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Systemic LSD1 inhibition prevents aberrant remodeling of metabolism in obesity

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Abstract

The transition from lean to obese states involves systemic metabolic remodeling that impacts insulin sensitivity, lipid partitioning, inflammation, and glycemic control. Here, we have taken a pharmacological approach to test the role of a nutrient-regulated chromatin modifier, lysine-specific demethylase (LSD1), in obesity-associated metabolic reprogramming. We show that systemic administration of an LSD1 inhibitor (GSK-LSD1) reduces food intake and body weight, ameliorates non-alcoholic fatty liver disease (NAFLD), and improves insulin sensitivity and glycemic control in mouse models of obesity. GSK-LSD1 has little effect on systemic metabolism of lean mice, suggesting LSD1 has a context-dependent role in promoting maladaptive changes in obesity. Analysis of insulin target tissues identified white adipose tissue as the major site of insulin sensitization by GSK-LSD1, where it reduces adipocyte inflammation and lipolysis. We demonstrate that GSK-LSD1 reverses NAFLD in a non-hepatocyte-autonomous manner, suggesting an indirect mechanism potentially via inhibition of adipocyte lipolysis and subsequent effects on lipid partitioning. Pair-feeding experiments further revealed that effects of GSK-LSD1 on hyperglycemia and NAFLD are not a consequence of reduced food intake and weight loss.

These findings suggest that targeting LSD1 could be a strategy for treatment of obesity and its associated complications including type 2 diabetes and NAFLD.

Introduction

The root cause of obesity is an imbalance between energy intake and expenditure. The resulting body weight gain is associated with remodeling of systemic metabolism. The metabolic remodeling gives rise to interrelated defects including insulin resistance, ectopic lipid deposition, and chronic, low-grade inflammation (1, 2). These defects predispose people with obesity to more serious chronic diseases including cardiovascular disease, type 2 diabetes (T2D), and nonalcoholic fatty liver disease (NAFLD), which together comprise much of the public health burden of obesity.

Obesity causes insulin resistance in white adipose tissue (WAT) (3, 4), thereby increasing lipolysis and the trafficking of free fatty acids (FFA) from WAT to the liver (5, 6). This oversupply of FFA to the liver contributes to accumulation of triglycerides that promote hepatic steatosis, the defining characteristic of NAFLD (6-8). Systemic insulin resistance caused by obesity increases pancreatic β-cell workload and thereby also predisposes to T2D, which manifests when the β-cell adaptive response fails to produce adequate insulin to meet demand (6, 9). The hyperinsulinemia associated with successful β-cell adaptation promotes lipogenesis in the liver and exacerbates hepatic steatosis, underscoring the systemic nature of metabolic defects in obesity (10, 11). Despite the urgent global need to ameliorate complications associated with obesity, there are few

therapeutic options to treat obesity itself (2). As obesity is a complex multi-organ disease, therapies that address its root cause or simultaneously target the secondary metabolic defects may be necessary to mitigate the associated complications. Unfortunately, current therapeutic efforts for obesity are limited by an incomplete understanding of how the nutrient environment is interpreted by various metabolically relevant tissues to evoke adaptive or maladaptive changes in obesity (12). Overall, there is an unmet need to understand context-dependent regulation of metabolism in the obese compared to the lean state.

Adaptation of systemic metabolism to changing nutrient states involves several layers of regulation that affect the intake, storage, and expenditure of energy. These processes are controlled at the whole-organism level through the endocrine and central nervous systems (13, 14). It is currently unclear whether these systemic controls are augmented by unified tissue-intrinsic mechanisms. One such potential mechanism is the transcriptional regulation of metabolism, which is mediated by transcription factors and coregulators whose functions are coupled to nutrient state (15-19). For example, intermediary metabolites have been shown to regulate the enzymatic activities of several coregulators that modify the epigenome (20, 21). Changes in cellular metabolism lead to altered abundance of substrates for these coregulators, thereby altering their

enzymatic activities to change epigenomic states and gene expression (22). Posttranslational modifications of coregulators in response to hormonal or nutrient signals provide an additional layer of regulation that links coregulator function to nutrient state (15, 17). Genetic inactivation of transcriptional coregulators has revealed pervasive roles for these enzymes in governing nutrient responses of metabolically relevant tissues (15-18, 23-27). For instance, SIN3A is an insulin-regulated corepressor of the glucokinase gene that restrains hepatic lipogenesis in the fasted state. In the absence of SIN3A, the lipogenic effect of insulin is dampened (18). Overall, nutrient regulation confers context-specific functions to transcriptional coregulators, and therefore these enzymes could underlie context-dependent regulatory mechanisms specific to lean or obese states. Given recent drug development efforts to target transcriptional coregulators, understanding how the compendium of these enzymes impacts metabolism could lead to new therapies for metabolic disease.

We and others have identified key roles for lysine-specific histone demethylase 1A (LSD1/KDM1A) in context-dependent regulation of metabolism. The demethylase activity of LSD1 requires flavin adenine dinucleotide (FAD) as a cofactor, linking cellular metabolism to the nutrient environment (26). Given its nutrient responsiveness and broad expression pattern (28), we

reasoned that LSD1 would be well-positioned to mediate systemic changes to metabolism. LSD1 is part of transcriptional complexes in the nucleus that regulate nutrient responses in various cell types including hepatocytes, adipocytes, and pancreatic β-cells (21, 27-32). LSD1 restrains the insulin secretory response by pancreatic β-cells in the fed state (27), whereas in the liver, LSD1 promotes insulin-stimulated lipogenesis in response to feeding (29-31). Furthermore, beiging of WAT during cold exposure requires LSD1 to activate thermogenesis (32, 33). While these studies indicate that LSD1 regulates context-specific functions of several metabolically relevant tissues, it is unknown whether LSD1 is involved in the remodeling of systemic metabolism in response to changing nutrient states.

In the current study, we employed a pharmacological approach to test the role of LSD1 in metabolic remodeling associated with obesity. We show that systemic LSD1 inhibition reduces hyperphagia and weight gain, improves insulin sensitivity, and prevents hyperglycemia in obesity models, while having no discernable metabolic effects in lean mice. Mechanistically, we found that LSD1 inhibition reduces adipose tissue inflammation and ameliorates NAFLD. In intervention studies, we demonstrate that LSD1 inhibition can reverse Western diet-induced weight gain and hyperinsulinemia as well as enhance insulin signaling. Together, our data suggest that LSD1 could

be a therapeutic target in metabolic disease that simultaneously addresses the root cause of obesity and its associated complications.

Methods

Mice

Mice homozygous for the leptin receptor (*BKS.Cg-Dock7^{m} +/+ Lepr^{db}/J*, JAX #000642 thereafter referred to as *db*/*db*) and the respective lean control animals (*db*/+) as well as C57BL/6J mice (JAX #000664) were purchased from The Jackson Laboratory (34, 35). *Lsd1*$^{fl/fl}$ mice (provided by the laboratory of Michael Rosenfeld) (36) were bred with *db*/*db* mice to generate *Lsd1*$^{fl/fl}$ *db*/*db* mice. Liver-specific *Lsd1* deletion was induced by intravenous injection of AAV8-TBG-iCre virus (2.5 x 10^{11} genome copies/mouse). As controls, *Lsd1*$^{fl/+}$*db*/*db* and *Lsd1*$^{+/+}$*db*/*db* mice were injected with the virus in parallel. All mice were housed and bred in vivaria approved by the Association for Assessment and Accreditation of Laboratory Animal Care located in the School of Medicine, UCSD, following standards and procedures approved by the UCSD Institutional Animal Care and Use Committee. Mice were weaned at 4 weeks, maintained on a 12-hour light cycle, and fed ad libitum with water and standard rodent chow (PicoLab® Rodent Diet 20 5053), a Western diet (TD.88137 Envigo Teklad) containing 42 % kcal from fat, or a high fat diet (HFD, D12492 Research Diets) containing 60 % kcal from fat, unless otherwise indicated. Both male and female mice were used for all studies on *db*/*db* mice, male mice only were used for Western diet and HFD

studies. Mice received GSK-LSD1 (500 μg/kg/mouse, Sigma SML1072) or vehicle (0.9% NaCl) daily via intraperitoneal injections. SP2509 (25 mg/kg/mouse, MedChemExpress HY-12636), dissolved in 10% DMSO, 10% Tween80 in PBS, or vehicle (10% DMSO, 10% Tween80 in PBS) were injected intraperitoneally three times per week. Body weight and blood glucose levels were monitored weekly.

Metabolic studies

For glucose tolerance tests (GTT), mice were fasted for 5 h and orally gavaged with 2 mg/g body weight glucose. Plasma glucose levels were measured in blood samples from the tail vein at baseline, 15 min, 30 min, 60 min, 90 min, and 120 min after gavage using a Bayer Contour glucometer (Bayer). For insulin tolerance tests (ITT), an insulin solution (0.8 – 2.0 U/kg body weight) was intraperitoneally injected into fasted (5 h) mice and glucose levels were monitored as described above. For pyruvate tolerance tests (PTT), overnight starved mice (16 h) were intraperitoneally injected with a pyruvate solution (1 mg/g body weight) and plasma glucose levels were analyzed as described above.

ELISA

Plasma insulin levels were measured after 5 h of fasting or before and 10 min after a glucose gavage (2 mg/g body weight) of fasted (5 h) mice via the mouse ultrasensitive or mouse insulin ELISA kit (Alpco). Norepinephrine levels were measure in homogenized WAT samples by ELISA according to the manufacturer's instructions (Abcam).

Acute insulin response

To determine tissues insulin responsiveness, mice were starved overnight (16 h) and intraperitoneally injected with 2.0 U/kg body weight of an insulin solution. Tissues were harvested 15 min after insulin stimulation and flash frozen in liquid N_2. Lysates were then prepared of gWAT, liver, and skeletal muscle and samples were subsequently analyzed via Western blotting.

To measure insulin sensitivity in vitro, differentiated adipocytes were pre-incubated with GSK-LSD1 or veh overnight. The next day, cells were serum starved in Krebs buffer for 2 h and stimulated with 10 mM Insulin for 10 min. Treatment with GSK-LSD1 or veh was continued throughout the experiment. Adipocytes were then washed with ice cold PBS, lysed in RIPA buffer (Thermo Fisher) containing protease inhibitor and phosphatase inhibitor and protein content was

determined using commercial kits. Insulin responsiveness in adipocytes was then quantified by visualizing Akt and p-Akt via Western blotting.

Western blotting

Tissues were homogenized using RIPA buffer (Thermo Fisher Scientific) and freshly added protease inhibitor cocktail (Roche) and phosphatase inhibitor (Sigma). Lysates of gWAT (20 μg), liver (40 μg), and skeletal muscle (40 μg) of *db/db* mice and of liver (30 μg) from *Lsd1*$^{\Delta L}$*db/db* mice were analyzed by SDS-PAGE on 12% Bis-Tris gels with equal amount of protein loading. Proteins were visualized after transfer onto a PVDF blotting membrane (GE Healthcare) and incubation with specific primary antibodies using horseradish peroxidase-conjugated secondary antibodies. Western blot primary antibodies included: rabbit anti-mouse Akt (Cell Signaling Technology, #4691S), rabbit anti-mouse p-Akt Ser473 (Cell Signaling Technology, #4060S), mouse anti-mouse GAPDH (Thermo Fisher, #AM4300), rabbit anti-mouse Hsl (Cell Signaling Technology, # 4107), rabbit anti-mouse p-Hsl Ser660 (Cell Signaling Technology, # 4126), rabbit-anti-mouse LSD1 (Abcam, #17721) and mouse anti-mouse Vinculin (Abcam, #ab18058). Western

blot secondary antibodies included: goat anti-rabbit HRP (Southern Biotech, #4010-05) and ECL sheep anti-mouse (GE Healthcare #NA931V).

Histology

Immunohistochemical analysis were performed on sections of paraformaldehyde-fixed and paraffin-embedded tissues. Histology was performed by the University of California San Diego Histology and Immunohistochemistry core. Routine hematoxylin and eosin (H&E) stain was performed on adipose tissues, liver, and skeletal muscle. The size of adipocytes was determined by quantifying at least 100 adipocytes using ImageJ analysis software (NIH).

To analyze crown-like structures, adipose tissues were stained with rat anti-F4/80 primary antibody (Bio-Rad, #MCA497B) and goat anti-rat HRP polymer (Cell IDX, #AH-100) followed by chromogenic 3,3'-diaminobenzidine (VWR, #95041-478) and counter stained with val hematoxylin (Biocare, #VLT8014G20). Slides were imaged using a slide scanner machine (NanoZoomer, Hamamatsu) and blinded samples were analyzed using ImageJ analysis software (NIH). The number of crown-like structures was quantified on whole tissue sections.

RNA extraction, RT-qPCR, and mRNA-seq library preparation

Total RNA was isolated in Trizol from homogenized tissue and cells and purified using RNeasy columns and Rnase free Dnase digestion according to the manufacturer's instructions (QIAGEN). The quality and quantity of the total RNA was monitored and measured with a NanoDrop (NanoDrop Technologies, Inc. Wilmington, DE) following the manufacturer's instructions. For quantitative PCR analysis, cDNA was synthesized using the iScript™ cDNA Synthesis Kit (Bio-Rad) and 500 ng of isolated RNA per reaction. 20 ng of template cDNA per reaction and iQ™ SYBR® Green Supermix (Bio-Rad) were used for real-time PCR with gene-specific primers (Supplemental Table 1) and *Tbp* as a house keeping gene on a CFX96™ Real-Time PCR Detection System (Bio-Rad).

For mRNA-seq library preparation, total RNA was assessed for quality using an Agilent Tapestation 4200, and samples with an RNA Integrity Number (RIN) greater than 8.0 were used to generate RNA sequencing libraries using the Illumina® Stranded mRNA Prep (Illumina, San Diego, CA). For each sample, 500 ng of RNA was processed following manufacturer's instructions. Resulting libraries were multiplexed and sequenced with 100 base pair Paired End reads (PE100) to a depth of approximately 50 million reads per sample on an

Illumina NovaSeq 6000. Samples were demultiplexed using bcl2fastq Conversion Software (Illumina, San Diego, CA).

mRNA-seq data analysis

mRNA-seq reads were mapped to the NCBI37/mm9 (mouse) genome by STAR (STAR-STAR_2.4.0f1, --outSAMstrandField intronMotif --outFilterMultimapNmax 1 --runThreadN 5), excluding reads mapping to multiple loci. Genes with mean RPKM $\geq$ 1 in at least one experimental group were considered to be expressed (total of 15,224 genes), and all non-expressed genes were excluded from downstream analyses. Cuffdiff was used to assess expression differences for all pairwise comparisons, with $p<0.01$ considered significant. For volcano plots, *P*-values = 0 were graphed as 0.00001. K-means clustering was performed using R. All differentially expressed genes identified in this study are listed in Supplemental Table 2A-C.

Gene ontology

Functional categories related to differentially expressed genes and links between each pair of categories were identified with Metascape as described in http://metascape.org/. All gene ontology

(GO) terms enriched among differentially expressed genes are listed in Supplemental Table 2D,E. Statistically enriched pathways from KEGG, Reactome, and GO (Biological Process) were hierarchically clustered into a tree based on Kappa-statistical similarities among their gene memberships. A 0.3 kappa score was applied as the threshold to define clusters, each of them representing a group of similar functional categories. A subset of representative terms from each cluster was automatically selected by Metascape and converted into a network, where terms with similarity > 0.3 are connected by edges. Specifically, terms with the most significant *P*-values from each of the clusters were depicted as network nodes, with the constraint of having a maximum of 15 terms per cluster and 250 terms in total, with node size representative of the degree of enrichment. For clarity, a representative term was selected to represent each cluster.

Lipolysis and Hsl phosphorylation in primary adipocytes

Lipolysis was measured in differentiated adipocytes derived from the stromal vascular fraction of subcutaneous white adipose tissue (sWAT). In detail, sWAT harvested from 5-week-old *db*/*db* mice was minced and digested with collagenase D (2.5 mg/mL, Sigma) for 30 min shaking at 37˚C. The digestion was stopped by adding 10 mL culture medium (DMEM/F12 containing 10% FBS,

100 units/ml penicillin, and 0.1 mg/ml streptomycin) and the homogenate was filtered through a 100 μm cell strainer. After a 5 min centrifugation at 500 x g, the pellet containing the stromal vascular fraction was collected and incubated with erythrocyte lysis buffer for 5 min at room temperature. Next, the stromal vascular fraction was precipitated, and the cell pellet was then resuspended in culture medium and seeded into a T75 flask.

Once the pre-adipocytes reached 80% confluency, the cells were seeded into 12-wells and grown to confluency. Adipocyte differentiation was induced by adding 0.1 μM dexamethasone, 450 μM isobutylmethylxanthine, 2 μg/mL insulin, and 1 μM rosiglitazone (day 0). After 3 days, the medium was changed to culture medium containing 2 μg/mL insulin and 1 μM rosiglitazone. On day 5, the medium was changed to culture medium and the adipocytes were grown for another two days.

Differentiated adipocytes were pre-incubated with 1 μM GSK-LSD1 or veh overnight. The next day (day 7), adipocytes were serum starved in DMEM containing 2% fatty acid free BSA supplemented with 10 μM isoproterenol or control. After 1 h, the incubation media was replaced, and the release of fatty acids (Wako chemicals) and glycerol (Sigma) was determined after 4h. Hsl phosphorylation was assessed by Western blotting in adipocytes harvested after 1 h of

isoproterenol treatment. Treatment with GSK-LSD1 or veh was continued throughout the experiment. Data were normalized to cellular protein content as described above.

Lipid and metabolic analysis

Lipid levels were analyzed in plasma and liver samples as previously described (37, 38). Blood was drawn via the tail vein from mice fasted for 5 h. Total cholesterol and triglyceride levels were determined in plasma and liver extracts using commercially available kits (Sekisui Diagnostics). Further, plasma β-hydroxybutyrate (Cayman Chemical), alanine aminotransferase and aspartate aminotransferase (Sigma) levels were determined using enzymatic kits. NEFA (Wako Chemicals) was measured in plasma obtained from overnight fasted mice.

Metabolic cages

To determine energy expenditure and food intake, *db*/*db* mice administered with veh or GSK-LSD1 were placed into metabolic cages. Over a 48 h time frame, carbon dioxide production (VCO_2), oxygen consumption (VO_2), food intake, consumed water, and spontaneous motor activity were analyzed using the Comprehensive Laboratory Monitoring System (CLAMS,

Columbus Instruments) at the University of California San Diego Animal Phenotyping Core. The respiratory quotient was calculated as the ratio of VCO_2 to O_2.

Pair-feeding study

A pair-feeding experiment was performed on 4-week-old, individually housed *db*/*db* mice (both males and females), which were randomly assigned to the respective treatment groups. To establish pair-feeding conditions, a group of mice were administered with GSK-LSD1 as described above and fed a normal chow diet ad libitum. Food intake was measured daily between 4 and 6 pm and the average daily food consumption was calculated across all mice in this treatment group with separate calculations for male and female mice. Next, the vehicle treated pair-fed mice were provided with the calculated average amount of food consumed by the GSK-LSD1 treated mice over the last 24 h. This procedure was then continued daily for 6 weeks. Leftover food of the pair-fed group, if any, was weighted and removed from the cage before new food was added. As a control group, vehicle administered *db*/*db* mice were fed normal chow diet ad libitum for 6 weeks.

Glucose production in primary hepatocytes

Primary hepatocytes were isolated from 5-week-old *db*/*db* mice by perfusion of the liver with EDTA to dissociate the cells, followed by Percoll centrifugation as described (39). Hepatocytes were seeded into collagen-coated 12-well plates at 300.000 cells/well, cultured in DMEM containing 10% FBS, 100 units/mL penicillin, and 0.1 mg/mL streptomycin and pre-incubated with 1 μM GSK-LSD1 or veh overnight. The next day, hepatocytes were serum starved in Krebs buffer (125 mM NaCl, 4 mM KCl, 1 mM $CaCl_2$, 1 mM $MgCl_2$, 0.85 mM KH_2PO_4, 1.25 mM Na_2HPO_4, 15 mM $NaHCO_3$, 10 mM HEPES, 0.2% fatty acid free BSA) for 1h and gluconeogenesis was stimulated by adding 1 mM pyruvate and 10 mM lactate. After 2h, glucose production was measured using the HK assay kit (Sigma). Cells were lysed in RIPA buffer (Thermo Fisher) containing protease inhibitor and phosphatase inhibitor and protein content was determined using commercial kits.

Statistics

Statistical analyses were performed using GraphPad Prism 8 (GraphPad Software). Normality was tested via Shapiro-Wilk test and F-tests were performed to analyze equal variances. Data that passed both tests were analyzed by two-tailed Student's t-test for two-group comparisons and one-

way ANOVA for comparison of multiple groups (> 2) followed by Tukey's post hoc testing. For data with multiple variables, e.g. glucose measurements over time, a two-way ANOVA for repeated measurements followed by Tukey's post hoc test or Fisher Least Significant Difference post hoc testing was performed. All data are presented as mean ± SEM. *P* values less than 0.05 were considered significant.

Study approval

All mouse experiments were approved by the UCSD Institutional Animal Care and Use Committee (IACUC).

Data and Resource Availability

mRNA-seq data have been submitted to GEO. All other data generated or analyzed in this study are included in the published article (and its Supplemental Material online). No applicable resources were generated or analyzed during the current study.

Results

LSD1 inhibition prevents hyperglycemia in db/db mice

To investigate whether LSD1 contributes to metabolic dysfunction in obesity, we studied the effect of systemic LSD1 inhibition in *db*/*db* mice. Four-week-old *db*/*db* mice and lean *db*/+ control mice were injected daily with GSK-LSD1, an LSD1 inhibitor, or vehicle (veh) and metabolic parameters were monitored longitudinally for six weeks (**Figure 1A**). As expected (40), veh-treated *db*/*db* mice rapidly gained weight and became hyperglycemic around six weeks of age (**Figure 1B**). GSK-LSD1 reduced body weight gain of *db*/*db* mice (**Figure 1B**). Remarkably, blood glucose levels of GSK-LSD1-treated *db*/*db* mice were comparable to levels in lean control mice (**Figure 1C**). GSK-LSD1-treated *db*/*db* mice also exhibited improved glucose tolerance (**Figure 1D**). Notably, GSK-LSD1 had no effect on body weight or blood glucose levels in lean *db*/+ mice (**Supplemental Figure 1A** and **B**), suggesting that LSD1 regulates maladaptive changes to metabolism in obesity. Together, these findings show that systemic LSD1 inhibition with GSK-LSD1 prevents development of diabetes in *db*/*db* mice, a model of obesity and T2D. Supporting these findings, similar effects were observed using the structurally distinct LSD1 inhibitor SP2509 (**Supplemental Figure 1C-G**).

To identify mechanisms leading to improved glycemic control after GSK-LSD1 treatment, we measured plasma insulin levels and performed insulin and pyruvate tolerance tests in veh- and GSK-LSD1-treated *db/db* mice. Fasting plasma insulin levels were significantly reduced after three and six weeks of GSK-LSD1 treatment (**Figure 1E**). Moreover, GSK-LSD1-treated mice showed a two-fold increase in plasma insulin levels after glucose stimulation compared to baseline, whereas glucose stimulation did not significantly increase insulin levels in the veh group (**Figure 1F**), indicating improved coupling of insulin secretion with blood glucose following LSD1 inhibition. Insulin tolerance tests revealed increased insulin sensitivity in the GSK-LSD1 treatment group compared to veh-treated *db/db* mice (**Figure 1G**). Finally, *db/db* mice that received GSK-LSD1 exhibited lower glucose excursions following pyruvate challenge compared to veh-treated mice (**Figure 1H**), suggesting that systemic LSD1 inhibition also reduces hepatic glucose production.

Insulin resistance in peripheral insulin target tissues is a major characteristic of obesity (6, 41). We therefore assessed signal transduction downstream of the insulin receptor by measuring p-Akt^{Ser473} in WAT, liver, and skeletal muscle following insulin injection of *db/db* mice. Insulin-stimulated p-Akt^{Ser473} was higher in gonadial white adipose tissue (gWAT) of the GSK-LSD1

group compared to the veh group (**Figure 1I** and **J**). By contrast, LSD1 inhibition had little effect on p-Akt^{Ser473} in skeletal muscle and liver (**Supplemental Figure 2**). These results suggest that systemic LSD1 inhibition improves glucose homeostasis of *db/db* mice in part through enhanced insulin sensitivity of adipose tissue.

LSD1 inhibition reduces adipose inflammation and lipolysis

To examine effects of GSK-LSD1 on adipose tissue, we first measured adipose tissue weight and adipocyte size in gWAT, subcutaneous white adipose tissue (sWAT), and brown adipose tissue (BAT). The tissue weights of gWAT and sWAT were significantly reduced in the GSK-LSD1-treated group, indicating a loss of fat mass following LSD1 inhibition (**Supplemental Figure 3A-C**). The fat mass loss was not a result of reduced adipocyte size (**Figure 2A** and **Supplemental Figure 3D-H**).

A key mechanism leading to impaired insulin sensitivity in WAT is local inflammation (1, 3). WAT inflammation is characterized by infiltration of macrophages, which form crown-like structures (CLS) around dead adipocytes (4, 42) and produce chemokines and cytokines that promote adipose tissue insulin resistance (3, 4). Histological evaluation revealed abundant CLS in

gWAT from veh-treated *db*/*db* mice more so than in sWAT and BAT (**Figure 2A** and **Supplemental Figure 3D** and **E**). CLS were rare in gWAT from GSK-LSD1-treated *db*/*db* mice (**Figure 2A**), suggesting that GSK-LSD1 reduces macrophage accumulation in gWAT. Quantification of macrophages based on staining for the macrophage-specific epitope F4/80 confirmed reduced macrophage numbers in gWAT after GSK-LSD1 treatment (**Figure 2B** and **C**). In line with this result, gene expression studies revealed downregulation of inflammatory genes, such as *interleukin 1β* (*Il1β*) and *interleukin 6* (*Il6)* in gWAT (**Figure 2D**). These observations indicate that LSD1 inhibition decreases adipose inflammation in obesity. Considering the association between inflammation and adipose tissue insulin resistance (3), the reduction of adipose inflammation by GSK-LSD1 could contribute to the improvement in adipose insulin sensitivity (**Figure 1H** and **I**). To determine whether the LSD1 inhibitor has direct effects on insulin sensitivity at the level of adipocytes, we measured insulin-stimulated p-Akt^{Ser473} following GSK-LSD1 treatment in differentiated adipocytes of *db*/*db* mice (**Supplemental Figure 3I-K**). In contrast to our observations in vivo, GSK-LSD1 did not alter insulin signaling in vitro in adipocytes (**Supplemental Figure 3J** and **K**). These data suggest that LSD1 inhibition improves adipose tissue insulin sensitivity indirectly.

Lipolysis is tightly regulated by circulating insulin. WAT insulin resistance is associated with augmented hydrolysis of triglycerides, resulting in increased levels of circulating non-esterified fatty acids (NEFA) (41, 43). To test whether GSK-LSD1 could exert adipocyte-autonomous effects on lipolysis, we pre-incubated differentiated adipocytes from *db/db* mice with GSK-LSD1 or veh and then treated with isoproterenol, which induces lipolysis by activating β-adrenergic signaling. GSK-LSD1 reduced isoproterenol-stimulated FFA release concomitant with a trend towards reduced glycerol release (**Figure 2E** and **F**). Moreover, GSK-LSD1 reduced plasma NEFA levels in *db/db* mice, suggesting that systemic LSD1 inhibition reduces WAT lipolysis in vivo (**Figure 2G**). Importantly, GSK-LSD1 did not change WAT norepinephrine levels, suggesting that the beneficial effects of LSD1 inhibition on adipose tissue lipolysis occur independent of changes in sympathetic tone (**Supplemental Figure 3L**). Together, these observations indicate that LSD1 inhibition corrects several WAT defects associated with obesity including insulin resistance, inflammation, and augmented lipolysis.

To identify potential mechanisms whereby GSK-LSD1 inhibits lipolysis and adipose inflammation, we performed mRNA-seq of gWAT from GSK-LSD1- or veh-treated *db/db* mice as well as veh-treated *db/+* mice as a lean control. Pairwise comparisons between groups yielded

a total of 2,269 genes that were differentially expressed for at least one comparison (p<0.01 by Cuffdiff; **Supplemental Table 2A-C**). Obesity exerted a more prominent effect than LSD1 inhibition, as reflected by 1,777 genes being differentially expressed between *db/db* and *db/+* gWAT compared to 731 genes being altered by GSK-LSD1 treatment in *db/db* mice. K-means clustering of all differentially expressed genes identified several clusters of genes strongly regulated by obesity whose obesity-associated changes were partially reversed by systemic LSD1 inhibition (**Supplemental Figure 4A**). These findings led us to predict that GSK-LSD1 improves adipose tissue function in *db/db* mice by reversing maladaptive transcriptional changes in obesity. LSD1 inhibition resulted in 359 upregulated and 372 downregulated genes (**Supplemental Figure 4B**), of which nearly all were changed in the opposite direction by obesity (**Supplemental Figure 4A**). Gene ontology analysis identified enrichment of inflammation-associated functional categories among genes downregulated by GSK-LSD1 (**Figure 2H, Supplemental Table 2D** and **E**), which included cell surface receptors (e.g., *Ccr5, Cd14,* and *Tlr4*) involved in recruitment and/or activation of immune cells as well as transcription factors downstream of inflammatory signaling pathways (e.g., *Fos*). GSK-LSD1-downregulated genes also included genes with indirect roles in inflammation whose inactivation has been shown to improve adipose tissue function in

obesity. These include enzymes involved in extracellular matrix remodeling (*Mmp14*) (44), activation of lipogenic gene expression (*Cyp1b1*) (45), and repression of insulin signaling (*Ptprj*) (46). As inflammation has been shown to promote lipolysis (47, 48), we predicted that reduced inflammation could underlie effects of GSK-LSD1 on lipolysis. These transcriptional changes could reflect differences in immune cell recruitment (**Figure 2H**) or, alternatively, cell-autonomous roles of LSD1 in adipocytes or the immune cells themselves.To test the possibility that LSD1 directly regulates these genes in adipocytes, we treated adipocytes differentiated from *db/db* mice with GSK-LSD1. GSK-LSD1 did not repress these inflammation genes ex vivo (**Supplemental Figure 4C**), suggesting the in vivo effect of GSK-LSD1 on these genes is indirect. This result also indicates that downregulation of these inflammation genes can be uncoupled from the effect of GSK-LSD1 on lipolysis, which is intact in this ex vivo experiment (**Figure 2E)**. As we also observed no ex vivo effect of GSK-LSD1 on insulin signal transduction (**Supplemental Figure 3J and K)**, these findings collectively suggest LSD1 regulates lipolysis independent of changes in insulin signaling and repression of inflammation genes.

To narrow down the step of the lipolysis pathway that is affected by LSD1 inhibition, we tested whether GSK-LSD1 interferes with the canonical phosphorylation cascade that activates

lipolysis. To this end, we assessed phosphorylation of hormone-sensitive lipase (Hsl), which is one of the distal lipolytic enzymes activated downstream of the β-adrenergic receptor (49). Robust Hsl phosphorylation in response to isoproterenol in GSK-LSD1-treated adipocytes (**Supplemental Figure 4D** and **E**) indicates that LSD1 inhibition does not interfere with—and in fact hyperactivates—the phosphorylation cascade downstream of β-adrenergic signaling. Overall, these results suggest the effect of LSD1 inhibition on lipolysis likely involves distal effects at the level of lipolytic enzymes or the lipid droplet. In support of this model, examination of lipolysis and lipid droplet genes in mRNA-seq data revealed upregulation of two genes encoding lipolysis inhibitors, *G0s2* (50) and *Plin5* (51, 52), in gWAT of GSK-LSD1-treated *db/db* mice (**Supplemental Table 2A**). These genes are strong candidates for future mechanistic studies of GSK-LSD1's effect on lipolysis.

LSD1 inhibition ameliorates liver steatosis in db/db *mice*

Obesity and insulin resistance are closely associated with NAFLD (6-8). Having observed that GSK-LSD1 prevents weight gain, increases insulin sensitivity, and reduces FFA release in *db/db* mice, we asked whether GSK-LSD1 ameliorates obesity-associated changes in the liver. Livers

from veh-treated *db*/*db* mice showed clear morphological and histological signs of steatosis (**Figure 3A** and **B**). In contrast, livers from *db*/*db* mice treated with GSK-LSD1 were grossly and histologically normal, resembling livers from lean *db*/+ mice. In addition, H&E staining of liver sections from GSK-LSD1-treated mice showed a reduction in microvesicular steatosis compared to veh-treated *db*/*db* mice (**Supplemental Figure 5A**). In line with these findings, GSK-LSD1 significantly reduced liver weight in *db*/*db* mice (**Figure 3C**). Steatosis results from a combination of increased lipid delivery from the circulation and increased lipogenesis by hepatocytes, leading to excess intrahepatic accumulation of lipids (7, 8). LSD1 inhibition in *db*/*db* mice decreased both circulating and hepatic triglycerides to levels comparable to those of lean *db*/+ mice (**Figure 3D** and **E**). Of note, plasma and hepatic cholesterol levels as well as circulating levels of the ketone body β-hydroxybutyrate were unaffected GSK-LSD1 administration (**Supplemental Figure 5B-D**). Effects of GSK-LSD1 on liver morphology and circulating lipid levels in *db*/*db* mice were recapitulated by SP2509 (**Supplemental Figure 5E-G**). To determine whether GSK-LSD1 improves clinical biomarkers of NAFLD, we measured plasma levels of aspartate aminotransferase (AST) and alanine aminotransferase (ALT). Treatment of *db*/*db* mice with GSK-LSD1 led to a significant reduction in AST activity and a slight, albeit not significant decrease in

ALT activity (**Figure 3F** and **G**). These results indicate that systemic LSD1 inhibition prevents liver pathology caused by obesity. In line with the GSK-LSD1-mediated reduction of steatosis, lipogenic genes such as elongation of very long chain fatty acids protein 6 (*Elovl6*), fatty acid synthase (*Fasn*), and stearyl-CoA desasturase (*Scd1*) were downregulated by GSK-LSD1 treatment (**Figure 3H**). LSD1 inhibition further reduced expression of pyruvate kinase isoenzyme R/L (*Pklr*), which catalyzes the last step in the glycolytic pathway and is required for *de novo* lipogenesis from glucose. Moreover, lower expression of fatty acid binding protein 1 (*Fabp1*) and cluster of differentiation 36 (*Cd36*) indicates a possible effect of GSK-LSD1 on liver fatty acid uptake in *db/db* mice. Liver inflammatory markers *Il1β*, *Il6*, *Il10*, and tumor necrosis factor alpha (*Tnfα*) did not significantly differ between treatment groups (**Supplemental Figure 5H**). Taken together, these observations suggest that systemic LSD1 inhibition impacts both lipid partitioning and hepatocyte metabolic pathways to ameliorate liver steatosis in obesity.

Hepatocyte-specific Lsd1 *deletion does not improve glycemia or liver steatosis in* db/db *mice*

We reasoned that a reduction in steatosis following GSK-LSD1 treatment could result from altered lipid partitioning from storage tissues or from cell autonomous effects of LSD1 in hepatocytes.

While reduced circulating NEFA and triglycerides following LSD1 inhibition supports a potential effect upon lipid partitioning (**Figure 2G** and **3D**), LSD1 is expressed in hepatocytes (**Supplemental Figure 6A**) and could have hepatocyte-autonomous effects on lipogenesis or lipid uptake. To analyze hepatocyte-specific functions of LSD1, we deleted *Lsd1* in hepatocytes of 6-week-old *db/db Lsd1*$^{fl/fl}$ mice using AAV8-TBG-iCre (*Lsd1*$^{\Delta L}$ *db/db* mice hereafter) (**Supplemental Figure 6B** and **C**). In contrast to systemic LSD1 inhibition, liver-specific *Lsd1* deletion did not alter body weight or blood glucose levels (**Supplemental Figure 6D** and **E**). Furthermore, glucose tolerance, plasma insulin levels, and insulin sensitivity were similar in *Lsd1*$^{\Delta L}$ *db/db* and control *db/db* mice (**Supplemental Figure 6F-H**). Accordingly, hepatocyte-specific *Lsd1* deletion did not improve pyruvate tolerance, reflecting unaltered hepatic gluconeogenesis (**Supplemental Figure 6I**). Further supporting this conclusion, LSD1 inhibition in primary hepatocytes isolated from *db/db* mice did not alter glucose production from lactate and pyruvate (**Supplemental Figure 6J**). Together, these findings suggest that improvements in glucose homeostasis following systemic LSD1 inhibition are not mediated by a direct effect on hepatocytes.

We further examined the effects of hepatocyte-specific *Lsd1* deletion on liver steatosis in *db/db* mice. *Lsd1*$^{\Delta L}$ *db/db* mice exhibited similar liver histology, liver weight, plasma triglycerides,

ALT, and AST levels as *db/db* control mice (**Supplemental Figure 6K-O**). However, we observed a reduction in hepatic triglyceride levels in *Lsd1*$^{\Delta L}$ *db/db* mice (**Supplemental Figure 6P)**, suggesting a hepatocyte-autonomous role of LSD1 in the regulation of hepatic lipid metabolism. Despite the observed effect of hepatic *Lsd1* deletion on hepatic triglycerides, our findings support the overall conclusion that the beneficial effects of systemic LSD1 inhibition on glucose homeostasis and liver steatosis are not a direct result of LSD1 inhibition in hepatocytes.

Food intake is reduced by systemic LSD1 inhibition

The improvements in glucose homeostasis and liver health following systemic LSD1 inhibition coincided with reductions in weight gain (**Figure 1B**). Changes in body weight typically result from imbalanced caloric intake and energy expenditure. To investigate whether GSK-LSD1-mediated effects on weight gain are caused by decreased food consumption or increased energy expenditure, GSK-LSD1- or veh-treated *db/db* mice were placed in metabolic cages and monitored over the course of 48 hours. This experiment revealed that food intake was reduced by GSK-LSD1 treatment (**Figure 4A** and **Supplemental Figure 7A**). In contrast, GSK-LSD1 had no significant impact on energy expenditure as measured by oxygen consumption and carbon dioxide production

(**Figure 4B** and **C**), resulting in a similar respiratory quotient between GSK-LSD1- and veh-treated mice (**Supplemental Figure 7B**). We also found no evidence for changes in animal activity levels (**Supplemental Figure 7C**). Fluid intake was reduced by GSK-LSD1 (**Supplemental Figure 7D** and **E**), which is likely a secondary effect of normalized glucose levels. Importantly, long-term measurements of food intake revealed no difference between GSK-LSD1- or veh-treated lean *db*/+ mice (**Supplemental Figure 7F**). Overall, these findings suggest that systemic LSD1 inhibition reduces weight gain in *db/db* mice in part by attenuating hyperphagia.

Metabolic effects of systemic LSD1 inhibition are independent of food intake

Pair-feeding of *db/db* mice to lean controls has been shown to prevent obesity and hyperglycemia (53). Having observed reduced food intake and weight gain in GSK-LSD1-treated mice, we reasoned that some of the metabolic benefits of systemic LSD1 inhibition could result from its effect on feeding. Therefore, we conducted a pair-feeding experiment in which food consumption in GSK-LSD1-treated *db*/*db* mice was measured daily and the same amount was then provided to a second group of *db*/*db* mice receiving veh, with a third group of veh-treated ad libitum-fed *db*/*db* mice serving as a control (**Figure 5A**). GSK-LSD1-treated mice consumed significantly less food

over the course of the study compared to veh-treated ad libitum-fed mice, whereas the veh-treated pair-fed group consumed the same amount of food as the GSK-LSD1-treated group as defined per experimental design (**Figure 5B** and **Supplemental Figure 8A**). Body weight gain did not differ between the three groups over the course of the intervention (**Supplemental Figure 8B**). Blood glucose levels in GSK-LSD1-treated *db/db* mice were significantly lower than in veh-treated pair-fed *db/db* mice (**Figure 5C**). Likewise, GSK-LSD1-treated *db/db* mice showed improved glucose tolerance relative to veh-treated pair-fed *db/db* mice (**Figure 5D**), indicating that GSK-LSD1 prevents hyperglycemia in *db/db* mice independent of food intake. Accordingly, fasting plasma insulin levels remained high in pair-fed compared to ad libitum-fed mice but were significantly lower in the GSK-LSD1-treated group (**Figure 5E**). Together, these observations suggest that GSK-LSD1 improves insulin sensitivity in *db/db* mice independent of its effect on food intake.

The feeding-independent effects of GSK-LSD1 upon glucose homeostasis suggested that systemic LSD1 inhibition could ameliorate complications of obesity independent of altered food intake. Indeed, LSD1 inhibition reduced plasma triglycerides, improved liver steatosis, reduced liver weight and plasma ALT activity compared to veh-treated pair-fed *db/db* mice (**Figure 5F-H** and **Supplemental Figure 8C**), indicating that these effects are independent of reduced feeding.

Similarly, the effect of LSD1 inhibition on adipose tissue inflammation was independent of reduced food intake, as evidenced by reduced abundance of F4/80$^+$ CLS compared to veh-treated pair-fed *db/db* mice (**Figure 5I** and **J**). Overall, these experiments show that beneficial effects of GSK-LSD1 on glucose homeostasis, liver health, and adipose inflammation occur independent of its hyperphagia-reducing effect.

GSK-LSD1 prevents obesity and improves insulin signaling in Western diet-fed mice

db/db mice are deficient for signaling by the satiety hormone leptin and therefore do not fully recapitulate human obesity, in which leptin function is intact. Therefore, we determined whether effects of GSK-LSD1 can be observed in mice that develop obesity following consumption of a high-energy Western diet (54). C57BL/6J mice were fed a Western diet (42% kcal from fat, 34% sucrose by weight) for 11 weeks concomitant with daily injections of GSK-LSD1 or veh, with veh-treated C57BL/6J mice fed a normal chow diet serving as a control (**Figure 6A**). Western diet feeding resulted in substantial weight gain of veh-treated mice, while GSK-LSD1-treated mice fed the Western diet remained lean, exhibiting body weights similar to those of normal chow-fed mice (**Figure 6B**). Notably, GSK-LSD1 also prevented obesity in response to consumption of a high fat

diet (HFD, 60% kcal from fat; **Supplemental Figure 9A**). While blood glucose levels did not change in response to either diet (**Figure 6C** and **Supplemental Figure 9B**), GSK-LSD1 improved glucose tolerance in mice fed a high fat diet but not a chow diet (**Supplemental Figure 9C**). Plasma insulin levels increased in response to Western diet feeding of veh-treated mice but remained low in the GSK-LSD1 group (**Figure 6D**). The reduction in insulin levels without corresponding increases of blood glucose in GSK-LSD1-treated mice suggests that LSD1 inhibition improves insulin sensitivity during Western diet feeding, as we observed in *db/db* mice.

The above findings collectively demonstrate that GSK-LSD1 prevents metabolic defects in several models of obesity. However, an ideal therapy for metabolic disease would reverse preexisting defects. Therefore, we performed a drug intervention study to ask whether GSK-LSD1 improves metabolic health in obese mice (**Figure 6E**). After 11 weeks of Western diet feeding and veh treatment, mice were split into two groups receiving either GSK-LSD1 for an additional 7 weeks or continuation of veh treatment. Remarkably, switching treatment groups from veh to GSK-LSD1 lowered body weight and plasma insulin levels significantly in Western diet-fed mice (**Figure 6F** and **G**). As blood glucose levels did not change in any of the treatment groups (**Supplemental Figure 10A**), this result suggests that GSK-LSD1 ameliorates insulin resistance in

mice with preexisting obesity. Indeed, insulin tolerance tests revealed that insulin sensitivity was improved to a similar extent whether GSK-LSD1 was administered concomitant with Western diet feeding or initiated after the establishment of obesity (**Figure 6H**). Altogether, these observations support the potential for systemic LSD1 inhibition as a therapy for obesity and T2D.

GSK-LSD1 is an irreversible inhibitor, which could limit the ability to reverse the effects of this drug following treatment withdrawal (e.g., when target weight is achieved in previously obese individuals). To test whether the effects of GSK-LSD1 upon systemic metabolism are reversible, we performed a washout study in Western diet-fed mice treated with GSK-LSD1 for 11 weeks, at which point mice were switched to veh treatment (**Figure 6E**). Western diet-fed mice that received GSK-LSD1 or veh for the duration of the study were used for comparison. The GSK-LSD1-mediated prevention of Western diet-induced body weight gain was completely reversible once the mice were taken off treatment, with body weights of the group taken off GSK-LSD1 converging with those of mice treated with veh for the duration of the study (**Figure 6I**). Similarly, beneficial effects of GSK-LSD1 on liver, gWAT, and sWAT weight were reversed when Western diet-fed mice were taken off the drug (**Supplemental Figure 10B-D**). Overall, our findings indicate

that systemic LSD1 inhibition prevents and corrects hallmark metabolic defects associated with obesity in a manner that is readily reversible upon drug withdrawal.

Discussion

Despite the growing obesity pandemic, there is an unmet need for efficient and safe therapies for obesity and its associated complications. Here, we report that systemic LSD1 inhibition in rodent models of obesity and T2D causes weight loss and ameliorates obesity-induced complications including hyperglycemia and NAFLD. LSD1 inhibition decreases food intake, body weight, and fat mass in diet-induced and genetic models of obesity. Moreover, LSD1 inhibitors prevent hyperglycemia and fatty liver disease in *db*/*db* mice. These effects are accompanied by improved adipose tissue function as shown by reduced tissue inflammation and increased insulin sensitivity. LSD1 inhibition does not affect metabolism in lean mice, indicating LSD1 plays a context-specific role during overfeeding. This is of importance for clinical applications, as LSD1 inhibition does not cause anorexia or hypoglycemia, suggesting physiological set points are maintained during LSD1 inhibition. Overall, these findings identify LSD1 as a potential therapeutic target to promote weight loss and prevent T2D and NAFLD in people with obesity.

The beneficial effects of LSD1 inhibition on metabolism occurred independent of reduced food intake, indicating direct effects upon tissues involved in nutrient metabolism. Our findings suggest that LSD1 inhibition in WAT contributes to the beneficial effect of GSK-LSD1 on obesity-

associated metabolic complications. In support of this conclusion, improved systemic insulin sensitivity after GSK-LSD1 treatment was associated with improved insulin signaling in WAT but not in skeletal muscle or liver. In addition, GSK-LSD1 reversed several obesity-associated defects in adipose tissue that are known to contribute to metabolic syndrome, including inflammation and excessive lipolysis. LSD1 has been reported to have a cell-autonomous role in hepatocytes, promoting steatosis through transcriptional activation of lipogenic enzyme genes (29). Consistent with this finding, we observed lower hepatic triglyceride levels after hepatocyte-specific *Lsd1* deletion. However, we found that hepatocyte-specific *Lsd1* deletion did not recapitulate the beneficial effect of systemic GSK-LSD1 treatment upon NAFLD or hepatic glucose production, suggesting that systemic LSD1 inhibition indirectly ameliorates hepatic steatosis and excessive gluconeogenesis.

It is well established that obesity-associated changes in adipose tissue can have pleiotropic effects on systemic metabolism (1, 4, 43, 55). Excess caloric intake and the subsequent expansion of fat mass result in increased infiltration of macrophages and local secretion of proinflammatory cytokines, which precipitate metabolic defects in adipocytes that lead to increased circulating FFA (4, 43). This sets in motion a vicious cycle of additional macrophage recruitment, further

inflammation, lipolysis, and insulin resistance (1, 5, 6, 43, 55-61). Our finding that GSK-LSD1 inhibits lipolysis in isolated adipocytes indicates effects of LSD1 on lipolysis independent of inflammation and insulin signaling, suggesting a direct effect of LSD1 on lipolysis could initiate a chain of events leading to adipose tissue inflammation and insulin resistance in vivo. In support of this model, inhibition of lipolysis has been shown to improve insulin sensitivity, glucose tolerance, adipose tissue inflammation, and liver health during obesity (43, 62). In addition to the GSK-LSD1-mediated reduction in lipolysis in isolated adipocytes, we also found decreased circulating FFA levels in vivo. It is known that fatty acids released from adipose promote hepatic glucose production and are the main substrate for hepatocyte triglyceride synthesis (5, 59, 63-67). Consequently, lipolysis-derived FFA promote hepatic gluconeogenesis and ectopic lipid deposition in hepatocytes (43, 62), providing a plausible link between lipolysis inhibition by GSK-LSD1 and indirect metabolic improvements in the liver. Our findings suggest GSK-LSD1 inhibits lipolysis at a site distal to the phosphorylation cascade linking the β-adrenergic receptor to lipolytic enzymes. Examination of transcriptomes of gWAT from GSK-LSD1-treated mice revealed upregulation of two genes encoding lipid droplet proteins that inhibit the enzymatic activity of the key lipase Atgl. Further studies will be necessary to determine exactly how LSD1 regulates

lipolysis as well as clarify the interrelationship between lipolysis inhibition, reduced adipose inflammation, and improved insulin signaling following systemic LSD1 inhibition. Inducible white adipocyte-specific *Lsd1* deletion would facilitate such mechanistic studies and determine the relative contribution of adipocyte LSD1 to aberrant metabolic remodeling in obesity. Nevertheless, it remains possible that LSD1's cell-autonomous functions in several cell types including but not limited to hepatocytes, adipocytes, and immune cells have additive effects in promoting obesity-associated defects.

Genetic studies in lean mice have revealed that a major function of LSD1 is to promote mitochondrial metabolism in adipocytes (33, 68). *Lsd1* deletion in white and brown fat via adiponectin-Cre leads to increased adipose tissue mass and weight gain (68). Moreover, this model develops exaggerated glucose intolerance during HFD feeding compared to *Lsd1*-intact controls (68). Our finding that pharmacological LSD1 inactivation reduces adipose tissue mass and improves glucose tolerance during obesity seemingly contrasts with these genetic studies. It is possible that pharmacological inhibition of LSD1's enzymatic activity has a distinct effect from genetic deletion of *Lsd1*, which can impact other functions such as scaffolding of proteins within

transcriptional complexes. Alternatively, the use of constitutive Cre recombinase to delete *Lsd1* may have confounding effects on adipocyte development (33).

The selective effect of LSD1 inhibition during overfeeding suggests LSD1 has context-dependent functions in the regulation of systemic metabolism. We found that GSK-LSD1 reduces food intake and body weight only in models of genetic or diet-induced obesity, with no effect on these parameters in lean, chow-fed mice. Similarly, LSD1 inhibition prevents hyperglycemia in *db*/*db* mice but is of little effect on glycemia or glucose tolerance in lean, nondiabetic mice. Obesity and T2D are known to disrupt homeostatic feedback mechanisms regulating appetite, weight gain, and blood glucose (13). Our observations open the possibility that LSD1 is involved in the maladaptive changes to systemic metabolism that result in higher defended body weight and blood glucose. Effects of LSD1 inhibition on food intake, adipose lipolysis, hepatic triglycerides, and gluconeogenesis suggest LSD1 could evoke shared tissue-autonomous mechanisms for metabolic rewiring during obesity. While our pharmacological approach does not definitively implicate a single target tissue responsible for these effects, simultaneously targeting several relevant tissues by GSK-LSD1 treatment provides the advantage of testing the coordinated effects of LSD1. Future work should address whether and how obesity-associated changes to LSD1 and its associated

epigenomic program occur in endocrine and neuronal systems involved in feeding behavior as well as in peripheral tissues directly involved in fuel metabolism.

One limitation of the study is that only male mice were analyzed in the Western diet study. Importantly, Western or high fat diet feeding evokes sex-dependent effects on metabolism, with female mice being less susceptible to Western or high fat diet-induced body weight gain, glucose intolerance, and insulin resistance (69-72). We understand that sex differences are a major concern given that sex is a variable affecting a multitude of physiological and pathological processes (73), thus future studies should include both sexes. However, no sex differences were observed in experiments performed with *db*/*db* mice in this study, suggesting that the effect of LSD1 inhibition in this model is similar in both males and females.

The development of weight loss therapies to treat obesity and its complications has proven to be a considerable challenge. None of the obesity drugs with longstanding FDA approval are widely used due to the risk of adverse events (74, 75). The recently approved glucagon-like peptide 1 receptor agonist semaglutide holds promise for safe and effective obesity treatment when combined with lifestyle interventions (76). With the hope that broad adoption of semaglutide mirrors results of clinical trials indicating durable weight loss and reduced complications of obesity

(76, 77), the next generation of obesity drugs may well be tailored to patients at risk for specific complications such as NAFLD, for which there is currently no approved therapy beyond implementing lifestyle changes. Epigenomic regulation has recently emerged as a novel regulatory layer in energy homeostasis, opening a new avenue for potential treatment strategies for metabolic disease (78, 79). Evidence that histone deacetylases (HDACs) play a role in glucose homeostasis by regulating the function of hepatocytes and insulin-producing pancreatic β-cells positioned these enzymes as potential drug targets in metabolic disease (78). Multiple HDAC inhibitors are currently being investigated for the treatment of obesity and T2D (78), but currently none have been approved for this clinical application. Here, we show that inhibition of the histone demethylase LSD1 has beneficial effects on glucose homeostasis and NAFLD independent of changes in food intake, suggesting that LSD1 could be a novel therapeutic target for correcting epigenomic defects in metabolic disease. The feasibility of LSD1 targeting in people with obesity will depend upon a favorable safety profile. Our results describing metabolic benefits of GSK-LSD1 provide a strong rationale for clinical trials investigating the safety and efficacy of LSD1 inhibitors in obesity and NAFLD.

Author contributions: B.R. designed research studies, conducted experiments, acquired data, analyzed data, and wrote the manuscript. D.P.P., H.Z., C.N., A.R.H., and I.O., conducted experiments and acquired data. P.L.S.M. designed research studies. M.W. designed research studies, conducted experiments, acquired data, analyzed data, and wrote the manuscript. M.S. designed research studies, analyzed data, and wrote the manuscript.

