.00263644	0.02358748
HMGB1P31	2.30738605	0.00263663	0.02358748
OR6N1	5.40545369	0.00263921	0.02360227
LINC01344	3.44755073	0.00264169	0.02361614
SPZ1	6.44328726	0.00264298	0.0236194
MYHAS	5.44920301	0.00264467	0.02362624
LINGO4	3.21077101	0.00265371	0.02369873
POU5F1P4	-2.4015729	0.00266316	0.0237582
OR2AE1	3.95447518	0.00266877	0.02378336
STPG2	2.61450447	0.00267445	0.02382566
OR6D1P	4.93151651	0.00268192	0.02387836
TAS2R9	5.84158166	0.00268224	0.02387836
IGKV1D-39	2.93795995	0.00268686	0.0239112
OR10A6	5.88308974	0.00268863	0.02391862
LINC01139	2.61339701	0.00269411	0.02395899
MAP4K1	1.29083762	0.00270897	0.02406599
PDGFD	1.06182781	0.00271094	0.02407003
HTN1	5.9800759	0.00271203	0.02407003
GPRC5C	1.18432423	0.00271225	0.02407003
NXPE4	6.07498925	0.00271366	0.02407415
SLC24A2	3.61730964	0.0027154	0.02408129
CD200R1L	5.73469167	0.00272129	0.02411671

OR13C3	5.03352371	0.00272504	0.02414157
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ADAM11	2.67970376	0.00274255	0.02424379
TMC8	1.08816062	0.00274395	0.02424379
FAM181A-AS1	4.87323138	0.0027448	0.02424379
LINC00517	5.96859545	0.00274512	0.02424379
TPTE2P2	5.17986493	0.00275822	0.02435109
CEACAMP3	-2.3832073	0.00276204	0.02435958
AKR1B1P1	4.68451768	0.00276959	0.02441646
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GJB5	4.81900408	0.00277282	0.02442089
LINC00934	6.30157513	0.0027779	0.02445719
ZDHHC20P1	6.02806193	0.00278472	0.02449921
KIF4B	2.63275989	0.00278562	0.02449921
TNNT3	2.72312696	0.00278651	0.02449921
LEAP2	2.30210101	0.00279593	0.02455079
TAC3	4.52325225	0.00279885	0.02455079
KERA	4.99318009	0.00280625	0.02460162
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TMEM161BP1	5.9863661	0.00281292	0.02464658
ART5	2.69219721	0.00281602	0.02466527
UGT2B11	4.19929657	0.00281718	0.02466698
SYT5	4.50635917	0.00282414	0.02471943
FAM207BP	-2.2634639	0.00283576	0.02481267
FETUB	4.12680549	0.00284038	0.02484457
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CDH12	4.4142765	0.00286134	0.02497655
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LINC01584	6.94660209	0.00288956	0.02516832
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ENTHD1	5.29928064	0.00297184	0.0256841
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ACE2	1.38731829	0.00300811	0.02588886
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DLX5	4.80372141	0.00301717	0.02594664
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MTND2P12	5.03302746	0.00302964	0.02603635
GALP	5.81274982	0.00303154	0.02604389
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MROH8	1.26622856	0.00307808	0.026311
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TUBA3E	5.94465263	0.00309918	0.0264471
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VEZF1P1	4.10228059	0.00315388	0.02678854
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CHRM4	4.00889114	0.00315607	0.02678935

PDZK1	2.73471586	0.00316688	0.02686322
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LDHBP1	4.98671366	0.00319504	0.02703928
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VSTM2A	5.73044738	0.00321331	0.02715593
GPR158	2.94812445	0.00321414	0.02715593
FTCDNL1	1.5032518	0.00321523	0.02715611
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B3GALT5-AS1	3.33412282	0.00324091	0.02731887
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KIR2DL1	3.04313319	0.00337202	0.02810069
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CLEC6A	4.17513773	0.00355092	0.0291996
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LINC00906	5.10330632	0.00358332	0.02939976
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SERPINA2	5.92913714	0.00369697	0.03007657
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MT-TP	-2.2039551	0.00370505	0.03008924
TRBV9	5.53417536	0.00370734	0.03009831
SAA4	2.17991339	0.00371077	0.03011524
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MT-ND1	1.23389881	0.00371722	0.0301402
OR2A25	6.01436879	0.00373069	0.03022258
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PATE2	3.64540831	0.00374491	0.03030694
GOLGA8IP	2.77857849	0.00375651	0.03039119
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BANF1P2	2.48575129	0.00376789	0.03045602
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NPSR1-AS1	4.66586395	0.00376956	0.03045817
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SPATA20P1	3.06508529	0.00377647	0.03048511
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BTF3P12	-2.6016889	0.00383341	0.03083224
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CISTR	6.87778297	0.00386035	0.03096516
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LINC00626	5.8822375	0.00386643	0.03096661
PRKAR2A-AS1	1.61174559	0.00387053	0.03098683
ATRIP	2.04967501	0.00387138	0.03098683
GNAT3	6.05189636	0.00388123	0.0310462
LINC00922	2.84364624	0.00388724	0.0310845
TEX15	2.87168788	0.00389218	0.03111127
PCDH19	1.56224653	0.00389302	0.03111127
DHRS11	1.0502305	0.00389698	0.03112494
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SORCS2	1.17330931	0.00390419	0.03114141
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ALG1L2	3.39883396	0.00392907	0.03126717
IGHJ3P	2.58146628	0.00393151	0.03126738
TM4SF20	4.01507975	0.00393214	0.03126738
OR5AM1P	6.2402495	0.00396679	0.03152328
IGHJ5	2.91501496	0.00397263	0.03155986
SIRPB3P	3.76042747	0.00397783	0.03158151
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TYRP1	-1.294429	0.00398722	0.03162656
HORMAD1	1.5594118	0.00398935	0.03163365
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CPT1B	1.32322532	0.0039985	0.03166491
HSPE1P25	2.13275224	0.00399949	0.03166491
OPALIN	4.64225004	0.0040219	0.03182256
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ARHGAP26-IT1	2.91977	0.00403536	0.03190419
PTMAP8	-2.403917	0.00403672	0.03190419
KCND2	2.34826561	0.0040379	0.03190419
C1orf94	5.9792052	0.00403846	0.03190419
UBE3AP2	4.4893053	0.00404034	0.03190783

AGR3	-1.5456308	0.00404142	0.03190783
LINC00550	6.41575454	0.00405278	0.03198768
SOGA3	-2.4204036	0.00406135	0.03204543
RPS10P3	4.55817327	0.0040679	0.03208719
ARHGEF38-IT1	2.45624019	0.00407511	0.03211939
OR11H13P	-2.4568212	0.00407664	0.03211939
ALOXE3	-2.3091651	0.00407702	0.03211939
FBXO40	3.7367999	0.00409035	0.03220371
MIR3646	3.35355375	0.0040915	0.03220371
SETP3	3.74941638	0.00409384	0.03221221
RN7SL145P	1.77872486	0.00409999	0.0322308
C5orf64	3.37363504	0.00410632	0.03226071
CNTN4-AS1	5.99623794	0.00411612	0.03232774
ITCH-IT1	1.97952995	0.00412322	0.03236358
MT-CO1	1.18837041	0.00412914	0.03240015
APOC4-APOC2	3.32126515	0.00413329	0.03241273
SEMG2	6.71406988	0.00414751	0.03249433
C18orf63	3.67843252	0.00415418	0.03253064
ITIH3	1.86817701	0.00415622	0.03253263
LINC01146	1.76480233	0.00415995	0.03255188
SLC6A16	1.25030429	0.00416267	0.03256314
AIRN	-2.6005261	0.00416516	0.03257055
C11orf53	5.75689488	0.00416735	0.03257055
PLA2G2C	2.78599089	0.00416744	0.03257055
MAGEL2	2.25778736	0.00417211	0.03259712
IGKV2-30	2.18821953	0.00417848	0.03261689
CHRNA2	4.6886361	0.00418459	0.03264845
MGAT4D	4.59749838	0.00418943	0.03266248
NRADDP	2.74139605	0.00419922	0.03270881
RPF2P1	-2.6301482	0.00420346	0.03273191
OPN5	4.2848224	0.00421678	0.03280563
RN7SL530P	2.42796508	0.00424299	0.03295933
MPPE1P1	4.18993429	0.00424887	0.03299498
XCL1	2.94538818	0.00425749	0.03305183
RNU7-80P	1.83693361	0.00426161	0.03307374
RN7SL143P	4.48887445	0.00426426	0.03308282
HPR	3.33267113	0.00426537	0.03308282
CD6	1.21780036	0.00428163	0.03319182
BCL2L15	1.00158097	0.00429407	0.03325492
ZNF969P	4.04107203	0.00429685	0.0332664

KREMEN2	-2.1375076	0.00430379	0.03328638
CYP11A1	2.0542496	0.0043042	0.03328638
PLAC8L1	1.76469075	0.00430464	0.03328638
OR2C1	4.88158058	0.00431477	0.0333546
POLR3GP2	5.84001234	0.00431975	0.03337287
TSPAN11	1.46078147	0.00432302	0.03338807
LINC00971	4.54883431	0.00433207	0.03344785
PDZD3	2.99758017	0.00436054	0.03364727
CD8B	1.4824967	0.0043633	0.03365114
ISX	6.02719322	0.00436367	0.03365114
CUL1P1	4.80295703	0.00437142	0.03367752
RN7SL672P	-2.4939615	0.00437237	0.03367752
ERICH3-AS1	4.80395615	0.00437454	0.0336841
GOLGA6L2	4.95190706	0.00437706	0.03369337
TUBB8P7	5.28544288	0.00437885	0.03369605
SLC39A12-AS1	5.57238743	0.00438005	0.03369605
LINC01181	-2.0828606	0.00438987	0.03376142
CYP4F11	3.07440324	0.00439455	0.03378727
CLDN14	3.31203132	0.00439655	0.03379242
ARHGEF9-IT1	2.03348414	0.00440659	0.03384375
INSL4	4.37912394	0.00440687	0.03384375
TKTL2	5.28971544	0.0044074	0.03384375
INTS6P1	3.23271119	0.00441084	0.03385138
OR7A5	5.94531294	0.00441384	0.03386419
FAM47C	-2.3422742	0.00441967	0.03389876
MYT1L-AS1	5.79972948	0.00442336	0.03391682
RN7SL784P	4.35381102	0.00443172	0.03395715
IL12B	-2.6887283	0.00443222	0.03395715
SNORD11B	-2.1286901	0.00444541	0.03402465
HCAR1	2.11056153	0.00445727	0.03410522
ABCF2P1	4.89286282	0.00445883	0.03410689
PLVAP	1.01513021	0.00446394	0.03412552
CEACAM7	4.68584418	0.00447317	0.0341793
RPL39P36	2.16433919	0.00447365	0.0341793
NEFM	-2.2237857	0.00447539	0.03418243
BMP2KL	-2.3654328	0.00449449	0.03430776
HIGD1B	2.76489029	0.00451117	0.03439009
LINC00470	2.61163342	0.00451505	0.03440298
APOA2	2.25049351	0.00451707	0.03440811
RN7SL344P	2.1862806	0.00452627	0.03445988

SLC12A1	3.16951034	0.00453957	0.03453832
RIPPLY2	5.5455639	0.00454479	0.03456776
ZNF491	1.01997387	0.00454873	0.03458741
RTP3	3.74489447	0.00457913	0.03478753
RPL4P1	5.47561691	0.00458137	0.03479416
FAM86B2	2.62732213	0.00458598	0.03481881
NUTM2HP	4.69431803	0.0045957	0.03488222
LINC00706	6.87484112	0.00459914	0.03489798
PTMAP3	-2.364703	0.0046034	0.03491996
KCNB2	4.6909824	0.00462347	0.03504094
HNRNPA3P8	5.26089083	0.00464244	0.03516579
VGLL1	3.52095007	0.00464269	0.03516579
SDS	1.99210719	0.00464634	0.03518298
FBLN7	1.41775163	0.0046532	0.03522446
CASQ2	-1.5819247	0.00465735	0.03523933
CCL24	2.81777646	0.00466524	0.03527474
CDSN	4.92167119	0.00466536	0.03527474
OR10H5	5.32432916	0.00467224	0.03530586
CDH17	5.15261928	0.00467484	0.03530673
ODF3L2	3.51880436	0.00467513	0.03530673
ANKK1	3.03659375	0.00468761	0.03538011
CTSLP2	3.38830084	0.00469537	0.03542816
RPL5P23	3.59564282	0.00469746	0.03542967
CAPNS2	1.82540522	0.00470339	0.03545727
NAV2-AS5	-2.327404	0.00470645	0.03546444
LINC01498	3.87922573	0.00470712	0.03546444
ZNF321P	1.73647865	0.00471355	0.03550244
RN7SKP239	2.67816562	0.00471552	0.03550679
CHST13	2.98452981	0.00472598	0.03557506
DCXR	1.19539493	0.0047287	0.03558506
NXPH2	6.26616964	0.00473202	0.03559954
GDF10	-1.7182762	0.00474685	0.03568758
RPL3P13	3.5580403	0.00474791	0.03568758
TRAV25	5.71534859	0.00476292	0.03576883
OTX2-AS1	5.12185889	0.00477084	0.03581774
IQCH-AS1	1.04039096	0.00478605	0.03592143
DPYS	2.46730515	0.00479422	0.03597216
PROKR2	4.79256079	0.00480125	0.03599795
CTAGE6	2.01261631	0.00480189	0.03599795
PEBP1P2	2.35730781	0.0048062	0.03601974



PPIAP11	2.27801956	0.00481271	0.03605791
PITPNA-AS1	1.41161454	0.00481901	0.03608515
TUBG1P	-2.4386369	0.00481917	0.03608515
SLCO6A1	4.63479664	0.00482079	0.0360867
HDGFP1	-2.1144498	0.00483928	0.03621202
OTP	5.86625754	0.00484149	0.03621202
PANK1	1.18529693	0.00484366	0.03621546
RPL41P1	1.87466798	0.00486165	0.03631804
SCG3	3.66075432	0.00486691	0.03633611
SLC10A5P1	3.6494855	0.00486857	0.03633785
ST13P18	4.13658591	0.00487132	0.03634773
GRID2IP	2.64767461	0.00487811	0.03637719
LIPF	4.4904173	0.00488487	0.03640634
ZSCAN23	-1.4819006	0.00489311	0.03644878
RPS7P1	-1.1165159	0.00489342	0.03644878
SETP12	2.50719798	0.00490263	0.03650669
CLEC5A	-1.0018535	0.0049187	0.0366012
ARG1	1.67177151	0.00492027	0.0366012
FNDC1-IT1	-2.2600747	0.00492129	0.0366012
SLC5A7	4.74923699	0.00492248	0.0366012
UGT1A2P	2.92278528	0.00492725	0.036626
TAC1	3.82750546	0.00493567	0.03664666
COLCA1	1.24176888	0.00493597	0.03664666
TECTA	1.24025158	0.00494332	0.03668136
LINC00844	2.63960026	0.00495038	0.03671991
LINC00892	3.82288994	0.0049562	0.03673431
CCDC87	2.92441075	0.00496467	0.03678535
KRT14	3.27921367	0.00496597	0.03678535
FGF19	3.36861585	0.00497478	0.03682922
SNORD99	-1.2498186	0.00497688	0.03683407
HCG25	1.298086	0.00498369	0.03687379
RPL26P30	2.23070353	0.00498549	0.03687644
MIR644A	1.83407181	0.00498795	0.03688395
CILP	1.07596278	0.00499162	0.03690045
SCARNA3	-1.5626979	0.00499759	0.03693388
NKX2-3	5.60695397	0.00500244	0.03693763
TRMT112P4	4.61044018	0.00501829	0.03703324
AKAP3	2.17068367	0.00502245	0.03705269
KRT18P41	6.68041459	0.00502518	0.03705269
SUPT20HL1	5.67981161	0.00502527	0.03705269

PLA2G10	2.81678118	0.00503411	0.03710713
SIGLEC14	-1.0463095	0.00503827	0.03712706
CNBD1	5.09575174	0.00504173	0.03714188
NAPRT	1.11205918	0.00505458	0.03721504
MIR3174	2.28888017	0.00506323	0.03725443
METTL7B	1.6253818	0.0050643	0.03725443
HSD17B8	1.53800224	0.00506913	0.03727659
SCGB1A1	-1.9817412	0.00507337	0.03728892
RPS4XP9	6.40245087	0.00507724	0.03729812
KLK6	4.84205582	0.00507754	0.03729812
NGFR	1.42547561	0.00508765	0.03735134
SLC7A4	3.25818171	0.00508771	0.03735134
S100A7	-2.0724508	0.00510003	0.03741653
MT-CO3	1.06739409	0.00510718	0.03744045
SPATA16	5.35943484	0.005122	0.03753833
TRBV5-1	5.39424932	0.00513284	0.03760693
DAND5	-1.7939817	0.00513666	0.03762419
MTND5P10	4.43463103	0.00514138	0.03764791
SRD5A2	2.96787009	0.0051481	0.0376755
OR2T6	5.22418357	0.00514982	0.03767732
SYT16	2.73459947	0.00515714	0.03770931
CTRC	3.09514667	0.00517212	0.03780801
SRGAP2-AS1	-2.4994628	0.00518221	0.0378709
OTX2	6.29153386	0.00518994	0.03791654
HTN3	5.92931583	0.00519219	0.03792214
REXO1L1P	4.93754524	0.00519598	0.03793896
RN7SKP11	-1.8241563	0.0052057	0.03798822
PSMC1P9	3.27048472	0.00521052	0.03800185
PTGES3P2	2.96283186	0.00521054	0.03800185
PWAR5	-2.8727355	0.00522258	0.03807875
AOX2P	3.08378232	0.00522549	0.03808868
RNU6-564P	2.96377689	0.00523183	0.03811359
FUT9	3.48495345	0.00525508	0.03826108
FOXD4L4	4.11528471	0.00525958	0.038283
LINC01582	5.26929407	0.00526885	0.03833949
PADI6	6.03881525	0.00527288	0.03835315
LINC01020	4.50985545	0.00527373	0.03835315
FCRL2	1.77064852	0.00529245	0.03846739
SPHKAP	-2.1389942	0.00530013	0.03851225
CIDEA	4.08491913	0.00531744	0.03858317

PIPOX	2.03218453	0.00532129	0.0386001
MIR3145	2.0482257	0.00532766	0.03862443
LINC01562	3.56764521	0.00533944	0.03868271
HPX	2.7615573	0.00534044	0.03868271
SNORA71D	-2.823836	0.00534176	0.03868271
ALG3P1	2.35026194	0.0053554	0.0387705
TRAV29DV5	5.72270931	0.00536612	0.03882609
LINC01030	4.01872822	0.00537417	0.03886929
PABPC1P7	3.5585665	0.00537514	0.03886929
GPR32	-2.3215187	0.00538259	0.03891221
MIR7515HG	4.61640153	0.00538491	0.03891793
RLN2	4.60878203	0.00538802	0.03892941
ZHX1-C8orf76	2.40542785	0.00540137	0.03901485
WASH2P	1.58777966	0.00542023	0.03911785
HSPA1B	-1.2225165	0.00543112	0.03918534
MTND5P15	3.24394683	0.00544991	0.03930985
CYP4F8	4.56666949	0.00545881	0.03936292
TEPP	2.45864457	0.00546036	0.039363
GRB7	1.08706706	0.00546703	0.03938144
CDKL2	-1.1841004	0.00546755	0.03938144
OR7E25P	5.29201059	0.00547124	0.03939692
DUX4L18	-2.2860954	0.00548151	0.03945979
TRAJ37	3.74012152	0.00548811	0.039485
ABCB5	3.20024546	0.00548985	0.03948642
LINC00698	4.98509369	0.00549288	0.03949708
RNU6-998P	1.64312871	0.00549523	0.03950122
FKBP4P6	5.35386885	0.0055178	0.03961402
GRK7	3.26922521	0.00552102	0.03962134
ADAMTS7P1	3.16319462	0.00552851	0.03966203
RN7SKP160	3.44936249	0.00553215	0.03966452
CYMP	5.41631388	0.00553329	0.03966452
PXMP2	1.41999338	0.00553892	0.03967181
OR8D1	3.40267433	0.00555323	0.03975948
PSG8	5.23748192	0.00555428	0.03975948
LINC01277	2.79160374	0.00556994	0.03985465
SMYD1	3.46427721	0.00558364	0.03992561
HSD3B1	3.41079462	0.00558374	0.03992561
MAL	-1.3915671	0.00559751	0.04001288
MAB21L3	2.89104565	0.00560637	0.04006502
OGFR-AS1	2.29881573	0.00560924	0.04007427

ITIH4-AS1	2.95106842	0.00561131	0.04007784
OR5BK1P	-2.3640282	0.0056267	0.04015411
FAM230C	3.29333762	0.00564016	0.04021642
RNU6-968P	4.69562199	0.00564424	0.0402343
CTBP2P7	3.29250714	0.00565832	0.04031221
ELAVL2	3.52185672	0.00566943	0.04036879
PIGCP1	-2.4153224	0.0056949	0.04049374
RNU6-13P	-2.4681983	0.00572604	0.04065939
RN7SL178P	-2.0553772	0.00572657	0.04065939
FGF10	-1.0591276	0.00572775	0.04065939
MUSTN1	3.04731922	0.00573239	0.040681
LINC01529	2.67865723	0.00579029	0.04104427
PITX2	3.97385817	0.00579161	0.04104427
COL6A5	-1.3901752	0.0057938	0.04104632
LIN28B	4.4154566	0.00583309	0.04125812
LINC00485	3.65766415	0.00584659	0.04133633
FBXW11P1	3.25241968	0.00584739	0.04133633
SERPINB7	-1.9335753	0.0058551	0.0413794
CA15P1	2.35312439	0.00586331	0.04142594
VDAC1P13	-2.0832066	0.00587335	0.04148541
ADAD2	3.01300515	0.00588301	0.04153068
MTND2P32	3.18148654	0.00588927	0.04154039
ANKRD20A8P	2.60041532	0.00590686	0.04165295
BTF3P7	4.58792099	0.00590887	0.04165567
LRTM2	4.88755309	0.00592689	0.04176982
GJA4	1.09824992	0.00595667	0.04195297
CDH8	2.52999434	0.00595979	0.0419567
IRF5P1	6.03315889	0.00596899	0.04198869
IYD	2.09566338	0.00596909	0.04198869
FXYD2	1.50488438	0.00596926	0.04198869
FMO4	1.02985174	0.00597325	0.04200515
NAT8L	2.84937967	0.00598427	0.04207107
LINC01033	2.10074483	0.00598793	0.04208523
UBTFL9	5.5175281	0.00600299	0.04215631
EVPLL	2.81392362	0.00601534	0.04223137
TLL2	2.01670806	0.00601826	0.04224028
PRELID1P1	3.04800198	0.00602722	0.0422799
MRGPRF-AS1	3.19482124	0.00604388	0.04235343
SLC15A5	5.06342857	0.00604433	0.04235343
ACTG1P10	-2.4462551	0.00604832	0.04236975

KRT18P8	4.75776098	0.0060526	0.04238813
AIFM3	1.55281703	0.00607297	0.04249287
HNRNPA1P66	2.82985206	0.00607389	0.04249287
RN7SL180P	2.78304348	0.00607421	0.04249287
TDGF1	3.00281216	0.00608834	0.042567
ANXA2R	1.28930742	0.00609029	0.042567
PLA2G5	1.16419086	0.00610731	0.04264968
EHHADH-AS1	5.12858768	0.00610832	0.04264968
LINC01446	3.39866439	0.00611725	0.0427004
ZC2HC1C	1.02875174	0.00614939	0.04287787
RNU4ATAC11P	1.62485668	0.00617837	0.04305639
RIBC2	-1.8040399	0.00618483	0.04307024
CYB5RL	1.09719114	0.00618516	0.04307024
MAEL	3.10103069	0.00618854	0.04308027
LCN6	2.84706217	0.00619102	0.04308575
OR4N2	4.2203638	0.00619823	0.04311249
EEF1A1P21	6.46174838	0.00620071	0.04311795
SNX29P2	1.13543965	0.00623797	0.04329508
TNNC1	-1.5585419	0.00623912	0.04329508
SUN3	3.99895075	0.00624146	0.04329508
PCGF7P	5.06890227	0.00624155	0.04329508
SLC38A11	1.89681371	0.00624313	0.04329508
RAB19	1.69653212	0.00627685	0.0434935
FNDC7	2.44361428	0.00630239	0.04363631
CYP2C9	2.90967473	0.0063028	0.04363631
OR4A19P	5.57092132	0.00630514	0.04363631
CXXC1P1	6.29024347	0.006306	0.04363631
ST13P2	2.78880735	0.00631447	0.04367121
OR52T1P	2.21964954	0.00633003	0.0437433
SMPD2	1.33490614	0.00633726	0.04376592
LINC01514	5.58785163	0.00633778	0.04376592
MTND5P21	6.37616602	0.00633844	0.04376592
FBXL22	2.17663713	0.00635042	0.04383658
CRISP2	4.90768171	0.00635211	0.04383658
RNU1-38P	-2.3643102	0.00635694	0.04385805
LINC01098	4.61982712	0.00637169	0.0439361
LINC01088	1.96985579	0.0063758	0.04395259
SNORA66	-1.4524566	0.00638371	0.0439952
PPP1R3A	3.77771065	0.00640409	0.04412375
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LINC01405	3.30078522	0.00643517	0.04427818
C1orf167	2.63612308	0.00644183	0.04428823
LSINCT5	5.17909815	0.00644883	0.04431253
CNR2	2.92067618	0.00647078	0.04442749
DCAF12L1	5.55664181	0.00647479	0.04444307
MIR4635	2.20888404	0.00648846	0.04448715
RNA5SP219	-2.2039447	0.00648992	0.04448715
KLKB1	2.20759259	0.00651286	0.04459848
TAS2R7	5.29445879	0.00651351	0.04459848
RNU6-202P	1.9898406	0.00651489	0.04459848
RNU6-966P	-2.3952239	0.00651841	0.04461062
KCNU1	4.98455722	0.00653421	0.04469477
SNORD105B	-2.0458998	0.0065363	0.04469712
EPYC	5.07484746	0.00654478	0.04473112
PVALB	5.09385604	0.00654813	0.04474207
ZNF98	2.6517509	0.00655763	0.04479499
HHATL	3.24338211	0.00658065	0.04494018
OR8D4	4.92989803	0.00660955	0.04512554
MYBPHL	2.2157705	0.00663047	0.0452353
FBN3	2.97454345	0.0066585	0.04541118
GLDCP1	2.94868595	0.00666575	0.04543534
RN7SKP178	-2.2271909	0.00667404	0.04545699
MT-TQ	2.02132068	0.00667412	0.04545699
TRAV5	5.18284135	0.00668068	0.04548951
TRAJ22	3.38261705	0.00669053	0.04553234
PPEF2	3.76359713	0.00669464	0.04554813
DYNLRB2	2.36130161	0.00670184	0.04557287
FTH1P24	-2.2416965	0.00671002	0.04561412
SCN3A	1.65675342	0.00671148	0.04561412
CHP2	5.51969138	0.0067255	0.04566672
KLK2	4.62180415	0.00672841	0.04566672
NDUFB1P2	2.38927713	0.00672994	0.04566672
ASNSP1	4.41524213	0.00673503	0.04567696
RNU6-125P	1.6152078	0.00674715	0.04573257
IGKV1D-27	-2.3955262	0.00674814	0.04573257
SHANK2-AS1	-2.4568115	0.00674953	0.04573257
VN1R17P	4.40927506	0.00680718	0.04606839
C10orf90	2.77559242	0.00681326	0.04609733
PRDM9	5.05801925	0.00681647	0.04610683
LIN7B	1.78399228	0.00683255	0.04620336

CYP2D7	2.21856545	0.00683691	0.04622062
SNX18P5	3.75669103	0.00684156	0.0462304
RNU6-219P	-2.1755022	0.00684198	0.0462304
CRACR2B	1.24313447	0.00685506	0.04629429
OR51L1	4.91943032	0.0068671	0.04635277
EMC9	1.31995451	0.00688204	0.04643969
RN7SKP195	-2.2903607	0.00688793	0.04645923
GYG2	1.76983288	0.00689814	0.04651145
AK5	3.30243324	0.00691563	0.04661708
POTEH	4.90146477	0.00693135	0.0466984
INA	3.98199975	0.0069468	0.04678153
CRYGS	1.33664619	0.00695337	0.04680973
LINC01583	5.09153546	0.00696277	0.04686066
BTBD18	-2.3603115	0.00698411	0.0469671
C1QTNF9	2.85895982	0.00698695	0.04697389
ZNF732	2.36631241	0.00700137	0.04705843
SNORD12B	-2.8199342	0.00700886	0.0470928
STXBP5L	3.99808659	0.00701198	0.0470928
NMNAT1P3	5.6306338	0.00701202	0.0470928
FSTL4	1.87601057	0.00702211	0.04714821
BBOX1-AS1	3.31071476	0.00703773	0.04724064
OR2L13	4.59369986	0.00704962	0.04729558
CLEC3A	5.10482601	0.00707123	0.04740323
EPHX3	2.14197562	0.00710913	0.04763226
IZUMO3	5.52245442	0.0071358	0.04776087
SNORA65	-1.4356565	0.007151	0.047825
TM6SF2	2.7052667	0.00715341	0.04782859
BEAN1-AS1	1.7039359	0.0071615	0.04785766
OR2G3	5.62833416	0.00716545	0.04786555
ACAD11	1.16998039	0.00716643	0.04786555
GOLT1A	1.83348173	0.00718483	0.04797588
TBC1D3L	2.08963551	0.0071911	0.04800521
SNORA70G	-2.3170297	0.00719702	0.04802816
HEXIM2	1.30129226	0.00720018	0.04802816
LRRC70	2.03082372	0.00720567	0.04805223
GPR12	4.2635931	0.00720872	0.04806
FAM180A	1.31198855	0.00722588	0.04815454
SLC8A2	-1.9333655	0.00722667	0.04815454
CAP1P2	2.00654897	0.00723877	0.04819783
C11orf52	3.77850165	0.00725009	0.04824767

RNA5SP202	-2.9643081	0.00725389	0.04826037
DQX1	2.50587337	0.00728474	0.04844823
OR10Z1	3.82458107	0.00728592	0.04844823
ZNF730	-1.7621566	0.00730919	0.04857768
SNORA46	-1.2967472	0.00731865	0.04862787
SNORA68	-2.1432944	0.00734537	0.04872393
PEX11G	1.80572092	0.00734632	0.04872393
LINC01503	1.20953393	0.00739497	0.04899479
ARSH	4.82749746	0.0073976	0.0489995
CXCL13	2.04909479	0.00740474	0.04903407
ENKUR	-1.2521568	0.00741933	0.0490925
DSCAML1	1.26909469	0.00744062	0.04920788
SLC38A4	2.27963656	0.0074558	0.04929555
RNY3	-2.5713495	0.00746042	0.04931328
ATP12A	3.30449252	0.00746648	0.0493406
IGKJ4	2.74049195	0.00747348	0.04936599
LINC00885	2.11519976	0.00748588	0.04943044
TRIM51	5.36816531	0.00750729	0.04955899
CDH20	3.35389412	0.00753134	0.04966936
TIMD4	1.56701603	0.0075317	0.04966936
MIR553	1.65637829	0.00754037	0.04971314
FOXB1	5.84927005	0.00754292	0.04971708
CDCA4P3	3.4071072	0.00757228	0.04986552
RSPH10B	2.21617236	0.00757337	0.04986552
ZDHHC22	4.84924746	0.00758521	0.04991856



Table A2. Log Fold Change of Blood Differential Gene Expression Analysis

Gene	log FC	P Value	FDR
ANKRD45	5.39873232	2.40E-19	7.52E-15
ADAMTS2	8.22241955	4.29E-18	6.74E-14
GALNT18	6.00171813	1.12E-17	9.83E-14
NR2E1	7.53250723	1.41E-17	9.83E-14
PCDHGB9P	12.2107098	1.57E-17	9.83E-14
PCSK9	8.43233746	2.47E-17	1.15E-13
TMPOP2	9.74597125	2.97E-17	1.15E-13
LINC01960	10.2832422	3.57E-17	1.15E-13
ACOD1	10.9140799	3.85E-17	1.15E-13
FAM187B	9.32706433	4.15E-17	1.15E-13
S100A16	9.77361329	4.77E-17	1.15E-13
CES3	10.2689914	5.94E-17	1.33E-13
RPLP2P1	6.13351455	6.46E-17	1.35E-13
IBA57.DT	10.9783983	7.09E-17	1.39E-13
SMPD5	8.68358341	7.88E-17	1.46E-13
KRT18P26	7.08764553	9.23E-17	1.59E-13
KIAA0087	8.6372861	9.64E-17	1.59E-13
IFIT1P1	5.29904915	1.21E-16	1.90E-13
RN7SKP26	5.59924068	1.34E-16	1.99E-13
VPS26CP1	7.5281554	1.44E-16	1.99E-13
NAT8L	5.45424245	1.46E-16	1.99E-13
MAS1	11.2581886	2.11E-16	2.65E-13
SH2D6	7.25445149	2.41E-16	2.91E-13
NANOGP6	9.96773895	2.56E-16	2.98E-13
SPATA18	8.00383669	2.84E-16	3.19E-13
AADA2L2.AS1	8.77153597	3.65E-16	3.80E-13
GRIN2A	9.68998759	3.83E-16	3.80E-13
ZYG11A	4.70918119	4.09E-16	3.80E-13
RN7SL494P	4.36427107	4.12E-16	3.80E-13
LINC02621	5.77364511	4.55E-16	3.97E-13
BTG3.AS1	7.87904047	4.88E-16	4.14E-13
PTP4A1P1	6.05256687	5.26E-16	4.35E-13
FBXO16	5.26488128	5.94E-16	4.67E-13
MLXP1	8.42523825	6.46E-16	4.79E-13
TBX10	7.38045172	6.56E-16	4.79E-13
RAB6C.AS1	4.96552926	6.96E-16	4.97E-13
PPP1R9A.AS1	3.93508752	7.27E-16	5.07E-13

CD200R1L.AS1	4.27233285	8.98E-16	5.85E-13
RIPOR3.AS1	7.98625241	9.13E-16	5.85E-13
SPDEF	7.12417689	1.12E-15	6.68E-13
PSMC1P7	8.69117461	1.15E-15	6.68E-13
GABRE	8.42910713	1.22E-15	6.68E-13
DIP2C.AS1	8.95845927	1.24E-15	6.68E-13
TRARG1	10.0993757	1.25E-15	6.68E-13
MRO	10.4574195	1.26E-15	6.68E-13
HECW1	7.60772342	1.27E-15	6.68E-13
KBTBD12	6.77065664	1.27E-15	6.68E-13
CDHR4	7.83598613	1.28E-15	6.68E-13
SRD5A3P1	6.714702	1.52E-15	7.69E-13
WFDC1	9.11275234	1.56E-15	7.79E-13
EPCAM.DT	5.44671206	1.63E-15	7.90E-13
VEGFD	8.20806718	1.79E-15	8.31E-13
PRTG	8.1866231	1.80E-15	8.31E-13
ZDHC20P2	5.60126935	1.87E-15	8.31E-13
ADAMTS12	9.21644641	1.88E-15	8.31E-13
RPS15AP18	5.68483586	1.91E-15	8.31E-13
OR52T1P	6.73661015	2.01E-15	8.42E-13
LINC01942	3.35150738	2.05E-15	8.42E-13
TBX20	7.61278528	2.07E-15	8.42E-13
LINC00221	6.87956067	2.11E-15	8.48E-13
RN7SKP37	6.87256052	2.14E-15	8.51E-13
DPPA2P2	6.52048815	2.19E-15	8.53E-13
SPACA3	5.37837536	2.23E-15	8.53E-13
PPP1R27	6.26803233	2.26E-15	8.53E-13
KRT40	6.48738214	2.33E-15	8.62E-13
NWD1	7.94749388	2.37E-15	8.65E-13
LINC00578	7.20143163	2.43E-15	8.71E-13
CMA1	6.97401511	2.44E-15	8.71E-13
LRP4	7.89320064	2.72E-15	9.43E-13
SRPX2	7.91581653	2.72E-15	9.43E-13
INSRR	7.79245956	2.73E-15	9.43E-13
ERICH2	8.11944907	3.00E-15	1.01E-12
DCC	6.27434225	3.14E-15	1.03E-12
SLC6A12.AS1	4.33865303	3.26E-15	1.06E-12
TIMP4	6.52676091	3.32E-15	1.06E-12
ZNF516.DT	8.51676747	3.45E-15	1.09E-12
CCDC54	6.74527551	3.62E-15	1.13E-12

RHCG	6.54686978	3.70E-15	1.14E-12
PROX1	9.35512567	3.99E-15	1.19E-12
ARFGF3	6.48449334	4.35E-15	1.25E-12
PNMA2	9.10984752	4.38E-15	1.25E-12
TXNDC8	5.12434727	4.43E-15	1.25E-12
ARL6IP1P1	7.17071277	4.78E-15	1.34E-12
CCDC27	7.32492642	4.92E-15	1.37E-12
LINC02527	6.7826191	4.99E-15	1.37E-12
CSP2	7.06996747	5.05E-15	1.37E-12
SNORA11	5.81994549	5.06E-15	1.37E-12
SCARNA14	5.14305208	5.94E-15	1.56E-12
TEAD3	7.55420863	5.97E-15	1.56E-12
ZNF843	8.33632955	6.60E-15	1.70E-12
GAP43	7.10208874	6.68E-15	1.70E-12
SEC16B	8.20669093	7.02E-15	1.76E-12
NEU4	5.93958028	7.09E-15	1.77E-12
ATP5MF.PTCD1	5.9184976	7.45E-15	1.83E-12
GPR179	6.80279373	7.67E-15	1.85E-12
AFDN.DT	6.79825128	8.32E-15	1.98E-12
SMCO2	5.36532724	8.50E-15	2.01E-12
LINC02137	5.4180975	8.70E-15	2.04E-12
INA	6.91130764	9.66E-15	2.25E-12
KNCN	8.78643786	1.02E-14	2.35E-12
SH2D5	6.41410535	1.04E-14	2.39E-12
SHANK3	8.3367963	1.06E-14	2.42E-12
NBPF4	5.27664321	1.12E-14	2.52E-12
LINC02128	6.98375609	1.15E-14	2.56E-12
LINC02626	6.72908037	1.15E-14	2.56E-12
DLL4	5.69275566	1.16E-14	2.56E-12
SLCO2B1	5.22716181	1.22E-14	2.66E-12
CHRNA6	5.68563408	1.25E-14	2.71E-12
MIR130AHG	6.32594405	1.35E-14	2.89E-12
GEMIN8P4	8.80720333	1.43E-14	3.02E-12
CBY2	4.65740526	1.45E-14	3.04E-12
SPRY4	6.23098731	1.58E-14	3.28E-12
SLC9A4	3.86099038	1.61E-14	3.30E-12
GLRA3	5.36335298	1.61E-14	3.30E-12
TNFAIP8L3	5.51930578	1.68E-14	3.43E-12
LINC02864	5.95464821	1.96E-14	3.92E-12
RPL7P4	7.2290122	1.97E-14	3.92E-12

GPR176	5.69505428	2.03E-14	3.99E-12
PGAP4	6.43541707	2.04E-14	3.99E-12
LRRC4B	6.58894525	2.17E-14	4.20E-12
LINC01479	6.02304344	2.24E-14	4.31E-12
CPE	5.12597456	2.31E-14	4.39E-12
APLP1	4.57147581	2.37E-14	4.46E-12
CHIA	5.88334556	2.37E-14	4.46E-12
RN7SKP237	5.40956577	2.42E-14	4.49E-12
FAM133FP	4.26613137	2.44E-14	4.51E-12
SHROOM3	5.8333086	2.47E-14	4.53E-12
FAM189A2	6.95947284	2.51E-14	4.57E-12
BTF3P6	5.93927578	2.52E-14	4.57E-12
IMP3P2	5.94313331	2.81E-14	5.04E-12
SLC66A1L	6.62198552	2.88E-14	5.13E-12
FLNC	5.95697078	3.00E-14	5.27E-12
KRT18P48	4.7567895	3.17E-14	5.50E-12
LINC00523	6.67584793	3.18E-14	5.50E-12
LINC01961	5.63310065	3.20E-14	5.50E-12
CHRNA3	5.62821833	3.48E-14	5.84E-12
RPL6P8	7.08862424	3.52E-14	5.85E-12
RPSAP13	5.5753937	3.66E-14	5.93E-12
OR7E46P	5.15230381	4.05E-14	6.45E-12
KCNIP3	5.64592792	4.09E-14	6.48E-12
RNU6.766P	5.04551717	4.11E-14	6.48E-12
DDX25	6.44092833	4.25E-14	6.63E-12
MTCO1P51	5.56654385	4.31E-14	6.70E-12
ALG14.AS1	5.24959603	4.34E-14	6.70E-12
GPR89P	6.20421154	4.36E-14	6.70E-12
A1CF	5.22394593	4.44E-14	6.77E-12
MST1R	5.5928796	4.49E-14	6.80E-12
PRDM13	5.60002712	4.53E-14	6.80E-12
SSUH2	5.59982834	4.63E-14	6.92E-12
HS3ST5	6.34664243	4.97E-14	7.33E-12
SLC6A11	6.79515895	5.10E-14	7.49E-12
GAPDHP44	4.95817265	5.21E-14	7.61E-12
LINC01933	4.35626708	5.23E-14	7.61E-12
CSPG4	4.97721373	5.56E-14	8.05E-12
LRRC4C	5.45763017	5.62E-14	8.09E-12
XIRP1	5.47695536	5.99E-14	8.59E-12
DUOX2	4.77142918	6.14E-14	8.76E-12

ANKRD26P1	5.4614173	6.43E-14	9.14E-12
RADIL	6.65351642	6.58E-14	9.29E-12
SPATA31C1	4.68074144	6.60E-14	9.29E-12
FGL1	6.00246196	7.38E-14	1.02E-11
REEP2	4.60885132	7.46E-14	1.02E-11
EMP2	6.3581043	7.47E-14	1.02E-11
LINC02334	5.94033064	7.48E-14	1.02E-11
MATN3	5.38264757	7.81E-14	1.06E-11
MTND5P33	5.9469286	8.42E-14	1.14E-11
C11orf87	4.65459666	8.57E-14	1.15E-11
C1QTNF1	5.43188196	8.58E-14	1.15E-11
COBL	6.11035538	8.63E-14	1.15E-11
ADGRG7	5.38258114	8.94E-14	1.18E-11
SCN2B	4.33936761	8.94E-14	1.18E-11
POTEH	5.25278721	9.22E-14	1.21E-11
CCDC158	6.55929559	9.41E-14	1.23E-11
RPL31P47	4.47568617	9.57E-14	1.24E-11
FBXW11P1	5.62734549	1.00E-13	1.28E-11
SALL4	5.05069572	1.04E-13	1.32E-11
AGR2	5.3715687	1.05E-13	1.32E-11
IGLV6.57	2.93849708	1.07E-13	1.34E-11
LINC01823	5.86344127	1.11E-13	1.37E-11
LINC02909	4.83527445	1.17E-13	1.43E-11
RPS3AP31	5.33438337	1.18E-13	1.43E-11
NPHP3.AS1	5.21828004	1.20E-13	1.46E-11
SPSB4	5.7683383	1.25E-13	1.51E-11
MYH7	5.65822592	1.27E-13	1.52E-11
RPS3AP40	5.65995902	1.42E-13	1.68E-11
OTOP2	5.00861318	1.43E-13	1.69E-11
RPS18P13	5.75702116	1.46E-13	1.71E-11
AQP7P1	3.98015624	1.47E-13	1.72E-11
SPIN2P1	4.59758882	1.47E-13	1.72E-11
CRTAC1	5.44108445	1.47E-13	1.72E-11
BDKRB2	5.47408747	1.51E-13	1.75E-11
HERC2P7	4.69889134	1.53E-13	1.76E-11
CASP12	5.97888465	1.59E-13	1.82E-11
NOTCH3	4.55765317	1.73E-13	1.96E-11
PCDHGB2	6.80953378	1.81E-13	2.02E-11
COL8A1	4.05956033	1.81E-13	2.02E-11
RPS7P6	4.62019365	1.82E-13	2.02E-11

CCDC169	6.19482137	1.90E-13	2.11E-11
TAS2R41	5.00314607	2.01E-13	2.22E-11
KIF6	6.28471853	2.03E-13	2.22E-11
FBN1.DT	5.03307955	2.10E-13	2.30E-11
CRYBA4	4.9036773	2.12E-13	2.31E-11
CYCSP24	4.42228244	2.14E-13	2.32E-11
RPL35AP6	6.81759707	2.14E-13	2.32E-11
SLC25A47	4.9680451	2.18E-13	2.35E-11
OR1F2P	5.54910993	2.19E-13	2.35E-11
GNG12	4.08809707	2.21E-13	2.36E-11
LINC01932	4.43263261	2.21E-13	2.36E-11
LINC01915	5.27344556	2.34E-13	2.48E-11
RPL7P12	4.40067666	2.41E-13	2.55E-11
RN7SKP40	3.95433008	2.55E-13	2.69E-11
SNAP23P1	4.79200146	2.57E-13	2.70E-11
HSD3B1	5.07555264	2.65E-13	2.76E-11
BVES	5.41982286	2.65E-13	2.76E-11
KRTAP29.1	4.54890957	2.75E-13	2.85E-11
PGM5P4.AS1	6.54306201	2.97E-13	3.06E-11
MRGPRE	4.14669093	3.00E-13	3.07E-11
ULBP1	4.69046923	3.03E-13	3.10E-11
RBISP1	4.75240304	3.08E-13	3.14E-11
RN7SL606P	4.584157	3.22E-13	3.26E-11
PCDHGA1	5.10946951	3.25E-13	3.29E-11
MIR942	5.25487715	3.65E-13	3.62E-11
AKAP14	4.750865	3.77E-13	3.72E-11
GRM1	5.48897285	3.80E-13	3.74E-11
ARNT2	4.8313105	3.89E-13	3.82E-11
GML	4.9603147	4.02E-13	3.93E-11
KRT8P15	4.41067629	4.15E-13	4.02E-11
AHCYP2	4.36191031	4.17E-13	4.02E-11
FABP2	4.10702174	4.18E-13	4.02E-11
NAT8	3.1377731	4.19E-13	4.02E-11
HUS1B	5.75337045	4.25E-13	4.06E-11
SFR1P2	4.67954042	4.43E-13	4.21E-11
CXCL11	3.86376734	4.44E-13	4.21E-11
GPR156	4.7089594	4.57E-13	4.31E-11
ENPP7	5.01341421	4.67E-13	4.39E-11
LINC02642	4.44629339	4.81E-13	4.51E-11
FAXC	5.48315142	4.98E-13	4.64E-11

MAP6	4.39065498	5.51E-13	5.07E-11
DNM1P33	4.07544292	5.73E-13	5.25E-11
VAT1L	4.95638043	5.86E-13	5.35E-11
FAM245B	4.73021078	5.90E-13	5.36E-11
LINC01234	4.92165977	6.04E-13	5.46E-11
SLC52A3	6.04452992	6.14E-13	5.54E-11
PPIL1P1	5.77306117	6.29E-13	5.66E-11
ZSCAN4	5.03136948	6.39E-13	5.73E-11
RN7SL689P	7.21102433	6.49E-13	5.81E-11
LINC00840	7.7495028	7.02E-13	6.26E-11
CDH24	4.59915551	7.27E-13	6.47E-11
LINC02136	4.90921092	7.36E-13	6.53E-11
ODAPH	5.23491676	7.50E-13	6.63E-11
FSIP2LP	4.78768413	7.70E-13	6.79E-11
OVCH2	4.21487518	7.88E-13	6.92E-11
RNF150	4.79532716	8.02E-13	7.01E-11
C12orf50	4.65920251	8.25E-13	7.16E-11
CARD10	4.30509457	8.52E-13	7.35E-11
EIF5P2	4.1886305	8.58E-13	7.38E-11
LINC01217	4.71662926	8.60E-13	7.38E-11
IMMP1LP2	4.04415691	9.32E-13	7.93E-11
NXPE4	4.40170247	9.54E-13	8.07E-11
TMEM37	5.09543525	1.05E-12	8.81E-11
CLRN1.AS1	4.51364364	1.06E-12	8.87E-11
HERC2P4	3.42839564	1.07E-12	8.91E-11
PTPRU	6.06799338	1.08E-12	9.00E-11
DBX2	4.73857893	1.09E-12	9.05E-11
TCERG1L	4.53640584	1.10E-12	9.08E-11
HR	4.43953858	1.20E-12	9.93E-11
RCBTB2P1	4.18865623	1.21E-12	9.93E-11
GCKR	5.519338	1.21E-12	9.94E-11
PSORS1C1	4.01238882	1.22E-12	9.98E-11
RN7SL825P	6.10795698	1.22E-12	9.98E-11
SYT3	3.44430218	1.24E-12	1.01E-10
ACP7	5.21600488	1.24E-12	1.01E-10
SDR9C7	4.38642951	1.27E-12	1.03E-10
IGKV3.11	2.29296709	1.29E-12	1.04E-10
HPRT1P1	4.22741165	1.30E-12	1.05E-10
MTND2P9	5.46152676	1.32E-12	1.06E-10
LIN28A	4.04336037	1.39E-12	1.10E-10

TAS2R9	4.1805074	1.40E-12	1.11E-10
TYRO3	6.4828608	1.44E-12	1.14E-10
RN7SL19P	2.85028415	1.50E-12	1.17E-10
RNU6.1115P	4.31285817	1.51E-12	1.18E-10
OXGR1	4.04054518	1.52E-12	1.19E-10
IGHV7.27	2.90352006	1.56E-12	1.21E-10
RPL31P30	3.47401765	1.60E-12	1.24E-10
MYO1D.DT	5.73466575	1.64E-12	1.27E-10
CCND3P1	6.34718699	1.72E-12	1.32E-10
BMPER	4.26459586	1.79E-12	1.37E-10
LINC02805	6.05753681	1.80E-12	1.38E-10
OPN1SW	3.66086561	1.86E-12	1.42E-10
LINC01581	4.49371639	1.86E-12	1.42E-10
KCNT2	6.28188047	1.91E-12	1.44E-10
LINC02227	4.25139251	1.91E-12	1.44E-10
VN1R96P	3.91254009	1.94E-12	1.46E-10
CLLU1	6.41844423	1.96E-12	1.48E-10
CYP4F25P	6.89235315	2.04E-12	1.53E-10
RNA5SP344	3.35725258	2.10E-12	1.56E-10
RPS3AP11	4.06602388	2.15E-12	1.59E-10
PRDM7	4.07293634	2.16E-12	1.59E-10
RN7SL668P	3.86168761	2.16E-12	1.59E-10
MFAP5	5.15527232	2.22E-12	1.63E-10
FOLH1	4.12435441	2.28E-12	1.67E-10
CNPY1	4.31140883	2.31E-12	1.68E-10
FDPSP8	4.14556829	2.43E-12	1.75E-10
PIEZO2	4.59987773	2.45E-12	1.76E-10
ZAR1L	4.24895485	2.53E-12	1.82E-10
THEGL	4.64456187	2.55E-12	1.83E-10
HCG22	6.00664638	2.61E-12	1.87E-10
LSMEM2	3.89991065	2.74E-12	1.95E-10
RPL7AP63	3.7920854	2.80E-12	2.00E-10
SOSTDC1	4.17873591	2.98E-12	2.11E-10
KCNS2	4.97732452	3.35E-12	2.33E-10
ASS1P12	3.8123846	3.50E-12	2.43E-10
RN7SL503P	4.47190172	3.51E-12	2.43E-10
CCDC92B	4.54173278	3.59E-12	2.47E-10
KRT18P62	3.85331635	3.59E-12	2.47E-10
BTNL2	3.42948188	3.64E-12	2.50E-10
CPHL1P	5.20150541	3.65E-12	2.50E-10



LRP11	4.73487383	3.70E-12	2.53E-10
NLRP4	4.66085628	3.84E-12	2.61E-10
PRG3	4.41403001	3.94E-12	2.66E-10
MAFG.DT	3.82744407	4.07E-12	2.75E-10
EEF1GP7	3.60059728	4.29E-12	2.88E-10
ADGRL2	4.56574452	4.33E-12	2.90E-10
LINC01556	3.76964957	4.42E-12	2.95E-10
TEAD1	4.7591053	4.47E-12	2.98E-10
CAB39P1	4.62839003	4.50E-12	3.00E-10
TCEAL3.AS1	4.77358147	4.56E-12	3.03E-10
SIGLEC1	2.85778089	4.62E-12	3.06E-10
IGHV4.61	2.88332257	4.88E-12	3.21E-10
SEPTIN9.DT	3.67908664	4.92E-12	3.22E-10
LINC01589	4.21500451	5.14E-12	3.36E-10
SLC34A2	4.17412619	5.16E-12	3.36E-10
HMGB1P49	3.92809312	5.40E-12	3.51E-10
FAP	4.39391008	5.43E-12	3.52E-10
IFITM3P5	3.55332358	5.52E-12	3.56E-10
MPO	3.23655978	5.55E-12	3.57E-10
LINC02852	3.60518084	5.72E-12	3.67E-10
TPTE2P6	3.91724929	6.95E-12	4.42E-10
DMRT2	3.98537967	7.01E-12	4.46E-10
SH3GL3	5.39885529	7.12E-12	4.52E-10
RPS10P2	3.75136126	7.29E-12	4.60E-10
ZNF385D.AS1	4.15785526	7.29E-12	4.60E-10
ADAMTS8	3.70654245	7.42E-12	4.65E-10
EXOC3L4	3.98441165	7.65E-12	4.79E-10
GDPD2	4.64318646	7.87E-12	4.91E-10
GJA6P	2.85217484	7.96E-12	4.96E-10
NACAD	4.54495289	8.17E-12	5.08E-10
SNX31	4.06565297	8.55E-12	5.30E-10
GYG2	3.90160916	8.62E-12	5.32E-10
TMEM233	3.49164411	8.63E-12	5.32E-10
TGFB2.AS1	3.76025147	9.19E-12	5.63E-10
ATRNL1	4.1483007	9.19E-12	5.63E-10
OR52I2	4.57468767	9.21E-12	5.63E-10
DUSP26	3.7653733	9.22E-12	5.63E-10
CPNE6	3.67616241	9.99E-12	6.07E-10
LINC00520	4.17317333	1.02E-11	6.16E-10
LINC03025	4.39858539	1.03E-11	6.25E-10

PPIAP20	2.88667701	1.05E-11	6.32E-10
HSPB3	4.96330324	1.06E-11	6.35E-10
DLGAP2	6.61015593	1.08E-11	6.46E-10
SULT1C2	4.41304464	1.13E-11	6.73E-10
HCAR1	4.00760976	1.13E-11	6.73E-10
NCCRP1	4.44664554	1.17E-11	6.94E-10
ACTL7A	3.47165749	1.18E-11	6.99E-10
SIGLECL1	2.95649651	1.20E-11	7.06E-10
LINC02026	4.07655055	1.21E-11	7.08E-10
PCLO	3.99266945	1.22E-11	7.10E-10
GCNT1P1	3.26929467	1.27E-11	7.41E-10
AGBL1	3.91785759	1.28E-11	7.43E-10
NR1I3	4.62554262	1.33E-11	7.67E-10
LINC02885	3.9761417	1.33E-11	7.67E-10
MLNR	5.84200524	1.43E-11	8.20E-10
TMCO2	3.04127311	1.45E-11	8.32E-10
ISM2	4.1125848	1.46E-11	8.36E-10
PTCHD1	4.58922311	1.48E-11	8.47E-10
IFNL4	3.18942445	1.50E-11	8.55E-10
ACBD7	4.5878676	1.51E-11	8.56E-10
PIP5K1P1	5.93060345	1.53E-11	8.68E-10
MAPK12	4.68565787	1.56E-11	8.82E-10
SOX21.AS1	4.26796785	1.59E-11	8.94E-10
BIRC7	5.32033572	1.59E-11	8.94E-10
OR6V1	4.53722318	1.62E-11	9.12E-10
NDUFA5P3	3.87899947	1.74E-11	9.74E-10
NKAIN1	3.40867571	1.75E-11	9.75E-10
FST	4.14539801	1.83E-11	1.02E-09
SCG2	3.26346972	1.85E-11	1.03E-09
OR2B2	3.20912488	1.86E-11	1.03E-09
SFXN4P1	3.49543775	1.91E-11	1.05E-09
RPL23AP35	3.433919	1.91E-11	1.05E-09
CASP16P	3.51127214	1.98E-11	1.09E-09
DACH2	3.84500242	2.06E-11	1.13E-09
LINC02932	3.72889059	2.12E-11	1.15E-09
EGFL6	3.98995943	2.16E-11	1.18E-09
SHMT1P1	5.25174776	2.19E-11	1.19E-09
RN7SL213P	4.34435643	2.30E-11	1.24E-09
H2AZ2.DT	3.07859898	2.31E-11	1.24E-09
C6orf132	3.70928225	2.31E-11	1.24E-09

PYY2	4.92568575	2.35E-11	1.26E-09
BSN	4.83596346	2.41E-11	1.29E-09
LINC00592	3.85625148	2.45E-11	1.31E-09
CDIPTOSP	3.52469117	2.64E-11	1.40E-09
TDO2	3.33858246	2.68E-11	1.42E-09
SPATA46	3.45082501	2.71E-11	1.43E-09
RN7SL251P	3.07203933	2.75E-11	1.45E-09
COL1A2	3.58643069	2.85E-11	1.50E-09
FREM1	4.15924526	2.85E-11	1.50E-09
NXF5	3.4020505	2.89E-11	1.52E-09
LINC01977	3.51935148	2.95E-11	1.54E-09
SYDE1	3.84628343	2.99E-11	1.56E-09
VN1R18P	3.7838877	3.29E-11	1.72E-09
KRT17	3.74752906	3.31E-11	1.73E-09
PGM5P3.AS1	3.36012142	3.37E-11	1.75E-09
PLA2G4E.AS1	3.72757576	3.40E-11	1.76E-09
KIF4B	3.33934267	3.45E-11	1.78E-09
KRT13	3.65317411	3.46E-11	1.78E-09
CTCFL	3.27430689	3.71E-11	1.91E-09
LNCTAM34A	3.43490187	3.74E-11	1.92E-09
NECTIN4	3.11905803	3.77E-11	1.93E-09
CFAP95	3.67267519	3.86E-11	1.97E-09
IL13	3.00317857	3.98E-11	2.02E-09
IL22	2.97214321	3.98E-11	2.02E-09
PCAT19	4.74883882	4.08E-11	2.07E-09
ENPP7P11	4.99424221	4.32E-11	2.18E-09
IGLV1.44	2.16312585	4.45E-11	2.24E-09
KCNA5	-7.3287473	4.52E-11	2.27E-09
TK1	1.98484489	5.01E-11	2.51E-09
VLDLR.AS1	3.61084053	5.07E-11	2.53E-09
RSPO3	3.94123379	5.26E-11	2.62E-09
KLRG2	3.62465598	5.32E-11	2.65E-09
MTCYBP28	3.98154256	5.36E-11	2.67E-09
HSD11B2	3.60275674	5.39E-11	2.67E-09
IGHV3.29	4.61533853	5.40E-11	2.68E-09
POF1B	5.52372032	5.44E-11	2.69E-09
LINC01091	3.99619783	5.49E-11	2.71E-09
MAPK8IP2	4.19251632	5.54E-11	2.73E-09
IL17RD	3.14338095	5.63E-11	2.77E-09
CCKBR	3.74205051	6.16E-11	3.02E-09

SPANXA2.OT1	3.90365385	6.89E-11	3.34E-09
CXCL12	3.78234873	6.97E-11	3.37E-09
PLK5	3.603039	7.19E-11	3.47E-09
PRKAR1AP1	3.70760342	7.91E-11	3.80E-09
IGHV1.69D	3.15745717	8.33E-11	4.00E-09
AMBP	3.85192869	8.49E-11	4.06E-09
ERFE	5.31903224	8.72E-11	4.17E-09
PAX3	3.67837329	9.32E-11	4.43E-09
S100A7	2.71391387	9.59E-11	4.55E-09
OR10A5	3.19657538	9.59E-11	4.55E-09
IGHVII.60.1	3.1747897	9.61E-11	4.55E-09
LCE5A	3.65760788	9.81E-11	4.64E-09
SCN2A	4.45394291	9.92E-11	4.68E-09
MARK2P11	3.52380152	1.01E-10	4.74E-09
IGKV2D.28	3.04147597	1.01E-10	4.77E-09
MZB1	1.86572381	1.02E-10	4.81E-09
IL19	5.31605763	1.04E-10	4.85E-09
CBX1P4	4.38635433	1.06E-10	4.97E-09
LRRC77P	3.72152859	1.06E-10	4.97E-09
LINC01426	2.91047111	1.08E-10	5.04E-09
NMNAT1P1	3.78031758	1.10E-10	5.10E-09
SMO	5.5283445	1.10E-10	5.10E-09
TPH2	3.81451771	1.14E-10	5.29E-09
SPIC	2.74573443	1.19E-10	5.48E-09
FRK	3.97958939	1.20E-10	5.53E-09
NTRK2	-7.8534161	1.20E-10	5.53E-09
RIMBP2	-5.6068645	1.23E-10	5.63E-09
ADAMTSL2	3.26798798	1.29E-10	5.88E-09
LINC01361	3.39561096	1.29E-10	5.90E-09
UGT2B15	5.04457255	1.31E-10	5.94E-09
CHRND	3.59791852	1.38E-10	6.27E-09
OLA1P3	3.08597015	1.39E-10	6.28E-09
LINC00377	4.64735513	1.40E-10	6.30E-09
LINC01865	4.49397595	1.40E-10	6.30E-09
IGHVII.33.1	3.33566518	1.50E-10	6.73E-09
LINC02046	3.52685823	1.55E-10	6.95E-09
RPL7AP14	4.15139653	1.55E-10	6.95E-09
RPL7P34	3.91338706	1.58E-10	7.07E-09
CCDC85A	3.3757455	1.59E-10	7.10E-09
LINC01030	3.16363347	1.60E-10	7.14E-09

CCDC187	3.71280235	1.61E-10	7.14E-09
LINC01187	4.92362312	1.62E-10	7.18E-09
STC1	3.50446707	1.66E-10	7.38E-09
MIR31HG	3.15159692	1.68E-10	7.45E-09
C5orf64	4.13730034	1.71E-10	7.56E-09
NMBR	3.33269107	1.77E-10	7.80E-09
LINC02982	3.63013094	1.81E-10	7.97E-09
ZPLD2P	3.62370477	1.81E-10	7.97E-09
KRT19P2	4.13116033	1.84E-10	8.10E-09
TGM7	3.08647005	1.87E-10	8.19E-09
SCIRT	3.35169832	1.90E-10	8.29E-09
SYNPO2L.AS1	3.51581494	1.92E-10	8.36E-09
H3P9	3.36376495	1.93E-10	8.41E-09
CALHM4	3.63694455	1.97E-10	8.54E-09
SPATA3.AS1	2.69214879	2.01E-10	8.67E-09
UQCRHP1	5.82427494	2.12E-10	9.12E-09
MANCR	3.03251907	2.17E-10	9.33E-09
RPL7AP26	2.66043034	2.20E-10	9.42E-09
VDAC2P3	2.96764222	2.22E-10	9.50E-09
KRT20	3.04524956	2.35E-10	1.01E-08
OTX2	3.23797228	2.38E-10	1.01E-08
TTC14.DT	2.93145885	2.42E-10	1.03E-08
PTH1R	3.65425179	2.43E-10	1.03E-08
KATNBL1P3	2.60743312	2.43E-10	1.03E-08
IGHV3.16	3.99875542	2.70E-10	1.14E-08
OR13D1	3.10159601	2.87E-10	1.21E-08
CD207	3.19888867	2.89E-10	1.21E-08
CFAP65	3.18392306	2.94E-10	1.23E-08
IGHG4	2.75057438	2.95E-10	1.24E-08
SNAP25	4.93823938	3.08E-10	1.29E-08
LINC00629	3.03287675	3.13E-10	1.31E-08
LINC00240	2.82807894	3.14E-10	1.31E-08
PDE1A	3.10343251	3.14E-10	1.31E-08
ACKR4P1	3.56466503	3.15E-10	1.31E-08
LINC01307	2.88463666	3.16E-10	1.31E-08
HES2	3.19959793	3.19E-10	1.32E-08
COL16A1	4.81654125	3.32E-10	1.37E-08
RBM24	3.15110017	3.41E-10	1.41E-08
LINC02733	3.2707245	3.57E-10	1.47E-08
LYPD4	3.10771821	3.75E-10	1.53E-08

IFNA14	3.2555787	3.75E-10	1.53E-08
GVINP2	4.01304469	3.82E-10	1.56E-08
NSG2	2.68222545	3.84E-10	1.57E-08
HHIPL2	3.69235471	3.91E-10	1.59E-08
SLC12A5.AS1	2.89016836	3.93E-10	1.60E-08
LINC01895	3.13096109	4.01E-10	1.63E-08
CCDC194	3.62189243	4.01E-10	1.63E-08
OR10J2P	2.89922007	4.19E-10	1.69E-08
AKR1B1P3	3.01536227	4.32E-10	1.73E-08
PGPEP1L	4.50008875	4.33E-10	1.74E-08
CARMN	2.81623825	4.45E-10	1.78E-08
IGF2BP1	2.59569623	4.45E-10	1.78E-08
KRT8P2	3.00733084	4.45E-10	1.78E-08
KRT18P55	2.7897046	4.49E-10	1.79E-08
OVOL1.AS1	2.92179559	4.55E-10	1.81E-08
H2AC10P	4.0721091	4.63E-10	1.83E-08
LINC01415	5.29292871	4.95E-10	1.96E-08
TAFA5	3.15592914	5.05E-10	1.99E-08
GRIK5	4.13228283	5.07E-10	2.00E-08
CILP2	4.03361655	5.26E-10	2.07E-08
RPL32P22	3.40694802	5.35E-10	2.10E-08
CDC20P1	4.28669709	5.52E-10	2.16E-08
LINC01755	3.10491018	5.66E-10	2.21E-08
RPS4XP5	4.92323564	5.83E-10	2.26E-08
OR7E91P	2.53815384	5.94E-10	2.29E-08
TBL1YP1	3.44755625	6.04E-10	2.33E-08
TBX3	3.13486878	6.08E-10	2.33E-08
RPL7AP5	3.23025752	6.29E-10	2.41E-08
RTL9	3.06468317	6.52E-10	2.49E-08
RIC3.DT	2.61194556	6.74E-10	2.57E-08
PIMREGP4	2.67485651	6.78E-10	2.59E-08
SLC25A1P1	3.75298123	6.92E-10	2.63E-08
LINC01095	2.70455728	6.95E-10	2.64E-08
EPN2.AS1	3.07668117	7.03E-10	2.67E-08
GREB1	3.78744676	7.07E-10	2.68E-08
MGAT3.AS1	5.45872217	7.07E-10	2.68E-08
IQSEC3.AS1	-5.6020238	7.25E-10	2.73E-08
TGM4	2.75911288	7.28E-10	2.74E-08
BHLHA15	3.6831906	7.31E-10	2.75E-08
CFAP20DC.DT	2.86266233	7.34E-10	2.76E-08

ARHGAP20	4.46799939	7.40E-10	2.77E-08
MPC1L	3.33643533	7.58E-10	2.83E-08
EGLN3P1	3.40157762	7.62E-10	2.84E-08
LINC00692	3.13307082	7.77E-10	2.90E-08
MIR4265	3.87117385	7.85E-10	2.92E-08
FOXD4L3	2.44750007	7.98E-10	2.96E-08
PBX1.AS1	3.61850838	7.98E-10	2.96E-08
RAPGEF4	3.09705911	7.99E-10	2.96E-08
MCEMP1	1.17591636	8.15E-10	3.02E-08
RAB3B	3.62702706	8.54E-10	3.15E-08
IGHV1.67	4.04465029	8.65E-10	3.19E-08
FFAR1	-4.7472274	8.80E-10	3.24E-08
IGHD3.16	3.44011445	8.81E-10	3.24E-08
LINC02609	4.05618611	9.01E-10	3.31E-08
HTD2	2.85144451	9.03E-10	3.31E-08
FABP5P3	4.67900408	9.04E-10	3.31E-08
POU3F2	2.75856664	9.08E-10	3.32E-08
KCNK9	3.36163006	9.27E-10	3.37E-08
MARK2P9	2.65597341	9.54E-10	3.46E-08
FGF8	2.80742404	9.89E-10	3.58E-08
GPC5	4.90425023	9.92E-10	3.59E-08
RNU4.30P	3.20672318	9.95E-10	3.60E-08
HMGB1P23	2.75805812	1.03E-09	3.71E-08
DDX59.AS1	3.77224131	1.04E-09	3.73E-08
ACTBP8	4.73905869	1.06E-09	3.81E-08
URAHP	2.58511163	1.08E-09	3.87E-08
OOSP1P2	3.81945861	1.10E-09	3.92E-08
LINC01545	3.49621542	1.10E-09	3.93E-08
IGKV2.28	2.31173113	1.10E-09	3.94E-08
LINC02267	3.03220951	1.18E-09	4.18E-08
PKMP5	3.26355143	1.19E-09	4.22E-08
IGLV2.14	1.97133703	1.23E-09	4.34E-08
OR1K1	3.03742424	1.24E-09	4.38E-08
RNA5SP51	2.66397561	1.25E-09	4.43E-08
MARK3P3	2.53753918	1.27E-09	4.47E-08
LINC01224	3.43598054	1.27E-09	4.47E-08
LINC01189	3.22064001	1.36E-09	4.77E-08
RNU4.36P	3.13348428	1.37E-09	4.79E-08
IGHV7.81	4.54600244	1.40E-09	4.88E-08
RPS13P5	4.4419336	1.40E-09	4.89E-08

ACTN3	-4.4502179	1.40E-09	4.89E-08
IFI44L	2.26694979	1.41E-09	4.93E-08
SLC9C2	2.79339804	1.43E-09	4.98E-08
IGKV3D.11	2.53292214	1.46E-09	5.06E-08
KDR	2.96103451	1.47E-09	5.11E-08
IGKV1.33	1.99201443	1.50E-09	5.19E-08
RRM2	2.51814873	1.56E-09	5.39E-08
C7	2.75910497	1.57E-09	5.40E-08
CASC9	2.50907139	1.62E-09	5.58E-08
TENM2	3.53743748	1.63E-09	5.59E-08
LINC02321	3.25683268	1.66E-09	5.69E-08
DLK1	4.4994922	1.66E-09	5.70E-08
STK16P1	3.18143948	1.67E-09	5.71E-08
LINC02250	4.83228579	1.73E-09	5.90E-08
CFAP97P1	3.81314534	1.75E-09	5.96E-08
SYNC	2.6700101	1.77E-09	6.04E-08
ATP6V0E1P1	3.96278979	1.77E-09	6.04E-08
MNS1	3.56128962	1.82E-09	6.17E-08
MET	4.70707726	1.84E-09	6.25E-08
VENTXP6	3.67090948	1.86E-09	6.30E-08
WFDC2	2.71495015	1.91E-09	6.48E-08
GOLGA8IP	3.05735531	1.95E-09	6.60E-08
IGLV1.40	2.34453929	1.96E-09	6.63E-08
C10orf99	2.84284411	1.98E-09	6.65E-08
FNTAP1	-4.3000213	2.06E-09	6.92E-08
ZNF214	2.66688017	2.08E-09	6.97E-08
CCL26	2.71883624	2.15E-09	7.20E-08
FAM124A	4.0384535	2.19E-09	7.31E-08
OXCT2	4.76188084	2.20E-09	7.32E-08
PERM1	3.02079265	2.25E-09	7.47E-08
REN	2.97767386	2.27E-09	7.50E-08
GGT8P	2.46893598	2.32E-09	7.65E-08
KAZALD1	2.90797648	2.33E-09	7.71E-08
CALHM3	3.4981792	2.37E-09	7.81E-08
SLC24A5	3.00368835	2.38E-09	7.85E-08
CD177	2.29776486	2.39E-09	7.88E-08
TUSC8	2.83647773	2.47E-09	8.11E-08
TRIM26BP	2.66511991	2.49E-09	8.16E-08
ANGPTL4	3.4748173	2.52E-09	8.25E-08
RPL23AP33	3.27042887	2.52E-09	8.25E-08



ATG12P2	3.35018978	2.54E-09	8.29E-08
NR5A2	3.80214433	2.55E-09	8.32E-08
OR5AU1	2.69135396	2.57E-09	8.40E-08
TGM5	3.91189907	2.66E-09	8.66E-08
IGLV2.23	2.22281855	2.68E-09	8.69E-08
IGLV9.49	2.44818072	2.77E-09	8.97E-08
IGKV1D.39	2.60746102	2.79E-09	9.03E-08
SLC25A53P1	2.55403783	2.84E-09	9.17E-08
GAS1RR	4.17730737	2.84E-09	9.18E-08
NYAP2	-4.4262055	2.88E-09	9.29E-08
CFAP61	3.82590071	3.00E-09	9.63E-08
PRXL2AP2	3.12677128	3.03E-09	9.71E-08
MTCO3P20	2.97212692	3.08E-09	9.87E-08
FZD9	-4.5479021	3.22E-09	1.03E-07
IGHV4.31	2.93520249	3.25E-09	1.04E-07
GRM7.AS1	3.15533747	3.25E-09	1.04E-07
MALLP2	2.53825609	3.33E-09	1.06E-07
CD38	1.23905406	3.33E-09	1.06E-07
FAM149A	4.24625473	3.34E-09	1.06E-07
IMPG1	3.24732583	3.34E-09	1.06E-07
IGKV1.12	1.96880674	3.38E-09	1.07E-07
RPS3AP54	2.71479389	3.43E-09	1.08E-07
LINC02865	2.59669396	3.55E-09	1.12E-07
TBPL2	2.86125134	3.62E-09	1.14E-07
AMPD1	2.84051007	3.65E-09	1.15E-07
KIF19BP	3.00104857	3.66E-09	1.15E-07
LZTS1.AS1	2.7822919	3.90E-09	1.22E-07
RAET1K	-4.4767013	4.05E-09	1.27E-07
DPYSL3	2.79084038	4.07E-09	1.27E-07
RBP4	6.10210318	4.08E-09	1.27E-07
IGHV1.24	3.10203179	4.12E-09	1.28E-07
PDE9A.AS1	4.08754471	4.12E-09	1.28E-07
TSGA10IP	4.2847983	4.15E-09	1.29E-07
DPEP2NB	4.038324	4.18E-09	1.29E-07
SLC23A4P	2.62385373	4.21E-09	1.30E-07
IGHV7.4.1	3.2894873	4.21E-09	1.30E-07
BCL2L14	4.62798574	4.22E-09	1.30E-07
PCOLCE2	4.49496041	4.23E-09	1.30E-07
MUCL1	2.96955725	4.59E-09	1.41E-07
LINC01548	2.65510848	4.60E-09	1.41E-07

MKI67	1.25570467	4.63E-09	1.42E-07
TIE1	4.27028558	4.65E-09	1.43E-07
TCAM1P	2.80426727	4.76E-09	1.46E-07
RPL23AP36	3.00475425	4.83E-09	1.47E-07
OR2G6	2.8264758	4.94E-09	1.50E-07
WFDC10B	3.39818648	5.00E-09	1.52E-07
USH2A	2.47996591	5.04E-09	1.53E-07
ITIH5	2.71894596	5.06E-09	1.54E-07
KRT87P	3.13539173	5.07E-09	1.54E-07
PDYN	2.48001573	5.19E-09	1.57E-07
CFAP77	2.55085486	5.24E-09	1.59E-07
CCL7	2.67787661	5.27E-09	1.59E-07
TRIM72	4.66966785	5.33E-09	1.61E-07
GPM6A.DT	3.02790161	5.34E-09	1.61E-07
KRT18P22	-4.1098996	5.37E-09	1.62E-07
TCHH	3.38994046	5.54E-09	1.67E-07
SPNS3	-1.3388786	5.56E-09	1.67E-07
FAM83E	2.95688904	5.70E-09	1.71E-07
H2BC5	1.19779777	5.78E-09	1.73E-07
KCTD14	4.40963325	5.78E-09	1.73E-07
PRSS37	4.28015267	6.05E-09	1.81E-07
CYYR1.AS1	2.53457081	6.27E-09	1.87E-07
THRB.AS1	3.37160479	6.35E-09	1.89E-07
DDX55P1	3.52351384	6.42E-09	1.91E-07
IGLV3.25	2.2931002	6.50E-09	1.93E-07
CTNS.AS1	2.93733058	6.64E-09	1.97E-07
LINC01122	3.8760305	6.78E-09	2.00E-07
SHH	2.5175165	6.91E-09	2.04E-07
OR3A1	2.96271633	6.98E-09	2.06E-07
TUBA5P	4.51629431	7.18E-09	2.11E-07
FIGN	4.89391107	7.34E-09	2.16E-07
IDI2	3.00686219	7.48E-09	2.19E-07
KDM3AP1	2.66171981	7.64E-09	2.24E-07
TMPRSS2	2.74865629	7.85E-09	2.29E-07
ZNF75BP	2.43233861	8.13E-09	2.37E-07
TDRG1	-3.4906121	8.13E-09	2.37E-07
CEACAM7	2.83043195	8.26E-09	2.40E-07
OR2B6	2.03158177	8.33E-09	2.42E-07
OR5AN2P	-3.8618342	8.33E-09	2.42E-07
TRAV11	2.39025966	8.74E-09	2.52E-07

HCG17	3.05306884	8.85E-09	2.55E-07
GMPPB	1.18297541	9.15E-09	2.63E-07
ENOX1	2.64112316	9.35E-09	2.69E-07
MPP4	2.88698068	9.46E-09	2.72E-07
PKNOX2	2.60601212	9.55E-09	2.74E-07
ZNF619P1	2.40406337	9.67E-09	2.77E-07
RPL34P21	2.62691385	9.69E-09	2.77E-07
SDK1.AS1	2.73925985	9.76E-09	2.78E-07
C10orf55	3.15952701	1.01E-08	2.87E-07
OR6J1	2.83004266	1.02E-08	2.91E-07
PTCHD3	2.47247888	1.03E-08	2.93E-07
ACTG1P22	2.68270335	1.05E-08	2.98E-07
CENPM	2.05319382	1.05E-08	2.98E-07
FOXC1	3.04577762	1.05E-08	2.98E-07
KLHL41	3.01872912	1.08E-08	3.06E-07
PCDHGA4	3.87710942	1.08E-08	3.06E-07
PHKA1	4.95623946	1.11E-08	3.12E-07
ADAMTS14	2.46052134	1.11E-08	3.14E-07
RN7SL384P	-2.9789493	1.14E-08	3.20E-07
IGLV3.21	2.10129103	1.14E-08	3.20E-07
SPATA17	3.0965357	1.17E-08	3.28E-07
F10	2.47202455	1.18E-08	3.29E-07
IGHV3.69.1	2.09892393	1.19E-08	3.34E-07
UGT2B17	4.01691738	1.20E-08	3.34E-07
MIR193BHG	4.27795066	1.21E-08	3.38E-07
MIR1972.1	2.51689905	1.26E-08	3.49E-07
RASSF8.AS1	2.95466592	1.26E-08	3.49E-07
IGFL2	3.50677579	1.26E-08	3.49E-07
RPL7P60	3.43305035	1.26E-08	3.49E-07
MTND5P25	2.44015353	1.28E-08	3.52E-07
ANOS1	2.48889555	1.29E-08	3.54E-07
RNF39	3.48616584	1.30E-08	3.57E-07
GSDMC	4.32680672	1.30E-08	3.57E-07
EPB41L1	2.69200759	1.30E-08	3.58E-07
GRK7	-3.8260008	1.35E-08	3.70E-07
RNU6.313P	3.42733538	1.40E-08	3.84E-07
H2BC17	1.97334504	1.41E-08	3.86E-07
UPK2	2.61828599	1.41E-08	3.86E-07
SLC13A5	4.74935073	1.42E-08	3.89E-07
RPL23AP72	3.57209073	1.49E-08	4.05E-07

LINC02050	2.27463888	1.51E-08	4.10E-07
EMSLR	3.03327874	1.52E-08	4.14E-07
TMEM167AP1	-3.7230404	1.53E-08	4.15E-07
FBLN1	3.56603379	1.58E-08	4.29E-07
STAB2	3.7793245	1.61E-08	4.35E-07
LINC01108	2.50801318	1.61E-08	4.36E-07
OIT3	4.52189223	1.62E-08	4.37E-07
C10orf67	2.64565235	1.62E-08	4.37E-07
NNMT	3.42396954	1.63E-08	4.41E-07
RPS15AP38	3.26553235	1.69E-08	4.56E-07
PSMA2P1	3.1003235	1.76E-08	4.73E-07
SNRPCP16	-3.1902816	1.80E-08	4.83E-07
POM121L6P	3.77216262	1.80E-08	4.84E-07
RABGEF1P2	3.55546642	1.81E-08	4.86E-07
LINC00242	2.85951203	1.87E-08	5.00E-07
OR52M2P	2.71533735	1.91E-08	5.11E-07
HTR4	3.53889605	1.96E-08	5.22E-07
LINC01980	2.61575482	1.98E-08	5.28E-07
IQSEC3	-4.8887542	1.99E-08	5.30E-07
IGLV3.6	4.20336319	2.03E-08	5.38E-07
RPS6P8	2.49593022	2.09E-08	5.52E-07
TTLL10	3.15658454	2.09E-08	5.54E-07
YWHAQP7	-4.2983588	2.15E-08	5.67E-07
H3C8	4.08999197	2.16E-08	5.70E-07
ZNF295.AS1	2.87918371	2.18E-08	5.75E-07
EEF1GP4	2.50645287	2.19E-08	5.77E-07
MIR579	2.51702763	2.27E-08	5.98E-07
CSNK1G2.AS1	2.48246236	2.29E-08	6.01E-07
TMBIM7P	2.71857277	2.34E-08	6.11E-07
RAPGEF4.AS1	2.41483333	2.34E-08	6.11E-07
NANOGP11	3.12749489	2.38E-08	6.22E-07
TSSK1A	2.45978096	2.56E-08	6.66E-07
SCNN1B	4.19644201	2.60E-08	6.76E-07
OR2T11	2.63425924	2.62E-08	6.79E-07
SOCS3.DT	3.63034462	2.64E-08	6.81E-07
TRBV12.1	2.39110657	2.64E-08	6.81E-07
NECTIN1.DT	2.53273366	2.65E-08	6.83E-07
LINC02709	3.37321226	2.69E-08	6.93E-07
LRRC37A9P	2.48527025	2.72E-08	7.01E-07
KRT15	3.84277054	2.79E-08	7.17E-07

IGHV3.21	1.65342776	2.92E-08	7.48E-07
PROM2	3.40881698	2.92E-08	7.48E-07
PRL	3.01130376	2.93E-08	7.51E-07
RN7SL706P	2.61766825	2.98E-08	7.64E-07
RHOG2P	3.03491043	3.01E-08	7.69E-07
PHB1P20	2.36525867	3.02E-08	7.72E-07
VN1R51P	2.4641655	3.03E-08	7.73E-07
ARL4AP3	2.64204698	3.06E-08	7.79E-07
LINC01923	3.3506111	3.10E-08	7.88E-07
BCAN	3.07738362	3.10E-08	7.88E-07
ATP6V1G1P2	2.43032339	3.10E-08	7.88E-07
LINC01544	2.51720041	3.11E-08	7.88E-07
ZNF385C	4.35516896	3.12E-08	7.91E-07
PLPPR3	2.71533566	3.17E-08	8.02E-07
H2BC6	1.48819275	3.18E-08	8.04E-07
ACTBP14	3.59203325	3.20E-08	8.08E-07
MSRB1P1	3.07053	3.39E-08	8.54E-07
SRRM5	3.37558525	3.42E-08	8.60E-07
ELL2	1.05393854	3.44E-08	8.66E-07
ZSCAN10	3.9620856	3.47E-08	8.72E-07
RPL7AP35	3.17958616	3.50E-08	8.77E-07
FIBCD1	-3.1590069	3.52E-08	8.82E-07
MMP2	2.58706446	3.58E-08	8.94E-07
FHOD3	2.46331695	3.62E-08	9.05E-07
ICAM5	3.43073512	3.64E-08	9.08E-07
LRRC2.AS1	5.65168527	3.64E-08	9.08E-07
RBP2	2.37371696	3.66E-08	9.11E-07
ZNF454	2.3420481	3.66E-08	9.11E-07
MRPL57P3	2.60438394	3.75E-08	9.30E-07
IGHV3.20	2.27397902	3.84E-08	9.52E-07
RPS3AP15	2.85392231	3.85E-08	9.53E-07
CNBD2	3.90517566	3.89E-08	9.63E-07
CYGB	2.92011913	3.89E-08	9.63E-07
RAB5C.AS1	2.68281073	3.95E-08	9.77E-07
FERMT1	2.64474004	4.19E-08	1.03E-06
IGHV3OR16.6	2.76975981	4.26E-08	1.05E-06
IGHV3.74	2.04971177	4.37E-08	1.07E-06
IGKV3D.20	2.27212458	4.42E-08	1.08E-06
AARSD1P1	2.31160997	4.46E-08	1.09E-06
TRIM55	4.48703365	4.49E-08	1.10E-06

LRFN2	3.42388955	4.54E-08	1.11E-06
CD44.DT	-3.7811388	4.58E-08	1.12E-06
PPIAP70	2.62875027	4.62E-08	1.12E-06
FMO7P	3.13283996	4.68E-08	1.14E-06
IGKV1OR2.6	2.58045055	4.83E-08	1.17E-06
RNA5SP47	2.39449428	5.04E-08	1.22E-06
RN7SKP106	3.47537665	5.16E-08	1.24E-06
IL20RA	-3.4138134	5.17E-08	1.25E-06
JPH1	3.16211851	5.18E-08	1.25E-06
LRRTM3	2.58218165	5.20E-08	1.25E-06
CPT1C	3.48863794	5.22E-08	1.26E-06
LINC01476	3.10755021	5.23E-08	1.26E-06
RPL31P44	-2.7688688	5.36E-08	1.29E-06
PITX1	5.43082982	5.42E-08	1.30E-06
CDC42P3	2.29685001	5.49E-08	1.31E-06
ANKRD62P1	2.70927692	5.51E-08	1.32E-06
PPIAP7	2.62069959	5.58E-08	1.33E-06
MRPL32P1	2.37943891	5.67E-08	1.35E-06
GABRB3	2.65849486	5.76E-08	1.37E-06
IGLV5.45	2.5669089	5.77E-08	1.37E-06
IGKV1.39	2.02352497	5.87E-08	1.39E-06
CDC45	3.20055154	5.88E-08	1.40E-06
SLC35F4	2.55218179	5.99E-08	1.42E-06
ZFP91P1	-3.0337898	6.07E-08	1.43E-06
HMGA2	3.15579095	6.17E-08	1.46E-06
RSL24D1P2	2.451748	6.19E-08	1.46E-06
TMEM51.AS1	2.58225432	6.31E-08	1.49E-06
MTND4P34	2.41785397	6.40E-08	1.51E-06
ANK2	4.52840596	6.46E-08	1.52E-06
TPO	4.20812984	6.47E-08	1.52E-06
GPR45	-3.1365234	6.48E-08	1.52E-06
IGLV3.1	2.02301812	6.53E-08	1.53E-06
HP	1.58464301	6.53E-08	1.53E-06
NHS.AS1	-4.1433943	6.58E-08	1.54E-06
RNU6.141P	2.87979467	6.58E-08	1.54E-06
TULP2	3.31406709	6.80E-08	1.59E-06
CNGA4	3.76572637	6.97E-08	1.63E-06
ARHGEF15	2.56350057	7.13E-08	1.66E-06
UBQLN3	3.71891936	7.21E-08	1.68E-06
IGKV3D.15	2.29219333	7.24E-08	1.68E-06

CLDN14.AS1	2.33997151	7.26E-08	1.69E-06
RN7SL7P	5.7100455	7.35E-08	1.71E-06
TRIM36.IT1	3.6118425	7.43E-08	1.72E-06
GRIN2B	2.44139681	7.45E-08	1.73E-06
GXYLT2	2.39489628	7.51E-08	1.74E-06
IGKV1.27	2.13252711	7.53E-08	1.74E-06
ARC	2.98360186	7.76E-08	1.79E-06
FGF2	3.33496464	8.19E-08	1.88E-06
BCAR1	3.00989672	8.20E-08	1.89E-06
TUBAL3	4.97379393	8.35E-08	1.92E-06
RN7SL491P	2.48411447	8.36E-08	1.92E-06
SCN5A	3.22636284	8.58E-08	1.96E-06
C17orf78	2.75072299	8.62E-08	1.97E-06
JPH3	2.52405412	8.70E-08	1.99E-06
ZDHHC19	2.04068367	8.83E-08	2.02E-06
COX7A1	-3.3336784	8.93E-08	2.03E-06
PHYHIP	5.87975732	8.93E-08	2.03E-06
TMEM198	2.31872921	8.97E-08	2.04E-06
CYP7A1	4.96752358	9.16E-08	2.08E-06
H3P7	2.50470711	9.48E-08	2.16E-06
MRGPRX2	2.39552844	9.49E-08	2.16E-06
AKR1B10	4.5928148	9.55E-08	2.17E-06
LCN15	2.27460854	9.63E-08	2.18E-06
IGLV4.69	1.96789639	1.01E-07	2.29E-06
PDLIM3	2.34757816	1.02E-07	2.30E-06
SHC2	-2.9260522	1.04E-07	2.35E-06
PSCA	2.23202568	1.06E-07	2.38E-06
BLACE	2.67697998	1.08E-07	2.43E-06
TUBB3P2	-3.8277554	1.10E-07	2.48E-06
NRXN2	-2.43216	1.12E-07	2.52E-06
FCHO2.DT	2.35544255	1.12E-07	2.52E-06
TFAP2D	2.53084721	1.13E-07	2.52E-06
RGS9BP	-3.2299003	1.15E-07	2.56E-06
NHLH1	3.74664116	1.15E-07	2.56E-06
PANX3	2.81016126	1.20E-07	2.66E-06
CYP27B1	4.25464693	1.24E-07	2.76E-06
TUBB2A	-2.6139633	1.25E-07	2.78E-06
TMEM52	2.62298952	1.26E-07	2.80E-06
RNU6.267P	2.37356801	1.27E-07	2.80E-06
SCGN	-2.9875725	1.27E-07	2.82E-06

LRIG3	2.2079523	1.29E-07	2.85E-06
C5orf46	2.97762093	1.29E-07	2.86E-06
OPRK1	-3.6568006	1.32E-07	2.91E-06
IGHD5.12	2.1956003	1.32E-07	2.92E-06
CREB3L1	4.20298178	1.33E-07	2.94E-06
MPDZ	4.79443967	1.34E-07	2.94E-06
DPF1	2.87705312	1.34E-07	2.95E-06
SYT5	3.76469798	1.36E-07	2.98E-06
NPSR1.AS1	2.69649651	1.36E-07	2.98E-06
GLCCI1.DT	2.70078726	1.38E-07	3.03E-06
RNU6.1042P	2.71782594	1.38E-07	3.03E-06
CFAP91	2.23953206	1.39E-07	3.03E-06
KHDRBS2.OT1	-2.9730812	1.40E-07	3.05E-06
CHAC1	4.33260276	1.42E-07	3.11E-06
LVRN	2.27373631	1.43E-07	3.13E-06
ABCA12	2.38773434	1.44E-07	3.14E-06
SKA2P1	3.31749548	1.46E-07	3.18E-06
CLC	-1.6102359	1.48E-07	3.23E-06
H4C8	1.48121485	1.52E-07	3.31E-06
IGLV1.50	2.48337417	1.52E-07	3.31E-06
ENPP6	4.27557311	1.54E-07	3.35E-06
EEF1A2	2.49596968	1.55E-07	3.37E-06
GGH	1.83135836	1.58E-07	3.43E-06
TIMM10	1.25755326	1.59E-07	3.44E-06
USP32P1	3.3576693	1.60E-07	3.46E-06
PIMREGP3	3.4200429	1.61E-07	3.48E-06
MYO3B.AS1	2.31801057	1.61E-07	3.48E-06
CT45A11P	2.98721702	1.62E-07	3.49E-06
STOX2	4.61053435	1.63E-07	3.51E-06
CTXND2	2.32815792	1.66E-07	3.59E-06
EGFL7	1.0336688	1.68E-07	3.62E-06
OR2L6P	3.99668464	1.69E-07	3.63E-06
SLC10A4	-3.3446962	1.69E-07	3.65E-06
LINC02936	2.64738576	1.70E-07	3.65E-06
RN7SL740P	2.70753598	1.72E-07	3.69E-06
OR10A4	2.34279852	1.75E-07	3.76E-06
TSPYL6	2.91769744	1.75E-07	3.76E-06
IRF7	1.06679722	1.75E-07	3.76E-06
HPN.AS1	2.25398728	1.75E-07	3.76E-06
LINC01168	4.66439617	1.85E-07	3.95E-06



WDR82P2	2.99709147	1.87E-07	3.98E-06
GUSBP5	4.17245202	1.88E-07	4.01E-06
LINC01204	3.11345518	1.89E-07	4.02E-06
RHOJ	2.20275032	1.93E-07	4.09E-06
PII5	2.67983693	1.94E-07	4.12E-06
IL17F	2.44821823	1.95E-07	4.14E-06
OAS2	1.22758725	1.96E-07	4.16E-06
MELK	3.08801944	2.02E-07	4.28E-06
ATXN2.AS	-2.5417228	2.04E-07	4.33E-06
CCDC198	2.42831457	2.08E-07	4.40E-06
HHLA2	2.60831578	2.18E-07	4.59E-06
INHBA.AS1	4.17379599	2.18E-07	4.60E-06
LINC01620	2.3591592	2.24E-07	4.71E-06
TUBA3E	2.48511796	2.26E-07	4.76E-06
GAD1	3.34234114	2.28E-07	4.79E-06
LINC01939	-2.9751124	2.30E-07	4.83E-06
RAD21.AS1	3.19860313	2.32E-07	4.86E-06
RPSAP1	-4.1133476	2.34E-07	4.90E-06
SAP18P3	2.65596026	2.36E-07	4.94E-06
PPIAL4G	2.43853747	2.39E-07	4.99E-06
IQCA1L	-3.0075772	2.40E-07	5.00E-06
SERPINA11	2.41993474	2.40E-07	5.01E-06
RPS12	-1.1643215	2.43E-07	5.06E-06
MIR7850	2.40982324	2.48E-07	5.17E-06
CCDC68	3.01323777	2.53E-07	5.25E-06
TRPM3	2.31510237	2.56E-07	5.31E-06
HERC6	1.11096033	2.57E-07	5.32E-06
LINC01475	2.13154209	2.58E-07	5.35E-06
GLRA1	4.36705551	2.64E-07	5.47E-06
ERRFI1.DT	-3.0706208	2.69E-07	5.56E-06
PIERCE1	3.68973639	2.70E-07	5.57E-06
FAM220CP	2.309967	2.70E-07	5.58E-06
HOXB6	-2.7699092	2.75E-07	5.68E-06
MED28P3	3.28241526	2.76E-07	5.69E-06
C12orf56	3.23878241	2.76E-07	5.69E-06
IGLV2.34	2.86266697	2.76E-07	5.69E-06
AKR7A2P1	2.27216722	2.78E-07	5.73E-06
IGKV3.15	1.50434359	2.80E-07	5.76E-06
RPLPOP3	2.31707446	2.83E-07	5.80E-06
NLRP14	4.10985599	2.84E-07	5.82E-06

TMEM256P1	-3.12303	2.88E-07	5.89E-06
VIP	2.24820498	2.89E-07	5.91E-06
F3	3.87320835	2.97E-07	6.05E-06
OR52V1P	2.21825182	2.99E-07	6.10E-06
GINS2	1.80725793	3.02E-07	6.15E-06
TROAP	2.49445838	3.07E-07	6.23E-06
RARRES2P3	2.20493526	3.17E-07	6.41E-06
RN7SL558P	2.78067698	3.18E-07	6.43E-06
H2BU2P	2.54269544	3.20E-07	6.45E-06
GRTP1.AS1	2.19915789	3.22E-07	6.48E-06
DISC1FP1	2.61986126	3.22E-07	6.48E-06
MTND2P32	3.07826077	3.23E-07	6.50E-06
ATP2B2	3.87118938	3.31E-07	6.64E-06
NMRAL2P	3.38892981	3.33E-07	6.69E-06
PARM1.AS1	2.163214	3.36E-07	6.73E-06
IGLC2	2.059668	3.38E-07	6.76E-06
RPS15AP39	2.39964571	3.41E-07	6.80E-06
RP1L1	4.40104424	3.50E-07	6.98E-06
KRT17P8	-3.4745822	3.57E-07	7.10E-06
RN7SL748P	-4.1321639	3.63E-07	7.20E-06
LINC01703	2.72295428	3.66E-07	7.26E-06
NPR1	2.31745263	3.67E-07	7.28E-06
WARS2.IT1	2.92378615	3.71E-07	7.36E-06
EIF5A2P1	-2.3358427	3.78E-07	7.48E-06
PTGIS	2.99321258	3.92E-07	7.75E-06
PRDX2P3	3.59875652	3.94E-07	7.79E-06
CFAP206	-2.7505758	3.95E-07	7.79E-06
ASH2LP1	-4.3067552	4.01E-07	7.92E-06
SEPTIN3	3.16413619	4.11E-07	8.10E-06
CFAP299	2.14331417	4.13E-07	8.13E-06
ANXA8	3.31269968	4.20E-07	8.25E-06
DCN	-2.844795	4.23E-07	8.31E-06
IGLC3	1.91384072	4.25E-07	8.33E-06
SOX11	2.14287535	4.37E-07	8.55E-06
RPL39	-1.3471497	4.51E-07	8.82E-06
RPS27A	-1.0009558	4.56E-07	8.91E-06
IGHG1	2.48315013	4.61E-07	8.99E-06
NFATC4	2.33698226	4.63E-07	9.03E-06
SVEP1	2.28501557	4.64E-07	9.04E-06
TRIM71	2.42855689	4.68E-07	9.10E-06