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Figures and figure legends

Figure 1. Systemic LSD1 inhibition prevents the development of hyperglycemia and improves insulin sensitivity in *db*/*db* mice. (**A**) 4-week-old male and female *db*/*db* mice received daily intraperitoneal (i.p.) injections of GSK-LSD1 or vehicle (veh) for 6 weeks. As a control, lean *db*/+ mice were injected with veh. Metabolic measurements were conducted at the indicated time points. (**B**) Body weight and (**C**) blood glucose levels measured weekly (n = 10 mice/group). (**D**) Blood glucose levels at indicated time points after a glucose bolus via oral gavage (n = 10 mice/group). Glucose tolerance test, GTT. (**E**) Fasting plasma insulin levels at baseline and after 1, 3, and 6 weeks of GSK-LSD1 or veh treatment (n = 6-10 mice/group). (**F**) Plasma insulin levels before and 10 min after glucose gavage (n = 8-10 mice/group). (**G**) Blood glucose levels at indicated time points after intraperitoneal insulin (2.0 U/kg body weight) injection (n = 10 mice/group). Insulin tolerance test, ITT. (**H**) Blood glucose levels at indicated time points after intraperitoneal pyruvate injection (n = 10 mice/group). Pyruvate tolerance test, PTT. (**I**) Immunoblot analysis of $pAkt^{Ser473}$, Akt, and vinculin in gWAT of GSK-LSD1- or veh-treated *db*/*db* mice injected with insulin or saline. (**J**) Quantification of $pAkt^{Ser473}$ to Akt ratio as fold change compared to veh-treated mice

without insulin injection (n = 4 mice/group). Data are presented as mean ± SEM. Statistical differences were calculated using a two-way ANOVA with Tukey post hoc analysis (in B-D, F, G, H, J). A one-way ANOVA with Tukey post hoc analysis was performed to analyze statistical differences between three or more groups (E). Unless otherwise indicated, significance is shown between GSK-LSD1- and veh-treated mice. *$p<0.05$, **$p<0.01$, ***$p<0.001$, $^{\#}p<0.05$, $^{\#\#}p<0.01$, $^{\#\#\#}p<0.001$. AU, arbitrary unit; ns, not significant.

Figure 2. LSD1 inhibition reduces adipose tissue inflammation and lipolysis in *db*/*db* mice. (**A**) Representative images of gWAT sections stained with hematoxylin and eosin (H&E) and (**B**) detection of crown-like structures (CLS) using an F4/80 antibody in gWAT after 6 weeks of daily GSK-LSD1 or vehicle (veh) administration to male and female *db*/*db* mice. As a control, lean *db*/+ mice were injected with veh. Red arrows highlight CLS. Scale bars = 100 μm. (**C**) Quantification of F4/80^{+} CLS in gWAT relative to tissue size (n = 4 mice/group). (**D**) qPCR analysis of inflammatory genes in gWAT. Transcript levels in GSK-LSD1-treated relative to veh-treated *db*/*db* mice (n = 6-11 mice/group). (**E**,**F**) Lipolysis in differentiated adipocytes isolated from *db*/*db* mice after preincubation with GSK-LSD1 or veh and stimulation with isoproterenol. (**E**) Free fatty

acid (FFA) release and (**F**) glycerol release (n = 3 mice). (**G**) Plasma non-esterified fatty acid (NEFA) levels (n = 6-10 mice/group). (H) Networks of genes upregulated (network nodes in red) or downregulated (network nodes in blue) by GSK-LSD1 compared to vehicle ($p<0.01$ by Cuffdiff) in gWAT from *db/db* mice following 6 weeks of treatment, shown as clustered functional categories (n = 4 mice/group). Data are presented as mean ± SEM. A one-way ANOVA with Tukey post hoc analysis was performed to analyze statistical differences between three or more groups (C, G) or multiple unpaired t-tests to determine differences between two groups (D, E-F). $*p<0.05$, $**p<0.01$, $***p<0.001$, $^{\#}p<0.05$, ns, not significant.

Figure 3. LSD1 inhibition protects against liver steatosis in *db/db* mice. (**A**) Representative images of livers in *db/db* mice treated daily with GSK-LSD1 or vehicle (veh) for 6 weeks. As a control, lean *db/+* mice were injected with veh (n = 13-14 mice/group). (**B**) Hematoxylin and eosin (H&E) stain of liver sections. Scale bars = 100 μm. (**C**) Liver weight (n = 13-14 mice/group). (**D**) Fasting plasma triglyceride levels at indicated time points (n = 9-10 mice/group). (**E**) Hepatic triglyceride levels (n = 4 mice/group). (**F**) AST and (**G**) ALT activity in plasma of GSK-LSD1- or veh-treated mice for 6 weeks (n = 8-10 mice/group). (**H**) qPCR analysis of genes associated with hepatic lipid

metabolism in liver. Transcript levels relative to *db*/+ mice. (n = 3-4 mice/group). Data are presented as mean ± SEM. Statistical differences were calculated using a one-way ANOVA (C, E-H) or two-way ANOVA (D, I) with Tukey post hoc analysis. *p<0.05, **p<0.01, ***p<0.001, ns, not significant.

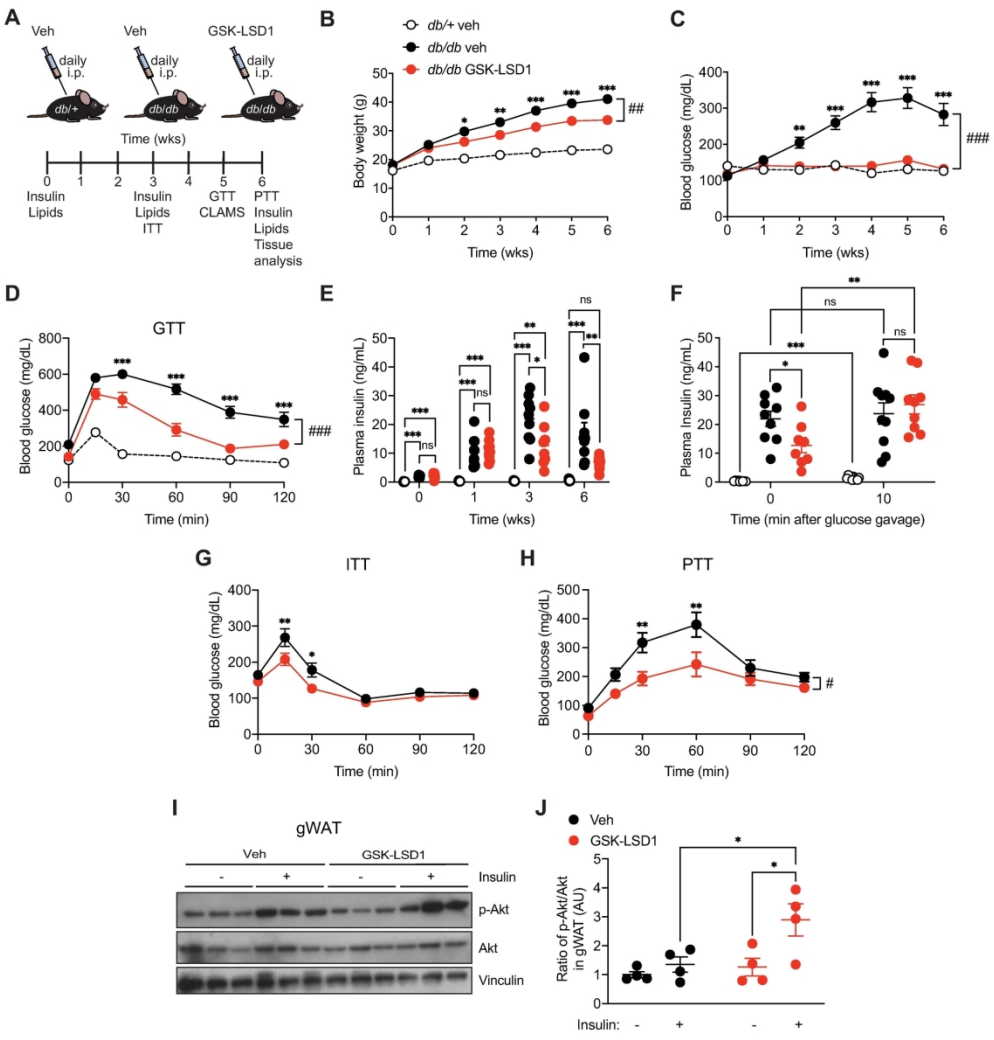
Figure 4. Food intake is reduced in GSK-LSD1-treated *db*/*db* mice. (**A**) Male and female mice were injected daily with GSK-LSD1 or vehicle (veh) for 5 weeks and then placed into metabolic cages. Using the Comprehensive Laboratory Monitoring System (CLAMS), food intake was monitored over 48 hours and is shown as food consumed per day (n = 4-5 mice/group/day). (**B**) Oxygen consumption (V_{O2}) and (**C**) carbon dioxide production (V_{CO2}) (n = 4-5 mice/group). Data presented as mean ± SEM. Statistical differences between two groups were calculated using an unpaired two-tailed Student's t-test (A) or a two-way ANOVA (B, C) with Tukey post hoc analysis. *p<0.05.

Figure 5. GSK-LSD1-mediated improvement of metabolic dysfunction is independent of reduced food intake. (**A**) Study design of pair-feeding experiment. 4-week-old male and female *db*/*db* mice

were injected daily with vehicle (veh) or GSK-LSD1 for 6 weeks and fed a normal chow diet ad libitum. A third group of mice received veh and was pair-fed to GSK-LSD1-treated mice. (**B**) Food consumption was monitored daily and is shown as cumulative food intake over the 6-week study (n = 8-11 mice/group). (**C**) Blood glucose levels measured weekly. Asterisks indicate statistical differences between veh (black) and GSK-LSD1 group (red). (**D**) Blood glucose levels at indicated time points after a glucose bolus via oral gavage (n = 8-11 mice/group). Glucose tolerance test, GTT. (**E**) Fasting plasma insulin levels at the indicated time points (n = 8-11 mice/group). (**F**) Fasting plasma triglycerides levels at indicated time points (n = 8-11 mice/group). (**G**) Representative images of liver sections stained with hematoxylin and eosin (H&E). Scale bars = 100 μm (n = 4 mice/group). (**H**) Liver weight (n = 8-11 mice/group). (**I**) Representative images of gWAT sections stained against F4/80 to detect crown-like structures (CLS). Red arrows indicate CLS. Scale bars = 100 μm. (**J**) Quantification of F4/80^{+} CLS in gWAT relative to tissue size (n = 8-9 mice/group). Data presented as mean ± SEM. Statistical differences were calculated using a one-way ANOVA (D, F, H, J) or two-way ANOVA (B, C, E) with Tukey post hoc analysis. $*p<0.05$, $**p<0.01$, $***p<0.001$, $^{\#\#\#}p<0.001$, ns, not significant.

Figure 6. GSK-LSD1 reverses metabolic dysfunction due to diet-induced obesity. (**A**) 10-week-old male C57BL/6J *wild type* (*WT*) mice fed a Western diet (WD) were injected daily with GSK-LSD1 or vehicle (veh) for 11 weeks. As a control, a group of *WT* mice received veh and was kept on a normal chow diet (NCD). (**B**) Body weight and (**C**) blood glucose levels measured weekly (n = 7-8 mice/group). Asterisks indicate statistical differences between GSK-LSD1- and veh-treated mice on WD unless otherwise stated. (**D**) Fasting plasma insulin levels at indicated time points (n = 6-8 mice/group). (**E**) Overview of intervention treatment protocol. After 11 weeks of veh administration, the veh group was split into one group continuing veh administration (black), whereas the other half began to receive GSK-LSD1 daily for another 7 weeks (blue). Likewise, the GSK-LSD1 group was split into one group continuing GSK-LSD1 administration after 11 weeks (red), whereas the other half began to receive veh daily for another 7 weeks (brown). (**F**) Body weight across all treatment groups (WD: n = 4 mice/group for week 11-16, n = 2-4 mice/group for week 17 and 18, n = 7 mice for NCD group). Asterisks indicate statistical differences between WD-fed mice administered veh (black) and the intervention group (blue). (**G**) Fasting plasma insulin levels 2 weeks after drug intervention (NCD veh: n = 7 mice, WD groups: n = 4 mice). (**H**) Blood glucose levels at indicated time points after intraperitoneal insulin (0.8

U/kg body weight) injection at week 17. Data shown relative to time point 0 min (n = 2-4 mice/group). Insulin tolerance test, ITT. (**I**) Body weight (WD: n = 4 mice/group for week 11-16, n = 2-4 mice/group for week 17 and 18). Data are shown as mean ± SEM. Statistical differences were calculated using a one-way ANOVA (G, J) or two-way ANOVA (B-D, F, H, I) with Tukey post hoc analysis. $*p<0.05$, $**p<0.01$, $***p<0.001$, $^{\#}p<0.05$, $^{\#\#}p<0.01$, $^{\#\#\#}p<0.001$, ns, not significant.



Systemic LSD1 inhibition prevents the development of hyperglycemia and improves insulin sensitivity in db/db mice. (A) 4-week-old male and female db/db mice received daily intraperitoneal (i.p.) injections of GSK-LSD1 or vehicle (veh) for 6 weeks. As a control, lean db/+ mice were injected with veh. Metabolic measurements were conducted at the indicated time points. (B) Body weight and (C) blood glucose levels measured weekly (n = 10 mice/group). (D) Blood glucose levels at indicated time points after a glucose bolus via oral gavage (n = 10 mice/group). Glucose tolerance test, GTT. (E) Fasting plasma insulin levels at baseline and after 1, 3, and 6 weeks of GSK-LSD1 or veh treatment (n = 6-10 mice/group). (F) Plasma insulin levels before and 10 min after glucose gavage (n = 8-10 mice/group). (G) Blood glucose levels at indicated time points after intraperitoneal insulin (2.0 U/kg body weight) injection (n = 10 mice/group). Insulin tolerance test, ITT. (H) Blood glucose levels at indicated time points after intraperitoneal pyruvate injection (n = 10 mice/group). Pyruvate tolerance test, PTT. (I) Immunoblot analysis of pAktSer473, Akt, and vinculin in gWAT of GSK-LSD1- or veh-treated db/db mice injected with insulin or saline. (J) Quantification of pAktSer473 to Akt ratio as fold change compared to veh-treated mice without insulin injection (n = 4 mice/group). Data are presented as mean ± SEM. Statistical differences were calculated using a two-way ANOVA with Tukey post hoc analysis (in B-D, F, G, H, J). A one-way ANOVA with Tukey post hoc analysis was performed to analyze statistical differences between three or more groups (E). Unless otherwise indicated, significance is shown between GSK-LSD1- and veh-treated mice. *p<0.05, **p<0.01, ***p<0.001, #p<0.05, ##p<0.01, ###p<0.001. AU, arbitrary unit; ns, not significant.

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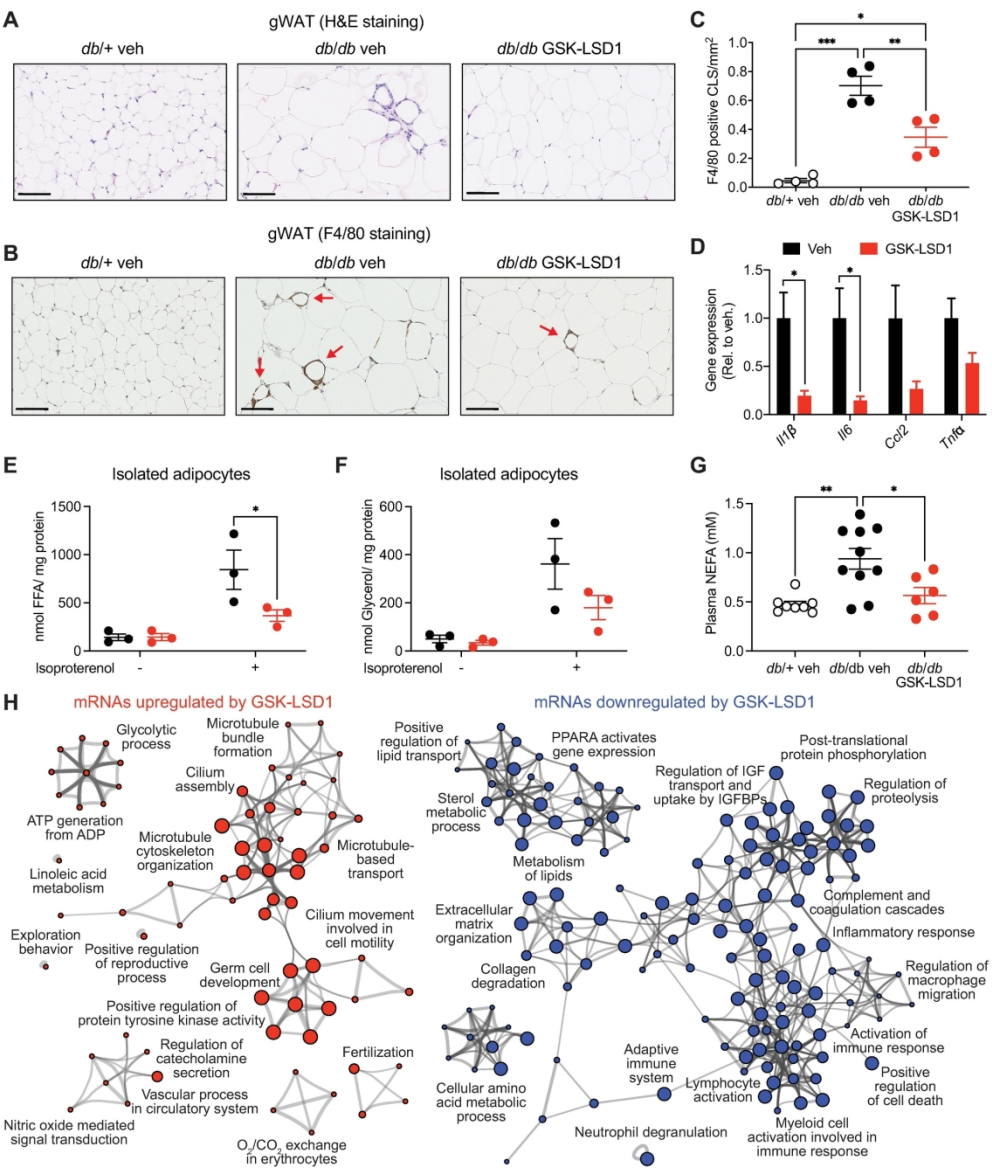

LSD1 inhibition reduces adipose tissue inflammation and lipolysis in db/db mice. (A) Representative images of gWAT sections stained with hematoxylin and eosin (H&E) and (B) detection of crown-like structures (CLS) using an F4/80 antibody in gWAT after 6 weeks of daily GSK-LSD1 or vehicle (veh) administration to male and female db/db mice. As a control, lean db/+ mice were injected with veh. Red arrows highlight CLS. Scale bars = 100 µm. (C) Quantification of F4/80+ CLS in gWAT relative to tissue size (n = 4 mice/group). (D) qPCR analysis of inflammatory genes in gWAT. Transcript levels in GSK-LSD1-treated relative to veh-treated db/db mice (n = 6-11 mice/group). (E,F) Lipolysis in differentiated adipocytes isolated from db/db mice after preincubation with GSK-LSD1 or veh and stimulation with isoproterenol. (E) Free fatty acid (FFA) release and (F) glycerol release (n = 3 mice). (G) Plasma non-esterified fatty acid (NEFA) levels (n = 6-10 mice/group). (H) Networks of genes upregulated (network nodes in red) or downregulated (network nodes in blue) by GSK-LSD1 compared to vehicle ($p<0.01$ by Cuffdiff) in gWAT from db/db mice following 6 weeks of treatment, shown as clustered functional categories (n = 4 mice/group). Data are presented as mean ± SEM. A one-way ANOVA with Tukey post hoc analysis was performed to analyze statistical differences between three or more groups (C, G) or multiple unpaired t-tests to determine differences between two

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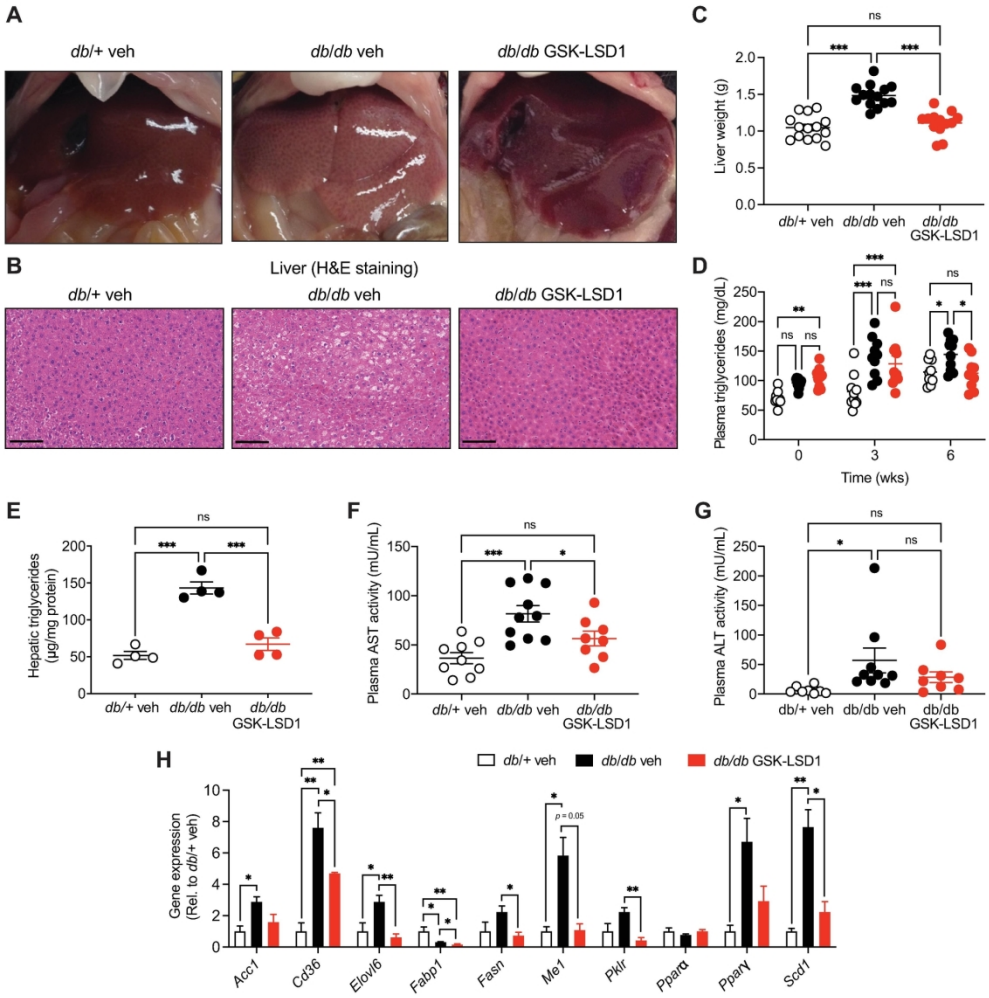

LSD1 inhibition protects against liver steatosis in db/db mice. (A) Representative images of livers in db/db mice treated daily with GSK-LSD1 or vehicle (veh) for 6 weeks. As a control, lean db/+ mice were injected with veh (n = 13-14 mice/group). (B) Hematoxylin and eosin (H&E) stain of liver sections. Scale bars = 100 µm. (C) Liver weight (n = 13-14 mice/group). (D) Fasting plasma triglyceride levels at indicated time points (n = 9-10 mice/group). (E) Hepatic triglyceride levels (n = 4 mice/group). (F) AST and (G) ALT activity in plasma of GSK-LSD1- or veh-treated mice for 6 weeks (n = 8-10 mice/group). (H) qPCR analysis of genes associated with hepatic lipid metabolism in liver. Transcript levels relative to db/+ mice. (n = 3-4 mice/group). Data are presented as mean ± SEM. Statistical differences were calculated using a one-way ANOVA (C, E-H) or two-way ANOVA (D, I) with Tukey post hoc analysis. *p<0.05, **p<0.01, ***p<0.001, ns, not significant.

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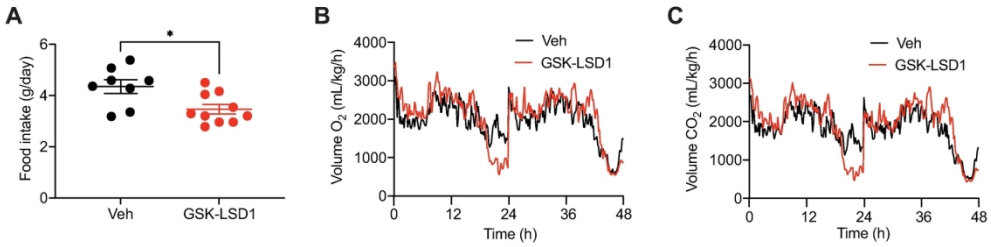

Food intake is reduced in GSK-LSD1-treated db/db mice. (A) Male and female mice were injected daily with GSK-LSD1 or vehicle (veh) for 5 weeks and then placed into metabolic cages. Using the Comprehensive Laboratory Monitoring System (CLAMS), food intake was monitored over 48 hours and is shown as food consumed per day (n = 4-5 mice/group/day). (B) Oxygen consumption (VO2) and (C) carbon dioxide production (VCO2) (n = 4-5 mice/group). Data presented as mean ± SEM. Statistical differences between two groups were calculated using an unpaired two-tailed Student's t-test (A) or a two-way ANOVA (B, C) with Tukey post hoc analysis. *p<0.05.

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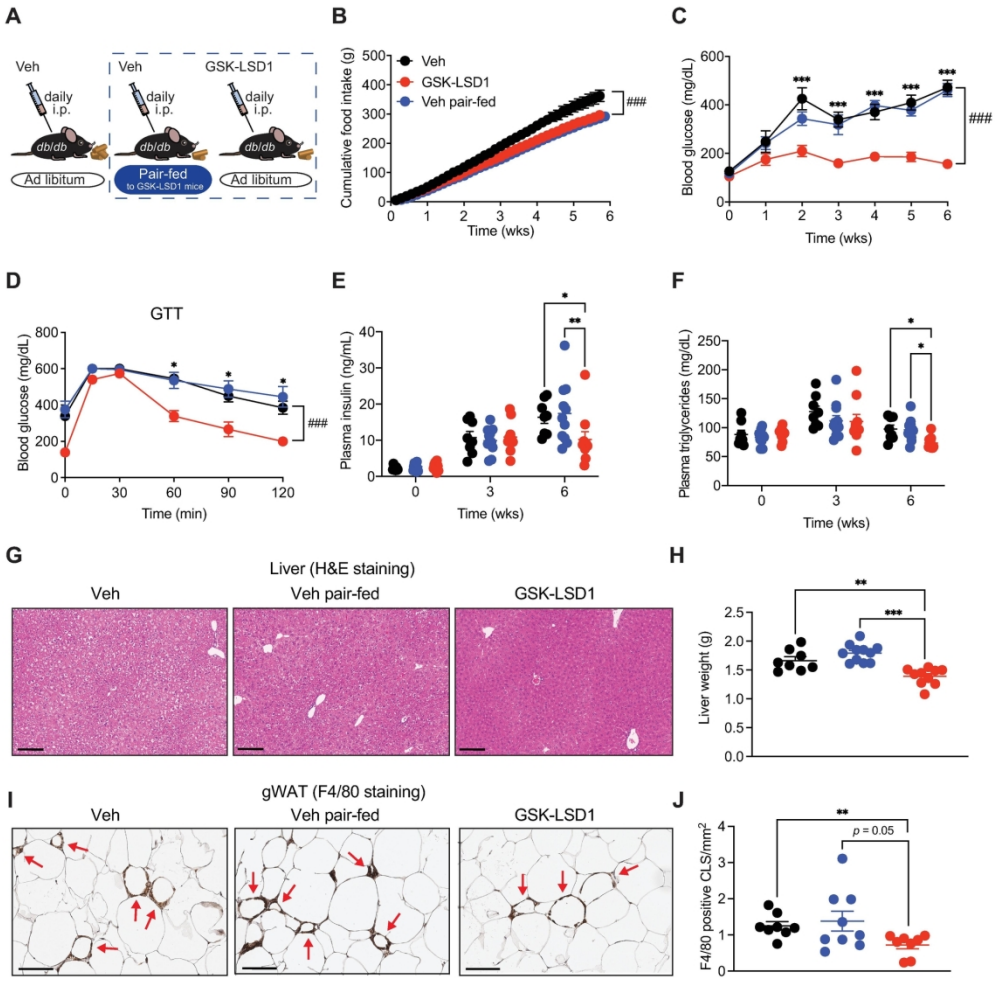

GSK-LSD1-mediated improvement of metabolic dysfunction is independent of reduced food intake. (A) Study design of pair-feeding experiment. 4-week-old male and female db/db mice were injected daily with vehicle (veh) or GSK-LSD1 for 6 weeks and fed a normal chow diet ad libitum. A third group of mice received veh and was pair-fed to GSK-LSD1-treated mice. (B) Food consumption was monitored daily and is shown as cumulative food intake over the 6-week study (n = 8-11 mice/group). (C) Blood glucose levels measured weekly. Asterisks indicate statistical differences between veh (black) and GSK-LSD1 group (red). (D) Blood glucose levels at indicated time points after a glucose bolus via oral gavage (n = 8-11 mice/group). Glucose tolerance test, GTT. (E) Fasting plasma insulin levels at the indicated time points (n = 8-11 mice/group). (F) Fasting plasma triglycerides levels at indicated time points (n = 8-11 mice/group). (G) Representative images of liver sections stained with hematoxylin and eosin (H&E). Scale bars = 100 μm (n = 4 mice/group). (H) Liver weight (n = 8-11 mice/group). (I) Representative images of gWAT sections stained against F4/80 to detect crown-like structures (CLS). Red arrows indicate CLS. Scale bars = 100 μm. (J) Quantification of F4/80+ CLS in gWAT relative to tissue size (n = 8-9 mice/group). Data presented as mean ± SEM. Statistical differences were calculated using a one-way ANOVA (D, F, H, J) or two-way ANOVA (B, C, E) with Tukey post hoc analysis. *p<0.05, **p<0.01, ***p<0.001, ###p<0.001, ns, not significant.

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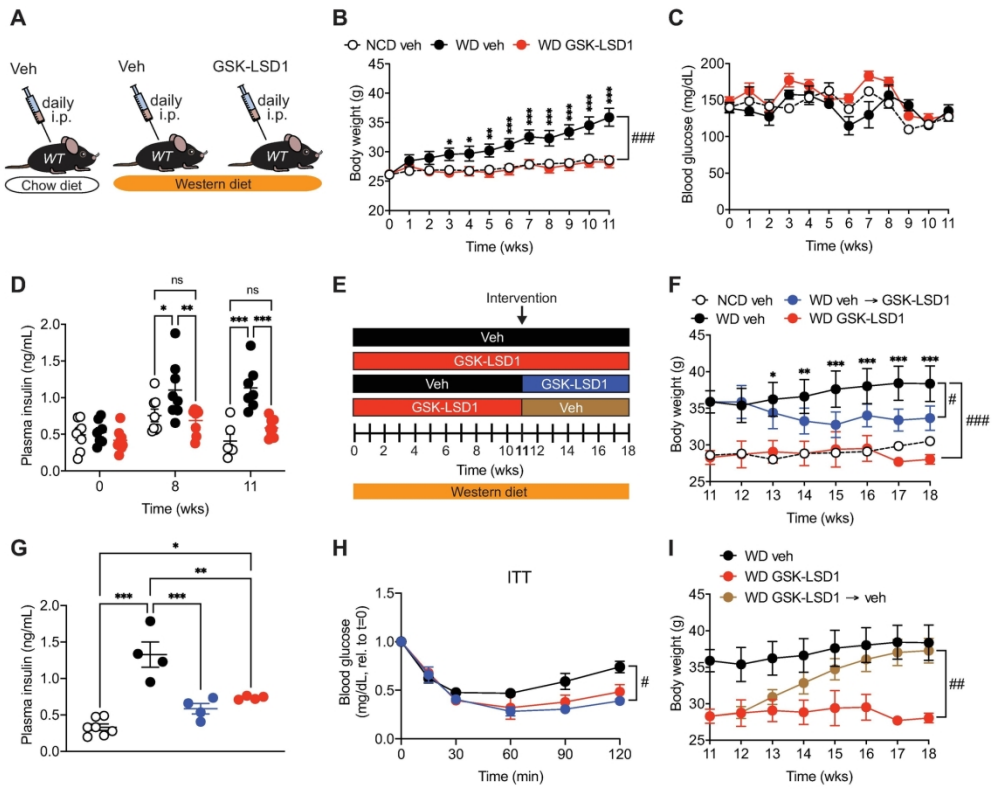

GSK-LSD1 reverses metabolic dysfunction due to diet-induced obesity. (A) 10-week-old male C57BL/6J wild type (WT) mice fed a Western diet (WD) were injected daily with GSK-LSD1 or vehicle (veh) for 11 weeks. As a control, a group of WT mice received veh and was kept on a normal chow diet (NCD). (B) Body weight and (C) blood glucose levels measured weekly (n = 7-8 mice/group). Asterisks indicate statistical differences between GSK-LSD1- and veh-treated mice on WD unless otherwise stated. (D) Fasting plasma insulin levels at indicated time points (n = 6-8 mice/group). (E) Overview of intervention treatment protocol. After 11 weeks of veh administration, the veh group was split into one group continuing veh administration (black), whereas the other half began to receive GSK-LSD1 daily for another 7 weeks (blue). Likewise, the GSK-LSD1 group was split into one group continuing GSK-LSD1 administration after 11 weeks (red), whereas the other half began to receive veh daily for another 7 weeks (brown). (F) Body weight across all treatment groups (WD: n = 4 mice/group for week 11-16, n = 2-4 mice/group for week 17 and 18, n = 7 mice for NCD group). Asterisks indicate statistical differences between WD-fed mice administered veh (black) and the intervention group (blue). (G) Fasting plasma insulin levels 2 weeks after drug intervention (NCD veh: n = 7 mice, WD groups: n = 4 mice). (H) Blood glucose levels at indicated time points after intraperitoneal insulin (0.8 U/kg body weight) injection at week 17. Data shown relative to time point 0 min (n = 2-4 mice/group). Insulin tolerance test, ITT. (I) Body weight (WD: n = 4 mice/group for week 11-16, n = 2-4 mice/group for week 17 and 18). Data are shown as mean ± SEM. Statistical differences were calculated using a one-way ANOVA (G, J) or two-way ANOVA (B-D, F, H, I) with Tukey post hoc analysis. *p<0.05, **p<0.01, ***p<0.001, #p<0.05, ##p<0.01, ###p<0.001, ns, not significant.

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Supplemental material

Supplemental figures

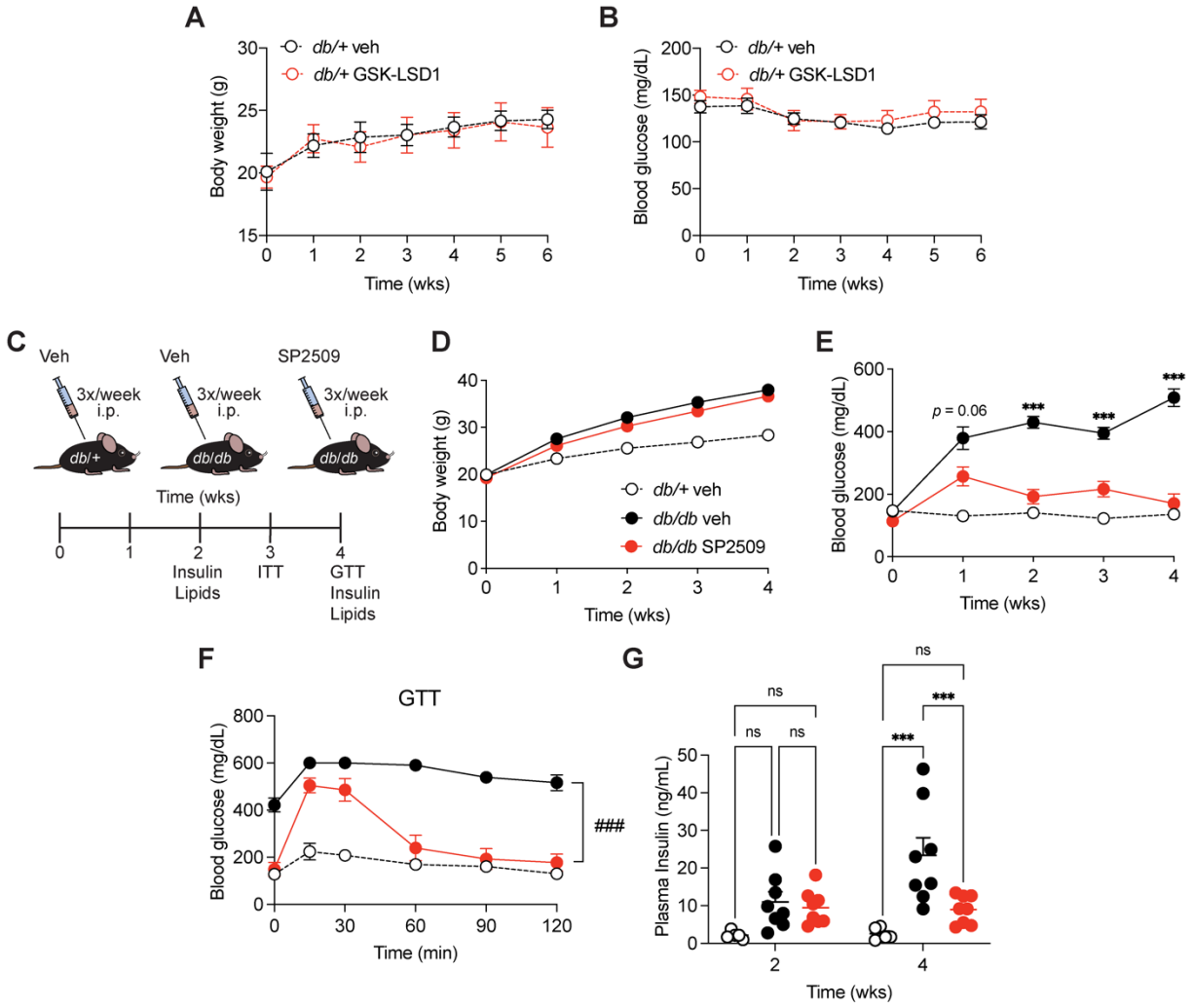

Figure S1. The structurally and mechanistically distinct LSD1 inhibitor SP2509 recapitulates effects of GSK-LSD1 on glucose homeostasis in *db/db* mice (**A**) Body weight and (**B**) blood glucose levels in 4-week-old male and female lean *db*/+ mice treated with GSK-LSD1 or vehicle (veh), respectively, for 6 weeks (n = 6 mice/group). (**C**-**G**) 4-week-old male and female *db/db* mice received SP2509 or vehicle (veh) thrice weekly via intraperitoneal injections for 4 weeks. As a control, lean *db*/+ mice were injected with veh. Metabolic measurements were conducted at the indicated time points. (**D**) Body weight and (**E**) blood glucose levels measured weekly (n = 5-8 mice/group). (**F**) Blood glucose levels at indicated time points after a glucose bolus via oral gavage (n = 5-8 mice/group). Glucose tolerance test, GTT. (**G**) Fasting plasma insulin levels after 2 and 4 weeks of SP2509 or veh treatment (n = 5-8 mice/group). Data are shown as mean ± SEM. Statistical differences were calculated using a two-way ANOVA with Tukey post hoc analysis. ***$p<0.001$, $^{###}p<0.001$, ns, not significant.

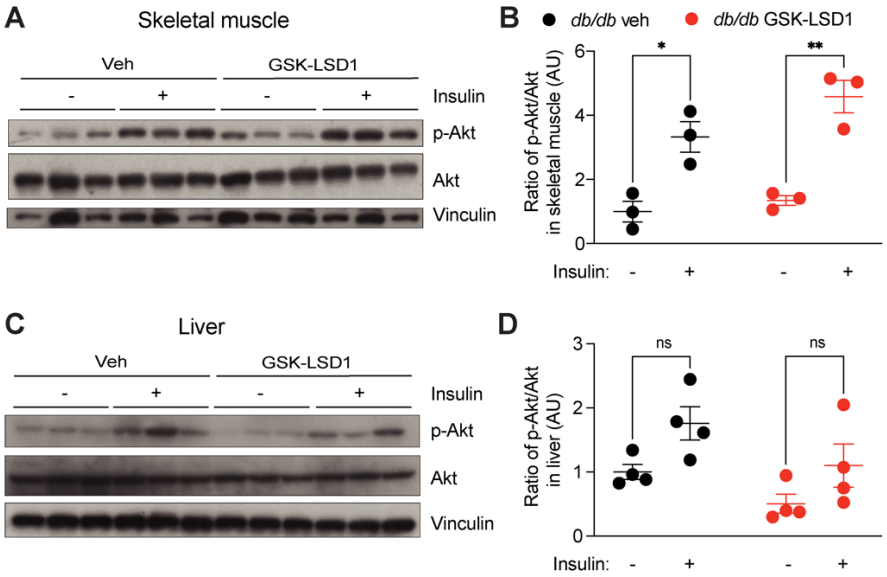

Figure S2. Impact of LSD1 inhibition on insulin sensitivity in peripheral tissues. (**A**-**D**) Immunoblot analysis of pAkt^{Ser473}, Akt, and vinculin in (**A**) skeletal muscle (n = 3 mice/group) and (**C**) liver (n = 4 mice/group). Quantification of pAkt^{Ser473} to Akt ratio as fold change compared to veh-treated mice without insulin injection in skeletal muscle (**B**) and liver (**D**). Data are shown as mean ± SEM. Statistical differences were calculated using a two-way ANOVA with Tukey post hoc analysis. *p<0.05, **p<0.01. AU, arbitrary units, ns, not significant.

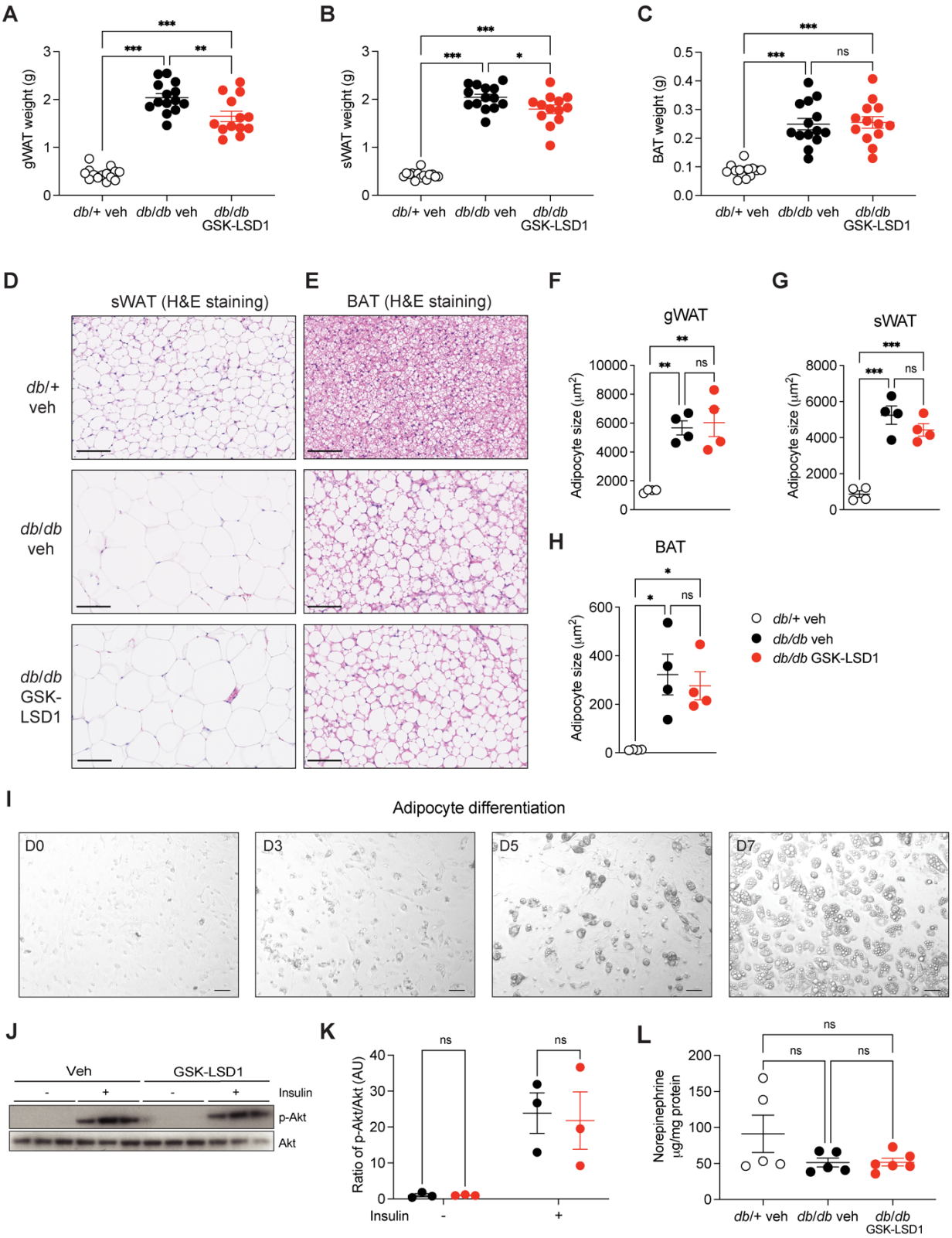

Figure S3. Impact of LSD1 inhibition on adipose tissue. (**A-H**) 4-week-old male and female *db*/*db* mice received daily intraperitoneal (i.p.) injections of GSK-LSD1 or vehicle (veh) for 6 weeks. As a control, lean *db*/+ mice were injected with veh. Tissue weight of (**A**) gWAT, (**B**)

sWAT, and (**C**) BAT (n = 13-14 mice/group). (**D**) Representative images of sWAT and (**E**) BAT sections stained with hematoxylin and eosin (H&E). Scale bars = 100 μm. (**F**) Adipocyte size quantified in gWAT, (**G**) sWAT, and (**H**) BAT (n = 4 mice/group). (**I**) Adipocytes were isolated from 5-week-old *db*/*db* mice. Representative images of adipocyte differentiation at day 0, 3, 5, and 7. Scale bars = 200 μm. (**J**) Immunoblot analysis of $pAkt^{Ser473}$ and Akt in differentiated adipocytes isolated from *db*/*db* mice after preincubation with GSK-LSD1 or veh and stimulation with insulin (n = 3 mice). (**K**) Quantification of $pAkt^{Ser473}$ to Akt ratio as fold change compared to veh-treated adipocytes. (**L**) WAT norepinephrine levels after 6 weeks of GSK-LSD1 or veh treatment of *db*/*db* mice or lean *db*/+ control mice (n = 5-6 mice/group). Data presented as mean ± SEM. A one-way ANOVA with Tukey post hoc analysis was performed to analyze statistical differences between three or more groups. *$p<0.05$, **$p<0.01$, ***$p<0.001$, ns, not significant.

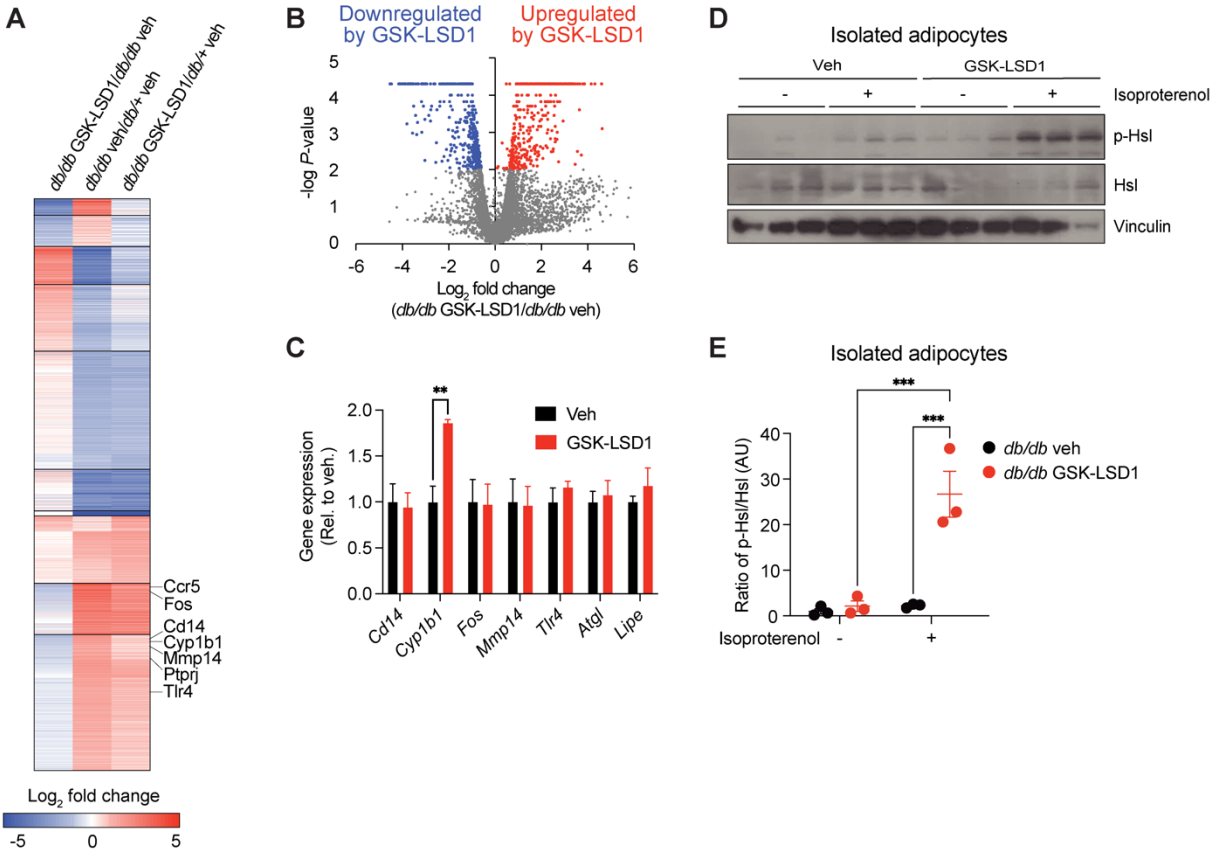

Figure S4. LSD1 inhibition in vivo reverses a subset of the effects of obesity on the gWAT transcriptome. (**A**) K-means clustering of $\log_2$ fold changes in mRNA levels in gWAT following 6 weeks of GSK-LSD1 treatment of male and female *db*/*db* mice, veh treatment of *db*/*db* mice, or veh treatment of *db*/+ mice for the indicated comparisons. mRNAs differentially expressed in at least one pairwise comparison (p<0.01 by Cuffdiff) were used for clustering (n = 4 mice/group). (**B**) Volcano plot comparing mRNA levels in gWAT following GSK-LSD1 or veh treatment of *db*/*db* mice. Differentially expressed genes (p<0.01 by Cuffdiff) are indicated in red or blue. (**C**) Networks of genes upregulated (network nodes in red) or downregulated (network nodes in blue) by GSK-LSD1 compared to vehicle (p<0.01 by Cuffdiff) in gWAT from *db*/*db* mice following 6 weeks of treatment, shown as clustered functional categories (n = 4 mice/group). (**D**) qPCR of select inflammation genes downregulated by GSK-LSD1 from (A) as well as the lipolysis enzyme genes Atgl and Lipe (encoding Hsl) in differentiated adipocytes isolated from *db*/*db* mice after preincubation with GSK-LSD1 or veh. (**E**) Immunoblot analysis of $pHsl^{Ser660}$, Hsl, and vinculin in differentiated adipocytes isolated from *db*/*db* mice after preincubation with GSK-LSD1 or veh and stimulation with isoproterenol. (**F**) Quantification of $pHsl^{Ser660}$ to Hsl ratio as fold change compared to veh-treated adipocytes without isoproterenol. Data are shown as mean ± SEM. Statistical differences were calculated using Cuffdiff (B), multiple t-tests (C), or two-way ANOVA with Tukey post hoc analysis (E). $^{**}p$<0.01, $^{***}p$<0.001. AU, arbitrary units.

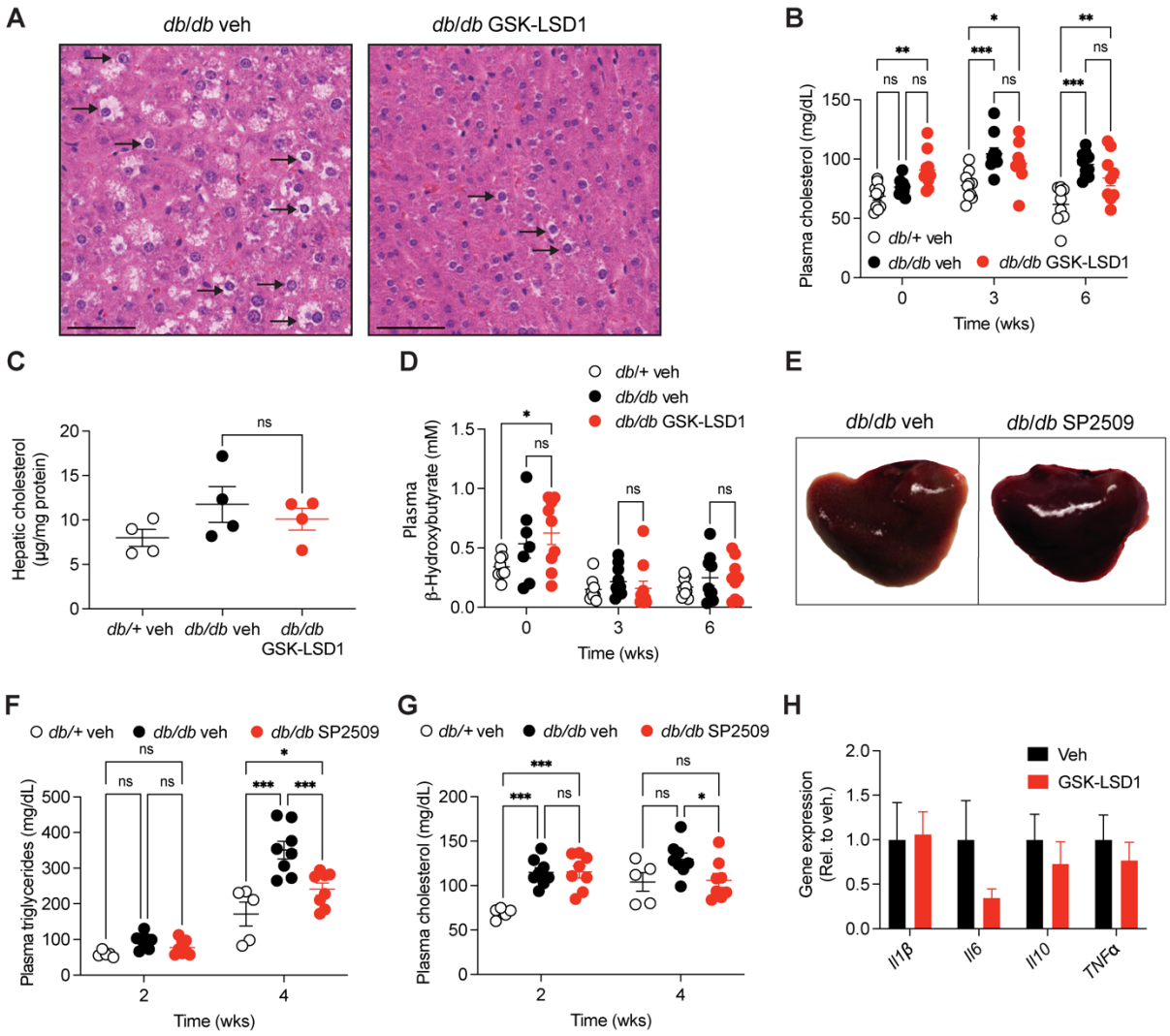

Figure S5. Plasma and hepatic metabolites in *db/db* mice. (**A**) 4-week-old male and female *db/db* mice received daily intraperitoneal injections of GSK-LSD1 or vehicle (veh) for 6 weeks. Representative images of H&E stains of livers. Examples of microvesicular steatosis are highlighted with an arrow. Scale bars = 50 µm. (**B**) Fasting plasma cholesterol levels at indicated time points (n = 9-10 mice/group). (**C**) Hepatic cholesterol levels (n = 4 mice/group). (**D**) Plasma β-hydroxybutyrate levels at indicated time points (n = 7-10 mice/group). (**E-G**) 4-week-old male and female *db/db* mice received SP2509 or vehicle (veh) thrice weekly via intraperitoneal injections for 4 weeks. As a control, lean *db/+* mice were injected with veh. (**E**) Representative images of livers of *db/db* mice treated with SP2509 or vehicle (veh). (**F**) Fasting plasma triglyceride and (**G**) cholesterol levels at indicated time points (n = 5-8 mice/group). (**H**) qPCR analysis of inflammatory genes in liver. Transcript levels in GSK-LSD1-treated relative to veh-treated *db/db* mice (n = 6-8 mice/group). Data are shown as mean ± SEM. Statistical differences were calculated using multiple t-tests (H), a one-way ANOVA (C) or two-way ANOVA (B, D, F, G) with Tukey post hoc analysis. *p<0.05, **p<0.01, ***p<0.001, ns, not significant.

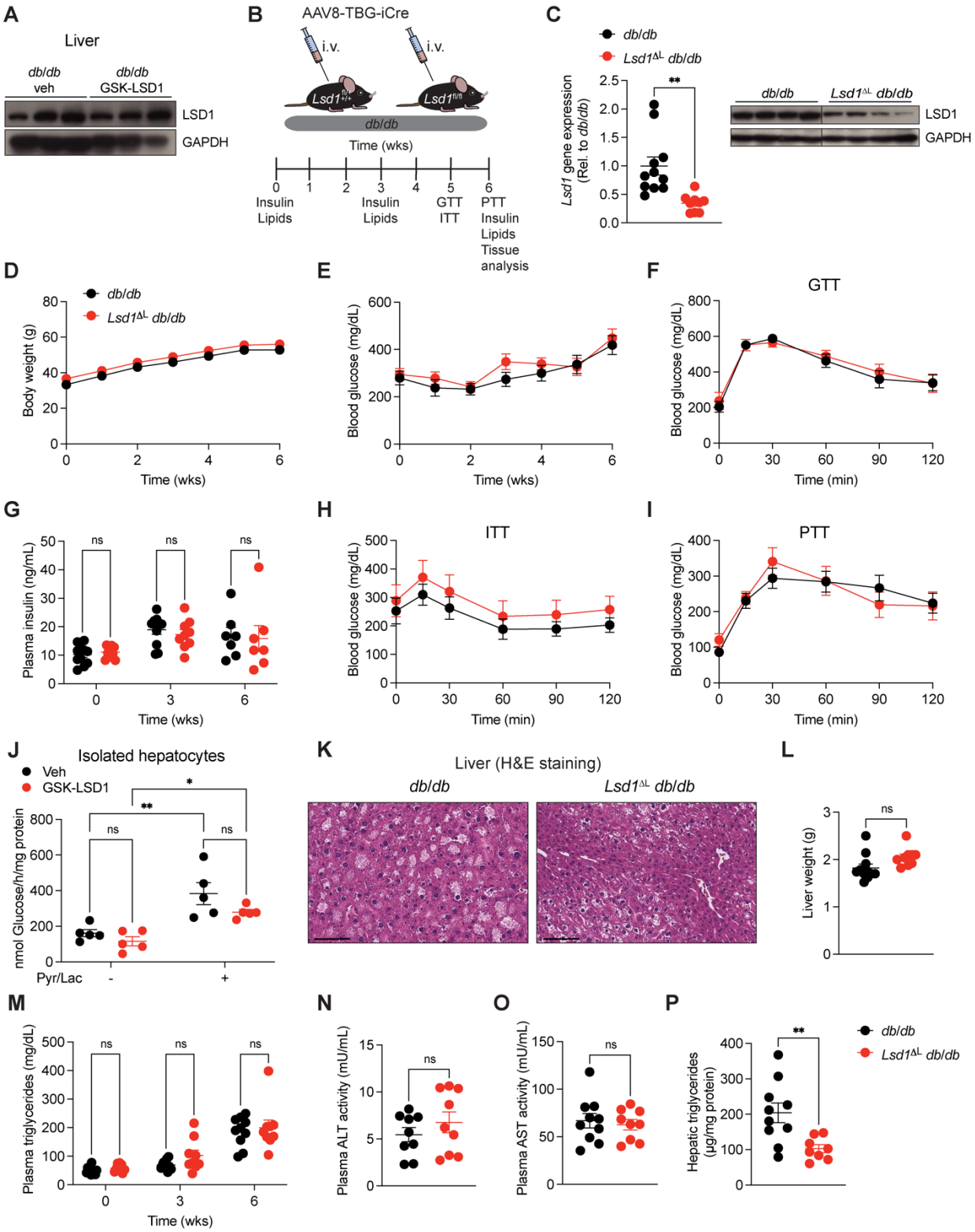

Figure S6: Hepatocyte-specific *Lsd1* deletion does not improve metabolic health in *db/db* mice. (**A**) Immunoblot analysis of LSD1 and GAPDH in the liver of GSK-LSD1- or vehicle (veh)-treated male and female *db/db* mice (n = 3 mice/group). (**B**) 5-week-old male and female *Lsd1*$^{fl/fl}$*db/db* or control (*Lsd1*$^{fl/+}$*db/db* and *Lsd1*$^{+/+}$*db/db*) mice were intravenously injected with

AAV8-TBG-iCre virus for hepatocyte-specific *Lsd1* deletion (hereafter referred to as *Lsd1*$^{\Delta L}$*db*/*db* mice). (**C**) qPCR analysis of *Lsd1* in livers of *Lsd1*$^{\Delta L}$*db*/*db* mice (left). Transcript levels relative to *db*/*db* control mice. (n = 9-11 mice/group). Immunoblot analysis of LSD1 and GAPDH in the liver of *Lsd1*$^{\Delta L}$*db*/*db* and control mice (right). The lanes were run on the same gel but were noncontiguous (n = 4 mice/group). (**D**) Body weight and (**E**) blood glucose levels measured weekly (n = 9-11 mice/group). (**F**) Blood glucose levels at indicated time points after a glucose bolus via oral gavage (n = 9-11 mice/group). Glucose tolerance test, GTT. (**G**) Fasting plasma insulin levels at baseline and after 3 and 6 weeks of GSK-LSD1 or veh treatment (n = 9-11 mice/group for week 0 and 3, n = 7 mice/group for week 6). (**H**) Blood glucose levels at indicated time points after intraperitoneal insulin (2.0 U/kg body weight) injection (n = 9-11 mice/group). Insulin tolerance test, ITT. (**I**) Blood glucose levels at indicated time points after intraperitoneal pyruvate injection (n = 9-11 mice/group). Pyruvate tolerance test, PTT. (**J**) Glucose production in hepatocytes isolated from 5-week-old *db*/*db* mice after preincubation with GSK-LSD1 or veh overnight. Glucose release into the medium was measured after 2 hours of pyruvate and lactate stimulation (n = 5 mice). (**K**) Representative images of liver sections stained with hematoxylin and eosin (H&E). Scale bars = 100 μm (n = 5-7 mice/group). (**L**) Liver weight (n = 9-11 mice/group). (**M**) Fasting plasma triglyceride levels at indicated time points. (**N**) Plasma ALT and (**O**) AST activity (n = 9-11 mice/group). (**P**) Hepatic triglyceride levels (n = 8-10 mice/group). Data are shown as mean ± SEM. Statistical differences were calculated using an unpaired Student's t-test (L, O-P) or two-way ANOVA (D-J, M) with Tukey post hoc analysis. *p<0.05, **p<0.01, ***p<0.001, ns, not significant.

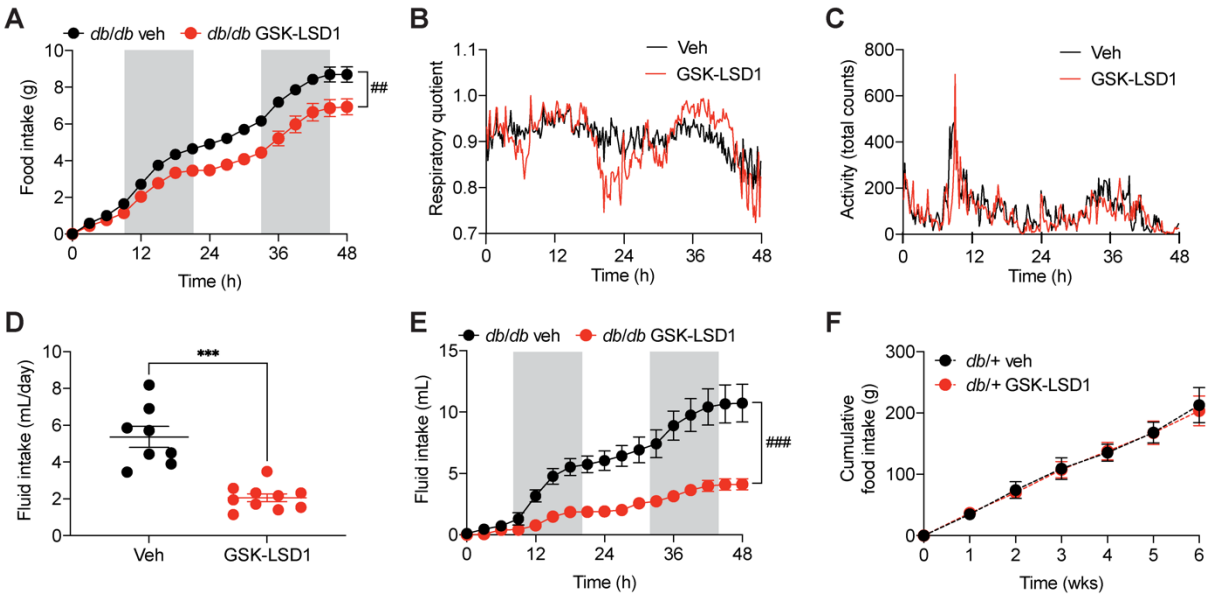

Figure S7. LSD1 inhibition does not alter energy expenditure in *db/db* mice. (**A**) Male and female m~~M~~ice were injected daily with GSK-LSD1 or vehicle (veh) for 5 weeks and then placed into metabolic cages. Using the Comprehensive Laboratory Monitoring System (CLAMS), food intake was monitored and is shown as additive food intake over 48 hours (n = 4-5 mice/group). (**B**) Respiratory quotient over the course of 48 hours (n = 4-5 mice/group). (**C**) Spontaneous motor activity along the X-, Y-, and Z- axis with IR photocells (n = 4-5 mice/group). (**D**) Daily water consumption (n = 4-5 mice/group/day) and (**E**) Cumulative water consumption (n = 4-5 mice/group). (**F**) Cumulative food intake in lean *db*/+ mice treated with GSK-LSD1 or veh for 6 weeks (n = 3 cages/group, total n = 7-9 mice/group). Data presented as mean ± SEM. Statistical differences were calculated using an unpaired Student's t-test (C) or two-way ANOVA (A, B, D-F) with Tukey post hoc analysis. **p*<0.05, ***p*<0.01, ****p*<0.001.

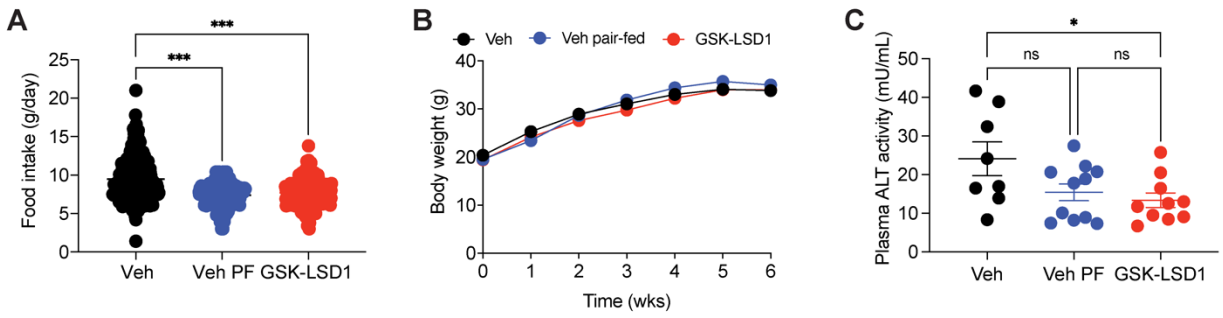

Figure S8. Metabolic parameters of pair-feeding study in *db/db* mice. (**A**) 4-week-old male and female *db/db* mice were injected daily with vehicle (veh) or GSK-LSD1 for 6 weeks and fed a normal chow diet ad libitum. A third group of mice received veh and was pair-fed to GSK-LSD1-treated mice. Food intake was measured daily (n = 8-11 mice/group/day). (**B**) Body weight measured weekly (n = 8-11 mice/group). (**C**) Plasma ALT activity (n = 8-11 mice/group). Data presented as mean ± SEM. Statistical differences were calculated using a one-way ANOVA (A, D) or two-way ANOVA (B, C) with Tukey post hoc analysis. *p<0.05, **p<0.01, ***p<0.001, ns, not significant.

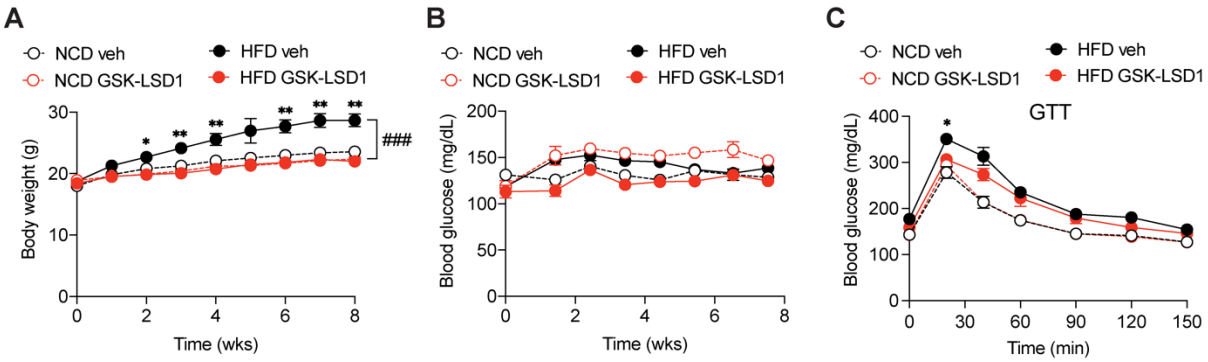

Figure S9. LSD1 inhibition prevents weight gain in high fat diet-fed mice. (**A**) 10-week-old male C57BL/6J *wild type* (*WT*) mice were fed a high fat diet (HFD) or normal chow diet (NCD) for 8 weeks and injected daily with GSK-LSD1 or vehicle (veh). (**B**) Body weight and (**C**) blood glucose levels measured weekly (n = 8 mice/group). Asterisks indicate statistical differences between HFD GSK-LSD1- and HFD veh-treated mice. (**C**) Blood glucose levels after 7 weeks of treatment at indicated time points after a glucose bolus via oral gavage (n = 8 mice/group). Glucose tolerance test, GTT. Asterisk indicates statistical difference between HFD GSK-LSD1 and HFD veh mice. Data presented as mean ± SEM. A two-way ANOVA with Tukey post hoc analysis was performed to determine statistical differences. *$p<0.05$, **$p<0.01$, $^{###}p<0.001$.

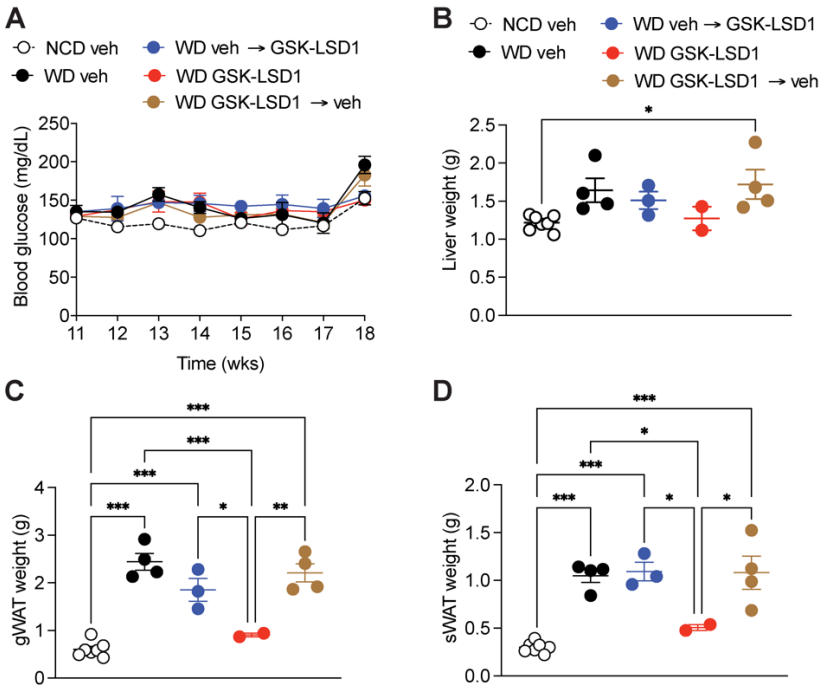

Figure S10. The effect of GSK-LSD1 on body weight in Western diet-fed mice is reversible. (**A**) 10-week-old male C57BL/6J mice fed a Western diet (WD) were injected daily with GSK-LSD1 or vehicle (veh) for 11 weeks. As a control, a group of mice received veh and was kept on a normal chow diet (NCD). After 11 weeks of veh administration, the veh group was split into one group continuing veh administration (black), whereas the other half began to receive GSK-LSD1 daily for another 7 weeks (blue). Likewise, the GSK-LSD1 group was split into one group continuing GSK-LSD1 administration after 11 weeks (red), whereas the other half began to receive veh daily for another 7 weeks (brown). Blood glucose levels were measured weekly (NCD veh: n = 7 mice, WD groups: n = 4 mice). (**B-D**) Tissue weights for (**B**) liver, (**C**) gWAT, and (**D**) sWAT (n = 2-7 mice/group). Data are shown as mean ± SEM. Statistical differences were calculated using a two-way ANOVA (A-D) with Tukey post hoc analysis. **p*<0.05, ***p*<0.01, ****p*<0.001.

Supplemental Table S1. List of quantitative PCR primers.

Gene	Forward Primer	Reverse Primer
Acc1	5'-CTTCCTGACAAACGAGTCTGG-3'	5'-CTGCCGAAACATCTCTGGGA-3'
Atgl	5'-AACACCAGCATCCAGTTCAA-3'	5'-GGTTCAGTAGGCCATTCCTC-3'
Ccl2	5'-CTCAGCCAGATGCAGTTAACG-3'	5'-AAACTACAGCTTCTTTGGGACAC-3'
Cd14	5'-GCCTTTCTCGGAGCCTATCT-3'	5'-TGGCTTCGGATCTGAGAAGT-3'
Cd36	5'-GAATTAGAACCGGGCCACGTA-3'	5'-CAGCCAGGACTGCACCAATA-3'
Cyp1b1	5'-TCCTCTCTGCCGAAAAGAAA-3'	5'-ACAACCTGGTCCAACTCAGC-3'
Elovl6	5'-GAAAAGCAGTTCAACGAGAACG-3'	5'-AGATGCCGACCACCAAAGATA-3'
Fabp1	5'-TGTGGTCAGCTGTGGAAAGG-3'	5'-CGGGCAGACCTATTGCCTTC-3'
Fasn	5'-GGAGGTGGTGATAGCCGGTAT-3'	5'-TGGGTAATCCATAGAGCCCAG-3'
Fos	5'-CGGGTTTCAACGCCGACTA-3'	5'-TTGGCACTAGAGACGGACAGA-3'

Il1β	5'-GAAATGCCACCTTTTGACAGTG-3'	5'-TGGATGCTCTCATCAGGACAG-3'
Il6	5'-TAGTCCTTCCTACCCCAATTTCC-3'	5'-TTGGTCCTTAGCCACTCCTTC-3'
Il10	5'-GCTCTTACTGACTGGCATGAG-3-	5'-CGCAGCTCTAGGAGCATGTG-3'
Lipe	5'-TGGTTCAACTGGAGAGCGGAT-3'	5'-TGATGCAGAGATTCCCACCTG-3'
Lsd1	5'-GCGCCATGGTCTTATCAACT-3'	5'-GCAACTCGTCCACCTACTCG-3'
Mmp14	5'-AAAGGCGCCCCAAGAGAG-3'	5'-GTCCCCTGGAGGTAGGTAGC-3'
Pklr	5'-GCCAGCAGGATACCTGAGAC-3'	5'-CATCCCTGCCTTGATCATCT-3'
Pparα	5'-AACATCGAGTGTCGAATATGTGG-3'	5'-AGCCGAATAGTTCGCCGAAAG-3'
Pparγ	5'-TCGCTGATGCACTGCCTATG-3'	5'-GAGAGGTCCACAGAGCTGATT-3'
Scd1	5'-TTCTTGCGATACACTCTGGTGC-3'	5'-CGGGATTGAATGTTCTTGTCGT-3'

Tbp	5'-GAAGCTGCGGTACAATTCCAG-3'	5'-CCCCTTGTACCCTTCACCAAT-3'
Tlr4	5'-GCTCCTGGCTAGGACTCTGA-3'	5'-AGAGGTGGTGTAAGCCATGC-3'
Tnfα	5'-CCTGTAGCCCACGTCGTAG-3'	5'-GGGAGTAGACAAGGTACAACCC-3'

gene_id	locus	sample_1	sample_2	status	value_1	value_2
Spp1	chr5:1048641	dbveh	dbLSDi	OK	1216.53	200.805
Hba-a1_dup1	chr11:32183€	dbveh	dbLSDi	OK	1203.06	2943.28
Hba-a1_dup2	chr11:321964	dbveh	dbLSDi	OK	712.938	1787.44
Apoa2	chr1:1731551	dbveh	dbLSDi	OK	657.241	35.887
Mgp	chr6:136820ᵹ	dbveh	dbLSDi	OK	489.71	215.935
Postn	chr3:5416502	dbveh	dbLSDi	OK	344.782	105.093
Cfd	chr10:793535	dbveh	dbLSDi	OK	255.706	1115.44
Mest	chr6:306880€	dbveh	dbLSDi	OK	192.586	556.042
Retnla	chr16:48842€	dbveh	dbLSDi	OK	154.555	381.989
Fabp1	chr6:711498ᵹ	dbveh	dbLSDi	OK	138.365	10.1619
Lum	chr10:970281	dbveh	dbLSDi	OK	128.956	58.0806
Bhmt	chr13:943868	dbveh	dbLSDi	OK	121.691	6.01933
Arg1	chr10:24635C	dbveh	dbLSDi	OK	120.35	28.9587
Adam8	chr7:147164ᵹ	dbveh	dbLSDi	OK	117.986	47.2403
Apoa1	chr9:4603671	dbveh	dbLSDi	OK	116.968	10.9354
Ttr	chr18:208237	dbveh	dbLSDi	OK	116.444	5.72773
Ahsg	chr16:228921	dbveh	dbLSDi	OK	107.617	7.04289
Emr1	chr17:574981	dbveh	dbLSDi	OK	100.732	40.2888
S100a8	chr3:904729ᵹ	dbveh	dbLSDi	OK	92.3454	349.904
Aldob	chr4:495488€	dbveh	dbLSDi	OK	91.9631	5.37625
Serpina3k	chr12:10557€	dbveh	dbLSDi	OK	85.1427	8.56722
Dab2	chr15:624978	dbveh	dbLSDi	OK	84.4372	40.1986
Serpina1b	chr12:104966	dbveh	dbLSDi	OK	80.7624	4.99083
Il1rn	chr2:2419237	dbveh	dbLSDi	OK	76.9234	24.777
Ms4a6d	chr19:11661C	dbveh	dbLSDi	OK	71.9214	30.0261
Mat1a	chr14:41918€	dbveh	dbLSDi	OK	67.8517	2.90313
Cyp4a10	chr4:1151908	dbveh	dbLSDi	OK	67.3439	1.94574
Lcn2	chr2:3224015	dbveh	dbLSDi	OK	66.1426	219.825
Hexb	chr13:979078	dbveh	dbLSDi	OK	66.0981	26.665
Ass1	chr2:3132578	dbveh	dbLSDi	OK	63.9318	11.4062
Gnmt	chr17:46862€	dbveh	dbLSDi	OK	62.9597	3.2327
Qpct	chr17:794512	dbveh	dbLSDi	OK	54.7037	19.5248
Igfbp3	chr11:710609	dbveh	dbLSDi	OK	53.0336	137.648
Saa3	chr7:539673€	dbveh	dbLSDi	OK	52.8529	190.026
Cyp4a14	chr4:1151588	dbveh	dbLSDi	OK	52.5888	1.40564
Pmepa1	chr2:173049ᵹ	dbveh	dbLSDi	OK	50.5073	141.988
Gc	chr5:8984653	dbveh	dbLSDi	OK	48.1881	2.32856
Fgg	chr3:8281181	dbveh	dbLSDi	OK	46.6235	1.83593
Col6a3	chr1:9266343	dbveh	dbLSDi	OK	44.7586	16.9735
Serpina1d	chr12:105001	dbveh	dbLSDi	OK	43.5451	2.41019
Fgb	chr3:8284622	dbveh	dbLSDi	OK	42.8562	1.79451
Vtn	chr11:78312€	dbveh	dbLSDi	OK	41.882	11.0341

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Myo1e	chr9:7005515	dbveh	dbLSDi	OK	39.1758	16.3384
Azgp1	chr5:1384227	dbveh	dbLSDi	OK	38.3215	2.18037
Loxl2	chr14:700092	dbveh	dbLSDi	OK	37.7953	15.7221
Chst1	chr2:924398(	dbveh	dbLSDi	OK	37.0674	89.6945
Cyp3a11	chr5:1466661	dbveh	dbLSDi	OK	36.6731	2.16456
Unc119	chr11:78157(	dbveh	dbLSDi	OK	34.1424	77.7028
Slc25a47	chr12:11008(	dbveh	dbLSDi	OK	33.9773	3.01055
Alas2	chrX:146981(	dbveh	dbLSDi	OK	33.5158	101.209
Slc27a2	chr2:1263787	dbveh	dbLSDi	OK	32.5946	2.36407
Fga	chr3:8283007	dbveh	dbLSDi	OK	31.2487	1.01559
Wisp2	chr2:1636465	dbveh	dbLSDi	OK	29.8636	120.32
Gstm5	chr3:1076801	dbveh	dbLSDi	OK	27.9507	92.7262
Fyb	chr15:652987	dbveh	dbLSDi	OK	27.8519	11.5758
Serpinc1	chr1:1629087	dbveh	dbLSDi	OK	27.2376	1.21258
Peg3	chr7:665867(	dbveh	dbLSDi	OK	27.1165	82.2109
Ambp	chr4:6280431	dbveh	dbLSDi	OK	25.8076	1.50583
Fbn1	chr2:1251263	dbveh	dbLSDi	OK	25.0964	12.1849
Bpgm	chr6:3442635	dbveh	dbLSDi	OK	24.8675	58.0608
Hrg	chr16:229511	dbveh	dbLSDi	OK	24.1647	1.37734
Adcy7	chr8:907963(	dbveh	dbLSDi	OK	24.0866	11.3083
Plg	chr17:125714	dbveh	dbLSDi	OK	22.0286	0.988407
Rgn	chrX:2012694	dbveh	dbLSDi	OK	21.4697	0.943148
Slc36a2	chr11:549719	dbveh	dbLSDi	OK	20.9578	45.7329
Cadm1	chr9:4733843	dbveh	dbLSDi	OK	20.4717	7.21165
Ccnd1	chr7:1521158	dbveh	dbLSDi	OK	20.4338	6.66289
Tat	chr8:1125143	dbveh	dbLSDi	OK	18.6305	0.585085
Itgad	chr7:1353174	dbveh	dbLSDi	OK	18.2409	6.3019
Odf2	chr2:2974523	dbveh	dbLSDi	OK	18.0602	69.1199
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Mug1	chr6:1217885	dbveh	dbLSDi	OK	11.9563	0.546252
G6pc	chr11:10122(	dbveh	dbLSDi	OK	11.4716	0.551

Pigr	chr1:1327232	dbveh	dbLSDi	OK	11.2439	0.572766
Hmga2	chr10:119798	dbveh	dbLSDi	OK	11.2258	2.21036
Nptx1	chr11:11940(	dbveh	dbLSDi	OK	9.51862	1.76544
Mki67	chr7:1428814	dbveh	dbLSDi	OK	9.2419	2.6827
Apob	chr12:798448	dbveh	dbLSDi	OK	9.01682	0.30519
Slc38a4	chr15:968252	dbveh	dbLSDi	OK	8.92843	0.431954
Iigp1	chr18:605356	dbveh	dbLSDi	OK	8.57775	22.8593
Hr	chr14:709538	dbveh	dbLSDi	OK	8.50017	21.4716
Slc40a1	chr1:4596491	dbveh	dbLSDi	OK	7.79096	19.1204
St6galnac2	chr11:116538	dbveh	dbLSDi	OK	7.7395	24.5343
Tnc	chr4:6362081	dbveh	dbLSDi	OK	7.15894	1.48133
Slc7a2	chr8:4194772	dbveh	dbLSDi	OK	7.10411	1.77694
Cyp8b1	chr9:1218234	dbveh	dbLSDi	OK	6.564	0.678903
Limch1	chr5:6713707	dbveh	dbLSDi	OK	6.04129	17.2395
Hspa2	chr12:775051	dbveh	dbLSDi	OK	5.91664	28.7926
Ybx2	chr11:697494	dbveh	dbLSDi	OK	5.82761	45.5615
Apod	chr16:312962	dbveh	dbLSDi	OK	5.79349	27.554
Bhmt2	chr13:94426(	dbveh	dbLSDi	OK	5.67728	0.353359
Mbl1	chr14:419647	dbveh	dbLSDi	OK	5.16728	0.270938
Serpinf2	chr11:752452	dbveh	dbLSDi	OK	5.1115	0.471973
Hnf4a	chr2:163372(	dbveh	dbLSDi	OK	5.0421	0.290712
Gbp4	chr5:1055447	dbveh	dbLSDi	OK	4.67141	13.6976
Pipox	chr11:776941	dbveh	dbLSDi	OK	4.52901	0.484147
Fmo3	chr1:164883(	dbveh	dbLSDi	OK	4.51737	0.458899
C6	chr15:46772(	dbveh	dbLSDi	OK	4.17306	19.3429
Ugt2b1	chr5:873456(	dbveh	dbLSDi	OK	4.10477	0.190831
Rdh16	chr10:127238	dbveh	dbLSDi	OK	3.36397	0.342288
Fam46c	chr3:1002754	dbveh	dbLSDi	OK	2.73598	18.6267
Itih1	chr14:317423	dbveh	dbLSDi	OK	2.29201	0.170444
4930579G22F	chr5:1303844	dbveh	dbLSDi	OK	2.04371	23.1765
Cyp3a13	chr5:1383341	dbveh	dbLSDi	OK	1.98858	0.100824
Fabp9	chr3:1019362	dbveh	dbLSDi	OK	1.7934	37.6342
1700029J11R	chr2:172298(	dbveh	dbLSDi	OK	1.63146	25.0314
Dbil5	chr11:760311	dbveh	dbLSDi	OK	1.62914	62.1629
Hc	chr2:348388(	dbveh	dbLSDi	OK	1.60445	0.128207
Grem2	chr1:176763(	dbveh	dbLSDi	OK	1.50755	0.176785
Pgam2	chr11:570163	dbveh	dbLSDi	OK	1.29563	19.6195
Hspb9	chr11:100575	dbveh	dbLSDi	OK	1.26371	19.8461
4732415M23	chr8:1257367	dbveh	dbLSDi	OK	1.14096	29.892
Mlf1	chr3:6717801	dbveh	dbLSDi	OK	1.09205	25.4239
Oaz3	chr3:9423708	dbveh	dbLSDi	OK	0.694063	32.5017
Fhl4	chr10:845597	dbveh	dbLSDi	OK	0.442524	24.5805
Fam71e1	chr7:5175195	dbveh	dbLSDi	OK	0.721369	16.8234

Spata3	chr1:8791851	dbveh	dbLSDi	OK	0.452531	16.1123
Ggn	chr7:2995522	dbveh	dbLSDi	OK	0.968289	13.1807
Clip4	chr17:72119C	dbveh	dbLSDi	OK	0.788281	12.7721
Tbata	chr10:606347	dbveh	dbLSDi	OK	0.351244	12.708
1700019D03F	chr1:5298197	dbveh	dbLSDi	OK	0.603973	12.5915
Rsph1	chr17:31391C	dbveh	dbLSDi	OK	0.612382	12.4479
2610318N02F	chr16:171134	dbveh	dbLSDi	OK	0.487946	12.267
1700026L06R	chr2:285475C	dbveh	dbLSDi	OK	0.606276	12.2072
Tssk1	chr16:178942	dbveh	dbLSDi	OK	0.167979	11.8106
Lrrc46	chr11:96895C	dbveh	dbLSDi	OK	0.326937	11.3741
Klhl10	chr11:100303	dbveh	dbLSDi	OK	0.23721	11.3081
1700003E16R	chr6:831063C	dbveh	dbLSDi	OK	0.251215	10.8751
BC049762	chr11:510671	dbveh	dbLSDi	OK	0.595877	10.0879
Aard	chr15:51871E	dbveh	dbLSDi	OK	0.345559	8.93004
Ccdc92	chr5:125314E	dbveh	dbLSDi	OK	0.458533	8.33085
Pmfbp1	chr8:112017C	dbveh	dbLSDi	OK	0.105381	8.04428
Trim17	chr11:587772	dbveh	dbLSDi	OK	0.238717	8.01127
Best1	chr19:10059E	dbveh	dbLSDi	OK	0.489972	7.28138
1700028J19R	chr7:514852C	dbveh	dbLSDi	OK	0.387731	6.63577
Slc22a14	chr9:1190785	dbveh	dbLSDi	OK	0.4775	6.47825
Ccdc89	chr7:9757482	dbveh	dbLSDi	OK	0.3734	6.47651
Ttll13	chr7:873912E	dbveh	dbLSDi	OK	0.262942	6.42863
Rnf32	chr5:2952454	dbveh	dbLSDi	OK	0.474908	6.34476
Bspry	chr4:621411C	dbveh	dbLSDi	OK	0.193886	6.33942
1700061G19F	chr17:57015C	dbveh	dbLSDi	OK	0.238454	6.22752
4930412F15R	chr4:436724C	dbveh	dbLSDi	OK	0.0732652	6.03268
Adam5	chr8:2584345	dbveh	dbLSDi	OK	0.172923	6.02389
1700030J22R	chr8:1194934	dbveh	dbLSDi	OK	0.332893	5.64905
Ccdc65	chr15:98538E	dbveh	dbLSDi	OK	0.208066	5.60037
Efcab9	chr11:324227	dbveh	dbLSDi	OK	0.247145	5.59021
Sox30	chr11:457938	dbveh	dbLSDi	OK	0.119008	5.54879
BC061194	chr2:1862064	dbveh	dbLSDi	OK	0.118689	5.48806
Spata9	chr13:761051	dbveh	dbLSDi	OK	0.262192	5.43696
Hook1	chr4:956340E	dbveh	dbLSDi	OK	0.436227	5.13502
Dnahc8	chr17:307638	dbveh	dbLSDi	OK	0.265331	5.04527
4930579J09R	chr19:105487	dbveh	dbLSDi	OK	0.155313	4.67514
Fank1	chr7:1409685	dbveh	dbLSDi	OK	0.281902	4.56185
Cldn11	chr3:3104884	dbveh	dbLSDi	OK	0.201617	4.48889
Ubxn10	chr4:1382744	dbveh	dbLSDi	OK	0.303249	4.35785
Ccdc116	chr16:171391	dbveh	dbLSDi	OK	0.0986201	4.34196
4930544O15F	chr4:1154524	dbveh	dbLSDi	OK	0.126063	4.30709
Gm4787	chr12:82477C	dbveh	dbLSDi	OK	0.0935228	4.30155
Stag3	chr5:1387217	dbveh	dbLSDi	OK	0.28548	4.25608

C530008M17	chr5:7726962	dbveh	dbLSDi	OK	0.0665608	4.23009
Chl1	chr6:103460[illegible]	dbveh	dbLSDi	OK	0.262729	3.81923
1700012A16R	chr1:1552723	dbveh	dbLSDi	OK	0.160027	3.78665
Mycbpap	chr11:94362[illegible]	dbveh	dbLSDi	OK	0.0753633	3.74043
Ccdc42	chr11:684005	dbveh	dbLSDi	OK	0.257419	3.73197
Amac1	chr11:695733	dbveh	dbLSDi	OK	0.13726	3.53562
Kif27	chr13:583888	dbveh	dbLSDi	OK	0.112266	3.43263
A330021E22R	chr5:5580981	dbveh	dbLSDi	OK	0.194224	3.12878
Pbx4	chr8:723566[illegible]	dbveh	dbLSDi	OK	0.187127	3.03982
Lpar3	chr3:145883[illegible]	dbveh	dbLSDi	OK	0.295405	2.87638
Ttc21a	chr9:1198467	dbveh	dbLSDi	OK	0.0434963	2.68869
Hipk4	chr7:2830827	dbveh	dbLSDi	OK	0.173316	2.66495
4931417G12R	chr6:1135467	dbveh	dbLSDi	OK	0.0976001	2.59952
Nsun7	chr5:666513[illegible]	dbveh	dbLSDi	OK	0.232921	2.46897
Cpa5	chr6:305610[illegible]	dbveh	dbLSDi	OK	0.128941	2.135
4930590J08R	chr6:9185422	dbveh	dbLSDi	OK	0.0467156	1.92991
Ccdc164	chr5:3060791	dbveh	dbLSDi	OK	0.0393383	1.75456
Adam4	chr12:825205	dbveh	dbLSDi	OK	0.110117	1.46919
Efhb	chr17:535382	dbveh	dbLSDi	OK	0.087852	1.35579
Lrp2bp	chr8:4709595	dbveh	dbLSDi	OK	0.0466609	1.32934
AI836003	chr15:979982	dbveh	dbLSDi	OK	0.0888529	1.23711
Sycp2	chr2:178080[illegible]	dbveh	dbLSDi	OK	0.12997	1.12714
Gm973	chr1:595731[illegible]	dbveh	dbLSDi	OK	0.0544407	1.07846
Asb15	chr6:2447814	dbveh	dbLSDi	OK	0.0516638	1.0242
Galnt3	chr2:6592082	dbveh	dbLSDi	OK	0.0630059	1.00777
Trank1	chr9:1112142	dbveh	dbLSDi	OK	0.0378857	0.60481
Wdr52	chr16:443949	dbveh	dbLSDi	OK	0.0382014	0.448135
Basp1	chr15:25293[illegible]	dbveh	dbLSDi	OK	47.4098	20.4766
Nceh1	chr3:2708192	dbveh	dbLSDi	OK	45.0699	22.3532
Vegfa	chr17:46153[illegible]	dbveh	dbLSDi	OK	30.7376	61.375
Clec12a	chr6:1293002	dbveh	dbLSDi	OK	30.3451	9.32376
Serpinb6b	chr13:330573	dbveh	dbLSDi	OK	26.7848	9.12363
Syt12	chr19:44459[illegible]	dbveh	dbLSDi	OK	8.03213	18.9978
Itih3	chr14:317217	dbveh	dbLSDi	OK	4.39933	0.411871
Aldh8a1	chr10:210971	dbveh	dbLSDi	OK	4.37214	0.445282
Phf7	chr14:320508	dbveh	dbLSDi	OK	3.95395	28.9946
Tmprss6	chr15:78270[illegible]	dbveh	dbLSDi	OK	2.79229	0.256633
Trim36	chr18:463249	dbveh	dbLSDi	OK	2.46951	8.33793
Nup210	chr6:909630[illegible]	dbveh	dbLSDi	OK	1.18219	4.69767
Ccdc19	chr1:1744512	dbveh	dbLSDi	OK	0.765334	8.29541
Chd5	chr4:1517127	dbveh	dbLSDi	OK	0.444895	4.60031
Lrrc9	chr12:735428	dbveh	dbLSDi	OK	0.205782	3.57991
1700102P08R	chr9:1082951	dbveh	dbLSDi	OK	0.238716	3.22599

Eno4	chr19:59017	dbveh	dbLSDi	OK	0.100042	1.07206
Lcp1	chr14:755362	dbveh	dbLSDi	OK	182.176	77.3266
Nckap1l	chr15:103284	dbveh	dbLSDi	OK	65.1092	31.653
Hpd	chr5:123621	dbveh	dbLSDi	OK	34.9813	2.97427
Ccr5	chr9:1240362	dbveh	dbLSDi	OK	31.5484	14.969
Hpx	chr7:1127401	dbveh	dbLSDi	OK	25.21	4.67383
Sel1l3	chr5:5349832	dbveh	dbLSDi	OK	12.4315	4.27132
Ugt3a2	chr15:926535	dbveh	dbLSDi	OK	11.6688	2.23923
Upb1	chr10:748697	dbveh	dbLSDi	OK	8.40378	0.805045
Prune2	chr19:17030	dbveh	dbLSDi	OK	5.5382	2.32761
1700029G01F	chr4:125827	dbveh	dbLSDi	OK	2.54199	23.5098
Spag4	chr2:155890	dbveh	dbLSDi	OK	1.05099	12.2581
Creb3l4	chr3:9004142	dbveh	dbLSDi	OK	0.814467	9.47971
Ak8	chr2:285556	dbveh	dbLSDi	OK	0.827608	8.09841
Stat4	chr1:520650	dbveh	dbLSDi	OK	0.43037	6.52458
Ttc39a	chr4:1090797	dbveh	dbLSDi	OK	0.55108	5.88859
4930579C15F	chr4:945739	dbveh	dbLSDi	OK	0.206607	4.64226
Enkur	chr2:211023	dbveh	dbLSDi	OK	0.346625	4.29914
Tmem146	chr17:567675	dbveh	dbLSDi	OK	0.106951	1.25657
Efhc2	chrX:1670917	dbveh	dbLSDi	OK	0.0993381	1.11812
Col1a1	chr11:947975	dbveh	dbLSDi	OK	557.204	146.329
Cd300lb	chr11:114784	dbveh	dbLSDi	OK	33.4436	16.421
Kng1	chr16:230583	dbveh	dbLSDi	OK	31.5446	1.85294
Cd300ld	chr11:114843	dbveh	dbLSDi	OK	29.5632	12.9545
Cxcl2	chr5:9133292	dbveh	dbLSDi	OK	26.6547	2.23829
Ttc36	chr9:446074	dbveh	dbLSDi	OK	25.2057	2.92256
Nedd9	chr13:414052	dbveh	dbLSDi	OK	24.8637	48.6856
Dcbld2	chr16:58408	dbveh	dbLSDi	OK	23.9891	12.1923
Slc25a42	chr8:7270823	dbveh	dbLSDi	OK	19.1465	36.5318
Lcat	chr8:1084634	dbveh	dbLSDi	OK	9.99614	1.10344
Ptch2	chr4:116768	dbveh	dbLSDi	OK	3.29762	10.3983
Amhr2	chr15:102275	dbveh	dbLSDi	OK	0.842887	9.94925
Xrra1	chr7:1070077	dbveh	dbLSDi	OK	0.566176	6.07166
Fndc8	chr11:82705	dbveh	dbLSDi	OK	0.261981	3.1859
Adcy10	chr1:167415	dbveh	dbLSDi	OK	0.279677	2.8489
Cct6b	chr11:825327	dbveh	dbLSDi	OK	0.182762	2.34927
Srcin1	chr11:97370	dbveh	dbLSDi	OK	0.0900947	0.894464
Sdc1	chr12:87782	dbveh	dbLSDi	OK	71.3177	35.5662
Rab8b	chr9:6669147	dbveh	dbLSDi	OK	48.1617	24.4903
S100a9	chr3:9049655	dbveh	dbLSDi	OK	39.7213	6.16446
Igf2r	chr17:128752	dbveh	dbLSDi	OK	25.4051	13.566
Pon1	chr6:511808	dbveh	dbLSDi	OK	15.2287	1.36373
Cd274	chr19:29441	dbveh	dbLSDi	OK	7.59872	16.1867

Top2a	chr11:988542	dbveh	dbLSDi	OK	6.67114	2.11085
Msln	chr17:258855	dbveh	dbLSDi	OK	4.47768	0.529622
Crisp2	chr17:40901(	dbveh	dbLSDi	OK	0.893433	22.5867
2810408A11F	chr11:697108	dbveh	dbLSDi	OK	0.550441	5.21993
1700008I05R	chrX:1321892	dbveh	dbLSDi	OK	0.190694	2.14803
Kcnu1	chr8:269600(	dbveh	dbLSDi	OK	0.206449	1.82922
Ulk4	chr9:120873(	dbveh	dbLSDi	OK	0.172118	1.49128
Hbb-b1	chr7:110961(	dbveh	dbLSDi	OK	347.561	1043.88
Fstl1	chr16:377771	dbveh	dbLSDi	OK	153.647	75.1889
Colec12	chr18:970764	dbveh	dbLSDi	OK	50.6312	28.1699
Slc37a2	chr9:3703673	dbveh	dbLSDi	OK	42.1427	21.052
Tlr8	chrX:163680(	dbveh	dbLSDi	OK	17.8023	7.42252
Efr3b	chr12:396255	dbveh	dbLSDi	OK	9.07682	3.46998
Lrrn4	chr2:1326942	dbveh	dbLSDi	OK	1.70744	0.240694
Fam71f2	chr6:2923114	dbveh	dbLSDi	OK	1.18826	9.58019
1700001K19F	chr12:111905	dbveh	dbLSDi	OK	0.390392	5.71809
Dyrk3	chr1:133025(	dbveh	dbLSDi	OK	0.519967	4.49963
Tmc7	chr7:1256793	dbveh	dbLSDi	OK	0.267082	2.31988
Mrc1	chr2:1415104	dbveh	dbLSDi	OK	71.5936	37.2434
Anpep	chr7:8696668	dbveh	dbLSDi	OK	62.8384	32.8748
Cd14	chr18:368847	dbveh	dbLSDi	OK	46.8209	20.9911
Selenbp1	chr3:947370(	dbveh	dbLSDi	OK	44.4731	81.886
Cd53	chr3:1065617	dbveh	dbLSDi	OK	39.6908	19.7765
Serpina1c	chr12:105133	dbveh	dbLSDi	OK	24.854	2.55471
Rdh7	chr10:127321	dbveh	dbLSDi	OK	20.5098	0.992067
Acr	chr15:893987	dbveh	dbLSDi	OK	1.01633	8.15479
Tekt2	chr4:1259993	dbveh	dbLSDi	OK	1.00114	10.6993
Slc2a5	chr4:1494934	dbveh	dbLSDi	OK	0.93532	7.08923
Catsper3	chr13:558859	dbveh	dbLSDi	OK	0.269799	4.43659
Comp	chr8:7289744	dbveh	dbLSDi	OK	0.367818	3.39654
Ldlr	chr9:2152803	dbveh	dbLSDi	OK	23.2337	11.909
Hspa4l	chr3:4054953	dbveh	dbLSDi	OK	8.27411	18.2706
Nrcam	chr12:454298	dbveh	dbLSDi	OK	6.06852	1.93505
Creb3l3	chr10:80547(	dbveh	dbLSDi	OK	5.28128	0.599843
Kif11	chr19:374508	dbveh	dbLSDi	OK	5.04276	1.61391
1700001L05R	chr15:831842	dbveh	dbLSDi	OK	0.736283	3.17301
Aldoart1	chr4:7251161	dbveh	dbLSDi	OK	0.193719	2.55754
Efcab5	chr11:769034	dbveh	dbLSDi	OK	0.0675498	1.02298
S100a4	chr3:9040769	dbveh	dbLSDi	OK	711.996	359.048
Itgam	chr7:1352061	dbveh	dbLSDi	OK	70.3145	34.4994
Hgsnat	chr8:2705493	dbveh	dbLSDi	OK	62.7823	32.8828
Rgs1	chr1:1460917	dbveh	dbLSDi	OK	58.4363	27.5045
Metrnl	chr11:121563	dbveh	dbLSDi	OK	46.4885	23.6064

Cyp2a5	chr7:2762035	dbveh	dbLSDi	OK	26.1373	2.33287
Zranb3	chr1:1298507	dbveh	dbLSDi	OK	5.02667	1.13595
1700010I14R	chr17:9181119	dbveh	dbLSDi	OK	0.8621	7.97169
Fbxo24	chr5:1380537	dbveh	dbLSDi	OK	0.540322	5.15686
Pfn4	chr12:4776100	dbveh	dbLSDi	OK	0.340381	3.18567
Ccdc158	chr5:9303732	dbveh	dbLSDi	OK	0.105814	1.06867
Tm4sf19	chr16:3240059	dbveh	dbLSDi	OK	52.0576	21.6553
Serpina1a	chr12:1050916	dbveh	dbLSDi	OK	19.1007	1.90474
Ropn1l	chr15:3137099	dbveh	dbLSDi	OK	3.35525	32.1523
Abcc2	chr19:4385677	dbveh	dbLSDi	OK	2.31203	0.320087
Gm70	chr12:7751855	dbveh	dbLSDi	OK	0.311942	3.98412
Apoh	chr11:1082566	dbveh	dbLSDi	OK	50.9501	4.11265
Cfh	chr1:1419824	dbveh	dbLSDi	OK	37.7587	21.5814
Cd180	chr13:1034833	dbveh	dbLSDi	OK	29.2706	13.8068
Fmod	chr1:135934(0	dbveh	dbLSDi	OK	14.2316	3.73867
Col8a1	chr16:5762433	dbveh	dbLSDi	OK	8.65374	3.10289
Cdh11	chr8:1051568	dbveh	dbLSDi	OK	5.68594	1.25309
1300017J02R	chr9:1031528	dbveh	dbLSDi	OK	3.21847	0.45914
Rdh9	chr10:1272133	dbveh	dbLSDi	OK	2.00235	0.293904
Sec14l4	chr11:3931788	dbveh	dbLSDi	OK	1.76377	0.149959
Col5a1	chr2:2774194	dbveh	dbLSDi	OK	122.482	60.2441
Cyth4	chr15:7842744	dbveh	dbLSDi	OK	87.8093	45.2993
Cyp2c50	chr19:4016414	dbveh	dbLSDi	OK	28.8321	1.13863
Phkg2	chr7:1347168	dbveh	dbLSDi	OK	20.7811	44.6425
Pdzrn3	chr6:1010996	dbveh	dbLSDi	OK	20.7153	37.4641
Cd109	chr9:7846335	dbveh	dbLSDi	OK	7.87959	3.53106
Calcrl	chr2:8417078	dbveh	dbLSDi	OK	12.5625	6.038
Fos	chr12:8681488	dbveh	dbLSDi	OK	53.8782	28.7577
Msr1	chr8:4066705	dbveh	dbLSDi	OK	38.3435	17.4506
Usp2	chr9:4387510	dbveh	dbLSDi	OK	5.08647	12.9917
Ankrd5	chr2:1363580	dbveh	dbLSDi	OK	2.43584	11.6647
Hspa1l	chr17:3510966	dbveh	dbLSDi	OK	1.09036	11.615
Ubxn11	chr4:1336585	dbveh	dbLSDi	OK	0.697951	5.68318
Cage1	chr13:3809799	dbveh	dbLSDi	OK	0.430589	3.43354
Agbl2	chr2:9062290	dbveh	dbLSDi	OK	0.123289	1.3805
Art3	chr5:9276086	dbveh	dbLSDi	OK	53.7234	96.5289
Vhl	chr6:1135740	dbveh	dbLSDi	OK	43.4511	78.5295
Rrm1	chr7:1095902	dbveh	dbLSDi	OK	15.3907	7.42301
D11Wsu47e	chr11:1135455	dbveh	dbLSDi	OK	4.30712	14.0086
Gpm6a	chr8:5604008	dbveh	dbLSDi	OK	3.25815	0.37271
Ptgs2	chr1:1519472	dbveh	dbLSDi	OK	1.13678	0.0863354
Ccdc30	chr4:1189964	dbveh	dbLSDi	OK	0.178593	2.22501
Cotl1	chr8:1223331	dbveh	dbLSDi	OK	187.614	103.539