ADAM7	2.29222987	4.83E-07	9.39E-06
LINC01808	2.1673568	4.87E-07	9.45E-06
PTMAP1	2.23041329	4.90E-07	9.51E-06
FAM221B	-3.6301399	4.92E-07	9.55E-06
GREM2	3.0073106	4.93E-07	9.55E-06
NRN1L	2.15342777	5.04E-07	9.76E-06
OR3A3	2.36671928	5.07E-07	9.81E-06
PLA1A	-3.1581735	5.08E-07	9.82E-06
LINC00332	2.13874057	5.23E-07	1.01E-05
PKP4.AS1	2.2576439	5.27E-07	1.02E-05
ARL5C	2.69150123	5.40E-07	1.04E-05
RMEL3	-2.9429969	5.44E-07	1.05E-05
RIBC2	3.32647892	5.46E-07	1.05E-05
A1BG	3.24229262	5.51E-07	1.06E-05
LINC02574	3.80281868	5.52E-07	1.06E-05
LSM3P4	2.23087341	5.55E-07	1.06E-05
XAF1	1.27501175	5.65E-07	1.08E-05
TAS2R8	3.90745432	5.65E-07	1.08E-05
FOXP2	2.14013503	5.69E-07	1.09E-05
IFI27	2.63748812	5.74E-07	1.10E-05
USP18	1.88399484	5.94E-07	1.13E-05
LMNB1.DT	3.70860796	6.05E-07	1.15E-05
CADPS2	2.25870327	6.09E-07	1.15E-05
VWA3B	2.6324645	6.12E-07	1.16E-05
CDY4P	-3.3009629	6.18E-07	1.17E-05
LINC00323	-3.0694174	6.21E-07	1.17E-05
RPS4XP17	3.06632112	6.24E-07	1.18E-05
SMCO3	2.51255044	6.47E-07	1.22E-05
TCN2	1.11625052	6.50E-07	1.22E-05
DCSTAMP	3.61776157	6.51E-07	1.22E-05
GULP1	4.18119828	6.53E-07	1.23E-05
CALR3	-3.5384501	6.58E-07	1.23E-05
TRBV22.1	2.12841738	6.60E-07	1.24E-05
SPATS2L	1.54266772	6.63E-07	1.24E-05
LINC02990	4.01816145	6.65E-07	1.24E-05
LHB	-2.5404074	6.68E-07	1.25E-05
EPS8L3	2.33650931	6.69E-07	1.25E-05
KRT5	3.74401605	6.84E-07	1.28E-05
ANKRD22	1.35600943	6.86E-07	1.28E-05
ZNF33BP1	3.49386942	6.87E-07	1.28E-05

AURKB	1.88183658	6.96E-07	1.30E-05
PRSS59P	-3.3096857	7.01E-07	1.31E-05
MTND1P23	-1.2299342	7.03E-07	1.31E-05
GAPDHP33	2.27857358	7.11E-07	1.32E-05
UCHL1	3.92801529	7.13E-07	1.32E-05
MYBL2	2.07649092	7.13E-07	1.32E-05
MT.ND3	-1.0695202	7.19E-07	1.34E-05
SMIM43	-4.4327486	7.38E-07	1.37E-05
GPR31	-2.75379	7.46E-07	1.38E-05
LINC02568	2.10072964	7.51E-07	1.39E-05
PRTN3	3.3027868	7.67E-07	1.42E-05
RPS29	-1.1158869	7.68E-07	1.42E-05
ZNF300P1	2.42456443	7.71E-07	1.42E-05
RPS27	-1.0788566	7.71E-07	1.42E-05
MRGPRF	2.21095405	7.77E-07	1.43E-05
EPX	4.72660507	7.79E-07	1.43E-05
CCNA2	2.35094937	7.83E-07	1.44E-05
FUT1	4.43605475	7.88E-07	1.45E-05
GAPDHP52	2.76634034	8.02E-07	1.47E-05
SUGT1P1	-3.0079761	8.20E-07	1.50E-05
FAM3D	-3.8962989	8.37E-07	1.53E-05
RPL35AP14	2.86890054	8.38E-07	1.53E-05
LPO	3.79158179	8.43E-07	1.54E-05
LINC02373	-2.4539119	8.43E-07	1.54E-05
NIFKP7	2.2461099	8.44E-07	1.54E-05
SHISA3	-3.9724572	8.47E-07	1.55E-05
SLC16A9	4.24808167	8.51E-07	1.55E-05
NR2F2	-2.4767699	8.56E-07	1.56E-05
KRT8P5	2.09600507	8.68E-07	1.58E-05
PTGFR	3.34704102	8.70E-07	1.58E-05
VENTX	-1.0569025	8.82E-07	1.60E-05
CLRN1	3.20570434	8.89E-07	1.61E-05
LINC01767	4.12403523	8.92E-07	1.62E-05
BMP2K.DT	2.56799578	8.95E-07	1.62E-05
CHKA.DT	-2.5367595	8.95E-07	1.62E-05
IL12B	3.74882882	9.07E-07	1.64E-05
LINC00678	2.35360775	9.14E-07	1.65E-05
TEX46	-2.8405764	9.15E-07	1.65E-05
COL25A1	2.78301508	9.29E-07	1.67E-05
RPL27P8	2.0935949	9.35E-07	1.68E-05

CNNM1	2.46779155	9.40E-07	1.69E-05
XDH	2.16136109	9.43E-07	1.70E-05
LINC01082	2.3017225	9.51E-07	1.71E-05
MRPS33P2	3.1359423	9.54E-07	1.71E-05
LINC01724	-3.4414277	9.63E-07	1.73E-05
SCN3B	3.39510606	9.69E-07	1.74E-05
IGHV2.5	2.02418693	9.90E-07	1.77E-05
FCN3	3.12608896	1.00E-06	1.80E-05
UBTFL8	4.25437865	1.02E-06	1.82E-05
PGBD4P8	3.4132272	1.03E-06	1.83E-05
IRF4	1.0155384	1.03E-06	1.84E-05
HOXA2	2.50174102	1.04E-06	1.85E-05
RN7SL806P	-3.4554623	1.05E-06	1.87E-05
CCNL2P1	2.78532827	1.07E-06	1.89E-05
TMPRSS15	2.06933821	1.08E-06	1.91E-05
CFAP73	2.19831936	1.09E-06	1.93E-05
TMEM125	-2.3870126	1.12E-06	1.97E-05
RIMS2	3.82962416	1.12E-06	1.98E-05
RPL11P1	-2.3328956	1.13E-06	1.99E-05
ITCH.AS1	3.00481365	1.13E-06	2.00E-05
MMRN2	3.99767718	1.19E-06	2.09E-05
FER1L4	3.7648935	1.19E-06	2.09E-05
IGLV3.19	2.06892763	1.21E-06	2.12E-05
IGHV4.34	1.51184616	1.21E-06	2.13E-05
G0S2	1.18615738	1.22E-06	2.14E-05
LINC01362	2.59413604	1.23E-06	2.15E-05
AXDND1	2.31329028	1.23E-06	2.15E-05
SNORD101	-2.9108132	1.23E-06	2.16E-05
PDGFRL	2.93817862	1.24E-06	2.17E-05
LINC02608	2.55858344	1.24E-06	2.17E-05
RPS20P4	2.10431123	1.24E-06	2.17E-05
NKX6.3	2.14833034	1.24E-06	2.17E-05
TMED10P2	2.11878731	1.25E-06	2.17E-05
FA2H	3.54565747	1.25E-06	2.18E-05
HMGB1P44	2.88182025	1.27E-06	2.20E-05
PNMA8B	2.91784855	1.27E-06	2.22E-05
GBP1P1	1.73872111	1.28E-06	2.23E-05
TRIP13	2.91070875	1.28E-06	2.23E-05
IGLV2.8	2.19557866	1.29E-06	2.24E-05
LINC01055	3.85870227	1.29E-06	2.24E-05

LINC00603	2.99017086	1.29E-06	2.24E-05
IGKV1.9	1.79155603	1.30E-06	2.25E-05
GOLGA2P4	-2.7293809	1.31E-06	2.26E-05
TRPM8	2.07763689	1.32E-06	2.28E-05
COL28A1	2.15360621	1.32E-06	2.28E-05
MYBPC1	2.29207325	1.32E-06	2.28E-05
IGKV2.29	1.75210794	1.33E-06	2.29E-05
RLN3	2.13537475	1.33E-06	2.30E-05
RGL1	1.96123798	1.34E-06	2.32E-05
GPAT2P1	-2.6138522	1.36E-06	2.35E-05
BIRC5	2.18227586	1.37E-06	2.36E-05
APOOP3	3.97460458	1.37E-06	2.36E-05
KDM5C.IT1	2.529862	1.38E-06	2.37E-05
RPL7AP19	2.32979707	1.41E-06	2.41E-05
NHLRC4	-3.7152137	1.41E-06	2.41E-05
SAMD15	2.45969206	1.41E-06	2.42E-05
OR10V2P	2.63011756	1.45E-06	2.48E-05
IGHV3.11	1.77697316	1.45E-06	2.48E-05
MTND2P2	2.41328191	1.45E-06	2.48E-05
CCDC110	3.54363553	1.46E-06	2.48E-05
YIPF7	2.13580497	1.46E-06	2.49E-05
WWC2.AS2	2.12081096	1.46E-06	2.49E-05
TRIM67	3.29186046	1.49E-06	2.53E-05
PPARG	3.20900871	1.49E-06	2.54E-05
BMP10	2.05788106	1.50E-06	2.55E-05
PDCL2P2	2.13193762	1.50E-06	2.55E-05
AK3P2	2.09977518	1.50E-06	2.55E-05
EPB41L4B	3.8053244	1.53E-06	2.59E-05
FAM47E	3.10271114	1.53E-06	2.60E-05
ACTRT3	3.37253506	1.54E-06	2.60E-05
TOMM7	-1.0846491	1.55E-06	2.61E-05
OR6N2	2.8580548	1.58E-06	2.67E-05
GEMIN2P2	-2.3904876	1.58E-06	2.67E-05
IZUMO4	2.35585848	1.60E-06	2.70E-05
LAMA4	3.89249972	1.61E-06	2.71E-05
IGKC	1.57732626	1.61E-06	2.72E-05
SPATA25	-4.2726166	1.65E-06	2.78E-05
RPL7P8	2.12373456	1.65E-06	2.78E-05
IL25	3.4359899	1.65E-06	2.78E-05
IGHV1.18	1.48950568	1.68E-06	2.82E-05

IGKV3.20	1.54928011	1.70E-06	2.86E-05
ATP6V1G1P4	2.01984492	1.70E-06	2.86E-05
LINC00628	3.61728937	1.71E-06	2.86E-05
GAS6	1.48756386	1.71E-06	2.87E-05
CSF2	3.09632278	1.71E-06	2.87E-05
CA12	3.56835515	1.73E-06	2.89E-05
RPS21	-1.0936437	1.77E-06	2.96E-05
PRAL	1.1746753	1.78E-06	2.98E-05
RPS2P41	2.11223989	1.78E-06	2.98E-05
IGKV1D.17	3.0733659	1.82E-06	3.03E-05
PRELID3BP11	-2.2345163	1.84E-06	3.07E-05
KLHL7.DT	-4.658071	1.85E-06	3.08E-05
ELK2AP	-2.0808494	1.85E-06	3.08E-05
MELTF	3.41587315	1.86E-06	3.09E-05
MAP7D2	2.95625918	1.86E-06	3.09E-05
IGHGP	2.14557511	1.87E-06	3.11E-05
INKA1	1.35766653	1.89E-06	3.14E-05
LINC01845	-2.5822921	1.89E-06	3.14E-05
RNU1.61P	2.65164062	1.90E-06	3.14E-05
IGHV3.23	1.53034679	1.90E-06	3.14E-05
TNFSF11	3.48434503	1.90E-06	3.14E-05
CMKLR2.AS	2.04904723	1.93E-06	3.18E-05
STEAP1B.AS1	-3.0316148	1.94E-06	3.19E-05
IGLV3.10	2.07665679	1.96E-06	3.22E-05
SNCAIP	-3.002609	1.97E-06	3.25E-05
SMIM38	2.06478061	1.98E-06	3.25E-05
INTS9.AS1	2.93824618	1.99E-06	3.27E-05
PPIAP77	3.0063346	2.00E-06	3.28E-05
GRM3.AS1	2.07020241	2.02E-06	3.31E-05
SLC36A2	2.12271518	2.04E-06	3.34E-05
YPEL3.DT	-1.2902606	2.07E-06	3.39E-05
OR1L4	-2.1857063	2.07E-06	3.39E-05
PMS2P2	-2.6133774	2.08E-06	3.40E-05
FAM95B1	2.39699655	2.09E-06	3.41E-05
OR51B4	3.86274847	2.11E-06	3.44E-05
GSTCD.AS1	2.49274221	2.11E-06	3.44E-05
IGLV3.9	2.0942451	2.14E-06	3.48E-05
LINC01554	3.08900459	2.15E-06	3.49E-05
TFGP1	2.98778903	2.15E-06	3.49E-05
ZNF652P1	3.90211957	2.16E-06	3.50E-05

SMAD9.IT1	-2.3625469	2.19E-06	3.55E-05
ZNF215	3.39708106	2.22E-06	3.59E-05
OTOF	3.37388691	2.22E-06	3.59E-05
ANGPTL3	3.39150698	2.24E-06	3.63E-05
DPEP1	2.10359483	2.26E-06	3.66E-05
IGHV3OR16.13	3.18480384	2.27E-06	3.67E-05
SMIM36	-3.0427637	2.28E-06	3.69E-05
HBG1	-2.0875778	2.29E-06	3.69E-05
MYLK2	3.64699937	2.29E-06	3.69E-05
CDCA2	2.99612935	2.29E-06	3.69E-05
DAO	3.74593199	2.31E-06	3.72E-05
C22orf42	-2.0382763	2.32E-06	3.73E-05
IGHV7.34.1	2.15150879	2.32E-06	3.73E-05
RPEP3	2.62820792	2.32E-06	3.73E-05
IGHG3	1.55726761	2.32E-06	3.73E-05
RPL6P31	2.09235284	2.34E-06	3.75E-05
STK32B	3.58753686	2.35E-06	3.77E-05
MAOB	3.3390884	2.35E-06	3.77E-05
RGN	2.00525962	2.36E-06	3.78E-05
CNOT10.AS1	2.60362561	2.38E-06	3.81E-05
CYP3A7	2.58664903	2.39E-06	3.83E-05
IGKV2.30	1.49383436	2.40E-06	3.83E-05
MSX1	3.6823876	2.41E-06	3.85E-05
ZAN	2.07231135	2.42E-06	3.87E-05
LINC02955	2.54086023	2.43E-06	3.88E-05
SLFNL1	-3.2574237	2.47E-06	3.94E-05
SLC4A11	3.67208546	2.48E-06	3.94E-05
LRRTM1	3.68679746	2.49E-06	3.96E-05
BPIFC	2.0915629	2.49E-06	3.96E-05
LINC01821	2.01781027	2.50E-06	3.97E-05
MRPS18AP1	-2.5156256	2.50E-06	3.97E-05
GPR84	1.55619222	2.53E-06	4.02E-05
DDN	3.58790562	2.53E-06	4.02E-05
PPP1R1C	3.52274636	2.55E-06	4.04E-05
IGHA2	1.69560495	2.57E-06	4.07E-05
ACRV1	2.99866896	2.60E-06	4.12E-05
KLHL2P1	2.16010542	2.63E-06	4.15E-05
LINC02960	3.95151887	2.65E-06	4.18E-05
H2AC12	2.10622432	2.66E-06	4.20E-05
SHBG	2.16469639	2.67E-06	4.21E-05



GAS6.DT	3.59256695	2.69E-06	4.23E-05
DNAI1	1.978579	2.78E-06	4.37E-05
ANO2	3.80973398	2.79E-06	4.38E-05
LINC01398	-2.0903926	2.80E-06	4.40E-05
LINC00462	3.29304293	2.80E-06	4.40E-05
IGLV3.16	2.32053442	2.82E-06	4.42E-05
MBNL3	-1.0999989	2.82E-06	4.42E-05
ATP1A4	-3.9264381	2.83E-06	4.44E-05
MEI4	2.01710859	2.87E-06	4.49E-05
LINC02476	2.11857697	2.97E-06	4.63E-05
TJP2	3.16840523	3.02E-06	4.71E-05
LINC02593	3.75103302	3.04E-06	4.72E-05
RPL23AP11	2.14863602	3.04E-06	4.73E-05
FOXJ1	-3.201783	3.06E-06	4.75E-05
DQX1	3.64820385	3.06E-06	4.76E-05
SPATA31C2	2.26882644	3.18E-06	4.93E-05
KCNK13	-3.9652179	3.18E-06	4.94E-05
METTL7B	3.09880292	3.18E-06	4.94E-05
OR52H2P	2.19519515	3.20E-06	4.96E-05
MCM10	2.6392271	3.30E-06	5.10E-05
IGHV3.33	1.7407128	3.31E-06	5.12E-05
LINC02078	2.00344575	3.32E-06	5.12E-05
LINC01474	-2.1216294	3.34E-06	5.15E-05
BNIP3L	-1.2452049	3.36E-06	5.18E-05
RN7SL569P	3.30687347	3.44E-06	5.29E-05
DAW1	2.17106908	3.50E-06	5.38E-05
LINC01132	2.18084511	3.51E-06	5.39E-05
LINC01484	3.75902153	3.54E-06	5.43E-05
SYT7	3.28985928	3.56E-06	5.45E-05
DEPP1	2.56725485	3.56E-06	5.45E-05
CYP51A1.AS1	2.70059392	3.61E-06	5.51E-05
TNRC18P1	-2.0835458	3.61E-06	5.51E-05
ANKRD65	3.37044968	3.69E-06	5.63E-05
SERPINA9	-2.5998536	3.70E-06	5.63E-05
RPL10P18	1.92259774	3.70E-06	5.64E-05
TEX19	2.56517985	3.71E-06	5.65E-05
MANEALP1	-2.1753307	3.72E-06	5.66E-05
NUDCP1	2.39949369	3.73E-06	5.66E-05
ZNF878	-2.4817446	3.76E-06	5.70E-05
HERC2P6	2.15435218	3.80E-06	5.75E-05

LY6E	1.15079611	3.82E-06	5.78E-05
TLL2	2.97809373	3.82E-06	5.78E-05
OAS3	1.26909056	3.86E-06	5.84E-05
NCAM2	2.14716385	3.88E-06	5.87E-05
LINC02721	2.22631263	3.92E-06	5.90E-05
IMPA1P1	2.71918564	3.93E-06	5.93E-05
MOGAT1	2.29212142	4.03E-06	6.06E-05
OR10Z1	3.59441144	4.04E-06	6.07E-05
H2AC13	1.33074371	4.06E-06	6.10E-05
IGKV1.6	1.87639169	4.10E-06	6.16E-05
ARL14EPL	-3.1233713	4.12E-06	6.17E-05
PKDREJ	3.19773376	4.13E-06	6.19E-05
RPS3A	-1.044207	4.13E-06	6.19E-05
RPS28P1	2.20344514	4.15E-06	6.21E-05
FOSL2.AS1	3.26434606	4.16E-06	6.22E-05
PKHD1	3.81131993	4.16E-06	6.22E-05
RPL35AP16	1.9758193	4.20E-06	6.27E-05
RNU6.1160P	1.95747385	4.21E-06	6.29E-05
PSMB3P1	2.64788751	4.25E-06	6.34E-05
CTSG	2.93397591	4.30E-06	6.39E-05
IGHV3.65	2.86923222	4.32E-06	6.42E-05
KIRREL2	1.94862506	4.34E-06	6.46E-05
RN7SKP271	1.92883333	4.39E-06	6.52E-05
PRKG1.AS1	2.05658399	4.47E-06	6.63E-05
LINC01446	2.88039302	4.60E-06	6.82E-05
CES1	1.30833789	4.62E-06	6.85E-05
RSAD2	1.61820953	4.65E-06	6.88E-05
KCNG2	2.6145943	4.68E-06	6.92E-05
BEND6	2.997617	4.69E-06	6.93E-05
MFAP4	3.57651209	4.73E-06	6.98E-05
IGFBP5	-2.3163422	4.74E-06	6.99E-05
CYP11B1	-3.9004433	4.79E-06	7.06E-05
IGHV4.39	1.68373026	4.80E-06	7.08E-05
RPS20P9	3.22255894	4.82E-06	7.10E-05
RPL41	-1.0226696	4.83E-06	7.11E-05
P2RX6	-3.8128808	4.84E-06	7.13E-05
MIR580	1.97683996	4.94E-06	7.27E-05
SLC1A4	1.01660305	4.97E-06	7.31E-05
IGLV3.17	-2.143019	4.98E-06	7.31E-05
LINC00309	2.09605117	5.08E-06	7.46E-05

LINC02105	3.13806257	5.15E-06	7.55E-05
COX6B1P6	3.59968513	5.30E-06	7.75E-05
IGKV2.10	3.50805031	5.35E-06	7.81E-05
IGLC7	1.86940457	5.48E-06	7.99E-05
DDX18P3	2.07363663	5.50E-06	8.00E-05
RANP8	-2.6194906	5.50E-06	8.00E-05
RN7SL760P	1.96939594	5.53E-06	8.04E-05
LINC02318	3.30055801	5.54E-06	8.06E-05
IGLV3.22	2.52234822	5.56E-06	8.07E-05
DUSP5P1	3.19529713	5.69E-06	8.26E-05
OR2AJ1	1.90119779	5.79E-06	8.38E-05
MIR1537	2.15918321	5.92E-06	8.57E-05
WWC2.AS1	1.98442861	5.99E-06	8.66E-05
PCDHGA5	-3.0804502	6.00E-06	8.66E-05
FBXO27	3.16648179	6.05E-06	8.73E-05
SERPING1	1.3186827	6.06E-06	8.74E-05
IGHV3.52	2.08555215	6.19E-06	8.91E-05
SHC4	-2.3973202	6.20E-06	8.92E-05
TMEFF2	2.41409275	6.26E-06	9.00E-05
LGR5	1.98797105	6.29E-06	9.04E-05
ACAN	2.82588761	6.36E-06	9.12E-05
KIF18B	2.94908213	6.37E-06	9.13E-05
USP12.AS1	2.41099799	6.42E-06	9.20E-05
RNASE1	2.35826879	6.44E-06	9.21E-05
CFB	2.0151587	6.58E-06	9.39E-05
COLCA2	-3.3951809	6.61E-06	9.43E-05
IGHV3.48	1.66519681	6.64E-06	9.47E-05
CCNB2	2.02538947	6.80E-06	9.69E-05
OR5B21	1.88828169	6.82E-06	9.71E-05
IGHD4.17	2.06303234	6.96E-06	9.90E-05
RPL31	-1.0187348	6.99E-06	9.93E-05
TDRD15	2.80450054	7.00E-06	9.95E-05
CLSPN	1.41722714	7.12E-06	0.0001011
SLC1A3	2.56420609	7.17E-06	0.00010178
IGHV3.62	2.35862546	7.22E-06	0.0001023
GCAWKR	-3.1052235	7.28E-06	0.00010304
LINC01121	2.89215998	7.29E-06	0.00010318
MELTF.AS1	2.02602125	7.33E-06	0.00010358
NAT8B	1.12178546	7.34E-06	0.00010365
UGT3A2	2.60855514	7.36E-06	0.00010379

IGHV4.28	2.04608839	7.38E-06	0.00010404
BGLT3	3.24417962	7.40E-06	0.00010423
MIR6131	2.19299738	7.41E-06	0.00010445
LGALS3BP	1.11373149	7.50E-06	0.00010553
RPL21P1	3.02136779	7.59E-06	0.00010669
CETN4P	2.99665514	7.69E-06	0.00010795
MAPK6P3	2.31050802	7.71E-06	0.00010813
IFI44	1.3019424	7.74E-06	0.00010837
NCAPG	2.09634117	7.77E-06	0.00010884
ADGB	2.37698677	7.80E-06	0.00010914
RPL41P1	-1.2574925	7.95E-06	0.00011101
BPI	1.46708863	8.02E-06	0.00011192
OAS1	1.02926497	8.13E-06	0.00011339
PTGDR2	-1.2478756	8.15E-06	0.00011357
CKS1BP6	3.11806138	8.16E-06	0.00011362
TEX48	2.32778864	8.18E-06	0.00011382
CRNDE	2.67852148	8.26E-06	0.00011484
IGLV2.18	2.05140146	8.28E-06	0.00011509
ADAM21	1.9481284	8.33E-06	0.00011559
RPL7P38	2.78838323	8.38E-06	0.00011624
EDNRB	3.86248216	8.59E-06	0.00011867
AMHR2	3.91611622	8.60E-06	0.0001187
RNY4P34	1.97350311	8.61E-06	0.00011876
SYN1	1.9897719	8.63E-06	0.00011902
RNU6.62P	2.13528957	8.71E-06	0.00012007
SNAP91	2.05616223	8.74E-06	0.00012044
CPXM1	3.17582012	8.84E-06	0.00012175
CD300H	-1.1580541	9.00E-06	0.00012368
MAPK11	3.46496597	9.10E-06	0.00012496
IGKV1D.27	2.65734769	9.27E-06	0.00012724
MEIS3P1	3.00982398	9.28E-06	0.00012736
IGLV3.31	2.75664864	9.34E-06	0.00012799
SPCS3.AS1	2.32529676	9.42E-06	0.00012912
PCLAF	1.91356332	9.48E-06	0.00012983
RN7SL168P	-1.9795364	9.56E-06	0.00013077
CCNB1	1.63216602	9.79E-06	0.0001336
CHST3	2.06663698	9.85E-06	0.00013435
SLC9A3P2	3.27792551	9.91E-06	0.00013503
CHRM3	2.70936055	9.91E-06	0.00013503
TMEM54	1.96098587	9.92E-06	0.00013505

LINC02824	2.43065476	9.95E-06	0.00013541
KCNMA1.AS1	-1.9630971	1.01E-05	0.00013784
CYP2A7	1.95736436	1.01E-05	0.00013784
LINC02562	2.17384238	1.02E-05	0.00013873
FUNDC2P4	2.4141919	1.02E-05	0.00013884
GFRA3	2.76769985	1.03E-05	0.00013923
MIR3611	2.20831565	1.03E-05	0.00013978
RN7SL334P	2.20009104	1.04E-05	0.00014057
SHC3	2.46577273	1.05E-05	0.00014145
RNU6.672P	1.9899498	1.05E-05	0.00014145
TECTA	3.21435216	1.05E-05	0.00014146
RNY1P4	-2.9574198	1.05E-05	0.00014146
RN7SL561P	-1.9783452	1.05E-05	0.00014162
IFI6	1.1586987	1.05E-05	0.00014162
LINC01926	1.87638991	1.05E-05	0.00014162
RPL7AP25	2.72632669	1.06E-05	0.000143
LINC01337	2.22428471	1.06E-05	0.00014309
TAL2	2.45330177	1.07E-05	0.00014336
TAS2R42	-1.9971346	1.07E-05	0.00014348
RPL36P2	2.74049112	1.07E-05	0.00014434
IGLV1.47	1.64019035	1.08E-05	0.00014518
SLC2A12	1.84931504	1.08E-05	0.00014528
IGLV2.11	1.45446642	1.10E-05	0.00014719
POLH.AS1	1.98366211	1.10E-05	0.00014817
SLC30A3	3.20344582	1.11E-05	0.00014869
F7	1.84807144	1.12E-05	0.00015043
ATP2B3	2.82078116	1.13E-05	0.00015059
CYP3A43	1.88546864	1.13E-05	0.0001514
PRSS1	-3.0815117	1.15E-05	0.00015293
RPS20P22	2.6070696	1.15E-05	0.00015293
CX3CL1	3.18953839	1.15E-05	0.00015293
ANAPC1P3	-2.3302181	1.15E-05	0.00015337
SLC4A9	1.94179548	1.15E-05	0.00015363
VPS33B.DT	-2.5779329	1.16E-05	0.0001541
UPK3BP1	-2.1065173	1.16E-05	0.0001541
FAM242F	1.95359532	1.18E-05	0.00015705
DNLZ	1.94583173	1.19E-05	0.00015745
LINC00355	-2.4237749	1.19E-05	0.0001578
ATE1.AS1	2.34720622	1.19E-05	0.00015821
DIO2	2.68182321	1.20E-05	0.00015845

GNA14.AS1	2.4739164	1.20E-05	0.00015853
CYP3A4	2.07465258	1.20E-05	0.00015867
NEK2P4	2.63339167	1.20E-05	0.00015896
MAGED4	-2.4963825	1.20E-05	0.00015903
IGLV3.27	2.35297713	1.20E-05	0.00015903
KRT18P59	2.96657932	1.20E-05	0.00015903
VN2R17P	2.95696173	1.21E-05	0.00015924
ANKRD20A7P	-3.5337289	1.21E-05	0.00016018
LINC02948	-2.2398528	1.22E-05	0.00016079
CDC6	2.38649177	1.22E-05	0.00016079
SNRPEP9	2.05925461	1.23E-05	0.00016176
KRT18P63	2.37645376	1.24E-05	0.00016247
TMEM74	3.06389573	1.24E-05	0.00016247
LINC00942	2.40950445	1.24E-05	0.00016317
MTOR.AS1	2.45210849	1.24E-05	0.00016338
TOP2A	1.96078368	1.25E-05	0.00016437
RPS6P16	1.9395191	1.26E-05	0.00016497
RNU6.930P	1.92845195	1.28E-05	0.00016705
NHLRC1	3.12822439	1.28E-05	0.00016754
GOLGA8M	-2.5370835	1.28E-05	0.00016774
MCM4	1.17274859	1.29E-05	0.00016887
BTBD17	2.68780643	1.30E-05	0.00016946
KHDC3L	2.8614731	1.31E-05	0.00017079
FCRL4	1.88998803	1.33E-05	0.00017265
LOXL4	2.82377427	1.33E-05	0.00017296
C2	1.69797054	1.33E-05	0.00017313
SEC61G.DT	2.26420589	1.35E-05	0.00017548
MYMX	2.44365161	1.37E-05	0.00017808
LINC02108	-2.0897893	1.37E-05	0.00017808
LINC02168	2.83026572	1.38E-05	0.00017897
TUSC1	2.79833976	1.38E-05	0.00017905
KRT12	2.65944645	1.41E-05	0.00018183
IGHV3.7	1.59051884	1.42E-05	0.00018307
COL12A1	3.27600414	1.42E-05	0.00018307
CHRD	3.06219647	1.43E-05	0.00018404
SHISA5P1	1.87506182	1.43E-05	0.00018484
STEAP1	-2.4326685	1.44E-05	0.00018573
PCDHGB3	2.81462061	1.47E-05	0.00018952
FLRT2	2.00337393	1.50E-05	0.00019354
FAM193B.DT	1.86295753	1.53E-05	0.00019639

PEG3	2.2690327	1.55E-05	0.00019856
BNIP3P17	1.83388712	1.55E-05	0.00019926
LINC01515	2.02626182	1.56E-05	0.00019967
MIR4480	2.31814803	1.56E-05	0.00019969
RPL22P19	2.607549	1.56E-05	0.00019984
E2F8	2.89983166	1.56E-05	0.00020017
LINC02872	2.8362119	1.57E-05	0.00020069
CDK1	2.32742454	1.57E-05	0.00020072
CIBAR2	1.89369564	1.57E-05	0.00020112
OR10G2	-3.1564307	1.57E-05	0.00020134
INHBC	3.07608743	1.58E-05	0.00020149
LAMA3	2.21944626	1.58E-05	0.00020195
KRT18P39	2.35750334	1.59E-05	0.00020324
CDH6	2.40730562	1.59E-05	0.00020324
ZMYND19P1	-2.8904271	1.60E-05	0.00020455
HTR6	-3.0563569	1.61E-05	0.00020465
UHRF1	1.51823568	1.61E-05	0.0002051
DBIP2	2.60541412	1.62E-05	0.00020602
PGC	1.85699666	1.62E-05	0.00020602
KCNA1	3.08467301	1.63E-05	0.00020655
LINC02196	2.90694698	1.64E-05	0.00020837
GPR63	3.18517571	1.65E-05	0.00020886
IGKV1.37	2.11992155	1.65E-05	0.00020926
FGF13.AS1	2.94893594	1.66E-05	0.00020987
MTCO2P20	2.55635268	1.68E-05	0.00021272
TARM1	2.54681239	1.68E-05	0.00021272
RNU6.1187P	1.95325193	1.72E-05	0.00021764
STRCP1	-3.5918201	1.73E-05	0.00021771
PHB1P16	2.7290591	1.73E-05	0.00021824
LINC02412	3.17300778	1.74E-05	0.00021875
SNHG31	2.85181538	1.74E-05	0.00021916
RNU6.823P	-2.3498886	1.75E-05	0.00021981
LINC01031	-2.7290074	1.75E-05	0.00022002
GPR162	-1.079683	1.75E-05	0.00022032
ATP11AUN	2.92438172	1.76E-05	0.00022149
DPP10	3.01198865	1.77E-05	0.00022282
GPAT4.AS1	2.99087832	1.79E-05	0.00022417
CES5AP1	1.91879647	1.81E-05	0.00022717
ACSL6.AS1	1.88147995	1.82E-05	0.00022789
AWAT1	1.93060351	1.83E-05	0.00022917

HORMAD2	2.97203293	1.84E-05	0.00022983
RPS20P31	2.11819972	1.85E-05	0.00023139
LINC01585	2.14765368	1.86E-05	0.00023274
CKMT1A	1.78268391	1.87E-05	0.00023284
UBD	2.53509211	1.88E-05	0.00023385
RPSAP70	1.77336994	1.88E-05	0.00023485
UBE2H.DT	1.86399756	1.89E-05	0.00023572
TSPAN12	2.74645981	1.89E-05	0.00023577
PSG9	2.97799104	1.93E-05	0.00023941
RN7SL791P	2.23383816	1.93E-05	0.00023968
MIR503HG	2.85269977	1.95E-05	0.0002418
ELANE	1.65047358	1.96E-05	0.00024332
OR52B1P	2.47917976	1.96E-05	0.00024346
RPL5P5	1.94597383	1.97E-05	0.00024346
RAB40A	1.91063956	1.97E-05	0.00024381
MCAM	2.76386835	1.97E-05	0.00024381
HNRNPA1P17	-1.9873503	1.98E-05	0.00024418
MOBP	2.94298694	1.98E-05	0.00024517
TMPRSS12	2.59387606	1.99E-05	0.0002455
ZNF750	2.664201	1.99E-05	0.0002455
PROKR1	-1.8788652	1.99E-05	0.00024595
CALML3.AS1	2.56651968	2.00E-05	0.00024603
SLC30A10	3.07556471	2.02E-05	0.00024904
IGKV1D.37	1.953056	2.03E-05	0.0002495
IGHA1	1.92281034	2.03E-05	0.00024959
SERPINB12	2.85107355	2.05E-05	0.00025142
TDGF1	2.74164287	2.06E-05	0.00025285
ATG10.AS1	-2.2764883	2.07E-05	0.00025391
FABP5P6	2.85224276	2.07E-05	0.00025395
CDCA5	2.15254854	2.09E-05	0.00025637
MOGAT2	2.77281733	2.11E-05	0.00025828
CD177P1	2.57353905	2.13E-05	0.0002601
IGHG2	1.96310615	2.13E-05	0.0002601
IGKV1.5	1.70981358	2.14E-05	0.00026094
GPR173	1.8789244	2.15E-05	0.00026221
CAMSAP3	1.90586293	2.16E-05	0.00026389
MAGEB2	2.74861172	2.18E-05	0.00026507
KIAA1549	2.54079588	2.19E-05	0.0002659
ABCC9	2.25803255	2.19E-05	0.00026642
ACTE1P	2.93094704	2.20E-05	0.00026691



MYCN	3.07606	2.21E-05	0.00026874
TRIM75	1.79258921	2.22E-05	0.00026908
PRELP	2.94922094	2.22E-05	0.00026933
LINC01399	1.86990228	2.25E-05	0.00027225
SLC22A20P	3.12424829	2.26E-05	0.00027338
LINC02947	1.88460168	2.30E-05	0.00027792
OR52A5	3.08066483	2.30E-05	0.00027804
TTLL6	2.62240349	2.31E-05	0.00027832
RAD54L	2.28147814	2.34E-05	0.00028152
LIFR	3.01571335	2.35E-05	0.00028346
FBLIM1	2.55885396	2.35E-05	0.00028346
KLF14	2.47030522	2.36E-05	0.00028425
RPL21P16	-1.0760521	2.37E-05	0.00028516
SIGLEC20P	2.92376454	2.40E-05	0.00028848
WNT3	3.04880946	2.41E-05	0.00028949
GNRHR2	-2.4077389	2.41E-05	0.00028949
H3P35	2.83809941	2.41E-05	0.00028949
PPIAP73	2.51737757	2.41E-05	0.0002899
CGNL1	2.6917761	2.41E-05	0.0002899
LINC02764	1.89674819	2.42E-05	0.00028996
ST3GAL1P1	2.45809532	2.43E-05	0.00029166
GAPLINC	2.22787313	2.44E-05	0.00029291
CASK.AS1	2.57392449	2.44E-05	0.00029292
SYT9	-3.1613514	2.46E-05	0.00029442
TDRD10	2.90595325	2.48E-05	0.00029707
ZNF804B	2.78658257	2.49E-05	0.00029784
GUCY1A2	2.72013303	2.50E-05	0.00029887
ST8SIA5	-3.5699194	2.52E-05	0.00030114
LINC02405	2.85987115	2.53E-05	0.00030134
RPL7P43	2.6973465	2.54E-05	0.00030314
SDC1	3.00040983	2.55E-05	0.0003041
LHX1.DT	2.85290537	2.56E-05	0.00030467
PRKCE.AS1	1.98319284	2.56E-05	0.00030506
GPR137C	2.72189388	2.57E-05	0.0003062
EDIL3	-3.4346412	2.58E-05	0.00030675
PLEKHH3	2.99844973	2.58E-05	0.00030702
FOXD4L6	1.93495724	2.59E-05	0.00030813
RNA5SP332	2.51400439	2.60E-05	0.00030865
MYH6	1.81178211	2.61E-05	0.00031016
LINC01115	3.32691101	2.62E-05	0.00031028

IFNA5	-1.8272521	2.63E-05	0.00031142
IQCJ	1.81656755	2.64E-05	0.00031263
TPBGL.AS1	2.69581514	2.64E-05	0.00031271
LEMD1.AS1	2.68587407	2.65E-05	0.00031338
SLC2A10	2.03855512	2.66E-05	0.00031508
CRISP1	2.63818061	2.67E-05	0.00031578
DHFRP2	1.84218904	2.68E-05	0.00031651
LINC01482	1.85117719	2.69E-05	0.00031749
RPL36AP43	2.15323565	2.69E-05	0.00031818
IGKV1.13	2.06958111	2.71E-05	0.00031972
TTK	2.8390261	2.72E-05	0.00032069
MYOZ1	1.9555118	2.72E-05	0.00032069
RNY1P13	-2.1119827	2.73E-05	0.00032201
KSR2	1.83251355	2.76E-05	0.00032492
RD3L	1.7498685	2.77E-05	0.00032654
PSME2P5	2.65694749	2.78E-05	0.00032684
IGHV4.4	1.45407804	2.80E-05	0.00032914
RAMP2.AS1	2.88633152	2.81E-05	0.00032972
NEURL1B	2.99022518	2.81E-05	0.00033034
PCDH19	2.59964012	2.81E-05	0.00033039
PLVAP	-1.5159946	2.82E-05	0.00033077
SMIM6	2.6765138	2.82E-05	0.00033077
ZIM2	2.26208131	2.82E-05	0.0003309
PDE4DIPP10	2.73650024	2.83E-05	0.0003318
CACNG4	2.37622808	2.83E-05	0.0003318
POU2F3	1.99507947	2.84E-05	0.0003318
KRR1P1	2.03854851	2.85E-05	0.00033294
AGBL4	2.1783204	2.85E-05	0.00033341
STARD13.AS	-1.9258702	2.86E-05	0.0003341
SMARCAD1.DT	2.70446728	2.86E-05	0.00033477
FKBP4P1	-1.9853554	2.87E-05	0.00033478
NXNL2	2.60755579	2.87E-05	0.00033563
DPPA3	-2.3448584	2.88E-05	0.00033586
TMEM63B	-1.2747883	2.91E-05	0.00033904
RAB42P1	2.60999736	2.93E-05	0.00034133
MYO1D	1.42221643	2.94E-05	0.00034201
WNT4	3.19581361	2.97E-05	0.0003454
DHCR24	1.2847198	2.99E-05	0.00034672
LINC01397	2.55833999	3.00E-05	0.00034849
LUM	2.58526769	3.02E-05	0.00035006

KRT18P60	2.34131383	3.02E-05	0.00035013
FAM138B	2.49712429	3.02E-05	0.0003503
RPL7L1P11	2.69038606	3.04E-05	0.00035205
MAP1LC3C	-2.3848765	3.05E-05	0.00035331
IGKV1D.33	1.97437066	3.06E-05	0.00035369
ZFP28.DT	-1.9271442	3.06E-05	0.00035415
ACTG2	3.14198872	3.07E-05	0.00035452
RNA5SP434	2.17117668	3.07E-05	0.00035455
LINC01537	2.31376037	3.07E-05	0.0003548
OR6K1P	2.8251797	3.08E-05	0.00035567
LINC02474	1.72118014	3.10E-05	0.00035724
PROSER2.AS1	1.83732383	3.12E-05	0.00035897
BHMT	-1.9245939	3.13E-05	0.00036006
TANK.AS1	1.94005174	3.16E-05	0.00036371
IGHV3.15	1.42219283	3.18E-05	0.0003651
DEPTOR.AS1	1.96213483	3.23E-05	0.00037021
GJB2	2.60922223	3.23E-05	0.0003706
RACK1P1	2.25329134	3.25E-05	0.00037242
CALCA	1.87434392	3.26E-05	0.0003728
TTC39DP	2.2394772	3.26E-05	0.00037318
GOLGA2P8	2.21227379	3.27E-05	0.00037347
H3P37	1.73561833	3.28E-05	0.00037444
RN7SL672P	2.27710702	3.28E-05	0.00037467
TEDC2.AS1	2.31478609	3.29E-05	0.00037542
IGHV6.1	1.66729231	3.30E-05	0.00037616
AOC4P	2.53113637	3.31E-05	0.0003777
P2RY4	1.8535939	3.35E-05	0.00038181
LINC01085	2.06189774	3.36E-05	0.00038288
TPM3P1	1.80805446	3.37E-05	0.00038347
FBN3	2.70942595	3.37E-05	0.00038347
FMN2	2.70328839	3.38E-05	0.0003842
SLC22A31	3.45243104	3.39E-05	0.00038554
MTCO1P21	2.77196339	3.42E-05	0.00038896
IGLV7.43	1.74244351	3.43E-05	0.00038979
CYP4A22	2.11234054	3.44E-05	0.00038985
POLR2K	-1.0431917	3.47E-05	0.00039281
PPP1R1B	-3.4611933	3.49E-05	0.00039501
OCA2	2.08921159	3.53E-05	0.00039955
LINC00305	2.3319316	3.54E-05	0.0004005
GJA3	-2.5237093	3.60E-05	0.00040626

OR7E26P	2.55805841	3.62E-05	0.00040743
HTR1F	2.60340384	3.62E-05	0.00040744
RN7SL301P	1.80032087	3.70E-05	0.0004152
RPL7AP74	-2.9505897	3.70E-05	0.00041573
TINCR	2.74401054	3.72E-05	0.00041767
LINC01198	2.64612855	3.73E-05	0.00041845
RABGEF1P3	1.92522433	3.75E-05	0.00042125
CCDC70	1.74582382	3.77E-05	0.00042305
PPP1R13B.DT	2.44660033	3.78E-05	0.00042374
CAMK1G	-1.7857013	3.79E-05	0.00042433
LINC01964	1.80454428	3.79E-05	0.00042465
MTND4P15	2.16389238	3.81E-05	0.00042598
BNIP3P28	2.68047449	3.81E-05	0.00042654
HMGB3P27	2.70131732	3.83E-05	0.00042852
MIR345	1.9752173	3.85E-05	0.00043044
RN7SKP269	2.46253703	3.88E-05	0.0004335
FBXO7	-1.0968636	3.89E-05	0.00043433
SLCO4A1	2.53539221	3.89E-05	0.00043457
ELL2P2	2.58024665	3.91E-05	0.00043562
OR52H1	1.71043888	3.95E-05	0.00044009
ARHGEF33	2.4561882	3.96E-05	0.00044165
TENM3	2.43052312	3.98E-05	0.00044286
VAMP9P	2.01750288	3.99E-05	0.00044339
RPS3AP30	2.69010534	4.01E-05	0.00044486
LINC02537	2.64126837	4.01E-05	0.00044527
ACTG1P15	-1.932713	4.02E-05	0.00044569
PAH	2.52292377	4.02E-05	0.00044653
LINC01411	2.61791462	4.04E-05	0.00044823
KLRB1	-1.0210997	4.05E-05	0.00044873
RTRAFP1	-1.9711854	4.09E-05	0.00045186
IGLV5.48	2.43741387	4.14E-05	0.00045789
ASH2LP3	2.62214644	4.15E-05	0.00045868
MCIDAS	2.66271469	4.16E-05	0.00045915
LRRC71	1.74652715	4.21E-05	0.00046455
RN7SKP9	1.64751388	4.23E-05	0.00046578
LINC00184	-2.5458532	4.23E-05	0.00046617
SLC6A19	3.25538885	4.24E-05	0.00046731
LINC01686	-2.0499425	4.25E-05	0.00046795
HRH1	2.8410955	4.27E-05	0.00046983
LINC00841	2.54127366	4.30E-05	0.00047314

RNY4P9	1.79377805	4.32E-05	0.00047422
PDE4B.AS1	2.22194775	4.32E-05	0.00047496
HIGD2B	2.12816705	4.33E-05	0.00047516
LINC01213	1.88501451	4.33E-05	0.00047523
OR14A2	2.66570009	4.37E-05	0.00047923
TEX26.AS1	1.7353801	4.39E-05	0.00048051
OR4F14P	2.50768484	4.41E-05	0.0004829
FGB	2.66766068	4.49E-05	0.00049155
PID1	-1.0853929	4.58E-05	0.00050041
LINC02687	2.23325484	4.59E-05	0.00050078
DNAAF1	2.75462564	4.59E-05	0.00050078
SHCBP1	1.80866511	4.60E-05	0.00050145
MIR4660	1.84768717	4.68E-05	0.00050939
ATP5PBP7	1.77193501	4.68E-05	0.00050955
LTV1P1	2.10859722	4.69E-05	0.00051058
MYH15	1.98053944	4.71E-05	0.00051173
SHC1P2	2.64524704	4.71E-05	0.00051173
MMP19	3.01283956	4.72E-05	0.0005125
DDX11L17	-1.241908	4.74E-05	0.00051345
HSPB8	2.05039558	4.74E-05	0.00051394
RNF152	3.04223348	4.81E-05	0.00052093
MIR3663HG	2.5117715	4.87E-05	0.00052626
LINC01991	1.69409313	4.88E-05	0.0005274
LINC02659	2.51272197	4.92E-05	0.00053033
TRERNA1	1.87864887	4.99E-05	0.00053701
UCN2	2.16317496	5.00E-05	0.00053838
IGHV1.46	1.71532849	5.02E-05	0.00054023
ASS1	3.58731455	5.05E-05	0.0005424
JKAMPP1	2.39378428	5.06E-05	0.00054372
GADL1	1.90852992	5.07E-05	0.00054415
IFITM8P	2.40453988	5.07E-05	0.00054448
RPSAP48	2.28488765	5.10E-05	0.00054682
MIR3975	1.82143295	5.11E-05	0.00054762
LINC01393	-2.3453862	5.17E-05	0.00055338
GDF10	-3.0482051	5.18E-05	0.00055465
LINC01828	-2.7291373	5.19E-05	0.00055572
IGLV8.61	2.17164647	5.20E-05	0.00055647
KIAA1614.AS1	1.88924203	5.25E-05	0.00056125
IGHV3.49	1.67098425	5.27E-05	0.00056276
MUC19	2.56844979	5.27E-05	0.00056301

PRELID3A	2.8194465	5.28E-05	0.0005637
KIFC1	3.03660931	5.30E-05	0.00056541
GPRC5B	3.11116399	5.32E-05	0.00056682
SNRPD2P2	2.4413596	5.33E-05	0.00056837
FHIP1A.DT	-1.9995571	5.37E-05	0.00057147
RPL7AP18	2.5707195	5.40E-05	0.00057458
LINC02177	1.71193265	5.43E-05	0.00057703
EFEMP1	2.45242614	5.46E-05	0.00057962
TMEM130	1.68335575	5.48E-05	0.00058176
PGAM1P10	2.20509172	5.52E-05	0.00058513
SNRPGP4	1.78433194	5.53E-05	0.00058623
DSCAM	2.45168977	5.53E-05	0.00058629
LINC01396	2.03502436	5.55E-05	0.00058773
DTL	2.08649754	5.60E-05	0.00059203
TM4SF5	1.83430172	5.61E-05	0.00059316
NFASC	1.84020725	5.61E-05	0.00059316
E2F1	1.37270775	5.63E-05	0.00059489
NPTX2	2.55409277	5.64E-05	0.00059574
MS4A4A	1.22317444	5.67E-05	0.00059844
MCTP1.AS1	2.244445	5.69E-05	0.00060017
CHEK1	1.41597779	5.70E-05	0.00060083
GABRA4	2.33217626	5.71E-05	0.00060162
AFAP1L1	-3.4749543	5.71E-05	0.00060162
PRICKLE4	2.14401922	5.74E-05	0.00060416
ACVRL1	2.83905721	5.84E-05	0.00061357
SNX18P9	1.85221467	5.84E-05	0.00061362
IL34	-3.3147116	5.85E-05	0.0006144
RASGRF2.AS1	-3.2315274	5.86E-05	0.00061495
SYT1	2.5465982	5.87E-05	0.00061519
SEMA6A.AS2	2.49894485	5.88E-05	0.00061675
GUCY2GP	2.13924533	5.89E-05	0.00061711
RPL13P4	-2.730207	5.91E-05	0.00061887
RN7SL507P	2.50817914	5.95E-05	0.0006218
OTOR	2.39592489	5.98E-05	0.00062499
RNU6.490P	1.79221407	6.03E-05	0.00063004
NANOG	1.73305584	6.04E-05	0.00063005
HYAL4	2.15935945	6.09E-05	0.00063522
CYP2B6	1.75629989	6.10E-05	0.00063626
DENND6A.DT	-2.7167291	6.15E-05	0.0006397
HOXA13	2.28738244	6.16E-05	0.00064072