Bnip3	chr7:1460825	dbveh	dbLSDi	OK	122.36	214.649
Gcnt1	chr19:17400€	dbveh	dbLSDi	OK	11.503	4.97713
Tulp2	chr7:5276907	dbveh	dbLSDi	OK	0.348845	31.9256
Hpgds	chr6:650672€	dbveh	dbLSDi	OK	21.0083	10.2069
Dhrs9	chr2:6921851	dbveh	dbLSDi	OK	17.542	6.22772
Tmeff1	chr4:485980€	dbveh	dbLSDi	OK	9.27138	20.767
Haao	chr17:84230€	dbveh	dbLSDi	OK	6.65934	0.897447
Tssk4	chr14:56269C	dbveh	dbLSDi	OK	0.357031	5.55922
Prr22	chr17:56909€	dbveh	dbLSDi	OK	0.405394	3.9624
Cyp2d9	chr15:822828	dbveh	dbLSDi	OK	6.57035	1.12497
Cox6b2	chr7:4703395	dbveh	dbLSDi	OK	2.96599	20.5444
Zfp37	chr4:6185057	dbveh	dbLSDi	OK	1.20392	4.7299
Tmem132b	chr5:1260127	dbveh	dbLSDi	OK	0.297238	2.69793
Siglec1	chr2:130894ᵹ	dbveh	dbLSDi	OK	15.0685	7.894
Cspg4	chr9:5671291	dbveh	dbLSDi	OK	9.93249	5.25017
Upk1b	chr16:387732	dbveh	dbLSDi	OK	4.39043	0.747568
Iyd	chr10:67916€	dbveh	dbLSDi	OK	1.71572	0.259165
Kap	chr6:133799ᵹ	dbveh	dbLSDi	OK	84.5626	25.1929
Alcam	chr16:522491	dbveh	dbLSDi	OK	20.3505	10.9322
Cyp3a25	chr5:1467887	dbveh	dbLSDi	OK	16.4909	0.954693
Tnfrsf11a	chr1:1076772	dbveh	dbLSDi	OK	15.0129	7.33795
Spa17	chr9:3741087	dbveh	dbLSDi	OK	2.8025	23.2223
Bgn	chrX:7072897	dbveh	dbLSDi	OK	482.197	234.204
Enpp2	chr15:546704	dbveh	dbLSDi	OK	99.3951	57.4096
Cyp1b1	chr17:801062	dbveh	dbLSDi	OK	32.6454	18.6162
Plxnb2	chr15:889859	dbveh	dbLSDi	OK	28.0408	15.6454
Uox	chr3:1462443	dbveh	dbLSDi	OK	24.3827	1.1547
Atp1a4	chr1:174153€	dbveh	dbLSDi	OK	0.77298	7.36171
Lass3	chr7:7388838	dbveh	dbLSDi	OK	0.140114	1.66
Rd3	chr1:1938012	dbveh	dbLSDi	OK	0.103465	0.965757
Fn1	chr1:7163209	dbveh	dbLSDi	OK	76.5146	36.0048
Clu	chr14:665873	dbveh	dbLSDi	OK	51.653	105.368
Atp2a3	chr11:72774€	dbveh	dbLSDi	OK	32.5989	56.9024
Ttc25	chr11:10040€	dbveh	dbLSDi	OK	0.525125	3.17524
Trem2	chr17:484857	dbveh	dbLSDi	OK	210.514	114.23
Apoc3	chr9:4604113	dbveh	dbLSDi	OK	131.383	11.6468
Gusb	chr5:1304648	dbveh	dbLSDi	OK	125.518	71.7021
Fkbp10	chr11:100277	dbveh	dbLSDi	OK	30.4561	15.4201
Hgfac	chr5:353842C	dbveh	dbLSDi	OK	1.70604	0.22813
Fcer1g	chr1:1731597	dbveh	dbLSDi	OK	256.327	139.763
Prrx1	chr1:1651752	dbveh	dbLSDi	OK	28.0855	15.9394
Dock2	chr11:341268	dbveh	dbLSDi	OK	9.89136	4.6418
Rbpms	chr8:3489311	dbveh	dbLSDi	OK	53.0095	98.8935

Ftcd	chr10:760383	dbveh	dbLSDi	OK	4.73314	0.604434
Iqgap3	chr3:8788597	dbveh	dbLSDi	OK	2.95313	0.792699
Ctsk	chr3:953032(	dbveh	dbLSDi	OK	393.899	203.994
Gas2l3	chr10:888715	dbveh	dbLSDi	OK	6.06285	2.43153
Slc2a2	chr3:2859682	dbveh	dbLSDi	OK	3.77106	0.603864
Nup210l	chr3:8990805	dbveh	dbLSDi	OK	0.085769	0.930542
Gcnt2	chr13:409555	dbveh	dbLSDi	OK	32.1784	55.3084
Psma8	chr18:148646	dbveh	dbLSDi	OK	0.569877	3.615
Apobec1	chr6:122527(	dbveh	dbLSDi	OK	69.796	38.9709
Chchd10	chr10:753983	dbveh	dbLSDi	OK	67.1019	135.055
Ptprc	chr1:1399594	dbveh	dbLSDi	OK	17.0607	9.21608
Igf2bp2	chr16:22059(	dbveh	dbLSDi	OK	10.9271	4.76527
Gltpd2	chr11:703327	dbveh	dbLSDi	OK	3.86778	0.453809
Atp6v0d2	chr4:198039(	dbveh	dbLSDi	OK	104.447	56.8413
Lpxn	chr19:12873(	dbveh	dbLSDi	OK	52.0316	28.2571
Clec4a2	chr6:1230727	dbveh	dbLSDi	OK	25.6989	12.4477
Ntrk2	chr13:589079	dbveh	dbLSDi	OK	21.7703	38.4979
Dusp9	chrX:7088477	dbveh	dbLSDi	OK	6.25815	16.0894
Tcfl5	chr2:180332(	dbveh	dbLSDi	OK	1.48305	11.9295
Morn5	chr2:359049(	dbveh	dbLSDi	OK	0.970056	10.9032
Plagl1	chr10:128105	dbveh	dbLSDi	OK	24.4464	44.31
Pla2g5	chr4:1383551	dbveh	dbLSDi	OK	0.956905	11.3594
Morn4	chr19:421494	dbveh	dbLSDi	OK	0.507202	3.22032
Tns3	chr11:833165	dbveh	dbLSDi	OK	24.1287	13.9312
5430411K18F	chr18:781352	dbveh	dbLSDi	OK	5.572	9.99866
Ptp4a3	chr15:735535	dbveh	dbLSDi	OK	12.7091	23.0891
Prkce	chr17:865671	dbveh	dbLSDi	OK	10.8925	18.6005
Cd84	chr1:1737698	dbveh	dbLSDi	OK	55.4303	31.2281
Acer2	chr4:8652031	dbveh	dbLSDi	OK	29.8635	50.9647
Brdt	chr5:1077602	dbveh	dbLSDi	OK	1.13917	4.96829
Beta-s	chr7:110975(	dbveh	dbLSDi	OK	2013.15	5315.35
Zfp598	chr17:248066	dbveh	dbLSDi	OK	28.9353	48.904
Sirpa	chr2:129418(	dbveh	dbLSDi	OK	137.615	73.4547
Plek	chr11:168712	dbveh	dbLSDi	OK	39.9558	22.8562
2210404O07F	chr10:808558	dbveh	dbLSDi	OK	4.94883	34.8422
Itgax	chr7:135273(	dbveh	dbLSDi	OK	42.935	24.1473
Lpin2	chr17:715333	dbveh	dbLSDi	OK	11.9527	6.19757
Atf3	chr1:1929941	dbveh	dbLSDi	OK	41.8923	22.8083
Pcp4l1	chr1:1731033	dbveh	dbLSDi	OK	15.5343	1.85437
Adam12	chr7:1410748	dbveh	dbLSDi	OK	8.15837	4.33984
Rnf17	chr14:570215	dbveh	dbLSDi	OK	0.319103	2.13479
Ace	chr11:10582(	dbveh	dbLSDi	OK	27.2018	46.4877
Dnahc1	chr14:320735	dbveh	dbLSDi	OK	0.0430219	0.28539

Tyrobp	chr7:311988(	dbveh	dbLSDi	OK	725.475	419.731
Mmp12	chr9:7347373	dbveh	dbLSDi	OK	212.867	86.2968
Rbp7	chr4:148823(	dbveh	dbLSDi	OK	61.9096	129.633
Celf5	chr10:80921(	dbveh	dbLSDi	OK	0.238318	1.48248
Lilrb4	chr10:512107	dbveh	dbLSDi	OK	154.854	84.65
Ahcy	chr2:154885(	dbveh	dbLSDi	OK	14.4051	4.45775
Laptm5	chr4:1304692	dbveh	dbLSDi	OK	213.554	115.685
Sfpi1	chr2:9093695	dbveh	dbLSDi	OK	132.466	76.1457
Sec14l2	chr11:399704	dbveh	dbLSDi	OK	5.97979	0.844772
Slc2a3	chr6:122677(	dbveh	dbLSDi	OK	3.75369	8.92121
Thy1	chr9:438514(	dbveh	dbLSDi	OK	31.0678	15.7362
Ttpa	chr4:1993557	dbveh	dbLSDi	OK	15.0532	6.33733
Elovl6	chr3:1292353	dbveh	dbLSDi	OK	11.4795	5.42408
Prc1	chr7:8743935	dbveh	dbLSDi	OK	9.55196	3.15464
Krt8	chr15:101827	dbveh	dbLSDi	OK	2.41067	0.354245
Slc6a13	chr6:1212503	dbveh	dbLSDi	OK	29.0192	49.9857
Rrm2	chr12:253931	dbveh	dbLSDi	OK	14.4846	3.53966
Proz	chr8:130609(	dbveh	dbLSDi	OK	3.21104	0.586932
Actg2	chr6:834629(	dbveh	dbLSDi	OK	1.02226	5.98128
Ly6a	chr15:748253	dbveh	dbLSDi	OK	107.199	178.679
Serpine1	chr5:1375373	dbveh	dbLSDi	OK	81.3416	147.374
Sbsn	chr7:315364(	dbveh	dbLSDi	OK	39.1828	81.9613
Osbpl8	chr10:110601	dbveh	dbLSDi	OK	36.229	21.8382
Cadm4	chr7:2526704	dbveh	dbLSDi	OK	14.0553	5.62643
Osbp2	chr11:360373	dbveh	dbLSDi	OK	0.886129	7.60482
Egr1	chr18:350208	dbveh	dbLSDi	OK	19.6765	10.6656
Zpbp2	chr11:984124	dbveh	dbLSDi	OK	0.108758	2.61855
Hk1	chr10:617316	dbveh	dbLSDi	OK	13.333	25.6936
Asrgl1	chr19:91862(	dbveh	dbLSDi	OK	8.85218	19.598
Gsg2	chr11:72904(	dbveh	dbLSDi	OK	1.94187	10.3956
Spatc1	chr15:760985	dbveh	dbLSDi	OK	0.390498	2.90345
Fbln1	chr15:850364	dbveh	dbLSDi	OK	16.5833	8.1305
Emilin1	chr5:3121615	dbveh	dbLSDi	OK	25.2185	14.1213
Racgap1	chr15:994509	dbveh	dbLSDi	OK	11.4047	5.03049
Aqp9	chr9:709584(	dbveh	dbLSDi	OK	4.90071	0.846294
Capg	chr6:7249443	dbveh	dbLSDi	OK	323.853	177.695
Pcolce	chr5:1380463	dbveh	dbLSDi	OK	58.5866	32.8615
Gpc6	chr14:117324	dbveh	dbLSDi	OK	6.48032	3.1734
Fam187b	chr7:3175882	dbveh	dbLSDi	OK	0.473471	6.03605
Gsto2	chr19:47940(	dbveh	dbLSDi	OK	0.841267	5.05014
Eps8	chr6:1374257	dbveh	dbLSDi	OK	27.0699	15.3188
B4galt6	chr18:20843(	dbveh	dbLSDi	OK	13.5758	7.60365
Prr11	chr11:86902(	dbveh	dbLSDi	OK	3.53543	1.07931

Ckb	chr12:112907	dbveh	dbLSDi	OK	91.4756	53.7958
Proc	chr18:322827	dbveh	dbLSDi	OK	5.41919	0.760542
Ccdc46	chr11:10828(	dbveh	dbLSDi	OK	1.22657	6.0467
Micalcl	chr7:119511(	dbveh	dbLSDi	OK	1.12586	7.83978
Kcnc3	chr7:518462!	dbveh	dbLSDi	OK	3.85459	8.27548
Myof	chr19:379735	dbveh	dbLSDi	OK	17.5829	10.2671
1700025K23F	chr10:388386	dbveh	dbLSDi	OK	3.78348	26.189
Ccdc40	chr11:11908!	dbveh	dbLSDi	OK	0.0930105	0.568314
Agt	chr8:1270804	dbveh	dbLSDi	OK	70.2444	121.105
Klhdc7a	chr4:139518(	dbveh	dbLSDi	OK	12.907	22.9321
Arhgap25	chr6:8740937	dbveh	dbLSDi	OK	32.5157	18.1228
Mfng	chr15:785863	dbveh	dbLSDi	OK	31.8824	55.3686
Mup3	chr4:6174451	dbveh	dbLSDi	OK	16.2558	3.04023
Slc16a7	chr10:124664	dbveh	dbLSDi	OK	7.16847	17.8352
G0s2	chr1:1950983	dbveh	dbLSDi	OK	205.364	336.354
Tlr7	chrX:163742(	dbveh	dbLSDi	OK	18.9651	10.7254
Slc25a13	chr6:5991217	dbveh	dbLSDi	OK	5.99724	1.71166
Slc16a5	chr11:115323	dbveh	dbLSDi	OK	1.2819	0.200615
Gm949	chr18:470814	dbveh	dbLSDi	OK	0.429473	2.50109
Ehhadh	chr16:217613	dbveh	dbLSDi	OK	16.8929	8.61992
Gm711	chr2:2678958	dbveh	dbLSDi	OK	0.250941	1.72977
Mmp14	chr14:550504	dbveh	dbLSDi	OK	90.8955	54.6159
Smc2	chr4:5245212	dbveh	dbLSDi	OK	6.98153	2.9608
Sykb	chr13:526788	dbveh	dbLSDi	OK	39.4925	23.3668
Adam1a	chr5:121968(	dbveh	dbLSDi	OK	0.575461	3.64394
Plb1	chr5:3253508	dbveh	dbLSDi	OK	0.119672	2.69078
Cd68	chr11:694778	dbveh	dbLSDi	OK	369.205	210.28
Asgr2	chr11:699061	dbveh	dbLSDi	OK	8.07741	1.41713
Crip2	chr12:114378	dbveh	dbLSDi	OK	101.508	166.948
Pde1c	chr6:560197!	dbveh	dbLSDi	OK	0.0331821	0.608529
Pcdh7	chr5:5810925	dbveh	dbLSDi	OK	18.0551	10.6704
Agpat9	chr5:1012752	dbveh	dbLSDi	OK	17.4613	30.003
Marco	chr1:1223711	dbveh	dbLSDi	OK	1.90505	15.3662
Ccdc136	chr6:2934892	dbveh	dbLSDi	OK	0.336012	14.6841
Iqcd	chr5:121039(	dbveh	dbLSDi	OK	0.392367	2.64532
Retn	chr8:365576!	dbveh	dbLSDi	OK	654.534	1216.74
Fgl1	chr8:422767(	dbveh	dbLSDi	OK	5.93139	1.08774
Dpy19l3	chr7:3647051	dbveh	dbLSDi	OK	4.57093	2.03257
Ggnbp1	chr17:271662	dbveh	dbLSDi	OK	2.18271	16.0869
Pacrg	chr17:105958	dbveh	dbLSDi	OK	1.47089	7.97932
Blnk	chr19:410034	dbveh	dbLSDi	OK	19.3056	9.17461
1700001O22F	chr2:3065108	dbveh	dbLSDi	OK	0.28459	3.54886
Ms4a6c	chr19:115438	dbveh	dbLSDi	OK	53.5749	24.06

Dusp1	chr17:266425	dbveh	dbLSDi	OK	90.7777	55.969
Col5a2	chr1:4543117	dbveh	dbLSDi	OK	65.7864	38.1786
Ccdc87	chr19:48393(	dbveh	dbLSDi	OK	0.171691	1.13633
Lat2	chr5:1350761	dbveh	dbLSDi	OK	45.5338	23.6747
Itgav	chr2:8356455	dbveh	dbLSDi	OK	14.0436	8.51526
Ly6c1	chr15:748754	dbveh	dbLSDi	OK	138.595	228.589
1100001G20F	chr11:835604	dbveh	dbLSDi	OK	116.971	238.323
Otub2	chr12:104615	dbveh	dbLSDi	OK	1.83806	6.33008
Ppm1j	chr3:104583(	dbveh	dbLSDi	OK	0.942061	5.40146
Apcdd1	chr18:63081(	dbveh	dbLSDi	OK	30.7773	51.8454
Plvap	chr8:7402165	dbveh	dbLSDi	OK	56.2268	92.6697
Tlr13	chrX:103338(	dbveh	dbLSDi	OK	46.5801	27.2557
Adamts12	chr15:109945	dbveh	dbLSDi	OK	7.39923	3.66127
Trim25	chr11:888607	dbveh	dbLSDi	OK	33.2813	20.0868
Cxcl14	chr13:56390(	dbveh	dbLSDi	OK	25.5451	12.8786
Fbxo2	chr4:1475347	dbveh	dbLSDi	OK	0.45963	2.49211
C5ar1	chr7:168320(	dbveh	dbLSDi	OK	62.5191	36.5451
Grap	chr11:614668	dbveh	dbLSDi	OK	28.247	48.6442
Apobr	chr7:1337285	dbveh	dbLSDi	OK	20.2164	11.4557
Efhc1	chr1:209417(	dbveh	dbLSDi	OK	1.1195	6.88017
Apbb1ip	chr2:2262984	dbveh	dbLSDi	OK	57.4938	34.7858
Cabyr	chr18:128998	dbveh	dbLSDi	OK	0.785441	22.4079
Tex14	chr11:872185	dbveh	dbLSDi	OK	0.121448	0.685859
Col1a2	chr6:445569(	dbveh	dbLSDi	OK	514.948	133.57
Dtx4	chr19:125408	dbveh	dbLSDi	OK	22.5659	13.8492
Frat1	chr19:419044	dbveh	dbLSDi	OK	2.03298	6.7589
A530016L24R	chr12:113727	dbveh	dbLSDi	OK	37.1077	59.9541
Isg20	chr7:8605865	dbveh	dbLSDi	OK	18.8953	43.4661
Ifi30	chr8:7328667	dbveh	dbLSDi	OK	125.851	75.2763
C3ar1	chr6:1227971	dbveh	dbLSDi	OK	62.2527	36.3713
Abat	chr16:851352	dbveh	dbLSDi	OK	12.1266	22.0646
Abcb4	chr5:889372(	dbveh	dbLSDi	OK	8.40695	3.83413
Slc4a1	chr11:10221(	dbveh	dbLSDi	OK	0.874073	5.70744
Prss23	chr7:966562(	dbveh	dbLSDi	OK	56.3516	34.867
Npy	chr6:4977272	dbveh	dbLSDi	OK	35.858	6.97244
Rgs2	chr1:1458464	dbveh	dbLSDi	OK	14.0623	7.24807
Olfml2b	chr1:172574(	dbveh	dbLSDi	OK	11.3603	5.24169
Zfp451	chr1:338185(	dbveh	dbLSDi	OK	5.30351	11.1342
Fads1	chr19:102573	dbveh	dbLSDi	OK	38.3105	23.794
Gpc1	chr1:947282(	dbveh	dbLSDi	OK	25.4972	42.896
Aqp11	chr7:1048748	dbveh	dbLSDi	OK	4.3962	14.3765
Gas1	chr13:602757	dbveh	dbLSDi	OK	35.5086	21.5183
6030429G01F	chr7:4474558	dbveh	dbLSDi	OK	0.543872	2.78475

Pik3ap1	chr19:413487	dbveh	dbLSDi	OK	19.7015	10.3469
Vav1	chr17:574185	dbveh	dbLSDi	OK	13.2771	7.09908
Aurkb	chr11:688591	dbveh	dbLSDi	OK	8.55617	2.68906
Havcr2	chr11:462684	dbveh	dbLSDi	OK	8.53015	3.24546
Aldh3b2	chr19:397232	dbveh	dbLSDi	OK	7.47498	16.3152
1810011O10F	chr8:255480	dbveh	dbLSDi	OK	30.0669	53.471
Mfap4	chr11:612989	dbveh	dbLSDi	OK	26.9354	11.8772
Flnc	chr6:2938315	dbveh	dbLSDi	OK	4.96737	2.60995
D0H4S114	chr18:335966	dbveh	dbLSDi	OK	21.2113	10.5423
Ccdc96	chr5:3682723	dbveh	dbLSDi	OK	0.349439	1.91615
D3Bwg0562e	chr3:117022C	dbveh	dbLSDi	OK	2.96612	6.63802
4930505A04F	chr11:30326C	dbveh	dbLSDi	OK	0.884485	6.84577
Rcl1	chr19:291758	dbveh	dbLSDi	OK	19.957	35.3845
Zim1	chr7:6628153	dbveh	dbLSDi	OK	1.91932	6.60849
Irak2	chr6:1135884	dbveh	dbLSDi	OK	46.3405	74.9885
Aass	chr6:2302217	dbveh	dbLSDi	OK	4.51264	0.747546
Clic1	chr17:351871	dbveh	dbLSDi	OK	222.728	136.329
Trim67	chr8:127316	dbveh	dbLSDi	OK	6.96804	11.7404
St3gal5	chr6:720476C	dbveh	dbLSDi	OK	30.775	17.4106
Napsa	chr7:5182781	dbveh	dbLSDi	OK	22.7324	9.46922
C1qtnf6	chr15:783537	dbveh	dbLSDi	OK	30.5661	17.3648
Acrbp	chr6:124999	dbveh	dbLSDi	OK	2.71756	11.9065
Ear11	chr14:518749	dbveh	dbLSDi	OK	18.5692	49.8754
Spaca1	chr4:341152	dbveh	dbLSDi	OK	5.53255	17.0571
Cdk18	chr1:1340101	dbveh	dbLSDi	OK	15.8997	7.9668
Ccnf	chr17:243601	dbveh	dbLSDi	OK	3.82499	1.29003
Pzp	chr6:1283887	dbveh	dbLSDi	OK	10.0475	0.350203
Gchfr	chr2:1189935	dbveh	dbLSDi	OK	9.72265	1.61793
Sh3bgrl3	chr4:1336833	dbveh	dbLSDi	OK	525.536	320.244
Efhd2	chr4:141414C	dbveh	dbLSDi	OK	99.1565	61.594
Lilrb3	chr7:366410	dbveh	dbLSDi	OK	44.3435	26.5346
Acad11	chr9:103966C	dbveh	dbLSDi	OK	33.2543	54.0411
Atp6v0e2	chr6:484875	dbveh	dbLSDi	OK	20.9371	36.9217
Nos3	chr5:2387063	dbveh	dbLSDi	OK	8.3138	15.05
Mex3d	chr10:79843C	dbveh	dbLSDi	OK	7.03567	14.0372
Ribc1	chrX:1484391	dbveh	dbLSDi	OK	0.4978	3.40328
Piwil2	chr14:707722	dbveh	dbLSDi	OK	0.327674	1.4869
Bmp3	chr5:9928345	dbveh	dbLSDi	OK	10.8943	18.9509
Slpi	chr2:164179	dbveh	dbLSDi	OK	22.1073	3.72349
Cpe	chr8:6707134	dbveh	dbLSDi	OK	30.6533	17.7121
Fmo5	chr3:9743272	dbveh	dbLSDi	OK	15.3816	7.78988
Lrrc27	chr7:146289	dbveh	dbLSDi	OK	9.61118	20.8011
Snx5	chr2:144075	dbveh	dbLSDi	OK	91.0914	56.4655

Stmn1	chr4:1340242	dbveh	dbLSDi	OK	29.59	13.1395
Sh3bp2	chr5:3486843	dbveh	dbLSDi	OK	28.5602	16.5371
Atp7a	chrX:1032226	dbveh	dbLSDi	OK	11.5995	6.9654
Irf5	chr6:2947673	dbveh	dbLSDi	OK	57.2073	34.8072
Gm11837	chr4:1485778	dbveh	dbLSDi	OK	2.17645	20.1008
Marcks	chr10:368530	dbveh	dbLSDi	OK	49.1548	31.3333
Wwp1	chr4:1953681	dbveh	dbLSDi	OK	42.8625	27.1121
Hs6st1	chr1:3612524	dbveh	dbLSDi	OK	31.7698	19.9779
Dpep2	chr8:1085089	dbveh	dbLSDi	OK	28.1823	14.4861
Lmnb1	chr18:568674	dbveh	dbLSDi	OK	9.14115	4.12404
Fhl2	chr1:4317991	dbveh	dbLSDi	OK	9.02405	3.05743
Sqle	chr15:591466	dbveh	dbLSDi	OK	18.7642	10.3507
Kcnn4	chr7:2515528	dbveh	dbLSDi	OK	24.4404	12.2542
Hgd	chr16:375802	dbveh	dbLSDi	OK	8.44486	0.606959
Tmem56	chr3:1209049	dbveh	dbLSDi	OK	1.81142	0.404184
Pld6	chr11:595973	dbveh	dbLSDi	OK	0.320924	1.43506
Nudt18	chr14:709776	dbveh	dbLSDi	OK	19.9796	31.3959
Ccna2	chr3:3645152	dbveh	dbLSDi	OK	11.6481	3.06776
BC021767	chr3:9446451	dbveh	dbLSDi	OK	0.189812	0.862876
Mfap5	chr6:1224636	dbveh	dbLSDi	OK	102.047	62.3782
Fnip2	chr3:7914929	dbveh	dbLSDi	OK	23.831	14.3304
Gbp3	chr3:1422230	dbveh	dbLSDi	OK	7.22425	14.3783
Rcn1	chr2:1052261	dbveh	dbLSDi	OK	16.6299	9.08125
Bcat1	chr6:1449423	dbveh	dbLSDi	OK	3.6331	1.33084
Krt7	chr15:101242	dbveh	dbLSDi	OK	1.88575	0.395476
Adssl1	chr12:113858	dbveh	dbLSDi	OK	52.185	30.4682
Agxt2l1	chr3:1303203	dbveh	dbLSDi	OK	2.18124	0.107482
P2ry6	chr7:1080861	dbveh	dbLSDi	OK	33.8048	19.0772
Ubd	chr17:373308	dbveh	dbLSDi	OK	109.469	62.5486
Gatsl3	chr11:411825	dbveh	dbLSDi	OK	11.9758	25.5776
Col15a1	chr4:4722088	dbveh	dbLSDi	OK	143.863	85.4922
Osbpl10	chr9:1149763	dbveh	dbLSDi	OK	0.991568	4.71875
Oxtr	chr6:1124236	dbveh	dbLSDi	OK	72.2247	121.446
Kif26a	chr12:113384	dbveh	dbLSDi	OK	4.0728	7.19064
Cd300lg	chr11:101902	dbveh	dbLSDi	OK	118.615	194.823
B3galt2	chr1:1454546	dbveh	dbLSDi	OK	16.0432	27.7544
Mtap7	chr10:198687	dbveh	dbLSDi	OK	8.55978	15.0179
Hcls1	chr16:369350	dbveh	dbLSDi	OK	57.4595	35.2874
Shisa2	chr14:602441	dbveh	dbLSDi	OK	0.604271	2.87498
Itgb2	chr10:769930	dbveh	dbLSDi	OK	182.738	107.044
Tubb5	chr17:359708	dbveh	dbLSDi	OK	158.568	96.2229
Arhgap11a	chr2:1136716	dbveh	dbLSDi	OK	8.55469	4.47069
Aldoart2	chr12:566661	dbveh	dbLSDi	OK	0.169993	11.7652

Myom3	chr4:135315€	dbveh	dbLSDi	OK	0.960878	2.94735
Pld3	chr7:2831703	dbveh	dbLSDi	OK	157.023	97.4374
Tubb6	chr18:675503	dbveh	dbLSDi	OK	79.7876	49.5027
Mcm5	chr8:7763342	dbveh	dbLSDi	OK	7.79855	3.03121
Folr2	chr7:108988[illegible]	dbveh	dbLSDi	OK	92.1866	57.3939
Wnt2b	chr3:1047477	dbveh	dbLSDi	OK	2.37549	0.475276
H2-Q6	chr17:355618	dbveh	dbLSDi	OK	60.0916	99.296
Cilp	chr9:651129[illegible]	dbveh	dbLSDi	OK	21.5558	13.04
Lca5l	chr16:96380C	dbveh	dbLSDi	OK	0.512224	2.49301
Gbp9	chr5:1055074	dbveh	dbLSDi	OK	5.92032	10.9968
Tpx2	chr2:152673€	dbveh	dbLSDi	OK	7.55614	2.82606
9530077C05F	chr9:2221602	dbveh	dbLSDi	OK	0.279108	1.22664
Ckap4	chr10:83989C	dbveh	dbLSDi	OK	36.8103	22.9392
Pfkl	chr10:77449€	dbveh	dbLSDi	OK	20.4862	32.2109
Adam19	chr11:458694	dbveh	dbLSDi	OK	8.01932	4.51381
Coro1a	chr7:1338432	dbveh	dbLSDi	OK	41.6768	24.0364
Plin5	chr17:56251C	dbveh	dbLSDi	OK	7.45769	17.3795
Col18a1	chr10:765149	dbveh	dbLSDi	OK	68.0333	43.334
Plod1	chr4:147283[illegible]	dbveh	dbLSDi	OK	63.2159	41.2982
Gm5617	chr9:4830344	dbveh	dbLSDi	OK	15.8789	51.8084
Limk2	chr11:32432[illegible]	dbveh	dbLSDi	OK	11.0281	18.2971
Pif1	chr9:6543501	dbveh	dbLSDi	OK	1.34739	0.308049
Mafb	chr2:1601894	dbveh	dbLSDi	OK	79.8145	50.1034
Khk	chr5:312242€	dbveh	dbLSDi	OK	31.4068	11.5363
Spata24	chr18:358163	dbveh	dbLSDi	OK	6.18954	24.3142
Car4	chr11:847712	dbveh	dbLSDi	OK	55.6059	88.2904
Pgp	chr17:246074	dbveh	dbLSDi	OK	34.8717	62.5507
Asprv1	chr6:865781€	dbveh	dbLSDi	OK	1.72003	0.373185
Hrasls	chr16:292097	dbveh	dbLSDi	OK	0.4165	1.80373
Ms4a7	chr19:113958	dbveh	dbLSDi	OK	32.556	12.9661
Acer3	chr7:1053621	dbveh	dbLSDi	OK	12.411	6.74888
Ckap2l	chr2:129093[illegible]	dbveh	dbLSDi	OK	4.12511	1.47021
Arhgap30	chr1:173319C	dbveh	dbLSDi	OK	27.0676	17.1283
Gm6268	chrX:3394347	dbveh	dbLSDi	OK	0	1.50291
Krt5	chr15:101537	dbveh	dbLSDi	OK	0	0.0952751
Tmem179	chr12:113738	dbveh	dbLSDi	OK	18.6101	31.755
Hmga1	chr17:276935	dbveh	dbLSDi	OK	30.2084	16.3434
Fstl3	chr10:79240C	dbveh	dbLSDi	OK	18.4848	32.0794
Lass4	chr8:4493404	dbveh	dbLSDi	OK	11.7703	19.4796
Ankrd42	chr7:997326[illegible]	dbveh	dbLSDi	OK	1.92499	5.77525
Sdc3	chr4:1303484	dbveh	dbLSDi	OK	83.3593	50.2831
Atp6v1a	chr16:440855	dbveh	dbLSDi	OK	91.6621	59.2716
Cxcr4	chr1:1304847	dbveh	dbLSDi	OK	32.8028	19.3262

Lama2	chr10:26701C	dbveh	dbLSDi	OK	9.81434	6.13199
Magi1	chr6:9362544	dbveh	dbLSDi	OK	4.16406	7.23786
1700023F02R	chr10:655833	dbveh	dbLSDi	OK	0	0.768662
Arsb	chr13:94541E	dbveh	dbLSDi	OK	22.8954	14.2112
Kcnj8	chr6:1425134	dbveh	dbLSDi	OK	7.78357	16.174
Klk1b7-ps	chr7:5120038	dbveh	dbLSDi	OK	0	1.25067
Mtap2	chr1:662219C	dbveh	dbLSDi	OK	0.151349	0.918085
Col3a1	chr1:453683E	dbveh	dbLSDi	OK	911.922	234.325
Tpd52	chr3:8929435	dbveh	dbLSDi	OK	51.1039	31.9869
Oscp1	chr4:1257358	dbveh	dbLSDi	OK	2.95001	8.95198
Tmem119	chr5:1142437	dbveh	dbLSDi	OK	30.5602	18.3399
Pstpip1	chr9:5593778	dbveh	dbLSDi	OK	27.3109	15.1157
Hk3	chr13:550507	dbveh	dbLSDi	OK	24.4132	13.5086
Rasd1	chr11:597617	dbveh	dbLSDi	OK	25.1155	51.5201
Il15ra	chr2:116271E	dbveh	dbLSDi	OK	18.695	35.0161
Ppm1d	chr11:851247	dbveh	dbLSDi	OK	7.38842	13.999
Tppp	chr13:741468	dbveh	dbLSDi	OK	2.83578	5.69958
1700080N15F	chr2:405311C	dbveh	dbLSDi	OK	0	1.43943
1700036G14F	chr3:8512144	dbveh	dbLSDi	OK	0	0.80295
Srebf2	chr15:81977E	dbveh	dbLSDi	OK	21.7642	13.6141
Alppl2	chr1:889832E	dbveh	dbLSDi	OK	0	0.0697523
1700025F24R	chr10:11885C	dbveh	dbLSDi	OK	0	0.416534
Tm7sf4	chr15:395774	dbveh	dbLSDi	OK	5.1975	1.11459
1700001F09R	chr14:440209	dbveh	dbLSDi	OK	0	0.370949
4933406F09R	chr14:824498	dbveh	dbLSDi	OK	0	0.285266
Ushbp1	chr8:7390817	dbveh	dbLSDi	OK	15.6058	25.0962
Sc4mol	chr8:6719694	dbveh	dbLSDi	OK	35.5535	21.1625
Ccl8	chr11:81928E	dbveh	dbLSDi	OK	151.048	260.265
Ptprj	chr2:9026991	dbveh	dbLSDi	OK	13.2647	8.32245
Gabra3	chrX:6967801	dbveh	dbLSDi	OK	5.08471	2.1466
Cenpa	chr5:3096927	dbveh	dbLSDi	OK	19.0008	7.81828
Bcam	chr7:2034148	dbveh	dbLSDi	OK	13.1789	22.7222
1700067G17F	chr1:9091268	dbveh	dbLSDi	OK	0	0.718177
Rassf2	chr2:131818E	dbveh	dbLSDi	OK	29.5586	18.9679
Cchcr1	chr17:35654C	dbveh	dbLSDi	OK	3.1417	7.64467
Lbh	chr17:73267E	dbveh	dbLSDi	OK	30.3611	18.8793
Mtap1a	chr2:1211153	dbveh	dbLSDi	OK	7.30896	3.49959
Il10ra	chr9:4506192	dbveh	dbLSDi	OK	15.2175	8.74662
Gm5458	chr14:204133	dbveh	dbLSDi	OK	0	0.409767
Cyp2d22	chr15:822009	dbveh	dbLSDi	OK	22.7358	36.4651
Peg10	chr6:4697305	dbveh	dbLSDi	OK	4.10407	7.27999
1700065I16R	chr15:636487	dbveh	dbLSDi	OK	0	0.58525
Hebp1	chr6:1350875	dbveh	dbLSDi	OK	143.363	222.352

Man2a1	chr17:64950[illegible]	dbveh	dbLSDi	OK	59.0722	37.9104

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Trank1	chr9:1112142	leanveh	dbveh	OK	9.41034	0.0410221
Wdr52	chr16:44394	leanveh	dbveh	OK	6.87144	0.0414149
Nceh1	chr3:2708192	leanveh	dbveh	OK	5.80832	49.1319
Phf7	chr14:320508	leanveh	dbveh	OK	69.4027	4.28806
Ccdc19	chr1:1744512	leanveh	dbveh	OK	19.0434	0.832615
1700102P08F	chr9:1082951	leanveh	dbveh	OK	11.446	0.259644

Eno4	chr19:59017	leanveh	dbveh	OK	5.90272	0.108896
Lcp1	chr14:75536	leanveh	dbveh	OK	21.5788	198.776
Nckap1l	chr15:10328	leanveh	dbveh	OK	8.21208	71.0506
Hpd	chr5:12362	leanveh	dbveh	OK	4.22355	37.5668
Ccr5	chr9:12403	leanveh	dbveh	OK	3.92167	34.5213
Prune2	chr19:17030	leanveh	dbveh	OK	1.03882	6.035
Ak8	chr2:28555	leanveh	dbveh	OK	23.0629	0.901626
Stat4	chr1:52065	leanveh	dbveh	OK	10.8956	0.465835
Ttc39a	chr4:10907	leanveh	dbveh	OK	14.5867	0.59603
Enkur	chr2:21102	leanveh	dbveh	OK	16.218	0.375987
Tmem146	chr17:56767	leanveh	dbveh	OK	4.46412	0.116151
Col1a1	chr11:94797	leanveh	dbveh	OK	62.3486	607.985
Cd300ld	chr11:11484	leanveh	dbveh	OK	4.81871	32.2441
Dcbld2	chr16:58408	leanveh	dbveh	OK	7.36464	26.1126
Amhr2	chr15:10227	leanveh	dbveh	OK	44.4164	0.913692
Xrra1	chr7:10700	leanveh	dbveh	OK	15.015	0.613911
Adcy10	chr1:16741	leanveh	dbveh	OK	5.58644	0.301482
Cct6b	chr11:82532	leanveh	dbveh	OK	6.82027	0.197905
Srcin1	chr11:97370	leanveh	dbveh	OK	1.97883	0.0975213
Sdc1	chr12:87782	leanveh	dbveh	OK	12.4192	77.8458
Rab8b	chr9:6669147	leanveh	dbveh	OK	9.98647	52.4668
Crisp2	chr17:40901	leanveh	dbveh	OK	64.4166	0.965478
2810408A11F	chr11:69710	leanveh	dbveh	OK	7.92456	0.599515
Ulk4	chr9:12087	leanveh	dbveh	OK	4.08899	0.187062
Colec12	chr18:97076	leanveh	dbveh	OK	10.2159	55.0388
Slc37a2	chr9:37036	leanveh	dbveh	OK	1.65812	46.005
Fam71f2	chr6:2923114	leanveh	dbveh	OK	24.7496	1.28794
1700001K19F	chr12:11190	leanveh	dbveh	OK	9.87302	0.422967
Dyrk3	chr1:13302	leanveh	dbveh	OK	14.0018	0.562556
Tmc7	chr7:12567	leanveh	dbveh	OK	3.42711	0.288499
Mrc1	chr2:14151	leanveh	dbveh	OK	16.4641	77.9396
Anpep	chr7:86966	leanveh	dbveh	OK	8.96147	68.5155
Cd53	chr3:10656	leanveh	dbveh	OK	5.58213	43.2334
Tekt2	chr4:12599	leanveh	dbveh	OK	15.0785	1.08318
Catsper3	chr13:55885	leanveh	dbveh	OK	4.04638	0.292491
Comp	chr8:7289744	leanveh	dbveh	OK	9.53239	0.398184
Aldoart1	chr4:7251161	leanveh	dbveh	OK	4.82972	0.209872
Efcab5	chr11:76903	leanveh	dbveh	OK	4.58941	0.0732794
S100a4	chr3:90407	leanveh	dbveh	OK	53.8268	776.875
Itgam	chr7:13520	leanveh	dbveh	OK	6.37578	76.6589
Hgsnat	chr8:27054	leanveh	dbveh	OK	18.0562	68.4578
Metrnl	chr11:12156	leanveh	dbveh	OK	8.09873	50.7006
1700010I14R	chr17:91811	leanveh	dbveh	OK	31.9348	0.936694

Ccdc158	chr5:9303732	leanveh	dbveh	OK	3.10932	0.114601
Ropn1l	chr15:31370	leanveh	dbveh	OK	69.0038	3.6323
Gm70	chr12:775185	leanveh	dbveh	OK	15.6441	0.337401
Cd180	chr13:103483	leanveh	dbveh	OK	1.78211	31.9582
Col5a1	chr2:2774194	leanveh	dbveh	OK	28.7334	133.059
Cyth4	chr15:784274	leanveh	dbveh	OK	13.5184	95.8908
Fos	chr12:86814	leanveh	dbveh	OK	8.57842	58.616
Msr1	chr8:4066705	leanveh	dbveh	OK	2.84767	41.746
Ankrd5	chr2:136358	leanveh	dbveh	OK	20.2616	2.6305
Ubxn11	chr4:1336585	leanveh	dbveh	OK	23.2868	0.757496
Cage1	chr13:38097	leanveh	dbveh	OK	11.7628	0.468199
Agbl2	chr2:906229	leanveh	dbveh	OK	4.88712	0.133929
Ccdc30	chr4:1189964	leanveh	dbveh	OK	6.19633	0.19343
Cotl1	chr8:1223331	leanveh	dbveh	OK	40.5664	204.355
Hpgds	chr6:650672	leanveh	dbveh	OK	2.49082	22.9137
Siglec1	chr2:130894	leanveh	dbveh	OK	2.37969	16.4259
Tnfrsf11a	chr1:1076772	leanveh	dbveh	OK	1.83566	16.3873
Spa17	chr9:3741087	leanveh	dbveh	OK	54.1355	3.03239
Lass3	chr7:738883	leanveh	dbveh	OK	5.05859	0.152193
Rd3	chr1:1938012	leanveh	dbveh	OK	2.52378	0.112179
Ttc25	chr11:10040	leanveh	dbveh	OK	11.2449	0.566816
Trem2	chr17:484857	leanveh	dbveh	OK	11.7296	229.361
Gusb	chr5:130464	leanveh	dbveh	OK	23.5286	136.568
Fcer1g	chr1:1731597	leanveh	dbveh	OK	41.1414	279.045
Dock2	chr11:34126	leanveh	dbveh	OK	1.85932	10.7851
Ctsk	chr3:953032	leanveh	dbveh	OK	19.951	429.185
Nup210l	chr3:8990805	leanveh	dbveh	OK	2.95592	0.0928951
Psma8	chr18:14864	leanveh	dbveh	OK	10.9042	0.619947
Apobec1	chr6:122527	leanveh	dbveh	OK	9.27524	76.018
Ptprc	chr1:1399594	leanveh	dbveh	OK	4.91785	18.5932
Atp6v0d2	chr4:198039	leanveh	dbveh	OK	5.45473	113.861
Lpxn	chr19:12873	leanveh	dbveh	OK	5.61529	56.6861
Morn5	chr2:359049	leanveh	dbveh	OK	28.6416	1.05002
Morn4	chr19:421494	leanveh	dbveh	OK	10.8398	0.549192
Cd84	chr1:173769	leanveh	dbveh	OK	5.05755	60.4245
Sirpa	chr2:129418	leanveh	dbveh	OK	26.5953	149.982
Plek	chr11:16871	leanveh	dbveh	OK	4.0687	43.5073
2210404O07	chr10:80855	leanveh	dbveh	OK	106.873	5.38533
Itgax	chr7:135273	leanveh	dbveh	OK	4.42358	46.8387
Atf3	chr1:1929941	leanveh	dbveh	OK	4.50731	45.7887
Rnf17	chr14:570215	leanveh	dbveh	OK	4.41561	0.346101
Dnahc1	chr14:320735	leanveh	dbveh	OK	1.41125	0.0468091
Tyrobp	chr7:311988	leanveh	dbveh	OK	90.0246	790.214

Mmp12	chr9:7347373	leanveh	dbveh	OK	14.4842	233.12
Lilrb4	chr10:512107	leanveh	dbveh	OK	10.7588	169.037
Laptm5	chr4:1304692	leanveh	dbveh	OK	24.647	232.513
Sfpi1	chr2:9093695	leanveh	dbveh	OK	14.0059	144.325
Slc2a3	chr6:122677&	leanveh	dbveh	OK	37.5026	4.06908
Krt8	chr15:101827	leanveh	dbveh	OK	60.6627	2.58879
Actg2	chr6:834629(	leanveh	dbveh	OK	19.958	1.10791
Osbpl8	chr10:110601	leanveh	dbveh	OK	12.4745	39.4275
Capg	chr6:7249443	leanveh	dbveh	OK	53.6565	353.213
Gsto2	chr19:47940(	leanveh	dbveh	OK	14.6729	0.910285
1700025K23F	chr10:38838(	leanveh	dbveh	OK	62.4272	4.10047
Ccdc40	chr11:11908&	leanveh	dbveh	OK	6.41199	0.101076
Agt	chr8:1270804	leanveh	dbveh	OK	230.295	75.7905
Arhgap25	chr6:8740937	leanveh	dbveh	OK	4.29945	35.4745
Tlr7	chrX:163742&	leanveh	dbveh	OK	2.33122	20.6442
Mmp14	chr14:550504	leanveh	dbveh	OK	30.8217	99.0633
Sykb	chr13:526788	leanveh	dbveh	OK	7.04104	43.0626
Cd68	chr11:694778	leanveh	dbveh	OK	21.3515	402.771
Iqcd	chr5:121039(	leanveh	dbveh	OK	8.22132	0.426223
Ggnbp1	chr17:271662	leanveh	dbveh	OK	60.9239	2.36094
Ms4a6c	chr19:115438	leanveh	dbveh	OK	9.44939	58.3339
Col5a2	chr1:4543117	leanveh	dbveh	OK	18.5491	71.6113
Tlr13	chrX:103338(	leanveh	dbveh	OK	3.08526	50.8128
C5ar1	chr7:168320&	leanveh	dbveh	OK	6.77638	68.3636
Apobr	chr7:133728&	leanveh	dbveh	OK	4.25552	22.0473
Efhc1	chr1:209417(	leanveh	dbveh	OK	20.1922	1.21689
Apbb1ip	chr2:2262984	leanveh	dbveh	OK	7.30339	62.6229
Tex14	chr11:872185	leanveh	dbveh	OK	2.23399	0.132096
Isg20	chr7:8605865	leanveh	dbveh	OK	133.59	20.4326
C3ar1	chr6:1227971	leanveh	dbveh	OK	4.24701	67.9025
Npy	chr6:4977272	leanveh	dbveh	OK	705.997	39.1277
6030429G01F	chr7:4474558	leanveh	dbveh	OK	6.72737	0.590665
Pik3ap1	chr19:413487	leanveh	dbveh	OK	3.54893	21.5052
Vav1	chr17:574185	leanveh	dbveh	OK	2.23006	14.4744
Havcr2	chr11:462684	leanveh	dbveh	OK	0.774066	9.31722
Ccdc96	chr5:3682723	leanveh	dbveh	OK	8.73442	0.379006
Acrbp	chr6:124999&	leanveh	dbveh	OK	33.3589	2.94739
Lilrb3	chr7:366410(	leanveh	dbveh	OK	5.52536	48.4346
Piwil2	chr14:707722	leanveh	dbveh	OK	7.2958	0.357667
Sh3bp2	chr5:3486843	leanveh	dbveh	OK	7.41527	31.1481
Irf5	chr6:2947673	leanveh	dbveh	OK	9.33551	62.3375
Wwp1	chr4:1953681	leanveh	dbveh	OK	12.096	46.5883
Dpep2	chr8:108508&	leanveh	dbveh	OK	1.98589	30.7051

BC021767	chr3:9446451	leanveh	dbveh	OK	2.06032	0.206929
Mfap5	chr6:1224636	leanveh	dbveh	OK	27.7763	111.089
Fnip2	chr3:7914929	leanveh	dbveh	OK	4.57664	25.9383
Adssl1	chr12:113858	leanveh	dbveh	OK	4.30397	57.0089
Oxtr	chr6:1124236	leanveh	dbveh	OK	16.4187	78.071
B3galt2	chr1:1454546	leanveh	dbveh	OK	54.4403	17.379
Hcls1	chr16:369350	leanveh	dbveh	OK	14.7767	62.5708
Itgb2	chr10:769930	leanveh	dbveh	OK	14.6677	199.448
Pld3	chr7:2831703	leanveh	dbveh	OK	32.5382	171.035
Tubb6	chr18:675503	leanveh	dbveh	OK	20.6947	87.0468
Folr2	chr7:1089885	leanveh	dbveh	OK	18.0632	100.271
Cilp	chr9:6511298	leanveh	dbveh	OK	5.36235	23.5058
Lca5l	chr16:963800	leanveh	dbveh	OK	8.35379	0.556613
9530077C05F	chr9:2221602	leanveh	dbveh	OK	5.72928	0.302122
Plod1	chr4:1472838	leanveh	dbveh	OK	21.8215	68.673
Gm5617	chr9:4830344	leanveh	dbveh	OK	108.855	17.1905
Mafb	chr2:1601894	leanveh	dbveh	OK	14.9991	86.789
Hrasls	chr16:292097	leanveh	dbveh	OK	5.55855	0.449691
Arhgap30	chr1:1733190	leanveh	dbveh	OK	4.84472	29.5049
Krt5	chr15:101537	leanveh	dbveh	OK	5.17975	0
Hmga1	chr17:276935	leanveh	dbveh	OK	5.28323	32.9583
Sdc3	chr4:1303484	leanveh	dbveh	OK	24.5473	90.7654
Atp6v1a	chr16:440855	leanveh	dbveh	OK	30.4847	99.7802
Oscp1	chr4:1257358	leanveh	dbveh	OK	20.0478	3.19173
Tmem119	chr5:1142437	leanveh	dbveh	OK	7.23482	33.2112
Pstpip1	chr9:5593778	leanveh	dbveh	OK	5.22786	29.8076
Hk3	chr13:550507	leanveh	dbveh	OK	2.09261	26.637
Alppl2	chr1:8898326	leanveh	dbveh	OK	3.45953	0
Tm7sf4	chr15:395774	leanveh	dbveh	OK	0.496875	5.7012
Bcam	chr7:2034148	leanveh	dbveh	OK	47.2028	14.2462
Rassf2	chr2:1318185	leanveh	dbveh	OK	9.83945	32.1698
Cd200r1	chr16:447658	leanveh	dbveh	OK	2.1253	28.9835
Krt18	chr15:101858	leanveh	dbveh	OK	111.692	4.08372
Pdk4	chr6:5433350	leanveh	dbveh	OK	15.3588	120.38
Dpysl4	chr7:1462718	leanveh	dbveh	OK	4.34254	0.277828
Myo1f	chr17:336926	leanveh	dbveh	OK	5.36821	34.8046
Ehd4	chr2:1199152	leanveh	dbveh	OK	28.7874	85.699
Sh3kbp1	chrX:1560653	leanveh	dbveh	OK	9.34086	30.4385
Ccdc74a	chr16:176465	leanveh	dbveh	OK	11.2554	0.485183
Pik3r5	chr11:682456	leanveh	dbveh	OK	3.42282	31.068
Selplg	chr5:1142678	leanveh	dbveh	OK	5.86712	26.979
Lrrc48	chr11:601668	leanveh	dbveh	OK	13.0228	0.471923
Fbln2	chr6:9116275	leanveh	dbveh	OK	22.6479	124.335

Ccl9	chr11:833864	leanveh	dbveh	OK	15.056	109.575
E030019B06F	chr7:146786	leanveh	dbveh	OK	2.10162	0
Spint2	chr7:3004134	leanveh	dbveh	OK	140.412	12.9457
Inpp5d	chr1:895168	leanveh	dbveh	OK	5.68708	27.8575
Cap2	chr13:465972	leanveh	dbveh	OK	3.19407	0.235401
S1pr2	chr9:207703	leanveh	dbveh	OK	5.20659	21.4711
Sh3pxd2b	chr11:32247	leanveh	dbveh	OK	4.86166	23.0377
Gp49a	chr10:512004	leanveh	dbveh	OK	8.06691	133.735
Plekho2	chr9:654021	leanveh	dbveh	OK	15.8226	79.7114
Fcgr3	chr1:172981	leanveh	dbveh	OK	29.3888	205.281
Rac2	chr15:78389	leanveh	dbveh	OK	4.66299	24.2132
Gas7	chr11:673464	leanveh	dbveh	OK	10.6255	34.0078
Slc1a3	chr15:858412	leanveh	dbveh	OK	42.9866	6.85318
Tcam1	chr11:106137	leanveh	dbveh	OK	6.85	0.336778
Mmp2	chr8:9535122	leanveh	dbveh	OK	26.9037	97.5949
Wfdc9	chr2:1644751	leanveh	dbveh	OK	25.4875	0
Fam198b	chr3:796898	leanveh	dbveh	OK	11.658	44.7393
Hmha1	chr10:794794	leanveh	dbveh	OK	11.6693	36.7182
Cln8	chr8:148885	leanveh	dbveh	OK	4.68868	19.1063
Car2	chr3:148864	leanveh	dbveh	OK	46.3521	4.95032
Daglb	chr5:144225	leanveh	dbveh	OK	9.90693	45.4259
Cybb	chrX:901237	leanveh	dbveh	OK	6.7225	43.0228
Atp1a3	chr7:257631	leanveh	dbveh	OK	1.99271	29.5334
Plau	chr14:216558	leanveh	dbveh	OK	47.3987	172.718
Zfp185	chrX:702326	leanveh	dbveh	OK	47.6509	2.75761
Col6a1	chr10:761715	leanveh	dbveh	OK	65.6318	295.529
Dnahc7b	chr1:461235	leanveh	dbveh	OK	1.40856	0.0797386
5031439G07F	chr15:847761	leanveh	dbveh	OK	12.8146	40.7012
Col6a2	chr10:760585	leanveh	dbveh	OK	67.975	318.842
5430435G22F	chr1:133585	leanveh	dbveh	OK	7.19275	72.8495
Cyba	chr8:124948	leanveh	dbveh	OK	52.0321	201.052
Ncf2	chr1:154655	leanveh	dbveh	OK	6.46661	41.0228
Sash1	chr10:844201	leanveh	dbveh	OK	16.2501	79.461
Ppil6	chr10:412102	leanveh	dbveh	OK	12.7629	0.835812
Plin2	chr4:863024	leanveh	dbveh	OK	101.061	1019.36
Tubb2a	chr13:341661	leanveh	dbveh	OK	17.5105	75.1918
Tnip3	chr6:655403	leanveh	dbveh	OK	0.365073	6.02332
Slc34a2	chr5:534405	leanveh	dbveh	OK	10.3776	0.223028
Cyb561	chr11:105795	leanveh	dbveh	OK	130.323	5.76964
Cldn2	chrX:136335	leanveh	dbveh	OK	28.8529	1.30727
Coro1c	chr5:1142924	leanveh	dbveh	OK	25.3505	108.012
Cerk	chr15:859695	leanveh	dbveh	OK	11.8277	36.089
Dlec1	chr9:119011	leanveh	dbveh	OK	3.9178	0.179576

Defb11	chr8:2301584	leanveh	dbveh	OK	159.73	0
Csf1r	chr18:612652	leanveh	dbveh	OK	29.6996	152.828
Plekho1	chr3:957927(	leanveh	dbveh	OK	25.586	82.8341
Cd44	chr2:1026512	leanveh	dbveh	OK	4.81251	36.6916
Dok3	chr13:556245	leanveh	dbveh	OK	4.48333	27.0789
Gldc	chr19:30172(	leanveh	dbveh	OK	25.9945	2.77059
C1qb	chr4:136436(	leanveh	dbveh	OK	106.757	584.174
Dnaja4	chr9:545473(	leanveh	dbveh	OK	71.4663	8.26944
Corin	chr5:726912(	leanveh	dbveh	OK	2.69536	0.0452509
Tmem106a	chr11:101443	leanveh	dbveh	OK	22.0333	74.5733
Pnmt	chr11:98247(	leanveh	dbveh	OK	17.2529	0
Dnase2a	chr8:8743252	leanveh	dbveh	OK	11.603	54.8374
Dmrt2	chr19:25746(	leanveh	dbveh	OK	16.27	58.4651
Gpr137b-ps	chr13:127063	leanveh	dbveh	OK	5.41228	28.8668
Lrrc33	chr16:32142(	leanveh	dbveh	OK	9.47641	36.9508
Inha	chr1:755036(	leanveh	dbveh	OK	28.0335	1.42766
Myo5a	chr9:7491901	leanveh	dbveh	OK	6.07625	29.4365
4930455F23R	chr1:1662057	leanveh	dbveh	OK	31.8991	6.92079
Dnahc6	chr6:729676(	leanveh	dbveh	OK	1.76483	0.0559752
Ctss	chr3:953307(	leanveh	dbveh	OK	77.751	861.663
Atp13a2	chr4:1405427	leanveh	dbveh	OK	19.3528	64.1067
Adamts2	chr11:504155	leanveh	dbveh	OK	18.4533	75.1678
Lgmn	chr12:103632	leanveh	dbveh	OK	65.099	550.922
Pla2g7	chr17:437053	leanveh	dbveh	OK	22.3446	134.249
Tcirg1	chr19:389604	leanveh	dbveh	OK	10.8787	69.0327
Mpeg1	chr19:125352	leanveh	dbveh	OK	21.5373	246.895
Slfn2	chr11:82878(	leanveh	dbveh	OK	13.0725	68.9769
Gng2	chr14:206917	leanveh	dbveh	OK	6.55336	24.9028
Ncrna00086	chrX:536277(	leanveh	dbveh	OK	5.16369	0.240187
Ccl2	chr11:81849(	leanveh	dbveh	OK	5.31659	94.9891
Cpne5	chr17:292934	leanveh	dbveh	OK	11.5433	0.0713488
Lipa	chr19:345668	leanveh	dbveh	OK	32.1015	249.828
Cd300a	chr11:114751	leanveh	dbveh	OK	2.86585	26.9654
Clec10a	chr11:699801	leanveh	dbveh	OK	34.5663	359.449
Man1c1	chr4:134117(	leanveh	dbveh	OK	7.02992	24.6988
Gpr137b	chr13:134498	leanveh	dbveh	OK	4.94307	25.1037
Slc5a7	chr17:54412(	leanveh	dbveh	OK	2.35105	55.8255
Ogdhl	chr14:331352	leanveh	dbveh	OK	11.6167	0.737865
Grn	chr11:102291	leanveh	dbveh	OK	147.403	673.339
Ptafr	chr4:132119(	leanveh	dbveh	OK	4.1771	42.1318
Slc25a24	chr3:108926(	leanveh	dbveh	OK	9.38861	32.9632
Pid1	chr1:840328(	leanveh	dbveh	OK	22.795	77.7083
Wwc1	chr11:35652(	leanveh	dbveh	OK	14.8472	1.06215

Kcnab2	chr4:151764[illegible]	leanveh	dbveh	OK	2.63422	18.4043
Fgf1	chr18:389983[illegible]	leanveh	dbveh	OK	15.5161	56.4638
Hdac11	chr6:911068[illegible]	leanveh	dbveh	OK	24.6728	3.25073
Mfsd1	chr3:673866[illegible]	leanveh	dbveh	OK	31.9631	93.218
Plk2	chr13:111185[illegible]	leanveh	dbveh	OK	13.1653	45.5734
Srpx2	chrX:130442[illegible]	leanveh	dbveh	OK	6.68574	32.4579
Gja1	chr10:560971[illegible]	leanveh	dbveh	OK	109.955	23.6366
Cdr2	chr7:128100[illegible]	leanveh	dbveh	OK	26.3753	102.067
Tgfbi	chr13:56710[illegible]	leanveh	dbveh	OK	26.3405	108.111
Col12a1	chr9:794467[illegible]	leanveh	dbveh	OK	0.93342	7.17782
2310046K01R	chr2:151822[illegible]	leanveh	dbveh	OK	38.2135	2.2854
Tex19.2	chr11:120977[illegible]	leanveh	dbveh	OK	2.86465	0
Mycl1	chr4:122673[illegible]	leanveh	dbveh	OK	11.8322	2.08043
Col5a3	chr9:205744[illegible]	leanveh	dbveh	OK	19.9398	94.5576
Fabp5	chr3:100126[illegible]	leanveh	dbveh	OK	151.168	606.734
Elovl2	chr13:412777[illegible]	leanveh	dbveh	OK	15.5731	1.0254
Cd24a	chr10:43298[illegible]	leanveh	dbveh	OK	61.7653	8.92415
Fam167a	chr14:640552[illegible]	leanveh	dbveh	OK	3.59108	0.0724503
Lmna	chr3:8828507[illegible]	leanveh	dbveh	OK	41.694	150.702
Acta1	chr8:126415[illegible]	leanveh	dbveh	OK	7.62277	54.9151
Tesc	chr5:118477[illegible]	leanveh	dbveh	OK	17.0644	0.891519
Cited4	chr4:1203391[illegible]	leanveh	dbveh	OK	42.1104	0.633748
Pf4	chr5:912014[illegible]	leanveh	dbveh	OK	54.5192	211.294
C1qc	chr4:1364457[illegible]	leanveh	dbveh	OK	108.539	501.062
Atp2b4	chr1:135600[illegible]	leanveh	dbveh	OK	38.9215	11.9656
Cdkn1a	chr17:29227[illegible]	leanveh	dbveh	OK	31.5129	215.767
Tmem104	chr11:115048[illegible]	leanveh	dbveh	OK	7.29693	26.8869
C1qa	chr4:136451[illegible]	leanveh	dbveh	OK	123.91	446.595
Erbb3	chr10:128006[illegible]	leanveh	dbveh	OK	7.11024	0.704017
9-Sep	chr11:11706[illegible]	leanveh	dbveh	OK	32.1853	106.036
Stom	chr2:351695[illegible]	leanveh	dbveh	OK	30.8723	109.937
Gstm7	chr3:1077292	leanveh	dbveh	OK	276.542	5.03786
Pdzk1	chr3:9663374	leanveh	dbveh	OK	31.2043	4.14414
Mrc2	chr11:105153[illegible]	leanveh	dbveh	OK	5.03743	73.5803
Lrp2	chr2:692623[illegible]	leanveh	dbveh	OK	8.36351	0.483989
BC021891	chr8:128434[illegible]	leanveh	dbveh	OK	7.2182	0.233921
Vat1	chr11:10132[illegible]	leanveh	dbveh	OK	71.1347	294.975
Wdr16	chr11:677383	leanveh	dbveh	OK	6.98426	0.0516471
4930471M23	chr5:3095031	leanveh	dbveh	OK	12.3648	37.4502
Pygb	chr2:150612[illegible]	leanveh	dbveh	OK	116.376	42.9001
Ttc9	chr12:827323	leanveh	dbveh	OK	6.90599	0.739124
1700007K13R	chr2:283175[illegible]	leanveh	dbveh	OK	12.2759	0.139592
E230008N13R	chr4:459031[illegible]	leanveh	dbveh	OK	3.44295	0.276565

Tnfrsf1b	chr4:1448022	leanveh	dbveh	OK	7.1135	29.8077
Espn	chr4:151494(	leanveh	dbveh	OK	28.5299	0.997419
Slc1a1	chr19:28909(	leanveh	dbveh	OK	15.6182	2.40244
Acsbg1	chr9:544528(	leanveh	dbveh	OK	51.6348	0.788624
Gm347	chr2:283034(	leanveh	dbveh	OK	1.97039	0.168554
Alox12	chr11:70054(	leanveh	dbveh	OK	12.3071	0.182206
Myo7b	chr18:32118(	leanveh	dbveh	OK	1.83444	0.146871
Deptor	chr15:549314	leanveh	dbveh	OK	12.5473	46.772
P2rx7	chr5:123093(	leanveh	dbveh	OK	4.6483	23.9518
Pfn2	chr3:5764581	leanveh	dbveh	OK	30.4713	7.22362
Wdr31	chr4:621147(	leanveh	dbveh	OK	5.88054	0.20513
Il7r	chr15:943591	leanveh	dbveh	OK	1.17763	17.4285
Fkbp4	chr6:1283801	leanveh	dbveh	OK	71.7088	21.6314
Zfand2a	chr5:1399471	leanveh	dbveh	OK	11.9664	40.4515
Anxa1	chr19:20447(	leanveh	dbveh	OK	101.159	617.45
Atp6v1b2	chr8:715616(	leanveh	dbveh	OK	60.7791	225.478
Ncf1	chr5:1346961	leanveh	dbveh	OK	6.84008	29.1105
Foxred2	chr15:77770(	leanveh	dbveh	OK	25.6455	2.90291
Emilin2	chr17:716015	leanveh	dbveh	OK	9.97886	52.2936
Arl4c	chr1:905948(	leanveh	dbveh	OK	29.3942	5.94203
Casq2	chr3:1018904	leanveh	dbveh	OK	4.637	0.344466
Fam124a	chr14:631745	leanveh	dbveh	OK	4.99233	21.7303
Sox9	chr11:112643	leanveh	dbveh	OK	11.5279	0.471623
Mogat1	chr1:7850763	leanveh	dbveh	OK	21.1153	1.17222
Fads2	chr19:10138(	leanveh	dbveh	OK	58.5676	7.09562
Ucp1	chr8:8581424	leanveh	dbveh	OK	0.261537	8.96797
Gabrr2	chr4:3315008	leanveh	dbveh	OK	0.86655	11.4781
Dgkg	chr16:22466(	leanveh	dbveh	OK	1.43113	0.0369335
Gm11992	chr11:891605	leanveh	dbveh	OK	5.08469	0.377173
Cdh1	chr8:1091272	leanveh	dbveh	OK	25.9451	0.402389
Dnahc10	chr5:1252054	leanveh	dbveh	OK	1.91713	0.0748549
2410004P03F	chr12:170117	leanveh	dbveh	OK	6.15532	0.324882
Plaur	chr7:2524751	leanveh	dbveh	OK	7.05757	50.316
Slc8a2	chr7:1671564	leanveh	dbveh	OK	2.12426	0.0629315
Tbx2	chr11:856461	leanveh	dbveh	OK	22.361	4.17676
Cdhr4	chr9:1078973	leanveh	dbveh	OK	12.1718	0.242301
1700067K01F	chr8:865256(	leanveh	dbveh	OK	4.12951	0.294896
B4galnt4	chr7:1482471	leanveh	dbveh	OK	1.91209	0.0550307
Styxl1	chr5:136223(	leanveh	dbveh	OK	2.9338	0.227122
Kdm4d	chr9:1426702	leanveh	dbveh	OK	4.66736	0.112762
Alox5ap	chr5:150076(	leanveh	dbveh	OK	30.0638	165.05
Zmynd12	chr4:1190952	leanveh	dbveh	OK	3.61665	0.272623
Lyz2	chr10:116714	leanveh	dbveh	OK	301.524	1902.57

Lrrc23	chr6:124719	leanveh	dbveh	OK	11.2389	0.224392
Lef1	chr3:130813	leanveh	dbveh	OK	3.01682	0.110258
Ctsz	chr2:174241	leanveh	dbveh	OK	95.8452	422.105
Prom1	chr5:443848	leanveh	dbveh	OK	66.2569	1.31528
Gpr81	chr5:124326	leanveh	dbveh	OK	24.7476	5.17343
C7	chr15:49387	leanveh	dbveh	OK	35.7995	4.14334
Ccdc103	chr11:10274	leanveh	dbveh	OK	3.12848	0.190139
Gramd2	chr9:595555	leanveh	dbveh	OK	14.2265	0.135477
4933433G15	chr9:752579	leanveh	dbveh	OK	3.77191	0.289624
Fgf13	chrX:563153	leanveh	dbveh	OK	5.26754	46.2791
Hapln4	chr8:726074	leanveh	dbveh	OK	0.232078	4.25109
Nxnl2	chr13:51266	leanveh	dbveh	OK	4.51574	0.150074
Trpv2	chr11:62387	leanveh	dbveh	OK	9.14393	32.2992
Gpr64	chrX:156828	leanveh	dbveh	OK	45.152	4.31091
Adam9	chr8:260600	leanveh	dbveh	OK	25.5903	71.0352
Lama1	chr17:68046	leanveh	dbveh	OK	2.64565	0.0759996
Celsr1	chr15:85729	leanveh	dbveh	OK	3.466	0.133023
Slain1	chr14:10404	leanveh	dbveh	OK	3.33054	0.131386
Atp8b5	chr4:432800	leanveh	dbveh	OK	1.78075	0.101448
Gm9696	chr3:597562	leanveh	dbveh	OK	0.587187	11.4491
Spef2	chr15:95924	leanveh	dbveh	OK	1.42803	0.102864
Tmed5	chr5:108550	leanveh	dbveh	OK	27.9644	75.5097
Slc7a4	chr16:17572	leanveh	dbveh	OK	33.9957	0.677639
Nipal2	chr15:34502	leanveh	dbveh	OK	1.89004	0.0954362
Spint1	chr2:119063	leanveh	dbveh	OK	11.382	0.593777
AI646023	chr10:75012	leanveh	dbveh	OK	6.85038	0.329275
Adrb3	chr8:283362	leanveh	dbveh	OK	195.031	5.48245
Slc22a4	chr11:53796	leanveh	dbveh	OK	6.40759	26.5129
Bmpr1b	chr3:141500	leanveh	dbveh	OK	7.20254	0.0559033
Irf6	chr1:194979	leanveh	dbveh	OK	6.88528	0.346022
Tmem150c	chr5:100506	leanveh	dbveh	OK	12.7673	0.0872337
Ehd3	chr17:74154	leanveh	dbveh	OK	10.7701	65.5776
AI607873	chr1:175653	leanveh	dbveh	OK	8.98126	37.2374
Fam13a	chr6:588835	leanveh	dbveh	OK	57.0522	10.4481
Fam55c	chr16:55840	leanveh	dbveh	OK	8.20022	0.521747
Ldhd	chr8:114150	leanveh	dbveh	OK	41.7664	7.49049
Hmox1	chr8:776175	leanveh	dbveh	OK	34.5038	332.017
Pkp3	chr7:148264	leanveh	dbveh	OK	3.96555	0.310181
Il17rb	chr14:30809	leanveh	dbveh	OK	6.28579	0.446387
S100a6	chr3:904168	leanveh	dbveh	OK	177.031	803.101
Dnaic2	chr11:11458	leanveh	dbveh	OK	5.79445	0.351435
Gata3	chr2:977870	leanveh	dbveh	OK	4.46699	0.381111
Maoa	chrX:161968	leanveh	dbveh	OK	9.67043	28.0154

Cyth3	chr5:1443833	leanveh	dbveh	OK	20.4642	59.3157
Wnk2	chr13:49131€	leanveh	dbveh	OK	6.40998	0.0845968
Sult2b1	chr7:5298535	leanveh	dbveh	OK	6.98028	0.325832
Wnt4	chr4:1368335	leanveh	dbveh	OK	2.80567	0.317022
Cdhr2	chr13:54802€	leanveh	dbveh	OK	5.79787	0.176019
Igsf11	chr16:389024	leanveh	dbveh	OK	12.015	0.930278
Tead1	chr7:119822€	leanveh	dbveh	OK	10.4595	30.7711
Ptprf	chr4:117880€	leanveh	dbveh	OK	18.6763	4.30261
Xist	chrX:100626€	leanveh	dbveh	OK	0.184101	9.22804
Folr1	chr7:109006€	leanveh	dbveh	OK	15.2734	1.06944
Gpr137c	chr14:458393	leanveh	dbveh	OK	1.65577	0.125968
Rab25	chr3:883459[	leanveh	dbveh	OK	11.4955	0.163999
Thbs1	chr2:117937€	leanveh	dbveh	OK	15.6151	95.2667
Clca2	chr3:144459[	leanveh	dbveh	OK	6.63062	0.153451
Scnn1a	chr6:125271[	leanveh	dbveh	OK	16.7683	0.656019
F13a1	chr13:36959C	leanveh	dbveh	OK	21.1797	76.8412
Tatdn2	chr6:1136474	leanveh	dbveh	OK	21.3671	77.2543
Vgll3	chr16:65815€	leanveh	dbveh	OK	4.79115	39.9056
Gipc2	chr3:151756€	leanveh	dbveh	OK	14.8495	0.962819
Fabp3	chr4:129986C	leanveh	dbveh	OK	30.6742	2.30921
Tmem38b	chr4:5383891	leanveh	dbveh	OK	12.677	40.5663
Cstb	chr10:778884	leanveh	dbveh	OK	151.28	555.117
Smarca1	chrX:4516254	leanveh	dbveh	OK	6.06655	0.393882
Rgs11	chr17:26339[	leanveh	dbveh	OK	8.04483	0.456165
Marcksl1	chr4:129190€	leanveh	dbveh	OK	61.6328	10.8949
Esr1	chr10:534277	leanveh	dbveh	OK	15.7247	3.3708
Dse	chr10:338711	leanveh	dbveh	OK	8.79888	34.2532
Esyt3	chr9:992103€	leanveh	dbveh	OK	3.26844	0.30501
Rbm11	chr16:755931	leanveh	dbveh	OK	3.93847	0.120934
Serpinf1	chr11:752235	leanveh	dbveh	OK	57.6962	256.486
Gda	chr19:214657	leanveh	dbveh	OK	16.8804	67.3255
Dock8	chr19:25074C	leanveh	dbveh	OK	4.59183	29.9942
Creg1	chr1:167693[	leanveh	dbveh	OK	41.3078	160.907
Nus1	chr10:521373	leanveh	dbveh	OK	24.14	65.9891
Rgs9	chr11:10908€	leanveh	dbveh	OK	5.79688	0.0360745
Ccr1	chr9:123876[	leanveh	dbveh	OK	2.93942	27.4965
Clec2l	chr6:386130€	leanveh	dbveh	OK	4.0403	0.285498
Mdfic	chr6:156706€	leanveh	dbveh	OK	17.4577	76.0942
Arnt2	chr7:913947€	leanveh	dbveh	OK	7.19891	0.220036
Slc6a17	chr3:1072704	leanveh	dbveh	OK	2.47388	0.146669
Gltp	chr5:115119[	leanveh	dbveh	OK	62.3819	231.496
Dnase1l2	chr17:245777	leanveh	dbveh	OK	11.115	0.789988
Ap3b2	chr7:886052€	leanveh	dbveh	OK	4.73266	0.182291

Susd4	chr1:184695(	leanveh	dbveh	OK	9.38289	0.687004
Suox	chr10:12810(	leanveh	dbveh	OK	49.3283	10.0427
Cd163	chr6:124254(	leanveh	dbveh	OK	13.8538	51.7541
Ch25h	chr19:345482	leanveh	dbveh	OK	12.8742	1.16144
Nek6	chr2:3836721	leanveh	dbveh	OK	13.4366	49.9603
Hdac6	chrX:7507247	leanveh	dbveh	OK	44.5322	4.07627
Ramp1	chr1:930763(	leanveh	dbveh	OK	46.3157	2.51191
Inadl	chr4:9806251	leanveh	dbveh	OK	6.89632	0.542303
Myl9	chr2:1566011	leanveh	dbveh	OK	174.659	60.019
Ccl6	chr11:833955	leanveh	dbveh	OK	54.3455	321.268
Eps8l2	chr7:148524(	leanveh	dbveh	OK	20.1338	2.89809
Cyp11a1	chr9:5786282	leanveh	dbveh	OK	28.9747	0.415887
Abcg1	chr17:31194(	leanveh	dbveh	OK	3.88968	14.9825
Wfs1	chr5:3735734	leanveh	dbveh	OK	10.955	50.8635
Slc11a1	chr1:7442177	leanveh	dbveh	OK	9.95803	65.5517
Syp	chrX:721570(	leanveh	dbveh	OK	8.10118	38.3064
Hoxb9	chr11:96132(	leanveh	dbveh	OK	9.15248	0.715163
Ninj1	chr13:49282(	leanveh	dbveh	OK	64.668	187.469
Mt2	chr8:9669651	leanveh	dbveh	OK	365.098	1445.2
Tnfaip2	chr12:11268(	leanveh	dbveh	OK	8.95395	34.8425
Fam129b	chr2:3273165	leanveh	dbveh	OK	32.9716	217.523
1700047G03F	chr15:118968	leanveh	dbveh	OK	25.3593	132.586
Pam	chr1:9971767	leanveh	dbveh	OK	23.3926	88.1916
D630003M21	chr2:1580082	leanveh	dbveh	OK	6.01315	0.395759
Lox	chr18:526768	leanveh	dbveh	OK	14.9436	196.787
Plxnb1	chr9:108997(	leanveh	dbveh	OK	8.58024	1.14065
Synpo2	chr3:1227794	leanveh	dbveh	OK	13.9016	36.0576
Duoxa1	chr2:1221292	leanveh	dbveh	OK	0.767437	12.3934
2010300C02F	chr1:3766852	leanveh	dbveh	OK	6.82525	0.523194
Smarcd3	chr5:2409843	leanveh	dbveh	OK	80.2064	7.09695
Apoc2	chr7:2025692	leanveh	dbveh	OK	3.51665	31.8853
Myh11	chr16:14194(	leanveh	dbveh	OK	21.0494	5.20291
Cryab	chr9:505608(	leanveh	dbveh	OK	102.638	343.647
Syne2	chr12:769193	leanveh	dbveh	OK	15.0854	4.04097
Hspb7	chr4:140976(	leanveh	dbveh	OK	12.0369	176.13
B4galnt2	chr11:957248	leanveh	dbveh	OK	6.73819	0.198835
Col4a4	chr1:824472(	leanveh	dbveh	OK	3.3905	0.242117
Tmem30b	chr12:746441	leanveh	dbveh	OK	15.5361	1.08883
Akap2	chr4:5785811	leanveh	dbveh	OK	32.2152	110.549
Mmp19	chr10:128227	leanveh	dbveh	OK	14.9914	84.4132
Mtap7d2	chrX:155852(	leanveh	dbveh	OK	3.5152	0.371438
Fam49a	chr12:12268(	leanveh	dbveh	OK	6.38306	25.9498
Thbs2	chr17:148025	leanveh	dbveh	OK	14.2871	73.5065

Mcoln3	chr3:1457847	leanveh	dbveh	OK	5.74066	0.22571
Defb38	chr8:190234(	leanveh	dbveh	OK	610.756	0
Defb39	chr8:1905282	leanveh	dbveh	OK	329.231	0
BC048679	chr7:8863915	leanveh	dbveh	OK	283.224	0
Defb40	chr8:1897493	leanveh	dbveh	OK	247.885	0
Gm17252	chr9:3549266	leanveh	dbveh	OK	111.029	0
9230107M04	chr7:1414021	leanveh	dbveh	OK	85.8758	0
Defb26	chr2:1523334	leanveh	dbveh	OK	78.9345	0
Abcb5	chr12:12010(	leanveh	dbveh	OK	29.4239	0
Crisp4	chr1:1810527	leanveh	dbveh	OK	18.4141	0
Gm6040	chr8_random	leanveh	dbveh	OK	16.7707	0
Spint4	chr2:164524(	leanveh	dbveh	OK	16.4895	0
Spinkl	chr18:44326(	leanveh	dbveh	OK	13.4023	0
Gm10823	chr16:27850(	leanveh	dbveh	OK	10.4621	0
Zfp648	chr1:1560483	leanveh	dbveh	OK	2.84264	0
Serpina3k	chr12:10557(	leanveh	dbveh	OK	12.2534	91.4166
Fgb	chr3:8284622	leanveh	dbveh	OK	4.07613	46.0123
Slc36a2	chr11:54971(	leanveh	dbveh	OK	6.30564	22.6834
Clec12a	chr6:1293002	leanveh	dbveh	OK	4.66344	33.0755
Lrrc9	chr12:735428	leanveh	dbveh	OK	7.31996	0.222507
Cd14	chr18:368847	leanveh	dbveh	OK	11.6727	51.0476
Pfn4	chr12:47761(	leanveh	dbveh	OK	10.1585	0.369031
Tmem132b	chr5:1260127	leanveh	dbveh	OK	4.22551	0.32236
Tns3	chr11:833165	leanveh	dbveh	OK	9.66898	26.2768
Brdt	chr5:1077602	leanveh	dbveh	OK	12.1889	1.23553
Gm711	chr2:2678958	leanveh	dbveh	OK	4.6873	0.272267
Pacrg	chr17:105958	leanveh	dbveh	OK	18.8249	1.60382
Blnk	chr19:410034	leanveh	dbveh	OK	4.04054	21.0589
Pld6	chr11:595973	leanveh	dbveh	OK	4.24485	0.346457
Cchcr1	chr17:35654(	leanveh	dbveh	OK	19.0988	3.41303
Sema5b	chr16:355414	leanveh	dbveh	OK	4.0956	0.363449
Pla2g15	chr8:1086742	leanveh	dbveh	OK	17.1701	49.4005
Ncf4	chr15:780752	leanveh	dbveh	OK	7.02216	37.9887
Galc	chr12:994405	leanveh	dbveh	OK	8.20818	24.9145
Asah1	chr8:424259(	leanveh	dbveh	OK	41.8998	107.156
Loxl1	chr9:5813552	leanveh	dbveh	OK	22.431	61.7689
Plekhb2	chr1:349068(	leanveh	dbveh	OK	17.4231	43.7703
Irf8	chr8:1232602	leanveh	dbveh	OK	8.38776	32.0813
Spon1	chr7:120909(	leanveh	dbveh	OK	19.3734	4.82762
Cd93	chr2:148262(	leanveh	dbveh	OK	20.4941	55.5231
Myo1g	chr11:640655	leanveh	dbveh	OK	2.47037	14.4798
Cd9	chr6:1254102	leanveh	dbveh	OK	39.6227	104.459
Ces1d	chr8:9568997	leanveh	dbveh	OK	358.742	87.0027

Rap1b	chr10:117251	leanveh	dbveh	OK	69.5184	184.013
Pkdrej	chr15:856451	leanveh	dbveh	OK	1.52957	0.135633
Unc93b1	chr19:393518	leanveh	dbveh	OK	42.6818	128.589
Wdr95	chr5:150331	leanveh	dbveh	OK	1.56976	0.098477
Ap1s2	chrX:160347	leanveh	dbveh	OK	21.7674	6.84502
Mum1l1	chrX:135744	leanveh	dbveh	OK	28.6899	0.658191
Ces1f	chr8:9578013	leanveh	dbveh	OK	31.1558	8.80116
Galntl4	chr7:1186151	leanveh	dbveh	OK	18.9216	5.03242
Dpep1	chr8:1257101	leanveh	dbveh	OK	46.7293	138.291
Wdr54	chr6:831027	leanveh	dbveh	OK	2.73148	0.241872
Klk1	chr7:514808	leanveh	dbveh	OK	39.8926	4.56177
Gab2	chr7:1042302	leanveh	dbveh	OK	11.0112	35.4429
Grb7	chr11:983081	leanveh	dbveh	OK	17.1328	1.61282
Cds1	chr5:1021941	leanveh	dbveh	OK	31.8123	7.39034
Scarb2	chr5:928728	leanveh	dbveh	OK	31.1711	81.573
Nrbp2	chr15:75916	leanveh	dbveh	OK	57.806	15.4427
Nt5e	chr9:8822244	leanveh	dbveh	OK	19.5562	1.09452
Alad	chr4:621702	leanveh	dbveh	OK	55.1059	13.32
Tsc22d2	chr3:5821961	leanveh	dbveh	OK	5.27219	16.1341
Fndc7	chr3:108656	leanveh	dbveh	OK	6.0109	0.230682
Rap1gap	chr4:137237	leanveh	dbveh	OK	6.77502	0.720899
Cela1	chr15:100504	leanveh	dbveh	OK	8.60747	44.685
Egf	chr3:1293804	leanveh	dbveh	OK	7.27898	0.694499
Myo6	chr9:8001284	leanveh	dbveh	OK	28.3548	7.57583
Mcoln2	chr3:1458127	leanveh	dbveh	OK	0.523476	4.4055
C2	chr17:349995	leanveh	dbveh	OK	39.7016	9.2162
Chrna2	chr14:667597	leanveh	dbveh	OK	13.2733	2.04297
Ezr	chr17:694247	leanveh	dbveh	OK	44.2348	11.9197
Fbxl5	chr5:4413585	leanveh	dbveh	OK	32.7298	93.7538
Col4a3	chr1:825834	leanveh	dbveh	OK	3.00496	0.29382
Dmpk	chr7:196691	leanveh	dbveh	OK	51.1506	142.886
Lcn2	chr2:322401	leanveh	dbveh	OK	216.71	71.6066
Chst1	chr2:924398	leanveh	dbveh	OK	119.858	40.1778
Pigr	chr1:1327232	leanveh	dbveh	OK	1.31181	12.0704
Apob	chr12:798448	leanveh	dbveh	OK	0.418249	9.67838
Hspa2	chr12:775051	leanveh	dbveh	OK	72.2209	6.41289
Ybx2	chr11:697494	leanveh	dbveh	OK	125.142	6.30065
Alcam	chr16:522491	leanveh	dbveh	OK	8.14069	22.1858
Prrx1	chr1:1651752	leanveh	dbveh	OK	6.70704	30.5702
Gas2l3	chr10:888715	leanveh	dbveh	OK	0.928368	6.60459
Clec4a2	chr6:1230727	leanveh	dbveh	OK	3.59906	28.0101
1810011O10	chr8:255480	leanveh	dbveh	OK	103.981	32.4695
Efhd2	chr4:141414	leanveh	dbveh	OK	38.3344	108.03

Pgp	chr17:246074	leanveh	dbveh	OK	128.713	37.8032
Lgals12	chr19:767115	leanveh	dbveh	OK	96.9913	35.0422
Mapk8ip2	chr15:892843	leanveh	dbveh	OK	3.47318	0.189542
Tbxas1	chr6:388689	leanveh	dbveh	OK	4.43882	31.632
Fxyd5	chr7:3181774	leanveh	dbveh	OK	23.1289	89.8231
Wdr91	chr6:3483042	leanveh	dbveh	OK	7.9467	27.7973
Gstm2	chr3:107784	leanveh	dbveh	OK	266.031	86.2857
Prkcb	chr7:129432	leanveh	dbveh	OK	1.53594	6.58192
Chst11	chr10:824482	leanveh	dbveh	OK	5.42692	16.7182
A930038C07F	chr6:656216	leanveh	dbveh	OK	0.306914	2.96902
Iqgap1	chr7:878564	leanveh	dbveh	OK	22.4666	67.4493
Gm885	chr11:106612	leanveh	dbveh	OK	1.55227	14.7476
Scel	chr14:103912	leanveh	dbveh	OK	10.3369	0.785342
Lgals3	chr14:479935	leanveh	dbveh	OK	114.593	1376.83
Pip5k1c	chr10:807557	leanveh	dbveh	OK	20.9947	58.2743
Gpr176	chr2:118102	leanveh	dbveh	OK	0.454436	3.8922
Cd48	chr1:1736121	leanveh	dbveh	OK	7.55998	36.9756
Tgfb1	chr7:2647202	leanveh	dbveh	OK	31.9484	84.1669
Cyp2b10	chr7:266826	leanveh	dbveh	OK	0.29678	3.16651
Nrgn	chr9:3735207	leanveh	dbveh	OK	38.5683	2.52305
Pi4k2a	chr19:421649	leanveh	dbveh	OK	17.0331	43.7593
Hunk	chr16:903866	leanveh	dbveh	OK	5.16356	0.492716
Enah	chr1:1838345	leanveh	dbveh	OK	15.257	2.65174
6330406I15Rik	chr5:1502143	leanveh	dbveh	OK	14.611	46.7365
Cpa2	chr6:3049164	leanveh	dbveh	OK	1.05111	9.74393
Tst	chr15:78229	leanveh	dbveh	OK	75.2302	19.0178
Itga7	chr10:12837	leanveh	dbveh	OK	38.3483	124.828
Gm4952	chr19:126744	leanveh	dbveh	OK	0.27502	2.76273
Rassf3	chr10:120847	leanveh	dbveh	OK	17.3648	51.1311
Rasd2	chr8:7773784	leanveh	dbveh	OK	8.51264	0.892123
Cad	chr5:3135718	leanveh	dbveh	OK	29.3662	4.94513
Eif1a	chr18:467573	leanveh	dbveh	OK	30.7245	77.3102
G6pdx	chrX:7163862	leanveh	dbveh	OK	56.8657	191.814
Kirrel	chr3:8688251	leanveh	dbveh	OK	13.3548	39.1794
Esd	chr14:751321	leanveh	dbveh	OK	68.2615	168.369
Lyve1	chr7:1179941	leanveh	dbveh	OK	10.086	30.9765
Veph1	chr3:6585874	leanveh	dbveh	OK	1.85671	0.0256807
Kcnk5	chr14:209592	leanveh	dbveh	OK	6.2241	0.809189
Serpina1d	chr12:105001	leanveh	dbveh	OK	4.75381	46.7531
Cyp3a11	chr5:1466661	leanveh	dbveh	OK	3.63337	39.3834
Sel1l3	chr5:5349832	leanveh	dbveh	OK	2.30546	13.5704
Cd300lb	chr11:114784	leanveh	dbveh	OK	2.49193	36.5271
Cd109	chr9:7846335	leanveh	dbveh	OK	2.2903	8.59913

Usp2	chr9:438751(	leanveh	dbveh	OK	29.2388	5.48964
Prr22	chr17:56909(	leanveh	dbveh	OK	8.51796	0.44057
Osbp2	chr11:360373	leanveh	dbveh	OK	13.4822	0.960379
Asrgl1	chr19:91862(	leanveh	dbveh	OK	41.6954	9.58043
Lat2	chr5:1350761	leanveh	dbveh	OK	4.92193	49.6899
Spata24	chr18:358163	leanveh	dbveh	OK	45.9409	6.71343
Itga5	chr15:103174	leanveh	dbveh	OK	8.136	23.7687
Arhgdib	chr6:1368722	leanveh	dbveh	OK	28.6976	108.976
Trfr2	chr5:138011(	leanveh	dbveh	OK	1.02998	10.497
F630110N24F	chr10:808203	leanveh	dbveh	OK	11.0033	53.5966
C530028O21I	chr6:1249467	leanveh	dbveh	OK	19.3303	57.4498
Pcyt1a	chr16:32431(	leanveh	dbveh	OK	20.6909	53.3181
Gyk	chrX:8294727	leanveh	dbveh	OK	21.807	4.93511
Rsph9	chr17:462662	leanveh	dbveh	OK	12.4645	1.4745
Chrm3	chr13:98758(	leanveh	dbveh	OK	1.88656	0.154098
Per3	chr4:1503777	leanveh	dbveh	OK	18.5935	6.28038
Sox7	chr14:645625	leanveh	dbveh	OK	21.0752	5.29109
Kcnj16	chr11:11082(	leanveh	dbveh	OK	8.68323	0.750917
Penk	chr4:4060682	leanveh	dbveh	OK	90.5626	25.5119
Ccnjl	chr11:433422	leanveh	dbveh	OK	1.65615	0.141859
Gm88	chr17:463911	leanveh	dbveh	OK	6.94998	0.487855
Hsf2bp	chr17:320817	leanveh	dbveh	OK	1.39354	0.148489
Sag	chr1:8970025	leanveh	dbveh	OK	3.57443	0.312919
Cpxm2	chr7:1392344	leanveh	dbveh	OK	5.56108	0.731018
Tcf7	chr11:520661	leanveh	dbveh	OK	4.86495	0.59026
Atp1b1	chr1:166237(	leanveh	dbveh	OK	92.5254	6.60214
Lipg	chr18:75098(	leanveh	dbveh	OK	17.7184	1.10685
Lrrc59	chr11:944911	leanveh	dbveh	OK	58.7671	143.519
Cfp	chrX:205026(	leanveh	dbveh	OK	15.0766	47.7405
Ccl11	chr11:818713	leanveh	dbveh	OK	27.2551	88.5194
Atp6v0a1	chr11:10087(	leanveh	dbveh	OK	46.3319	144.048
Slc24a6	chr5:1209612	leanveh	dbveh	OK	18.5289	53.0617
1110059M19	chrX:4244408	leanveh	dbveh	OK	9.36899	53.9924
Zmiz1	chr14:26278(	leanveh	dbveh	OK	16.6542	40.5185
Gnmt	chr17:46862(	leanveh	dbveh	OK	5.53185	67.593
Mki67	chr7:1428814	leanveh	dbveh	OK	2.73656	10.0725
Clip4	chr17:72119(	leanveh	dbveh	OK	16.4894	0.857551
Spag4	chr2:155890(	leanveh	dbveh	OK	11.232	1.13737
Cyp1b1	chr17:801062	leanveh	dbveh	OK	13.5415	35.5167
Spatc1	chr15:760985	leanveh	dbveh	OK	6.75825	0.423545
Aqp9	chr9:709584(	leanveh	dbveh	OK	22.5582	5.26649
B4galt6	chr18:20843(	leanveh	dbveh	OK	4.14704	14.779
Snx8	chr5:1408162	leanveh	dbveh	OK	11.2929	30.8713

Spred1	chr2:1169471	leanveh	dbveh	OK	10.4681	30.3988
Mtl5	chr19:33888(	leanveh	dbveh	OK	17.729	1.57297
Cetn4	chr3:3720754	leanveh	dbveh	OK	20.1261	1.93688
4930432K21F	chr8:8667193	leanveh	dbveh	OK	5.4801	0.246885
Parvb	chr15:840624	leanveh	dbveh	OK	11.4004	34.0118
Mmgt1	chrX:538386(	leanveh	dbveh	OK	15.8421	40.7359
Cpt1a	chr19:33233(	leanveh	dbveh	OK	33.3148	82.4781
Rnh1	chr7:1483462	leanveh	dbveh	OK	44.5579	115.594
Trpm3	chr19:22213(	leanveh	dbveh	OK	3.43684	0.397178
Fam65c	chr2:1678062	leanveh	dbveh	OK	0.416466	3.51518
Kcnj14	chr7:5307183	leanveh	dbveh	OK	0.310149	2.75755
Art5	chr7:1092453	leanveh	dbveh	OK	4.0852	0.397301
P2rx4	chr5:1231575	leanveh	dbveh	OK	26.5913	75.3835
Pgd	chr4:148524(	leanveh	dbveh	OK	102.047	281.359
Gspt2	chrX:918814(	leanveh	dbveh	OK	11.9257	2.55692
Gstm6	chr3:1077417	leanveh	dbveh	OK	74.0303	5.19048
Fcgr2b	chr1:172890(	leanveh	dbveh	OK	22.6849	72.5491
Aipl1	chr11:718422	leanveh	dbveh	OK	0.0993424	1.10966
Fbxo10	chr4:4504711	leanveh	dbveh	OK	15.1167	3.46575
Igf2r	chr17:128752	leanveh	dbveh	OK	10.8451	27.6595
Gcnt2	chr13:409555	leanveh	dbveh	OK	12.4096	34.8377
Ccdc87	chr19:48393(	leanveh	dbveh	OK	2.97034	0.186553
Abcb4	chr5:889372(	leanveh	dbveh	OK	0.839907	9.09824
Ubd	chr17:373308	leanveh	dbveh	OK	6.89881	119.394
Man2a1	chr17:649509	leanveh	dbveh	OK	24.4544	64.1951
Lrrc18	chr14:337727	leanveh	dbveh	OK	26.7614	0.415167
Clmn	chr12:106001	leanveh	dbveh	OK	10.5892	3.50647
Vwa3a	chr7:127883(	leanveh	dbveh	OK	6.41826	1.48783
Rfx2	chr17:569153	leanveh	dbveh	OK	12.4112	2.54658
Dpep3	chr8:1084974	leanveh	dbveh	OK	13.012	1.44078
Ncan	chr8:7261698	leanveh	dbveh	OK	0.508761	4.79928
Efhd1	chr1:8916093	leanveh	dbveh	OK	40.844	2.58402
Itpripl2	chr7:125628(	leanveh	dbveh	OK	9.54003	25.6138
Myo5b	chr18:746022	leanveh	dbveh	OK	10.567	1.64938
Serpinb6a	chr13:340097	leanveh	dbveh	OK	91.193	290.409
Sfmbt2	chr2:1029207	leanveh	dbveh	OK	1.62738	0.210225
Mfap3l	chr8:6311165	leanveh	dbveh	OK	14.1035	4.38263
Capn9	chr8:127100(	leanveh	dbveh	OK	0.380371	2.94165
Isyna1	chr8:7311837	leanveh	dbveh	OK	61.6165	19.7279
Wnk4	chr11:101121	leanveh	dbveh	OK	10.3438	0.926015
F2r	chr13:963717	leanveh	dbveh	OK	7.14711	22.7395
Gprc5c	chr11:114712	leanveh	dbveh	OK	26.366	8.11559
Serpina1b	chr12:10496(	leanveh	dbveh	OK	7.19226	86.7238

Hspa1l	chr17:35109€	leanveh	dbveh	OK	16.5126	1.18179
Eps8	chr6:1374257	leanveh	dbveh	OK	10.5979	29.5235
Ptprj	chr2:9026991	leanveh	dbveh	OK	4.97379	14.4126
Gla	chrX:1311227	leanveh	dbveh	OK	4.05904	24.2952
Fbxo21	chr5:1184267	leanveh	dbveh	OK	77.1647	31.8545
Angel1	chr12:880414	leanveh	dbveh	OK	11.3201	2.27843
Stab1	chr14:31948C	leanveh	dbveh	OK	10.1067	29.2517
Tppp3	chr8:1079913	leanveh	dbveh	OK	55.5973	15.5114
Sema4d	chr13:51796€	leanveh	dbveh	OK	3.00698	10.1856
Csf2ra	chr19:613003	leanveh	dbveh	OK	16.1474	54.3053
Cmpk1	chr4:1146332	leanveh	dbveh	OK	45.7915	116.403
Slc12a2	chr18:580383	leanveh	dbveh	OK	13.9782	4.67881
Sult1e1	chr5:880049$	leanveh	dbveh	OK	33.919	4.48855
Cpn1	chr19:440307	leanveh	dbveh	OK	15.5572	2.39887
Hoxd4	chr2:745481C	leanveh	dbveh	OK	21.7286	4.23853
Lhfpl2	chr13:948277	leanveh	dbveh	OK	31.477	89.7244
Aspg	chr12:113344	leanveh	dbveh	OK	22.5519	4.03141
Tnnt2	chr1:137732$	leanveh	dbveh	OK	8.31492	0.201897
Ccdc114	chr7:531837€	leanveh	dbveh	OK	6.24601	0.724629
Gm216	chr1:744086€	leanveh	dbveh	OK	5.50782	0.688006
Sdc4	chr2:1642497	leanveh	dbveh	OK	34.79	83.5399
Svep1	chr4:580556€	leanveh	dbveh	OK	5.60708	15.4771
Gm4956	chr1:2127532	leanveh	dbveh	OK	3.90314	0.501671
Mt3	chr8:966765C	leanveh	dbveh	OK	53.2032	6.56616
Celsr2	chr3:1081937	leanveh	dbveh	OK	3.51842	0.319547
Ms4a6d	chr19:11661C	leanveh	dbveh	OK	5.27087	78.2887
Col14a1	chr15:551393	leanveh	dbveh	OK	6.02707	16.9176
Kcnu1	chr8:269600$	leanveh	dbveh	OK	2.46991	0.223855
Gcnt1	chr19:17400€	leanveh	dbveh	OK	3.32203	12.5344
Osbpl10	chr9:1149763	leanveh	dbveh	OK	11.1839	1.07502
Scpep1	chr11:887853	leanveh	dbveh	OK	28.989	70.0603
Hexa	chr9:5938747	leanveh	dbveh	OK	89.1596	229.085
Tmem53	chr4:1169245	leanveh	dbveh	OK	42.7185	9.45574
Rassf8	chr6:145756$	leanveh	dbveh	OK	8.26666	29.8615
Rab11fip4	chr11:794047	leanveh	dbveh	OK	6.85615	0.654408
Tlr4	chr4:6648884	leanveh	dbveh	OK	5.60852	16.9532
Gsta4	chr9:7803977	leanveh	dbveh	OK	118.453	30.7408
6330503K22F	chr7:1258561	leanveh	dbveh	OK	9.87646	2.8225
Ttyh2	chr11:11453€	leanveh	dbveh	OK	21.1078	54.2858
Gm11710_du	chr11:114882	leanveh	dbveh	OK	0.28841	2.54721
Gm5627	chr9:102641$	leanveh	dbveh	OK	3.01504	24.6321
Capsl	chr15:936578	leanveh	dbveh	OK	7.68119	0.66326
Ift80	chr3:6869642	leanveh	dbveh	OK	6.29688	1.47454

Elovl7	chr13:109004	leanveh	dbveh	OK	2.20032	0.290245
D630045J12R	chr6:379984	leanveh	dbveh	OK	2.48291	0.297305
Trim7	chr11:48639	leanveh	dbveh	OK	10.2549	1.12642
Pgbd5	chr8:126892	leanveh	dbveh	OK	4.03811	0.306608
Fndc8	chr11:82705	leanveh	dbveh	OK	2.73136	0.284244
Tlr8	chrX:163680	leanveh	dbveh	OK	1.55019	19.3951
Fermt3	chr19:707062	leanveh	dbveh	OK	4.9829	34.9684
Cep63	chr9:102488	leanveh	dbveh	OK	21.6656	6.00475
Igsf8	chr1:174242	leanveh	dbveh	OK	21.5469	55.3795
Dennd4c	chr4:863944	leanveh	dbveh	OK	7.81341	19.5173
Hipk2	chr6:386478	leanveh	dbveh	OK	13.04	36.1963
Cald1	chr6:346594	leanveh	dbveh	OK	44.5294	107.622
Fam164c	chr12:866295	leanveh	dbveh	OK	4.27498	0.465407
Slc43a2	chr11:753451	leanveh	dbveh	OK	12.0436	32.8931
Plekha6	chr1:135142	leanveh	dbveh	OK	11.1254	3.04649
Rnf208	chr2:250984	leanveh	dbveh	OK	2.79752	0.287627
Wdr78	chr4:102710	leanveh	dbveh	OK	4.53291	0.47454
Gna14	chr19:165101	leanveh	dbveh	OK	1.82699	0.150026
Adap1	chr5:139747	leanveh	dbveh	OK	6.47163	22.5124
Slc6a6	chr6:916340	leanveh	dbveh	OK	35.1036	109.98
Vldlr	chr19:272915	leanveh	dbveh	OK	10.8471	28.4593
Plcl1	chr1:554627	leanveh	dbveh	OK	5.66495	1.21768
Nptx1	chr11:11940	leanveh	dbveh	OK	1.12292	10.4382
Klhdc7a	chr4:139518	leanveh	dbveh	OK	38.8314	13.9407
Ccl8	chr11:81928	leanveh	dbveh	OK	47.7289	163.79
2310022A10R	chr7:2833831	leanveh	dbveh	OK	8.49004	26.6293
11-Sep	chr5:935224	leanveh	dbveh	OK	7.94708	19.7299
Rap2b	chr3:611684	leanveh	dbveh	OK	8.48962	24.1242
Wipf1	chr2:732676	leanveh	dbveh	OK	9.45263	27.2495
Lrriq3	chr3:154756	leanveh	dbveh	OK	5.44665	0.667202
Wdr96	chr19:478113	leanveh	dbveh	OK	4.82451	0.426807
Wdr1	chr5:389180	leanveh	dbveh	OK	47.5543	113.317
Lmtk3	chr7:5303931	leanveh	dbveh	OK	1.24492	0.111269
Snhg11	chr2:158201	leanveh	dbveh	OK	23.6138	10.0022
Prpf40b	chr15:991258	leanveh	dbveh	OK	18.4244	6.43719
Vit	chr17:789074	leanveh	dbveh	OK	6.29041	1.08091
Cldn22	chr8:489098	leanveh	dbveh	OK	10.4286	1.70224
Ccno	chr13:113778	leanveh	dbveh	OK	4.4094	0.323844
Ncam1	chr9:493102	leanveh	dbveh	OK	6.4478	0.2015
Blvra	chr2:126896	leanveh	dbveh	OK	36.9751	106.613
Grid1	chr14:356333	leanveh	dbveh	OK	0.337282	2.50474
Dusp3	chr11:101832	leanveh	dbveh	OK	41.8254	100.175
Ank3	chr10:689964	leanveh	dbveh	OK	6.18204	0.413039

Fga	chr3:8283007	leanveh	dbveh	OK	6.2458	33.5416
Bgn	chrX:7072897	leanveh	dbveh	OK	149.993	524.482
Atp8b4	chr2:1261467	leanveh	dbveh	OK	0.57451	4.88376
Itga4	chr2:7909558	leanveh	dbveh	OK	1.37563	4.68605
Entpd6	chr2:1505748	leanveh	dbveh	OK	30.6962	11.4205
Ccdc162	chr10:41258(	leanveh	dbveh	OK	2.08191	0.194843
Ildr2	chr1:1681842	leanveh	dbveh	OK	8.34518	1.71283
Il4ra	chr7:1326957	leanveh	dbveh	OK	11.5611	29.0656
Tmem64	chr4:151929(	leanveh	dbveh	OK	52.0223	10.8992
Arhgef6	chrX:544846(	leanveh	dbveh	OK	6.91339	19.3895
Retnla	chr16:48842(	leanveh	dbveh	OK	424.357	167.57
Zpbp2	chr11:984124	leanveh	dbveh	OK	17.6705	0.118241
Nphp1	chr2:1275664	leanveh	dbveh	OK	30.4298	8.47491
Fam49b	chr15:63760(	leanveh	dbveh	OK	8.19897	22.1562
Ica1l	chr1:6004591	leanveh	dbveh	OK	2.0645	0.211999
Rasl2-9-ps	chr7:5076543	leanveh	dbveh	OK	12.1245	0.898554
Sox8	chr17:25702(	leanveh	dbveh	OK	2.95852	0.262828
Gna12	chr5:1412358	leanveh	dbveh	OK	25.3388	63.3965
Rbfox3	chr11:118351	leanveh	dbveh	OK	1.7097	0.101063
Tpm4	chr8:7465919	leanveh	dbveh	OK	91.646	243.82
Hhipl1	chr12:109544	leanveh	dbveh	OK	0.606409	4.24489
Ap3s1	chr18:4690159	leanveh	dbveh	OK	48.8579	117.594
Tulp2	chr7:5276907	leanveh	dbveh	OK	34.5905	0.377146
Pde1c	chr6:5601979	leanveh	dbveh	OK	2.73862	0.0357912
P2ry6	chr7:1080861	leanveh	dbveh	OK	6.80452	36.885
Actr3	chr1:1272894	leanveh	dbveh	OK	46.2308	120.235
Naa50	chr16:4413959	leanveh	dbveh	OK	27.7588	67.8052
Mmp11	chr10:7538599	leanveh	dbveh	OK	6.70041	23.4516
Mlph	chr1:9281167	leanveh	dbveh	OK	20.5674	1.39837
Alms1	chr6:8553752	leanveh	dbveh	OK	2.45647	0.608763
Ccl7	chr11:818592	leanveh	dbveh	OK	3.53177	32.6805
Abca6	chr11:110038	leanveh	dbveh	OK	1.55817	6.28675
Fgfr2	chr7:1373059	leanveh	dbveh	OK	9.13551	1.35682
Serpinb6b	chr13:330573	leanveh	dbveh	OK	8.43329	29.1918
Apoh	chr11:10825(	leanveh	dbveh	OK	6.13365	54.7064
Myof	chr19:3797359	leanveh	dbveh	OK	7.35835	19.1815
Adam1a	chr5:121968(	leanveh	dbveh	OK	5.46834	0.623624
1700001O22F	chr2:3065108	leanveh	dbveh	OK	10.0495	0.308485
Rasd1	chr11:597617	leanveh	dbveh	OK	116.106	27.2414
Fam111a	chr19:12648(	leanveh	dbveh	OK	4.60116	19.0877
Ddr1	chr17:3581859	leanveh	dbveh	OK	26.6479	8.52795
Kcnk6	chr7:3000694	leanveh	dbveh	OK	3.28518	10.8793
Cldn1	chr16:263567	leanveh	dbveh	OK	3.4284	0.611838