PPARGC1A	-2.3550115	6.23E-05	0.00064725
IGFALS	-2.5474039	6.24E-05	0.00064758
H2BC10	1.85579507	6.25E-05	0.00064827
CBX2	2.98090388	6.26E-05	0.00064972
MTND1P34	2.48286842	6.27E-05	0.00065042
SLC5A10	1.9500242	6.31E-05	0.00065384
TNFRSF19	2.23495847	6.35E-05	0.00065732
MKRN5P	1.74771377	6.47E-05	0.00066906
PPBPP2	2.04687803	6.52E-05	0.00067285
PTCD2P1	2.48032218	6.54E-05	0.00067451
LINC01998	2.16074921	6.54E-05	0.0006748
LY6G6C	2.85948057	6.56E-05	0.00067636
UHRF2P1	1.79772074	6.58E-05	0.0006776
FAM167A.AS1	2.20790854	6.58E-05	0.0006776
RENO1	1.82281044	6.58E-05	0.0006776
FAM225B	2.46884012	6.58E-05	0.0006776
CDON	2.34742314	6.58E-05	0.0006776
CDCA3	1.85717181	6.63E-05	0.00068142
KCNJ10	2.55670403	6.63E-05	0.00068142
LINC01114	2.15077776	6.65E-05	0.00068306
TRAV31	2.19588383	6.65E-05	0.00068306
PPIAP88	2.1868976	6.65E-05	0.00068306
PLEKHD1	-3.3406283	6.68E-05	0.00068518
DCAF12	-1.1555972	6.68E-05	0.00068572
RN7SL75P	1.73525428	6.69E-05	0.00068633
RRN3P4	2.35564819	6.71E-05	0.00068765
LINC01471	-2.7880489	6.74E-05	0.0006908
MOGAT3	2.33431767	6.76E-05	0.00069188
EIPR1.IT1	1.8011519	6.77E-05	0.00069281
CRACR2B	1.29649028	6.77E-05	0.00069306
FBXO36.IT1	-2.4716078	6.79E-05	0.00069454
GINS1	2.06827975	6.83E-05	0.0006972
DDX11L1	-1.0093353	6.94E-05	0.00070723
NDNF	2.45107276	6.94E-05	0.00070742
SLC22A10	2.32815425	6.96E-05	0.00070853
CASC18	2.27572033	6.98E-05	0.00070981
SCARA5	-3.6977117	7.00E-05	0.00071172
TMEM184A	1.75471381	7.03E-05	0.00071432
CES5A	2.31979308	7.05E-05	0.00071626
PRSS48	-1.7233073	7.06E-05	0.00071628

NXPB2	2.28218212	7.06E-05	0.00071636
DAP.DT	2.08011026	7.08E-05	0.00071815
GATD3	-1.4296792	7.10E-05	0.00072023
CMPK2	1.1332554	7.11E-05	0.00072044
MUC7	2.35200117	7.12E-05	0.00072125
SIX1	2.17861924	7.14E-05	0.00072299
LINC00545	1.75536764	7.17E-05	0.00072556
LINC01623	2.47139572	7.19E-05	0.00072693
CACNG6	-1.8861171	7.19E-05	0.00072712
WHSC1L2P	2.08400251	7.22E-05	0.00072996
NDN	2.72491342	7.24E-05	0.000731
RNF6P1	2.24047906	7.31E-05	0.00073785
CADPS	-1.7690727	7.34E-05	0.00074085
CLDN34	2.41453915	7.35E-05	0.00074181
IGHV3.32	2.4963777	7.36E-05	0.00074181
SLC12A8	2.58645981	7.36E-05	0.00074181
RPL21P12	1.6423702	7.36E-05	0.00074186
C2CD4D	-1.9651022	7.39E-05	0.0007436
OR51K1P	2.05146935	7.42E-05	0.00074661
IGLV7.46	1.88550836	7.49E-05	0.00075253
UQCRC2P1	1.94511482	7.50E-05	0.00075356
TMEM255A	2.71760753	7.52E-05	0.0007554
MX1	1.01359089	7.55E-05	0.00075759
EYA2	2.71432134	7.70E-05	0.00077175
ARNTL2	2.04001331	7.71E-05	0.00077281
LINC01068	-1.7989942	7.73E-05	0.00077423
IGHV3.73	1.95919897	7.73E-05	0.00077445
CYP4F12	-1.4601987	7.76E-05	0.00077673
RCOR2	1.89524032	7.76E-05	0.00077719
BCL2L1	-1.0369111	7.77E-05	0.0007775
RN7SL26P	1.61815011	7.81E-05	0.00078131
KRT8P23	2.14618718	7.81E-05	0.00078137
PRICKLE2	2.59192833	7.83E-05	0.00078253
PTPN21	2.25567194	7.88E-05	0.00078704
TCERG1P2	-1.9950545	7.88E-05	0.00078759
RN7SL242P	2.41282578	7.92E-05	0.00079014
OR7E2P	1.68603338	7.98E-05	0.00079588
ERICH2.DT	1.80720716	8.17E-05	0.0008126
SLC25A24P1	2.02404664	8.18E-05	0.00081282
RN7SL68P	1.73754746	8.19E-05	0.00081327



ITM2C	1.01506405	8.21E-05	0.00081469
MAP3K19	1.97780676	8.21E-05	0.00081489
LYPLAL1.AS1	1.86482749	8.26E-05	0.00081868
C19orf84	2.47073439	8.27E-05	0.00081971
RNU6.1057P	1.83626128	8.31E-05	0.00082313
OR51V1	2.41220801	8.35E-05	0.00082645
EFNB3	2.11635514	8.47E-05	0.00083609
LINC02099	1.67744521	8.48E-05	0.00083715
SYT8	2.09814331	8.49E-05	0.000838
COL1A1	2.59640909	8.54E-05	0.00084254
HMGNI1P5	-2.4283856	8.65E-05	0.00085198
LINC02821	1.78068654	8.70E-05	0.00085569
KRT18P18	-1.8359521	8.78E-05	0.00086297
HNRNPA1P6	2.31670883	8.82E-05	0.00086625
ASXL3	3.23779435	8.83E-05	0.00086681
MRPS31P2	1.75772477	8.83E-05	0.00086715
IGKV3D.7	1.85863026	8.95E-05	0.00087792
C1QA	1.09264196	8.96E-05	0.0008782
COX4I2	1.68690209	8.96E-05	0.00087822
HSPD1P10	-1.7122465	8.97E-05	0.00087856
ADORA2BP1	1.91947745	8.98E-05	0.00087919
VN1R12P	2.12490893	9.01E-05	0.00088204
ESRRG	2.1270292	9.01E-05	0.00088204
ZNF99	1.78759087	9.03E-05	0.00088332
TMEM230P1	2.14291491	9.10E-05	0.00088917
MARCHF11	2.04440828	9.14E-05	0.00089231
IGLV5.37	2.64279141	9.14E-05	0.00089284
TMC7	1.5605251	9.24E-05	0.00090093
GRIK1.AS1	1.747616	9.32E-05	0.00090835
C1orf146	2.38048594	9.32E-05	0.00090837
RBM22P4	1.70982179	9.35E-05	0.00091065
CASKIN1	2.11226233	9.38E-05	0.0009123
RNA5SP239	1.75687004	9.44E-05	0.00091832
POU1F1	1.70880927	9.50E-05	0.00092321
FAM78B.AS1	1.87688532	9.57E-05	0.0009302
RSU1P3	2.12837029	9.58E-05	0.00093055
DDX3ILA1	-2.6799432	9.58E-05	0.00093055
DRD5	1.75005282	9.69E-05	0.0009388
RPS26P43	1.69528787	9.72E-05	0.00094154
C8B	2.16715361	9.77E-05	0.0009464

SLC7A9	2.52868419	9.80E-05	0.00094808
SHANK2	1.77593002	9.81E-05	0.00094924
CCDC144A	2.86209837	9.85E-05	0.00095217
RNU6.1127P	1.76084811	9.87E-05	0.00095362
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PKMYT1	2.08892553	9.96E-05	0.00096123
MMP20	2.23491978	9.97E-05	0.00096186
HOXD3	2.08438358	0.00010042	0.00096813
WDR87BP	1.86854191	0.00010083	0.00097159
SILC1	2.0435519	0.00010084	0.00097159
LINC02400	1.93735354	0.00010115	0.00097427
TENM2.AS1	2.39259894	0.00010124	0.00097486
IGFBP2	2.77505929	0.00010147	0.00097678
RGS20	1.78810576	0.0001021	0.00098255
MALRD1	1.76552375	0.00010226	0.00098348
NRARP	2.16122081	0.00010269	0.00098702
HNRNPA1P53	1.59347541	0.00010292	0.0009889
PTPN20	2.74636584	0.00010395	0.00099851
RETN	1.22055297	0.00010448	0.00100267
STEAP2	1.99032315	0.00010472	0.0010047
SMPD4P1	-2.960094	0.00010487	0.00100572
TMPRSS11B	2.04928667	0.00010489	0.00100572
TTC12.DT	-1.9032814	0.00010532	0.00100865
TRH	1.83370726	0.00010591	0.00101333
FAM237B	1.62886946	0.00010708	0.00102355
NFIA.AS1	1.71650559	0.00010735	0.00102588
KRT8P43	2.020913	0.00010761	0.00102802
UQCRB.AS1	1.73731116	0.00010838	0.00103379
SERPINB7	2.09878454	0.00010846	0.00103424
DNMT3L	1.910017	0.00010866	0.00103585
XIAPP2	2.75142587	0.00010916	0.00103878
RGS7	2.51607828	0.00010948	0.00104139
RN7SL174P	1.81208573	0.00010992	0.00104403
IGHV3.72	1.93380771	0.00011164	0.00105937
PRKD1	2.94318863	0.00011197	0.00106221
BMS1P10	2.25623537	0.00011234	0.00106538
ERICH5	-2.8546947	0.00011237	0.00106538
C4BPAP1	2.17126613	0.00011344	0.00107458
IFIT3	1.03911234	0.00011415	0.00108027
EDDM3A	-1.6972968	0.00011462	0.00108442

RPS17P13	1.84240402	0.00011468	0.00108467
KRT18P6	2.2465491	0.00011486	0.00108549
PTTG1	1.03021982	0.00011487	0.00108549
LINC.ROR	1.74353189	0.00011557	0.0010908
EVA1CP5	1.95680045	0.00011567	0.00109141
OR2A12	2.19306464	0.00011592	0.00109347
MROH5	2.16592778	0.00011623	0.00109569
HBA1	-1.2276832	0.0001174	0.00110573
LINC01267	1.66146481	0.00011941	0.0011226
RNU4ATAC11P	-2.2684084	0.00012109	0.00113675
TRPC7.AS1	1.84865677	0.00012237	0.00114805
SPAG5	1.60318985	0.00012313	0.00115487
ESCO2	2.01485619	0.00012326	0.00115569
LRIT2	-1.6321775	0.00012388	0.00116121
TEX38	2.26300006	0.0001252	0.00117214
RNA5SP290	2.53023222	0.0001253	0.00117271
COL4A5	1.9083934	0.00012561	0.00117532
NMU	-3.1772519	0.00012583	0.00117702
MIPEPP1	1.99772294	0.00012623	0.00118008
LINC02068	2.38637766	0.00012639	0.00118121
ATP1B3.AS1	1.74897108	0.00012658	0.00118258
SETP4	-2.3059954	0.00012736	0.00118885
ZNRF2P2	1.59924914	0.00012828	0.00119633
NUPR1	2.25091138	0.00012846	0.00119764
CGN	2.52307915	0.00012922	0.00120406
LINC02141	2.93253267	0.00012943	0.00120568
APP.DT	2.04446766	0.00012977	0.0012085
HNRNPA1P24	1.98154557	0.00013077	0.00121666
MMP27	1.93791402	0.00013173	0.00122486
NMNAT2	2.22207207	0.00013236	0.00123035
CLEC14A	1.6187548	0.00013308	0.00123633
CNIH3.AS2	2.06585856	0.00013456	0.00124903
DAND5	1.81221571	0.00013463	0.00124926
CADM1.AS1	-2.588892	0.00013527	0.00125407
RNA5SP324	1.88518862	0.00013553	0.00125617
SMIM24	-1.0243768	0.00013631	0.00126265
AZU1	1.54094894	0.00013658	0.00126401
LINC01909	1.72925583	0.00013666	0.0012644
TTC3.AS1	1.73000063	0.00013678	0.00126509
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RHBDL2	1.74850054	0.00013701	0.00126611
PIR	2.70782691	0.00013701	0.00126611
TFAP2C	1.76297441	0.00013705	0.00126615
FBXO43	2.76571824	0.00013718	0.0012669
RPL35AP23	-1.8638983	0.0001376	0.00126966
TEX15	1.84707092	0.00013774	0.00127061
LEP	2.7120613	0.00013778	0.00127061
RBM25.AS1	2.01438373	0.000138	0.00127229
TPTE2P3	1.53405252	0.00013842	0.00127519
BMP4	-2.6977816	0.00013844	0.00127519
KANK4	1.55137499	0.00013873	0.0012771
RNU5E.10P	1.67425596	0.00013891	0.00127844
FAM162B	1.94987122	0.00013954	0.00128382
PPM1K.DT	2.20578258	0.00014029	0.00129036
PLA2R1	-2.7162443	0.00014048	0.0012915
CYP4Z1	1.92493674	0.0001405	0.0012915
IFNA22P	1.70908085	0.00014058	0.00129191
NXPE2	-1.7071026	0.00014085	0.00129358
FOXMI	1.85082992	0.00014158	0.00129877
H2BC15	1.08209756	0.00014196	0.00130189
COL27A1	2.40766978	0.00014271	0.00130708
RN7SL688P	-1.8493567	0.00014356	0.00131311
RPL21P43	1.87322186	0.00014395	0.00131553
PIFO	2.47512943	0.00014401	0.00131571
ABALON	-1.0283417	0.00014463	0.00132024
AGBL3	-1.0053593	0.00014471	0.00132042
IGHV3.35	1.92535364	0.00014581	0.00132984
STRADB	-1.1739611	0.00014648	0.00133514
IQGAP3	2.62058474	0.00014853	0.00135109
FGF14	1.57118802	0.00014952	0.0013593
C1GALT1P3	1.8290374	0.00014967	0.00136025
HMCN1	2.46082024	0.00014996	0.00136212
SLITRK5	2.47556228	0.0001506	0.00136594
MOCOS	2.57726238	0.00015078	0.00136724
MED28P1	1.66694989	0.00015084	0.00136739
RASIP1	2.04327412	0.0001511	0.00136889
LINC01710	2.12557138	0.00015143	0.00137116
BNIP5	1.72078978	0.00015263	0.00138117
ADAMTS3	1.6593691	0.00015293	0.00138315
IL6.AS1	-1.7256605	0.00015399	0.00139106

DPPA5P4	-2.2216635	0.00015623	0.00140975
KCNJ1	2.43690106	0.00015798	0.00142472
KIAA1755	2.04362483	0.00015856	0.0014295
PNLDC1	2.76839277	0.00016012	0.00144231
CAVIN3	1.76579583	0.00016133	0.00145118
SNRPCP10	1.75437454	0.00016265	0.00146175
RBP1	2.72935385	0.0001629	0.00146359
ALOX15	-1.4863326	0.0001651	0.0014804
TAB2.AS1	1.66147694	0.00016547	0.00148329
CRHR2	1.63782938	0.00016629	0.00148892
RNA5SP48	1.85052012	0.00016669	0.00149211
ETV3L	-1.7179836	0.00016707	0.00149461
DCST1.AS1	2.37434486	0.00016805	0.00150256
RPL21P136	-2.3306371	0.00016835	0.00150479
ACP4	1.59217895	0.00016874	0.00150698
OR2L2	2.43943562	0.00016903	0.00150877
LINC00161	2.24367789	0.00017085	0.00152452
CSMD1	-2.7501001	0.00017094	0.00152494
CDH5	1.72079708	0.0001715	0.00152906
CELF2.DT	1.59081613	0.0001716	0.00152949
TRGV9	-1.0466318	0.00017259	0.00153747
CASR	1.71865248	0.00017449	0.00155213
UBE2Q1.AS1	1.7704158	0.00017464	0.00155264
SMTNL1	1.41582329	0.00017504	0.0015557
CYP39A1	1.70553985	0.00017592	0.00156137
C16orf89	2.0883689	0.00017601	0.00156173
DSCAML1	1.65874552	0.00017662	0.00156637
GAPDHP29	1.63947078	0.00017736	0.00157239
GJB6	2.70159525	0.00017798	0.00157694
TPSAB1	2.61668718	0.00017818	0.0015779
RPS3AP41	1.68274456	0.00017821	0.0015779
RN7SKP170	1.6752648	0.00017824	0.0015779
LINC02898	1.96993724	0.00017871	0.00158077
KCNN1	1.70639062	0.00017882	0.00158126
ZBTB32	1.20490594	0.00017914	0.00158367
RN7SL541P	1.91909377	0.00017999	0.00159069
TBR1	1.72590992	0.0001802	0.00159212
RN7SL328P	2.02372599	0.00018079	0.00159671
TRHDE	2.08898601	0.00018082	0.00159671
CHST6	1.73962668	0.00018119	0.0015995

LINC00689	-2.9515438	0.00018236	0.001609
STMN2	1.80755748	0.00018289	0.00161275
OR51A1P	2.0028423	0.00018447	0.00162577
SGCG	1.61363856	0.00018554	0.00163286
RNU6.103P	1.9032014	0.00018682	0.0016423
MAGI1	2.17520591	0.00018702	0.00164319
TBC1D26	1.70180752	0.00018761	0.00164693
IGKV7.3	2.61406911	0.00018822	0.00165139
XKR9	-2.2751846	0.00018875	0.0016556
PFN2.AS1	1.74965337	0.00018893	0.00165672
MTND2P31	1.53962286	0.00018918	0.00165794
NXF3	2.88512341	0.0001893	0.00165851
LINC01842	1.46968223	0.00019012	0.00166475
RN7SL113P	1.69320961	0.00019084	0.00167017
CLRN3	1.56184895	0.00019194	0.0016789
KBTBD11.AS1	1.57606999	0.00019296	0.0016873
NCAPH	1.81138563	0.00019456	0.00170083
RPL12P25	2.018177	0.00019685	0.00171991
MAFA	1.66567142	0.00019785	0.00172769
ITGBL1	1.62507262	0.00019825	0.00173036
GOLGA6L7	1.63065682	0.00019827	0.00173036
OR2AG1	1.65017409	0.00019984	0.00174212
BRIX1P1	1.5759636	0.00020011	0.00174397
MED15P9	1.62913907	0.00020029	0.00174512
GPR142	-2.3569154	0.0002016	0.00175556
PDIA5	1.07759817	0.00020408	0.00177564
RPL7AP28	1.98120516	0.00020415	0.00177576
LINC02344	1.52264983	0.00020557	0.00178764
MCM2	1.10861884	0.00020566	0.00178788
PRELID3BP4	1.57012927	0.00020582	0.00178884
ELN.AS1	-1.7443154	0.00020713	0.0017982
TDGF1P6	1.67897649	0.00020789	0.00180329
SEC63P1	1.5325515	0.00020826	0.00180502
MTND5P7	1.67389793	0.00020951	0.00181486
RNA5SP123	-1.9875341	0.00020963	0.0018149
CCDC184	-2.0146417	0.0002098	0.00181586
STARD6	1.9295408	0.00021048	0.00182126
FOXR1	-1.7361755	0.00021075	0.00182307
C17orf64	1.92670038	0.00021151	0.00182913
OR7E36P	-1.67126	0.00021342	0.00184215

CDH13	-2.1525415	0.00021399	0.00184653
JCHAIN	1.25189969	0.00021447	0.00185014
ROR2	2.75314091	0.00021464	0.0018511
C1QB	1.23375001	0.00021578	0.0018584
CCDC190	1.55549911	0.00021621	0.00186156
KIF15	1.43571168	0.0002198	0.00188905
DCXR.DT	-1.716197	0.00021982	0.00188905
TRGV11	-1.7318336	0.0002207	0.00189608
DNAAF4	1.61797357	0.00022141	0.00190114
LINC00334	-2.9647855	0.00022183	0.00190426
IGHV1.69.2	2.68600767	0.00022414	0.00191774
GSC	-3.2830607	0.00022436	0.00191839
LINC02816	1.96018039	0.0002244	0.00191839
IGKV3OR2.268	2.30246833	0.00022615	0.00193287
RN7SKP282	-2.8477403	0.00022629	0.00193357
NES	1.91204976	0.00022709	0.00193982
GALNT9	2.31257409	0.00022754	0.00194266
TRBV25OR9.2	1.64341923	0.00022811	0.00194677
BUB1B	2.30780448	0.00022819	0.00194677
CHMP4C	2.56077428	0.00022844	0.00194823
LINC02080	-2.1127867	0.00022912	0.0019519
PSMD10P3	2.40636008	0.00023049	0.00196192
ZBBX	1.8731325	0.00023159	0.00196969
GLDC	2.0090771	0.00023225	0.00197475
RPL23AP22	1.52187066	0.00023267	0.00197783
OR3A2	1.70340645	0.00023489	0.00199568
SYP.AS1	-1.8845113	0.00023649	0.00200808
SDC2	-1.4315169	0.00023701	0.00201038
CDC20	1.974546	0.00023992	0.00203176
IGKV5.2	2.10882889	0.00024101	0.00204046
UBE2Q2P9	2.09059611	0.00024439	0.00206741
FAM227A	1.63458425	0.00024524	0.00207233
DEFA3	1.77504641	0.00024614	0.00207885
RNU6.1099P	1.63133899	0.00024695	0.0020834
H4C4	1.89679826	0.00025034	0.00210752
RNU6.136P	1.61845373	0.0002507	0.00210993
SPACA6.AS1	1.67039084	0.00025088	0.00211092
IDI1P1	1.6341878	0.00025101	0.00211141
GRB7	-2.3647961	0.00025215	0.00211928
TPX2	1.6227684	0.0002527	0.00212339

FDPSP4	2.50195731	0.00025363	0.00212892
SIGLEC8	-1.6139094	0.00025374	0.00212928
MT2P1	1.55001167	0.00025483	0.00213717
MIR5585	1.91908384	0.00025487	0.00213717
RN7SL233P	1.9316419	0.00025489	0.00213717
NUDT19.DT	2.23643966	0.00025555	0.00214214
RND1	2.67396325	0.0002558	0.00214312
MIR5581	-2.041671	0.0002558	0.00214312
AMBN	1.71449729	0.00025645	0.00214742
TRMT9B	1.58678527	0.00025987	0.00217081
ZNF474	-2.8434339	0.00026264	0.00219278
LINC01298	1.62745473	0.00026521	0.00221189
AK4P4	2.63395443	0.00026569	0.00221531
CD200R1L	2.20977332	0.0002673	0.00222707
KCNN3	2.05079504	0.00027033	0.00225102
IGKV3.7	1.41719538	0.00027092	0.00225532
KRT8P31	-2.2619372	0.00027142	0.00225829
FAM210B	-1.0130803	0.00027382	0.00227766
OR5BA1P	1.65075333	0.00027465	0.00228219
VWA3A	2.42423521	0.00027577	0.00228846
HSPA8P18	-1.9952924	0.00027623	0.00229164
EPS15.AS1	1.67981531	0.00027692	0.00229554
PAPPA2	1.49164775	0.00027753	0.00230001
SELE	2.04467453	0.00027806	0.00230318
CH25H	-2.1897788	0.00027882	0.00230883
RNU7.30P	1.60928615	0.00028006	0.00231856
KRT8P28	1.52756991	0.0002821	0.00233294
TAGLN3	1.52959494	0.00028561	0.00235612
ASB11	1.53109002	0.00028579	0.00235612
SEC1P	2.54606461	0.0002858	0.00235612
BNIP3P31	1.64072998	0.00028625	0.00235919
APLNR	-1.5997706	0.00028714	0.00236527
RN7SL520P	1.66966161	0.00028729	0.00236587
MYL3	-2.6000211	0.0002891	0.00237831
TMPRSS11F	1.76090041	0.00028951	0.00238106
IGLV2.28	1.72048414	0.00029083	0.00238862
IGHV4.55	1.97437702	0.00029111	0.00238862
PRDX3P1	1.66300742	0.00029273	0.00240061
RPL23AP43	-1.8876795	0.00029463	0.00241496
PRB3	2.0088715	0.00029483	0.00241594



SLC22A3	1.93209393	0.00029495	0.00241631
LPAR4	-2.9224525	0.0002957	0.00242119
LINC02889	-3.1565627	0.00029637	0.00242603
RNU6ATAC23P	1.59640357	0.00029647	0.0024262
IGKV4.1	1.24235068	0.00029932	0.00244633
MAGOH.DT	-2.1306991	0.00029964	0.00244836
BNC2.AS1	-1.6358181	0.00030149	0.00246283
GCNAP1	2.44098682	0.00030225	0.00246837
LINC01726	-2.2845277	0.00030246	0.00246942
RAD51	1.68023847	0.00030412	0.00248015
GSTT2B	1.41794996	0.00030676	0.00249935
LINC02689	1.54766501	0.00030915	0.00251561
NARF.AS1	1.62180598	0.00030942	0.00251713
ACTG1P24	-1.8760405	0.00031171	0.00253235
OR10H5	1.46694049	0.00031178	0.00253235
CKM	2.32474153	0.00031374	0.00254568
WNK4	1.59346931	0.0003146	0.00255134
OR51F3P	1.5474742	0.00031495	0.00255354
ABCB5	1.57854229	0.00031594	0.00256088
HBA2	-1.1690782	0.00031684	0.00256685
RNVU1.15	-1.6821656	0.00031936	0.00258455
RN7SKP266	2.14606382	0.00031949	0.00258498
TM4SF20	2.11899899	0.00032066	0.00259178
UGT2B11	-1.7840331	0.00032229	0.00260298
IGHV4.59	1.30982016	0.00032292	0.00260604
RPL6P13	1.62309058	0.00032292	0.00260604
PCGF2	1.76644457	0.00032317	0.00260733
BUB1	1.38278638	0.0003242	0.00261502
GAPDHP51	-2.2211342	0.00032472	0.00261781
CRISPLD1	1.53894095	0.00032593	0.0026269
ASPM	1.08369831	0.00032679	0.00263321
IGKV2.18	2.08759598	0.00032709	0.0026349
STRC	2.92153326	0.00032779	0.0026385
LINC01973	2.23612775	0.00032843	0.00264299
HMMR	1.86402768	0.0003333	0.00267944
RPL12P11	1.94000944	0.00033458	0.00268699
DDI1	1.94187928	0.00033711	0.00270453
SCO2	1.32099989	0.00033758	0.00270766
SNORA9B	-1.7724375	0.00033799	0.00270983
PTPRH	1.59667953	0.00033803	0.00270983

IGHD6.13	1.85532075	0.00033882	0.00271412
OR5P2	1.62928703	0.00033908	0.00271545
MDGA2	1.51299671	0.00033973	0.00271865
PON1	1.44919815	0.00034165	0.00273193
ARHGAP39	-1.8329117	0.00034257	0.00273852
NUTF2P7	1.6829127	0.00034289	0.00274043
POLQ	2.03876285	0.00034374	0.00274583
ACOX2	2.19856238	0.00034715	0.00276847
ZNF695	1.60677008	0.00034749	0.00277016
HSPD1P11	2.44030603	0.00034887	0.00277833
LCN12	1.59841805	0.00034988	0.00278491
ZNF730	1.66353582	0.00035222	0.00279859
C1QC	1.82852757	0.00035361	0.0028089
ISG15	1.03874075	0.0003545	0.00281465
SLC26A5.AS1	1.49065319	0.00035456	0.00281465
OR10A2	1.64984208	0.0003546	0.00281465
MTATP6P27	2.23766953	0.00035681	0.00283074
CEACAM6	1.4576179	0.00035696	0.00283122
HMGB3P26	1.60291095	0.00035705	0.00283122
C1orf53	1.85181052	0.00035729	0.00283231
LCN8	2.48870496	0.00035736	0.00283231
SLC30A8	1.52476296	0.00035924	0.00284644
MARVELD2	2.5217126	0.0003611	0.00285974
TMEM44.AS2	2.14711162	0.00036195	0.00286529
KCNK10	-3.1085596	0.00036198	0.00286529
MLECP1	1.71029377	0.00037137	0.00293071
NEK2	2.23929631	0.00037307	0.00294344
IGKV2OR22.4	2.23921138	0.00037427	0.0029514
LINC01255	1.43932569	0.00037445	0.00295209
BTBD10P2	2.00604951	0.0003755	0.00295889
CDC25A	2.44822867	0.00037669	0.00296752
WSCD2	-2.5685556	0.0003769	0.00296839
LINC00574	1.33516987	0.00037809	0.00297554
LGALS14	1.61347373	0.00037821	0.00297573
RPL12P10	1.58800697	0.00037924	0.00298306
PTGR1	2.38758861	0.00038084	0.00299346
RN7SL762P	1.44870376	0.00038327	0.00301172
CICP25	-2.4062399	0.00038408	0.0030166
MIR3174	1.57189373	0.00038937	0.00305292
GPC3	2.41506077	0.00038938	0.00305292

MARK3P1	1.62261117	0.00039065	0.00306138
ITGA8	3.03301269	0.00039139	0.00306546
LIPK	1.58365668	0.00039147	0.00306546
OR52B4	1.80010942	0.00039253	0.00307225
LINC02457	1.70648487	0.00039578	0.00309558
C9orf57	1.37699675	0.00039581	0.00309558
AGAP6	1.52536956	0.0003964	0.00309924
CLEC5A	1.11597487	0.00040156	0.00313589
IGKV6D.21	2.16716629	0.00040215	0.0031389
TYMS	1.49648307	0.00040235	0.0031397
HASPIN	2.53373823	0.00040289	0.00314239
TEDC2	2.59404121	0.00040459	0.00315482
PNMA8A	1.85263541	0.00040794	0.00317698
EIF2S2P3	1.40434183	0.00040856	0.00318108
MTHFD1L	1.41086273	0.00041148	0.00320065
ALOXE3	-2.1181123	0.0004125	0.00320697
NIPSNAP3B	-1.3254627	0.00041371	0.00321557
TMEM253	1.58467132	0.00041761	0.00324189
FREM3	2.05727831	0.00042079	0.00326416
MIR652	-1.7639434	0.00042118	0.00326555
WDR72	1.68147754	0.00042311	0.00327726
IDSP1	-1.3105111	0.00042397	0.0032815
C9orf163	-1.9109048	0.00042682	0.00329947
GRID1	2.04721695	0.00042748	0.00330379
H1.5	2.32071285	0.00043217	0.0033384
APCDD1L.DT	2.1840678	0.00043334	0.00334494
OGFR.AS1	1.55097878	0.00043499	0.00335608
CASC11	2.0787389	0.000439	0.00338368
TTLL7	1.54779875	0.00043938	0.00338491
CBLC	1.3911879	0.00043965	0.00338622
MTND5P12	2.03349983	0.00043996	0.00338774
SPATC1	2.08215453	0.00044028	0.00338934
MTCYBP11	2.32781134	0.00044374	0.00341184
CCNYL7	2.34550379	0.00044842	0.00344521
LINC02236	-2.3667862	0.00044852	0.00344521
TMEM18.DT	1.51144999	0.0004505	0.00345785
DAZL	1.98976066	0.00045243	0.00347016
IGHV3.43	1.36614079	0.0004533	0.003476
RPS10P16	2.02586175	0.00045613	0.00349425
POU5F1	2.13709098	0.000458	0.00350601

GTSE1	1.78094182	0.00045977	0.003517
ASB4	1.42941732	0.00046249	0.00353432
SLC5A11	2.10809775	0.00046295	0.00353663
CYP2W1	-1.5306437	0.00046301	0.00353663
KCND1	1.186122	0.00046333	0.00353818
HNF4A	1.51169476	0.00047417	0.00361019
CPA6	2.18484067	0.00047425	0.00361019
MYOT	1.56371715	0.00047747	0.00363377
ANKRD20A1	2.12456202	0.00048308	0.00367176
MIR2909	1.48855462	0.0004832	0.00367176
ARL9	1.9582576	0.00048452	0.00367939
LINC01732	1.99107548	0.00048662	0.00369448
CENPI	2.27819305	0.00048686	0.0036954
TUBAP13	1.70423067	0.00048709	0.00369549
IGF1	2.16095614	0.00048711	0.00369549
KIAA1958	1.10905899	0.00048882	0.00370673
RPL10P7	-1.5020772	0.00048966	0.00371037
B4GALNT2	1.54623592	0.00049263	0.00373015
OR7E14P	1.50033037	0.00050057	0.00378395
TFPI2	-2.4006382	0.00050096	0.00378593
OLFML2A	2.59732819	0.00050183	0.00379162
MRAP2	1.50592118	0.00050267	0.00379522
POLHP1	1.59849929	0.00050371	0.00380216
CHRNE	-1.5204898	0.00050398	0.00380325
IL17C	-2.3022484	0.00050799	0.00383081
SMIM23	2.20369388	0.00050849	0.00383273
IGKV1D.13	1.80613832	0.00050968	0.00383894
DERL3	1.24806758	0.00050968	0.00383894
RFTN1P1	1.49061524	0.00051328	0.00386509
POLG.DT	-2.5619116	0.00051849	0.00389684
THOC7.AS1	2.01271326	0.00052167	0.00391885
RASD2	1.42347997	0.00052897	0.00395954
CTAGE7P	1.98141687	0.00053138	0.00397568
RAX2	-1.8348058	0.00053801	0.00401763
FAM83A.AS1	1.50074294	0.00053947	0.00402656
MIR4762	1.42152572	0.00053991	0.00402889
ANKRD30BP3	1.34851183	0.00054078	0.00403445
SLC25A39	-1.0443759	0.00054301	0.00404823
H4C12	1.87432526	0.00054388	0.00405371
PI3	-1.0418016	0.00054552	0.00406402

SSC5D	2.10398718	0.00054872	0.00408107
KIF4A	2.06360144	0.00055152	0.00410094
LINC02883	1.52806314	0.0005525	0.0041048
KMT5AP3	1.67436995	0.0005542	0.00411316
IGHV5.51	1.29902841	0.00055421	0.00411316
GTF2IP7	1.57319633	0.00055521	0.0041196
COL6A5	1.52129825	0.00055543	0.00412026
RPS3AP14	1.55910263	0.00055701	0.00412904
GRXCR2	1.45366854	0.00055806	0.00413489
CELF3	1.52263547	0.00055913	0.00414186
KIF2C	1.54310697	0.00056294	0.00416514
PLK4	1.78562397	0.00056399	0.00417192
GRIN2D	2.03373054	0.00056521	0.00417895
LINC02153	1.41957035	0.00056551	0.00418023
LINC01857	-2.0106713	0.00056759	0.00419361
LINC01852	1.90278508	0.00057111	0.00421666
RNA5SP82	1.74037766	0.00057946	0.00426929
ETV7	1.14702751	0.00057969	0.00426995
PKIB	-2.3831095	0.0005836	0.00429376
MYT1	1.56688938	0.00058517	0.00430425
CACNA2D3.AS1	1.4025086	0.00058702	0.00431683
TRDV2	-1.2839541	0.00059012	0.00433525
HTR2A	1.66148275	0.00059067	0.0043366
RPS10P9	1.42523527	0.00059776	0.00438147
HJURP	1.77369581	0.00059992	0.00439626
RPL39P18	1.82147779	0.0006005	0.00439849
FERMT2	2.29773813	0.00060342	0.00441307
ART3	-1.958512	0.00060343	0.00441307
MUC1	2.32861294	0.00060348	0.00441307
WFS1	1.39937175	0.00060965	0.00445409
DIAPH3.AS1	1.54590687	0.00061213	0.00446909
C1GALT1P2	1.59728746	0.00061671	0.00450043
ATP4B	1.98840424	0.00062022	0.00452263
SAMD12.AS1	1.4908479	0.00062045	0.00452263
SLC2A7	-1.5580002	0.00062375	0.00454542
HPN	2.40117536	0.00062437	0.0045489
LINC02676	-2.0220348	0.00063121	0.00459235
NPC1L1	1.42824168	0.00063182	0.00459572
CDT1	1.87908423	0.00063221	0.00459754
OXCT1.AS1	-2.2444679	0.00063322	0.00460311

AKR1C5P	2.01310173	0.00063778	0.0046337
IGKV2.24	1.53970042	0.00063977	0.00464601
PRSS40A	-2.2548149	0.0006405	0.00465022
LINC01275	1.5650452	0.00064123	0.00465357
FTLP15	-2.0658923	0.00064327	0.00466499
IL1RL2	1.57502138	0.00064919	0.00470353
CALHM1	2.43760719	0.00065062	0.00471173
TSIX	2.26990273	0.00065098	0.00471217
DZIP1	1.40766323	0.00065613	0.00474614
SYCE2	1.90747792	0.0006585	0.00476113
RNU6.517P	1.79123439	0.00066295	0.00478781
RPS5P3	1.83685371	0.00066409	0.0047949
PLK1	1.61410218	0.0006659	0.00480579
IGHV3.71	1.83445122	0.00066609	0.00480605
SNORA74B	1.86399176	0.00066634	0.00480674
ASS1P8	1.69317015	0.00066966	0.00482625
LINC01354	1.40554174	0.00067411	0.00485719
RNA5SP152	1.41271434	0.00067493	0.00486127
COL7A1	2.19436887	0.00068002	0.00489303
PDE4DIPP7	1.87076064	0.00068077	0.0048962
KIF11	1.3134977	0.00068303	0.00491135
MIR3941	2.00876039	0.00068854	0.00494756
ITGA2.AS1	1.43188651	0.00069061	0.00496018
SNORA37	1.55037967	0.00069402	0.00498239
EPHB2	1.38706095	0.00069501	0.00498837
SDK1	2.37825524	0.00069625	0.00499612
SFRP4	2.07474784	0.000703	0.00503652
STPG3.AS1	1.7237143	0.00070534	0.00505211
RPS27AP10	1.40559949	0.00070838	0.00507159
GPR146	-1.0079458	0.0007101	0.00508042
RPS2P28	1.83564056	0.00071088	0.00508481
TMEM132B	1.49131105	0.00071254	0.00509556
PPP1R14D	1.51994304	0.00071801	0.00513229
GOT2P2	1.81759604	0.00072062	0.00514746
LINC00596	1.3140407	0.00072168	0.00515383
IGLV1.41	1.604176	0.00072319	0.00516114
MTCO2P21	1.46887252	0.00072477	0.00516881
RN7SL526P	2.1335852	0.00073497	0.00523686
DCDC1	1.50040733	0.00073785	0.00525379
ENHO	-2.1496934	0.00074577	0.00530536

TMEM108.AS1	1.32468296	0.00074741	0.00531584
RN7SL788P	1.57119923	0.00075257	0.00534748
ANK3.DT	1.64257176	0.00075271	0.00534748
ROR1	-2.4313177	0.00075352	0.00535203
PPIC	1.54959785	0.0007555	0.00536121
EXO1	2.07711165	0.00075845	0.00538095
SPP1	-1.7740346	0.00076055	0.00539409
TRNP1	-2.1562704	0.00076065	0.00539409
LINC01140	-2.5852591	0.00076428	0.00541813
CD300LD	-2.425864	0.00076594	0.00542793
MLXIPL	1.29543407	0.00076642	0.00543014
TNFRSF11B	1.33787824	0.00076928	0.00544812
HPDL	2.22940458	0.00076954	0.00544853
BCL2L10	1.49665332	0.00077082	0.00545637
OR2L5	1.5543108	0.00077343	0.0054736
HPYR1	2.05578487	0.00077395	0.00547606
CDO1	2.63829344	0.00077856	0.00550623
PATL1.DT	1.39576263	0.00077942	0.00551102
TP73	2.08004821	0.00078033	0.00551623
SNORD17	1.39357607	0.00078223	0.00552846
PLIN1	1.44890007	0.00078537	0.00554814
C5orf67	1.4802495	0.00078612	0.00554962
IGKV2D.30	1.36238508	0.00078631	0.00554962
DACT3.AS1	1.46755823	0.00078631	0.00554962
DNAH2	2.34982509	0.00078664	0.00554962
IGKV1.16	1.14578443	0.00078831	0.00556015
OTOAP1	1.98666468	0.00080173	0.00564341
VPREB1	1.887097	0.00080861	0.00568418
MAGED4B	-1.7786547	0.00081886	0.00574846
PTP4A1P3	1.87554373	0.00082034	0.00575631
LINC01695	1.29684083	0.00082222	0.00576691
CLDN10	-2.5406575	0.00083574	0.00585651
NETO1	2.3448449	0.00083766	0.00586864
GLI3	2.49760398	0.00083896	0.00587517
SAMM50P1	1.50481165	0.00084132	0.00588777
SETP17	1.91856771	0.00084596	0.00591626
SNORA19	1.51981855	0.00085006	0.00594099
KRTAP4.12	-2.0189653	0.0008503	0.00594131
ATP5MGP8	1.49328993	0.00085236	0.00595306
ANP32AP1	-1.5037947	0.00085489	0.00596314

AMD1P1	2.53425515	0.00085649	0.00597126
ZNF497.AS1	-1.9837918	0.00085924	0.00598779
SMOC1	1.85278619	0.00086845	0.00604527
SNORA59B	1.46756545	0.00087011	0.00605549
CAPN12	-1.0296502	0.00087328	0.00607213
NFIX	-1.1264617	0.00087557	0.00608403
CARD17	1.13678968	0.00088659	0.0061552
LINC00895	1.29109872	0.00088797	0.00616202
ALDH7A1P2	1.28789253	0.0008911	0.00618096
UQCRFS1.DT	1.39773143	0.00089339	0.00619179
TMIGD1	1.34802526	0.00089361	0.00619179
OR51B5	1.41203208	0.00089482	0.00619856
ADAMTS9	1.38248936	0.00090913	0.00628389
UPB1	1.00657532	0.00091075	0.0062937
NOTCH2NLR	1.70291992	0.00091111	0.00629479
RHBDF1	1.73284635	0.00091419	0.00631326
HSPA5.DT	1.52074062	0.00092054	0.00635575
MRPL57P8	1.47044679	0.00092863	0.00640598
RN7SL833P	1.52306631	0.00092929	0.00640911
KRT8	1.84396361	0.00093078	0.00641797
HNRNPH1P1	1.94374899	0.00093151	0.0064216
EIF4E2P2	1.45799152	0.00094107	0.00648324
IL17RE	2.09285883	0.00094179	0.00648534
KCNA4	1.28191992	0.00094293	0.0064918
AP3B2	2.5648668	0.00094557	0.00650699
RASAL2.AS1	1.70850596	0.0009579	0.00658185
TAC3	-2.3973371	0.00095895	0.00658616
LINC01748	1.84755159	0.00096242	0.00660566
DPH6.DT	1.5223596	0.00098261	0.00673247
AURKA	1.1091892	0.00098792	0.00676736
SCD	1.17768136	0.00099173	0.00679198
TRIM80P	1.71790239	0.00099404	0.00680338
IGLC6	1.3787482	0.00099844	0.00683201
CARD11.AS1	1.30470522	0.00099956	0.00683749
ANKFN1	1.44947595	0.0010053	0.00687293
WNT8B	1.52410845	0.00100649	0.00687959
RN7SL211P	1.52121334	0.00100831	0.00689049
HMSD	1.34324646	0.00100924	0.00689407
SND1.DT	-1.8672603	0.00100927	0.00689407
LINC02974	1.47388688	0.00101018	0.0068976



LINC02249	-1.3952608	0.00101022	0.0068976
ENPP7P4	1.94623809	0.00101071	0.00689944
DUTP2	1.85320163	0.00101197	0.00690511
KRT74	2.14877569	0.0010122	0.00690511
RNU6.316P	1.41822145	0.00101459	0.00691392
LINC01805	1.27492558	0.0010146	0.00691392
AK4P3	1.65071434	0.00101926	0.0069382
LINC00336	-1.4013234	0.00102476	0.00697109
CXCL8	-1.2297155	0.00102964	0.00699668
ADGRF5P1	-1.465816	0.00103106	0.00700485
IFNA21	-1.3752658	0.00103177	0.00700812
DMRTC2	2.23043317	0.00104532	0.00709403
MBL3P	1.39194496	0.00106386	0.00720898
ZFHX2	2.32430885	0.00106696	0.00722682
DNAJA2.DT	-2.0417074	0.00107007	0.00724318
STK24.AS1	1.61496638	0.00107404	0.00726851
OR51A10P	1.22959388	0.00107526	0.00727519
SMIM14.DT	2.00994453	0.00107613	0.00727956
MPC1.DT	1.80398846	0.00108107	0.00731133
NEFLP1	-1.9832112	0.00108194	0.0073157
TNFRSF13B	1.65145033	0.00108698	0.0073466
MIR3909	1.41057564	0.00108777	0.00735037
LINC01877	1.55527776	0.00109005	0.00736261
ATXN7L3.AS1	1.78188577	0.00109203	0.00737276
COL9A1	1.89467595	0.00109629	0.00739993
LINC00525	1.37514529	0.00110346	0.00744193
DOCK1	2.36594581	0.00110725	0.00746594
REXO5	1.22545979	0.00110839	0.00747041
PATE2	1.50196496	0.00111195	0.00748977
KIT	-1.6309209	0.00111683	0.00752081
TDRKH.AS1	-2.0739317	0.00111707	0.00752081
LINC02561	1.96526637	0.00111797	0.00752526
CTTNBP2	-1.8593728	0.00112029	0.0075392
KRT80	1.54510904	0.00112052	0.0075392
DEFA4	1.52816972	0.00112487	0.00756363
HINT2	1.81723076	0.00113182	0.00760383
OR51AB1P	-2.5856059	0.00113356	0.00761224
AXL	1.59873652	0.00113475	0.00761701
PDE1C	1.3959399	0.00113579	0.00762237
SMOC2	1.42019912	0.00114662	0.00769012

CREB3L3	2.39609086	0.00114882	0.00770319
MIRLET7F2	1.51973685	0.00115156	0.00771991
KCNJ3	-2.2340767	0.00115205	0.00772159
MIR1343	1.67041947	0.00115732	0.00775191
CYP21A2	1.53928049	0.00116384	0.0077923
ENPP7P12	1.4549798	0.00116482	0.0077955
PWWP2AP1	1.42455257	0.00116911	0.00781919
RASSF9	1.24419224	0.00117179	0.00783381
LINC03020	2.35928448	0.00117287	0.00783938
ANGPT1	-1.1417941	0.00118077	0.00788366
LINC02929	-1.4870455	0.001181	0.00788366
IGHV3.13	1.35136986	0.00118362	0.00789775
DNAJB6P2	1.89563101	0.001184	0.00789862
UBE2CP2	1.31716635	0.00118446	0.00790003
OR7E59P	-1.6511255	0.00118612	0.00790603
FTLP12	1.46282716	0.00118746	0.00791331
STEAP3.AS1	1.66896477	0.00118907	0.00792066
THRB.IT1	1.4658905	0.0011914	0.00793446
DUSP21	1.67678378	0.00119328	0.00794531
IMPDH1P2	2.03938555	0.00119997	0.00798481
RPS29P14	1.13400686	0.00120778	0.00802509
CRPPA.AS1	1.88571325	0.0012103	0.00803993
ARHGAP23	2.13613948	0.00122396	0.00811517
VSTM2B	2.32066458	0.00122888	0.00814613
TUBBP9	-2.1514453	0.00123028	0.00815024
PPIAP37	1.61804328	0.00123364	0.00817078
GABRB1	1.40846639	0.0012343	0.00817337
ANKRD30B	1.39688396	0.00123797	0.00819425
C12orf71	1.96416348	0.00124476	0.0082305
LINC00570	-1.4343484	0.00124615	0.008238
CYP2A6	1.43441918	0.00125616	0.00829717
MIR8076	1.20383634	0.00125655	0.00829797
RORA.AS2	-1.3835135	0.00125791	0.0083035
CENPA	2.25982812	0.00125878	0.00830747
RNU6.444P	1.45776595	0.00126031	0.0083141
MRPL23.AS1	1.46910007	0.00126281	0.00832708
UBE2C	1.01484233	0.0012648	0.00833843
IGLV1.51	1.60405231	0.00126725	0.0083511
TXNDC2	2.18269125	0.00126908	0.00836141
SKA1	1.79009077	0.00127093	0.00837009

RN7SKP38	1.99557012	0.00127566	0.00839947
LINC00857	1.40413609	0.00127739	0.0084073
LINC01729	1.7286966	0.00128021	0.00842235
MEIOB	1.87451861	0.00128434	0.00844065
CHCHD4P5	1.32140776	0.00128929	0.00846965
LINC02967	1.2996444	0.00129827	0.00851886
RN7SL36P	-1.3961001	0.00129841	0.00851886
FGFR2	-1.9081007	0.00130083	0.00852945
C22orf31	1.5643977	0.00130184	0.00853425
IGKV1D.12	1.53263131	0.00130305	0.00853801
RPL7P7	1.29013077	0.00130323	0.00853801
CNTN4.AS1	-2.3377355	0.00130452	0.00854467
SPC24	1.50808699	0.00130767	0.00855671
OR52B3P	1.66974191	0.00130767	0.00855671
HTR7	2.44840669	0.00130772	0.00855671
CBX3P5	1.72195143	0.00131262	0.00858343
CTRC	2.11694	0.00131506	0.0085922
RPS2P16	1.39200403	0.00132212	0.00863476
PRPF31.AS1	1.71282388	0.00132399	0.00864339
CCN6	1.49064729	0.00132604	0.00865278
ACSL3.AS1	-1.7453397	0.00132615	0.00865278
KRT39	1.25932395	0.00132626	0.00865278
PLP1	1.39060849	0.00132952	0.00867046
GPR79	-1.4363821	0.00133614	0.0087064
KIF20A	1.91378282	0.00134073	0.00873086
SKA3	1.68615212	0.00134565	0.00875385
NOS1AP	2.30093768	0.00134817	0.00876838
RNASEH2A	1.83345597	0.00135612	0.00881102
HSD3BP3	1.47304081	0.00135863	0.00882546
L1CAM	-2.377453	0.00136087	0.00883821
LINC01284	-2.1789154	0.00137223	0.00889692
AADAC	1.26418944	0.00137246	0.00889692
APOD	2.43464948	0.00137342	0.00889946
SPAAR	1.37918451	0.0013751	0.00890848
ZC3HAV1L	1.27893778	0.00137757	0.00892264
PLA2G5	2.28210085	0.00137822	0.00892505
ADGRA2	2.11533862	0.00138106	0.00893787
MIR548AC	1.45489471	0.0013827	0.00894661
MIR4718	1.46419531	0.00138298	0.00894661
RPL7AP15	1.55503297	0.00138712	0.00896973

ERICD	-1.494266	0.00139472	0.00901515
ZNF197.AS1	2.10591209	0.00139547	0.00901817
COL20A1	1.19822763	0.001397	0.00902618
ARHGEF26.AS1	1.94412094	0.00139947	0.00904028
LINC02896	1.48630779	0.00140046	0.00904481
CYP2G1P	1.43801701	0.00140249	0.00905605
GNB1.DT	-1.3935049	0.00140447	0.009067
GAPDHP39	2.26085795	0.00140543	0.0090713
OTOGL	1.30323808	0.00140974	0.00909164
BSND	1.41849988	0.00141608	0.0091288
TRBV25.1	-1.035412	0.0014176	0.00913481
AOX2P	1.46401889	0.00141796	0.00913522
LHX3	1.34138638	0.00141829	0.00913522
RNF212	-1.6660567	0.00141853	0.00913522
CAV1	1.65186162	0.00142459	0.00916672
NUDT11	2.35321942	0.00143431	0.00922169
PCDHGB5	2.22879324	0.00143644	0.00923294
TRAJ51	1.47282757	0.00143665	0.00923294
EDDM3CP	1.30022284	0.0014461	0.00928986
FAM189A1	1.37766876	0.00144921	0.00929875
MND1	1.94808578	0.00144926	0.00929875
LINC02240	1.38302644	0.00145161	0.00931008
LINC02301	-1.3488554	0.00147437	0.00944061
ANKRD20A3P	1.40725079	0.00147492	0.0094422
ABCB6	1.04741687	0.00147771	0.00945618
GRM8	1.2560847	0.00148054	0.00947045
SNTG1	1.19887415	0.00148572	0.00950164
GFPT2	2.2497084	0.0014874	0.00951043
DEFA1	1.44809235	0.00148775	0.00951078
NDUFB4P8	1.49775599	0.00149833	0.00956864
PSORS1C3	2.21899231	0.00149957	0.00957462
RPL23AP23	1.40004728	0.00150553	0.00960876
ADAM33	1.38318683	0.00151561	0.00966919
ACSM4	-1.3809977	0.00151966	0.00968911
SLC16A2	-1.4094702	0.00152657	0.00973119
CAP2	1.42724546	0.00153129	0.00975337
TRBVB	-1.7324299	0.00153234	0.00975607
CD276	1.36382086	0.00153882	0.00978941
B4GALNT3	1.9955159	0.00154153	0.00980466
THBS2	-1.8873753	0.00155039	0.00985899

APOA1	-1.7997828	0.00156077	0.009917
CDC42EP3P1	-1.7250883	0.00156949	0.00996139
PCNAP1	-1.6715035	0.00157044	0.00996434
HIPK1.AS1	1.53031593	0.00157347	0.00997952
RN7SL608P	1.53121036	0.00157509	0.00998779
MMP7	1.2859769	0.0015776	0.01000164
PRDX2P1	1.20133213	0.00158014	0.0100137
LINGO1	1.24366693	0.00158419	0.01003333
LINC01878	1.3758873	0.00159094	0.01007403
LIFR.AS1	1.27597942	0.00159792	0.010106
PAFAH1B1P2	1.83837691	0.0016	0.01011709
PPP1R3B.DT	-2.1437322	0.00160145	0.01012118
RPL22L1	-1.0638914	0.00160161	0.01012118
LMO3	1.36604698	0.00162757	0.01026251
BMS1P17	1.28073959	0.00163201	0.01028639
CLCA3P	1.37149975	0.00163526	0.01029862
CD5L	-2.3606803	0.00164061	0.01032605
FOSL1	1.26539239	0.00164125	0.01032804
SCUBE1	1.45104372	0.00164552	0.01035282
KARS1P1	1.98497756	0.00165369	0.01040003
ZNF385B	1.37970918	0.00165598	0.01041055
ENPP7P5	1.79950145	0.00165602	0.01041055
RPS10P18	1.67089357	0.00166858	0.01048384
SNORA14A	1.80684288	0.00166868	0.01048384
TMPRSS9	-1.2289545	0.00167256	0.01050401
CLEC4M	1.34981364	0.0016768	0.01052644
RSL24D1P11	1.45214147	0.00167963	0.01054001
UFL1.AS1	1.40105094	0.00168114	0.01054733
RAB41	1.93201437	0.00168659	0.01057306
PRSS33	-1.235376	0.00169581	0.01061816
ANLN	1.77445788	0.00169942	0.01063656
MEP1A	1.34264753	0.00170326	0.01065847
CYCSP28	-1.8950603	0.00170501	0.01066517
MIR210HG	2.04382663	0.00170572	0.01066744
NOS2	1.84406044	0.00171083	0.01069302
HMGB3	1.73643347	0.00171561	0.0107208
C4BPAP2	1.39524354	0.00172822	0.01079255
TEKT1	2.40602882	0.00172968	0.01079793
DOCK7.DT	-1.3184339	0.00173158	0.01080338
TTLL7.IT1	1.21582895	0.00173451	0.01081951

IGHV1.2	1.32853252	0.00173742	0.01083552
CFAP99	1.92573083	0.00173936	0.01084122
RHCE	1.20024941	0.00174134	0.01084916
MEDAG	-2.1008852	0.00174289	0.01085668
STK31	-2.1920692	0.00174755	0.01088136
DEFB124	1.26985279	0.00175062	0.01089837
IGDCC4	-2.4272249	0.00175171	0.01090297
DRG1P1	1.69059931	0.00175936	0.01094192
BAMBI	1.96899626	0.00176363	0.01096193
BNIP3P24	-2.0019901	0.0017678	0.01098349
IGKV2.40	1.61739097	0.00177227	0.01100477
OR52B5P	1.95867274	0.00177459	0.01101697
RPL12P9	1.28594881	0.00180257	0.01116184
SFRP1	1.48110472	0.0018029	0.01116184
BFSP1	1.53337083	0.00180399	0.01116638
RPS6P2	-1.3104363	0.00180444	0.01116697
HSPE1P11	1.44725988	0.00180834	0.01118887
OVOL3	1.45504654	0.00180991	0.01119422
COL23A1	2.23528946	0.00182951	0.01131098
COL5A3	-1.8720357	0.00184367	0.01139178
PCARE	-1.2829829	0.0018669	0.01151718
TMEM72.AS1	2.1417007	0.00186766	0.01151961
ST8SIA5.DT	2.09788894	0.00187136	0.01153452
SHISA4	-1.0528253	0.00188496	0.01161037
IGLV4.3	1.7736123	0.00189511	0.011666
RBM17P4	1.44456983	0.00190838	0.0117339
RN7SL270P	-1.4389347	0.00193199	0.01187211
SCYL2P1	-1.2768898	0.00194241	0.01192912
ACSBG2	1.94130545	0.00195506	0.01199975
RPL37P23	-1.7739951	0.00196483	0.01205269
LINC02765	1.97900927	0.00196914	0.0120697
FAM72A	1.86257078	0.00197829	0.0121163
IL1A	1.24353307	0.00198228	0.012136
ATP5PBP5	-1.8010698	0.00198414	0.01214505
RPS27AP16	-1.1821123	0.00198672	0.01215607
LINC00365	1.26811185	0.0019875	0.01215846
HEYL	2.00926763	0.001989	0.01216529
YRDCP1	1.42212326	0.00199731	0.01220837
CNIH3	-1.065355	0.00200418	0.01223428
CCN4	-1.3473295	0.00202056	0.01232711

DEFA1B	1.38109602	0.00203401	0.01240079
NSA2P5	-1.774805	0.0020358	0.01240803
PHGDH	1.07391944	0.0020469	0.01246114
LINC00964	-1.7262606	0.00205511	0.01249663
DLL3	-1.9994522	0.00205581	0.01249684
ASB15	1.35745977	0.00206825	0.01256193
OLFM1	-1.484295	0.00207202	0.01258239
ZWINT	1.22865604	0.00209229	0.01268828
PWP2	-1.173336	0.00209376	0.01269477
SNORA46	-1.5604047	0.00209954	0.01272734
RNU6.1241P	1.23750965	0.00210771	0.01275735
LYPD1	-1.3768734	0.00210774	0.01275735
TBILA	1.52682261	0.00211558	0.01279988
SPATA16	1.30254578	0.00212395	0.01284307
DIAPH3	1.46767345	0.00214343	0.01294969
AMOTL2	1.81957794	0.00215619	0.01301297
OLIG2	-1.8823846	0.00216447	0.01305293
ACKR3	-1.0738048	0.00216881	0.01307409
ATP8A2P3	1.46071827	0.00217606	0.01310516
FAM90A1	2.02895841	0.00218165	0.01312627
WASF1	1.15341255	0.00218304	0.01312811
CALCR	1.32604989	0.00218556	0.01313723
PGAM1P11	1.4945636	0.00218992	0.01316088
RRM2P2	1.32404443	0.0021923	0.0131727
CSNK1G2P1	2.47070162	0.00219372	0.01317653
H4C2	1.36491364	0.00219378	0.01317653
LINC02763	1.766705	0.00219499	0.01318128
FLG.AS1	1.32688447	0.00220178	0.01321447
HSBP1P1	1.35131982	0.00220224	0.01321471
DENND2C	1.1704935	0.00221225	0.01326044
TUBB2B	-1.022516	0.0022124	0.01326044
H1.12P	1.4129887	0.00221576	0.01327304
OR2D3	1.24100266	0.00222584	0.01332319
CCDC81	2.31595276	0.00223266	0.01335386
ABCC13	-1.0031828	0.0022438	0.01341283
MPV17L	2.25856297	0.00226256	0.01350952
CHGB	2.12480567	0.00226697	0.0135333
NPR3	2.30706487	0.00227396	0.01356728
NCKAP5	-2.1349371	0.00227524	0.01357232
MIR938	-1.76285	0.00228476	0.01361619

STAU2.AS1	1.29805513	0.00229504	0.01366191
FXYD4	1.37872743	0.00231461	0.01376274
ODCP	2.03828366	0.00232118	0.01378763
LPL	-1.7837317	0.00232754	0.01381466
SLCO2A1	2.47254323	0.00233405	0.01384625
KHDRBS3	1.4328852	0.00233483	0.01384625
LINC02346	1.28793676	0.00234088	0.01387429
KNL1	1.05863286	0.00234277	0.01388027
TSEN15P1	1.66366036	0.00235168	0.0139304
LINC02735	1.18955477	0.00235811	0.01396321
LINC00896	-1.8289111	0.00236004	0.01397203
TICRR	2.194202	0.00236139	0.01397737
VPS13C.DT	-1.9093973	0.00236683	0.01400431
RUFY4	1.43214369	0.00239165	0.01413254
MT1DP	1.53985081	0.00239333	0.01413936
MTCO1P31	1.22419024	0.00239371	0.01413936
LINC02295	-1.2560515	0.00239561	0.01414792
TMEM178A	1.78902649	0.00240096	0.01417686
TNFSF18	1.47437443	0.00240512	0.01419609
MEIS3P2	1.97552913	0.00241892	0.01427487
PEG10	-2.3553602	0.0024204	0.0142809
IGHV3.53	1.16370582	0.00243523	0.01436029
FAM245A	-1.3932462	0.00246645	0.01451989
PAK3	1.86527021	0.00247517	0.01456026
PACRG.AS3	1.27616753	0.00247957	0.01458072
DNM1P51	1.134814	0.00248835	0.01462655
CPHXL	1.34947228	0.00251317	0.01475891
ESPNL	1.23568091	0.00251562	0.01476788
FMOD	-1.3090814	0.00253432	0.01486647
RBM20	2.05375072	0.00254184	0.01490778
MRPS15P1	1.25438502	0.00254967	0.01494814
DNTT	-2.2916302	0.00256845	0.01503857
PPIAP4	1.5857202	0.00262275	0.01529943
TSPAN1	1.40353544	0.00263759	0.01537459
LINC02416	-2.0601319	0.00265961	0.01547995
KLK14	1.35492006	0.0026623	0.01548561
HSPA8P3	1.87416648	0.00266252	0.01548561
LIX1.AS1	-1.186275	0.00266255	0.01548561
HOXA6	-1.3891205	0.00267191	0.01553143
TBATA	1.20007996	0.00270706	0.01571536



CSRP1.AS1	1.28135832	0.00273229	0.01584426
LINC00906	2.02276007	0.00273753	0.01586583
RNU6.85P	1.50175824	0.00274395	0.01589423
OR52L2P	-2.0242207	0.00275406	0.01594104
CYP4F59P	1.39539908	0.00278017	0.01608031
TUBB2BP1	-1.5348481	0.00278742	0.01611633
IGHV3.30	1.06935634	0.00279392	0.01614797
TRBV16	1.9945367	0.00279864	0.01617225
LINC01218	1.88401395	0.00280164	0.01618353
MTND4P23	1.36952576	0.00280214	0.01618353
PIF1	1.35999646	0.00280415	0.01619217
RN7SL419P	-1.3940932	0.00281509	0.01624723
VPS26AP1	-2.1510631	0.00282029	0.0162734
CA5AP1	1.37981001	0.00283312	0.01632946
SNX25P1	2.19117873	0.00284655	0.01639479
ERICH3	1.85646507	0.00285141	0.0164198
RPL7AP42	1.30581857	0.00285577	0.01643887
ORC1	1.51755932	0.00290732	0.01667448
TNFRSF10A.AS1	1.3256165	0.00291541	0.01671783
RNU6.194P	1.34170494	0.00291926	0.01673377
DLGAP5	1.57921701	0.00292083	0.01673974
SPANXN4	2.26313532	0.00292466	0.01674945
MIR618	1.38443427	0.00294218	0.01684057
GNRH2	-1.6093649	0.00295025	0.01688062
ART4	-1.9882144	0.0029553	0.01690024
GALNT15	1.58648966	0.00299353	0.0170866
PIGZ	1.71128403	0.00299387	0.0170866
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SVOPL	1.29390978	0.00301498	0.01718837
PCDHGA7	1.33305539	0.00303503	0.01728067
CAPN9	1.37223718	0.00303562	0.0172809
HHATL	1.11264113	0.0030364	0.01728224
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TNS4	1.99295032	0.00305305	0.01736754
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CCDC83	1.64040707	0.00309707	0.01758607
LGMNP1	1.31142506	0.00309936	0.01759475
LAMC2	1.16415228	0.00310466	0.01761643

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LINC02393	-1.7988908	0.00310749	0.01762294
MIR562	1.31165224	0.00310815	0.0176235
GUCY1B2	1.43478918	0.00311037	0.01762975
AURKAP1	1.55121934	0.00312395	0.0177035
IGBP1P1	1.51779471	0.0031277	0.01772155
TAAR1	1.13654157	0.00313146	0.01773324
LNCBRM	-1.3027099	0.00313551	0.01774979
PDZPH1P	1.1483102	0.00314032	0.01777383
SPDYC	1.43545896	0.00315482	0.01784869
CCNB1IP1P1	1.12467745	0.00316308	0.01788328
IGLV2.5	1.4124771	0.00316697	0.01790207
CALCRL.AS1	1.37140685	0.00316917	0.0179113
UBE3AP2	1.3922833	0.00317256	0.01792722
IGKV2D.29	1.28800789	0.00319425	0.01801736
HNRNPA1P62	1.51701249	0.00321525	0.01812278
PYCR1	1.54504976	0.00322056	0.01814622
SPC25	1.75497792	0.00323138	0.01820066
LINC00643	1.34018221	0.00324048	0.01823882
LINC02319	1.28475592	0.00324244	0.01824535
WFDC5	1.15293501	0.00324867	0.0182751
LEF1.AS1	-1.5196187	0.00325425	0.01829994
CTF1	1.81698619	0.00326142	0.01832712
CPLX4	1.09273991	0.00327197	0.01837982
LINC02836	1.1707806	0.00328806	0.01844051
SUMO2P14	-1.3589664	0.00329355	0.0184536
IGSF10	1.48451109	0.00330303	0.01849802
LDHC	-1.3611805	0.00330508	0.01850623
RNA5SP111	-1.3561228	0.00331125	0.01853746
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PRELID2P1	1.3075562	0.00334148	0.01867006
LIPJ	-2.50376	0.00334299	0.01867185
ARSJ	2.09590638	0.00335766	0.01873716
SNORC	2.14256078	0.00336202	0.01875815
KIF23	1.12098598	0.00337197	0.0188103
DGAT2L7P	-1.2734603	0.00337589	0.01882549
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PTBP1P	1.93320828	0.00340518	0.01896389

RASAL1	1.92174199	0.00341078	0.01898972
ANKRD62	1.17148986	0.00342705	0.01907354
ANKRD20A4P	1.66352707	0.00344458	0.01916087
KLHL31	-2.0565586	0.00345662	0.01922103
TAF9BP2	1.78608766	0.00346138	0.01924412
EGFEM1P	1.10399009	0.00348072	0.01933452
VN1R20P	-1.8813922	0.00348411	0.01934996
OPA1.AS1	1.44384362	0.00351407	0.01949328
AOX1	1.2328281	0.0035159	0.01949547
RBMXP4	1.5251796	0.00353065	0.01956344
CCT6P2	1.35907161	0.00353754	0.01959123
CNKS3	2.02419382	0.00354825	0.01964706
CEACAM22P	-2.1594424	0.00355423	0.01966635
NTRK3	1.24875501	0.00357323	0.01975754
MIR3139	-2.1848718	0.00358534	0.01981053
IGHVIII.76.1	-1.4342624	0.00360507	0.01990906
RDH12	1.28909873	0.00362555	0.01998698
MTND1P32	1.2460831	0.0036263	0.01998764
CSPG4P10	-1.8220341	0.00367132	0.02021446
DPYS	1.31990813	0.0036783	0.02024225
LINC02073	1.69953692	0.00367945	0.02024408
AR	1.59285414	0.00369252	0.02029916
RN7SL268P	1.32048557	0.00372	0.02043234
ABCA4	1.37342279	0.00373663	0.02050763
H2AC14	1.51509226	0.00377365	0.02066915
LINC01483	1.32032558	0.00378073	0.02070436
RPL7AP10	1.7074483	0.00380254	0.0208129
SUPT4H1P1	1.25094736	0.00381052	0.02084203
RNU6.828P	-1.3026955	0.00381837	0.02087409
PODXL2	-2.0749667	0.00382083	0.0208839
UCP1	1.45379847	0.00383974	0.02096169
IGHV3.66	1.06281771	0.00384128	0.02096644
CDH2	-1.6149472	0.00384769	0.02099415
ATG3P1	1.07546402	0.00386769	0.02107724
ZNF823	-1.0737805	0.00386819	0.02107724
FZD5	1.24227966	0.00386974	0.02107781
NPM2	1.64520049	0.00387892	0.02112049
CICP4	1.39677518	0.00388859	0.0211585
RPL12P15	1.30052741	0.00389007	0.02116289
LNK1.AS2	1.22551837	0.00391367	0.02127651

LINC02009	1.27399928	0.00392053	0.02131015
PPM1J.DT	1.20196942	0.00392946	0.02135494
SIGLEC10.AS1	-1.3966513	0.0039381	0.02139449
ATP5MC1P4	1.68640879	0.00394175	0.02141064
RN7SL221P	-1.5978955	0.0039485	0.02143246
RGSL1	1.69813184	0.0039751	0.02156942
FBXW10	1.33000416	0.00399328	0.02166058
CPS1	1.34706192	0.00399501	0.02166619
HFM1	1.50264561	0.0039963	0.02166641
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DDR2	1.86478994	0.00401049	0.0217314
XCR1	2.05447244	0.00401959	0.02177318
ITFG1.AS1	1.53539337	0.00403185	0.02183582
TMSB10P1	1.23874021	0.00404539	0.0218903
ALDH1L2	1.7688227	0.00406306	0.0219594
MIR378D2HG	1.37844469	0.00406929	0.02198552
IGHV3.36	1.25325578	0.00411391	0.02219222
TMEM213	1.41073686	0.0041286	0.02224851
CYP2B7P	1.50083156	0.00413708	0.02228277
LINC02938	1.15287411	0.00414097	0.02229988
SNX19P4	1.51173174	0.00414963	0.02233885
SH3PXD2B	1.76812779	0.00416842	0.02242848
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BICRA.AS1	1.6680423	0.00420663	0.02258761
CD24P4	1.45495539	0.00423119	0.0226887
KCNE5	1.72989742	0.00423124	0.0226887
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GEMIN8P1	-2.0182112	0.00426929	0.0228661
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UBE2CP3	1.17094273	0.00427021	0.0228661
USP2	1.97053732	0.00428538	0.0229339
WDR64	1.70116932	0.00428573	0.0229339
SLC47A2	1.31180719	0.00428711	0.0229374
MIR7111	-1.477659	0.00429928	0.02298681
RPL7P18	1.34435373	0.00430295	0.02300253
LINC01375	-1.1530882	0.00430935	0.02302891
HMG1P2	1.26027376	0.00431889	0.02307598

RGS16	1.21514888	0.00432216	0.02307773
GUCY2EP	1.83575089	0.00433334	0.02311321
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ANGPTL2	-1.4502406	0.00434118	0.02313207
PREX2	-1.8135841	0.00435006	0.02317155
RNU7.181P	1.24674369	0.00436247	0.02323373
JARID2.DT	2.2223625	0.00438783	0.02334107
IGHJ2	1.39757307	0.00440103	0.0233994
LINC01050	1.01476026	0.00442859	0.02352199
TUBB8P11	1.47139443	0.00444393	0.0235915
STPG2	-2.023243	0.00444943	0.02360875
ELF2P1	-2.2329455	0.00449038	0.02379161
SEMA3D	1.39623825	0.00450989	0.02388917
RNU6.213P	1.1696332	0.00451918	0.02393433
CEND1	1.87252287	0.00452518	0.02395801
TGFA.IT1	1.30600061	0.00452889	0.02396961
CNTF	2.02038663	0.00453199	0.02398197
PLAAT2	1.47864206	0.00454108	0.02401793
H2AC16	1.62997073	0.00455819	0.02409624
KRT8P26	1.84321625	0.00457948	0.02418844
CHL1.AS1	1.11866263	0.00458183	0.02418863
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OR2C1	-1.7075442	0.00461123	0.02432747
TUB	-1.1672496	0.00462787	0.02439477
TCAP	1.52178853	0.00464785	0.02448368
RPS3AP5	-1.0839454	0.00466303	0.02454308
NEIL3	1.32584214	0.00466345	0.02454308
OTX1	-1.0462421	0.00466382	0.02454308
NCAPG2	1.09201941	0.00466605	0.02455072
RACGAP1	1.306024	0.00467105	0.0245729
LRGUK	1.83316455	0.00467188	0.02457314
CLCNKA	1.06575226	0.00470778	0.02472055
DEPDC1B	1.56637174	0.00476123	0.02496616
ARF4P2	1.29160668	0.00477852	0.02503758
TLL13	1.86245005	0.00480412	0.02516064
TERT	1.48870561	0.00482487	0.025251
S100A2	-2.225633	0.00483243	0.02528208
IGKV2D.24	1.68764557	0.00484515	0.02533177
LINC02778	1.36190383	0.00485138	0.02535233
MTUS2.AS1	1.09155677	0.00485965	0.0253822

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LINC02042	1.19207563	0.00487409	0.0254363
GPR33	-1.935612	0.00487487	0.0254363
MRC2	-1.2525515	0.00489693	0.02551328
SCARNA5	1.56756403	0.00491514	0.02559539
GPR52	1.67680587	0.00493038	0.02564497
HSPE1P13	1.65616738	0.0049362	0.025671
SEPTIN14P6	1.4306828	0.00494907	0.02572529
SH3D19	1.58296936	0.00494909	0.02572529
KCNMB2.AS1	1.18421986	0.00495265	0.0257395
RPS18P1	-1.8967436	0.0049555	0.02574697
RNA5SP527	-1.3381151	0.00496517	0.02577896
RPL27AP8	1.12132393	0.00499173	0.0258912
UBE2L4	1.37836646	0.00501555	0.02597615
RNU6.937P	-1.7170575	0.00502984	0.02603726
LINC00606	1.13819036	0.00503416	0.02605534
FRZB	1.31382713	0.00504608	0.02609979
SLC35E4	1.25956843	0.005057	0.02615199
MYBPC2	-2.2490466	0.00507611	0.02622492
NCAM1.AS1	1.95757832	0.00508222	0.02624351
IMPDH1P8	-1.8619954	0.00509198	0.02628525
DIPK2B	1.13507779	0.00509723	0.02630371
TMPRSS4	2.15703903	0.00510069	0.02631294
OR2L9P	1.08718006	0.00510292	0.02632009
FAM88B	-1.0228668	0.00510559	0.02632525
GRIK2	1.44018921	0.00511678	0.02636995
RN7SKP150	-1.5288702	0.0051255	0.02641056
RN7SL118P	1.70041443	0.00513132	0.02642958
SLC25A30.AS1	1.30555232	0.00513172	0.02642958
GOLPH3.DT	1.16973412	0.00514346	0.02647699
RPEP4	1.83446032	0.00514618	0.02648668
USP41	1.46499791	0.00515158	0.02650146
KIR2DL4	1.14894198	0.00518743	0.02664045
JAKMIP1.DT	-2.4943999	0.00518794	0.02664045
IGHV3.38	1.45318315	0.00520516	0.02671145
ADAM23	-1.4175316	0.00522803	0.02681125
NPTX1	1.30665669	0.00526063	0.02693205
RAB25	-2.1198285	0.00526326	0.02693913
DUTP7	-1.9465019	0.0052673	0.02694666
LINC00632	1.25752902	0.00531445	0.02715482

GPX6	1.14170486	0.0053227	0.02718134
OR4G4P	-1.1691206	0.00535174	0.02731633
NR2F1.AS1	1.12783584	0.00535774	0.02733807
MLF1	-2.0538218	0.00544965	0.02776191
RN7SL824P	1.01078812	0.00547347	0.02784514
RFX8	1.37936959	0.00554731	0.02815872
LINC00562	-1.831054	0.00554815	0.02815872
OR52U1P	1.59450851	0.00554817	0.02815872
SHANK1	-1.3888727	0.00555138	0.02816796
CCR10	1.0243659	0.0055565	0.02818734
TMEM266	1.66111308	0.00556253	0.02821336
TRPM5	1.75212009	0.00556865	0.02823984
BHLHE41	1.24392721	0.00557492	0.02825794
FABP5P8	1.06956779	0.0055774	0.02826597
AKR1B1P1	2.200642	0.005598	0.02833835
SCGB1C1	1.13887509	0.0056129	0.02840142
ACTA2.AS1	1.69743454	0.00562819	0.02844535
ZDHHC4P1	1.85320279	0.00563546	0.02846834
RPL7AP53	1.95542444	0.00565564	0.02855189
IGHV1.58	1.85073243	0.00565702	0.02855426
RNU4.9P	1.29778012	0.00566267	0.02857362
RSPH10B	1.45920163	0.00567285	0.028602
IGHV4.80	1.22454265	0.00571197	0.02876688
IGLV3.12	1.95088619	0.00572162	0.02881088
ABHD11.AS1	1.53802323	0.00573354	0.02885699
LINC01033	1.59496616	0.00574381	0.02889944
PIH1D2	1.24777311	0.00578934	0.02908656
GOT2P3	-1.4244227	0.00580071	0.0291344
RUNDC3B	1.40443071	0.00583806	0.02930789
IGKV2D.26	1.39366287	0.00584824	0.02934964
IL23R	-1.7294933	0.00585476	0.02937763
RIMKLA	1.98866042	0.00587884	0.02949328
GAL3ST1	1.77266666	0.00588554	0.02951794
ELAVL4	-1.6784762	0.00588877	0.02952942
RPL14P6	-1.2569839	0.00589977	0.02957512
EPGN	1.59558759	0.00595162	0.02980573
ERCC8.AS1	-1.3698687	0.00596534	0.02986092
OIP5	1.02872616	0.00600179	0.03002425
DPYSL4	-2.1207332	0.00602142	0.03010806
SRP14P1	1.37084848	0.00602584	0.03011578

DUXAP1	1.14006827	0.00603287	0.03014416
ACAD11	1.24231787	0.00603344	0.03014416
WEE2	1.45402511	0.0060846	0.03035147
RPL29P12	-1.3450717	0.006125	0.03052393
MGAT4EP	1.00776024	0.00614745	0.03062119
H4P1	1.20950359	0.00617526	0.03074022
CYP4F8	-1.2375649	0.00619523	0.03082987
TROAP.AS1	-1.4634027	0.00619888	0.03083931
MIR3157	1.24740182	0.00620192	0.03084847
TUBB8P7	-1.4937259	0.00621286	0.03089799
MYB.AS1	1.20019088	0.0062465	0.03104563
BNIP3P26	1.72288994	0.00627163	0.03114617
OPALIN	1.12260725	0.00628056	0.03118308
PRELID2	1.22587091	0.0062811	0.03118308
CAPN14	2.02447675	0.00630955	0.03129612
ACTG1P3	1.19078025	0.00632791	0.03134111
IQCA1.AS1	1.14845236	0.00633929	0.03138758
ADAMDEC1	1.87645914	0.00635381	0.03144461
RNA5SP477	1.25487081	0.00638661	0.03158702
SLC6A3	1.54628944	0.00640516	0.03167376
LRP1B	-1.2897084	0.00641352	0.03170953
KCNJ16	-1.2035583	0.00642224	0.03173825
SPDYE4	1.64857569	0.00644321	0.03182684
HNRNPA1P36	1.2044275	0.00645197	0.03186509
MTDHP1	-1.8988986	0.00648144	0.03200057
IGHV2.70D	1.4517526	0.00648352	0.03200581
LINC02090	1.2361751	0.00651567	0.03214936
ANXA10	1.50668728	0.00655271	0.0323073
SKIDA1	1.18047253	0.00656664	0.03235949
LINC00327	1.26864939	0.00657168	0.03237483
SMIM10L2A	-1.7459694	0.00657948	0.03240309
SYNJ2.IT1	1.08540654	0.00659516	0.03247015
PBK	1.75987825	0.00659871	0.0324724
CYP1A1	1.10289066	0.00661915	0.03256276
SLC2A3P2	1.90971902	0.00663511	0.03262083
LINC02926	1.94361073	0.00665468	0.03270305
MORC1.AS1	1.0892407	0.00666711	0.03274738
RSKR	1.18235964	0.00667562	0.03278402
LINC02287	-1.5418255	0.00670122	0.03288918
NPM1P18	-1.1771134	0.00672281	0.03298484



STK25P1	-1.867019	0.00675162	0.03309516
RNU1.67P	1.34487005	0.00675517	0.03310225
MRRFP1	1.33160431	0.00676464	0.03313829
LINC01277	-1.9563194	0.00678129	0.03319397
COL4A2	1.99898033	0.00678807	0.03321162
NUP62CL	1.88566787	0.00682472	0.03336496
FANCD2OS	-1.2037276	0.00684748	0.03345538
EHD4.AS1	1.21456106	0.00688333	0.03359395
PDE4DIPP4	1.28684478	0.00689542	0.03364506
WEE2.AS1	1.49850067	0.00690486	0.03366238
DES	-1.8816818	0.00694044	0.03380436
TGM3	1.39811055	0.00694978	0.03382363
PLA2G2C	1.25561673	0.0069615	0.03387541
HNRNPA1P22	-1.3279485	0.00696383	0.03387625
VN2R19P	-1.2259837	0.00696676	0.03388001
ESPL1	1.53444779	0.00700638	0.0340305
TUNAR	1.23361002	0.00706711	0.03426769
COL4A1	1.22584354	0.00707768	0.03429726
DCT	1.80322109	0.00709397	0.03436557
KLHL30.AS1	1.08688001	0.00710038	0.03438604
LINC01586	-1.2724345	0.00710675	0.03441156
PRKN	-1.5086676	0.00712594	0.0344789
CDC25C	1.77565816	0.00715219	0.03457778
RPL21P65	-1.1985879	0.00715429	0.03457778
MTCYBP29	1.01905649	0.00716715	0.03462394
RN7SL23P	-1.5139452	0.00721242	0.0348212
LINC00974	1.10699316	0.00721932	0.0348429
NFYAP1	1.08926769	0.00721953	0.0348429
ELOCP2	1.29434	0.00722024	0.0348429
GRPR	1.47648479	0.007242	0.03492414
P4HA3	1.28499976	0.00724317	0.03492414
PIMREG	1.96127308	0.00727141	0.03502523
RPL5P30	-1.6151661	0.00729119	0.035099
RNU6.711P	1.31696608	0.00729826	0.03512762
SLC35G6	1.26483238	0.00733984	0.03530069
RNU6.181P	1.35330471	0.00735045	0.03534631
JCAD	1.89181595	0.00736377	0.03539413
DAAM2.AS1	1.64693139	0.00737202	0.03542832
HSPE1P28	1.5533569	0.00738593	0.03547891
MROCKI	1.9923346	0.00740701	0.03557471

PLAC4	-2.0176611	0.00741278	0.03559698
RN7SL166P	1.22074837	0.00743071	0.03566129
ATP8A2P2	1.66234794	0.00751639	0.03605043
ZNF334	-1.944601	0.00753197	0.03610308
LINC01018	1.21482183	0.00759252	0.0363545
HNRNPA1P37	1.27398045	0.00762176	0.03646116
GARIN5A	1.52160068	0.00767247	0.0366758
CCL8	1.97161973	0.00772539	0.03689507
RPL7AP29	1.18994782	0.0078032	0.03720241
MAFTRR	1.57260193	0.00781336	0.03723025
NENFP2	1.50887237	0.00784385	0.03735851
MEIS1.AS2	1.29951499	0.00785498	0.03739717
SSR4P1	1.75797206	0.00789485	0.03756156
RN7SL144P	1.1678235	0.00791499	0.03764595
SF3A3P1	-1.6284302	0.00793635	0.03773041
LINC02291	1.19907743	0.00796085	0.0378297
SMARCE1P1	1.46380939	0.0079967	0.03798854
IFNA20P	1.68569754	0.00799847	0.03799122
RSF1.IT1	1.62574792	0.00801628	0.03806432
DSCAS	1.13251035	0.00812314	0.03847859
WNT10B	-1.3673768	0.00813807	0.03853189
GSTA6P	-1.5012713	0.00813988	0.03853464
EIF1AX.AS1	1.1777392	0.00816584	0.03864588
RN7SL273P	1.34238852	0.00818215	0.03870558
NUP210P3	1.14848192	0.00818705	0.03871708
TRIM7	1.09870314	0.00821218	0.03881255
SLC34A1	1.36142636	0.00821785	0.03883353
STX1B	1.45734969	0.00822737	0.03886097
KIAA2012.AS1	1.00783078	0.00826199	0.03901537
SLIT3	1.15101447	0.00830806	0.0392008
POLR2KP1	-1.3825084	0.00833533	0.03931765
SAMD11	1.12462952	0.00834662	0.03935909
NPAS1	-1.6566619	0.00836743	0.03942763
GRM7.AS3	1.03933481	0.00839951	0.03955506
UNC5A	1.64774734	0.00847342	0.0398553
H3P18	1.4038239	0.00848614	0.03990912
GATA6	-1.6749104	0.00849367	0.03993857
DEPDC1	1.67230205	0.00851438	0.03999401
CSPG4P12	-1.2539635	0.00852552	0.04002799
LINC03028	1.40888132	0.00856531	0.04017314

SSX1	1.0516617	0.00864297	0.04051317
ZNF887P	-1.2025319	0.00868111	0.04067377
RAI1.AS1	-1.6587704	0.00874791	0.04091348
LINC02222	1.0072566	0.00876586	0.0409705
CES1P1	1.21062529	0.00876657	0.0409705
MGP	1.49152207	0.00877779	0.04101046
LINC02521	1.00568857	0.00878124	0.04102047
OR52A1	1.09394371	0.00879234	0.04105403
MMP26	1.03201916	0.00881264	0.04113658
FLG2	1.03761503	0.00882474	0.04117467
RPL35AP29	1.10836322	0.00892785	0.04153849
RNA5SP159	-1.573915	0.00893516	0.04156358
FBLN2	-1.3074981	0.00893589	0.04156358
HNRNPA1P54	-1.4303655	0.00893785	0.04156604
VEZTP1	-1.5550744	0.00893906	0.04156604
RPSAP51	1.19391663	0.00894341	0.04158012
DPP9.AS1	1.75402385	0.00896719	0.04166596
LYPD2	-1.4421851	0.00900487	0.04180394
DUOXA1	-1.2842753	0.00900718	0.04180851
RNU6.1208P	1.23258166	0.00902901	0.04187888
SLC45A2	1.39037653	0.00905308	0.04197811
HNRNPA3P11	-1.8734018	0.00907481	0.04205402
EPOP	1.5380476	0.0090913	0.04209938
ENAM	1.49894393	0.00910539	0.042153
SPRING1P2	1.47488412	0.00910868	0.04216121
PRKX.AS1	1.17795706	0.00912163	0.0422087
LINC01783	-1.3742213	0.00914936	0.04231206
FAM174A.DT	1.15345527	0.00915357	0.04232531
KREMEN2	1.1573291	0.00917637	0.04241199
HSD17B2	1.46981078	0.00918785	0.04244631
EIF5AP3	-1.431285	0.0092543	0.04269052
PFN1P3	-1.557528	0.00925755	0.04269924
GSG1L	1.42963004	0.00926152	0.04270499
CHMP1B2P	1.1811972	0.00927383	0.04274919
GPR37L1	1.8400877	0.00932139	0.04292431
TRGV6	-1.2184183	0.0093912	0.0431951
PXMP2	1.00519318	0.00942672	0.04331376
LINC01258	-1.1280037	0.00943197	0.0433227
NBEAP1	-1.3300902	0.00944574	0.0433634
RPL30P7	1.00304316	0.00946054	0.04341867

RXFP1	-1.1273589	0.00952904	0.04366919
NANOGP4	1.55748069	0.00954756	0.04372854
LINC02997	1.36152003	0.00955602	0.04374816
MIR4324	-1.3163255	0.00955763	0.04374916
ABCA13	1.24156672	0.00958265	0.04383809
SCN8A	1.86477468	0.0096325	0.04401246
ARHGAP42	1.31697675	0.0096908	0.04424144
MIR99AHG	-1.8079928	0.0097123	0.04431499
GTSCR1	-1.2919586	0.00972965	0.04436837
CCDC168	-1.8097528	0.00976377	0.04449167
NAP1L4P1	1.51858079	0.00978504	0.04456275
TTYH1	1.58120353	0.00979725	0.04459892
RNU6.537P	1.11465236	0.00982474	0.04469817
FGF7	1.07338515	0.00986415	0.04484294
CHD5	1.61424668	0.00988714	0.04492997
EWSAT1	1.16501567	0.00990893	0.04500944
DNAJB6P8	1.4987425	0.00992137	0.0450464
FARS2.AS1	1.20462773	0.00997606	0.0452598
GFAP	2.06015194	0.00998434	0.04528648
LINC00958	-2.3633785	0.00998902	0.04529856



## Appendix B

Table B1 Lung differential gene expression analysis at the pathway level

Pathway	Log FC	P Value	Adj P Value
REACTOME_CD28_DEPENDENT_VAV1_PATHWAY	0.52536425	8.93E-05	0.00789576
KEGG_SYSTEMIC_LUPUS_ERYTHEMATOSUS	0.33183053	8.96E-05	0.00789576
REACTOME_TCR_SIGNALING	0.44985736	0.00010763	0.00789576
REACTOME_PECAM1_INTERACTIONS	0.47260671	0.00014633	0.00789576
REACTOME_DOWNSTREAM_TCR_SIGNALING	0.43762305	0.00014668	0.00789576
REACTOME_GENERATION_OF_SECOND_MESSENGER_MOLECULES	0.4521215	0.00019163	0.00789576
REACTOME_COSTIMULATION_BY_THE_CD28_FAMILY	0.39910954	0.00021658	0.00789576
REACTOME_CTLA4_INHIBITORY_SIGNALING	0.42195766	0.00021881	0.00789576
REACTOME_CD28_DEPENDENT_PI3K_AKT_SIGNALING	0.41098171	0.00023103	0.00789576
KEGG_ABC_TRANSPORTERS	0.30592205	0.00023589	0.00789576
KEGG_PHOSPHATIDYLINOSITOL_SIGNALING_SYSTEM	0.3696531	0.00024805	0.00789576
KEGG_NON_HOMOLOGOUS_END_JOINING	0.37723236	0.00025102	0.00789576
KEGG_INOSITOL_PHOSPHATE_METABOLISM	0.39804847	0.00027029	0.00789576
KEGG_PRIMARY_IMMUNODEFICIENCY	0.34023269	0.00027367	0.00789576
KEGG_T_CELL_RECEPTOR_SIGNALING_PATHWAY	0.35590632	0.00035195	0.00789576
REACTOME_THE_ROLE_OF_NEF_IN_HIV1_REPLICATION_AND_DISEASE_PATHOGENESIS	0.4428666	0.00039184	0.00789576

REACTOME_NEF_MEDIATES_DOWN_MODULATION_OF_CELL_SURFACE_RECEPTORS_BY_RECRUITING_THE_M_TO_CLATHRIN_ADAPTERS	0.44303805	0.00039634	0.00789576
REACTOME_PLC_BETA_MEDIATED_EVENTS	0.36403865	0.0004182	0.00789576
REACTOME_PLC_GAMMA1_SIGNALLING	0.33834619	0.00045535	0.00789576
REACTOME_AMINE_DERIVED_HORMONES	-0.3428058	0.00048017	0.00789576
KEGG_GLYCEROPHOSPHOLIPID_METABOLISM	0.30610178	0.00052233	0.00789576
REACTOME_CASPASE_MEDIATED_CLEAVAGE_OF_CYTOSKELETAL_PROTEINS	0.43382563	0.00053289	0.00789576
REACTOME_CD28_CO_STIMULATION	0.39472342	0.0005568	0.00789576
REACTOME_NRAGE_SIGNALS_DEATH_THROUGH_JNK	0.37896214	0.00056697	0.00789576
REACTOME_CAM_PATHWAY	0.3319346	0.00060255	0.00789576
REACTOME_SIGNALING_IN_IMMUNE_SYSTEM	0.29633029	0.00061868	0.00789576
REACTOME_APOPTOTIC_EXECUTION_PHASE	0.38010635	0.00063567	0.00789576
REACTOME_CELL_DEATH_SIGNALLING_VIA_NLRP1_AND_NAIP	0.38245993	0.00065278	0.00789576
REACTOME_GENES_INVOLVED_IN_APOPTOTIC_CLEAVAGE_OF_CELLULAR_PROTEINS	0.37548189	0.00067261	0.00789576
REACTOME_RHO_GTPASE_CYCLE	0.36122898	0.00070664	0.00789576
REACTOME_RNA_POLYMERASE_I_PROMOTER_CLEAVAGE	0.41648765	0.00073189	0.00789576
REACTOME_TOLL_LIKE_RECEPTOR_9_CASCADE	0.38369733	0.00075429	0.00789576
REACTOME_RNA_POLYMERASE_I_TRANSCRIPTION_INITIATION	0.41447449	0.00076972	0.00789576

REACTOME_TOLL_LIKE_RECEPTOR_4_CASCADE	0.36371869	0.00083909	0.00789576
REACTOME_AMINE_LIGAND_BINDING_RECEPTORS	-0.2873672	0.00086107	0.00789576
REACTOME_RNA_POLYMERASE_I_III_AND_MITOCHONDRIAL_TRANSCRIPTION	0.40289316	0.00087792	0.00789576
REACTOME_MRNA_DECAY_BY_5_TO_3_EXORIBONUCLEASE	0.42254576	0.0008919	0.00789576
REACTOME_REGULATION_OF_GLUKOKINASE_BY_GLUKOKINASE_REGULATORY_PROTEIN	0.39662545	0.00090665	0.00789576
REACTOME_TRANSPORT_OF_RIBONUCLEOPROTEINS_INTO_THE_HOST_NUCLEUS	0.42102061	0.00091254	0.00789576
REACTOME_P75_NTR_RECEPTOR_MEDIATED_SIGNALING	0.35813589	0.00092998	0.00789576
REACTOME_EARLY_PHASE_OF_HIV_LIFE_CYCLE	0.40613695	0.00093055	0.00789576
KEGG_B_CELL_RECEPTOR_SIGNALING_PATHWAY	0.35010032	0.00093599	0.00789576
KEGG_PURINE_METABOLISM	0.30865255	0.00094126	0.00789576
REACTOME_NEP_NS2_INTERACTS_WITH_THE_CELLULAR_EXPORT_MACHINERY	0.4181738	0.0009672	0.00789576
REACTOME_ACTIVATED_AMPK_STIMULATES_FATTY_ACID_OXIDATION_IN_MUSCLE	0.39056255	0.00097121	0.00789576
REACTOME_HDL_MEDIATED_LIPID_TRANSPORT	0.36923167	0.00097459	0.00789576
REACTOME_G_ALPHA_12_13_SIGNALLING_EVENTS	0.37296943	0.00097797	0.00789576
KEGG_ERBB_SIGNALING_PATHWAY	0.35539816	0.00098752	0.00789576
KEGG_FC_GAMMA_R_MEDIATED_PHAGOCYTOSIS	0.36837742	0.00100329	0.00789576
REACTOME_MITOCHONDRIAL_TRNA_AMINOACYLATION	0.41519357	0.0010037	0.00789576

REACTOME_RNA_POLYMERASE_I_CHAIN_ELONGATI ON	0.4116024	0.00102313	0.00789576
KEGG_COLORECTAL_CANCER	0.36578495	0.00102324	0.00789576
REACTOME_GENERIC_TRANSCRIPTION_PATHWAY	0.38232786	0.00103205	0.00789576
KEGG_AMINOACYL_TRNA_BIOSYNTHESIS	0.42527645	0.00103223	0.00789576
REACTOME_CENTROSOME_MATURATION	0.38654066	0.00103814	0.00789576
REACTOME_RNA_POLYMERASE_I_TRANSCRIPTION_T ERMINATION	0.40698363	0.00104593	0.00789576
KEGG_GLYCOSAMINOGLYCAN_BIOSYNTHESIS_CHO NDROITIN_SULFATE	0.3337403	0.00104998	0.00789576
REACTOME_TRANSPORT_OF_MATURE_MRNA_DERIV ED_FROM_AN_INTRON_CONTAINING_TRANSCRIPT	0.41750031	0.00107979	0.00789576
REACTOME_TRANSPORT_OF_THE_SLBP_INDEPENDE NT_MATURE_MRNA	0.41440606	0.00108512	0.00789576
REACTOME_VPR_MEDIATED_NUCLEAR_IMPORT_OF_ PICS	0.40204831	0.00108958	0.00789576
KEGG_N_GLYCAN_BIOSYNTHESIS	0.40867884	0.00110399	0.00789576
REACTOME_TRANSCRIPTION	0.39802651	0.00111773	0.00789576
REACTOME_RNA_POLYMERASE_III_TRANSCRIPTION _INITIATION_FROM_TYPE_2_PROMOTER	0.41102173	0.00115281	0.00789576
REACTOME_DOUBLE_STRAND_BREAK_REPAIR	0.41987617	0.00115572	0.00789576
KEGG_PROGESTERONE_MEDIATED_OOCYTE_MATUR ATION	0.33428242	0.00116004	0.00789576
REACTOME_CELL_SURFACE_INTERACTIONS_AT_THE _VASCULAR_WALL	0.30112918	0.00117399	0.00789576



REACTOME_TRAFFICKING_OF_GLUR2_CONTAINING_AMPA_RECEPTORS	0.26652017	0.00119189	0.00789576
REACTOME_NUCLEAR_IMPORT_OF_REV_PROTEIN	0.40721879	0.00123389	0.00789576
REACTOME_REV_MEDIATED_NUCLEAR_EXPORT_OF_HIV1_RNA	0.40889678	0.00123412	0.00789576
REACTOME_TOLL_RECEPTOR_CASCADES	0.36612213	0.00125138	0.00789576
REACTOME_MRNA_3_END_PROCESSING	0.41215596	0.00125151	0.00789576
REACTOME_HOMOLOGOUS_RECOMBINATION_REPAIR	0.41633584	0.00126266	0.00789576
REACTOME_RNA_POLYMERASE_III_TRANSCRIPTION_INITIATION	0.39253954	0.00127438	0.00789576
KEGG_BASAL_TRANSCRIPTION_FACTORS	0.34758711	0.00127664	0.00789576
REACTOME_RNA_POLYMERASE_I_PROMOTER_ESCAPE	0.39938957	0.00131176	0.00789576
REACTOME_LOSS_OF_NLP_FROM_MITOTIC_CENTROSOMES	0.38087466	0.00132306	0.00789576
REACTOME_RNA_POLYMERASE_III_TRANSCRIPTION_INITIATION_FROM_TYPE_3_PROMOTER	0.3880401	0.00134725	0.00789576
REACTOME_SYNTHESIS_OF_GLYCOSYLPHOSPHATIDYLINOSITOL	0.40349128	0.00134755	0.00789576
REACTOME_HIV1_TRANSCRIPTION_INITIATION	0.40017371	0.00134931	0.00789576
KEGG_NUCLEOTIDE_EXCISION_REPAIR	0.40640939	0.00135415	0.00789576
REACTOME_RNA_POLYMERASE_III_TRANSCRIPTION	0.38760623	0.00135424	0.00789576
KEGG_NON_SMALL_CELL_LUNG_CANCER	0.35079908	0.00135876	0.00789576
REACTOME_G2_M_TRANSITION	0.37233266	0.00135942	0.00789576