4921536K21R	chr11:37860	leanveh	dbveh	OK	4.59701	0.603572
Ttc16	chr2:326127	leanveh	dbveh	OK	4.58113	0.0693631
Htra3	chr5:359946	leanveh	dbveh	OK	99.0781	309.339
Rtn4	chr11:29592	leanveh	dbveh	OK	71.398	227.736
Tmem189	chr2:167468	leanveh	dbveh	OK	55.4154	133.044
Scml4	chr10:42580	leanveh	dbveh	OK	2.7011	0.426976
Pde7a	chr3:1912591	leanveh	dbveh	OK	8.19111	23.4883
Serpina3n	chr12:10564	leanveh	dbveh	OK	160.014	642.93
AU021092	chr16:521191	leanveh	dbveh	OK	6.45655	0.880985
Tprn	chr2:2511811	leanveh	dbveh	OK	19.1925	5.38913
Fam20c	chr5:139231	leanveh	dbveh	OK	20.2512	49.37
Tmem27	chrX:160528	leanveh	dbveh	OK	19.4343	2.86201
St8sia2	chr7:810840	leanveh	dbveh	OK	2.00797	0.341652
Dact2	chr17:14332	leanveh	dbveh	OK	6.16865	1.04115
Osgin1	chr8:121961	leanveh	dbveh	OK	29.0671	70.097
Ctsd	chr7:149561	leanveh	dbveh	OK	474.106	2705.55
Lpar2	chr8:723464	leanveh	dbveh	OK	2.45487	0.352287
Cxcr4	chr1:130484	leanveh	dbveh	OK	9.91883	35.549
Fbxw10	chr11:62660	leanveh	dbveh	OK	6.72831	0.705142
Sdcbp	chr4:629282	leanveh	dbveh	OK	82.5133	223.355
1700021C14R	chr3:880866	leanveh	dbveh	OK	18.6625	2.28901
2610020H08R	chr7:126937	leanveh	dbveh	OK	13.8558	2.23011
Ankrd29	chr18:12410	leanveh	dbveh	OK	8.96749	2.17204
Apoa2	chr1:1731551	leanveh	dbveh	OK	69.0061	705.75
Best1	chr19:10059	leanveh	dbveh	OK	5.08799	0.532477
Fam187b	chr7:3175882	leanveh	dbveh	OK	13.5695	0.515344
Ccdc136	chr6:2934892	leanveh	dbveh	OK	39.5667	0.364938
Ptchd1	chrX:152004	leanveh	dbveh	OK	0.274133	2.06133
4930578N16R	chr2:6959611	leanveh	dbveh	OK	6.3286	0.838754
Trim37	chr11:86940	leanveh	dbveh	OK	18.2193	5.76499
Arl11	chr14:61928	leanveh	dbveh	OK	2.43817	19.2766
1700029J07R	chr8:47038	leanveh	dbveh	OK	4.84444	0.640677
Ucp2	chr7:107641	leanveh	dbveh	OK	73.8959	252.351
Gm5465	chr14:79851	leanveh	dbveh	OK	1.52381	0.23494
Mgat3	chr15:800041	leanveh	dbveh	OK	7.12867	1.71515
Podn	chr4:107687	leanveh	dbveh	OK	36.1946	15.085
Glb1l2	chr9:2657062	leanveh	dbveh	OK	139.045	40.4092
Atp6ap2	chrX:121648	leanveh	dbveh	OK	33.9055	81.9497
Fam183b	chr11:58606	leanveh	dbveh	OK	21.4223	2.85884
Ivns1abp	chr1:153191	leanveh	dbveh	OK	202.327	70.8607
Pde1b	chr15:10333	leanveh	dbveh	OK	6.54341	25.3872
Ctsl	chr13:64464	leanveh	dbveh	OK	233.453	1575.24
Mbnl2	chr14:12067	leanveh	dbveh	OK	37.7243	91.8404

Acpp	chr9:1041905	leanveh	dbveh	OK	6.24849	0.782812
Ppp1r9a	chr6:485331	leanveh	dbveh	OK	6.44744	2.28335
Cx3cl1	chr8:9729607	leanveh	dbveh	OK	12.8066	4.06427
Mapk4	chr18:740881	leanveh	dbveh	OK	2.35877	0.374032
Thbd	chr2:1482302	leanveh	dbveh	OK	65.0266	27.2493
Tgfbr2	chr9:115996	leanveh	dbveh	OK	30.463	76.4849
Gltpd2	chr11:703327	leanveh	dbveh	OK	0.636826	4.15605
Ttpa	chr4:1993557	leanveh	dbveh	OK	3.42355	16.1791
Ssx2ip	chr3:146067	leanveh	dbveh	OK	16.872	4.82514
Emp3	chr7:531733	leanveh	dbveh	OK	24.3128	91.0126
Dnaic1	chr4:4151682	leanveh	dbveh	OK	5.87612	0.0740765
6720401G13	chrX:4790892	leanveh	dbveh	OK	23.9284	10.1297
AF251705	chr11:11485	leanveh	dbveh	OK	4.03104	31.6078
H1fx	chr6:8793041	leanveh	dbveh	OK	36.1912	8.17973
Mical2	chr7:1193693	leanveh	dbveh	OK	8.34715	19.146
Litaf	chr16:109593	leanveh	dbveh	OK	34.8112	86.223
Synm	chr7:7487504	leanveh	dbveh	OK	9.38683	2.78701
Mtap7d1	chr4:1259094	leanveh	dbveh	OK	42.75	101.446
Rlf	chr4:120817	leanveh	dbveh	OK	6.43348	15.7004
Igf2bp2	chr16:22059	leanveh	dbveh	OK	2.58858	11.9495
Hs6st1	chr1:3612524	leanveh	dbveh	OK	13.9105	34.5521
Acer3	chr7:1053621	leanveh	dbveh	OK	3.96405	13.5041
Ifi27l2a	chr12:10468	leanveh	dbveh	OK	812.241	337.047
Uap1l1	chr2:2521701	leanveh	dbveh	OK	10.6522	34.7452
Gna13	chr11:109216	leanveh	dbveh	OK	13.7763	29.8916
Clec4a3	chr6:122902	leanveh	dbveh	OK	9.47047	45.0883
Ccl4	chr11:83476	leanveh	dbveh	OK	0.75218	6.11319
Trp63	chr16:25683	leanveh	dbveh	OK	1.9727	0.162518
Msi1	chr5:115879	leanveh	dbveh	OK	8.13544	1.16469
Ptpn13	chr5:1038542	leanveh	dbveh	OK	8.89474	2.9594
Lamc3	chr2:317428	leanveh	dbveh	OK	7.59641	2.39487
Cyb5r3	chr15:82983	leanveh	dbveh	OK	123.12	299.128
Tert	chr13:737644	leanveh	dbveh	OK	1.45881	0.171904
Odf2	chr2:2974523	leanveh	dbveh	OK	142.534	19.5925
Vegfa	chr17:46153	leanveh	dbveh	OK	91.4116	33.2715
Psd4	chr2:2424091	leanveh	dbveh	OK	2.05894	9.02974
Camk2n1	chr4:138011	leanveh	dbveh	OK	16.8949	5.94431
Stk36	chr1:7464802	leanveh	dbveh	OK	5.21078	0.623089
Dok2	chr14:711741	leanveh	dbveh	OK	10.5182	36.4432
Stard10	chr7:108469	leanveh	dbveh	OK	125.023	41.4793
Orm1	chr4:630055	leanveh	dbveh	OK	116.51	301.669
Rab11fip3	chr17:26125	leanveh	dbveh	OK	17.0298	6.69046
Fzd6	chr15:38837	leanveh	dbveh	OK	14.3317	3.38747

4933411K20F	chr8:472549(	leanveh	dbveh	OK	15.9873	5.13546
Ldhb	chr6:1424387	leanveh	dbveh	OK	68.8108	18.9571
Prtn3	chr10:793424	leanveh	dbveh	OK	24.7985	3.02526
Tcfcp2l1	chr1:1205245	leanveh	dbveh	OK	3.0684	0.430114
Coro1a	chr7:1338432	leanveh	dbveh	OK	12.9584	45.4233
Rhog	chr7:109387(	leanveh	dbveh	OK	39.2213	94.2537
Plcd4	chr1:7445595	leanveh	dbveh	OK	5.01136	0.0614551
Msc	chr1:1474342	leanveh	dbveh	OK	1.17833	7.42982
Pld4	chr12:113998	leanveh	dbveh	OK	14.4525	43.0329
Capn2	chr1:1843973	leanveh	dbveh	OK	58.2869	135.389
Chd5	chr4:1517127	leanveh	dbveh	OK	3.8669	0.484485
Ifi30	chr8:7328667	leanveh	dbveh	OK	50.4219	137.067
4930505A04F	chr11:30326(	leanveh	dbveh	OK	6.74909	0.957199
Kcnn4	chr7:2515528	leanveh	dbveh	OK	6.73144	26.7439
Matn2	chr15:342364	leanveh	dbveh	OK	26.2243	59.9277
Clec7a	chr6:129411(	leanveh	dbveh	OK	5.76838	28.2368
Capza2	chr6:175870(	leanveh	dbveh	OK	79.679	176.758
Rab44	chr17:29272(	leanveh	dbveh	OK	1.69432	0.237196
Smpdl3a	chr10:575143	leanveh	dbveh	OK	60.2342	137.906
Art3	chr5:927608(	leanveh	dbveh	OK	138.887	58.0729
Mum1	chr10:796893	leanveh	dbveh	OK	37.5225	16.2934
Cdt1	chr8:125091(	leanveh	dbveh	OK	3.559	15.2115
Pip4k2a	chr2:187638(	leanveh	dbveh	OK	8.19988	23.8913
Ccdc62	chr5:124380(	leanveh	dbveh	OK	7.94685	0.899142
Arpc1b	chr5:1458751	leanveh	dbveh	OK	155.785	408.482
Ankrd54	chr15:788835	leanveh	dbveh	OK	26.0856	8.23674
Tnfrsf26	chr7:1507935	leanveh	dbveh	OK	0.441638	2.77615
Spag1	chr15:361092	leanveh	dbveh	OK	4.19531	0.584248
Strbp	chr2:374253(	leanveh	dbveh	OK	2.52934	0.570502
Tmem107	chr11:688843	leanveh	dbveh	OK	15.2744	2.95394
Rab31	chr17:66001(	leanveh	dbveh	OK	17.198	46.5578
Il6ra	chr3:8967324	leanveh	dbveh	OK	8.25681	23.2908
Akr1b8	chr6:343041(	leanveh	dbveh	OK	33.7912	84.5467
Fn1	chr1:716320(	leanveh	dbveh	OK	25.2645	83.4883
Ms4a7	chr19:113958	leanveh	dbveh	OK	4.81013	35.4601
Anubl1	chr6:1162142	leanveh	dbveh	OK	9.39494	1.12744
B4galt5	chr2:167123(	leanveh	dbveh	OK	6.39103	18.3414
Zeb2	chr2:448391(	leanveh	dbveh	OK	17.2112	42.4919
Spata22	chr11:731432	leanveh	dbveh	OK	4.03848	0.55389
Elf4	chrX:4576422	leanveh	dbveh	OK	3.75222	10.4277
Serpinb8	chr1:1094865	leanveh	dbveh	OK	3.51534	14.0061
Tnfrsf13b	chr11:609543	leanveh	dbveh	OK	0.55611	4.0179
Hprt	chrX:5034125	leanveh	dbveh	OK	89.3323	194.345

Plekha2	chr8:2614961	leanveh	dbveh	OK	10.7812	25.3936
Pkdcc	chr17:83614€	leanveh	dbveh	OK	31.5082	11.2191
1700001L05R	chr15:831842	leanveh	dbveh	OK	7.87655	0.798145
Asprv1	chr6:865781€	leanveh	dbveh	OK	0.290163	1.87331
Sgcg	chr14:617572	leanveh	dbveh	OK	15.4031	3.74089
Ly9	chr1:1735187	leanveh	dbveh	OK	1.80958	13.6277
Bcl2a1b	chr9:8909411	leanveh	dbveh	OK	4.6252	28.2807
Mosc1	chr1:186610€	leanveh	dbveh	OK	6.04014	28.8262
Hoxb8	chr11:961432	leanveh	dbveh	OK	24.0828	4.72607
Lgr4	chr2:109757€	leanveh	dbveh	OK	15.1037	33.8604
Rnasel	chr1:155596ᵹ	leanveh	dbveh	OK	10.663	25.3772
Nup210	chr6:909630€	leanveh	dbveh	OK	5.53563	1.27988
Cox6b2	chr7:470339ᵹ	leanveh	dbveh	OK	38.0911	3.20696
Clu	chr14:665873	leanveh	dbveh	OK	356.436	55.6542
Catsper2	chr2:121220C	leanveh	dbveh	OK	9.27339	1.21238
Arpc5	chr1:154613€	leanveh	dbveh	OK	95.3343	221.801
Car12	chr9:665614ᵹ	leanveh	dbveh	OK	2.30099	0.373639
Angptl4	chr17:339118	leanveh	dbveh	OK	204.749	613.107
Pebp1	chr5:117732€	leanveh	dbveh	OK	286.302	99.6102
Klhl23	chr2:6966042	leanveh	dbveh	OK	7.33473	0.8489
Maff	chr15:791781	leanveh	dbveh	OK	6.34607	28.8558
Ell2	chr13:75844ᵹ	leanveh	dbveh	OK	19.723	43.7596
Degs1	chr1:184205ᵹ	leanveh	dbveh	OK	85.8822	196.208
Adam12	chr7:141074€	leanveh	dbveh	OK	2.44863	8.90037
St3gal5	chr6:720476C	leanveh	dbveh	OK	11.0922	33.4055
Gpr133	chr5:129602€	leanveh	dbveh	OK	4.92293	13.8178
Bst1	chr5:4421013	leanveh	dbveh	OK	2.57854	22.7072
Abca9	chr11:109962	leanveh	dbveh	OK	3.30547	9.12211
Lcp2	chr11:339472	leanveh	dbveh	OK	2.87411	12.7778
St8sia4	chr1:9748425	leanveh	dbveh	OK	3.62849	12.3951
Ldlrap1	chr4:1343013	leanveh	dbveh	OK	12.0303	29.216
Dnali1	chr4:1247072	leanveh	dbveh	OK	11.2997	0.0558949
Rbm28	chr6:2907357	leanveh	dbveh	OK	16.3658	36.1942
Rassf10	chr7:1200974	leanveh	dbveh	OK	3.62058	0.579731
Ss18l1	chr2:1797771	leanveh	dbveh	OK	10.7853	3.01241
Pcdh7	chr5:581092ᵹ	leanveh	dbveh	OK	7.83311	19.6314
Shisa2	chr14:602441	leanveh	dbveh	OK	4.14169	0.654862
Adcy3	chr12:41333ᵹ	leanveh	dbveh	OK	6.62844	31.1013
Ms4a6b	chr19:11593C	leanveh	dbveh	OK	6.94219	30.8857
Dusp15	chr2:1527667	leanveh	dbveh	OK	4.35979	0.37327
Mid1ip1	chrX:102944ᵹ	leanveh	dbveh	OK	95.7692	35.5914
Fam174b	chr7:808851ᵹ	leanveh	dbveh	OK	10.4986	2.71959
Slc16a2	chrX:1008927	leanveh	dbveh	OK	13.5304	4.85976

Lrrc8e	chr8:422682€	leanveh	dbveh	OK	2.7039	0.240539
Tnfrsf23	chr7:1508517	leanveh	dbveh	OK	0.925977	7.08011
Hoxb7	chr11:96147९	leanveh	dbveh	OK	26.1526	6.24378
Cytl1	chr5:3812675	leanveh	dbveh	OK	20.4466	3.65204
Pon2	chr6:5214623	leanveh	dbveh	OK	54.8602	125.115
Asgr2	chr11:699061	leanveh	dbveh	OK	1.5367	8.68402
Zpbp	chr11:11180C	leanveh	dbveh	OK	4.05428	0.527121
Lrp12	chr15:397021	leanveh	dbveh	OK	7.43793	17.7225
Tubb3	chr8:1259354	leanveh	dbveh	OK	8.82256	0.812186
Smap2	chr4:120640९	leanveh	dbveh	OK	13.9265	32.2908
4933430H15F	chr3:8742267	leanveh	dbveh	OK	7.27838	0.237781
Echdc2	chr4:107838C	leanveh	dbveh	OK	62.776	23.056
2310016C08F	chr6:292224€	leanveh	dbveh	OK	13.6291	66.555
Csf2rb2	chr15:78112९	leanveh	dbveh	OK	4.48906	12.387
Ceacam16	chr7:2043744	leanveh	dbveh	OK	0.212608	1.61224
Hspa4l	chr3:4054953	leanveh	dbveh	OK	29.5449	8.97097
Kap	chr6:133799€	leanveh	dbveh	OK	375.085	90.764
Galnt6	chr15:10052C	leanveh	dbveh	OK	0.67845	13.6418
Tuba1c	chr15:988603	leanveh	dbveh	OK	10.0844	33.9992
Cenpv	chr11:623384	leanveh	dbveh	OK	35.015	9.25268
Shroom1	chr11:532707	leanveh	dbveh	OK	4.41969	0.8141
Pros1	chr16:628541	leanveh	dbveh	OK	26.8276	58.5011
Sgpl1	chr10:605613	leanveh	dbveh	OK	39.7291	92.9776
Vwa1	chr4:155142€	leanveh	dbveh	OK	13.3857	4.51285
Zfp184	chr13:220369	leanveh	dbveh	OK	1.17582	0.168433
Miox	chr15:891649	leanveh	dbveh	OK	24.722	4.33002
Rnf186	chr4:138523C	leanveh	dbveh	OK	4.72887	0.638415
Adam19	chr11:458694	leanveh	dbveh	OK	3.33638	8.74077
Scd3	chr19:442777	leanveh	dbveh	OK	1.62754	0.248132
Tmem65	chr15:586138	leanveh	dbveh	OK	22.9834	49.2343
Fam154b	chr7:897814€	leanveh	dbveh	OK	2.08349	0.221186
Mt1	chr8:967029€	leanveh	dbveh	OK	550.71	1295.06
Zfyve28	chr5:3453754	leanveh	dbveh	OK	1.79269	7.04033
Atp1a4	chr1:174153€	leanveh	dbveh	OK	6.84868	0.837364
Actr2	chr11:199623	leanveh	dbveh	OK	43.3252	101.374
4930506M07	chr19:590478	leanveh	dbveh	OK	5.94195	18.4676
Dhcr7	chr7:151009C	leanveh	dbveh	OK	7.92268	21.2968
Gkap1	chr13:583347	leanveh	dbveh	OK	39.1865	11.916
Fam48a	chr3:5449702	leanveh	dbveh	OK	37.4214	15.0643
9030425E11F	chr9:4049404	leanveh	dbveh	OK	8.44908	22.7357
Rgs7bp	chr13:105737	leanveh	dbveh	OK	3.90393	1.10236
Fbp2	chr13:629382	leanveh	dbveh	OK	9.28297	1.4554
Lcat	chr8:1084634	leanveh	dbveh	OK	1.86789	10.7408

Nrcam	chr12:45429	leanveh	dbveh	OK	0.889044	6.60124
Llgl2	chr11:11568	leanveh	dbveh	OK	16.3685	5.70599
Arhgef37	chr18:61653	leanveh	dbveh	OK	3.09232	12.2754
Sirpb1b	chr3:154957	leanveh	dbveh	OK	0.284322	1.9859
Amph	chr13:19040	leanveh	dbveh	OK	1.21202	0.152933
Bzrap1	chr11:87574	leanveh	dbveh	OK	1.56067	0.254492
Col6a3	chr1:926634	leanveh	dbveh	OK	17.9779	48.7401
Creb3l4	chr3:900414	leanveh	dbveh	OK	8.4072	0.884371
C230081A13	chr9:560489	leanveh	dbveh	OK	6.45793	14.6068
Egr2	chr10:67000	leanveh	dbveh	OK	2.82623	10.0152
1500009L16R	chr10:83185	leanveh	dbveh	OK	5.80466	0.711704
Slco4a1	chr2:180195	leanveh	dbveh	OK	1.99811	0.315978
Chst10	chr1:3892071	leanveh	dbveh	OK	11.733	1.49306
Sash3	chrX:454997	leanveh	dbveh	OK	3.39363	13.4575
Eaf1	chr14:32308	leanveh	dbveh	OK	15.1049	33.0283
Cachd1	chr4:100449	leanveh	dbveh	OK	17.3115	6.96508
4930473A06	chr4:831714	leanveh	dbveh	OK	3.33468	0.477462
Csf2rb	chr15:78156	leanveh	dbveh	OK	11.7811	27.0553
Zfp39	chr11:58701	leanveh	dbveh	OK	7.73452	2.00924
Map3k8	chr18:43313	leanveh	dbveh	OK	3.11401	11.1989
Slc6a9	chr4:117507	leanveh	dbveh	OK	11.9873	2.85457
Hoxb6	chr11:96160	leanveh	dbveh	OK	34.7277	3.75611
C4bp	chr1:132532	leanveh	dbveh	OK	43.9689	5.42414
Npc1	chr18:12327	leanveh	dbveh	OK	8.51781	26.1309
Dyx1c1	chr9:728065	leanveh	dbveh	OK	4.83929	0.714397
Tsku	chr7:1054991	leanveh	dbveh	OK	9.7125	27.444
Clec4a1	chr6:122871	leanveh	dbveh	OK	7.75623	33.8298
H2-Eb1	chr17:34442	leanveh	dbveh	OK	170.015	80.0025
Mfge8	chr7:8627865	leanveh	dbveh	OK	197.578	1209.24
Ttr	chr18:20823	leanveh	dbveh	OK	12.5112	125.029
Fstl1	chr16:377771	leanveh	dbveh	OK	61.2058	167.411
Ppm1j	chr3:104583	leanveh	dbveh	OK	6.63559	1.02064
Letm2	chr8:266889	leanveh	dbveh	OK	7.65595	1.17598
Tsga10	chr1:3781162	leanveh	dbveh	OK	6.48051	0.893473
Tpm3	chr3:8987661	leanveh	dbveh	OK	30.3774	68.5904
Palld	chr8:6399381	leanveh	dbveh	OK	2.71422	11.6319
Gns	chr10:12080	leanveh	dbveh	OK	69.5803	175.561
Fam83f	chr15:80502	leanveh	dbveh	OK	1.37875	9.98163
Zranb3	chr1:129850	leanveh	dbveh	OK	1.51843	5.49104
Vwf	chr6:125502	leanveh	dbveh	OK	22.4934	9.51935
Nin	chr12:711124	leanveh	dbveh	OK	5.02469	11.9665
Hap1	chr11:10020	leanveh	dbveh	OK	4.42631	0.275152
Adam23	chr1:6349247	leanveh	dbveh	OK	10.7236	28.4799

Axin2	chr11:108781	leanveh	dbveh	OK	14.7192	5.55262
Gpd1	chr15:99548(	leanveh	dbveh	OK	218.394	644.193
Pde4dip	chr3:9749375	leanveh	dbveh	OK	16.7713	7.0585
Casp1	chr9:529851(	leanveh	dbveh	OK	6.19388	22.8136
Hpdl	chr4:1164925	leanveh	dbveh	OK	15.1927	2.01818
1700029G01F	chr4:125827(	leanveh	dbveh	OK	22.2532	2.75196
Adig	chr2:1583283	leanveh	dbveh	OK	253.427	108.602
Nfam1	chr15:828282	leanveh	dbveh	OK	4.23592	18.9922
A930018P22F	chr2:103962(	leanveh	dbveh	OK	6.8581	1.13735
Calu	chr6:2929811	leanveh	dbveh	OK	99.3013	257.761
Ccdc39	chr3:3369911	leanveh	dbveh	OK	7.83744	0.19891
Ifngr2	chr16:915473	leanveh	dbveh	OK	27.3341	58.166
Mtap1b	chr13:100191	leanveh	dbveh	OK	7.30418	3.257
Abca7	chr10:794603	leanveh	dbveh	OK	4.21157	9.96985
Cyp2d26	chr15:826205	leanveh	dbveh	OK	2.68546	17.1666
Catsperg1	chr7:2996655	leanveh	dbveh	OK	3.30684	0.509963
Hip1	chr5:1358823	leanveh	dbveh	OK	16.4621	34.6177
Lrp8	chr4:107474(	leanveh	dbveh	OK	4.63871	1.14269
Ostf1	chr19:18654(	leanveh	dbveh	OK	38.9109	81.4926
Osbpl6	chr2:762445(	leanveh	dbveh	OK	3.30785	0.902146
Large	chr8:753384(	leanveh	dbveh	OK	6.05581	16.2519
Smoc1	chr12:821277	leanveh	dbveh	OK	93.5029	41.5599
Tcea2	chr2:181415(	leanveh	dbveh	OK	31.393	3.88438
Hsd17b7	chr1:171879(	leanveh	dbveh	OK	3.29464	9.54652
Tifa	chr3:127492(	leanveh	dbveh	OK	4.42923	16.3691
Pdgfra	chr5:7554831	leanveh	dbveh	OK	11.6371	26.4456
Nlrp6	chr7:148106(	leanveh	dbveh	OK	4.90815	0.963518
Stk39	chr2:680485(	leanveh	dbveh	OK	18.4123	6.81324
Sec24d	chr3:122970	leanveh	dbveh	OK	21.7949	48.3555
Adamts5	chr16:858584	leanveh	dbveh	OK	22.8723	54.9579
Ap2a2	chr7:148748(	leanveh	dbveh	OK	39.2901	86.3449
Txnrd3	chr6:895939(	leanveh	dbveh	OK	30.3338	8.81887
Btk	chrX:131076(	leanveh	dbveh	OK	1.34406	9.2411
Rasgrf1	chr9:8980461	leanveh	dbveh	OK	2.14003	0.359462
Rab3ip	chr10:116342	leanveh	dbveh	OK	15.793	5.27811
Ccdc116	chr16:171391	leanveh	dbveh	OK	4.20623	0.10709
Pqlc3	chr12:169954	leanveh	dbveh	OK	10.7598	34.776
Gmfb	chr14:474278	leanveh	dbveh	OK	30.4114	63.9859
Tlr6	chr5:6534433	leanveh	dbveh	OK	0.717421	4.4117
Fam38a	chr8:125000(	leanveh	dbveh	OK	11.1412	27.5781
Cldn23	chr8:368877(	leanveh	dbveh	OK	8.7293	0.916089
Emilin1	chr5:3121615	leanveh	dbveh	OK	10.9299	27.4638
Ly6e	chr15:747854	leanveh	dbveh	OK	495.555	158.728

Grk4	chr5:3500302	leanveh	dbveh	OK	6.49707	1.25306
Serpina3m	chr12:105625	leanveh	dbveh	OK	3.2112	25.6
Amt	chr9:1081992	leanveh	dbveh	OK	12.7444	2.12633
Ramp3	chr11:655015	leanveh	dbveh	OK	51.532	0.892587
Vtn	chr11:78312(	leanveh	dbveh	OK	15.9218	45.1108
Acr	chr15:893987	leanveh	dbveh	OK	13.7551	1.09798
Stard6	chr18:706321	leanveh	dbveh	OK	4.95166	0.681383
Prcp	chr7:1000237	leanveh	dbveh	OK	13.8586	35.1254
Lrrc51	chr7:1090615	leanveh	dbveh	OK	36.8198	5.74516
AK129341	chr9:8076632	leanveh	dbveh	OK	8.91338	1.18748
Lrp1	chr10:126975	leanveh	dbveh	OK	27.2641	69.3268
2310067B10F	chr11:11562(	leanveh	dbveh	OK	16.9895	7.76189
Osbpl7	chr11:969121	leanveh	dbveh	OK	11.8238	3.99951
Fblim1	chr4:141131(	leanveh	dbveh	OK	12.554	31.522
Rnf150	chr8:853872(	leanveh	dbveh	OK	2.94571	6.88357
Ccdc38	chr10:930033	leanveh	dbveh	OK	13.3236	0.106481
Msn	chrX:932913(	leanveh	dbveh	OK	74.8454	180.525
Fcgr4	chr1:172949(	leanveh	dbveh	OK	2.14522	12.9928
Gpr88	chr3:115952(	leanveh	dbveh	OK	1.456	0.196431
Phkg2	chr7:134716(	leanveh	dbveh	OK	88.704	22.5424
Dtx4	chr19:125408	leanveh	dbveh	OK	10.7772	24.5296
Col18a1	chr10:765149	leanveh	dbveh	OK	34.0315	73.7324
Mtap2	chr1:662219(	leanveh	dbveh	OK	1.62721	0.163505
1110012J17R	chr17:666863	leanveh	dbveh	OK	2.27712	0.353664
Spp1	chr5:1048641	leanveh	dbveh	OK	38.8786	1322.67
Slc16a7	chr10:124664	leanveh	dbveh	OK	25.1285	7.76181
Atp6v1c1	chr15:38591(	leanveh	dbveh	OK	38.8841	78.5323
Slc9a4	chr1:4063707	leanveh	dbveh	OK	0.386476	2.0664
Pnma1	chr12:85487(	leanveh	dbveh	OK	2.66901	0.377316
Myh10	chr11:685054	leanveh	dbveh	OK	9.3381	3.91372
Elovl4	chr9:836722(	leanveh	dbveh	OK	0.123647	0.716879
Cmtm8	chr9:1146984	leanveh	dbveh	OK	11.1489	2.22618
Trim25	chr11:888607	leanveh	dbveh	OK	16.4252	36.1251
Ribc1	chrX:1484391	leanveh	dbveh	OK	3.84938	0.538929
Fam189a2	chr19:240472	leanveh	dbveh	OK	25.0744	7.82119
Fgd4	chr16:16422(	leanveh	dbveh	OK	2.28513	7.7823
Gnptab	chr10:878421	leanveh	dbveh	OK	15.0083	32.6645
Map4k4	chr1:3995775	leanveh	dbveh	OK	33.1709	69.8486
Aldh3b1	chr19:391349	leanveh	dbveh	OK	8.49884	24.8695
Lama2	chr10:26701(	leanveh	dbveh	OK	4.65477	10.679
Adap2	chr11:79967(	leanveh	dbveh	OK	34.8169	75.7437
Ovol1	chr19:554913	leanveh	dbveh	OK	2.78635	0.300267
Pgap2	chr7:109371(	leanveh	dbveh	OK	73.9105	23.3782

Slc16a11	chr11:700274	leanveh	dbveh	OK	14.0091	2.15995
Ankrd33b	chr15:312212	leanveh	dbveh	OK	1.34682	6.99192
Grb2	chr11:115505	leanveh	dbveh	OK	35.1025	73.0768
Arpc2	chr1:7428312	leanveh	dbveh	OK	141.887	348.061
Il22ra2	chr10:193418	leanveh	dbveh	OK	2.13317	0.376029
B9d1	chr11:61318(	leanveh	dbveh	OK	28.4616	4.33427
Cda	chr4:1378944	leanveh	dbveh	OK	15.4338	2.83209
Rragc	chr4:123594(	leanveh	dbveh	OK	65.1394	138.776
Slc9a2	chr1:4073855	leanveh	dbveh	OK	1.81791	0.253015
Fosl2	chr5:3243884	leanveh	dbveh	OK	10.8704	23.503
Ctsa	chr2:1646562	leanveh	dbveh	OK	51.2725	191.456
BC030307	chr10:861685	leanveh	dbveh	OK	3.74388	0.392331
Gba	chr3:8900684	leanveh	dbveh	OK	30.1418	67.7792
Pkm2	chr9:5950441	leanveh	dbveh	OK	198.718	503.827
Ppp4r4	chr12:10477(	leanveh	dbveh	OK	5.4152	0.886983
Pde2a	chr7:1085702	leanveh	dbveh	OK	38.873	94.3915
Sgcb	chr5:740239(	leanveh	dbveh	OK	11.0324	23.8938
Stk24	chr14:121685	leanveh	dbveh	OK	20.5602	42.7848
Lrrc25	chr8:7314074	leanveh	dbveh	OK	4.04564	29.1457
Lrrc50	chr8:1220991	leanveh	dbveh	OK	35.6037	0.131668
Tank	chr2:6141664	leanveh	dbveh	OK	19.933	49.3261
BC051019	chr7:1168472	leanveh	dbveh	OK	2.40714	0.0323175
Gsto1	chr19:479294	leanveh	dbveh	OK	65.5641	147.412
Cdk18	chr1:1340101	leanveh	dbveh	OK	4.15298	17.3522
Lyar	chr5:3861172	leanveh	dbveh	OK	79.7268	19.8885
Ccdc7	chr8:131503(	leanveh	dbveh	OK	1.17547	0
Tssk4	chr14:56269(	leanveh	dbveh	OK	8.10545	0.388816
Thy1	chr9:438514(	leanveh	dbveh	OK	13.5867	33.8049
Taok3	chr5:1175701	leanveh	dbveh	OK	7.15849	18.1594
Arhgap9	chr10:12676(	leanveh	dbveh	OK	5.88993	29.8852
Actn1	chr12:812685	leanveh	dbveh	OK	18.5871	40.1091
Mtap6	chr7:106415(	leanveh	dbveh	OK	6.54668	21.374
2810474O19F	chr6:149257(	leanveh	dbveh	OK	9.31487	20.6923
Edem1	chr6:108778(	leanveh	dbveh	OK	20.5594	44.1604
C2cd2	chr16:980768	leanveh	dbveh	OK	7.09852	15.6426
Rnase4	chr14:517107	leanveh	dbveh	OK	92.3997	208.415
Jakmip1	chr5:374420(	leanveh	dbveh	OK	2.39238	0.389782
Epb4.1l4a	chr18:339559	leanveh	dbveh	OK	2.27049	0.391968
Snx10	chr6:514739(	leanveh	dbveh	OK	24.2035	54.6592
Pex6	chr17:468484	leanveh	dbveh	OK	29.5488	13.5134
Ift122	chr6:115803(	leanveh	dbveh	OK	13.3409	2.49073
Sgsm2	chr11:746627	leanveh	dbveh	OK	10.7208	4.09606
Rab11fip1	chr8:2824924	leanveh	dbveh	OK	7.09726	1.81276

Il10ra	chr9:4506192	leanveh	dbveh	OK	5.33919	16.531
Tpcn2	chr7:152439[illegible]	leanveh	dbveh	OK	1.68262	12.1816
Mboat1	chr13:302283	leanveh	dbveh	OK	7.86059	1.18206
Wif1	chr10:120471	leanveh	dbveh	OK	0.326967	2.47543
Elmo2	chr2:165113[illegible]	leanveh	dbveh	OK	10.032	21.933
Mef2d	chr3:8794631	leanveh	dbveh	OK	19.9459	44.3837
Tmem182	chr1:4086244	leanveh	dbveh	OK	36.146	97.4032
Hspb1	chr5:1363637	leanveh	dbveh	OK	90.3406	196.29
Cacna1h	chr17:255074	leanveh	dbveh	OK	6.27623	0.120045
Fcgr1	chr3:960868[illegible]	leanveh	dbveh	OK	1.64489	10.9123
Mfsd7c	chr12:870874	leanveh	dbveh	OK	3.54883	0.649432
Mobkl2a	chr10:80147[illegible]	leanveh	dbveh	OK	11.7951	27.883
Gng4	chr13:13876[illegible]	leanveh	dbveh	OK	1.46784	0.238558
Apoa1	chr9:4603671	leanveh	dbveh	OK	28.8524	125.654
Asgr1	chr11:69867[illegible]	leanveh	dbveh	OK	3.42991	16.2088
Cabyr	chr18:12899[illegible]	leanveh	dbveh	OK	18.6688	0.850763
Irak2	chr6:1135884	leanveh	dbveh	OK	22.6012	50.1284
Nov	chr15:545774	leanveh	dbveh	OK	10.8919	3.06435
Otop1	chr5:3866864	leanveh	dbveh	OK	0.532549	2.88742
Gbp4	chr5:1055447	leanveh	dbveh	OK	12.3073	5.05214
Slpi	chr2:164179[illegible]	leanveh	dbveh	OK	4.35949	23.7832
Ticam2	chr18:46717[illegible]	leanveh	dbveh	OK	1.03715	5.9867
Tmem120b	chr5:1235262	leanveh	dbveh	OK	62.6391	135.471
Wipf3	chr6:5440287	leanveh	dbveh	OK	9.61034	2.51846
2610029I01R	chr4:2168452	leanveh	dbveh	OK	4.72492	15.7849
Ptgs1	chr2:3608594	leanveh	dbveh	OK	20.8018	6.64558
Prlr	chr15:10106[illegible]	leanveh	dbveh	OK	6.95618	2.47321
Arxes1	chrX:132567[illegible]	leanveh	dbveh	OK	14.8641	36.091
1700048O20I	chr9:1218463	leanveh	dbveh	OK	2.27646	0.384614
C030037D09I	chr11:88579[illegible]	leanveh	dbveh	OK	2.14184	0.40976
Mthfd1l	chr10:617945	leanveh	dbveh	OK	10.3291	2.39429
Bri3bp	chr5:125921[illegible]	leanveh	dbveh	OK	8.40928	2.46331
Prps2	chrX:1637842	leanveh	dbveh	OK	30.0433	11.4271
Bhlhb9	chrX:132420[illegible]	leanveh	dbveh	OK	16.0968	4.62098
Prrg1	chrX:756949[illegible]	leanveh	dbveh	OK	8.99628	2.22502
Epha1	chr6:4230848	leanveh	dbveh	OK	3.4337	0.736526
Rps6ka3	chrX:155694[illegible]	leanveh	dbveh	OK	25.5403	57.8222
Rbm20	chr19:537517	leanveh	dbveh	OK	1.05867	0.205771
Mthfd2	chr6:832556[illegible]	leanveh	dbveh	OK	25.5686	8.22918
Mal	chr2:127458[illegible]	leanveh	dbveh	OK	12.524	1.12354
Gm221	chr10:578542	leanveh	dbveh	OK	1.77738	0.279956
Ldlr	chr9:2152803	leanveh	dbveh	OK	10.4809	25.3485
Clic1	chr17:351871	leanveh	dbveh	OK	111.577	242.725

Tln1	chr4:435443{	leanveh	dbveh	OK	23.3891	51.8941
Bag3	chr7:135667(	leanveh	dbveh	OK	33.567	66.7722
Cpe	chr8:6707134	leanveh	dbveh	OK	71.2216	33.2675
Slc41a2	chr10:826938	leanveh	dbveh	OK	4.0842	11.8451
1700009P17F	chr1:1730517	leanveh	dbveh	OK	30.247	4.29312
1-Mar	chr8:6814193	leanveh	dbveh	OK	2.39534	11.2355
Phf19	chr2:3474927	leanveh	dbveh	OK	7.8524	2.01221
Angpt4	chr2:151737(	leanveh	dbveh	OK	3.00544	0.436785
Apoc3	chr9:4604113	leanveh	dbveh	OK	22.8671	141.121
Rgs18	chr1:146599(	leanveh	dbveh	OK	1.27162	7.18647
Glrx	chr13:759773	leanveh	dbveh	OK	8.01021	28.0287
Myo9b	chr8:7379661	leanveh	dbveh	OK	11.7836	24.4995
Dbp	chr7:5296061	leanveh	dbveh	OK	98.493	27.7489
Bex1	chrX:132748(	leanveh	dbveh	OK	11.2677	2.32109
Igf1r	chr7:7509714	leanveh	dbveh	OK	7.41736	3.34527
Trim67	chr8:127316(	leanveh	dbveh	OK	3.06699	7.53147
Sugp2	chr8:727440(	leanveh	dbveh	OK	21.8118	7.39001
Rprml	chr11:10351(	leanveh	dbveh	OK	24.7423	7.91252
Tmem88b	chr4:155155(	leanveh	dbveh	OK	6.68997	2.03487
9430023L20R	chr15:101114	leanveh	dbveh	OK	25.9457	57.9716
Fam46c	chr3:1002754	leanveh	dbveh	OK	22.7566	2.95584
Rgs10	chr7:1355171	leanveh	dbveh	OK	14.1467	52.2145
BC005537	chr13:248935	leanveh	dbveh	OK	77.7544	168.633
3930402G23F	chr8:1092442	leanveh	dbveh	OK	0.131464	0.851891
Myoc	chr1:1645692	leanveh	dbveh	OK	0.618723	5.3794
Akap13	chr7:8260041	leanveh	dbveh	OK	11.547	23.6114
Akirin1	chr4:1234124	leanveh	dbveh	OK	24.2289	50.2887
Ston2	chr12:928714	leanveh	dbveh	OK	3.47845	0.486881
1700007G11F	chr5:9875832	leanveh	dbveh	OK	11.1111	0.190677
Aph1c	chr9:666628(	leanveh	dbveh	OK	1.40504	4.73948
Daam2	chr17:495953	leanveh	dbveh	OK	10.8825	4.00295
Ptpdc1	chr13:486732	leanveh	dbveh	OK	12.086	4.55119
Lrrfip1	chr1:928953(	leanveh	dbveh	OK	15.3997	36.6462
Klf6	chr13:586073	leanveh	dbveh	OK	44.3184	92.9552
Prosapip1	chr2:130458(	leanveh	dbveh	OK	9.73885	2.59386
Retn	chr8:365576(	leanveh	dbveh	OK	2087	705.373
Slc22a5	chr11:53678(	leanveh	dbveh	OK	24.133	10.0628
Apln	chrX:4537832	leanveh	dbveh	OK	9.14304	2.70038
Arl6ip5	chr6:9716078	leanveh	dbveh	OK	72.8624	148.96
Aqp11	chr7:1048748	leanveh	dbveh	OK	37.5987	4.75603
Slc10a1	chr12:820541	leanveh	dbveh	OK	0.602237	14.672
Mme	chr3:630997(	leanveh	dbveh	OK	30.1448	11.4677
Dock10	chr1:8049764	leanveh	dbveh	OK	2.87861	7.10967

Plekha8	chr6:545451C	leanveh	dbveh	OK	8.01451	3.11733
Gm5148	chr3:3761311	leanveh	dbveh	OK	1.88612	0.365569
Vhl	chr6:113574C	leanveh	dbveh	OK	22.3791	46.9702
Galntl2	chr14:328422	leanveh	dbveh	OK	17.7027	40.787
Abi1	chr2:2275104	leanveh	dbveh	OK	23.1638	48.7991
Gstt1	chr10:752465	leanveh	dbveh	OK	78.7317	31.9396
Hook2	chr8:875144C	leanveh	dbveh	OK	15.2198	4.57379
D11Wsu47e	chr11:113545	leanveh	dbveh	OK	16.3183	4.68396
Prss23	chr7:966562C	leanveh	dbveh	OK	28.1467	61.1035
Mtap1a	chr2:1211153	leanveh	dbveh	OK	1.87611	7.92727
Slc14a2	chr18:783428	leanveh	dbveh	OK	4.64832	0.0499371
Ccng1	chr11:40562C	leanveh	dbveh	OK	34.2233	67.6762
Uox	chr3:1462443	leanveh	dbveh	OK	4.5297	26.1767
4932412D23F	chr16:427258	leanveh	dbveh	OK	2.03114	0
Rab11fip5	chr6:852849C	leanveh	dbveh	OK	20.1114	46.9957
Nasp	chr4:116273C	leanveh	dbveh	OK	30.5188	8.41139
Ahi1	chr10:206723	leanveh	dbveh	OK	7.97072	2.15787
Htatip2	chr7:5701447	leanveh	dbveh	OK	28.5383	71.0507
Samd10	chr2:181329C	leanveh	dbveh	OK	12.242	1.86584
Kng1	chr16:230583	leanveh	dbveh	OK	2.58041	33.8762
Arhgap11a	chr2:113671C	leanveh	dbveh	OK	3.43379	9.29898
Papolb	chr5:1429607	leanveh	dbveh	OK	24.4495	0.0803955
Dnajb2	chr1:752329C	leanveh	dbveh	OK	37.6389	16.2083
Ccdc120	chrX:730883C	leanveh	dbveh	OK	3.20825	0.581697
B4galnt1	chr10:126602	leanveh	dbveh	OK	10.9794	31.6674
Prdm8	chr5:9860988	leanveh	dbveh	OK	1.49799	0.273441
Bmp1	chr14:708743	leanveh	dbveh	OK	17.3217	36.8673
Eif2c2	chr15:72932C	leanveh	dbveh	OK	4.83762	10.0717
Plekhm3	chr1:648356C	leanveh	dbveh	OK	2.87119	7.28748
Bcl7a	chr5:1237944	leanveh	dbveh	OK	12.0776	4.34451
Fhl1	chrX:539849C	leanveh	dbveh	OK	130.376	310.471
Phyhipl	chr10:699034	leanveh	dbveh	OK	9.09969	0.176679
Diap1	chr18:380044	leanveh	dbveh	OK	10.8501	23.9697
Gabra3	chrX:6967801	leanveh	dbveh	OK	1.7678	5.51709
Rbm4b	chr19:475652	leanveh	dbveh	OK	13.867	3.98945
Sh3bgrl	chrX:1062907	leanveh	dbveh	OK	111.989	244.619
Acat2	chr17:13135C	leanveh	dbveh	OK	35.6925	15.3919
Slc16a13	chr11:700302	leanveh	dbveh	OK	8.27786	2.48139
Pcna	chr2:132075C	leanveh	dbveh	OK	24.7046	55.2175
Cap1	chr4:1225364	leanveh	dbveh	OK	83.6594	179.745
Rhbdl1	chr17:259714	leanveh	dbveh	OK	30.0347	8.40808
Pitpna	chr11:75401C	leanveh	dbveh	OK	40.8452	82.6142
Matk	chr10:807202	leanveh	dbveh	OK	2.27097	13.2041

Slc9a6	chrX:5386301	leanveh	dbveh	OK	30.5198	74.5944
Itgb7	chr15:10204(	leanveh	dbveh	OK	1.58911	9.39477
Acer2	chr4:8652031	leanveh	dbveh	OK	15.0675	32.2894
Ptpn7	chr1:1370293	leanveh	dbveh	OK	1.63609	11.6242
Spata7	chr12:998663	leanveh	dbveh	OK	14.931	4.28237
Trp53inp1	chr4:110835(	leanveh	dbveh	OK	12.9636	27.956
Uvrag	chr7:1060352	leanveh	dbveh	OK	11.8672	25.1384
Fam161b	chr12:856862	leanveh	dbveh	OK	2.65654	0.522569
Gprasp1	chrX:1322772	leanveh	dbveh	OK	11.3642	2.47041
Hoxb2	chr11:96212(	leanveh	dbveh	OK	14.8769	4.47187
Scube3	chr17:282794	leanveh	dbveh	OK	1.41601	0.209798
Agpat9	chr5:1012752	leanveh	dbveh	OK	41.9585	18.8933
Pex5l	chr3:3284855	leanveh	dbveh	OK	1.35764	25.0501
Hhex	chr19:375093	leanveh	dbveh	OK	4.5039	14.6495
Xk	chrX:8849905	leanveh	dbveh	OK	2.82934	0.497598
Ddah1	chr3:145421(	leanveh	dbveh	OK	14.1741	4.8148
Rnf149	chr1:3960814	leanveh	dbveh	OK	25.5277	54.6405
Armc2	chr10:416347	leanveh	dbveh	OK	1.6619	0.207262
Ift74	chr4:9428121	leanveh	dbveh	OK	19.3137	6.41159
Nav2	chr7:5621444	leanveh	dbveh	OK	4.90657	1.9368
Nrp2	chr1:6274985	leanveh	dbveh	OK	9.95382	23.119
6430531B16F	chr7:1471582	leanveh	dbveh	OK	4.61403	0.866054
Keg1	chr19:127702	leanveh	dbveh	OK	11.2433	2.50847
Lepre1	chr4:1189055	leanveh	dbveh	OK	14.7513	31.7462
Rbms1	chr2:605900(	leanveh	dbveh	OK	20.7104	47.3075
Ptpn12	chr5:204924(	leanveh	dbveh	OK	14.8327	31.1074
3110082D06F	chr17:424528	leanveh	dbveh	OK	0.433568	2.24988
Galns	chr8:1251021	leanveh	dbveh	OK	9.10973	22.9103
Mfsd7b	chr1:1928297	leanveh	dbveh	OK	4.14789	11.5176
Fndc3b	chr3:2731508	leanveh	dbveh	OK	19.5028	38.6975
Serping1	chr2:8460551	leanveh	dbveh	OK	125.381	269.284
Nek7	chr1:1403812	leanveh	dbveh	OK	27.5522	54.2343
Specc1	chr11:618905	leanveh	dbveh	OK	2.81594	8.08994
Atg4a	chrX:1374914	leanveh	dbveh	OK	44.1157	11.9304
Fmnl1	chr11:103032	leanveh	dbveh	OK	9.2155	20.8969
Fam105a	chr15:275848	leanveh	dbveh	OK	5.07818	13.8843
Ltbp1	chr17:754048	leanveh	dbveh	OK	12.688	5.37316
6330439K17F	chr2:1442962	leanveh	dbveh	OK	1.92328	0.348733
F2rl1	chr13:96281(	leanveh	dbveh	OK	5.51204	1.01106
4930550C14F	chr9:532133(	leanveh	dbveh	OK	4.90665	0.855254
Arpc3	chr5:122841(	leanveh	dbveh	OK	196.291	390.013
Ptprs	chr17:565518	leanveh	dbveh	OK	8.10729	16.5849
Arrb2	chr11:702461	leanveh	dbveh	OK	20.7701	46.6335

Naip2	chr13:100914	leanveh	dbveh	OK	1.12188	6.8222
Dusp10	chr1:185858	leanveh	dbveh	OK	6.83264	19.6349
Pvrl3	chr16:46394	leanveh	dbveh	OK	13.5425	4.33615
Gsg2	chr11:72904	leanveh	dbveh	OK	28.12	2.11313
Mns1	chr9:722863	leanveh	dbveh	OK	22.7649	0.374168
Sorcs2	chr5:363598	leanveh	dbveh	OK	5.05046	0.797922
Pmp22	chr11:62945	leanveh	dbveh	OK	107.065	218.742
Herc3	chr6:587836	leanveh	dbveh	OK	6.43124	14.322
Ace	chr11:10582	leanveh	dbveh	OK	63.6957	29.5248
C1qtnf6	chr15:783537	leanveh	dbveh	OK	14.103	33.3049
Hck	chr2:152934	leanveh	dbveh	OK	2.55806	16.4811
Fcna	chr2:254801	leanveh	dbveh	OK	6.10588	43.0492
Dtna	chr18:23573	leanveh	dbveh	OK	2.40616	0.602747
Bak1	chr17:271567	leanveh	dbveh	OK	18.9385	42.9874
Tspan17	chr13:548907	leanveh	dbveh	OK	45.911	92.5933
Gpsm3	chr17:347267	leanveh	dbveh	OK	12.3081	33.1149
Lsr	chr7:317427	leanveh	dbveh	OK	17.6821	4.62835
Fbxo24	chr5:138053	leanveh	dbveh	OK	4.07603	0.585972
Slc6a8	chrX:709184	leanveh	dbveh	OK	22.4059	49.8763
Plod3	chr5:137458	leanveh	dbveh	OK	30.1877	70.0425
Tctex1d4	chr4:116799	leanveh	dbveh	OK	12.9528	0.592398
Fbln1	chr15:850364	leanveh	dbveh	OK	6.91968	17.8806
Dync2h1	chr9:692850	leanveh	dbveh	OK	1.99067	0.606583
Spire2	chr8:125856	leanveh	dbveh	OK	3.68293	0.507554
Ube2g2	chr10:77085	leanveh	dbveh	OK	38.808	80.8293
Zcchc18	chrX:133515	leanveh	dbveh	OK	1.31064	0.0858235
Cab39	chr1:876900	leanveh	dbveh	OK	41.8785	81.4167
Gyg	chr3:200219	leanveh	dbveh	OK	38.0467	81.221
Srgap3	chr6:112667	leanveh	dbveh	OK	2.65214	0.82391
Hpx	chr7:112740	leanveh	dbveh	OK	5.39367	27.1062
Lhfp	chr3:528454	leanveh	dbveh	OK	16.599	36.7915
Tgm2	chr2:157942	leanveh	dbveh	OK	94.79	217.684
Ptk2b	chr14:66772	leanveh	dbveh	OK	13.8272	29.2909
1810044D09F	chr6:913909	leanveh	dbveh	OK	27.1038	5.54591
3000002C10F	chr9:109732	leanveh	dbveh	OK	3.7788	0.646945
Dnase1l1	chrX:715185	leanveh	dbveh	OK	13.0075	34.2244
Gpr77	chr7:168199	leanveh	dbveh	OK	0.854773	4.6247
Slc48a1	chr15:976147	leanveh	dbveh	OK	108.507	265.038
Snx9	chr17:584137	leanveh	dbveh	OK	31.6868	64.0986
Ctf1	chr7:134856	leanveh	dbveh	OK	9.51167	1.89352
Hip1r	chr5:124423	leanveh	dbveh	OK	13.3638	5.5873
Nptn	chr9:584300	leanveh	dbveh	OK	99.8282	201.159
Tppp	chr13:741468	leanveh	dbveh	OK	8.55315	3.06576

Ufm1	chr3:536572	leanveh	dbveh	OK	12.5343	24.9524
Wdr35	chr12:89808	leanveh	dbveh	OK	11.9427	4.21995
Ttll5	chr12:87165	leanveh	dbveh	OK	10.0595	3.33969
Med26	chr8:750184	leanveh	dbveh	OK	10.6187	4.20307
4930528F23R	chr17:24941	leanveh	dbveh	OK	4.3909	0.750628
Lpgat1	chr1:193541	leanveh	dbveh	OK	82.5685	251.535
Iigp1	chr18:60535	leanveh	dbveh	OK	21.9475	9.26513
Rgs16	chr1:155587	leanveh	dbveh	OK	1.15376	6.10224
Sox6	chr7:122614	leanveh	dbveh	OK	4.9921	1.57151
4921530L18R	chr2:139919	leanveh	dbveh	OK	4.59812	0.897824
Med28	chr5:459114	leanveh	dbveh	OK	21.0795	10.1726
Mertk	chr2:128524	leanveh	dbveh	OK	16.4423	32.4219
Tsga14	chr6:306034	leanveh	dbveh	OK	7.05738	2.23303
Mdc1	chr17:35978	leanveh	dbveh	OK	11.991	5.44662
Ano1	chr7:151774	leanveh	dbveh	OK	8.12091	2.45779
Rasa1	chr13:85354	leanveh	dbveh	OK	10.4372	21.3557
Tnfaip8l2	chr3:949380	leanveh	dbveh	OK	5.96121	34.5648
Nqo1	chr8:109912	leanveh	dbveh	OK	19.3603	5.8834
Sh3bgr	chr16:96422	leanveh	dbveh	OK	3.0985	0.514398
Lss	chr10:75994	leanveh	dbveh	OK	8.04014	19.1271
Spnb3	chr19:47112	leanveh	dbveh	OK	2.00019	0.451019
Pppde1	chr1:180117	leanveh	dbveh	OK	7.87451	17.5606
Wipi1	chr11:10943	leanveh	dbveh	OK	14.6966	35.731
Ccdc37	chr6:903537	leanveh	dbveh	OK	2.39221	0.433305
Camk1d	chr2:521450	leanveh	dbveh	OK	1.62979	5.86786
Pik3cg	chr12:32858	leanveh	dbveh	OK	1.06423	4.13528
Gadd45b	chr10:80392	leanveh	dbveh	OK	11.0171	39.7227
Kcnb1	chr2:166928	leanveh	dbveh	OK	4.21404	11.2572
B130034C11R	chr16:87496	leanveh	dbveh	OK	1.01786	0.215605
Rcn1	chr2:105226	leanveh	dbveh	OK	44.1067	18.0777
Mcl1	chr3:954626	leanveh	dbveh	OK	70.5505	145.897
Ift172	chr5:315556	leanveh	dbveh	OK	9.42619	4.00729
Itgb1	chr8:131209	leanveh	dbveh	OK	120.994	283.456
Bmp3	chr5:992834	leanveh	dbveh	OK	4.67645	11.7805
Soat1	chr1:158358	leanveh	dbveh	OK	9.4453	21.2746
Lrrc32	chr7:105642	leanveh	dbveh	OK	9.66314	20.4038
Ddi2	chr4:141239	leanveh	dbveh	OK	5.51769	15.7477
Adra1a	chr14:67254	leanveh	dbveh	OK	2.05707	6.67837
Klhl2	chr8:672186	leanveh	dbveh	OK	40.2478	19.8305
Upk1b	chr16:38773	leanveh	dbveh	OK	0.866712	4.71112
Perp	chr10:18564	leanveh	dbveh	OK	15.0846	3.12806
Fmr1	chrX:659317	leanveh	dbveh	OK	43.5408	90.3521
Oasl1	chr5:115373	leanveh	dbveh	OK	1.724	8.92907

Flywch2	chr17:239138	leanveh	dbveh	OK	16.8669	3.32948
Psip1	chr4:831015	leanveh	dbveh	OK	16.8626	6.42778
Igf2	chr7:149836	leanveh	dbveh	OK	7.88039	1.89374
2310014H01F	chr17:360025	leanveh	dbveh	OK	27.5503	57.5207
8-Sep	chr11:533333	leanveh	dbveh	OK	23.9558	46.4407
Osr2	chr15:352258	leanveh	dbveh	OK	6.65096	1.47844
Maf	chr8:1182271	leanveh	dbveh	OK	16.3486	34.5064
Mfap2	chr4:140566	leanveh	dbveh	OK	6.13908	28.4615
Serf1	chr13:100877	leanveh	dbveh	OK	91.5429	32.1918
Rab36	chr10:744998	leanveh	dbveh	OK	4.46058	0.870011
Ptgfrn	chr3:1008441	leanveh	dbveh	OK	11.7636	23.0019
Abhd12	chr2:150658	leanveh	dbveh	OK	78.9918	165.081
Coil	chr11:888352	leanveh	dbveh	OK	13.9252	3.99575
Rgs5	chr1:171585	leanveh	dbveh	OK	97.6226	45.3959
Kif5c	chr2:494748	leanveh	dbveh	OK	1.64957	0.316007
Ikzf4	chr10:128069	leanveh	dbveh	OK	1.18289	0.202774
Arc	chr15:744995	leanveh	dbveh	OK	10.3366	1.62562
Plxna1	chr6:892663	leanveh	dbveh	OK	9.89631	18.7327
Clic5	chr17:443255	leanveh	dbveh	OK	11.8709	4.96643
Zfp574	chr7:258622	leanveh	dbveh	OK	12.9987	5.27877
I830077J02Ri	chr3:105728	leanveh	dbveh	OK	0.302433	1.43109
Trp53inp2	chr2:155207	leanveh	dbveh	OK	156.368	407.356
Rab3b	chr4:108551	leanveh	dbveh	OK	1.52481	0.285009
Slc23a2	chr2:131878	leanveh	dbveh	OK	6.92846	14.5319
Hsd17b12	chr2:938728	leanveh	dbveh	OK	67.0942	128.065
Bbx	chr16:501919	leanveh	dbveh	OK	11.5429	5.46453
Mrap	chr16:907385	leanveh	dbveh	OK	160.516	330.286
Tmprss6	chr15:78270	leanveh	dbveh	OK	0.491164	2.99889
Phf1	chr17:27070	leanveh	dbveh	OK	35.0639	16.9281
Grhpr	chr4:449942	leanveh	dbveh	OK	78.7181	35.5218
Lekr1	chr3:6547014	leanveh	dbveh	OK	3.80589	0.73222
Luc7l3	chr11:941524	leanveh	dbveh	OK	32.7156	15.5387
Ccdc46	chr11:10828	leanveh	dbveh	OK	8.44251	1.33129
4930529L06R	chr16:84680	leanveh	dbveh	OK	1.14803	0
Epb4.1l4b	chr4:570745	leanveh	dbveh	OK	7.06864	1.43299
Rab22a	chr2:173485	leanveh	dbveh	OK	30.2454	59.749
Scml2	chrX:157600	leanveh	dbveh	OK	1.61622	0.269243
Slc7a6	chr8:108692	leanveh	dbveh	OK	10.039	21.8209
Efr3b	chr12:396255	leanveh	dbveh	OK	3.61306	9.91197
Prkcq	chr2:110940	leanveh	dbveh	OK	3.73712	0.782631
Alb	chr5:9088991	leanveh	dbveh	OK	56.0125	1302.46
Zdhhc9	chrX:455251	leanveh	dbveh	OK	11.7416	25.8469
Angpt1	chr15:422562	leanveh	dbveh	OK	6.40757	1.0377

Gm11428	chr11:835175	leanveh	dbveh	OK	19.6793	111.521
Dgkz	chr2:9177297	leanveh	dbveh	OK	14.4882	29.4851
Ift140	chr17:25153(	leanveh	dbveh	OK	19.4529	6.3476
Mctp1	chr13:765224	leanveh	dbveh	OK	0.921389	4.61737
Tbx3	chr5:120120(	leanveh	dbveh	OK	11.86	4.53518
Ctxn1	chr8:4257645	leanveh	dbveh	OK	15.7465	3.25915
Sclt1	chr3:4143062	leanveh	dbveh	OK	6.80686	2.21502
Arntl	chr7:120350(	leanveh	dbveh	OK	2.28254	8.92787
Cep72	chr13:74173(	leanveh	dbveh	OK	5.3627	0.940006
Fgfr3	chr5:3406437	leanveh	dbveh	OK	8.53939	2.43289
Krba1	chr6:4834558	leanveh	dbveh	OK	5.95774	1.69959
2200002K05F	chr9:1504348	leanveh	dbveh	OK	2.19947	0.417927
Atp2a3	chr11:72774(	leanveh	dbveh	OK	17.266	35.382
Nfkbid	chr7:3120832	leanveh	dbveh	OK	1.07064	5.06293
Vars	chr17:351378	leanveh	dbveh	OK	36.4212	18.7726
Gprin3	chr6:5930245	leanveh	dbveh	OK	0.934365	4.38315
Epn2	chr11:613307	leanveh	dbveh	OK	24.571	46.3065
Fibin	chr2:110201(	leanveh	dbveh	OK	4.34117	13.5547
Cxcl14	chr13:56390(	leanveh	dbveh	OK	10.4558	27.7944
Mtpn	chr6:3545882	leanveh	dbveh	OK	48.1607	98.643
Clock	chr5:766412(	leanveh	dbveh	OK	8.5385	16.8693
Rhoj	chr12:764092	leanveh	dbveh	OK	21.7076	43.5628
Plscr2	chr9:9217043	leanveh	dbveh	OK	18.5774	5.78347
Csf3r	chr4:125701(	leanveh	dbveh	OK	1.0737	5.27226
Fabp1	chr6:7114988	leanveh	dbveh	OK	28.7008	148.625
Cnr2	chr4:1354513	leanveh	dbveh	OK	0.96225	5.00013
Gcom1	chr9:7135215	leanveh	dbveh	OK	10.7589	3.61269
Ptpre	chr7:1427295	leanveh	dbveh	OK	4.37892	10.282
Cabp1	chr5:115618(	leanveh	dbveh	OK	1.37074	0.28329
Pacsin3	chr2:910969(	leanveh	dbveh	OK	26.9146	10.7502
B430306N03F	chr17:484554	leanveh	dbveh	OK	0.774986	3.16076
Ifrd1	chr12:409297	leanveh	dbveh	OK	48.9449	96.8945
Ugt1a1	chr1:8995198	leanveh	dbveh	OK	0.0936067	7.52787
Plekha5	chr6:140372(	leanveh	dbveh	OK	9.65059	3.53869
Serpina1a	chr12:105091	leanveh	dbveh	OK	4.16362	20.5169
Trim36	chr18:463249	leanveh	dbveh	OK	9.14994	2.68168
Rnf138	chr18:211598	leanveh	dbveh	OK	22.1314	9.03814
Hsd11b1	chr1:1950478	leanveh	dbveh	OK	96.6223	216.245
2210020M01	chr11:115753	leanveh	dbveh	OK	12.7431	0.489428
Plp1	chrX:133357(	leanveh	dbveh	OK	3.27882	0.846685
1700080N15F	chr2:405311(	leanveh	dbveh	OK	0.71178	0
Cd47	chr16:498557	leanveh	dbveh	OK	31.6024	60.9519
Itih4	chr14:316996	leanveh	dbveh	OK	2.38682	15.4542

Rhoc	chr3:104591	leanveh	dbveh	OK	145.163	273.782
Zfp711	chrX:109714	leanveh	dbveh	OK	1.7005	0.296878
Ube2c	chr2:164595	leanveh	dbveh	OK	10.2172	30.166
Ostm1	chr10:42398	leanveh	dbveh	OK	24.9177	48.2069
Impdh1	chr6:291504	leanveh	dbveh	OK	17.6916	38.3469
Ntn1	chr11:68022	leanveh	dbveh	OK	9.73717	4.13494
Ahcy	chr2:154885	leanveh	dbveh	OK	5.49027	15.5074
Ckap4	chr10:83989	leanveh	dbveh	OK	20.6361	40.0819
Pkp2	chr16:16213	leanveh	dbveh	OK	27.1013	52.5397
Got2	chr8:983880	leanveh	dbveh	OK	68.3474	28.3757
Slc44a3	chr3:121162	leanveh	dbveh	OK	15.3856	4.54199
Tuba1a	chr15:98780	leanveh	dbveh	OK	163.811	339.595
Hadhb	chr5:304818	leanveh	dbveh	OK	60.9167	121.29
1700065J18R	chr1:194667	leanveh	dbveh	OK	0.660186	0
Cyp2e1	chr7:147949	leanveh	dbveh	OK	1495.31	317.369
Abl2	chr1:158488	leanveh	dbveh	OK	4.08717	8.31032
Nnt	chr13:12012	leanveh	dbveh	OK	16.4365	6.94569
Flnc	chr6:293831	leanveh	dbveh	OK	1.99219	5.4272
Fhl3	chr4:124377	leanveh	dbveh	OK	9.30608	23.3294
Heatr5a	chr12:52976	leanveh	dbveh	OK	4.45134	9.60427
Cd37	chr7:524890	leanveh	dbveh	OK	5.36782	31.7194
Klk1b7-ps	chr7:512003	leanveh	dbveh	OK	0.844162	0
Ndrg1	chr15:66760	leanveh	dbveh	OK	89.4902	44.8492
Itfg3	chr17:26349	leanveh	dbveh	OK	26.6225	52.6954
Tdrd6	chr17:43752	leanveh	dbveh	OK	11.5359	0.0384171
Lrrcc1	chr3:145337	leanveh	dbveh	OK	12.7791	4.64086
Aplnr	chr2:8497651	leanveh	dbveh	OK	14.6064	5.50677
Cd82	chr2:932592	leanveh	dbveh	OK	44.7463	19.5969
Arhgap8	chr15:84545	leanveh	dbveh	OK	4.61257	1.11725
Itsn1	chr16:91729	leanveh	dbveh	OK	15.3274	30.9394
Adra2c	chr5:3562121	leanveh	dbveh	OK	1.56096	0.259391
Tpcn1	chr5:1209841	leanveh	dbveh	OK	17.8832	35.2517
2410001C21F	chr2:172266	leanveh	dbveh	OK	63.4607	121.803
Fam102b	chr3:108773	leanveh	dbveh	OK	12.6334	24.5347
Slc7a2	chr8:4194772	leanveh	dbveh	OK	3.36987	7.68993
Mocos	chr18:248121	leanveh	dbveh	OK	6.86969	18.987
Runx1	chr16:92601	leanveh	dbveh	OK	1.35959	4.2558
Khdrbs3	chr15:68758	leanveh	dbveh	OK	14.3719	4.79943
Gm10267	chr18:44316	leanveh	dbveh	OK	5.55288	0
Incenp	chr19:99467	leanveh	dbveh	OK	4.48234	10.8275
Lars2	chr9:123276	leanveh	dbveh	OK	296.785	116.826
Ptpra	chr2:130276	leanveh	dbveh	OK	40.3139	77.0577
Naip5	chr13:100981	leanveh	dbveh	OK	1.1952	3.55239

Nomo1	chr7:532890€	leanveh	dbveh	OK	38.5098	71.5979
Fam102a	chr2:3239087	leanveh	dbveh	OK	20.1911	9.59222
Clip1	chr5:124029C	leanveh	dbveh	OK	14.6951	28.585
Nkapl	chr13:21558ç	leanveh	dbveh	OK	6.63817	1.04499
A630033H20I	chrX:1043442	leanveh	dbveh	OK	0.679552	4.03606
Dtx3	chr10:126627	leanveh	dbveh	OK	46.689	23.284
Frmd4b	chr6:972368€	leanveh	dbveh	OK	6.63303	14.3058
Mpdz	chr4:809244C	leanveh	dbveh	OK	9.13199	17.4799
Hsd17b4	chr18:502878	leanveh	dbveh	OK	102.188	204.64
Defb18	chr1:182265ç	leanveh	dbveh	OK	1.77901	0
Pde1a	chr2:796746C	leanveh	dbveh	OK	15.1316	5.45571
Kctd9	chr14:683341	leanveh	dbveh	OK	9.06597	20.7681
Syngr1	chr15:799217	leanveh	dbveh	OK	7.45217	58.1964
Eea1	chr10:954032	leanveh	dbveh	OK	8.1025	15.5888
Tctn2	chr5:1250487	leanveh	dbveh	OK	13.8014	5.32777
Ano6	chr15:956212	leanveh	dbveh	OK	29.2615	54.3437
Col4a1	chr8:1119842	leanveh	dbveh	OK	133.464	409.454
Igf2bp3	chr6:4903521	leanveh	dbveh	OK	1.66985	0.303458
Vwa5a	chr9:385258ç	leanveh	dbveh	OK	21.7873	43.3379
Hoxd8	chr2:7454354	leanveh	dbveh	OK	38.8787	17.4131
Gm973	chr1:595731C	leanveh	dbveh	OK	3.88109	0.0587939
Was	chrX:7658591	leanveh	dbveh	OK	2.41508	12.9718
Nsf	chr11:103683	leanveh	dbveh	OK	9.69283	20.9209
Hmgb3	chrX:688091€	leanveh	dbveh	OK	34.5043	14.9386
Lrig1	chr6:944503C	leanveh	dbveh	OK	15.6675	7.08822
Cadm4	chr7:2526704	leanveh	dbveh	OK	4.71984	15.2958
Flrt2	chr12:969304	leanveh	dbveh	OK	2.38394	6.14733
Lrrc36	chr8:1079375	leanveh	dbveh	OK	8.57395	0.908401
Ergic1	chr17:266984	leanveh	dbveh	OK	49.4404	93.3411
Setx	chr2:2898051	leanveh	dbveh	OK	19.7679	7.64844
Tmem135	chr7:9628823	leanveh	dbveh	OK	34.4326	67.2148
Nln	chr13:104813	leanveh	dbveh	OK	10.7166	21.007
Col16a1	chr4:129725C	leanveh	dbveh	OK	9.41446	20.3035
Adam11	chr11:102622	leanveh	dbveh	OK	6.13173	1.23106
Col4a6	chrX:137599ç	leanveh	dbveh	OK	1.9559	0.516469
7-Sep	chr9:2506003	leanveh	dbveh	OK	61.8404	114.616
Atp1b2	chr11:694132	leanveh	dbveh	OK	18.6106	6.3656
Gm14420	chr2:1772494	leanveh	dbveh	OK	13.9219	30.0342
Glg1	chr8:1136814	leanveh	dbveh	OK	15.4355	29.2738
Hpse	chr5:1011085	leanveh	dbveh	OK	1.65519	8.39722
B230312A22I	chr4:4304538	leanveh	dbveh	OK	21.8919	42.2672
4930511M06	chr18:576934	leanveh	dbveh	OK	1.11936	0.00847837
Mitf	chr6:9775705	leanveh	dbveh	OK	3.5443	10.0591

Slc9a9	chr9:9457031	leanveh	dbveh	OK	2.73309	8.72349
Mpp3	chr11:10186C	leanveh	dbveh	OK	2.99038	0.665602
Ccdc18	chr5:108561	leanveh	dbveh	OK	1.12469	0.242043
Defb10	chr8:2296937	leanveh	dbveh	OK	3.4566	0
Znhit2-ps	chr19:60612C	leanveh	dbveh	OK	51.9607	24.2803
Cyfip1	chr7:6309744	leanveh	dbveh	OK	17.9813	38.0616
Izumo4	chr10:801654	leanveh	dbveh	OK	28.7973	9.71583
Ccdc109b	chr3:129617	leanveh	dbveh	OK	3.02157	14.5345
Cpeb4	chr11:317722	leanveh	dbveh	OK	11.3264	25.8371
Lrrc56	chr7:148380C	leanveh	dbveh	OK	13.3527	3.21622
Eif4a1	chr11:694804	leanveh	dbveh	OK	51.6323	97.2852
Fam169a	chr13:978372	leanveh	dbveh	OK	4.9437	0.142452
Tnc	chr4:6362081	leanveh	dbveh	OK	3.35046	7.77781
Ywhah	chr5:333614	leanveh	dbveh	OK	58.0378	108.312
Ric3	chr7:116154	leanveh	dbveh	OK	4.8197	11.3491
Zfp318	chr17:465207	leanveh	dbveh	OK	12.9744	5.63911
Mrgpre	chr7:150964	leanveh	dbveh	OK	0.881899	3.94059
Fnip1	chr11:54251	leanveh	dbveh	OK	9.76192	18.4615
Podxl	chr6:314694	leanveh	dbveh	OK	25.4543	11.9016
Nr6a1	chr2:385788	leanveh	dbveh	OK	3.82401	0.664822
Antxr1	chr6:8708384	leanveh	dbveh	OK	4.58301	10.545
Cltb	chr13:546942	leanveh	dbveh	OK	44.5801	84.9595
Lyn	chr4:3605267	leanveh	dbveh	OK	15.7736	32.6152
Evpl	chr11:116081	leanveh	dbveh	OK	1.82062	0.428655
Sh3bp1	chr15:787302	leanveh	dbveh	OK	4.26159	12.3703
AI428936	chr7:310998	leanveh	dbveh	OK	1.96126	0.443022
Adcy7	chr8:907963C	leanveh	dbveh	OK	11.8783	26.3219
H2-Ab1	chr17:344001	leanveh	dbveh	OK	288.733	154.567
Itgb3	chr11:10446	leanveh	dbveh	OK	1.49416	4.34565
0610011F06R	chr17:260124	leanveh	dbveh	OK	42.0094	14.0393
Reep1	chr6:7165767	leanveh	dbveh	OK	10.0357	3.04269
Hspb6	chr7:3133832	leanveh	dbveh	OK	17.647	38.8801
Myb	chr10:208447	leanveh	dbveh	OK	2.63057	0.101716
Xylt1	chr7:1245244	leanveh	dbveh	OK	1.00286	4.53488
Gm6377	chrX:106392C	leanveh	dbveh	OK	0.312221	1.79458
Rogdi	chr16:500882	leanveh	dbveh	OK	28.2816	8.75845
Atp11a	chr8:1275701	leanveh	dbveh	OK	38.8875	18.9644
Aprt	chr8:125098	leanveh	dbveh	OK	23.8016	60.0214
AI662270	chr11:83037C	leanveh	dbveh	OK	4.65893	27.4183
Aldh1a2	chr9:710635	leanveh	dbveh	OK	13.5657	4.47309
Man2b2	chr5:371980	leanveh	dbveh	OK	17.0853	32.2137
Racgap1	chr15:994509	leanveh	dbveh	OK	5.20041	12.4125
Cdk14	chr5:4803384	leanveh	dbveh	OK	5.53278	12.5937

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Tubb2b	chr13:342188	leanveh	dbveh	OK	1.50942	6.43059
Cd276	chr9:583721C	leanveh	dbveh	OK	2.05768	6.02987
Ap2m1	chr16:205355	leanveh	dbveh	OK	51.4097	99.4391
Nhlrc3	chr3:5325591	leanveh	dbveh	OK	5.51423	16.0363
Camsap1	chr2:257823	leanveh	dbveh	OK	8.00442	3.40486
Aim2	chr1:175350	leanveh	dbveh	OK	1.46276	7.17656
Mpi	chr9:573920	leanveh	dbveh	OK	20.4925	8.28659
Spag17	chr3:996893	leanveh	dbveh	OK	6.34281	0.0574784
Phospho2	chr2:696277	leanveh	dbveh	OK	30.4004	12.6167
Megf9	chr4:700929	leanveh	dbveh	OK	6.66472	14.6722
Etl4	chr2:202115	leanveh	dbveh	OK	13.0889	6.03008
Ccdc148	chr2:586741C	leanveh	dbveh	OK	1.19664	0.0629128
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Spp1	chr5:1048641	leanveh	dbLSDi	OK	39.5425	218.574
Adam8	chr7:147164[illegible]	leanveh	dbLSDi	OK	4.04604	51.6738
Emr1	chr17:574981	leanveh	dbLSDi	OK	10.1217	43.8122
S100a8	chr3:904729[illegible]	leanveh	dbLSDi	OK	23.3947	380.137
Aldob	chr4:495488[illegible]	leanveh	dbLSDi	OK	35.1813	5.86291
Igfbp3	chr11:71060[illegible]	leanveh	dbLSDi	OK	15.7682	149.635
Pmepa1	chr2:173049[illegible]	leanveh	dbLSDi	OK	54.0285	154.449
Alas2	chrX:146981[illegible]	leanveh	dbLSDi	OK	26.452	108.585
Slc27a2	chr2:1263787	leanveh	dbLSDi	OK	25.4954	2.57871
Wisp2	chr2:163646[illegible]	leanveh	dbLSDi	OK	13.2044	130.603
Peg3	chr7:665867[illegible]	leanveh	dbLSDi	OK	17.166	89.149
Slc36a2	chr11:54971[illegible]	leanveh	dbLSDi	OK	6.36587	49.8102
Col6a5	chr9:105758[illegible]	leanveh	dbLSDi	OK	10.4232	3.52524
Trank1	chr9:1112142	leanveh	dbLSDi	OK	9.55077	0.641332
Nceh1	chr3:2708192	leanveh	dbLSDi	OK	5.89626	24.3397
Lcp1	chr14:755362	leanveh	dbLSDi	OK	21.8886	84.0442
Nckap1l	chr15:103284	leanveh	dbLSDi	OK	8.31556	34.4305
Nedd9	chr13:414052	leanveh	dbLSDi	OK	15.3266	52.8132
Anpep	chr7:869666[illegible]	leanveh	dbLSDi	OK	9.09806	35.7804
S100a4	chr3:904076[illegible]	leanveh	dbLSDi	OK	54.5084	392.58
Itgam	chr7:1352061	leanveh	dbLSDi	OK	6.46397	37.6109
Cd180	chr13:103483	leanveh	dbLSDi	OK	1.80683	15.0456
Cyth4	chr15:784274	leanveh	dbLSDi	OK	13.6936	49.2855
Vhl	chr6:113574[illegible]	leanveh	dbLSDi	OK	22.6654	85.0799
Atp2a3	chr11:72774[illegible]	leanveh	dbLSDi	OK	17.4793	61.6317
Trem2	chr17:484857	leanveh	dbLSDi	OK	11.9115	124.572
Gusb	chr5:130464[illegible]	leanveh	dbLSDi	OK	23.8711	77.9062
Ctsk	chr3:953032[illegible]	leanveh	dbLSDi	OK	20.2245	222.707
Gcnt2	chr13:409555	leanveh	dbLSDi	OK	12.568	60.1343
Atp6v0d2	chr4:198039[illegible]	leanveh	dbLSDi	OK	5.55632	61.9987
Acer2	chr4:8652031	leanveh	dbLSDi	OK	15.2361	55.2981
Sirpa	chr2:129418[illegible]	leanveh	dbLSDi	OK	26.9599	79.8842
Pcp4l1	chr1:173103[illegible]	leanveh	dbLSDi	OK	17.297	2.01458
Tyrobp	chr7:311988[illegible]	leanveh	dbLSDi	OK	91.2165	457.713
Laptm5	chr4:130469[illegible]	leanveh	dbLSDi	OK	24.9702	126.106
Capg	chr6:7249443	leanveh	dbLSDi	OK	54.5476	193.482
Sykb	chr13:526788	leanveh	dbLSDi	OK	7.12571	25.3765
Cd68	chr11:69477[illegible]	leanveh	dbLSDi	OK	21.6641	229.325
Tlr13	chrX:103338[illegible]	leanveh	dbLSDi	OK	3.12862	29.7785
Apbb1ip	chr2:2262984	leanveh	dbLSDi	OK	7.39423	37.8393
C3ar1	chr6:1227971	leanveh	dbLSDi	OK	4.30691	39.6576
Irak2	chr6:1135884	leanveh	dbLSDi	OK	22.8964	81.1824

Trim67	chr8:127316	leanveh	dbLSDi	OK	3.1224	12.6831
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Rcn1	chr2:1052261	leanveh	dbLSDi	OK	44.9815	9.80362
Oxtr	chr6:112423	leanveh	dbLSDi	OK	16.6661	131.923
Itgb2	chr10:76993	leanveh	dbLSDi	OK	14.8839	116.92
Pld3	chr7:2831703	leanveh	dbLSDi	OK	33.0207	106.289
Mafb	chr2:1601894	leanveh	dbLSDi	OK	15.1779	54.4166
Cd200r1	chr16:447658	leanveh	dbLSDi	OK	2.15493	15.6262
Pdk4	chr6:543335	leanveh	dbLSDi	OK	15.5487	188.728
Myo1f	chr17:33692	leanveh	dbLSDi	OK	5.44273	21.7725
Fbln2	chr6:9116275	leanveh	dbLSDi	OK	22.91	79.1856
Ccl9	chr11:833864	leanveh	dbLSDi	OK	15.2452	68.4926
Spint2	chr7:3004134	leanveh	dbLSDi	OK	143.383	27.6211
Plekho2	chr9:654021	leanveh	dbLSDi	OK	16.0146	51.3532
Fcgr3	chr1:1729812	leanveh	dbLSDi	OK	29.7511	133.789
Slc1a3	chr15:858412	leanveh	dbLSDi	OK	43.4637	11.7878
Cybb	chrX:9012377	leanveh	dbLSDi	OK	6.81222	28.4819
Zfp185	chrX:7023267	leanveh	dbLSDi	OK	48.6926	6.3558
5430435G22F	chr1:1335852	leanveh	dbLSDi	OK	7.28328	46.9758
Sash1	chr10:844201	leanveh	dbLSDi	OK	16.4644	52.2241
Plin2	chr4:863024	leanveh	dbLSDi	OK	102.302	579.049
Coro1c	chr5:1142924	leanveh	dbLSDi	OK	25.6726	73.397
Csf1r	chr18:612652	leanveh	dbLSDi	OK	30.0699	102.044
Cd44	chr2:1026512	leanveh	dbLSDi	OK	4.87606	24.777
Gldc	chr19:301729	leanveh	dbLSDi	OK	26.6659	0.804877
C1qb	chr4:136436	leanveh	dbLSDi	OK	108.086	390.032
Dnaja4	chr9:545473	leanveh	dbLSDi	OK	72.7145	13.597
Dmrt2	chr19:257469	leanveh	dbLSDi	OK	16.4854	85.4581
Myo5a	chr9:7491901	leanveh	dbLSDi	OK	6.14935	20.5701
Ctss	chr3:953307	leanveh	dbLSDi	OK	78.8848	554.127
Adamts2	chr11:504155	leanveh	dbLSDi	OK	18.6635	53.7085
Lgmn	chr12:103632	leanveh	dbLSDi	OK	66.0234	355.61
Pla2g7	chr17:437053	leanveh	dbLSDi	OK	22.6213	93.1306
Tcirg1	chr19:389604	leanveh	dbLSDi	OK	11.0247	47.9898
Mpeg1	chr19:125352	leanveh	dbLSDi	OK	21.8301	158.041
Ccl2	chr11:81849	leanveh	dbLSDi	OK	5.38366	62.5336
Lipa	chr19:345668	leanveh	dbLSDi	OK	32.5881	164.119
Cd300a	chr11:114751	leanveh	dbLSDi	OK	2.90578	19.2168
Clec10a	chr11:699801	leanveh	dbLSDi	OK	34.9893	243.585
Slc5a7	chr17:544129	leanveh	dbLSDi	OK	2.37967	79.2231
Fgf1	chr18:389983	leanveh	dbLSDi	OK	15.7474	41.2815
Gja1	chr10:560971	leanveh	dbLSDi	OK	111.916	33.2323
Cdr2	chr7:128100	leanveh	dbLSDi	OK	26.6961	139.847

Tgfbi	chr13:56710	leanveh	dbLSDi	OK	26.6594	78.5387
Col12a1	chr9:794467	leanveh	dbLSDi	OK	0.943102	10.0817
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Col5a3	chr9:205744	leanveh	dbLSDi	OK	20.1852	69.1536
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C1qc	chr4:1364457	leanveh	dbLSDi	OK	109.884	374.84
Atp2b4	chr1:135600	leanveh	dbLSDi	OK	39.4581	16.053
Cdkn1a	chr17:29227	leanveh	dbLSDi	OK	31.9752	160.95
Stom	chr2:351695	leanveh	dbLSDi	OK	31.2188	85.1218
Gstm7	chr3:1077292	leanveh	dbLSDi	OK	283.259	9.40896
Mrc2	chr11:105153	leanveh	dbLSDi	OK	5.10222	97.0124
BC021891	chr8:1284343	leanveh	dbLSDi	OK	7.35715	0.614225
Vat1	chr11:10132	leanveh	dbLSDi	OK	72.129	218.352
Tnfrsf1b	chr4:1448022	leanveh	dbLSDi	OK	7.20614	23.3877
Acsbg1	chr9:544528	leanveh	dbLSDi	OK	52.3254	1.93378
P2rx7	chr5:123093	leanveh	dbLSDi	OK	4.70724	18.5988
Anxa1	chr19:20447	leanveh	dbLSDi	OK	102.43	485.901
Atp6v1b2	chr8:715616	leanveh	dbLSDi	OK	61.6487	179.176
Emilin2	chr17:716015	leanveh	dbLSDi	OK	10.091	42.2504
Arl4c	chr1:905948	leanveh	dbLSDi	OK	29.948	4.27644
Sox9	chr11:112643	leanveh	dbLSDi	OK	11.712	0.986411
Fads2	chr19:10138	leanveh	dbLSDi	OK	59.7701	4.3735
Alox5ap	chr5:150076	leanveh	dbLSDi	OK	30.4684	135.551
Lyz2	chr10:116714	leanveh	dbLSDi	OK	305.493	1446.01
Ctsz	chr2:1742413	leanveh	dbLSDi	OK	97.0496	343.579
Fgf13	chrX:5631532	leanveh	dbLSDi	OK	5.32767	38.5123
Gpr64	chrX:156828	leanveh	dbLSDi	OK	45.9688	5.79591
Slc7a4	chr16:175721	leanveh	dbLSDi	OK	34.8044	1.23156
Spint1	chr2:119063	leanveh	dbLSDi	OK	11.6179	1.03013
Adrb3	chr8:2833624	leanveh	dbLSDi	OK	197.148	7.12911
Ehd3	chr17:741541	leanveh	dbLSDi	OK	10.9007	75.3528
Fam13a	chr6:5888352	leanveh	dbLSDi	OK	57.6921	12.2492
Hmox1	chr8:7761751	leanveh	dbLSDi	OK	34.9266	402.001
S100a6	chr3:9041681	leanveh	dbLSDi	OK	179.236	705.363
Tead1	chr7:119822	leanveh	dbLSDi	OK	10.5852	34.4046
Ptprf	chr4:117880	leanveh	dbLSDi	OK	19.0149	3.71409
Thbs1	chr2:117937	leanveh	dbLSDi	OK	15.7941	106.046
F13a1	chr13:36959	leanveh	dbLSDi	OK	21.4282	69.5934
Tatdn2	chr6:1136474	leanveh	dbLSDi	OK	21.6473	85.0365
Vgll3	chr16:65815	leanveh	dbLSDi	OK	4.84331	43.9044
Cstb	chr10:778884	leanveh	dbLSDi	OK	153.476	508.79
Marcksl1	chr4:129190	leanveh	dbLSDi	OK	62.5579	12.3521
Esr1	chr10:534277	leanveh	dbLSDi	OK	15.9743	3.91439

Dse	chr10:338711	leanveh	dbLSDi	OK	8.90732	31.7632
Serpinf1	chr11:752235	leanveh	dbLSDi	OK	58.396	238.753
Gda	chr19:214657	leanveh	dbLSDi	OK	17.1068	62.7038
Dock8	chr19:25074(	leanveh	dbLSDi	OK	4.65054	27.9495
Creg1	chr1:167693(	leanveh	dbLSDi	OK	41.8388	150.309
Mdfic	chr6:156706(	leanveh	dbLSDi	OK	17.6734	80.845
Gltp	chr5:115119(	leanveh	dbLSDi	OK	63.1595	218.309
Suox	chr10:12810(	leanveh	dbLSDi	OK	50.4199	9.14563
Cd163	chr6:124254(	leanveh	dbLSDi	OK	14.0199	54.5173
Nek6	chr2:3836721	leanveh	dbLSDi	OK	13.6025	47.3745
Hdac6	chrX:7507247	leanveh	dbLSDi	OK	45.5328	4.46163
Ramp1	chr1:930763(	leanveh	dbLSDi	OK	47.4714	2.19486
Myl9	chr2:1566011	leanveh	dbLSDi	OK	176.503	63.5764
Ccl6	chr11:833955	leanveh	dbLSDi	OK	55.0321	340.403
Wfs1	chr5:3735734	leanveh	dbLSDi	OK	11.1297	48.4865
Slc11a1	chr1:7442177	leanveh	dbLSDi	OK	10.094	62.849
Hoxb9	chr11:96132(	leanveh	dbLSDi	OK	9.32303	0.818506
Ninj1	chr13:49282(	leanveh	dbLSDi	OK	65.5668	194.677
Mt2	chr8:9669651	leanveh	dbLSDi	OK	370.212	1390.52
Tnfaip2	chr12:11268(	leanveh	dbLSDi	OK	9.05018	33.5513
Fam129b	chr2:327316(	leanveh	dbLSDi	OK	33.4267	208.981
1700047G03F	chr15:11896(	leanveh	dbLSDi	OK	25.6744	137.044
Pam	chr1:9971767	leanveh	dbLSDi	OK	23.6445	91.0373
Lox	chr18:526768	leanveh	dbLSDi	OK	15.1343	204.237
Smarcd3	chr5:2409843	leanveh	dbLSDi	OK	82.1423	7.42094
Myh11	chr16:14194(	leanveh	dbLSDi	OK	21.2756	5.29421
Cryab	chr9:505608(	leanveh	dbLSDi	OK	103.919	348.82
Syne2	chr12:769193	leanveh	dbLSDi	OK	15.3678	3.97499
Hspb7	chr4:140976(	leanveh	dbLSDi	OK	12.1883	178.71
Tmem30b	chr12:746441	leanveh	dbLSDi	OK	15.912	1.13535
Mmp19	chr10:128227	leanveh	dbLSDi	OK	15.1712	85.0848
Fam49a	chr12:12268(	leanveh	dbLSDi	OK	6.45732	26.087
Thbs2	chr17:148025	leanveh	dbLSDi	OK	14.4658	73.253
Defb38	chr8:190234(	leanveh	dbLSDi	OK	626.674	0
Defb39	chr8:1905282	leanveh	dbLSDi	OK	337.819	0
BC048679	chr7:8863915	leanveh	dbLSDi	OK	290.591	0
Defb40	chr8:1897493	leanveh	dbLSDi	OK	254.337	0
Gm17252	chr9:354926(	leanveh	dbLSDi	OK	113.921	0
9230107M04	chr7:1414021	leanveh	dbLSDi	OK	88.1138	0
Defb26	chr2:1523334	leanveh	dbLSDi	OK	80.9941	0
Abcb5	chr12:12010(	leanveh	dbLSDi	OK	30.1913	0
Crisp4	chr1:1810527	leanveh	dbLSDi	OK	18.8936	0
Gm10823	chr16:27850(	leanveh	dbLSDi	OK	10.7345	0

Zfp648	chr1:156048	leanveh	dbLSDi	OK	2.91149	0
Ces1f	chr8:957801	leanveh	dbLSDi	OK	31.4845	5.75011
Dpep1	chr8:125710	leanveh	dbLSDi	OK	47.2766	166.134
Cds1	chr5:102194	leanveh	dbLSDi	OK	32.4457	9.26361
Nrbp2	chr15:7591	leanveh	dbLSDi	OK	58.6183	18.5004
Nt5e	chr9:882224	leanveh	dbLSDi	OK	19.886	1.72041
Tsc22d2	chr3:582196	leanveh	dbLSDi	OK	5.3385	18.362
Myo6	chr9:800128	leanveh	dbLSDi	OK	28.9051	8.1169
Ezr	chr17:69424	leanveh	dbLSDi	OK	45.1365	11.3609
Fbxl5	chr5:441358	leanveh	dbLSDi	OK	33.1317	91.1655
Col4a3	chr1:825834	leanveh	dbLSDi	OK	3.05103	0.280014
Lgals3	chr14:47993	leanveh	dbLSDi	OK	116.442	862.211
Itga7	chr10:1283	leanveh	dbLSDi	OK	38.8112	143.567
G6pdx	chrX:716386	leanveh	dbLSDi	OK	57.6405	207.21
Kirrel	chr3:868825	leanveh	dbLSDi	OK	13.508	41.2169
Trfr2	chr5:13801	leanveh	dbLSDi	OK	1.043	18.2959
Gyk	chrX:829472	leanveh	dbLSDi	OK	22.3031	2.8357
Atp1b1	chr1:166237	leanveh	dbLSDi	OK	94.3562	4.9583
Lipg	chr18:75098	leanveh	dbLSDi	OK	18.1141	0.749386
Gstm6	chr3:107741	leanveh	dbLSDi	OK	75.6487	6.73094
Ncan	chr8:726169	leanveh	dbLSDi	OK	0.513085	8.16649
Gprc5c	chr11:11471	leanveh	dbLSDi	OK	26.924	7.54382
Svep1	chr4:580556	leanveh	dbLSDi	OK	5.67489	16.1674
Vldlr	chr19:27291	leanveh	dbLSDi	OK	10.9808	31.119
Ildr2	chr1:168184	leanveh	dbLSDi	OK	8.48283	1.2786
Htra3	chr5:359946	leanveh	dbLSDi	OK	100.207	448.182
Thbd	chr2:148230	leanveh	dbLSDi	OK	65.8356	25.4789
Ifi27l2a	chr12:1046	leanveh	dbLSDi	OK	821.186	223.038
Stard10	chr7:108469	leanveh	dbLSDi	OK	127.379	24.6037
Orm1	chr4:630055	leanveh	dbLSDi	OK	117.656	407.321
Hip1	chr5:135882	leanveh	dbLSDi	OK	16.67	43.1909
Pqlc3	chr12:16995	leanveh	dbLSDi	OK	10.8868	44.3656
Adap2	chr11:79967	leanveh	dbLSDi	OK	35.2536	112.573
Mboat1	chr13:30228	leanveh	dbLSDi	OK	8.04125	0.779859
Hspb1	chr5:136363	leanveh	dbLSDi	OK	91.3797	296.542
Fhl1	chrX:539849	leanveh	dbLSDi	OK	132.371	490.26
Atg4a	chrX:137491	leanveh	dbLSDi	OK	45.1623	11.8603
Epn2	chr11:61330	leanveh	dbLSDi	OK	24.8969	63.5032
Cyp2e1	chr7:147949	leanveh	dbLSDi	OK	1511.19	106.143
Ampd3	chr7:117916	leanveh	dbLSDi	OK	17.4338	49.4377
Sfrp5	chr19:42272	leanveh	dbLSDi	OK	92.6887	299.39
Ddit4l	chr3:137286	leanveh	dbLSDi	OK	8.24775	1.06353
Ap1s3	chr1:796034	leanveh	dbLSDi	OK	7.53135	0.933681

Chdh	chr14:308221	leanveh	dbLSDi	OK	28.6622	3.63636
Sntn	chr14:145033	leanveh	dbLSDi	OK	10.5497	0
Ly6f	chr15:750988	leanveh	dbLSDi	OK	197.998	0
Spag11a	chr8:191578	leanveh	dbLSDi	OK	29.3973	0
Ces5a	chr8:960380	leanveh	dbLSDi	OK	261.579	0
Mia1	chr7:279647	leanveh	dbLSDi	OK	18.4126	0
Defb2	chr8:229503	leanveh	dbLSDi	OK	227.924	0
Gpnmb	chr6:4898651	leanveh	dbLSDi	OK	28.3916	648.13
Rnase9	chr14:516581	leanveh	dbLSDi	OK	201.012	0
Cgn	chr3:945639	leanveh	dbLSDi	OK	8.30738	0.976328
Frmpd4	chrX:1639092	leanveh	dbLSDi	OK	1.7555	0
Defb37	chr8:189862	leanveh	dbLSDi	OK	325.946	0
AY761185	chr8_random	leanveh	dbLSDi	OK	74.1513	0
Fam84a	chr12:141544	leanveh	dbLSDi	OK	9.60211	1.28431
Lilrb4	chr10:512107	leanveh	dbLSDi	OK	10.9165	92.6656
Gpc1	chr1:947282	leanveh	dbLSDi	OK	14.5288	46.6166
Dpep2	chr8:108508	leanveh	dbLSDi	OK	2.01395	15.7759
Sh3pxd2b	chr11:32247	leanveh	dbLSDi	OK	4.92983	15.4076
Daglb	chr5:144225	leanveh	dbLSDi	OK	10.038	30.3538
Fabp5	chr3:100126	leanveh	dbLSDi	OK	152.872	448.326
AI607873	chr1:175653	leanveh	dbLSDi	OK	9.09289	32.6056
Ldhd	chr8:1141501	leanveh	dbLSDi	OK	42.6086	9.52548
Cyth3	chr5:144383	leanveh	dbLSDi	OK	20.7106	53.0697
Akap2	chr4:5785811	leanveh	dbLSDi	OK	32.6067	109.027
Dmpk	chr7:196691	leanveh	dbLSDi	OK	51.7223	143.468
Eif1a	chr18:467573	leanveh	dbLSDi	OK	31.1391	84.4687
Atp6v0a1	chr11:10087	leanveh	dbLSDi	OK	47.0705	134.302
Pgd	chr4:148524	leanveh	dbLSDi	OK	103.387	320.735
Cyb5r3	chr15:82983	leanveh	dbLSDi	OK	124.78	306.144
Maff	chr15:791781	leanveh	dbLSDi	OK	6.43244	34.8075
2810474O19I	chr6:149257	leanveh	dbLSDi	OK	9.46873	27.4991
Tmem120b	chr5:1235262	leanveh	dbLSDi	OK	63.3122	174.493
Galntl2	chr14:328422	leanveh	dbLSDi	OK	17.9084	62.6557
Serping1	chr2:8460551	leanveh	dbLSDi	OK	126.905	408.867
Srd5a1	chr13:697123	leanveh	dbLSDi	OK	6.31272	0.76796
Ctgf	chr10:243152	leanveh	dbLSDi	OK	62.3102	22.3073
Pdzrn3	chr6:101099	leanveh	dbLSDi	OK	13.3623	40.6302
Apobec1	chr6:122527	leanveh	dbLSDi	OK	9.40672	42.4245
Dusp9	chrX:7088477	leanveh	dbLSDi	OK	2.05684	17.4485
C5ar1	chr7:168320	leanveh	dbLSDi	OK	6.86208	39.6913
Irf5	chr6:294767	leanveh	dbLSDi	OK	9.45783	37.9563
Grn	chr11:102291	leanveh	dbLSDi	OK	149.504	427.945
C1qa	chr4:136451	leanveh	dbLSDi	OK	125.423	338.911

C7	chr15:49387€	leanveh	dbLSDi	OK	36.2121	2.65786
Syp	chrX:721570$	leanveh	dbLSDi	OK	8.19969	36.7629
Gab2	chr7:1042302	leanveh	dbLSDi	OK	11.1382	29.729
Rlf	chr4:120817$	leanveh	dbLSDi	OK	6.52076	17.1316
Mosc1	chr1:186610€	leanveh	dbLSDi	OK	6.11946	33.376
Csf2rb	chr15:781564	leanveh	dbLSDi	OK	11.9154	33.3909
Pde2a	chr7:1085702	leanveh	dbLSDi	OK	39.3175	114.247
Phf19	chr2:3474927	leanveh	dbLSDi	OK	8.046	0.846122
Slc48a1	chr15:976147	leanveh	dbLSDi	OK	109.896	343.905
Gm11428	chr11:835175	leanveh	dbLSDi	OK	19.917	195.25
Gstm5	chr3:1076801	leanveh	dbLSDi	OK	413.696	98.5676
Sdc1	chr12:87782C	leanveh	dbLSDi	OK	12.5873	38.704
Cd84	chr1:173769€	leanveh	dbLSDi	OK	5.13066	34.0053
Ubd	chr17:373308	leanveh	dbLSDi	OK	7.00576	67.8977
Col6a2	chr10:760585	leanveh	dbLSDi	OK	68.8112	193.658
Lmna	chr3:8828507	leanveh	dbLSDi	OK	42.2333	110.949
Foxred2	chr15:777709	leanveh	dbLSDi	OK	26.2624	4.173
Nus1	chr10:521373	leanveh	dbLSDi	OK	24.4849	61.9654
Inadl	chr4:9806251	leanveh	dbLSDi	OK	7.04246	0.628297
6330406I15R	chr5:1502143	leanveh	dbLSDi	OK	14.7815	40.2908
Cad	chr5:3135718	leanveh	dbLSDi	OK	30.0197	4.30403
Slc24a6	chr5:1209612	leanveh	dbLSDi	OK	18.7618	55.4862
Gsta4	chr9:7803977	leanveh	dbLSDi	OK	119.793	41.9685
Ncam1	chr9:4931025	leanveh	dbLSDi	OK	6.5952	0.134178
Il4ra	chr7:1326957	leanveh	dbLSDi	OK	11.7048	30.8795
Fam20c	chr5:139231C	leanveh	dbLSDi	OK	20.5184	58.0734
Rbm28	chr6:2907357	leanveh	dbLSDi	OK	16.5796	42.4616
Serpina3m	chr12:105625	leanveh	dbLSDi	OK	3.25544	30.3687
Amt	chr9:1081992	leanveh	dbLSDi	OK	13.0149	1.80518
Itgb7	chr15:10204€	leanveh	dbLSDi	OK	1.60869	10.8778
C3	chr17:573433	leanveh	dbLSDi	OK	48.0669	136.85
Ccnd1	chr7:1521158	leanveh	dbLSDi	OK	24.0609	7.23751
Slc37a2	chr9:3703673	leanveh	dbLSDi	OK	1.68194	22.9128
Kap	chr6:1337998	leanveh	dbLSDi	OK	381.428	27.1246
Fcer1g	chr1:1731597	leanveh	dbLSDi	OK	41.6776	152.27
Ccl8	chr11:81928€	leanveh	dbLSDi	OK	48.2879	283.38
Fam198b	chr3:7968985	leanveh	dbLSDi	OK	11.8009	30.3561
Espn	chr4:151494$	leanveh	dbLSDi	OK	28.9567	2.24808
Fkbp4	chr6:1283801	leanveh	dbLSDi	OK	72.7752	27.6306
Adam9	chr8:2606008	leanveh	dbLSDi	OK	25.9247	60.2203
C2	chr17:349995	leanveh	dbLSDi	OK	40.1768	8.51182
Enah	chr1:1838345	leanveh	dbLSDi	OK	15.5027	3.68326
Zmiz1	chr14:26278€	leanveh	dbLSDi	OK	16.8579	42.0507

Tpm4	chr8:746591	leanveh	dbLSDi	OK	92.7899	219.202
Ucp2	chr7:107641	leanveh	dbLSDi	OK	74.8515	200.324
Ldhb	chr6:142438	leanveh	dbLSDi	OK	69.7885	21.5578
Tcfcp2l1	chr1:120524	leanveh	dbLSDi	OK	3.13263	0.371681
Smpdl3a	chr10:57514	leanveh	dbLSDi	OK	61.0716	148.019
Hoxb6	chr11:96160	leanveh	dbLSDi	OK	35.526	3.78381
3110082D06F	chr17:42452	leanveh	dbLSDi	OK	0.438935	3.27778
Gprin3	chr6:59302	leanveh	dbLSDi	OK	0.945725	6.64381
Optn	chr2:49416	leanveh	dbLSDi	OK	17.2944	51.5352
Lats2	chr14:58308	leanveh	dbLSDi	OK	16.3174	37.4291
Gria1	chr11:56825	leanveh	dbLSDi	OK	2.05833	0.0353778
Hba-a1_dup2	chr11:32196	leanveh	dbLSDi	OK	594.165	1921.85
Cotl1	chr8:12233	leanveh	dbLSDi	OK	41.1337	112.419
9-Sep	chr11:11706	leanveh	dbLSDi	OK	32.5556	80.5503
Tmem38b	chr4:53838	leanveh	dbLSDi	OK	12.8242	37.2071
Sdc4	chr2:16424	leanveh	dbLSDi	OK	35.2272	88.1724
Ap3s1	chr18:46901	leanveh	dbLSDi	OK	49.4402	117.139
Mid1ip1	chrX:10294	leanveh	dbLSDi	OK	97.6961	28.6003
Epb4.1l4b	chr4:57074	leanveh	dbLSDi	OK	7.22429	0.983195
Blvrb	chr7:28232	leanveh	dbLSDi	OK	70.0971	180.054
Tmem45b	chr9:31233	leanveh	dbLSDi	OK	111.75	264.5
Pi15	chr1:17591	leanveh	dbLSDi	OK	2.34008	0.314096
Col7a1	chr9:10885	leanveh	dbLSDi	OK	1.3071	0.202054
Rab8b	chr9:66691	leanveh	dbLSDi	OK	10.1061	26.6266
Rbpms	chr8:34893	leanveh	dbLSDi	OK	40.8208	107.217
Itgax	chr7:13527	leanveh	dbLSDi	OK	4.49121	26.2532
Slc2a3	chr6:12267	leanveh	dbLSDi	OK	37.8968	9.48875
Fstl3	chr10:7924	leanveh	dbLSDi	OK	10.1975	34.859
Abcg1	chr17:31194	leanveh	dbLSDi	OK	3.94338	15.7301
Ces1d	chr8:95689	leanveh	dbLSDi	OK	363.234	122.348
Rap1gap	chr4:13723	leanveh	dbLSDi	OK	6.88222	0.980822
Tnfrsf23	chr7:15085	leanveh	dbLSDi	OK	0.937437	6.45193
Hpdl	chr4:11649	leanveh	dbLSDi	OK	15.565	2.22588
Adamts5	chr16:85858	leanveh	dbLSDi	OK	23.1711	59.5612
Cltb	chr13:54694	leanveh	dbLSDi	OK	45.1329	108.797
Ccdc108	chr1:74948	leanveh	dbLSDi	OK	9.68422	1.2472
Fnip2	chr3:79149	leanveh	dbLSDi	OK	4.63874	15.6708
Atp13a2	chr4:14054	leanveh	dbLSDi	OK	19.577	45.1467
Tbx2	chr11:85646	leanveh	dbLSDi	OK	22.762	5.9054
Trpv2	chr11:62387	leanveh	dbLSDi	OK	9.25	26.9546
Pde7a	chr3:19125	leanveh	dbLSDi	OK	8.31	29.7715
Ctsl	chr13:64464	leanveh	dbLSDi	OK	236.353	1099.13
Adam23	chr1:63492	leanveh	dbLSDi	OK	10.8379	33.7797