REACTOME_REGULATION_OF_INSULIN_SECRETION_BY_ACETYLCHOLINE	0.32067346	0.00140409	0.00789576
REACTOME_CLATHRIN_DERIVED_VESICLE_BUDDING	0.37026344	0.00140604	0.00789576
KEGG_LYSOSOME	0.35340759	0.00143098	0.00789576
REACTOME_PD1_SIGNALING	0.37389283	0.00143372	0.00789576
REACTOME_DUAL_INCISION_REACTION_IN_GG_NER	0.40564046	0.00144633	0.00789576
REACTOME_MYD88_CASCADE	0.35861786	0.00144762	0.00789576
REACTOME_BOTULINUM_NEUROTOXICITY	0.35110971	0.00145072	0.00789576
REACTOME_HIV_LIFE_CYCLE	0.38759493	0.00145446	0.00789576
REACTOME_SIGNALLING_BY_NGF	0.33644873	0.00145937	0.00789576
REACTOME_GOLGI_ASSOCIATED_VESICLE_BIOGENESIS	0.36701938	0.00146377	0.00789576
REACTOME_DNA_REPAIR	0.38756987	0.00146524	0.00789576
REACTOME_LYSOSOME_VESICLE_BIOGENESIS	0.3468995	0.00147433	0.00789576
KEGG_BASE_EXCISION_REPAIR	0.37776888	0.00147549	0.00789576
KEGG_GLYCOSYLPHOSPHATIDYLINOSITOL_GPIANCHOR_BIOSYNTHESIS	0.38815867	0.0014808	0.00789576
KEGG_ADIPOCYTOKINE_SIGNALING_PATHWAY	0.28990395	0.00151464	0.00789576
REACTOME_METABOLISM_OF_MRNA	0.38868433	0.00151865	0.00789576
KEGG_RNA_POLYMERASE	0.39421926	0.00152054	0.00789576
KEGG_ETHER_LIPID_METABOLISM	0.23588852	0.00152675	0.00789576
REACTOME_HIV_INFECTION	0.39121476	0.00155412	0.00789576
REACTOME_RESOLUTION_OF_AP_SITES_VIA_THE_SINGLE_NUCLEOTIDE_REPLACEMENT_PATHWAY	0.36481693	0.00155634	0.00789576

KEGG_ACUTE_MYELOID_LEUKEMIA	0.35544109	0.0015591	0.00789576
KEGG_GLYCOPHINGOLIPID_BIOSYNTHESIS_LACTO_AND_NEOLACTO_SERIES	0.25293721	0.00156028	0.00789576
KEGG_VASOPRESSIN_REGULATED_WATER_REABSORPTION	0.3242865	0.00157278	0.00789576
REACTOME_COLLAGEN_MEDIATED_ACTIVATION_CASCADE	0.35213522	0.00158335	0.00789576
REACTOME_TELOMERE_MAINTENANCE	0.39275623	0.00160849	0.00789576
REACTOME_ACTIVATED_TLR4_SIGNALLING	0.35039006	0.00161063	0.00789576
KEGG_NEUROTROPIN_SIGNALLING_PATHWAY	0.33210257	0.00161507	0.00789576
REACTOME_G_PROTEIN_BETA_GAMMA_SIGNALLING	0.26403687	0.00162521	0.00789576
REACTOME_RNA_POLYMERASE_II_TRANSCRIPTION	0.38816468	0.00164199	0.00789576
REACTOME_HOST_INTERACTIONS_OF_HIV_FACTORS	0.39192944	0.00164422	0.00789576
KEGG_ENDOCYTOSIS	0.34075452	0.00164755	0.00789576
REACTOME_MTOR_SIGNALLING	0.34433165	0.00165725	0.00789576
REACTOME_RNA_POLYMERASE_III_TRANSCRIPTION_TERMINATION	0.39007131	0.00166364	0.00789576
KEGG_OLFACTORY_TRANSDUCTION	-0.4282075	0.00166717	0.00789576
KEGG_FC_EPSILON_RI_SIGNALLING_PATHWAY	0.25306661	0.00166891	0.00789576
REACTOME_SNRNP_ASSEMBLY	0.39553338	0.00167647	0.00789576
REACTOME_PHOSPHORYLATION_OF_CD3_AND_TCR_ZETA_CHAINS	0.37300088	0.00167795	0.00789576
KEGG_PANTOTHENATE_AND_COA_BIOSYNTHESIS	0.36175282	0.00167908	0.00789576
REACTOME_OPIOID_SIGNALLING	0.27923626	0.00168403	0.00789576
REACTOME_TRNA_AMINOACYLATION	0.40044217	0.00170162	0.00789576

REACTOME_TRAFFICKING_OF_AMPA_RECEPTORS	0.21498036	0.00170337	0.00789576
REACTOME_LATE_PHASE_OF_HIV_LIFE_CYCLE	0.38639597	0.0017071	0.00789576
REACTOME_NA_CL_DEPENDENT_NEUROTRANSMITTER_TRANSPORTERS	-0.2756444	0.00175631	0.00789576
KEGG_PROSTATE_CANCER	0.32698366	0.00176028	0.00789576
KEGG_CELL_ADHESION_MOLECULES_CAMS	0.26581044	0.00176781	0.00789576
KEGG_LYSINE_DEGRADATION	0.37950537	0.00177004	0.00789576
KEGG_GLYCEROLIPID_METABOLISM	0.25142694	0.00177025	0.00789576
REACTOME_PROCESSING_OF_CAPPED_INTRON_CONTAINING_PRE_MRNA	0.3969526	0.0017865	0.00789576
KEGG_LONG_TERM_DEPRESSION	0.20551936	0.00179142	0.00789576
KEGG_MISMATCH_REPAIR	0.39067251	0.00183242	0.00789576
REACTOME_POLYMERASE_SWITCHING	0.40018555	0.00184161	0.00789576
KEGG_ENDOMETRIAL_CANCER	0.31919077	0.00185389	0.00789576
REACTOME_METABOLISM_OF_RNA	0.38827165	0.00185528	0.00789576
REACTOME_AKT_PHOSPHORYLATES_TARGETS_IN_THE_CYTOSOL	0.35238467	0.00189146	0.00789576
KEGG_RNA_DEGRADATION	0.3739972	0.00189636	0.00789576
REACTOME_EXTENSION_OF_TELOMERES	0.38796414	0.00191115	0.00789576
REACTOME_MEMBRANE_TRAFFICKING	0.36690322	0.00191886	0.00789576
REACTOME_FORMATION_AND_MATURATION_OF_MRNA_TRANSCRIPT	0.38751323	0.00191934	0.00789576
REACTOME_OLFACTORY_SIGNALING_PATHWAY	-0.4445334	0.00193825	0.00789576
REACTOME_SEMA4D_IN_SEMAPHORIN_SIGNALING	0.36094611	0.00194118	0.00789576
REACTOME_TRANSCRIPTION_OF_THE_HIV_GENOME	0.37556764	0.00195195	0.00789576

REACTOME_REGULATION_OF_LIPID_METABOLISM_BY_PEROXISOME_PROLIFERATOR_ACTIVATED_RECEPTOR_ALPHA	0.30162581	0.00195413	0.00789576
REACTOME_GLUCOSE_TRANSPORT	0.34655892	0.00195475	0.00789576
KEGG_MTOR_SIGNALING_PATHWAY	0.33372017	0.00197509	0.00789576
REACTOME_BASE_FREE_SUGAR_PHOSPHATE_REMOVAL_VIA_THE_SINGLE_NUCLEOTIDE_REPLACEMENT_PATHWAY	0.36069284	0.00197698	0.00789576
REACTOME_DEADENYLATION_OF_MRNA	0.37983098	0.00198248	0.00789576
KEGG_THYROID_CANCER	0.34372341	0.00200203	0.00789576
KEGG_NATURAL_KILLER_CELL_MEDIATED_CYTOTOXICITY	0.25480814	0.00201836	0.00789576
REACTOME_PKA_ACTIVATION	0.27566705	0.00204558	0.00789576
REACTOME_HEMOSTASIS	0.27079261	0.00204933	0.00789576
REACTOME_APOPTOSIS	0.37227271	0.00205106	0.00789576
REACTOME_PLATELET_ACTIVATION_TRIGGERS	0.29329719	0.00207489	0.00789576
REACTOME_RNA_POLYMERASE_III_CHAIN_ELONGATION	0.39183882	0.00208042	0.00789576
REACTOME_JNK_PHOSPHORYLATION_AND_ACTIVATION_MEDIATED_BY_ACTIVATED_HUMAN_TAKI	0.36704009	0.00208758	0.00789576
REACTOME_ELONGATION_AND_PROCESSING_OF_CAPPED_TRANSCRIPTS	0.38606045	0.00208944	0.00789576
REACTOME_MRNA_PROCESSING	0.34426771	0.00209067	0.00789576
KEGG_SNARE_INTERACTIONS_IN_VESICULAR_TRANSPORT	0.33831958	0.00209402	0.00789576
REACTOME_GENE_EXPRESSION	0.37149666	0.00210466	0.00789576

KEGG_CHRONIC_MYELOID_LEUKEMIA	0.34983671	0.00212509	0.00792317
KEGG_LEISHMANIA_INFECTION	0.30116576	0.00216739	0.00800398
KEGG_GLYCOPHINGOLIPID_BIOSYNTHESIS_GLOBO _SERIES	0.28459591	0.00217718	0.00800398
KEGG_AXON_GUIDANCE	0.26886459	0.00220571	0.00800398
REACTOME_TIE2_SIGNALING	0.29649196	0.00221133	0.00800398
REACTOME_MRNA_SPLICING	0.39056962	0.00221302	0.00800398
KEGG_VEGF_SIGNALING_PATHWAY	0.26447709	0.00222649	0.00800477
REACTOME_REGULATED_PROTEOLYSIS_OF_P75NTR	0.37507426	0.0022602	0.00803723
KEGG_PEROXISOME	0.36141765	0.00226213	0.00803723
REACTOME_REGULATION_OF_PYRUVATE_DEHYDRO GENASE_COMPLEX	0.40535573	0.0022761	0.00803956
KEGG_UBIQUITIN_MEDIATED_PROTEOLYSIS	0.35531254	0.00230864	0.00805072
REACTOME_SIGNALING_BY_ROBO_RECEPTOR	0.33972855	0.00234202	0.00805072
REACTOME_GLOBAL_GENOMIC_NER	0.38521148	0.00237438	0.00805072
REACTOME_EGFR_DOWNREGULATION	0.35197315	0.00237478	0.00805072
KEGG_GLYCOPHINGOLIPID_BIOSYNTHESIS_GANGLI O_SERIES	0.32565692	0.00239172	0.00805072
REACTOME_STEROID_HORMONE_BIOSYNTHESIS	-0.2696528	0.0023951	0.00805072
REACTOME_REMOVAL_OF_THE_FLAP_INTERMEDIAT E	0.39238967	0.0024166	0.00805072
REACTOME_DUAL_INCISION_REACTION_IN_TC_NER	0.3887204	0.00242598	0.00805072
KEGG_AMYOTROPIC_LATERAL_SCLEROSIS_ALS	0.22038497	0.00242827	0.00805072
KEGG_OTHER_GLYCAN_DEGRADATION	0.33002713	0.00243538	0.00805072
REACTOME_TRANSCRIPTION_COUPLED_NER	0.38872025	0.00243897	0.00805072

REACTOME_PEPTIDE_LIGAND_BINDING_RECEPTORS	-0.2247201	0.00244328	0.00805072
KEGG_PANCREATIC_CANCER	0.3555571	0.00245455	0.00805072
REACTOME_RNA_POL_II_CTD_PHOSPHORYLATION_AND_INTERACTION_WITH_CE	0.37841702	0.00246587	0.00805072
REACTOME_NUCLEOTIDE_EXCISION_REPAIR	0.38583322	0.00249539	0.00808191
REACTOME_NEURORANSMITTER_RECEPTOR_BINDING_AND_DOWNSTREAM_TRANSMISSION_IN_THE_POSTSYNAPTIC_CELL	0.19566334	0.00250218	0.00808191
KEGG_SPLICEOSOME	0.36430122	0.00255299	0.0081052
REACTOME_RETROGRADE_NEUROTROPIN_SIGNALING	0.32954973	0.00255529	0.0081052
REACTOME_LAGGING_STRAND_SYNTHESIS	0.39228524	0.00256702	0.0081052
KEGG_VASCULAR_SMOOTH_MUSCLE_CONTRACTION	0.23144836	0.00257198	0.0081052
KEGG_REGULATION_OF_AUTOPHAGY	0.22046866	0.00257649	0.0081052
REACTOME_REGULATION_OF_AMPK_ACTIVITY_VIA_LKB1	0.33627824	0.00262545	0.00821173
REACTOME_TRKA_SIGNALING_FROM_THE_PLASMA_MEMBRANE	0.30876258	0.00264211	0.00821173
REACTOME_MITOCHONDRIAL_FATTY_ACID_BETA_OXIDATION	0.41813751	0.00265114	0.00821173
REACTOME_INTRINSIC_PATHWAY_FOR_APOPTOSIS	0.35205857	0.0026746	0.00824039
KEGG_LONG_TERM_POTENTIATION	0.22683042	0.00269379	0.00824039
REACTOME_PEROXISOMAL_LIPID_METABOLISM	0.38808484	0.00270132	0.00824039
REACTOME_SYNTHESIS_OF_GPI_ANCHORED_PROTEINS	0.36671271	0.00274656	0.00833629

REACTOME_ENERGY_DEPENDENT_REGULATION_OF_MTOR_BY_LKB1_AMPK	0.32767509	0.00276415	0.00834775
REACTOME_TRAF6_MEDIATED_INDUCTION_OF_THE_ANTIVIRAL_CYTOKINE_IFN_ALPHA_BETA_CASCADE	0.35074222	0.00280837	0.00842826
REACTOME_TOLL_LIKE_RECEPTOR_3_CASCADE	0.35210421	0.00281872	0.00842826
KEGG_HOMOLOGOUS_RECOMBINATION	0.33806831	0.00288803	0.00859294
REACTOME_RECRUITMENT_OF_NUMA_TO_MITOTIC_CENTROSOMES	0.35854169	0.00292534	0.00866613
KEGG_DNA_REPLICATION	0.36077908	0.00295383	0.008666343
REACTOME_NRIF_SIGNALS_CELL_DEATH_FROM_THE_NUCLEUS	0.35041764	0.00295474	0.008666343
KEGG_NICOTINATE_AND_NICOTINAMIDE_METABOLISM	0.30069816	0.00298414	0.00870735
REACTOME_MAP_KINASES_ACTIVATION_IN_TLR_CASCADE	0.34195615	0.0030165	0.00875944
REACTOME_CELL_CYCLE_MITOTIC	0.34942078	0.0030428	0.00879354
REACTOME_TRANSLOCATION_OF_ZAP70_TO_IMMUNOLOGICAL_SYNAPSE	0.35929294	0.00309477	0.00890114
REACTOME_EFFECTS_OF_PIP2_HYDROLYSIS	0.26918743	0.00311426	0.00890681
KEGG_GLYCOSAMINOGLYCAN_BIOSYNTHESIS_KERATAN_SULFATE	0.32109669	0.00313044	0.00890681
REACTOME_BRANCHED_CHAIN_AMINO_ACID_CATABOLISM	0.3665518	0.00314777	0.00890681
REACTOME_SEMAPHORIN_INTERACTIONS	0.3209633	0.00317131	0.00890681
REACTOME_MTORC1_MEDIATED_SIGNALLING	0.3391174	0.00318126	0.00890681



REACTOME_FORMATION_OF_PLATELET_PLUG	0.26839132	0.00318522	0.00890681
REACTOME_FORMATION_OF_THE_EARLY_ELONGATI ON_COMPLEX	0.36065308	0.00320508	0.00890791
REACTOME_INNATE_IMMUNITY_SIGNALING	0.22905308	0.00321511	0.00890791
KEGG_APOPTOSIS	0.29358369	0.0032507	0.00893161
REACTOME_MRNA_SPLICING_MINOR_PATHWAY	0.38389617	0.00326653	0.00893161
REACTOME_INTEGRIN_ALPHAIIIBBETA3_SIGNALING	0.31413661	0.00327	0.00893161
KEGG_HUNTINGTONS_DISEASE	0.32590539	0.00331032	0.00893161
REACTOME_PLATELET_ACTIVATION	0.25934257	0.00331237	0.00893161
KEGG_RIBOFLAVIN_METABOLISM	0.30422379	0.00332261	0.00893161
REACTOME_GLYCOGEN_BREAKDOWN_GLYCOGENO LYSIS	0.3763661	0.00332717	0.00893161
REACTOME_PROTEOLYTIC_CLEAVAGE_OF_SNARE_C OMPLEX_PROTEINS	0.35790171	0.00335936	0.00897811
KEGG_SPHINGOLIPID_METABOLISM	0.2939637	0.00339289	0.00902073
REACTOME_METABOLISM_OF_VITAMINS_AND_COFA CTORS	0.34033421	0.00340518	0.00902073
REACTOME_HIV1_TRANSCRIPTION_ELONGATION	0.3534984	0.00342659	0.00903783
REACTOME_SEMA3A_PAK_DEPENDENT_AXON_REPU LSION	0.32400983	0.00362603	0.00936336
KEGG_FATTY_ACID_METABOLISM	0.3546756	0.00362878	0.00936336
KEGG_GLIOMA	0.28064606	0.00363194	0.00936336
REACTOME_TRANSMEMBRANE_TRANSPORT_OF_SM ALL_MOLECULES	0.15830713	0.00365325	0.00936336
KEGG_SMALL_CELL_LUNG_CANCER	0.3072442	0.00365606	0.00936336

REACTOME_SCF_SKP2_MEDIATED_DEGRADATION_OF_P27_P21	0.39676299	0.00365622	0.00936336
REACTOME_STABILIZATION_OF_P53	0.3990845	0.00365853	0.00936336
REACTOME_S_PHASE	0.37411493	0.00370214	0.0094037
REACTOME_VIF_MEDIATED_DEGRADATION_OF_APOBEC3G	0.40226396	0.00372734	0.0094037
KEGG_VALINE_LEUCINE_AND_ISOLEUCINE_DEGRADATION	0.36121036	0.00372929	0.0094037
REACTOME_SIGNALING_BY_WNT	0.39093173	0.00374303	0.0094037
REACTOME_DARPP32_EVENTS	0.32786929	0.00375566	0.0094037
REACTOME_BETACATENIN_PHOSPHORYLATION_CASE	0.3588877	0.00376771	0.0094037
KEGG_AMINO_SUGAR_AND_NUCLEOTIDE_SUGAR_METABOLISM	0.30552872	0.00378447	0.00940667
KEGG_ADHERENS_JUNCTION	0.31236525	0.00381717	0.00944907
REACTOME_PURINE_SALVAGE_REACTIONS	0.31043197	0.00386325	0.00949252
REACTOME_G_BETA_GAMMA_SIGNALING_THROUGH_HIPI3KGAMMA	0.236462	0.00387103	0.00949252
KEGG_OOCYTE_MEIOSIS	0.27824901	0.00389526	0.00949252
REACTOME_SIGNALING_BY_EGFR	0.32777842	0.00391178	0.00949252
REACTOME_TRANSMISSION_ACROSS_CHEMICAL_SYNAPSES	0.16903055	0.00391331	0.00949252
REACTOME_GAP_JUNCTION_DEGRADATION	0.35362192	0.00404191	0.00964485
REACTOME_POST_TRANSLATIONAL_PROTEIN_MODIFICATION	0.32528499	0.00404598	0.00964485

REACTOME_DEATH_RECEPTOR_SIGNALLING	0.34938814	0.00404779	0.00964485
KEGG_CELL_CYCLE	0.32023223	0.00405904	0.00964485
REACTOME_G_ALPHA_Z_SIGNALLING_EVENTS	0.27776017	0.00408351	0.00964485
REACTOME_BASE_EXCISION_REPAIR	0.32909804	0.00408661	0.00964485
REACTOME_CYCLIN_E_ASSOCIATED_EVENTS_DURIN G_G1_S_TRANSITION	0.38642672	0.00410459	0.00964485
REACTOME_DNA_STRAND_ELONGATION	0.36617136	0.00411484	0.00964485
KEGG_TOLL_LIKE_RECEPTOR_SIGNALING_PATHWA Y	0.2427339	0.00413671	0.00964485
KEGG_BETA_ALANINE_METABOLISM	0.30843636	0.00414772	0.00964485
REACTOME_HUMAN_TAK1_ACTIVATES_NFKB_BY_P HOSPHORYLATION_AND_ACTIVATION_OF_IKKS_CO MPLEX	0.34706905	0.00416044	0.00964485
REACTOME_ACTIVATION_OF_KAINATE_RECEPTORS_ UPON_Glutamate_Binding	0.22395246	0.00417	0.00964485
REACTOME_AUTODEGRADATION_OF_CDHI_BY_CDH 1_APC	0.38755488	0.00418369	0.00964485
REACTOME_ACTIVATION_OF_THE_PRE_REPLICATIV E_COMPLEX	0.36969424	0.00429268	0.00970718
REACTOME_G1_S_TRANSITION	0.3565245	0.00429517	0.00970718
REACTOME_SEMA4D_INDUCED_CELL_MIGRATION_A ND_GROWTH_CONE_COLLAPSE	0.33859786	0.00429686	0.00970718
REACTOME_REGULATION_OF_RHEB_GTPASE_ACTIVI TY_BY_AMPK	0.30761534	0.00430838	0.00970718
REACTOME_REGULATION_OF_INSULIN_SECRETION_ BY_FREE_FATTY_ACIDS	0.26504496	0.00430956	0.00970718

REACTOME_NEF_MEDIATED_DOWNREGULATION_OF_MHC_CLASS_I_COMPLEX_CELL_SURFACE_EXPRESSION	0.36387773	0.00432961	0.00970718
REACTOME_FANCONI_ANEMIA_PATHWAY	0.37714522	0.00434066	0.00970718
REACTOME_MAPK_TARGETS_NUCLEAR_EVENTS_MEDIATED_BY_MAP_KINASES	0.32783421	0.00436175	0.00970718
REACTOME_NUCLEAR_EVENTS_KINASE_AND_TRANSCRIPTION_FACTOR_ACTIVATION	0.33058238	0.004362	0.00970718
REACTOME_NOTCH_HLH_TRANSCRIPTION_PATHWAY	0.31198192	0.00437506	0.00970718
KEGG_GNRH_SIGNALING_PATHWAY	0.21548465	0.00438752	0.00970718
REACTOME_OTHER_SEMAPHORIN_INTERACTIONS	0.31798414	0.00442034	0.00974411
REACTOME_ACTIVATED_TAK1_MEDIATES_P38_MAPK_ACTIVATION	0.33468199	0.00448941	0.00974998
KEGG_ONE_CARBON_POOL_BY_FOLATE	0.32909502	0.00449127	0.00974998
KEGG_EPITHELIAL_CELL_SIGNALING_IN_HELICOBACTER_PYLORI_INFECTION	0.29082513	0.0044916	0.00974998
KEGG_PRION_DISEASES	0.2344244	0.00449203	0.00974998
REACTOME_DNA_REPLICATION_PRE_INITIATION	0.37410588	0.00451588	0.00974998
REACTOME_MRNA_DECAY_BY_3_TO_5_EXORIBONUCLEASE	0.34135623	0.00451986	0.00974998
REACTOME_REGULATION_OF_APC_ACTIVATORS_BETWEEN_G1_S_AND_EARLY_ANAPHASE	0.36870261	0.00454032	0.00975927
REACTOME_REPAIR_SYNTHESIS_OF_PATCH_27_30_BASAL_LONG_BY_DNA_POLYMERASE	0.37828221	0.00456141	0.00976983
REACTOME_METABOLISM_OF_PROTEINS	0.3431196	0.00458549	0.00977109

REACTOME_INFLUENZA_LIFE_CYCLE	0.36645763	0.00459436	0.00977109
REACTOME_PYRUVATE_METABOLISM	0.338363	0.00463565	0.00980699
REACTOME_SYNTHESIS_OF_DNA	0.3666858	0.00464921	0.00980699
REACTOME_CLASS_A1_RHODOPSIN_LIKE_RECEPTOR S	-0.1916192	0.00465994	0.00980699
KEGG_REGULATION_OF_ACTIN_CYTOSKELETON	0.25536985	0.00468977	0.00983548
REACTOME_MICRORNA_BIOGENESIS	0.3624766	0.00476243	0.00995332
REACTOME_REMOVAL_OF_DNA_PATCH_CONTAININ G_ABASIC_RESIDUE	0.32251939	0.00480307	0.01000363
KEGG_SELENOAMINO_ACID_METABOLISM	0.32610466	0.00483977	0.01004543
KEGG_CHEMOKINE_SIGNALING_PATHWAY	0.21964769	0.00486298	0.01004692
REACTOME_CELL_CYCLE_CHECKPOINTS	0.3535629	0.00487376	0.01004692
REACTOME_STRIATED_MUSCLE_CONTRACTION	-0.268891	0.00495889	0.01018454
KEGG_ALZHEIMERS_DISEASE	0.30160261	0.00497424	0.01018454
REACTOME_MITOTIC_M_M_G1_PHASES	0.33825029	0.00499541	0.01019334
REACTOME_Glutamate_Neurotransmitter_Rel ease_Cycle	0.23066642	0.00505003	0.01025504
REACTOME_VIRAL_DSRNA_TLR3_TRIF_COMPLEX_A CTIVATES_RIP1	0.35386191	0.00505999	0.01025504
KEGG_LEUKOCYTE_TRANSENDOTHELIAL_MIGRATIO N	0.22799397	0.00507658	0.01025504
REACTOME_PURINE_METABOLISM	0.26487627	0.00511179	0.01027752
REACTOME_SCF_BETA_TRCP_MEDIATED_DEGRADAT ION_OF_EMII	0.38834801	0.00512174	0.01027752
REACTOME_ERK_MAPK_TARGETS	0.3191173	0.00515443	0.01030886

REACTOME_P75NTR_RECRUITS_SIGNALLING_COMPL EXES	0.32005719	0.00525985	0.01045792
KEGG_PYRIMIDINE_METABOLISM	0.29575537	0.00527265	0.01045792
REACTOME_P53_INDEPENDENT_DNA_DAMAGE_RESP ONSE	0.39271064	0.0052809	0.01045792
REACTOME_G1_PHASE	0.33163286	0.00532761	0.01051419
REACTOME_PROSTANOID_HORMONES	0.31286016	0.00534413	0.01051419
REACTOME_AXON_GUIDANCE	0.25508616	0.0054336	0.01064567
KEGG_INSULIN_SIGNALING_PATHWAY	0.26341579	0.00544719	0.01064567
REACTOME_INTEGRIN_CELL_SURFACE_INTERACTIO NS	0.26895574	0.00547788	0.01064567
REACTOME_CDC20_PHOSPHO_APC_MEDIATED_DEGR ADATION_OF_CYCLIN_A	0.36499589	0.00549994	0.01064567
REACTOME_MITOTIC_PROMETAPHASE	0.32168381	0.00550413	0.01064567
KEGG_VIBRIO_CHOLERAE_INFECTION	0.27010565	0.00552114	0.01064567
REACTOME_SIGNAL_ATTENUATION	0.33044301	0.00553434	0.01064567
REACTOME_NF_KB_IS_ACTIVATED_AND_SIGNALS_S URVIVAL	0.30126345	0.00556988	0.01067441
REACTOME_PLATELET_AGGREGATION_PLUG_FORM ATION	0.2813312	0.00559046	0.01067441
KEGG_PROTEIN_EXPORT	0.3649855	0.0056023	0.01067441
REACTOME_GPCR_LIGAND_BINDING	-0.1705154	0.00564685	0.01072546
REACTOME_POST_NMDA_RECEPTOR_ACTIVATION_E VENTS	0.20194455	0.00567623	0.01074075

REACTOME_CDT1_ASSOCIATION_WITH_THE_CDC6_ORC_ORIGIN_COMPLEX	0.37631512	0.00569046	0.01074075
REACTOME_ACTIVATION_OF_NMDA_RECEPTOR_UPON_GLUTAMATE_BINDING_AND_POSTSYNAPTIC_EVENTS	0.1826415	0.00573886	0.01079148
REACTOME_AMINE_COMPOUND_SLC_TRANSPORTERS	-0.1932329	0.00575307	0.01079148
REACTOME_SPHINGOLIPID_METABOLISM	0.27711692	0.00578447	0.01081679
KEGG_RENAL_CELL_CARCINOMA	0.31134041	0.0058091	0.01082932
KEGG_INTESTINAL_IMMUNE_NETWORK_FOR_IGA_PRODUCTION	0.24564309	0.00585153	0.01083698
REACTOME_CONVERSION_FROM_APC_CDC20_TO_APC_CDH1_IN_LATE_ANAPHASE	0.34536133	0.00586595	0.01083698
REACTOME_ORC1_REMOVAL_FROM_CHROMATIN	0.35975366	0.00586704	0.01083698
REACTOME_ELECTRON_TRANSPORT_CHAIN	0.38160758	0.0059369	0.01092246
KEGG_O_GLYCAN_BIOSYNTHESIS	0.2296647	0.00596751	0.01092246
REACTOME_INTEGRATION_OF_ENERGY_METABOLISM	0.30440538	0.00597671	0.01092246
REACTOME_ACTIVATION_OF_BH3_ONLY_PROTEINS	0.32408371	0.00600203	0.01092246
KEGG_NEUROACTIVE_LIGAND_RECEPTOR_INTERACTION	-0.1965623	0.00600374	0.01092246
REACTOME_M_G1_TRANSITION	0.36420855	0.00603751	0.01093434
REACTOME_PI3K_AKT_SIGNALLING	0.28703322	0.00606768	0.01093434
REACTOME_GAP_JUNCTION_ASSEMBLY	-0.2251052	0.00608326	0.01093434
REACTOME_VITAMIN_B5_(PANTOTHENATE)_METABOLISM	0.35412942	0.00610136	0.01093434

REACTOME_PHOSPHOLIPASE_CMEDIATED_CASCADE	-0.1683194	0.00611474	0.01093434
REACTOME_METABOLISM_OF_NUCLEOTIDES	0.27058693	0.00611889	0.01093434
REACTOME_REGULATION_OF_ORNITHINE_DECARBOXYLASE	0.37178587	0.00617705	0.01100572
REACTOME_METABOLISM_OF_LIPIDS_AND_LIPOPROTEINS	0.25813049	0.00626741	0.01113387
REACTOME_SHCMEDIATED_CASCADE	-0.15744	0.00640373	0.01130889
KEGG_NOTCH_SIGNALING_PATHWAY	0.26589805	0.0064125	0.01130889
KEGG_ALPHA_LINOLENIC_ACID_METABOLISM	0.17431409	0.0064221	0.01130889
REACTOME_GRB2_SOS_PROVIDES_LINKAGE_TO_MAPK_SIGNALING_FOR_INTERGRINS	0.28344717	0.00652674	0.01145974
REACTOME_ACTIVATION_OF_ATR_IN_RESPONSE_TO_REPLICATION_STRESS	0.33965027	0.00655798	0.01148121
REACTOME_ASSOCIATION_OF_TRIC_CCT_WITH_TARGGET_PROTEINS_DURING_BIOSYNTHESIS	0.32820185	0.00664479	0.01159958
REACTOME_CHAPERONIN_MEDIATED_PROTEIN_FOLDING	0.28903212	0.00681526	0.01182134
REACTOME_SIGNAL_AMPLIFICATION	0.24382488	0.00681969	0.01182134
KEGG_DORSO_VENTRAL_AXIS_FORMATION	0.24678169	0.00683054	0.01182134
REACTOME_TAT_MEDIATED_HIV1_ELONGATION_ARREST_AND_RECOVERY	0.32798677	0.00686009	0.01183856
REACTOME_DOWN_STREAM_SIGNAL_TRANSDUCTION	0.29749291	0.00689797	0.01187001
REACTOME_PHOSPHORYLATION_OF_THE_APC	0.3418806	0.00698875	0.01199125
KEGG_WNT_SIGNALING_PATHWAY	0.22484544	0.00700813	0.01199125



REACTOME_METABOLISM_OF_CARBOHYDRATES	0.26265733	0.00708711	0.01209213
REACTOME_DIABETES_PATHWAYS	0.29675819	0.00713263	0.01213551
KEGG_PATHWAYS_IN_CANCER	0.2423791	0.00722576	0.01224216
KEGG_TYPE_II_DIABETES_MELLITUS	0.18335096	0.00723584	0.01224216
REACTOME_G2_M_CHECKPOINTS	0.33401631	0.00730285	0.01229537
REACTOME_COPI_MEDIATED_TRANSPORT	0.33387277	0.00730801	0.01229537
REACTOME_P75NTR_SIGNALS_VIA_NFKB	0.30698342	0.00744707	0.01249453
REACTOME_NUCLEAR_RECEPTOR_TRANSCRIPTION_PATHWAY	0.23494213	0.00754213	0.01261897
KEGG_OXIDATIVE_PHOSPHORYLATION	0.30965557	0.00769514	0.01283941
REACTOME_PYRUVATE_METABOLISM_AND_TCA_CYCLE	0.33503033	0.0078157	0.01300463
REACTOME_VIRAL_MESSENGER_RNA_SYNTHESIS	0.34370459	0.00808678	0.01335001
KEGG_PROPANOATE_METABOLISM	0.29857018	0.00808715	0.01335001
REACTOME_REGULATION_OF_GENE_EXPRESSION_IN_BETA_CELLS	0.31033631	0.00808957	0.01335001
REACTOME_SIGNALING_BY_TGF_BETA	0.32913562	0.00819447	0.01348626
REACTOME_METABOLISM_OF_AMINO_ACIDS	0.27491263	0.00831325	0.01364457
KEGG_FRUCTOSE_AND_MANNOSE_METABOLISM	0.27505087	0.00841505	0.01377423
REACTOME_ADP_SIGNALLING_THROUGH_P2Y_PURINOCEPTOR_1	0.22592211	0.00865816	0.01413387
REACTOME_NOREPINEPHRINE_NEUROTRANSMITTER_RELEASE_CYCLE	0.19201084	0.00869179	0.01413792
KEGG_P53_SIGNALING_PATHWAY	0.25315225	0.00874263	0.01413792
KEGG_BIOSYNTHESIS_OF_UNSATURATED_FATTY_ACIDS	0.32092725	0.00875181	0.01413792

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REACTOME_G_BETA_GAMMA_SIGNALLING_THROUGH_H_PLC_BETA	0.20332698	0.00875427	0.01413792	
KEGG_TIGHT_JUNCTION	0.19890316	0.00879514	0.01416604	
REACTOME_SEROTONIN_RECEPTORS	-0.2800261	0.00885398	0.01422288	
REACTOME_TRANSLATION	0.33685723	0.00894801	0.01433581	
KEGG_MAPK_SIGNALING_PATHWAY	0.20514897	0.00911784	0.01448139	
REACTOME_HORMONE_SENSITIVE_LIPASE_HSL_MEDIATED_TRIACYLGLYCEROL_HYDROLYSIS	0.27612403	0.00911863	0.01448139	
REACTOME_LIPOPROTEIN_METABOLISM	0.26495232	0.00911908	0.01448139	
REACTOME_REGULATION_OF_INSULIN_SECRETION	0.27266526	0.00913479	0.01448139	
KEGG_VIRAL_MYOCARDITIS	0.2413853	0.0092147	0.01456985	
REACTOME_INFLUENZA_VIRAL_RNA_TRANSCRIPTION_AND_REPLICATION	0.34807204	0.00935011	0.01472839	
REACTOME_METABOLISM_OF_NITRIC_OXIDE	0.3354017	0.00938624	0.01472839	
REACTOME_INSULIN_SYNTHESIS_AND_SECRETION	0.32943978	0.00938813	0.01472839	
REACTOME_TRANSLATION_INITIATION_COMPLEX_FORMATION	0.32659909	0.00948742	0.01484561	
REACTOME_APCDC20_MEDIATED_DEGRADATION_OF_CYCLIN_B	0.32889284	0.0095845	0.01495876	
KEGG_GLYCOSAMINOGLYCAN_BIOSYNTHESIS_HEPARAN_SULFATE	0.16787114	0.00981624	0.01528095	
REACTOME_PYRIMIDINE_METABOLISM	0.29341206	0.01010096	0.01565398	
KEGG_PARKINSONS_DISEASE	0.29766463	0.01012144	0.01565398	

REACTOME_REMOVAL_OF_THE_FLAP_INTERMEDIATE_FROM_THE_C_STRAND	0.32866035	0.01013362	0.01565398
REACTOME_SIGNALING_BY_NOTCH	0.2980286	0.01024662	0.01578816
REACTOME_GTP_HYDROLYSIS_AND_JOINING_OF_THE_60S_RIBOSOMAL_SUBUNIT	0.33579481	0.01046155	0.01604084
REACTOME_FORMATION_OF_THE_TERNARY_COMPLEX_AND_SUBSEQUENTLY_THE_43S_COMPLEX	0.3262227	0.01049097	0.01604084
REACTOME_E2F_ENABLED_INHIBITION_OF_PRE_REPLICATION_COMPLEX_FORMATION	0.36216096	0.01051345	0.01604084
REACTOME_IONOTROPIC_ACTIVITY_OF_KAINATE_RECEPTORS	0.23954038	0.01051684	0.01604084
REACTOME_GLUCOSE_REGULATION_OF_INSULIN_SECRETION	0.29757314	0.01060092	0.01612835
KEGG_ALDOSTERONE_REGULATED_SODIUM_REABSORPTION	0.17919252	0.01065945	0.01617443
REACTOME_GAB1_SIGNALOSOME	0.29506063	0.01070352	0.01617443
REACTOME_ACTIVATION_OF_RAC	0.28955717	0.01071154	0.01617443
REACTOME_REGULATION_OF_BETA_CELL_DEVELOPMENT	0.27114255	0.01074127	0.01617887
REACTOME_SIGNALING_BY_VEGF	0.31095535	0.01082877	0.01627009
REACTOME_UNFOLDED_PROTEIN_RESPONSE	0.32436811	0.01094662	0.01640635
REACTOME_VIRAL_MRNA_TRANSLATION	0.34194001	0.0111214	0.01662704
REACTOME_FORMATION_OF_A_POOL_OF_FREE_40S_SUBUNITS	0.33486948	0.01116581	0.01665221
REACTOME_TRIACYLGLYCERIDE_BIOSYNTHESIS	0.29805135	0.01120624	0.01667135

REACTOME_FURTHER_PLATELET_RELEASEATE	0.26182535	0.0113424	0.01683245
KEGG_PROTEASOME	0.29978609	0.01145211	0.01695362
REACTOME_CLASS_C3_METABOTROPIC_Glutamate_Pheromone_Receptors	-0.2957135	0.01156855	0.01704483
REACTOME_INACTIVATION_OF_APC_VIA_DIRECT_INHIBITION_OF_THE_APCOMPLEX	0.31841992	0.01157016	0.01704483
REACTOME_PEPTIDE_CHAIN_ELONGATION	0.33879192	0.01182152	0.01737274
REACTOME_SIGNALING_TO_ERKS	0.25734741	0.01194291	0.01750854
REACTOME_ACTIVATION_OF_CHAPERONES_BY_IRE1_ALPHA	0.33300149	0.01210232	0.0176772
REACTOME_FR2_MEDIATED_ACTIVATION	0.28024523	0.01211649	0.0176772
REACTOME_IRS_RELATED_EVENTS	0.21134302	0.01230073	0.01790275
KEGG_FOCAL_ADHESION	0.22983368	0.01247586	0.01811399
KEGG_PATHOGENIC_ESCHERICHIA_COLI_INFECTION	0.24304322	0.01253616	0.01815789
KEGG_RIBOSOME	0.32527952	0.01259146	0.01819436
REACTOME_ACTIVATION_OF_THE_API_FAMILY_OF_TRANSCRIPTION_FACTORS	0.28968248	0.01269527	0.01826898
REACTOME_E2F_MEDIATED_REGULATION_OF_DNA_REPLICATION	0.29416084	0.0127036	0.01826898
KEGG_PYRUVATE_METABOLISM	0.25048698	0.01293432	0.0185566
REACTOME_SHC_RELATED_EVENTS	0.29602029	0.01305084	0.0186794
REACTOME_GLUcAGON_SIGNALING_IN_Metabolic_Regulation	0.18610228	0.01311067	0.01872068
REACTOME_CDC6_ASSOCIATION_WITH_THE_ORC_ORIGIN_COMPLEX	0.34016604	0.01320701	0.01881376

REACTOME_THROMBIN_SIGNALLING_THROUGH_PROTEINASE_ACTIVATED_RECEPTORS	0.20236256	0.01327527	0.01886651
KEGG_BUTANOATE_METABOLISM	0.24225949	0.01336116	0.01894399
REACTOME_CITRIC_ACID_CYCLE	0.3322216	0.0137363	0.01941263
KEGG_GALACTOSE_METABOLISM	0.19854197	0.01375597	0.01941263
REACTOME_THROMBOXANE_SIGNALLING_THROUGH_H_TP_RECEPTOR	0.20909415	0.01383841	0.01948345
REACTOME_CREB_PHOSPHORYLATION_THROUGH_THE_ACTIVATION_OF_RAS	0.18363779	0.0138977	0.01952142
KEGG_GLYCOSAMINOGLYCAN_DEGRADATION	0.24180466	0.01411562	0.01978153
REACTOME_FACILITATIVE_NA_INDEPENDENT_GLUCOSE_TRANSPORTERS	0.25905938	0.01473713	0.02060469
REACTOME_ASSOCIATION_OF_LICENSING_FACTORS_WITH_THE_PREREPLICATIVE_COMPLEX	0.32441419	0.01561527	0.02178204
REACTOME_OPSINS	-0.2523665	0.01570819	0.02185611
KEGG_BLADDER_CANCER	0.25031968	0.01574074	0.02185611
REACTOME_P130CAS_LINKAGE_TO_MAPK_SIGNALING_FOR_INTEGRINS	0.24805424	0.01593735	0.02207835
REACTOME_ERKS_ARE_INACTIVATED	0.26766025	0.01626756	0.02248423
REACTOME_SIGNALLING_TO_RAS	0.25964258	0.01650884	0.02276562
REACTOME_SHC_MEDIATED_SIGNALLING	0.28300037	0.01656441	0.02279021
KEGG_TGF_BETA_SIGNALING_PATHWAY	0.21049811	0.01674087	0.02287293
REACTOME_UNWINDING_OF_DNA	0.33195776	0.0167462	0.02287293
REACTOME_PLATELET_DEGRANULATION	0.21841822	0.01676652	0.02287293

REACTOME_REGULATION_OF_INSULIN_SECRETION_BY_GLUCAGON_LIKE_PEPTIDE_1	0.16690382	0.01682123	0.02287293
KEGG_CYTOSOLIC_DNA_SENSING_PATHWAY	0.17939768	0.01684601	0.02287293
KEGG_CITRATE_CYCLE_TCA_CYCLE	0.29517074	0.01685174	0.02287293
KEGG_GAP_JUNCTION	0.1726349	0.01726975	0.023338774
REACTOME_GRB2_EVENTS_IN_EGFR_SIGNALING	0.27978952	0.01731099	0.023339113
REACTOME_SMOOTH_MUSCLE_CONTRACTION	0.26956126	0.01738317	0.02343624
REACTOME_SIGNALLING_TO_P38_VIA_RIT_AND_RIN	0.23295416	0.01749747	0.02349704
KEGG_PPARG_SIGNALING_PATHWAY	0.19260368	0.01750607	0.02349704
REACTOME_GLUCOSE_METABOLISM	0.26663007	0.01763022	0.0236112
REACTOME_PREFOLDIN_MEDIATED_TRANSFER_OF_SUBSTRATE_TO_CCT_TRIC	0.24102462	0.01835741	0.0245307
REACTOME_SYNTHESIS_AND_INTERCONVERSION_OF_NUCLEOTIDE_DI_AND_TRIPHOSPHATES	0.24916605	0.01959156	0.02612208
KEGG_HISTIDINE_METABOLISM	0.20263769	0.01994585	0.02653589
REACTOME_APOPTOTIC_CLEAVAGE_OF_CELL_ADHESION_PROTEINS	0.230526	0.02009747	0.02667884
KEGG_ALANINE_ASPARTATE_AND_Glutamate_Metabolism	0.23466879	0.02077414	0.02751662
KEGG_MELANOMA	0.18288616	0.02082115	0.02751854
REACTOME_SOS_MEDIATED_SIGNALING	0.26730724	0.02088574	0.02754364
REACTOME_ADP_SIGNALLING_THROUGH_P2Y_PURINOCEPTOR_12	0.18183777	0.02142531	0.02819366
REACTOME_BASIGIN_INTERACTIONS	0.19726603	0.02156924	0.02832135

REACTOME_POST_CHAPERONIN_TUBULIN_FOLDING_PATHWAY	0.1976423	0.02177243	0.02852613
KEGG_TAURINE_AND_HYPOTAURINE_METABOLISM	0.18244866	0.02210532	0.02889959
KEGG_NOD_LIKE_RECEPTOR_SIGNALING_PATHWAY	0.21983006	0.02227063	0.02905283
REACTOME_PYRIMIDINE_CATABOLISM	0.25110995	0.02285932	0.02975653
REACTOME_PP2A_MEDIATED_DEPHOSPHORYLATION_OF_KEY_METABOLIC_FACTORS	0.2523037	0.02302021	0.02990153
KEGG_PENTOSE_PHOSPHATE_PATHWAY	0.20801694	0.02349455	0.03045216
KEGG_CIRCADIAN_RHYTHM_MAMMAL	0.26607916	0.02482616	0.03210921
KEGG_ANTIGEN_PROCESSING_AND_PRESENTATION	0.19416932	0.02509664	0.03238968
REACTOME_ADENYLATE_CYCLASE_ACTIVATING_PATHWAY	0.20653494	0.02572549	0.03313049
REACTOME_AMINO_ACID_SYNTHESIS_AND_INTERCONVERSION	0.27413553	0.02578884	0.0331414
REACTOME_SIGNALING_BY_PDGF	0.20185708	0.02619374	0.03359028
REACTOME_CYCLIN_A1_ASSOCIATED_EVENTS_DURING_G2_M_TRANSITION	0.26794706	0.02637868	0.03375577
KEGG_GLUTATHIONE_METABOLISM	0.20568335	0.02822442	0.03604133
REACTOME_SEMA3A_PLEXIN_REPULSION_SIGNALING_BY_INHIBITING_INTEGRIN_ADHESION	0.23356875	0.02869173	0.03654297
REACTOME_CREB_PHOSPHORYLATION_THROUGH_THE_ACTIVATION_OF_CAMKII	0.15793025	0.02873826	0.03654297
KEGG_MELANOGENESIS	0.15969549	0.02900361	0.0368029
KEGG_CYSTEINE_AND_METHIONINE_METABOLISM	0.1907096	0.03005921	0.0380624
KEGG_CALCIIUM_SIGNALING_PATHWAY	0.11586968	0.03035648	0.0383584

KEGG_RIG_I_LIKE_RECEPTOR_SIGNALING_PATHWAY	0.15675433	0.03073882	0.03876043
Y			
REACTOME_SIGNALING_BY_BMP	0.23290983	0.03179153	0.04000434
KEGG_ARGININE_AND_PROLINE_METABOLISM	0.20161193	0.03282639	0.04122066
REACTOME_CELLEXTRACELLULAR_MATRIX_INTERACTIONS	0.2355796	0.03353867	0.04202771
REACTOME_GLUTATHIONE_CONJUGATION	0.19500031	0.03366606	0.0421
REACTOME_MYOGENESIS	0.15776592	0.03589358	0.04479281
REACTOME_CELL_JUNCTION_ORGANIZATION	0.14259285	0.03742776	0.04661107
REACTOME_GS_ALPHA_MEDIATED_EVENTS_IN_GLUCAGON_SIGNALLING	0.14800862	0.03859059	0.04796032
REACTOME_HORMONE_BIOSYNTHESIS	-0.1007267	0.04025038	0.04983335
KEGG_GLYOXYLATE_AND_DICARBOXYLATE_METABOLISM	0.21509633	0.04026271	0.04983335
REACTOME_GLUCONEOGENESIS	0.23146452	0.04338904	0.05359301
REACTOME_METAL_ION_SLC_TRANSPORTERS	0.17847234	0.04502061	0.0554948
KEGG_PORPHYRIN_AND_CHLOROPHYLL_METABOLISM	0.17871567	0.04536363	0.05580373
KEGG_TERPENOID_BACKBONE_BIOSYNTHESIS	0.2624921	0.0467542	0.05739743
REACTOME_CALCITONIN_LIKE_LIGAND_RECEPTORS	-0.1230069	0.04915839	0.06022651



Table B2. Blood Differential Expression Analysis at the pathway level

Pathway	Log FC	P Value	Adj P Value
REACTOME_INITIAL_TRIGGERING_OF_COMPLEMENT	0.34486073	6.14E-08	2.64E-05
REACTOME_E2F_TRANSCRIPTIONAL_TARGETS_AT_G1_S	0.40025849	8.75E-08	2.64E-05
REACTOME_COMPLEMENT_CASCADE	0.29908831	4.18E-07	8.41E-05
REACTOME_UNWINDING_OF_DNA	0.46035963	7.09E-07	0.00010699
REACTOME_E2F_MEDIATED_REGULATION_OF_DNA_REPLICATION	0.30373158	2.60E-06	0.00031381
REACTOME_CLASSICAL_ANTIBODY_MEDIATED_COMPLEMENT_ACTIVATION	0.3759158	1.48E-05	0.00148718
REACTOME_REGULATION_OF_BETA_CELL_DEVELOPMENT	-0.3581821	2.07E-05	0.00153436
REACTOME_VIRAL_MRNA_TRANSLATION	-0.3802315	2.40E-05	0.00153436
REACTOME_REGULATION_OF_GENE_EXPRESSION_IN_BETA_CELLS	-0.3682298	2.46E-05	0.00153436
REACTOME_PEPTIDE_CHAIN_ELONGATION	-0.3839259	2.59E-05	0.00153436
KEGG_RIBOSOME	-0.3758236	2.79E-05	0.00153436
REACTOME_CYCLIN_A1_ASSOCIATED_EVENTS_DURING_G2_M_TRANSITION	0.30739899	4.37E-05	0.00219966
REACTOME_INFLUENZA_VIRAL_RNA_TRANSCRIPTION_AND_REPLICATION	-0.341565	4.83E-05	0.00224277
REACTOME_FORMATION_OF_A_POOL_OF_FREE_40S_SUBUNITS	-0.3461452	7.43E-05	0.003132

REACTOME_SYNTHESIS_OF_GLYCOSYLPHOSPHATIDYLINOSITOL	-0.2175198	7.78E-05	0.003132
REACTOME_INFLUENZA_LIFE_CYCLE	-0.2833769	0.00010006	0.00377709
REACTOME_GTP_HYDROLYSIS_AND_JOINING_OF_THE_60S_RIBOSOMAL_SUBUNIT	-0.3201565	0.00011716	0.00396802
KEGG_REGULATION_OF_AUTOPHAGY	-0.2025667	0.00011825	0.00396802
REACTOME_SIGNALING_BY_TGF_BETA	-0.2261827	0.00016423	0.00522082
REACTOME_TRANSLATION	-0.3054869	0.00017545	0.00529853
REACTOME_G2_M_CHECKPOINTS	0.24631822	0.0001963	0.00564597
REACTOME_TRANSLATION_INITIATION_COMPLEX_FORMATI ON	-0.2876	0.0002073	0.0056914
REACTOME_GENERATION_OF_SECOND_MESSENGER_MOLEC ULES	-0.2306557	0.00022604	0.0059359
REACTOME_ACTIVATION_OF_THE_PRE_REPLICATIVE_COMPL EX	0.24355507	0.00029103	0.00724308
REACTOME_METABOLISM_OF_PROTEINS	-0.2186499	0.00030705	0.00724308
REACTOME_FORMATION_OF_THE_TERNARY_COMPLEX_AND_ SUBSEQUENTLY_THE_43S_COMPLEX	-0.2926331	0.00031179	0.00724308
REACTOME_G1_S_TRANSITION	0.2109903	0.00061529	0.01367804
REACTOME_PLATELET_ADHESION_TO_EXPOSED_COLLAGEN	0.24042514	0.00067533	0.01367804
REACTOME_ACTIVATION_OF_ATR_IN_RESPONSE_TO_REPLICA TION_STRESS	0.22094832	0.00067934	0.01367804
KEGG_ARACHIDONIC_ACID_METABOLISM	-0.1329668	0.00067937	0.01367804

REACTOME_NUCLEAR_RECEPTOR_TRANSCRIPTION_PATHWAY	-0.115896	0.00077755	0.0145616
REACTOME_INSULIN_SYNTHESIS_AND_SECRETION	-0.2600203	0.00078837	0.0145616
REACTOME_CHEMOKINE_RECEPTORS_BIND_CHEMOKINES	-0.1357118	0.00079558	0.0145616
REACTOME_POST_NMDA_RECEPTOR_ACTIVATION_EVENTS	-0.1474849	0.00082343	0.01462805
REACTOME_ACTIVATION_OF_NMDA_RECEPTOR_UPON_GLUTAMATE_BINDING_AND_POSTSYNAPTIC_EVENTS	-0.1429114	0.00090134	0.01555451
KEGG_DRUG_METABOLISM_OTHER_ENZYMES	0.14087382	0.00098629	0.01654773
KEGG_NON_HOMOLOGOUS_END_JOINING	-0.1766662	0.00106969	0.01746192
KEGG_FOLATE_BIOSYNTHESIS	0.19367375	0.00122791	0.01951736
REACTOME_PYRIMIDINE_METABOLISM	0.17336607	0.0013729	0.02126242
KEGG_CELL_CYCLE	0.15948492	0.00161449	0.02437884
KEGG_ONE_CARBON_POOL_BY_FOLATE	0.20126396	0.00169735	0.02500492
KEGG_GLYCOSAMINOGLYCAN_BIOSYNTHESIS_KERATAN_SULFATE	0.17532316	0.00175262	0.02520429
REACTOME_PROSTANOID_HORMONES	-0.2306157	0.00205427	0.02885536
REACTOME_PHOSPHORYLATION_OF_CD3_AND_TCR_ZETA_CHAINS	-0.2637374	0.00237418	0.03217381
REACTOME_DNA_STRAND_ELONGATION	0.22866488	0.00239706	0.03217381
REACTOME_SYNTHESIS_OF_GPI_ANCHORED_PROTEINS	-0.1392558	0.00282971	0.0359706

REACTOME_CELL_CYCLE_MITOTIC	0.16096812	0.00284129	0.0359706
REACTOME_E2F_ENABLED_INHIBITION_OF_PRE_REPLICATION_COMPLEX_FORMATION	0.22246119	0.00285859	0.0359706
REACTOME_P75NTR_RECRUITS_SIGNALLING_COMPLEXES	-0.1844301	0.00340451	0.04196576
REACTOME_MITOTIC_M_M_G1_PHASES	0.16596285	0.0035642	0.04305554
KEGG_P53_SIGNALING_PATHWAY	0.1227851	0.00377406	0.0446967
REACTOME_DNA_REPLICATION_PRE_INITIATION	0.18133536	0.00455902	0.05295476
REACTOME_EICOSANOID_LIGAND_BINDING_RECEPTORS	-0.1536893	0.00506525	0.05673121
REACTOME_CELL_CYCLE_CHECKPOINTS	0.17014884	0.00518685	0.05673121
KEGG_SYSTEMIC_LUPUS_ERYTHEMATOSUS	0.12342719	0.00522491	0.05673121
REACTOME_CREB_PHOSPHORYLATION_THROUGH_THE_ACTIVATION_OF_RAS	-0.137806	0.00525985	0.05673121
REACTOME_PI3K_AKT_SIGNALLING	-0.1312421	0.00546181	0.05787602
KEGG_MATURITY_ONSET_DIABETES_OF_THE_YOUNG	0.15816716	0.00566387	0.05898241
REACTOME_SYNTHESIS_OF_DNA	0.17978508	0.00596853	0.06092811
REACTOME_AMINO_ACID_AND_OLIGOPEPTIDE_SLC_TRANSPORTERS	0.0943695	0.00605246	0.06092811
KEGG_INOSITOL_PHOSPHATE_METABOLISM	-0.1231181	0.00680206	0.06735158
REACTOME_TRANSLOCATION_OF_ZAP70_TO_IMMUNOLOGICAL_SYNAPSE	-0.2723904	0.00711247	0.06928919
REACTOME_TCR_SIGNALING	-0.1647015	0.00732827	0.0702583

REACTOME_ORC1_REMOVAL_FROM_CHROMATIN	0.18189364	0.00762576	0.07196812
REACTOME_ENDOGENOUS_STEROLS	0.14207314	0.00778293	0.07232134
REACTOME_GENE_EXPRESSION	-0.1534119	0.00793405	0.07260862
REACTOME_ADENYLATE_CYCLASE_ACTIVATING_PATHWAY	0.16004625	0.00805925	0.07265353
REACTOME_S_PHASE	0.16993358	0.00856494	0.07607686
KEGG_DNA_REPLICATION	0.18304418	0.00917304	0.07951889
REACTOME_M_G1_TRANSITION	0.17797477	0.00921577	0.07951889
REACTOME_NEURANSMITTER_RECEPTOR_BINDING_AND_DOWNSTREAM_TRANSMISSION_IN_THE_POSTSYNAPTIC_CELL	-0.0902099	0.00992458	0.08442882
REACTOME_DOWNSTREAM_EVENTS_IN_GPCR_SIGNALING	-0.0653675	0.01119102	0.09186448
REACTOME_G1_PHASE	0.13866637	0.01119209	0.09186448
KEGG_OOCYTE_MEIOSIS	0.10298339	0.01139167	0.09186448
REACTOME_CDC6_ASSOCIATION_WITH_THE_ORC_ORIGINS_COMPLEX	0.15979405	0.011534	0.09186448
REACTOME_P38MAPK_EVENTS	0.15611136	0.01155911	0.09186448
REACTOME_MITOTIC_PROMETAPHASE	0.13717214	0.01238514	0.0948962
REACTOME_POST_TRANSLATIONAL_PROTEIN_MODIFICATION	-0.0845128	0.01248734	0.0948962
REACTOME_RNA_POLYMERASE_I_TRANSCRIPTION_INITIATION	-0.1586697	0.01255514	0.0948962
REACTOME_FANCONI_ANEMIA_PATHWAY	0.13808487	0.01256903	0.0948962

KEGG_PHOSPHATIDYLINOSITOL_SIGNALING_SYSTEM	-0.1152032	0.01278363	0.09532488
REACTOME_SIGNALING_BY_BMP	-0.1229382	0.01358247	0.10004646
REACTOME_G_ALPHA_I_SIGNALLING_EVENTS	-0.0867961	0.01443903	0.10507437
REACTOME_INTRINSIC_PATHWAY	0.13264544	0.01579563	0.11357813
REACTOME_G_PROTEIN_BETA_GAMMA_SIGNALLING	-0.1301297	0.0161117	0.11406795
REACTOME_P2Y_RECEPTORS	-0.1597757	0.01624146	0.11406795
KEGG_MTOR_SIGNALING_PATHWAY	-0.1172165	0.01774074	0.12316557
KEGG_GLYCOPHINGOLIPID_BIOSYNTHESIS_LACTO_AND_NEO_LACTO_SERIES	0.10285937	0.01988945	0.13532185
REACTOME_STEROID_HORMONES	0.11739813	0.01993981	0.13532185
REACTOME_NRIF_SIGNALS_CELL_DEATH_FROM_THE_NUCLEUS	-0.1354672	0.0215161	0.14439697
KEGG_HEMATOPOIETIC_CELL_LINEAGE	-0.0908403	0.0218487	0.14501774
REACTOME_NUCLEOTIDE_LIKE_PURINERGIC_RECEPTORS	-0.1355621	0.02247711	0.14756709
REACTOME_COSTIMULATION_BY_THE_CD28_FAMILY	-0.1254624	0.02484659	0.16136925
REACTOME_RNA_POLYMERASE_I_PROMOTER_CLEARANCE	-0.1352492	0.02723288	0.17410228
REACTOME_DIABETES_PATHWAYS	-0.1208109	0.02776803	0.17410228
REACTOME_NEF_MEDIATES_DOWN_MODULATION_OF_CELL_SURFACE_RECEPTORS_BY_RECRUITING_THEM_TO_CLATHRIN_ADAPTERS	-0.1444367	0.02823383	0.17410228

KEGG_ECM_RECEPTOR_INTERACTION	0.0882367	0.02823434	0.17410228
REACTOME_G_BETA_GAMMA_SIGNALLING_THROUGH_PI3KG AMMA	-0.1207033	0.02824838	0.17410228
KEGG_GLYCOSYLPHOSPHATIDYLINOSITOL_GPI_ANCHOR_BIO SYNTHESIS	-0.0993848	0.02958908	0.18052328
KEGG_GALACTOSE_METABOLISM	0.14209283	0.03055052	0.18452515
KEGG_AMINO_SUGAR_AND_NUCLEOTIDE_SUGAR_METABOLIS M	0.12370201	0.03113291	0.18618094
REACTOME_MTOR_SIGNALLING	-0.1003121	0.03156784	0.18693116
REACTOME_CREB_PHOSPHORYLATION_THROUGH_THE_ACTIV ATION_OF_CAMKII	-0.1094543	0.03351978	0.19656258
REACTOME_AMINO_ACID_TRANSPORT_ACROSS_THE_PLASMA _MEMBRANE	0.0814502	0.03409307	0.19800207
REACTOME_G_ALPHA_12_13_SIGNALLING_EVENTS	-0.092533	0.03444728	0.1981539
KEGG_OXIDATIVE_PHOSPHORYLATION	-0.1305633	0.0348355	0.19849662
REACTOME_NEF_MEDIATED_DOWNREGULATION_OF_MHC_CL ASS_I_COMPLEX_CELL_SURFACE_EXPRESSION	-0.1388317	0.03601809	0.20331704
REACTOME_GAP_JUNCTION_TRAFFICKING	0.09502936	0.03640539	0.20360053
REACTOME_ASSOCIATION_OF_LICENSING_FACTORS_WITH_TH E_PREREPLICATIVE_COMPLEX	0.13112445	0.03727177	0.20526661
REACTOME_TRAFFICKING_OF_AMPA_RECEPTORS	-0.0979461	0.03738299	0.20526661

KEGG_ASCORBATE_AND_ALDARATE_METABOLISM	-0.1266349	0.03779516	0.20566015
KEGG_AUTOIMMUNE_THYROID_DISEASE	0.09378937	0.03963465	0.21309717
REACTOME_CD28_CO_STIMULATION	-0.1263156	0.04001438	0.21309717
KEGG_PRION_DISEASES	0.0871493	0.04022033	0.21309717
KEGG_BASAL_CELL_CARCINOMA	0.07612628	0.04354053	0.22868244
REACTOME_DOWNSTREAM_TCR_SIGNALING	-0.1364941	0.04610831	0.2400812
REACTOME_PECAMI_INTERACTIONS	-0.1303023	0.04694438	0.24234536
REACTOME_MITOCHONDRIAL_FATTY_ACID_BETA_OXIDATION	0.177033	0.0483418	0.24744449





## Appendix C

Table C 1. Lung immune cell fraction (Cont.)

Mixture	B cells naive	B cells memory	Plasma cells	T cells CD8	T cells CD4 naive	T cells CD4 memory resting	T cells CD4 memory activated	T cells follicular helper	T cells regulatory (Tregs)	T cells gamma delta
Healthy	0.0124	0.0000	0.0074	0.0000	0.0000	0.2407	0.0000	0.0000	0.0000	0.0000
Healthy.1	0.0438	0.0000	0.1259	0.0000	0.0438	0.1819	0.0000	0.0000	0.0000	0.0000
Healthy.2	0.0115	0.0000	0.0028	0.0000	0.0000	0.1403	0.0000	0.0000	0.0000	0.0000
Healthy.3	0.0082	0.0066	0.0464	0.0098	0.0000	0.3345	0.0000	0.0000	0.0000	0.0000
Healthy.4	0.0028	0.0402	0.0279	0.0000	0.0000	0.2132	0.0069	0.0000	0.0000	0.0000
Healthy.5	0.0044	0.0045	0.0157	0.0000	0.0000	0.1810	0.0000	0.0000	0.0000	0.0000
Healthy.6	0.0032	0.0000	0.0087	0.0000	0.0000	0.1753	0.0000	0.0000	0.0000	0.0000
Healthy.7	0.0127	0.0000	0.0037	0.0000	0.0000	0.2816	0.0015	0.0000	0.0000	0.0000
Healthy.8	0.0022	0.0028	0.0027	0.0000	0.0000	0.2431	0.0000	0.0000	0.0000	0.0000
Healthy.9	0.0146	0.0030	0.0333	0.0000	0.0000	0.1215	0.0000	0.0000	0.0000	0.0000
Healthy.10	0.0110	0.0000	0.0235	0.0000	0.0000	0.2331	0.0000	0.0000	0.0000	0.0000
Healthy.11	0.0000	0.1335	0.1505	0.0000	0.0000	0.1335	0.0220	0.0078	0.0000	0.0000
Healthy.12	0.0261	0.0000	0.0023	0.0000	0.0000	0.1221	0.0000	0.0000	0.0000	0.0000
Healthy.13	0.0041	0.0000	0.0051	0.0000	0.0000	0.1758	0.0000	0.0000	0.0000	0.0000
Healthy.14	0.0042	0.0147	0.1360	0.0069	0.0000	0.2587	0.0000	0.0000	0.0000	0.0000
Healthy.15	0.0410	0.0000	0.0000	0.0000	0.0113	0.1230	0.0000	0.0000	0.0000	0.0000
Healthy.16	0.0059	0.0122	0.0041	0.0000	0.0000	0.1944	0.0000	0.0000	0.0000	0.0000
Healthy.17	0.0152	0.0094	0.0924	0.0000	0.0000	0.2412	0.0000	0.0027	0.0000	0.0000
Healthy.18	0.0811	0.0000	0.0604	0.0000	0.0123	0.1305	0.0000	0.0000	0.0000	0.0000
Healthy.19	0.0025	0.0066	0.0305	0.0000	0.0000	0.2146	0.0000	0.0000	0.0000	0.0000
Healthy.20	0.0021	0.0050	0.0066	0.0131	0.0000	0.2554	0.0000	0.0000	0.0000	0.0000

Table C 1. Lung immune cell fraction (Cont.)

Mixture	B cells naive	B cells memory	Plasma cells	T cells CD8	T cells CD4 naive	T cells CD4 memory resting	T cells CD4 memory activated	T cells follicular helper	T cells regulatory (Tregs)	T cells gamma delta
NonTrigger.1	0.0445	0.0000	0.0475	0.0000	0.0000	0.1924	0.0000	0.0000	0.0000	0.0000
NonTrigger.2	0.0589	0.0000	0.0300	0.0000	0.0016	0.1475	0.0186	0.0136	0.0000	0.0000
NonTrigger.3	0.1275	0.0000	0.0749	0.0000	0.1424	0.0868	0.1379	0.0000	0.0000	0.0000
NonTrigger.4	0.0409	0.0000	0.0918	0.0000	0.0421	0.1308	0.0242	0.0000	0.0000	0.0000
NonTrigger.5	0.0943	0.0000	0.0684	0.0000	0.0065	0.2020	0.0000	0.0017	0.0000	0.0018
NonTrigger.6	0.1306	0.0000	0.0648	0.0000	0.0578	0.2350	0.0000	0.0000	0.0000	0.0000
NonTrigger.7	0.1404	0.0000	0.0699	0.0000	0.0000	0.2545	0.0000	0.0000	0.0000	0.0000
NonTrigger.8	0.0359	0.0604	0.0499	0.0000	0.0000	0.2406	0.0000	0.0000	0.0000	0.0000
NonTrigger.9	0.0628	0.0000	0.0704	0.0000	0.0000	0.3350	0.0000	0.0000	0.0000	0.0000
NonTrigger.10	0.0706	0.0000	0.0556	0.0000	0.0000	0.2323	0.0000	0.0000	0.0000	0.0000
NonTrigger.11	0.0747	0.0000	0.1240	0.0141	0.0000	0.2683	0.0000	0.0000	0.0000	0.0000
NonTrigger.12	0.1200	0.0128	0.0506	0.0000	0.0458	0.2468	0.0000	0.0000	0.0000	0.0000
NonTrigger.13	0.0223	0.0000	0.1310	0.0000	0.0000	0.2205	0.0131	0.0000	0.0000	0.0000
NonTrigger.14	0.0000	0.0557	0.0098	0.0000	0.0000	0.2042	0.0001	0.0000	0.0000	0.0000
Trigger	0.0474	0.0000	0.0161	0.0322	0.0000	0.2220	0.0127	0.0000	0.0000	0.0000
Trigger.1	0.0430	0.0000	0.0661	0.0399	0.0000	0.3175	0.0132	0.0000	0.0101	0.0000
Trigger.2	0.0518	0.0000	0.0360	0.0307	0.0000	0.2661	0.0279	0.0000	0.0000	0.0000
Trigger.3	0.0795	0.0749	0.0754	0.0367	0.0326	0.1032	0.0000	0.0000	0.0374	0.0000
Trigger.4	0.1390	0.0000	0.0218	0.0576	0.0000	0.2381	0.0000	0.0000	0.0468	0.0000
Trigger.5	0.0359	0.0000	0.1212	0.0141	0.0000	0.2789	0.0204	0.0000	0.0000	0.0000

Table C 1. Lung immune cell fraction (Cont.)

Mixture	B cells naive	B cells memory	Plasma cells	T cells CD8	T cells CD4 naive	T cells CD4 memory resting	T cells CD4 memory activated	T cells follicular helper	T cells regulatory (Tregs)	T cells gamma delta
Trigger.6	0.0019	0.1731	0.1496	0.0000	0.0275	0.0774	0.0431	0.0000	0.0334	0.0000
Trigger.7	0.1675	0.0204	0.0577	0.0000	0.0302	0.1495	0.0000	0.0000	0.0000	0.0000
Trigger.8	0.1553	0.0000	0.0867	0.0214	0.0000	0.1397	0.0238	0.0102	0.0000	0.0000
Trigger.9	0.1434	0.0000	0.0855	0.0183	0.0000	0.2480	0.0000	0.0000	0.0000	0.0000
Trigger.10	0.1628	0.0000	0.0677	0.0000	0.0588	0.1693	0.0000	0.0000	0.0000	0.0000
Trigger.11	0.1083	0.0000	0.1026	0.0000	0.0000	0.2495	0.0064	0.0000	0.0000	0.0000
Trigger.12	0.0313	0.0000	0.0614	0.0000	0.1996	0.1890	0.0471	0.0000	0.0000	0.0000
Trigger.13	0.0026	0.0538	0.0657	0.0000	0.0947	0.1558	0.0136	0.0000	0.0000	0.0467
Trigger.14	0.1357	0.0327	0.0615	0.0000	0.0839	0.1143	0.0000	0.0000	0.0000	0.0000
Trigger.15	0.0991	0.0000	0.2192	0.0000	0.0000	0.2205	0.0000	0.0000	0.0000	0.0249
Trigger.16	0.0611	0.0000	0.0390	0.0000	0.0000	0.3681	0.0000	0.0000	0.0000	0.0231
Trigger.17	0.0753	0.0000	0.1238	0.0000	0.0515	0.2038	0.0000	0.0000	0.0000	0.0492
Trigger.18	0.0000	0.0483	0.0277	0.0000	0.0000	0.2520	0.0000	0.0000	0.0000	0.0000
Trigger.19	0.1200	0.0000	0.0841	0.0000	0.0000	0.3194	0.0000	0.0000	0.0000	0.0307
Trigger.20	0.0797	0.0000	0.0578	0.0000	0.1052	0.2557	0.0264	0.0000	0.0000	0.0093
Trigger.21	0.0578	0.0000	0.0845	0.0000	0.0000	0.3257	0.0020	0.0000	0.0000	0.0153
Trigger.22	0.0904	0.0000	0.0673	0.0466	0.0000	0.2530	0.0110	0.0000	0.0000	0.0000

Table C 1. Lung immune cell fraction (Cont.)

Mixture	B cells naive	B cells memory	Plasma cells	T cells CD8	T cells CD4 naive	T cells CD4 memory resting	T cells CD4 memory activated	T cells follicular helper	T cells regulatory (Tregs)	T cells gamma delta
Trigger.23	0.0311	0.0038	0.0201	0.0000	0.0000	0.2399	0.0000	0.0000	0.0000	0.0000
Trigger.24	0.1410	0.0000	0.1388	0.0308	0.0484	0.2277	0.0672	0.0000	0.0000	0.0257
Trigger.25	0.0570	0.0000	0.0613	0.0000	0.0000	0.2567	0.0060	0.0000	0.0000	0.0057
Trigger.26	0.0864	0.0000	0.0413	0.0000	0.0000	0.3261	0.0000	0.0000	0.0000	0.0000
Trigger.27	0.0254	0.0000	0.0468	0.0097	0.0000	0.3259	0.0000	0.0000	0.0000	0.0000
Trigger.28	0.0624	0.0000	0.0800	0.0000	0.0000	0.3559	0.0000	0.0000	0.0000	0.0000
Trigger.29	0.0946	0.0000	0.0437	0.0000	0.0000	0.2628	0.0000	0.0000	0.0000	0.0000
Trigger.30	0.0917	0.0000	0.0467	0.0000	0.0085	0.2000	0.0096	0.0033	0.0000	0.0000
Trigger.31	0.1021	0.0000	0.0710	0.0000	0.0000	0.3042	0.0000	0.0156	0.0000	0.0000
Trigger.32	0.0109	0.0074	0.0248	0.0000	0.0313	0.2225	0.0000	0.0000	0.0000	0.0000
Trigger.33	0.1050	0.0000	0.0172	0.0000	0.0000	0.2618	0.0000	0.0000	0.0000	0.0000
Trigger.34	0.0776	0.0000	0.0581	0.0000	0.0006	0.3131	0.0144	0.0000	0.0000	0.0000
Trigger.35	0.0791	0.0000	0.0412	0.0000	0.0208	0.2799	0.0000	0.0000	0.0000	0.0116
Trigger.36	0.0546	0.0000	0.0438	0.0000	0.0154	0.1595	0.0000	0.0050	0.0000	0.0128
Trigger.37	0.1587	0.0000	0.0994	0.0000	0.0169	0.2311	0.0000	0.0000	0.0000	0.0000
Trigger.38	0.1180	0.0000	0.0469	0.0186	0.0000	0.2267	0.0000	0.0000	0.0000	0.0000
Trigger.39	0.1297	0.0000	0.0931	0.0073	0.0026	0.2510	0.0000	0.0000	0.0000	0.0034
Trigger.40	0.0032	0.0653	0.1411	0.0174	0.0000	0.1563	0.0382	0.0000	0.0000	0.0233
Trigger.41	0.0282	0.0000	0.0223	0.0000	0.0227	0.3758	0.0180	0.0000	0.0000	0.0285
Trigger.42	0.0427	0.0000	0.0235	0.0000	0.0000	0.2435	0.0000	0.0000	0.0000	0.0000
Trigger.43	0.0472	0.0000	0.0276	0.0028	0.0000	0.2179	0.0000	0.0000	0.0000	0.0000

Table C 1. Lung immune cell fraction (Cont.)

Mixture	NK cells resting	NK cells activated	Monocytes	Macrophages M0	Macrophages M1	Macrophages M2	Dendritic cells resting	Dendritic cells activated	Mast cells resting	Mast cells activated	Eosinophils	Neutrophils
Healthy	0.0913	0.0408	0.1612	0.1235	0.0117	0.1176	0.0000	0.0450	0.0000	0.0641	0.0310	0.0532
Healthy.1	0.0833	0.0000	0.0534	0.1177	0.0000	0.0827	0.0000	0.1482	0.0166	0.0000	0.0000	0.1027
Healthy.2	0.0748	0.0000	0.1323	0.3447	0.0000	0.1339	0.0000	0.0441	0.0278	0.0039	0.0335	0.0504
Healthy.3	0.0287	0.0324	0.0365	0.0708	0.0000	0.1634	0.0000	0.0881	0.0699	0.0000	0.0525	0.0523
Healthy.4	0.0331	0.0000	0.0194	0.3653	0.0000	0.0942	0.0000	0.0974	0.0110	0.0000	0.0398	0.0487
Healthy.5	0.0714	0.0004	0.1552	0.3204	0.0000	0.1385	0.0000	0.0652	0.0118	0.0000	0.0000	0.0316
Healthy.6	0.0581	0.0000	0.2131	0.2658	0.0000	0.0651	0.0000	0.0395	0.0275	0.0000	0.0093	0.1345
Healthy.7	0.0298	0.0000	0.1208	0.2710	0.0000	0.1163	0.0000	0.0643	0.0331	0.0000	0.0203	0.0450
Healthy.8	0.0463	0.0095	0.0740	0.2604	0.0000	0.1875	0.0000	0.0823	0.0610	0.0000	0.0053	0.0231
Healthy.9	0.1000	0.0000	0.1215	0.3678	0.0000	0.1644	0.0000	0.0263	0.0366	0.0000	0.0000	0.0111
Healthy.10	0.0283	0.0104	0.1758	0.1530	0.0000	0.0850	0.0000	0.1326	0.0639	0.0000	0.0277	0.0557
Healthy.11	0.0568	0.0000	0.0120	0.2155	0.0000	0.1229	0.0000	0.0501	0.0000	0.0262	0.0030	0.0661
Healthy.12	0.0514	0.0010	0.2078	0.2903	0.0000	0.1388	0.0000	0.0743	0.0189	0.0000	0.0108	0.0561
Healthy.13	0.0608	0.0063	0.1499	0.2398	0.0000	0.1677	0.0000	0.0878	0.0385	0.0000	0.0084	0.0559
Healthy.14	0.0429	0.0420	0.0758	0.0645	0.0000	0.1429	0.0000	0.0530	0.1181	0.0000	0.0098	0.0306
Healthy.15	0.0509	0.0000	0.1782	0.2860	0.0000	0.1016	0.0000	0.0207	0.0000	0.0000	0.0000	0.1871
Healthy.16	0.0475	0.0038	0.1223	0.3158	0.0000	0.1631	0.0000	0.0494	0.0342	0.0000	0.0042	0.0431
Healthy.17	0.0738	0.0097	0.1589	0.1042	0.0000	0.1072	0.0000	0.0641	0.0158	0.0383	0.0315	0.0356
Healthy.18	0.0656	0.0031	0.1536	0.1546	0.0000	0.1061	0.0000	0.0437	0.0133	0.0000	0.0000	0.1757
Healthy.19	0.0434	0.0193	0.1448	0.1866	0.0000	0.1232	0.0000	0.0904	0.0524	0.0000	0.0043	0.0812
Healthy.20	0.0623	0.0587	0.2452	0.0557	0.0480	0.0817	0.0000	0.1380	0.0096	0.0121	0.0066	0.0000

Table C 1. Lung immune cell fraction (Cont.)

Mixture	NK cells resting	NK cells activated	Monocytes	Macrophages M0	Macrophages M1	Macrophages M2	Dendritic cells resting	Dendritic cells activated	Mast cells resting	Mast cells activated	Eosinophils	Neutrophils
NonTrigger	0.0224	0.0364	0.1886	0.1816	0.0609	0.0210	0.0008	0.0000	0.0523	0.0000	0.0586	0.1065
NonTrigger.1	0.0125	0.0367	0.0985	0.1650	0.0028	0.0239	0.0000	0.1328	0.0000	0.1599	0.0161	0.0673
NonTrigger.2	0.1097	0.0448	0.1929	0.0240	0.0233	0.0108	0.0000	0.1488	0.0898	0.0000	0.0000	0.0857
NonTrigger.3	0.1394	0.0000	0.1011	0.0302	0.0000	0.0893	0.0000	0.0359	0.0272	0.0000	0.0015	0.0060
NonTrigger.4	0.0238	0.0849	0.0936	0.0577	0.0334	0.0107	0.0000	0.1269	0.0949	0.0000	0.0000	0.1442
NonTrigger.5	0.0511	0.0438	0.0784	0.0238	0.0000	0.0265	0.0000	0.1612	0.0877	0.0000	0.0000	0.1528
NonTrigger.6	0.0133	0.0687	0.0806	0.0137	0.0000	0.0245	0.0000	0.0764	0.1135	0.0000	0.0000	0.1212
NonTrigger.7	0.0015	0.0508	0.0148	0.0672	0.0018	0.1199	0.0019	0.0762	0.1070	0.0000	0.0197	0.0744
NonTrigger.8	0.0126	0.0140	0.0858	0.0333	0.0188	0.1329	0.0000	0.1144	0.0675	0.0000	0.0469	0.0870
NonTrigger.9	0.0220	0.0235	0.0078	0.0773	0.0147	0.1106	0.0000	0.0633	0.0665	0.0000	0.0000	0.1462
NonTrigger.10	0.0145	0.0144	0.1265	0.0282	0.0565	0.1264	0.0000	0.0749	0.0781	0.0000	0.0145	0.1076
NonTrigger.11	0.0437	0.0160	0.0461	0.0729	0.0568	0.1447	0.0000	0.0006	0.0444	0.0063	0.0000	0.0874
NonTrigger.12	0.0442	0.0126	0.0358	0.0040	0.0000	0.1705	0.0000	0.1699	0.0469	0.0000	0.0000	0.0403
NonTrigger.13	0.0429	0.0000	0.0799	0.0797	0.0000	0.0000	0.0000	0.2095	0.0281	0.0004	0.0000	0.1725
NonTrigger.14	0.0344	0.0000	0.0889	0.1666	0.0000	0.1045	0.0000	0.0995	0.0396	0.0000	0.0000	0.1967
Trigger	0.0480	0.0062	0.1192	0.1883	0.0089	0.1180	0.0000	0.0390	0.0588	0.0000	0.0000	0.0832
Trigger.1	0.0000	0.0429	0.0333	0.2107	0.0012	0.0947	0.0000	0.0602	0.0401	0.0000	0.0044	0.0225
Trigger.2	0.0472	0.0000	0.0444	0.1854	0.0000	0.0966	0.0000	0.0837	0.0570	0.0000	0.0000	0.0731
Trigger.3	0.0339	0.0139	0.1236	0.2348	0.0112	0.0212	0.0000	0.0788	0.0372	0.0000	0.0000	0.0058
Trigger.4	0.0558	0.0136	0.0507	0.0384	0.0165	0.1024	0.0235	0.0725	0.0450	0.0238	0.0152	0.0394
Trigger.5	0.0224	0.0268	0.1854	0.0490	0.0359	0.0593	0.0000	0.0934	0.0427	0.0000	0.0000	0.0146

Table C 1. Lung immune cell fraction (Cont.)

Mixture	NK cells resting	NK cells activated	Monocytes	Macrophages M0	Macrophages M1	Macrophages M2	Dendritic cells resting	Dendritic cells activated	Mast cells resting	Mast cells activated	Eosinophils	Neutrophils
Trigger.6	0.0650	0.0000	0.2090	0.0878	0.0000	0.0195	0.0000	0.0665	0.0355	0.0000	0.0107	0.0000
Trigger.7	0.0460	0.0224	0.1736	0.0741	0.0609	0.0607	0.0000	0.0176	0.0345	0.0000	0.0000	0.0849
Trigger.8	0.0099	0.0339	0.1220	0.0807	0.0669	0.0823	0.0000	0.0586	0.0850	0.0000	0.0000	0.0236
Trigger.9	0.0151	0.0389	0.1641	0.0651	0.0535	0.0498	0.0000	0.0040	0.0578	0.0000	0.0000	0.0565
Trigger.10	0.0000	0.0949	0.0935	0.0858	0.0895	0.0000	0.0000	0.0858	0.0000	0.0215	0.0000	0.0704
Trigger.11	0.0368	0.0308	0.1160	0.0185	0.0143	0.0526	0.0000	0.1604	0.0308	0.0000	0.0035	0.0695
Trigger.12	0.0532	0.0187	0.0701	0.0389	0.0000	0.0176	0.0102	0.1350	0.0233	0.0000	0.0059	0.0988
Trigger.13	0.0858	0.0000	0.0662	0.0633	0.0570	0.0000	0.0000	0.0387	0.0061	0.0414	0.0000	0.2085
Trigger.14	0.1075	0.0000	0.0229	0.0462	0.0817	0.0062	0.0000	0.1534	0.0000	0.0289	0.0000	0.1250
Trigger.15	0.0000	0.0279	0.0305	0.0867	0.0000	0.1331	0.0006	0.0406	0.0593	0.0000	0.0000	0.0576
Trigger.16	0.0000	0.0558	0.1012	0.0695	0.0505	0.0923	0.0103	0.0331	0.0848	0.0000	0.0000	0.0111
Trigger.17	0.0046	0.0194	0.1779	0.0948	0.0034	0.0219	0.0000	0.0433	0.0425	0.0000	0.0000	0.0886
Trigger.18	0.0182	0.0313	0.1045	0.1241	0.0751	0.0102	0.0466	0.0000	0.0410	0.0000	0.0503	0.1708
Trigger.19	0.0000	0.0274	0.0699	0.0078	0.0171	0.0607	0.0438	0.0051	0.0506	0.0000	0.0000	0.1634
Trigger.20	0.0448	0.0000	0.0864	0.0755	0.0038	0.0188	0.0000	0.0257	0.0000	0.0492	0.0176	0.1442
Trigger.21	0.0374	0.0382	0.0614	0.0000	0.0458	0.0767	0.0000	0.1300	0.1011	0.0000	0.0000	0.0243
Trigger.22	0.0864	0.0000	0.0551	0.1089	0.0217	0.1218	0.0514	0.0186	0.0223	0.0000	0.0000	0.0454

Table C 1. Lung immune cell fraction (Cont.)

Mixture	NK cells resting	NK cells activated	Monocytes	Macrophages M0	Macrophages M1	Macrophages M2	Dendritic cells resting	Dendritic cells activated	Mast cells resting	Mast cells activated	Eosinophils	Neutrophils
Trigger.23	0.0000	0.0349	0.1712	0.1499	0.0176	0.0088	0.0099	0.0165	0.0715	0.0000	0.0867	0.1383
Trigger.24	0.0165	0.0000	0.0152	0.0119	0.0102	0.0711	0.0312	0.1122	0.0365	0.0000	0.0000	0.0155
Trigger.25	0.0353	0.0033	0.0250	0.1144	0.0102	0.1797	0.0000	0.1239	0.0474	0.0000	0.0245	0.0495
Trigger.26	0.0820	0.0148	0.1122	0.0779	0.0353	0.1226	0.0000	0.0332	0.0641	0.0000	0.0000	0.0041
Trigger.27	0.0359	0.0476	0.1247	0.1103	0.0453	0.1015	0.0000	0.0266	0.0792	0.0000	0.0000	0.0213
Trigger.28	0.0659	0.0175	0.0401	0.1060	0.0256	0.0830	0.0000	0.0861	0.0060	0.0414	0.0000	0.0302
Trigger.29	0.0828	0.0175	0.0621	0.1374	0.0211	0.0351	0.0000	0.1358	0.0541	0.0000	0.0000	0.0532
Trigger.30	0.0504	0.0000	0.2284	0.1252	0.0255	0.0278	0.0000	0.0034	0.0298	0.0000	0.0445	0.1051
Trigger.31	0.0523	0.0179	0.0862	0.0949	0.0300	0.0687	0.0000	0.0756	0.0331	0.0000	0.0047	0.0438
Trigger.32	0.0256	0.0064	0.2571	0.0225	0.0033	0.2546	0.0019	0.0018	0.0531	0.0000	0.0000	0.0769
Trigger.33	0.0326	0.0279	0.1290	0.1550	0.0603	0.0356	0.0095	0.0000	0.0258	0.0000	0.0090	0.1313
Trigger.34	0.0374	0.0046	0.0774	0.1154	0.0000	0.0380	0.0000	0.0752	0.0252	0.0000	0.0503	0.1126
Trigger.35	0.0426	0.0043	0.0762	0.1747	0.0298	0.0557	0.0000	0.0000	0.0350	0.0000	0.0000	0.1490
Trigger.36	0.0000	0.0415	0.2708	0.1026	0.0637	0.0702	0.0000	0.0000	0.0425	0.0000	0.0091	0.1085
Trigger.37	0.0279	0.0202	0.0921	0.0546	0.0023	0.0802	0.0000	0.0404	0.0515	0.0000	0.0000	0.1246
Trigger.38	0.0433	0.0068	0.0981	0.1914	0.0149	0.0558	0.0000	0.0137	0.0000	0.0474	0.0121	0.1063
Trigger.39	0.0497	0.0066	0.1054	0.0435	0.0121	0.0742	0.0000	0.0593	0.0501	0.0000	0.0000	0.1120
Trigger.40	0.0456	0.0327	0.1367	0.0676	0.0595	0.0270	0.0000	0.0485	0.0920	0.0000	0.0000	0.0457
Trigger.41	0.0072	0.0099	0.0604	0.0101	0.0453	0.1019	0.0519	0.0401	0.1019	0.0000	0.0175	0.0584
Trigger.42	0.0118	0.0307	0.2345	0.1830	0.0653	0.0182	0.0000	0.0000	0.0275	0.0000	0.0123	0.1069
Trigger.43	0.0562	0.0218	0.2461	0.1245	0.0209	0.0364	0.0000	0.0251	0.0385	0.0000	0.0000	0.1350



Table C.2. Blood immune cell fraction (Cont.)

Mixture	B cells naive	B cells memory	Plasma cells	T cells CD8	T cells CD4 naive	T cells CD4 memory resting	T cells CD4 memory activated	T cells follicular helper	T cells regulatory (Tregs)	T cells gamma delta	NK cells resting
Healthy	0.129276017	0	0.015619713	0.07338799	0.133126842	0.060595262	0.013776413	0	0.046181482	0	0.099672679
Healthy.1	0.031881829	0.012134853	0.00904994	0.079897585	0.091364691	0.036802579	0.017258661	0	0.004197891	0	0.072721701
Healthy.2	0.020619072	0.001599062	0	0.076039721	0.021133588	0	0.037240747	0	0	0	0.11307632
Healthy.3	0.060881273	0	0.007895593	0.016213022	0.084894042	0.019266694	0.048146215	0	0.004151949	0	0.133481308
Healthy.4	0.084658326	0	0.004703645	0.136366681	0.081437468	0	0.012173823	0	0.04017868	0	0.200946091
Healthy.5	0.133126022	0	0.005153187	0.05839315	0.130239016	0.036654423	0.013785508	0	0.021643217	0	0.125355106
Healthy.6	0.057384355	0.001943114	0.018625516	0.070581191	0.077408517	0.055534923	0.025793267	0	0.024890292	0	0.084288478
Healthy.7	0.041624151	0.013013985	0.009051449	0.08048312	0.083306357	0.068719685	0.048934725	0	0.005515318	0	0.189593604
NonTrigger.1	0.035213738	0	0.005827465	0.124822628	0.04172173	0	0.033938126	0	0.034506597	0	0.234667129
NonTrigger.2	0.128073122	0	0	0.095657772	0.047355469	0.026201508	0.032851543	0	0	0	0.124164442
NonTrigger.3	0.037312975	0	0.005531546	0.134284334	0	0	0.020534978	0	0.035579027	0	0.164929281
NonTrigger.4	0.136894178	0	0.001298261	0.165763149	0.003041042	0.016057598	0.042377753	0	0.036949247	0	0.163387162
NonTrigger.5	0.006380741	0.003708041	0	0.076091714	0.029935703	0.027861616	0.001934913	0	0	0	0.165570206
NonTrigger.6	0.025852989	0	0.005537775	0.131620417	0.018538498	0.008405721	0.022481867	0	0.018149823	0	0.208519379
NonTrigger.7	0.091288005	0	0	0.069110007	0.008451418	0.012239679	0.032511254	0	0.002555122	0	0.150109928
NonTrigger.8	0.034879564	0	0.005445692	0.046685622	0.026691903	0	0	0.006696273	0.010226848	0	0.142188152
NonTrigger.9	0.118952576	0	0	0.031702832	0.038193862	0	0.016932709	0	0.026658771	0	0.070120593
NonTrigger.10	0.044837341	0	0.002343557	0.026416119	0.069049921	0.066241093	0.01624778	0	0.048325002	0	0.093478621
NonTrigger.11	0.038837478	0	0.000832769	0.019946038	0.009925397	0.023512605	0.02542794	0	0	0	0.088582465
NonTrigger.12	0.037349514	0	0	0.10145381	0.044197337	0	0.021967513	0	0.013279871	0	0.090624098
NonTrigger.13	0.074048196	0	0.000451211	0.049110855	0	0.059489638	0.033324511	0	0.004391126	0	0.118768155
NonTrigger.14	0.086746943	0	0.008990224	0.104279605	0.032379955	0.042859072	0.025932407	0	0.035466138	0	0.183045998
NonTrigger.15	0.024495258	0	0.003492227	0.057915244	0.028650926	0.017687667	0.034966264	0	0	0	0.103808581
NonTrigger.16	0.041712271	0.026905916	0.005463955	0.126499405	0.086811105	0.007250458	0.05078113	0	0.020753933	0	0.121955388
NonTrigger.17	0.058202402	0	0.002675981	0.087214338	0.046340276	0.059127405	0.022046401	0	0.038382639	0	0.11012743
NonTrigger.18	0.119512024	0	0	0.143781906	0.01371642	0.122190495	0	0	0.02406738	0	0.181535667
NonTrigger.19	0.106770456	0	0.023154786	0.14259495	0	0.03359833	0.007959074	0	0.067860952	0	0.13346861

Table C.2. Blood immune cell fraction (Cont.)

Mixture	B cells naive	B cells memory	Plasma cells	T cells CD8	T cells CD4 naive	T cells CD4 memory resting	T cells CD4 memory activated	T cells follicular helper	T cells regulatory (Tregs)	T cells gamma delta	NK cells resting
NonTrigger.20	0.05285836	0	0.00471104	0.16485009	0.05779192	0.01012813	0.00629788	0	0.04816412	0	0.10690848
NonTrigger.21	0.04095287	0	0.02848494	0.12245231	0	0.08290603	0.01490096	0	0.02896187	0	0.16821235
NonTrigger.22	0.04666567	0	0	0.06177041	0.07223374	0.05244743	0.0074743	0	0	0	0.15565415
NonTrigger.23	0	0.02432606	0.02005871	0.09939699	0.0439052	0.00243658	0.04803647	0	0.01903492	0	0.24997425
NonTrigger.24	0.06542563	0	0.00749797	0.2840785	0	0.01967735	0.0241441	0	0.02910804	0	0.19314107
NonTrigger.25	0.03981793	0	0.007802	0.04002134	0.05824157	0.02916208	0.0412818	0	0	0	0.15409764
NonTrigger.26	0.04817421	0.01358013	0.00355413	0.10123547	0.01054719	0.09189187	0.01252523	0	0	0	0.17580497
NonTrigger.27	0.04291459	0.01988857	0.03300429	0.20437527	0.01270932	0.01532378	0.06063181	0	0.03243607	0	0.11167705
NonTrigger.28	0.02027121	0.01809961	0.011110668	0.03687357	0.06387732	0.00068381	0.02130175	0	0	0	0.05814089
NonTrigger.29	0.03754547	0	0	0.13432767	0.04307834	0	0.06380538	0	0	0.00785983	0.10832122
NonTrigger.30	0.04494531	0.00937517	0.01917715	0.02601005	0.0597536	0.07117292	0.0273957	0	0	0	0.06003489
NonTrigger.31	0.0101872	0.03169528	0.02440341	0.10404388	0.06509128	0	0	0	0.01724377	0	0.07566093
NonTrigger.32	0.1383133	0	0.03860522	0.16009387	0.05600381	0	0.01964855	0	0.07157937	0	0.11599171
NonTrigger.33	0.04549916	0	0.00745952	0.15898215	0.0010869	0	0.01318294	0	0.05034299	0	0.23903435
NonTrigger.34	0.06717101	0	0.01120634	0.1723585	0.10147165	0.07382552	0	0	0.03046657	0	0.16634891
NonTrigger.35	0.03621262	0	0.01130264	0.08071364	0.04913568	0.05823887	0.00522635	0	0.01131461	0	0.12758364
NonTrigger.36	0.04512446	0	0.00475625	0.10232554	0.00197768	0.0813476	0.02215973	0	0.02267538	0	0.14718298
NonTrigger.37	0.12323579	0	0.01470274	0.15356627	0.06155481	0	0.02092353	0	0.05480486	0	0.12630828
NonTrigger.38	0.11621189	0	0.01342548	0.15690877	0.08101453	0	0.03155829	0	0.03732266	0	0.17262151
NonTrigger.39	0.01381484	0.01518538	0.01125943	0.01397582	0.07813599	0	0.03957633	0	0	0	0.06782328
NonTrigger.40	0.02454718	0.0260006	0.02704509	0.07450836	0.09176866	0.0457335	0.04827863	0	0.01258409	0	0.12094831
NonTrigger.41	0.03427829	0	0.00916469	0.08527858	0.01311984	0.0149884	0.0778459	0	0	0	0.15347943
NonTrigger.42	0.07728961	0	0.01041296	0.16895694	0	0.05271676	0.05366286	0	0.00192702	0	0.1604916
NonTrigger.43	0.10085291	0	0.00429439	0.12417023	0.05107725	0.06867594	0.01213582	0	0.03214506	0	0.11403185
NonTrigger.44	0.04478794	0	0.011149932	0.10661799	0.08667814	0.05210572	0.02102674	0	0.01632551	0	0.12726892
NonTrigger.45	0.01358133	0.01168316	0.00825768	0.05732688	0.05246662	0.00123845	0.05218492	0	0.00499055	0	0.18526182
NonTrigger.46	0.02357382	0.00283707	0.0151323	0.08980961	0.04419409	0	0.0219186	0	0	0	0.09489699

Table C.2. Blood immune cell fraction (Cont.)

Mixture	B cells naive	B cells memory	Plasma cells	T cells CD8	T cells CD4 naive	T cells CD4 memory resting	T cells CD4 memory activated	T cells follicular helper	T cells regulatory (Tregs)	T cells gamma delta	NK cells resting
NonTrigger.47	0.00663686	0.00028763	0.0134431	0.10105719	0.00884938	0.07081985	0.07812123	0	0	0.11106051	0.14044866
NonTrigger.48	0.02283539	0.00166812	0.0041579	0.08437321	0.0388822	0.00310647	0.03626666	0	0.02356869	0	0.15912054
NonTrigger.49	0.02045012	0	0.00394271	0.01943538	0	0.02474577	0.02731766	0.0142937	0	0	0.06836254
NonTrigger.50	0.05059288	0	0.00066381	0.13196736	0.03396513	0.02888271	0.00877598	0	0.01840115	0	0.16234453
Trigger	0.03052245	0.0020554	0.07720904	0.02775586	0.09239389	0	0.0654869	0	0.01857972	0	0.06408778
Trigger.1	0.02593946	0	0.00888671	0.18053612	0	0.01608195	0.03396139	0	0.03329965	0	0.25889873
Trigger.2	0.0118284	0	0.0422434	0.08171314	0.01782767	0.03774826	0.05379805	0	0.00566432	0	0.17504449
Trigger.3	0.00191277	0.04031293	0.06314546	0.05506694	0.02890882	0	0.07165797	0	0.00605633	0	0.09585066
Trigger.4	0.04201798	0	0.01817677	0.03355766	0.0523879	0.01891043	0.04689287	0	0.000644	0	0.16118142
Trigger.5	0.05587485	0	0.00689638	0.0826807	0	0.04667372	0.03054725	0	0.0104207	0	0.18225439
Trigger.6	0.05002069	0	0.04234867	0.11398403	0.0195204	0.01450897	0.10300227	0	0	0	0.17842364
Trigger.7	0.0470788	0	0.01880842	0.08790632	0.00180696	0.0491788	0.04007612	0	0.02279374	0	0.20235531
Trigger.8	0	0.03813611	0.02792645	0.06800773	0.03452333	0.05125282	0.0600288	0	0	0	0.14183689
Trigger.9	0.00996495	0.02904473	0.02175606	0.13529386	0.01265305	0.03070785	0.01310796	0	0.01487963	0	0.15194444
Trigger.10	0.00407496	0.01864547	0.04775074	0.12088232	0	0.01668627	0.07806859	0	0.02189561	0	0.21369937
Trigger.11	0.05393042	0	0.00843116	0.1867295	0.00498102	0.07702675	0.02644621	0	0.04059496	0	0.22881755
Trigger.12	0.00160212	0.04447209	0.03532106	0.00142125	0.06982923	0.01777893	0.02812897	0	0	0.01919103	0.0822838
Trigger.13	0.03344409	0.02827096	0.0171886	0.03955889	0.04233289	0.04246128	0.01869296	0	0.00227337	0	0.13047548
Trigger.14	0.04766246	0	0.01717992	0.02828547	0.04363265	0.00693698	0.07326468	0	0.01809493	0	0.13525002
Trigger.15	0.07295392	0	0.00994216	0.08181494	0.05424306	0.04234271	0.01695763	0	0.0373697	0	0.18322007
Trigger.16	0.01160446	0.00138056	0.00289352	0.08207534	0	0	0.05938633	0	0	0	0.17789663
Trigger.17	0.05203514	0	0	0.05238946	0.04711042	0.0472591	0.02793374	0	0	0	0.11670107

Table C.2. Blood immune cell fraction (Cont.)

Mixture	B cells naive	B cells memory	Plasma cells	T cells CD8	T cells CD4 naive	T cells CD4 memory resting	T cells CD4 memory activated	T cells follicular helper	T cells regulatory (Tregs)	T cells gamma delta	NK cells resting
Trigger.18	0.05101799	0	0.07350947	0.05033544	0.06650366	0	0.06929819	0	0.03389516	0	0.07179758
Trigger.19	0.10381389	0	0.01302813	0.14120221	0.09552188	0.03026604	0.03681958	0	0.03142275	0	0.13377622
Trigger.20	0.01153156	0.00143471	0.00947407	0.15699843	0.04082	0.01594455	0.05243643	0	0.01023866	0	0.26082223
Trigger.21	0.02979064	0.00591509	0.02896005	0.05052058	0.03853388	0.0212474	0.0499877	0	0.00999224	0	0.10975748
Trigger.22	0.02870913	0.001053	0.01093424	0.09665167	0	0.00800675	0.03406084	0	0.0258736	0	0.11846652
Trigger.23	0.02330688	0.00417605	0.00386475	0.08242301	0	0.0324594	0.02094019	0	0	0	0.08805423
Trigger.24	0.08277542	0	0.01648415	0.13156277	0.04203426	0	0.03023646	0	0.03591786	0	0.18390368
Trigger.25	0.0915612	0	0.01742882	0.12117376	0	0.02750252	0.00489091	0	0.07472302	0	0.06176254
Trigger.26	0.00590783	0.00844271	0.0699458	0.10341953	0.00894413	0.04664945	0.09230167	0	0.02343073	0	0.16377668
Trigger.27	0.05343251	0	0.00585385	0.14106715	0	0.03475452	0.01906545	0	0.04582416	0	0.20303672
Trigger.28	0.03840426	0.0054407	0.0657052	0.08493013	0.02604236	0.02033953	0.07175244	0	0.00712275	0	0.12395207
Trigger.29	0.03993031	0.03333158	0.05095474	0.00127551	0.03135604	0.02505058	0.02112605	0	0	0	0.09385582
Trigger.30	0.01719121	0	0.0356908	0.04854778	0.02913472	0.02002955	0.02438024	0	0.02275981	0	0.12062552
Trigger.31	0.02197557	0.01082659	0.01339863	0.05719721	0.03070487	0.00964002	0.01846587	0	0.01863659	0	0.134245
Trigger.32	0.01716131	0.00091459	0.01496278	0.03199615	0.04060112	0	0.04643679	0	0.00611944	0	0.09450653
Trigger.33	0.05564959	0	0.02161423	0.10787536	0.0490074	0	0.04325499	0	0.03933672	0	0.20408257
Trigger.34	0.07094807	0	0.06205875	0.0445637	0.02076756	0.04724597	0.02198738	0	0.02608972	0	0.13651807
Trigger.35	0.0342018	0.00905246	0.02514697	0.08007726	0	0.06808158	0.03870881	0	0.02668943	0	0.16073254
Trigger.36	0.0055643	0.00180988	0.00511419	0.01676146	0.00864971	0.02100746	0.02857401	0	0.00452879	0	0.10767547
Trigger.37	0.01103638	0.0068293	0.01410388	0.05680659	0.04093447	0.0427244	0.02213794	0	0.00019687	0	0.18017463



Table C.2. Blood immune cell fraction (Cont.)

Mixture	NK cells activated	Monocytes	Macrophages M0	Macrophages M1	Macrophages M2	Dendritic cells resting	Dendritic cells activated	Mast cells resting	Mast cells activated	Eosinophils	Neutrophils
NonTrigger.20	0	0.3389889	0	0	0	0	0.00016429	0.01243631	0	0	0.19670048
NonTrigger.21	0	0.21811517	0.01172709	0	0	0	0	0.00141971	0	0	0.2818667
NonTrigger.22	0	0.18383305	0	0	0.00093442	0	0.00228701	0.03105146	0	0	0.38564836
NonTrigger.23	0	0.21715344	0	0.00314276	0	0	0.00390289	0.00755985	0	0	0.26107188
NonTrigger.24	0	0.27212135	0	0	0	0	0.00335311	0.01001611	0	0	0.09143676
NonTrigger.25	0	0.28131811	0	0	0.00607777	0	0.00140657	0.01956686	0	0	0.32120634
NonTrigger.26	0	0.25900167	0	0	0.00175452	0	0.00253536	0.02211679	0	0	0.25727846
NonTrigger.27	0	0.18172478	0.00756656	0	0	0	0.00795115	0.01327318	0	0	0.25652358
NonTrigger.28	0	0.06880245	0	0	0.01662274	0	0.00878474	0.00826655	0	0	0.66716868
NonTrigger.29	0	0.14301039	0	0	0.03010059	0	0.01014673	0.01777027	0	0.00640803	0.39762608
NonTrigger.30	0	0.25331375	0	0	0	0	0.00490623	0.00849798	0	0	0.41541726
NonTrigger.31	0.00481879	0.18369742	0	0.00109134	0	0	0.00803069	0.01238898	0	0	0.46164702
NonTrigger.32	0	0.1600047	0.01379498	0	0	0	0.01217706	0.00415559	0	0	0.20963183
NonTrigger.33	0	0.21398062	0.0047858	0	0	0	0	0.00944833	0	0	0.25619724
NonTrigger.34	0	0.16350174	0	0	0	0	0.00095719	0.00883388	0	0	0.20385869
NonTrigger.35	0	0.16987447	0	0	0	0	0.00207324	0.00575223	0	0	0.44257202
NonTrigger.36	0	0.14656854	0	0	0	0	0.00197663	0.00962335	0	0	0.41428186
NonTrigger.37	0	0.18843634	0.00125579	0	0	0	0	0.01416641	0	0	0.24104516
NonTrigger.38	0	0.19654145	0	0	0	0	0	0.01054553	0	0	0.18384988
NonTrigger.39	0	0.1604059	0	0	0.00567847	0	0.00280372	0.03570103	0	0	0.55563982
NonTrigger.40	0	0.1584516	0	0	0.01531188	0	0.00982149	0.03556599	0	0	0.30943461
NonTrigger.41	0	0.15810439	0	0	0	0	0.00483194	0.01710004	0	0	0.4318085
NonTrigger.42	0	0.16141487	0	0	0	0	0.00343785	0	0.00184068	0	0.30784883
NonTrigger.43	0	0.11162083	0	0	0	0	0.00086784	0.00494366	0	0	0.37518421
NonTrigger.44	0	0.12713871	0	0	0	0	0.00218884	0.00446341	0	0	0.39989876
NonTrigger.45	0	0.25214645	0	0	0	0	0.00166332	0.00565212	0	0	0.3535467
NonTrigger.46	0	0.15151979	0	0	0	0	0.00480703	0.01848474	0	0	0.53282595

Table C.2. Blood immune cell fraction (Cont.)

Mixture	NK cells activated	Monocytes	Macrophages M0	Macrophages M1	Macrophages M2	Dendritic cells resting	Dendritic cells activated	Mast cells resting	Mast cells activated	Eosinophils	Neutrophils
NonTrigger.47	0	0.1768925	0	0	0.00261839	0	0.00733994	0.00060524	0	0.03873483	0.2430847
NonTrigger.48	0	0.20844795	0	0	0	0	0.00307677	0.01113375	0	0	0.40336234
NonTrigger.49	0	0.11303698	0	0	0	0	0.02123337	0.01670699	0	0	0.67047478
NonTrigger.50	0	0.22720761	0	0	0	0	0.0077763	0.00025624	0	0	0.32916629
Trigger	0	0.17115698	0.01956227	0	0	0	0.01017785	0.0349769	0	0	0.38603495
Trigger.1	0	0.14191726	0	0.00140998	0	0	0	0.01451131	0	0	0.28455743
Trigger.2	0	0.37630097	0.01376367	0	0	0	0.00181885	0.00412244	0	0	0.17812633
Trigger.3	0	0.06464885	0	0	0.02031896	0	0.0125668	0.02120379	0	0	0.51834972
Trigger.4	0	0.23196255	0	0	0	0	0.00406872	0.01475631	0	0	0.37544339
Trigger.5	0	0.1894979	0	0	0	0	0.00113408	0.00973221	0	0	0.3842878
Trigger.6	0	0.26860107	0.00142465	0	0	0	0.00727748	0.01865677	0	0	0.18223135
Trigger.7	0	0.23899697	0	0	0	0	0	0.00898725	0	0	0.28201133
Trigger.8	0	0.25758167	0.01643729	0	0	0	0.00999319	0.0268789	0	0	0.26739682
Trigger.9	0	0.31697681	0.01694345	0	0	0	0.00891005	0.0196783	0	0	0.21813888
Trigger.10	0	0.25520871	0	0.00353379	0	0	0.00143639	0.01281086	0	0	0.20530691
Trigger.11	0	0.1890452	0	0	0	0	0	0.00181021	0	0	0.18218701
Trigger.12	0	0.15863935	0	0	0	0	0.00578177	0.02416857	0	0.01823973	0.4931421
Trigger.13	0	0.16742819	0	0	0.01059008	0	0.00224849	0.01534801	0	0	0.44968672
Trigger.14	0	0.27753872	0	0	0	0	0.00436814	0.01754685	0	0	0.33023917
Trigger.15	0	0.26610653	0	0	0	0	0.00052344	0.02618362	0	0	0.20834221
Trigger.16	0	0.25793477	0	0	0	0	0.00274241	0.0113685	0	0	0.39271747
Trigger.17	0	0.12545008	0	0	0	0	0.00049731	0.01010767	0	0	0.520516

Table C.2. Blood immune cell fraction (Cont.)

Mixture	NK cells activated	Monocytes	Macrophages M0	Macrophages M1	Macrophages M2	Dendritic cells resting	Dendritic cells activated	Mast cells resting	Mast cells activated	Eosinophils	Neutrophils
Trigger.18	0	0.18927009	0.03277524	0	0	0	0.00940333	0.02560646	0	0	0.32658739
Trigger.19	0	0.16083818	0.00154487	0	0	0	0.00125989	0.00938589	0	0	0.24112048
Trigger.20	0	0.16136188	0	0	0	0	0.00278867	0.01779678	0	0	0.25835204
Trigger.21	0	0.43785292	0	0	0	0	0.00272476	0.00971401	0	0	0.20500325
Trigger.22	0	0.33609429	0.00013318	0	0	0	0.00445253	0.01180075	0	0	0.3237635
Trigger.23	0	0.15019685	0	0	0	0	0.00652194	0.01971874	0	0	0.56833797
Trigger.24	0	0.28905153	0	0	0	0	0.00224245	0.01020923	0	0	0.17558219
Trigger.25	0.01702316	0.24246156	0	0	0	0	0	0.03759718	0	0	0.30387532
Trigger.26	0	0.30617898	0.02981721	0	0	0	0.00277477	0.00596831	0	0	0.13244218
Trigger.27	0	0.22438705	0.00208952	0	0	0	0.00103508	0.00158996	0	0	0.26786403
Trigger.28	0	0.09245529	0.03444582	0	0	0	0.00938832	0.01366139	0	0	0.40635974
Trigger.29	0	0.19647421	0.00839563	0	0.00032321	0	0.0018532	0.00615212	0	0	0.48992098
Trigger.30	0	0.29908711	0.01227232	0	0	0	0.00289235	0.00673318	0	0	0.36065541
Trigger.31	0	0.2322105	0	0	0	0	0.0018137	0.01758382	0	0	0.43330163
Trigger.32	0	0.31207274	0.00829191	0	0	0	0.00167215	0.02084214	0	0	0.40442235
Trigger.33	0	0.26175196	0.00043701	0	0	0	0.00161462	0.00458523	0	0	0.21079031
Trigger.34	0	0.26847755	0	0	0	0	0.00317553	0.01895748	0	0	0.27921024
Trigger.35	0	0.22803734	0.00328077	0	0	0	0.00286234	0.01408216	0	0	0.30904655
Trigger.36	0	0.24387347	0.01157061	0	0	0	0.00345331	0.01718944	0	0	0.52422789
Trigger.37	0	0.26661178	0	0	0	0	0.00370211	0.02309558	0	0	0.33164608



Table C 3. Permutational multivariate analysis of variance from lung Immune cell fraction

	Df	SumOfSqs	R2	F	Pr(>F)
condition	2	0.50905383	0.17917632	8.40410463	0.000999
Residual	77	2.33202384	0.82082368	NA	NA
Total	79	2.84107767	1	NA	NA



Table C 4. Post-hoc analysis for permutational multivariate analysis of variance from lung Immune cell fraction

pairs	Df	SumsOfSqs	F.Model	R2	p.value	p.adjusted
Negative vs NonTrigger	1	0.31018652	10.3552867	0.23346229	0.001	0.0015
Negative vs Trigger	1	0.39251683	13.1004805	0.17214715	0.001	0.0015
NonTrigger vs Trigger	1	0.06854233	2.22237406	0.03752592	0.025	0.025



Table C 5. Permutational multivariate analysis of variance from blood Immune cell fraction

	Df	SumOfSqs	R2	F	Pr(>F)
condition	2	0.18962791	0.0653136	3.2493062	0.02297702
Residual	93	2.71371716	0.9346864	NA	NA
Total	95	2.90334507	1	NA	NA



Table C 6. Post-hoc analysis for permutational multivariate analysis of variance from blood Immune cell fraction

pairs	Df	SumsOfSqs	F.Model	R2	p.value	p.adjusted
Negative vs NonTrigger	1	0.02905448	0.9608991	0.01686945	0.356	0.356
Negative vs Trigger	1	0.0791966	3.08190385	0.06545835	0.038	0.057
NonTrigger vs Trigger	1	0.14631905	4.83328775	0.05321053	0.012	0.036



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Table C 7. Lung immune cell fraction comparison (cont.).

cell	Comparison	P.unadj	P.adj
Macrophages.M1	Negative - Trigger	7.41E-08	2.22E-07
B.cells.naive	Negative - Trigger	5.38E-07	1.61E-06
Macrophages.M2	Negative - Trigger	6.30E-06	1.89E-05
Macrophages.M0	Negative - NonTrigger	6.64E-06	1.99E-05
Macrophages.M0	Negative - Trigger	5.17E-05	0.0001034
B.cells.naive	Negative - NonTrigger	0.00049793	0.00099585
Plasma.cells	Negative - Trigger	0.00118184	0.00354552
Mast.cells.resting	Negative - NonTrigger	0.00156647	0.00469941
T.cells.gamma.delta	Negative - Trigger	0.00213696	0.00641087
NK.cells.resting	Negative - Trigger	0.00250597	0.00751792
Plasma.cells	Negative - NonTrigger	0.00376211	0.00752423
Macrophages.M2	Negative - NonTrigger	0.00598874	0.01197747
Dendritic.cells.activated	NonTrigger - Trigger	0.00458247	0.01374742
NK.cells.resting	Negative - NonTrigger	0.00699487	0.01398973
Dendritic.cells.resting	Negative - Trigger	0.00647	0.01941001
Macrophages.M1	Negative - NonTrigger	0.01139362	0.02278724
Neutrophils	Negative - NonTrigger	0.00835391	0.02506172
NK.cells.activated	Negative - NonTrigger	0.00933131	0.02799394
Eosinophils	Negative - Trigger	0.01462645	0.04387934
T.cells.gamma.delta	NonTrigger - Trigger	0.0238963	0.04779261
T.cells.CD4.memory.activated	Negative - Trigger	0.01683852	0.05051555
Macrophages.M1	NonTrigger - Trigger	0.05584914	0.05584914
Mast.cells.resting	NonTrigger - Trigger	0.05885988	0.05885988
NK.cells.activated	Negative - Trigger	0.02980911	0.05961821
T.cells.CD4.memory.resting	Negative - Trigger	0.02139231	0.06417694
T.cells.CD8	NonTrigger - Trigger	0.02494244	0.07482733
T.cells.CD4.naive	Negative - NonTrigger	0.0375669	0.07513379
T.cells.CD4.naive	Negative - Trigger	0.02982973	0.08948919
T.cells.CD8	Negative - Trigger	0.04576707	0.09153414
B.cells.memory	Negative - Trigger	0.03647321	0.10941964
Neutrophils	NonTrigger - Trigger	0.05515534	0.11031068
Mast.cells.resting	Negative - Trigger	0.05734253	0.11468505
Dendritic.cells.activated	Negative - Trigger	0.06358259	0.12716518

Table C 7. Lung immune cell fraction comparison (cont.).

cell	Comparison	P.unadj	P.adj
Macrophages.M0	NonTrigger - Trigger	0.13284669	0.13284669
Monocytes	Negative - NonTrigger	0.05940822	0.17822467
Eosinophils	Negative - NonTrigger	0.09660749	0.19321498
B.cells.memory	Negative - NonTrigger	0.10094994	0.20189988
Neutrophils	Negative - Trigger	0.23016622	0.23016622
T.cells.CD4.memory.resting	NonTrigger - Trigger	0.13262189	0.26524377
Dendritic.cells.activated	Negative - NonTrigger	0.29284324	0.29284324
Monocytes	NonTrigger - Trigger	0.30179891	0.30179891
NK.cells.activated	NonTrigger - Trigger	0.31148622	0.31148622
Dendritic.cells.resting	NonTrigger - Trigger	0.16552311	0.33104622
T.cells.regulatory..Tregs.	NonTrigger - Trigger	0.16581191	0.33162383
T.cells.regulatory..Tregs.	Negative - Trigger	0.11824661	0.35473984
Dendritic.cells.resting	Negative - NonTrigger	0.3628939	0.3628939
Macrophages.M2	NonTrigger - Trigger	0.36880895	0.36880895
T.cells.CD4.memory.activated	Negative - NonTrigger	0.18924583	0.37849166
Monocytes	Negative - Trigger	0.21541294	0.43082588
T.cells.CD4.memory.activated	NonTrigger - Trigger	0.5248082	0.5248082
B.cells.naive	NonTrigger - Trigger	0.61044785	0.61044785
T.cells.CD4.memory.resting	Negative - NonTrigger	0.63462299	0.63462299
T.cells.CD4.naive	NonTrigger - Trigger	0.67137855	0.67137855
T.cells.CD8	Negative - NonTrigger	0.67744988	0.67744988
T.cells.gamma.delta	Negative - NonTrigger	0.68087451	0.68087451
Plasma.cells	NonTrigger - Trigger	0.68983678	0.68983678
NK.cells.resting	NonTrigger - Trigger	0.71270112	0.71270112
Eosinophils	NonTrigger - Trigger	0.7739914	0.7739914
Mast.cells.activated	NonTrigger - Trigger	0.81639172	0.81639172
T.cells.follicular.helper	Negative - Trigger	0.99757793	0.99757793
B.cells.memory	NonTrigger - Trigger	0.99934666	0.99934666
T.cells.follicular.helper	Negative - NonTrigger	0.70425976	1
T.cells.follicular.helper	NonTrigger - Trigger	0.66583249	1
T.cells.regulatory..Tregs.	Negative - NonTrigger	1	1
Mast.cells.activated	Negative - NonTrigger	0.75536868	1
Mast.cells.activated	Negative - Trigger	0.50998031	1

Table 8 blood immune cell fraction comparison (cont.).

Cell	Comparison	P.unadj	P.adj
Plasma.cells	NonTrigger - Trigger	2.612E-06	7.836E-06
T.cells.CD4.naive	Negative - Trigger	1.052E-04	3.157E-04
Monocytes	NonTrigger - Trigger	3.460E-04	1.038E-03
Macrophages.M0	NonTrigger - Trigger	5.933E-04	1.780E-03
T.cells.CD4.memory.activated	NonTrigger - Trigger	2.552E-03	7.655E-03
Monocytes	Negative - Trigger	6.469E-03	1.294E-02
Macrophages.M0	Negative - Trigger	7.619E-03	1.524E-02
Macrophages.M2	NonTrigger - Trigger	6.994E-03	2.098E-02
Macrophages.M2	Negative - Trigger	1.121E-02	2.243E-02
Plasma.cells	Negative - Trigger	1.930E-02	3.860E-02
B.cells.naive	NonTrigger - Trigger	2.725E-02	5.449E-02
B.cells.naive	Negative - Trigger	2.048E-02	6.144E-02
Mast.cells.resting	NonTrigger - Trigger	2.597E-02	7.791E-02
B.cells.memory	NonTrigger - Trigger	3.534E-02	1.060E-01
T.cells.CD4.naive	NonTrigger - Trigger	1.227E-01	1.227E-01
Mast.cells.resting	Negative - NonTrigger	6.738E-02	1.348E-01
T.cells.CD8	NonTrigger - Trigger	4.504E-02	1.351E-01
T.cells.CD4.memory.activated	Negative - Trigger	9.085E-02	1.817E-01
T.cells.CD8	Negative - NonTrigger	1.024E-01	2.048E-01
B.cells.naive	Negative - NonTrigger	2.629E-01	2.629E-01
Macrophages.M2	Negative - NonTrigger	2.863E-01	2.863E-01
Neutrophils	NonTrigger - Trigger	1.258E-01	3.774E-01
Macrophages.M0	Negative - NonTrigger	4.326E-01	4.326E-01
Monocytes	Negative - NonTrigger	4.476E-01	4.476E-01
NK.cells.resting	Negative - NonTrigger	5.567E-01	5.567E-01
Mast.cells.resting	Negative - Trigger	5.764E-01	5.764E-01
T.cells.follicular.helper	NonTrigger - Trigger	1.955E-01	5.865E-01
T.cells.CD8	Negative - Trigger	6.242E-01	6.242E-01
Macrophages.M1	NonTrigger - Trigger	6.274E-01	6.274E-01
Neutrophils	Negative - Trigger	3.310E-01	6.621E-01
T.cells.gamma.delta	NonTrigger - Trigger	7.162E-01	7.162E-01
NK.cells.resting	NonTrigger - Trigger	3.628E-01	7.256E-01
B.cells.memory	Negative - Trigger	7.279E-01	7.279E-01

Table 8 blood immune cell fraction comparison (cont.).

Cell	Comparison	P.unadj	P.adj
Dendritic.cells.activated	NonTrigger - Trigger	7.320E-01	7.320E-01
NK.cells.activated	NonTrigger - Trigger	7.355E-01	7.355E-01
Eosinophils	Negative - Trigger	7.390E-01	7.390E-01
Plasma.cells	Negative - NonTrigger	7.904E-01	7.904E-01
B.cells.memory	Negative - NonTrigger	4.043E-01	8.087E-01
NK.cells.resting	Negative - Trigger	2.806E-01	8.419E-01
Eosinophils	Negative - NonTrigger	4.313E-01	8.627E-01
Neutrophils	Negative - NonTrigger	8.984E-01	8.984E-01
T.cells.follicular.helper	Negative - NonTrigger	4.644E-01	9.288E-01
T.cells.CD4.memory.resting	Negative - Trigger	4.696E-01	9.391E-01
T.cells.CD4.memory.resting	NonTrigger - Trigger	9.718E-01	9.718E-01
T.cells.CD4.memory.activated	Negative - NonTrigger	9.823E-01	9.823E-01
T.cells.regulatory..Tregs.	NonTrigger - Trigger	9.989E-01	9.989E-01
T.cells.CD4.memory.resting	Negative - NonTrigger	4.480E-01	1.000E+00
T.cells.follicular.helper	Negative - Trigger	1.000E+00	1.000E+00
T.cells.regulatory..Tregs.	Negative - NonTrigger	8.763E-01	1.000E+00
T.cells.regulatory..Tregs.	Negative - Trigger	8.795E-01	1.000E+00
T.cells.gamma.delta	Negative - NonTrigger	5.482E-01	1.000E+00
T.cells.gamma.delta	Negative - Trigger	6.990E-01	1.000E+00
NK.cells.activated	Negative - NonTrigger	5.524E-01	1.000E+00
NK.cells.activated	Negative - Trigger	6.930E-01	1.000E+00
Macrophages.M1	Negative - NonTrigger	3.932E-01	1.000E+00
Macrophages.M1	Negative - Trigger	5.706E-01	1.000E+00
Dendritic.cells.activated	Negative - NonTrigger	5.321E-01	1.000E+00
Dendritic.cells.activated	Negative - Trigger	4.231E-01	1.000E+00
Mast.cells.activated	Negative - NonTrigger	6.068E-01	1.000E+00
Mast.cells.activated	Negative - Trigger	1.000E+00	1.000E+00
Mast.cells.activated	NonTrigger - Trigger	3.625E-01	1.000E+00
Eosinophils	NonTrigger - Trigger	4.295E-01	1.000E+00



## Appendix D

Table D1. Lung Reactome signaling in immune system gene net correlation value (Cont.)

Gene	Non-Trigger gene weight	Trigger gene weight
ITK	0.958294346	1.37512403
KLRD1	1.062403936	1.36734235
SIRPG	0.973880061	1.34464583
TLR1	0.886936065	1.32500695
CD48	1.009072029	1.32437175
CD247	1.021955198	1.32073178
CD58	1.132200281	1.30994227
TRAT1	0.807732727	1.28816539
CD200R1	0.896882159	1.27638728
TLR8	1.017300097	1.27338827
CD8A	0.952210876	1.27264601
LCP2	1.074923012	1.27109168
CD180	0.95726653	1.26274508
GRAP2	0.983415093	1.25954072
RIPK3	0.927169997	1.25833968
PIK3C3	1.114730277	1.2451272
LAT	0.864628258	1.2409204
MAP3K1	1.10593194	1.23654156
CD84	0.863621412	1.23170309
CD8B	0.822188692	1.22418955
CD28	0.959481028	1.22266341
PTPRC	1.142289541	1.22086032
ICOS	1.023359485	1.22058274
ITGB7	1.00803179	1.21950133
LYN	0.949023601	1.21468489
CD3G	0.910270708	1.21145897
CD3D	0.903866557	1.21078622
CD86	0.798972264	1.20647808
LILRB3	0.891676374	1.20617027
SLC7A7	0.863069729	1.20547201

Table D1. Lung Reactome signaling in immune system gene net correlation value (Cont.)

Gene	Non-Trigger gene weight	Trigger gene weight
KIR2DL4	0.87539874	1.20043279
KIR2DL3	0.79522497	1.19980928
GP6	0.89852746	1.1954463
ITGA4	0.99009813	1.19250402
IKBKB	1.09388082	1.18633247
VCAM1	0.94814082	1.17710915
TLR2	1.23753873	1.17410296
PROS1	0.99004639	1.17096198
PDCD1	0.65883592	1.17018868
CD2	0.99356008	1.167058
TLR7	0.7594671	1.16684476
VAV1	1.06721662	1.16653125
LCK	1.0155786	1.16322603
TLR5	0.70284343	1.15908703
CD80	0.65306605	1.15798033
MAP2K1	1.10298664	1.15657308
ITGAL	0.92365117	1.15651545
MAP2K2	0.91056955	1.15126666
SRC	0.96903231	1.15007546
INPP5D	1.15756959	1.14988251
MAP2K4	0.70171267	1.1498726
TLR6	0.89603955	1.14847997
KLRK1	0.73884008	1.14841188
SELL	0.97882233	1.14811388
HCST	0.92051886	1.14217922
CD226	0.97998	1.14189949
MALT1	0.90434051	1.14172742
MASP1	0.76051023	1.14100161
SELPLG	0.99960238	1.13895296
CD160	0.89989887	1.13708066
RPS6KA2	1.08331235	1.13511147
L1CAM	0.76352313	1.13447233
FCER1G	1.157307	1.12871211
TLR10	0.88616269	1.1280656

Table D1. Lung Reactome signaling in immune system gene net correlation value (Cont.)

Gene	Non-Trigger gene weight	Trigger gene weight
TEK	1.06574466	1.12754079
ITGAX	1.0711363	1.12654168
SLC7A10	1.000039	1.12147345
KRAS	1.05799953	1.12001935
RIPK1	1.1818349	1.1198224
KIR3DL1	0.88585459	1.11976492
HLA-DOB	0.95761817	1.1188236
KLRC1	1.03810056	1.11865304
IRAK3	1.19293467	1.11770103
AKT1	0.80814616	1.1106382
RPS6KA5	1.09641517	1.11009286
TREM1	0.87870744	1.10219273
APOB	0.91289352	1.1003422
FYN	1.13173826	1.1000018
GAS6	0.89572916	1.09817487
ECSIT	1.09106231	1.09760139
HLA-DMA	0.9837912	1.09636144
FCGR3A	1.10515896	1.09568465
MAPK8	1.12482809	1.09416005
HLA-B	1.36745232	1.09132624
CD177	1.13763491	1.08967317
NFKBIB	0.82495322	1.08958137
THEM4	1.02644153	1.08954088
MAP2K3	0.83423523	1.08808355
MADCAM1	0.69911039	1.08773455
KIR3DL2	0.77510841	1.08698292
LY86	0.76106322	1.08510885
LILRA1	0.87568039	1.08472516
CREB1	0.88720993	1.08230721
FCGR2B	1.08126188	1.07591214
KIR2DL1	0.66925678	1.07539712
NFKB1	0.90921792	1.07471071
ANGPT4	1.00573241	1.07435522
LILRB4	1.00332269	1.07410825
C1QB	0.99574771	1.07401304

Table D1. Lung Reactome signaling in immune system gene net correlation value (Cont.)

Gene	Non-Trigger gene weight	Trigger gene weight
SLC16A3	1.03725431	1.07263202
ATF2	1.09853669	1.07251688
PIK3CA	1.0458327	1.06594128
MAG	1.0937247	1.0617096
GRB2	0.95247312	1.06099751
PRKCQ	0.7596139	1.06070146
PLCG1	0.98269541	1.05931961
MAPKAPK3	0.95047668	1.05870657
GRB7	0.73362893	1.05810707
ULBP1	0.97850116	1.05468605
CD40	0.91691492	1.05438272
PECAM1	1.19941357	1.0516109
SLC7A6	1.04326047	1.05061409
MAPK11	0.89056088	1.05036031
TAB2	1.03369494	1.04972251
MAP3K14	0.71141898	1.04664388
HLA-DOA	1.06335733	1.04584633
UBE2N	0.79928043	1.04540027
MAPK1	0.9787495	1.0452455
WAS	1.12070713	1.04372549
CARD11	0.99352605	1.04122392
EEA1	1.17092112	1.03916118
SLC16A1	0.8248167	1.03833218
PDPK1	1.00695522	1.03581524
HLA-DRA	1.03785406	1.03576478
MEF2A	1.29157039	1.03282416
TLR3	0.80449421	1.03011027
C1QA	0.93822497	1.03003153
HLA-C	1.34308909	1.02700267
TAB1	1.16435959	1.02595564
MAPK3	1.1103204	1.02356564
ATP1B2	1.14207516	1.02287951
HLA-DQA1	1.07205151	1.02232126
PIK3R2	1.1358905	1.02198564
CD274	1.0367351	1.02146775

Table D1. Lung Reactome signaling in immune system gene net correlation value (Cont.)

Gene	Non-Trigger gene weight	Trigger gene weight
SOS1	1.06647828	1.0214609
KLRG1	0.77596112	1.01513081
VASP	1.00864564	1.01474143
TYROBP	0.85692751	1.01342467
MAP3K8	1.05537253	1.0131363
BTLA	0.88666844	1.01128042
LILRB1	0.98072064	1.00901976
CTLA4	0.97047438	1.00840755
PPP2CA	1.07397021	1.00723351
NFKBIA	1.06228837	1.00705521
RPS6KA1	1.04047166	1.00594762
CD3E	0.97801917	1.0056908
IKBKE	1.03666266	1.00560265
CD47	1.14566111	1.00489707
IGLV5-37	0.66858849	1.00478997
IRAK1	0.93181909	1.00278881
HLA-G	1.01318665	1.00114182
PTPN6	0.9597647	1.0005051
C6	0.88900096	1.00046067
DUSP4	1.00671581	1.00018765
ITGA3	1.15729464	0.9999791
LBP	0.85975171	0.99915119
CD244	0.97745784	0.99839747
MAPK9	0.85935703	0.99769943
MAPK7	1.18896789	0.9968478
JAM2	1.10462246	0.99528664
HLA-DMB	1.14793155	0.99496511
ITGB2	0.84317146	0.99309302
HLA-DPB1	0.96698366	0.99289735
DUSP6	1.02696928	0.99280786
HLA-F	1.15228629	0.99091297
CRTAM	0.96932492	0.98902853
AKT3	1.07663478	0.98793742
BCL10	1.22966591	0.98754399
ITGB1	1.24489413	0.98722866

Table D1. Lung Reactome signaling in immune system gene net correlation value (Cont.)

Gene	Non-Trigger gene weight	Trigger gene weight
TBK1	1.04948373	0.98566404
CFD	0.77090388	0.98531979
MAP2K6	0.64155494	0.98440655
PROC	0.80036646	0.98386128
ZAP70	1.02560176	0.98043958
ITGAM	0.77893625	0.97922673
MERTK	0.97753014	0.97912995
NFKB2	0.93362393	0.97792383
TNFRSF14	0.90962623	0.97672443
TICAM1	0.95697777	0.9745259
HLA-DPA1	0.95214769	0.97403405
C4A	0.85057078	0.97333153
CAV1	1.19200656	0.97282132
SLC7A11	1.10924705	0.97177679
MAPK10	1.23019137	0.97166301
AKT2	1.00326771	0.97076468
ICAM2	0.81480795	0.96985874
CXADR	0.97143822	0.9678341
ELK1	1.00083184	0.96301744
PAG1	1.12895179	0.96268386
TLR4	0.93762639	0.96165129
SLC7A8	1.13799694	0.9599529
SPN	0.76474496	0.95807201
CD34	0.96030337	0.95386807
HLA-DRB1	1.10192566	0.95376086
ITGA6	1.09827717	0.94959242
THBD	1.12417874	0.94862266
C8A	1.1191869	0.94780812
CD96	0.93274033	0.94724215
IGHV3-23	1.08768923	0.94619377
CD4	0.98919599	0.94239591
ESAM	0.82787758	0.94176772
PDCD1LG2	0.70795072	0.94099983
BSG	0.95869513	0.93887352
IGLV3-25	1.07848912	0.93859521

Table D1. Lung Reactome signaling in immune system gene net correlation value (Cont.)

Gene	Non-Trigger gene weight	Trigger gene weight
CD81	1.00636868	0.93840181
DUSP7	1.04519726	0.93811617
RAET1E	1.00165685	0.93715459
CHUK	1.06572032	0.93628378
PIK3R4	1.14873738	0.93621617
PPP2R5D	1.22107369	0.93619474
IGLV4-69	1.03925622	0.93618176
C1QC	1.09249555	0.93337683
CD19	1.01429663	0.932555
SLC3A2	1.09939021	0.93223906
C9	0.65047034	0.93114309
HLA-DQB1	1.11523209	0.92712211
IGLC3	1.10353494	0.92584936
TIRAP	0.84380521	0.92569905
ATF1	0.89639689	0.92471287
MAPK14	0.97983828	0.92109004
PPP2R1B	0.89215708	0.92056165
IGLV2-11	1.04739223	0.9200523
C8G	0.64604214	0.91711362
C8B	0.83676733	0.91710488
MAP2K7	0.76826148	0.9164785
HLA-A	1.32128138	0.91474143
RICTOR	1.0375662	0.91392677
IRF3	0.94234722	0.90881473
ANGPT1	1.06875189	0.90837646
PPP2R1A	1.093329	0.90765547
PTPN11	0.95558438	0.9071191
C1S	1.11656625	0.90471006
HLA-E	1.22714123	0.90455382
LILRB5	1.05148534	0.90153563
B2M	1.26802541	0.89959047
SLC7A9	1.07307306	0.89833078
PAK2	1.11021059	0.89823724
YES1	1.00999126	0.89426265

Table D1. Lung Reactome signaling in immune system gene net correlation value (Cont.)

Gene	Non-Trigger gene weight	Trigger gene weight
MBL2	0.67239651	0.88987396
IRAK4	0.8422434	0.88968648
C5	1.14799138	0.88793935
CD200	0.9218229	0.88745516
C1R	1.08859429	0.88738618
C3	1.05264564	0.88491101
CDH1	1.09526636	0.88393908
CD40LG	0.95871807	0.88253318
RBSN	0.92216568	0.8803024
SHC1	0.77696526	0.8792084
PIK3CB	0.8878223	0.87416132
MEF2C	0.92388886	0.87371137
C2	0.82518765	0.87114184
JUN	0.94140139	0.86703627
RAC1	1.27964345	0.86577116
UBE2V1	0.81009638	0.86355157
F11R	0.75835988	0.85457399
PPP2R5B	0.89531257	0.85440221
FOS	0.88203657	0.84709695
ICOSLG	1.09062187	0.84492391
ULBP2	0.87243033	0.84458511
SELP	0.7590867	0.8421542
CSK	1.07351663	0.83940907
PTEN	1.06202559	0.83752422
HLA-DRB5	1.053425	0.83741334
NCK1	0.88639583	0.83532114
JAM3	0.90142519	0.83273887
ANGPT2	0.78330779	0.83147701
GRB14	0.85239831	0.82819238
CFB	0.96409244	0.82763991
NRAS	0.96057175	0.82742261
TICAM2	0.79581563	0.8264978
MYD88	1.11771333	0.82640144
PPP2CB	1.16338312	0.82307585
PAK1	0.76585524	0.82097963



Table D1. Lung Reactome signaling in immune system gene net correlation value (Cont.)

Gene	Non-Trigger gene weight	Trigger gene weight
PVR	0.91169314	0.82014387
RELA	1.02348443	0.81788409
PIK3R1	1.19788126	0.81787944
LILRB2	0.93332609	0.81528978
PPIA	1.04189969	0.81467144
TRAF6	0.89166131	0.81460553
IGKV1-5	1.05769891	0.81037076
LY96	0.96837133	0.80912915
ICAM1	0.86102882	0.80794198
F2	0.64821552	0.80694956
IGLV2-18	0.83551348	0.80524073
ATP1B1	0.8478187	0.80483431
SIRPA	1.16683303	0.80444564
HRAS	0.96202936	0.80391585
COL1A1	0.93746066	0.79646139
PPP2R5C	0.99754866	0.79603756
IGLV8-61	0.8647707	0.7959587
DOK2	1.24663751	0.7946512
MLST8	0.9554808	0.79257176
MASP2	0.71859173	0.78931776
IKBKG	0.91559966	0.78878284
IRF7	0.91150049	0.78456531
MAPKAPK2	0.77305505	0.78420418
SIGIRR	0.75242395	0.78260094
FN1	1.12386791	0.77956171
PPIL2	0.99665827	0.77767551
COL1A2	0.94060772	0.77752619
IGKV4-1	0.93615942	0.7766467
IGLV2-23	1.00492751	0.77405896
TRIB3	1.35690079	0.76657767
IGLV1-44	0.95751748	0.75864933
PPP2R5A	1.01324696	0.75759207
IGLV1-36	0.92668525	0.75649402
DUSP3	1.20417431	0.7530957

Table D1. Lung Reactome signaling in immune system gene net correlation value (Cont.)

Gene	Non-Trigger gene weight	Trigger gene weight
RIPK2	0.861722168	0.751743287
MTOR	0.968602513	0.748972527
CD14	0.942906739	0.745529254
TAB3	1.11506126	0.737356175
EVL	0.945480505	0.735465311
IGLV1-40	0.880150514	0.727982495
MAPKAP1	0.85168964	0.72599084
IGLC2	1.037030828	0.722275844
SLC7A5	1.142210974	0.721324598
TLR9	0.82491657	0.718570936
ICAM3	0.977367834	0.717894853
OLR1	0.925929098	0.714567728
ITGA5	1.265107221	0.712037474
IGLV7-46	0.892560116	0.710392193
ENAH	0.995542511	0.709063772
HLA-DQA2	0.946115206	0.706397896
C7	1.095426797	0.70563891
IGLV7-43	0.678021504	0.700239794
MAP3K7	1.155064371	0.688570006
ITGAV	1.231521363	0.681589849
IGLV4-60	0.813281724	0.675074199
IGKC	0.959596864	0.674924841
IGLV3-27	0.84724321	0.674276323
RPS6KA3	1.060293676	0.664103345
ITGB3	0.810180751	0.64825014
PF4	0.960445789	0.641422793
ULBP3	1.225930928	0.636553988
IFITM1	1.09894557	0.622976738
CDC42	0.8222621	0.578627227
ATP1B3	1.232801675	0.567650674
IGLV10-54	0.941394679	0.563834541
MMP1	0.782292709	0.557975139
IGLV3-16	0.847065024	0.551753149
MICB	1.370753328	0.550391222
IGLV5-45	1.098152197	0.541567064
UBB	1.3829163	0.510596621
ICAM4	0.832946326	0.458024658

Table D2. Lung KEGG TGF beta signaling pathway gene net correlation value (Cont.)

Gene	Non-Trigger gene weight	Trigger gene weight
EP300	1.01536945	1.29836605
TGFB1	1.11675013	1.29002083
RPS6KB1	0.93643973	1.27832632
ROCK1	1.27524934	1.27370253
PPP2CA	1.22578584	1.27183727
ACVR2A	0.84399613	1.26554441
SP1	1.18068682	1.22207975
ZFYVE16	1.10833544	1.20981666
AMH	0.68935089	1.18120588
ID3	0.89535432	1.17884023
SKP1	1.05083177	1.16689792
MAPK1	1.07667571	1.1639276
TFDP1	0.89697695	1.15276843
SMAD7	0.79205069	1.15010076
ACVRL1	1.06368459	1.13608668
SMURF1	0.90518059	1.13499016
SMURF2	1.11330407	1.13413746
CUL1	0.9710847	1.12972325
RPS6KB2	0.95357885	1.1292206
INHBE	0.71591192	1.12139249
BMPR1A	0.86748196	1.10593536
TGFBR2	0.95495246	1.10220913
ROCK2	1.29312813	1.08955013
RBL1	1.00055879	1.08851417
TGFB2	0.91256453	1.08032035
RBL2	1.01678506	1.06338003
AMHR2	1.03827301	1.05868849
GDF6	1.0153616	1.05789244
INHBB	0.91167817	1.05779042
ZFYVE9	0.88141195	1.04819917
BMPR2	1.26323568	1.03800089
RBX1	0.73734612	1.03753481
ACVR1	0.90028729	1.032588
ACVR2B	0.95017585	1.02343201
CDKN2B	0.74306217	1.01735297
ACVR1C	0.89094231	1.00564634
SMAD6	1.08363282	1.00492861
RHOA	1.19791143	0.99874673
E2F5	0.95898333	0.99833711
SMAD2	0.97606626	0.99377813

Table D2. Lung KEGG TGF beta signaling pathway gene net correlation value (Cont.)

Gene	Non-Trigger gene weight	Trigger gene weight
DCN	0.94992436	0.99021457
GDF5	0.85401128	0.98786649
TNF	0.7660122	0.98160208
PPP2R1B	1.02116575	0.97404162
SMAD5	1.22646789	0.96378292
CREBBP	0.87020303	0.9635913
PPP2R1A	1.00054127	0.95182195
BMP8B	0.88192534	0.94127468
SMAD9	0.80675142	0.92509872
LEFTY2	1.02166983	0.91849513
BMPR1B	0.87553658	0.90726009
ID2	1.07159631	0.90521204
THBS3	1.00134846	0.90257561
MAPK3	1.08197087	0.89841795
INHBC	1.02791176	0.88522254
BMP4	1.0289328	0.88424212
CHRD	0.87994143	0.88129706
ID4	0.92347764	0.87495575
BMP6	1.21796452	0.84591449
PPP2CB	1.14353368	0.84470582
BMP5	0.88705628	0.83566554
LTBP1	1.00987065	0.83348806
SMAD3	0.7157377	0.82627039
FST	0.87462074	0.82208805
SMAD4	0.97645233	0.78949484
THBS1	1.15202942	0.77745216
TGFBR1	1.03093479	0.76598937
INHBA	0.80559594	0.76502366
COMP	1.03606074	0.76091662
E2F4	0.98095182	0.75482033
GDF7	1.03128916	0.75246596
THBS2	1.09719217	0.72599878
IFNG	0.71111331	0.72216139
NOG	0.59673485	0.7056404
BMP7	0.90933953	0.68981524
SMAD1	1.1644632	0.68499271
ID1	1.08388512	0.68199239
MYC	0.95760348	0.6713048
THBS4	1.00186548	0.58420901
TGFB3	1.09894565	0.54311143
BMP2	0.98081308	0.53981603
BMP8A	1.10735953	0.53947938

Table D3. Blood Reactome Complement Cascade gene net correlation value (Cont.)

Gene	Non-Trigger gene weight	Trigger gene weight
C1QA	0.442465072	1.006701337
C1QB	0.408926539	1.180462314
C1QC	0.510774917	1.103909655
C1R	0.436616976	0.340668594
C1S	0.319866109	0.535755489
C2	0.408583479	0.858173386
C3	0.494464033	0.422798448
C4A	0.646000905	0.294436593
C5	0.562584935	0.261403092
C8G	0.405251431	0.291875499
C9	0.309164487	0.550695451
CFB	0.374797714	0.46599897
CFD	0.50594511	0.405104008
IGHV3-23	1.159112916	1.353154061
IGKC	1.608402273	1.41332885
IGKV1-5	0.560115223	1.001736613
IGKV4-1	0.892029784	1.10615437
IGLC2	1.745151897	1.455775718
IGLC3	1.479591926	1.16876121
IGLV1-36	0.794098481	1.345297024
IGLV1-40	1.16608645	0.912187461
IGLV1-44	1.369375527	1.29303657
IGLV10-54	0.485160294	0.413366738
IGLV2-11	0.680212424	1.059608077
IGLV2-18	0.658829607	1.178293792
IGLV2-23	1.063949509	0.500042249
IGLV3-12	0.43949036	0.197350697
IGLV3-16	1.119174734	1.002728482
IGLV3-22	0.646643012	0.906115591
IGLV3-25	1.379114499	1.380646183
IGLV3-27	1.316499758	0.701689356
IGLV4-3	1.122412663	1.391465536
IGLV4-60	0.427472031	0.376298154
IGLV4-69	1.083147214	0.537144368
IGLV5-37	0.365094556	0.686028429
IGLV5-45	1.307605397	0.408445669
IGLV7-43	0.342412951	0.893596165
IGLV7-46	1.183299756	1.14910823
IGLV8-61	0.847319397	0.551474714
MASP2	0.464081374	0.432405349

**VITA**

**NAME** Bayu Cakra Buana

**DATE OF BIRTH** 06 May 1994

**PLACE OF BIRTH** Jakarta

**INSTITUTIONS  
ATTENDED** Chulalongkorn University  
IPB University

**HOME ADDRESS** Taman Dramaga Permai Blok L4. 10, Bogor, West Java,  
Indonesia

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