Pex5l	chr3:3284855	leanveh	dbLSDi	OK	1.36811	41.5623
Stim1	chr7:1094163	leanveh	dbLSDi	OK	49.6527	119.6
Saa3	chr7:539673(	leanveh	dbLSDi	OK	23.3841	206.294
Cldn11	chr3:3104884	leanveh	dbLSDi	OK	40.2553	4.73575
Mrc1	chr2:1415104	leanveh	dbLSDi	OK	16.6566	40.5119
Mmp12	chr9:7347373	leanveh	dbLSDi	OK	14.7312	94.0396
Slc22a4	chr11:537966	leanveh	dbLSDi	OK	6.48532	31.0072
Rassf3	chr10:120847	leanveh	dbLSDi	OK	17.5703	45.9505
Tgfbr2	chr9:1159968	leanveh	dbLSDi	OK	30.8092	76.5643
Ptpn13	chr5:1038542	leanveh	dbLSDi	OK	9.04597	2.41134
Hprt	chrX:503412	leanveh	dbLSDi	OK	90.5493	206.93
Mthfd1l	chr10:617945	leanveh	dbLSDi	OK	10.5822	1.684
Gstt1	chr10:752465	leanveh	dbLSDi	OK	79.7856	27.6304
Fcna	chr2:2548018	leanveh	dbLSDi	OK	6.18113	63.3393
Cyb561	chr11:105795	leanveh	dbLSDi	OK	133.5	11.2598
Lrrc33	chr16:32142(	leanveh	dbLSDi	OK	9.59204	25.6306
Inha	chr1:7550365	leanveh	dbLSDi	OK	28.2294	4.20005
Prom1	chr5:443848(	leanveh	dbLSDi	OK	67.8524	2.30064
Penk	chr4:4060682	leanveh	dbLSDi	OK	91.7877	31.7486
Ank3	chr10:689964	leanveh	dbLSDi	OK	6.31552	0.423104
Pon2	chr6:5214623	leanveh	dbLSDi	OK	55.5513	123.029
Tspan17	chr13:548907	leanveh	dbLSDi	OK	46.4429	109.43
Serpine1	chr5:1375373	leanveh	dbLSDi	OK	58.331	160.736
Atp1a3	chr7:2576318	leanveh	dbLSDi	OK	2.01897	18.5587
Tmem104	chr11:11504(	leanveh	dbLSDi	OK	7.39384	20.4094
Zfand2a	chr5:1399471	leanveh	dbLSDi	OK	12.1235	32.6046
Mmp11	chr10:75385(	leanveh	dbLSDi	OK	6.77795	31.1424
Podn	chr4:1076873	leanveh	dbLSDi	OK	36.6458	14.5456
Prm1	chr16:107964	leanveh	dbLSDi	OK	471.361	86.3755
Lep	chr6:2901022	leanveh	dbLSDi	OK	227.602	1539.1
Plek	chr11:168712	leanveh	dbLSDi	OK	4.12313	24.9299
Sfpi1	chr2:9093695	leanveh	dbLSDi	OK	14.186	82.998
Tubb6	chr18:675503	leanveh	dbLSDi	OK	20.9228	53.8243
Fam124a	chr14:631745	leanveh	dbLSDi	OK	5.0474	17.5763
Gpr81	chr5:1243267	leanveh	dbLSDi	OK	25.0032	6.9478
Ap1s2	chrX:160347(	leanveh	dbLSDi	OK	22.153	4.41629
Tst	chr15:78229(	leanveh	dbLSDi	OK	76.1331	14.9926
Rasd2	chr8:7773784	leanveh	dbLSDi	OK	8.64806	1.34456
Cyp4v3	chr8:4639115	leanveh	dbLSDi	OK	22.7329	59.1786
Wwp1	chr4:1953681	leanveh	dbLSDi	OK	12.2628	29.3953
Wnk4	chr11:101121	leanveh	dbLSDi	OK	10.5388	1.34463
Arl11	chr14:619285	leanveh	dbLSDi	OK	2.46649	13.1694
Akap13	chr7:8260041	leanveh	dbLSDi	OK	11.7141	26.2112

Uvrag	chr7:1060352	leanveh	dbLSDi	OK	12.033	29.193
Ube2g2	chr10:77085C	leanveh	dbLSDi	OK	39.2996	86.4421
Cldn3	chr5:135462C	leanveh	dbLSDi	OK	78.538	2.92421
Hbb-b1	chr7:110961C	leanveh	dbLSDi	OK	188.363	1123.85
Msr1	chr8:4066705	leanveh	dbLSDi	OK	2.88509	19.0492
Arhgap30	chr1:173319C	leanveh	dbLSDi	OK	4.90474	18.6098
Plau	chr14:216558	leanveh	dbLSDi	OK	48.1719	112.467
Slfn2	chr11:82878C	leanveh	dbLSDi	OK	13.2345	47.9056
Ncf1	chr5:1346961	leanveh	dbLSDi	OK	6.9266	23.2529
Fcgr2b	chr1:172890C	leanveh	dbLSDi	OK	22.9781	65.9517
Aco1	chr4:400902C	leanveh	dbLSDi	OK	77.7873	35.1966
Irs3	chr5:1380842	leanveh	dbLSDi	OK	13.1682	42.0858
Col1a1	chr11:947975	leanveh	dbLSDi	OK	63.1211	157.856
Lilrb3	chr7:366410C	leanveh	dbLSDi	OK	5.6013	28.9357
Cyp2d22	chr15:822009	leanveh	dbLSDi	OK	14.7456	39.5625
Lbp	chr2:1581322	leanveh	dbLSDi	OK	97.2227	290.068
Pik3r5	chr11:68245C	leanveh	dbLSDi	OK	3.469	19.9871
Man1c1	chr4:134117C	leanveh	dbLSDi	OK	7.11404	17.602
Tmem64	chr4:151929C	leanveh	dbLSDi	OK	53.1818	11.5019
Rab31	chr17:66001C	leanveh	dbLSDi	OK	17.3726	44.717
Clec4a1	chr6:122871	leanveh	dbLSDi	OK	7.85227	30.0714
Pde4dip	chr3:974937	leanveh	dbLSDi	OK	17.0632	6.65141
Gsto1	chr19:479294	leanveh	dbLSDi	OK	66.335	152.436
Wipi1	chr11:109434	leanveh	dbLSDi	OK	14.8961	42.9573
Csdc2	chr15:817671	leanveh	dbLSDi	OK	7.0936	1.10167
Ccr5	chr9:1240362	leanveh	dbLSDi	OK	3.97437	16.2247
Dnase2a	chr8:8743252	leanveh	dbLSDi	OK	11.7774	36.8482
Il6ra	chr3:8967324	leanveh	dbLSDi	OK	8.35711	23.7237
Txndc16	chr14:457541	leanveh	dbLSDi	OK	23.2195	8.01835
Eya2	chr2:1654807	leanveh	dbLSDi	OK	5.05352	19.5742
Fbp1	chr13:629661	leanveh	dbLSDi	OK	45.48	11.5182
Colec12	chr18:970764	leanveh	dbLSDi	OK	10.342	30.5852
Metrnl	chr11:121563	leanveh	dbLSDi	OK	8.21901	25.6077
Folr2	chr7:108988	leanveh	dbLSDi	OK	18.2785	62.0092
Srpx2	chrX:130442	leanveh	dbLSDi	OK	6.76429	23.4531
Slc12a2	chr18:580383	leanveh	dbLSDi	OK	14.1945	6.11486
Blvra	chr2:1268963	leanveh	dbLSDi	OK	37.4392	101.033
Ly9	chr1:1735187	leanveh	dbLSDi	OK	1.83476	10.1832
Hoxb8	chr11:961432	leanveh	dbLSDi	OK	24.619	5.35388
Ccdc120	chrX:730883	leanveh	dbLSDi	OK	3.27542	0.588011
Bcar3	chr3:122122C	leanveh	dbLSDi	OK	39.8165	91.454
Sdc3	chr4:1303484	leanveh	dbLSDi	OK	24.854	54.7359
Mmp2	chr8:9535122	leanveh	dbLSDi	OK	27.2398	62.2283

Col6a1	chr10:761715	leanveh	dbLSDi	OK	66.4359	180.876
Tmed5	chr5:108550(	leanveh	dbLSDi	OK	28.314	65.1109
Mtap6	chr7:106415(	leanveh	dbLSDi	OK	6.61739	28.1234
Ctxn1	chr8:4257645	leanveh	dbLSDi	OK	15.9985	2.69027
Tubb2a	chr13:341661	leanveh	dbLSDi	OK	17.7578	50.1067
Unc93b1	chr19:393518	leanveh	dbLSDi	OK	43.2251	98.0141
Pgap2	chr7:109371(	leanveh	dbLSDi	OK	75.4555	20.8961
Ptgs1	chr2:3608594	leanveh	dbLSDi	OK	21.2197	6.34878
Pkp2	chr16:162134	leanveh	dbLSDi	OK	27.4573	63.0936
Chst12	chr5:1409815	leanveh	dbLSDi	OK	43.3085	95.2277
Cd1d1	chr3:8679975	leanveh	dbLSDi	OK	105.486	238.879
Slc12a3	chr8:968531(	leanveh	dbLSDi	OK	1.82517	0.10057
Zim1	chr7:6628153	leanveh	dbLSDi	OK	1.20665	7.13827
Scarb2	chr5:928728(	leanveh	dbLSDi	OK	31.5626	70.1295
Ccl11	chr11:818713	leanveh	dbLSDi	OK	27.5414	94.1212
Lhfpl2	chr13:948277	leanveh	dbLSDi	OK	31.9011	74.0294
Prtn3	chr10:793424	leanveh	dbLSDi	OK	25.1032	4.21293
Pkdcc	chr17:836146	leanveh	dbLSDi	OK	31.8826	11.1082
Slc6a9	chr4:1175078	leanveh	dbLSDi	OK	12.2112	2.81093
Prps2	chrX:1637842	leanveh	dbLSDi	OK	30.6778	9.79872
Fgfrl1	chr5:1091232	leanveh	dbLSDi	OK	93.1241	219.354
Acta1	chr8:126415(	leanveh	dbLSDi	OK	7.68782	84.6069
Dusp3	chr11:101832	leanveh	dbLSDi	OK	42.3103	96.5389
Lgr4	chr2:109757(	leanveh	dbLSDi	OK	15.3526	34.7543
Degs1	chr1:184205(	leanveh	dbLSDi	OK	87.0046	190.398
Ddah1	chr3:145421(	leanveh	dbLSDi	OK	14.4377	4.65134
Doc2b	chr11:755825	leanveh	dbLSDi	OK	2.73283	10.7598
Grap	chr11:614668	leanveh	dbLSDi	OK	15.1954	52.8144
F2r	chr13:963717	leanveh	dbLSDi	OK	7.22738	24.427
Bri3bp	chr5:125921(	leanveh	dbLSDi	OK	8.59033	1.92083
2210403K04F	chr11:75275(	leanveh	dbLSDi	OK	29.4579	70.9132
Bcl2l13	chr6:1207862	leanveh	dbLSDi	OK	14.3764	31.5006
Hebp1	chr6:1350875	leanveh	dbLSDi	OK	105.683	240.813
Nrgn	chr9:3735207	leanveh	dbLSDi	OK	39.501	5.35112
Capn2	chr1:1843973	leanveh	dbLSDi	OK	58.9913	136.646
Hsd11b1	chr1:1950478	leanveh	dbLSDi	OK	97.84	212.459
Rnf180	chr13:105937	leanveh	dbLSDi	OK	3.69719	0.654631
Cth	chr3:1575572	leanveh	dbLSDi	OK	16.0291	2.57588
1100001G20F	chr11:835604	leanveh	dbLSDi	OK	80.2832	258.512
Bmp3	chr5:9928345	leanveh	dbLSDi	OK	4.73334	20.4171
Synpo2	chr3:1227794	leanveh	dbLSDi	OK	14.0682	35.058
S100b	chr10:757165	leanveh	dbLSDi	OK	1.6006	8.75782
Gp49a	chr10:512004	leanveh	dbLSDi	OK	8.18876	83.3144

Alad	chr4:621702(	leanveh	dbLSDi	OK	56.0714	16.6242
P2rx4	chr5:123157[	leanveh	dbLSDi	OK	26.9396	65.1723
Tsku	chr7:1054991	leanveh	dbLSDi	OK	9.84953	33.1597
H2-Eb1	chr17:344428	leanveh	dbLSDi	OK	172.299	75.5004
Fam83f	chr15:805022	leanveh	dbLSDi	OK	1.3998	7.60884
Deptor	chr15:549314	leanveh	dbLSDi	OK	12.7005	37.3442
Efhd1	chr1:8916093	leanveh	dbLSDi	OK	41.1916	9.66215
Myo5b	chr18:746022	leanveh	dbLSDi	OK	10.7716	3.31832
Ston2	chr12:928714	leanveh	dbLSDi	OK	3.55221	0.513159
Dennd4a	chr9:6465881	leanveh	dbLSDi	OK	4.21081	10.5838
Gstt3	chr10:752368	leanveh	dbLSDi	OK	21.6381	5.98198
Prm2	chr16:107914	leanveh	dbLSDi	OK	706.448	104.734
Ttyh2	chr11:114536	leanveh	dbLSDi	OK	21.3455	47.1967
Slc6a6	chr6:916340(	leanveh	dbLSDi	OK	35.612	98.8474
Nnt	chr13:120123	leanveh	dbLSDi	OK	16.7062	5.47565
Tmem106a	chr11:101443	leanveh	dbLSDi	OK	22.3169	51.4684
Pid1	chr1:840328(	leanveh	dbLSDi	OK	23.0883	56.1441
Maoa	chrX:161968:	leanveh	dbLSDi	OK	9.78823	24.93
Hunk	chr16:90386(	leanveh	dbLSDi	OK	5.25271	0.868285
Lrrc59	chr11:944911	leanveh	dbLSDi	OK	59.5526	133.414
Limch1	chr5:6713707	leanveh	dbLSDi	OK	8.05126	18.7274
Esd	chr14:751321	leanveh	dbLSDi	OK	69.2477	161.619
Mt1	chr8:9670298	leanveh	dbLSDi	OK	558.78	1232.04
Mafk	chr5:1402674	leanveh	dbLSDi	OK	18.1473	42.1538
Cd300lb	chr11:114784	leanveh	dbLSDi	OK	2.52653	17.8953
Adssl1	chr12:113858	leanveh	dbLSDi	OK	4.36784	33.2964
Atp6v1a	chr16:440855	leanveh	dbLSDi	OK	30.9103	64.4335
Mfsd1	chr3:6738668	leanveh	dbLSDi	OK	32.4032	68.5213
Plk2	chr13:111185	leanveh	dbLSDi	OK	13.3163	32.8277
Isyna1	chr8:7311837	leanveh	dbLSDi	OK	62.3591	23.0295
Rnasel	chr1:1555965	leanveh	dbLSDi	OK	10.7998	25.8462
Csf2rb2	chr15:781129	leanveh	dbLSDi	OK	4.5395	13.9498
Gm7444	chr9:5587544	leanveh	dbLSDi	OK	11.9946	1.95646
Rorc	chr3:9417674	leanveh	dbLSDi	OK	14.7752	4.24217
Sox7	chr14:645625	leanveh	dbLSDi	OK	21.3185	7.94652
Trpm3	chr19:22213(	leanveh	dbLSDi	OK	3.50716	0.733432
Tmem182	chr1:4086244	leanveh	dbLSDi	OK	36.5378	100.685
Slc37a4	chr9:4420625	leanveh	dbLSDi	OK	31.0411	11.9857
Iqgap1	chr7:878564(	leanveh	dbLSDi	OK	22.7833	47.2029
Aspg	chr12:113344	leanveh	dbLSDi	OK	23.1242	2.79639
AF251705	chr11:114858	leanveh	dbLSDi	OK	4.08875	21.0998
Tgm2	chr2:1579421	leanveh	dbLSDi	OK	95.9265	296.229
Hpse	chr5:101108[	leanveh	dbLSDi	OK	1.67464	9.99135

Atp13a4	chr16:293961	leanveh	dbLSDi	OK	7.03158	0.0687125
Cib2	chr9:5439315	leanveh	dbLSDi	OK	83.8186	200.8
Tmem184a	chr5:140280	leanveh	dbLSDi	OK	25.5975	4.36153
Mlph	chr1:9281167	leanveh	dbLSDi	OK	21.0167	2.16408
Fgfr2	chr7:137305	leanveh	dbLSDi	OK	9.27475	1.70408
Col16a1	chr4:129725(	leanveh	dbLSDi	OK	9.53238	21.2661
Slc6a13	chr6:1212503	leanveh	dbLSDi	OK	21.384	54.3449
Abcb4	chr5:889372(	leanveh	dbLSDi	OK	0.849887	4.15296
F630110N24F	chr10:808203	leanveh	dbLSDi	OK	11.1404	35.9537
Mup11	chr4:6059113	leanveh	dbLSDi	OK	9.69754	0.12957
Ms4a6d	chr19:11661(	leanveh	dbLSDi	OK	5.33891	32.7977
Arhgef6	chrX:544846(	leanveh	dbLSDi	OK	6.99825	18.9149
Sgpp1	chr12:768152	leanveh	dbLSDi	OK	76.9682	18.6832
Gng2	chr14:206917	leanveh	dbLSDi	OK	6.633	17.4417
Ccr1	chr9:123876	leanveh	dbLSDi	OK	2.97651	25.4377
Celsr3	chr9:108728(	leanveh	dbLSDi	OK	0.217071	1.0422
Pamr1	chr2:1023901	leanveh	dbLSDi	OK	3.6846	12.3346
Pebp1	chr5:117732(	leanveh	dbLSDi	OK	291.291	122.466
Bst1	chr5:4421013	leanveh	dbLSDi	OK	2.60697	15.1278
Akirin1	chr4:1234124	leanveh	dbLSDi	OK	24.5413	53.0962
Htatip2	chr7:5701447	leanveh	dbLSDi	OK	28.876	81.819
Specc1	chr11:618905	leanveh	dbLSDi	OK	2.8527	8.73945
Ric3	chr7:1161543	leanveh	dbLSDi	OK	4.87266	13.7389
Napsa	chr7:5182781	leanveh	dbLSDi	OK	40.083	10.3197
Car2	chr3:1488642	leanveh	dbLSDi	OK	47.3367	14.1716
Ptafr	chr4:132119	leanveh	dbLSDi	OK	4.23097	28.8393
Ss18l1	chr2:1797771	leanveh	dbLSDi	OK	11.0241	2.87933
Amhr2	chr15:102275	leanveh	dbLSDi	OK	44.7093	10.5309
Gla	chrX:1311227	leanveh	dbLSDi	OK	4.12148	14.9862
Got2	chr8:9838803	leanveh	dbLSDi	OK	69.8855	24.0581
Ap2a2	chr7:148748(	leanveh	dbLSDi	OK	39.7812	84.5864
Hba-a1_dup1	chr11:32183(	leanveh	dbLSDi	OK	910.116	3164.98
Inpp5d	chr1:8951688	leanveh	dbLSDi	OK	5.75302	17.8722
Pfn2	chr3:5764581	leanveh	dbLSDi	OK	30.9679	10.6356
Fbp2	chr13:629382	leanveh	dbLSDi	OK	9.46198	1.99614
Slc16a11	chr11:700274	leanveh	dbLSDi	OK	14.2582	2.60155
Slc7a6	chr8:1086927	leanveh	dbLSDi	OK	10.1503	23.785
Wwtr1	chr3:572595(	leanveh	dbLSDi	OK	30.5101	63.6113
Mthfd2	chr6:832556	leanveh	dbLSDi	OK	26.1237	6.51128
C1qtnf1	chr11:11828	leanveh	dbLSDi	OK	30.5501	64.9393
Slc1a1	chr19:28909(	leanveh	dbLSDi	OK	15.971	3.91421
Hspb6	chr7:3133832	leanveh	dbLSDi	OK	17.8666	55.0116
Fmr1	chrX:6593172	leanveh	dbLSDi	OK	44.1088	116.034

Fam70a	chrX:3555047	leanveh	dbLSDi	OK	5.17219	1.04662
Mest	chr6:306880€	leanveh	dbLSDi	OK	207.837	604.57
Cmpk1	chr4:1146332	leanveh	dbLSDi	OK	46.4187	95.4458
Plekha2	chr8:2614961	leanveh	dbLSDi	OK	10.9291	24.8455
Galnt6	chr15:10052C	leanveh	dbLSDi	OK	0.688074	8.68977
Scn1b	chr7:3190154	leanveh	dbLSDi	OK	23.1455	60.9976
Lyve1	chr7:1179941	leanveh	dbLSDi	OK	10.1962	31.7735
Fam164c	chr12:866295	leanveh	dbLSDi	OK	4.34278	0.917623
Pld4	chr12:113998	leanveh	dbLSDi	OK	14.6294	37.58
Tlr8	chrX:163680€	leanveh	dbLSDi	OK	1.57055	8.05474
Col5a2	chr1:4543117	leanveh	dbLSDi	OK	18.7719	41.3797
Ncf2	chr1:154655C	leanveh	dbLSDi	OK	6.55292	26.9112
Osgin1	chr8:121961C	leanveh	dbLSDi	OK	29.49	63.4698
Synm	chr7:7487504	leanveh	dbLSDi	OK	9.52196	3.29122
BC051019	chr7:1168472	leanveh	dbLSDi	OK	2.45366	0.044707
Gm10267	chr18:44316C	leanveh	dbLSDi	OK	5.69795	0
Cyp4b1	chr4:1152973	leanveh	dbLSDi	OK	43.3042	97.3595
Tmem37	chr1:121963€	leanveh	dbLSDi	OK	31.7408	79.0694
Pgap3	chr11:98249€	leanveh	dbLSDi	OK	6.96258	1.32072
Palmd	chr3:1166211	leanveh	dbLSDi	OK	72.6082	156.882
Evpl	chr11:116081	leanveh	dbLSDi	OK	1.84935	0.390569
Col5a1	chr2:2774194	leanveh	dbLSDi	OK	29.0905	64.9007
Pdzk1	chr3:9663374	leanveh	dbLSDi	OK	31.7095	6.89396
Plxnb1	chr9:108997€	leanveh	dbLSDi	OK	8.71473	1.07256
Pde1b	chr15:103333	leanveh	dbLSDi	OK	6.62443	18.338
Fads1	chr19:102573	leanveh	dbLSDi	OK	56.0315	25.7737
Fbxo10	chr4:4504711	leanveh	dbLSDi	OK	15.4409	3.52006
Pabpc2	chr18:399331	leanveh	dbLSDi	OK	26.6738	6.91891
Ston1	chr17:890258	leanveh	dbLSDi	OK	6.07266	16.5944
Elovl2	chr13:412777	leanveh	dbLSDi	OK	15.7922	2.48752
Arhgdib	chr6:1368722	leanveh	dbLSDi	OK	29.0412	73.6078
Acat2	chr17:13135€	leanveh	dbLSDi	OK	36.3799	13.7891
Fermt3	chr19:707062	leanveh	dbLSDi	OK	5.04819	20.7461
Stambpl1	chr19:342667	leanveh	dbLSDi	OK	5.78284	18.5729
Fndc5	chr4:1288143	leanveh	dbLSDi	OK	10.8402	2.09017
Hcls1	chr16:36935C	leanveh	dbLSDi	OK	14.9565	38.3231
Defb10	chr8:2296937	leanveh	dbLSDi	OK	3.54636	0
S100a11	chr3:9332441	leanveh	dbLSDi	OK	667.008	1347.17
Mum1l1	chrX:135744	leanveh	dbLSDi	OK	29.3134	1.4215
Cyba	chr8:124948€	leanveh	dbLSDi	OK	52.7821	133.727
Cfp	chrX:205026€	leanveh	dbLSDi	OK	15.2616	44.2574
Slc43a2	chr11:753451	leanveh	dbLSDi	OK	12.1959	27.7284
Pltp	chr2:1646562	leanveh	dbLSDi	OK	43.8177	208.486

Dpp4	chr2:6216812	leanveh	dbLSDi	OK	7.51591	2.29793
Cln8	chr8:1488853	leanveh	dbLSDi	OK	4.75374	12.6134
Parva	chr7:1195712	leanveh	dbLSDi	OK	42.7372	86.5185
Mtap7d1	chr4:1259094	leanveh	dbLSDi	OK	43.2597	92.631
Spag1	chr15:361092	leanveh	dbLSDi	OK	4.23879	0.980009
Ell2	chr13:75844(	leanveh	dbLSDi	OK	19.9706	41.7118
Ednrb	chr14:104213	leanveh	dbLSDi	OK	12.9938	30.5565
Gm10804	chr2:932592(	leanveh	dbLSDi	OK	1.58162	0.0734132
4930471M23	chr5:3095031	leanveh	dbLSDi	OK	12.5402	29.2657
Mfge8	chr7:8627865	leanveh	dbLSDi	OK	200.199	1153.12
Gprasp1	chrX:1322772	leanveh	dbLSDi	OK	11.5244	3.06285
Acot1	chr12:853504	leanveh	dbLSDi	OK	9.60061	2.04497
Acpp	chr9:1041905	leanveh	dbLSDi	OK	6.38339	1.29804
Litaf	chr16:109593	leanveh	dbLSDi	OK	35.2885	71.3516
Cd53	chr3:1065617	leanveh	dbLSDi	OK	5.65506	21.5512
Unc79	chr12:104187	leanveh	dbLSDi	OK	0.315697	1.51272
Ngfrap1	chrX:1328047	leanveh	dbLSDi	OK	61.58	16.6842
Cd209b	chr8:391765(	leanveh	dbLSDi	OK	2.55423	11.499
Cacna1e	chr1:156239(	leanveh	dbLSDi	OK	0.429271	2.27604
Clec7a	chr6:129411(	leanveh	dbLSDi	OK	5.85022	20.2311
2310016C08F	chr6:292224(	leanveh	dbLSDi	OK	13.785	57.1563
Dbp	chr7:5296061	leanveh	dbLSDi	OK	99.6468	37.1131
Aifm2	chr10:61178(	leanveh	dbLSDi	OK	88.2664	206.022
Ctsd	chr7:149561(	leanveh	dbLSDi	OK	480.189	2222.44
Igf1r	chr7:7509714	leanveh	dbLSDi	OK	7.54934	3.15808
Sorbs2	chr8:4659314	leanveh	dbLSDi	OK	9.94148	3.56185
Arpc1b	chr5:1458751	leanveh	dbLSDi	OK	157.847	324.239
1300014I06R	chr13:347197	leanveh	dbLSDi	OK	20.3367	45.1667
Mbnl2	chr14:120674	leanveh	dbLSDi	OK	38.1866	77.7925
Lamc3	chr2:317428(	leanveh	dbLSDi	OK	7.67636	2.85931
Kif5c	chr2:4947483	leanveh	dbLSDi	OK	1.67558	0.390053
Aplnr	chr2:8497651	leanveh	dbLSDi	OK	14.7783	4.01496
Rasa4	chr5:1365597	leanveh	dbLSDi	OK	12.359	28.1076
Gm14420	chr2:1772494	leanveh	dbLSDi	OK	14.0757	30.4787
Per3	chr4:1503777	leanveh	dbLSDi	OK	18.8297	8.59713
Rab11fip4	chr11:794047	leanveh	dbLSDi	OK	6.97529	1.38172
Trp53inp2	chr2:1552075	leanveh	dbLSDi	OK	158.487	556.435
D0H4S114	chr18:335966	leanveh	dbLSDi	OK	31.736	11.4177
Pi4k2a	chr19:42164(	leanveh	dbLSDi	OK	17.2735	35.5279
Tuba3b	chr6:1455644	leanveh	dbLSDi	OK	71.9554	19.6338
Spink12	chr18:442641	leanveh	dbLSDi	OK	1.10442	0
9030425E11R	chr9:4049404	leanveh	dbLSDi	OK	8.54303	25.5447
Cd274	chr19:29441(	leanveh	dbLSDi	OK	7.1649	17.6686

Strbp	chr2:374253{	leanveh	dbLSDi	OK	2.56682	0.747616
Defb18	chr1:182265{	leanveh	dbLSDi	OK	1.82465	0
2310001A20F	chr2:150408{	leanveh	dbLSDi	OK	64.3532	126.88
Fosl2	chr5:3243884	leanveh	dbLSDi	OK	11.0102	23.8151
Cd82	chr2:932592{	leanveh	dbLSDi	OK	45.5575	18.0752
Slc40a1	chr1:4596491	leanveh	dbLSDi	OK	8.64487	21.0208
Plod1	chr4:147283{	leanveh	dbLSDi	OK	22.088	44.82
Pygb	chr2:150612{	leanveh	dbLSDi	OK	117.776	54.4426
4933411K20F	chr8:472549(	leanveh	dbLSDi	OK	16.1408	6.1049
Bcap31	chrX:709315{	leanveh	dbLSDi	OK	131.882	264.522
Zc3h12a	chr4:124795{	leanveh	dbLSDi	OK	4.08514	13.2966
Apod	chr16:312962	leanveh	dbLSDi	OK	10.6655	30.0192
Olfm1	chr2:2804861	leanveh	dbLSDi	OK	36.5954	88.2753
Itih5	chr2:100751{	leanveh	dbLSDi	OK	61.0006	176.519
Dap	chr15:311541	leanveh	dbLSDi	OK	128.034	262.211
Plekha6	chr1:135142{	leanveh	dbLSDi	OK	11.3403	3.90466
Nav2	chr7:5621444	leanveh	dbLSDi	OK	4.9933	1.77866
Ifrd1	chr12:409297	leanveh	dbLSDi	OK	49.5728	96.0266
Gjb2	chr14:577174	leanveh	dbLSDi	OK	2.39414	10.7506
Creld1	chr6:1134335	leanveh	dbLSDi	OK	32.8239	63.9184
Dctn3	chr4:4166182	leanveh	dbLSDi	OK	60.0909	126.942
Fgl2	chr5:2079877	leanveh	dbLSDi	OK	17.2474	6.52725
Rap1b	chr10:117251	leanveh	dbLSDi	OK	70.399	138.427
Mgat3	chr15:800041	leanveh	dbLSDi	OK	7.27019	1.31258
Rragc	chr4:123594{	leanveh	dbLSDi	OK	65.996	129.033
Epb4.1	chr4:1314793	leanveh	dbLSDi	OK	18.7309	37.6926
Pf4	chr5:912014{	leanveh	dbLSDi	OK	55.1679	154.57
Fzd6	chr15:388378	leanveh	dbLSDi	OK	14.5893	4.40461
Tmem231	chr8:114435{	leanveh	dbLSDi	OK	6.54431	1.4611
Efemp1	chr11:287532	leanveh	dbLSDi	OK	59.5833	123.668
Ggt5	chr10:750521	leanveh	dbLSDi	OK	6.41509	15.2174
Rassf2	chr2:131818{	leanveh	dbLSDi	OK	9.94913	20.5906
Gns	chr10:120802	leanveh	dbLSDi	OK	70.5948	141.389
Clip1	chr5:124029(	leanveh	dbLSDi	OK	14.8748	30.2491
Sucnr1	chr3:598857{	leanveh	dbLSDi	OK	48.3155	103.344
Luc7l3	chr11:941524	leanveh	dbLSDi	OK	33.2391	15.6354
Rspo1	chr4:124663{	leanveh	dbLSDi	OK	23.0301	4.05918
Tctex1d4	chr4:1167994	leanveh	dbLSDi	OK	13.2104	0.64204
Serpinb6a	chr13:340097	leanveh	dbLSDi	OK	92.2821	200.727
Aacs	chr5:1259562	leanveh	dbLSDi	OK	67.4991	33.337
Slc16a2	chrX:1008927	leanveh	dbLSDi	OK	13.7877	3.65409
Slc9a3r1	chr11:115024	leanveh	dbLSDi	OK	77.7038	26.4914
5031439G07F	chr15:847761	leanveh	dbLSDi	OK	12.9934	26.7388

Fkbp5	chr17:28536(	leanveh	dbLSDi	OK	78.3242	169.07
Pafah1b3	chr7:260800(	leanveh	dbLSDi	OK	19.7868	4.44493
Pip5k1c	chr10:807557	leanveh	dbLSDi	OK	21.2872	42.6215
Parvb	chr15:840624	leanveh	dbLSDi	OK	11.5239	26.1348
Sec24d	chr3:1229704	leanveh	dbLSDi	OK	22.0954	42.7116
1110008P14F	chr2:3223462	leanveh	dbLSDi	OK	82.1498	184.579
Ormdl3	chr11:98442(	leanveh	dbLSDi	OK	148.286	294.582
1700010I14R	chr17:91811(	leanveh	dbLSDi	OK	32.1664	8.42668
Nomo1	chr7:532890(	leanveh	dbLSDi	OK	38.9738	75.6062
Fads3	chr19:10116(	leanveh	dbLSDi	OK	161.102	403.564
Bspry	chr4:621411(	leanveh	dbLSDi	OK	41.0276	6.68557
Itfg3	chr17:26349(	leanveh	dbLSDi	OK	26.9519	54.2107
Tmem164	chrX:139115(	leanveh	dbLSDi	OK	20.8953	10.1451
Slc25a24	chr3:108926(	leanveh	dbLSDi	OK	9.50446	23.4407
2900073G15F	chr17:713431	leanveh	dbLSDi	OK	153.361	311.69
Tle2	chr10:810382	leanveh	dbLSDi	OK	9.68188	1.98668
Sema3g	chr14:32031(	leanveh	dbLSDi	OK	20.5909	40.8302
Hdac11	chr6:911068(	leanveh	dbLSDi	OK	25.1761	6.94857
Ppp1r9a	chr6:485331(	leanveh	dbLSDi	OK	6.52584	2.72588
9430023L20R	chr15:101114	leanveh	dbLSDi	OK	26.303	63.2273
Ptpn12	chr5:204924(	leanveh	dbLSDi	OK	15.0106	31.5813
Slc35e2	chr4:154975(	leanveh	dbLSDi	OK	9.53115	3.96635
Sh2b2	chr5:136694(	leanveh	dbLSDi	OK	18.6081	38.8686
Slc2a5	chr4:1494934	leanveh	dbLSDi	OK	24.2885	7.47951
Akr1b8	chr6:343041(	leanveh	dbLSDi	OK	34.1486	84.8391
Psph	chr5:1302714	leanveh	dbLSDi	OK	27.6907	8.50962
Prdx5	chr19:69813(	leanveh	dbLSDi	OK	161.455	309.11
Ggnbp1	chr17:271662	leanveh	dbLSDi	OK	61.4122	17.0391
Rab36	chr10:744998	leanveh	dbLSDi	OK	4.52664	1.14033
Hsd17b4	chr18:502878	leanveh	dbLSDi	OK	103.432	211.928
Ttc26	chr6:3833152	leanveh	dbLSDi	OK	4.16705	1.0058
Mrgpre	chr7:1509642	leanveh	dbLSDi	OK	0.891876	3.67025
Hsd3b1	chr3:9865611	leanveh	dbLSDi	OK	54.5395	0.159069
Arfgef2	chr2:166631(	leanveh	dbLSDi	OK	11.3854	22.1627
Angptl4	chr17:339118	leanveh	dbLSDi	OK	207.014	465.796
6330439K17F	chr2:1442962	leanveh	dbLSDi	OK	1.95444	0.457281
Acox3	chr5:359257(	leanveh	dbLSDi	OK	56.6669	21.4404
Alppl2	chr1:889832(	leanveh	dbLSDi	OK	3.5471	0.073512
Csf2ra	chr19:613003	leanveh	dbLSDi	OK	16.383	40.2442
Acpl2	chr9:967237(	leanveh	dbLSDi	OK	6.52302	1.33332
Nog	chr11:89161(	leanveh	dbLSDi	OK	2.61389	11.5541
6330503K22F	chr7:1258561	leanveh	dbLSDi	OK	9.97752	3.79579
Gpr137b	chr13:134498	leanveh	dbLSDi	OK	5.00599	17.4346

Klhl23	chr2:6966042	leanveh	dbLSDi	OK	7.42344	1.51222
Arhgef5	chr6:4321564	leanveh	dbLSDi	OK	8.87052	3.42511
Gpr137b-ps	chr13:127063	leanveh	dbLSDi	OK	5.48175	19.6476
Mme	chr3:630997	leanveh	dbLSDi	OK	30.7163	14.2303
Tuba1a	chr15:987802	leanveh	dbLSDi	OK	165.837	387.547
Slc38a10	chr11:119965	leanveh	dbLSDi	OK	38.9916	74.3134
Hoxd4	chr2:745481C	leanveh	dbLSDi	OK	22.1436	6.22612
Atp8b4	chr2:1261467	leanveh	dbLSDi	OK	0.581862	2.3794
2310022B05F	chr8:127159	leanveh	dbLSDi	OK	19.1853	37.912
Agrn	chr4:1555393	leanveh	dbLSDi	OK	10.8438	5.39036
Siglec1	chr2:130894	leanveh	dbLSDi	OK	2.4092	8.58034
Sbsn	chr7:315364	leanveh	dbLSDi	OK	28.4773	88.9195
Plod3	chr5:137458C	leanveh	dbLSDi	OK	30.5484	64.2854
Gm8909	chr17:363013	leanveh	dbLSDi	OK	42.9245	89.2206
Serpinb8	chr1:109486	leanveh	dbLSDi	OK	3.55758	10.1925
Cpt1a	chr19:33233C	leanveh	dbLSDi	OK	33.7452	63.9369
Scel	chr14:103912	leanveh	dbLSDi	OK	10.6011	2.20827
Dnahc8	chr17:30763	leanveh	dbLSDi	OK	24.294	5.32809
Mfap3l	chr8:631116	leanveh	dbLSDi	OK	14.3874	5.96858
Tpcn2	chr7:152439	leanveh	dbLSDi	OK	1.70568	7.17703
Serpina3n	chr12:10564	leanveh	dbLSDi	OK	161.879	931.082
Cdhr5	chr7:148454	leanveh	dbLSDi	OK	11.1251	0.111327
Echdc2	chr4:107838C	leanveh	dbLSDi	OK	63.6066	29.9224
Gas7	chr11:67346	leanveh	dbLSDi	OK	10.7323	22.18
Ankrd29	chr18:12410	leanveh	dbLSDi	OK	9.13421	3.18947
Mtap1b	chr13:100191	leanveh	dbLSDi	OK	7.39507	3.62141
Naip2	chr13:100914	leanveh	dbLSDi	OK	1.13544	5.04187
Prune	chr3:950575	leanveh	dbLSDi	OK	11.8969	26.2181
Pde4d	chr13:109444	leanveh	dbLSDi	OK	2.01074	6.80528
Nes	chr3:8777501	leanveh	dbLSDi	OK	8.67309	3.3163
Igsf5	chr16:965833	leanveh	dbLSDi	OK	7.92542	0.110694
Gyg	chr3:200219	leanveh	dbLSDi	OK	38.5442	75.8352
Zfp541	chr7:166572	leanveh	dbLSDi	OK	7.09014	1.61193
Fyb	chr15:652987	leanveh	dbLSDi	OK	4.29886	12.6005
Cela1	chr15:100504	leanveh	dbLSDi	OK	8.73673	48.7527
Hadhb	chr5:304818	leanveh	dbLSDi	OK	61.627	116.364
Aldh1a2	chr9:710635	leanveh	dbLSDi	OK	13.6871	2.95032
Zfp385b	chr2:772486	leanveh	dbLSDi	OK	5.98131	0.91966
Lrriq1	chr10:10252	leanveh	dbLSDi	OK	1.62233	0.162818
Stk33	chr7:1164227	leanveh	dbLSDi	OK	10.9329	2.68011
Slc34a1	chr13:55501C	leanveh	dbLSDi	OK	17.6788	1.31872
Osbpl11	chr16:331851	leanveh	dbLSDi	OK	29.2642	54.7098
Mfap5	chr6:122463	leanveh	dbLSDi	OK	28.077	67.179

Enc1	chr13:98011C	leanveh	dbLSDi	OK	15.2187	29.1079
St8sia4	chr1:9748425	leanveh	dbLSDi	OK	3.67246	9.3219
Clgn	chr8:8591378	leanveh	dbLSDi	OK	34.4108	10.0895
Arhgef4	chr1:3485856	leanveh	dbLSDi	OK	7.52157	1.69836
Itpk1	chr12:10380€	leanveh	dbLSDi	OK	20.3522	41.3744
Gm70	chr12:7751855	leanveh	dbLSDi	OK	15.8341	4.20909
Fos	chr12:8681485	leanveh	dbLSDi	OK	8.66097	31.2909
Cald1	chr6:3465944	leanveh	dbLSDi	OK	45.0197	89.0086
Rbms1	chr2:605900C	leanveh	dbLSDi	OK	20.9577	45.3222
Ccdc96	chr5:3682723	leanveh	dbLSDi	OK	8.81028	2.02741
Chrna2	chr14:667597	leanveh	dbLSDi	OK	13.5834	2.36503
Adcy5	chr16:351557	leanveh	dbLSDi	OK	30.0687	59.441
Khk	chr5:312242€	leanveh	dbLSDi	OK	37.9994	12.5069
Tdrd6	chr17:437522	leanveh	dbLSDi	OK	11.6155	2.69743
Acsm3	chr7:1269044	leanveh	dbLSDi	OK	9.52009	0.881483
Gadd45b	chr10:803928	leanveh	dbLSDi	OK	11.1467	33.8368
Pygl	chr12:712918	leanveh	dbLSDi	OK	56.0769	118.474
Krt79	chr15:101759	leanveh	dbLSDi	OK	3.39493	15.9916
Clec4a2	chr6:1230727	leanveh	dbLSDi	OK	3.64448	13.5475
Prkce	chr17:865671	leanveh	dbLSDi	OK	10.5136	20.2339
Atf3	chr1:1929941	leanveh	dbLSDi	OK	4.57186	24.8308
Bcam	chr7:203414€	leanveh	dbLSDi	OK	47.8432	24.5611
Cds2	chr2:132088	leanveh	dbLSDi	OK	23.3996	43.7822
Cilp	chr9:651129€	leanveh	dbLSDi	OK	5.44213	14.1142
Krt5	chr15:101537	leanveh	dbLSDi	OK	5.31396	0.10637
Ubxn2b	chr4:6118251	leanveh	dbLSDi	OK	6.07728	2.20076
Sycp2	chr2:178080C	leanveh	dbLSDi	OK	4.91588	1.19042
Klb	chr5:6573964	leanveh	dbLSDi	OK	6.45641	17.1317
Plekha5	chr6:140372€	leanveh	dbLSDi	OK	9.79904	3.83587
Rtn2	chr7:1986801	leanveh	dbLSDi	OK	27.7297	71.4319
Gstm2	chr3:107784€	leanveh	dbLSDi	OK	270.698	126.2
Tusc5	chr11:764933	leanveh	dbLSDi	OK	121.899	263.648
Sgpl1	chr10:605613	leanveh	dbLSDi	OK	40.246	74.6549
Map3k6	chr4:1327967	leanveh	dbLSDi	OK	22.3586	41.1815
Csf3r	chr4:125701	leanveh	dbLSDi	OK	1.08753	4.40139
Eps8l2	chr7:148524	leanveh	dbLSDi	OK	20.5017	3.22736
Ndrg2	chr14:52524	leanveh	dbLSDi	OK	88.2002	173.686
Heg1	chr16:336845	leanveh	dbLSDi	OK	23.3071	44.4841
Aldh3b1	chr19:391349	leanveh	dbLSDi	OK	8.60321	27.655
Itpripl2	chr7:125628€	leanveh	dbLSDi	OK	9.65375	18.2682
Rtn4	chr11:295928	leanveh	dbLSDi	OK	72.2842	161.974
Cdkn1c	chr7:150644	leanveh	dbLSDi	OK	17.9611	40.3433
Prrx1	chr1:165175	leanveh	dbLSDi	OK	6.78332	17.2623

Mmp14	chr14:550504	leanveh	dbLSDi	OK	31.2482	59.2998
Mmgt1	chrX:538386	leanveh	dbLSDi	OK	16.0838	31.2305
Isg20	chr7:860586	leanveh	dbLSDi	OK	136.699	46.796
Hipk2	chr6:386478	leanveh	dbLSDi	OK	13.1938	27.6645
Piwil2	chr14:70772	leanveh	dbLSDi	OK	7.37849	1.57853
Sytl4	chrX:13047	leanveh	dbLSDi	OK	6.23141	1.42633
Rac2	chr15:78389	leanveh	dbLSDi	OK	4.72257	14.9508
1110059M19	chrX:42444	leanveh	dbLSDi	OK	9.47229	51.6211
Rnf144b	chr13:47218	leanveh	dbLSDi	OK	30.4691	15.8606
C1qtnf4	chr2:907259	leanveh	dbLSDi	OK	17.5571	4.35563
Ttc9	chr12:82732	leanveh	dbLSDi	OK	7.00506	1.78829
Rab3ip	chr10:11634	leanveh	dbLSDi	OK	16.0775	6.71965
Zfp423	chr8:90185	leanveh	dbLSDi	OK	8.4913	18.0766
Tmem65	chr15:58613	leanveh	dbLSDi	OK	23.3081	43.2163
Lpgat1	chr1:193541	leanveh	dbLSDi	OK	83.6083	248.465
Atp11a	chr8:12757	leanveh	dbLSDi	OK	39.6176	19.011
Nap1l1	chr10:11091	leanveh	dbLSDi	OK	122.199	269.899
Cd300ld	chr11:11484	leanveh	dbLSDi	OK	4.88153	14.024
Plaur	chr7:252475	leanveh	dbLSDi	OK	7.1456	40.3272
Gatm	chr2:122420	leanveh	dbLSDi	OK	24.1029	9.36957
Fam38a	chr8:12500	leanveh	dbLSDi	OK	11.2792	22.9807
Anxa6	chr11:54792	leanveh	dbLSDi	OK	76.0605	147.506
Ece1	chr4:137418	leanveh	dbLSDi	OK	44.9099	86.8382
Ubtd2	chr11:32355	leanveh	dbLSDi	OK	8.51587	18.8291
Postn	chr3:541650	leanveh	dbLSDi	OK	59.4814	113.853
Tgfb1	chr7:264720	leanveh	dbLSDi	OK	32.3706	63.4528
Capza2	chr6:17587	leanveh	dbLSDi	OK	80.6921	149.303
Marveld3	chr8:11247	leanveh	dbLSDi	OK	6.97613	0.0576927
Rassf10	chr7:120097	leanveh	dbLSDi	OK	3.68175	0.919352
Ppfibp1	chr6:14683	leanveh	dbLSDi	OK	27.8312	58.5626
Bpgm	chr6:34426	leanveh	dbLSDi	OK	31.2121	62.3708
Dync2h1	chr9:692850	leanveh	dbLSDi	OK	2.01775	0.732511
Gm1564	chr11:10252	leanveh	dbLSDi	OK	4.67057	1.27538
Lrig1	chr6:94450	leanveh	dbLSDi	OK	15.8788	6.73491
P2ry6	chr7:108086	leanveh	dbLSDi	OK	6.88465	20.6875
Crabp1	chr9:546126	leanveh	dbLSDi	OK	21.1113	0.482462
Sox12	chr2:152219	leanveh	dbLSDi	OK	6.9407	2.42284
Hmga1	chr17:27693	leanveh	dbLSDi	OK	5.35412	17.819
Samd5	chr10:93470	leanveh	dbLSDi	OK	3.73464	0.70151
Egf	chr3:129380	leanveh	dbLSDi	OK	7.45319	0.543476
Lrrc25	chr8:731407	leanveh	dbLSDi	OK	4.09692	15.9848
Wipf3	chr6:544028	leanveh	dbLSDi	OK	9.69686	3.35944
Plekhb1	chr7:107792	leanveh	dbLSDi	OK	11.2837	1.27512

Ubxn10	chr4:1382744	leanveh	dbLSDi	OK	13.9317	4.64523
Samd10	chr2:181329(	leanveh	dbLSDi	OK	12.4863	2.82086
Phospho1	chr11:95685(	leanveh	dbLSDi	OK	14.7639	42.4253
Sh3kbp1	chrX:156065(	leanveh	dbLSDi	OK	9.44984	19.7767
Exoc6	chr19:37624(	leanveh	dbLSDi	OK	14.9345	31.7063
Mboat2	chr12:255164	leanveh	dbLSDi	OK	20.1947	0.892759
Pcyt1a	chr16:32431(	leanveh	dbLSDi	OK	20.9403	39.4736
Fam178a	chr19:45005(	leanveh	dbLSDi	OK	16.4924	7.95543
Rasa3	chr8:1356721	leanveh	dbLSDi	OK	25.8834	46.994
Prdx6	chr1:1631702	leanveh	dbLSDi	OK	173.864	358.111
Lamc2	chr1:154969(	leanveh	dbLSDi	OK	5.93749	1.23998
Snx7	chr3:1174844	leanveh	dbLSDi	OK	10.0525	24.345
Riok3	chr18:122873	leanveh	dbLSDi	OK	39.6625	73.7167
Ankrd44	chr1:547021(	leanveh	dbLSDi	OK	5.91929	12.1954
Adam11	chr11:102622	leanveh	dbLSDi	OK	6.23165	1.31668
Lama3	chr18:124925	leanveh	dbLSDi	OK	1.50965	0.365426
Xylb	chr9:1192664	leanveh	dbLSDi	OK	7.58154	1.678
Ocrl	chrX:452656(	leanveh	dbLSDi	OK	22.6401	10.5178
Zcchc16	chrX:1411234	leanveh	dbLSDi	OK	1.4638	0.0447933
Papss1	chr3:1312277	leanveh	dbLSDi	OK	41.8375	21.049
Lpxn	chr19:12873(	leanveh	dbLSDi	OK	5.68218	30.8414
Stk24	chr14:121685	leanveh	dbLSDi	OK	20.8361	39.9056
Cd37	chr7:524890(	leanveh	dbLSDi	OK	5.43276	22.7843
Cyp2j13	chr4:9570935	leanveh	dbLSDi	OK	5.07669	0.0188309
Gna12	chr5:1412358	leanveh	dbLSDi	OK	25.6453	50.7054
Mef2d	chr3:8794631	leanveh	dbLSDi	OK	20.1989	40.5318
Mrap	chr16:907385	leanveh	dbLSDi	OK	162.263	308.831
Osbpl7	chr11:969121	leanveh	dbLSDi	OK	12.0565	4.97183
Pex6	chr17:468484	leanveh	dbLSDi	OK	29.9344	15.228
Gm8439	chr4:1202613	leanveh	dbLSDi	OK	4.06378	0
Ift122	chr6:1158035	leanveh	dbLSDi	OK	13.4805	4.46722
Mal	chr2:127458(	leanveh	dbLSDi	OK	12.7323	0.926457
H2-Ab1	chr17:344001	leanveh	dbLSDi	OK	292.725	145.606
Fitm2	chr2:1632944	leanveh	dbLSDi	OK	58.851	111.735
Galntl4	chr7:1186151	leanveh	dbLSDi	OK	19.2945	7.429
Myh10	chr11:685054	leanveh	dbLSDi	OK	9.4754	4.54863
Tuba3a	chr6:1252282	leanveh	dbLSDi	OK	58.8989	18.1702
Large	chr8:753384(	leanveh	dbLSDi	OK	6.13146	16.1772
Mtmr6	chr14:60884(	leanveh	dbLSDi	OK	32.2201	58.6814
Gapdh	chr6:125111(	leanveh	dbLSDi	OK	80.1986	148.447
Cbr2	chr11:12059(	leanveh	dbLSDi	OK	25.4935	65.6934

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2.23586	0.0075
1.89424	0.00755
0.944518	0.00755
2.44128	0.00755
-0.961938	0.00755
0.90386	0.00755
1.37491	0.0076
-5.64262	0.0076
-1.46542	0.0076
-2.04598	0.00765
1.40786	0.00765
-1.35309	0.0077
1.36514	0.0077
-1.10097	0.00775
1.11293	0.00775
0.891392	0.0078
0.881166	0.0078
2.01691	0.00785
-2.66731	0.0079
0.977624	0.0079
0.932519	0.0079
1.68459	0.00795
0.920175	0.008
1.16401	0.008
1.16746	0.008
1.34756	0.00805

0.924255	0.00805
0.957346	0.00805
-1.54655	0.0081
1.06818	0.0081
-2.22474	0.00815
-2.12725	0.00815
1.66258	0.0082
2.44618	0.0082
-0.941901	0.0082
-2.0111	0.0082
-1.96982	0.00825
-1.25859	0.00825
1.09007	0.00825
0.890747	0.0083
1.57133	0.0083
-1.05931	0.0083
1.14319	0.0083
1.52249	0.00835
2.49662	0.00835
-1.36315	0.00835
1.02676	0.0084
0.955555	0.0084
0.951296	0.0084
1.14474	0.0084
0.936667	0.00845
0.971	0.00845
0.887748	0.00845
-6.91789	0.00845
-2.0017	0.00855
1.07328	0.00855
0.998765	0.0086
-1.46182	0.0086
-1.87267	0.0086
-1.23737	0.00865
1.5873	0.0087
-5.45145	0.0087
-1.51838	0.00875
1.73469	0.0088
-2.41243	0.0088
-3.77757	0.00885
1.96409	0.00885
-1.52929	0.00885
-3.14553	0.0089

-1.58455	0.00895
-2.14613	0.00895
1.52286	0.00895
1.06544	0.009
1.08612	0.009
-4.49956	0.009
0.914606	0.00905
-1.05179	0.0091
0.86045	0.0091
1.04245	0.0091
-2.25954	0.00915
1.27607	0.00915
0.894216	0.0092
1.04284	0.00925
-2.24271	0.00935
-2.04656	0.00935
-2.17575	0.0094
-1.10604	0.00945
-5.03029	0.00945
-0.991047	0.0095
2.44035	0.00955
0.937504	0.00955
2.06828	0.00955
-8.07464	0.00955
0.983442	0.0096
1.00478	0.0097
0.92848	0.0097
-1.27796	0.00975
-0.975083	0.00975
#NAME?	0.00975
-1.59342	0.0098
-3.78062	0.0098
-1.00748	0.0098
0.924941	0.0098
-1.37695	0.00985
-1.05876	0.00985
-1.69666	0.00985
1.39966	0.0099
0.864942	0.0099
0.888303	0.0099
1.36562	0.0099

GroupID	Category	Term
1_Summary	GO Biological Processes	GO:0048232
1_Member	GO Biological Processes	GO:0048232
1_Member	GO Biological Processes	GO:0007283
1_Member	GO Biological Processes	GO:0007276
1_Member	GO Biological Processes	GO:0007286
1_Member	GO Biological Processes	GO:0048515
1_Member	GO Biological Processes	GO:0007281
1_Member	GO Biological Processes	GO:0022412
2_Summary	GO Biological Processes	GO:0001539
2_Member	GO Biological Processes	GO:0001539
2_Member	GO Biological Processes	GO:0060285
2_Member	GO Biological Processes	GO:0003341
2_Member	GO Biological Processes	GO:0030317
2_Member	GO Biological Processes	GO:0097722
2_Member	GO Biological Processes	GO:0060294
2_Member	GO Biological Processes	GO:0048240
2_Member	GO Biological Processes	GO:0007018
2_Member	GO Biological Processes	GO:0048469
3_Summary	GO Biological Processes	GO:0003351
3_Member	GO Biological Processes	GO:0003351
3_Member	GO Biological Processes	GO:0006858
3_Member	GO Biological Processes	GO:0099111
4_Summary	GO Biological Processes	GO:0001675
4_Member	GO Biological Processes	GO:0001675
4_Member	GO Biological Processes	GO:0010927
4_Member	GO Biological Processes	GO:0033363
5_Summary	GO Biological Processes	GO:0001578
5_Member	GO Biological Processes	GO:0001578
5_Member	GO Biological Processes	GO:0007017
5_Member	GO Biological Processes	GO:0070286
5_Member	GO Biological Processes	GO:0035082
5_Member	GO Biological Processes	GO:0044782
5_Member	GO Biological Processes	GO:0000226
5_Member	GO Biological Processes	GO:0036159
5_Member	GO Biological Processes	GO:0060271
5_Member	GO Biological Processes	GO:0044458
6_Summary	GO Biological Processes	GO:0060632
6_Member	GO Biological Processes	GO:0060632
6_Member	GO Biological Processes	GO:0003352
6_Member	GO Biological Processes	GO:0060287
6_Member	GO Biological Processes	GO:0003356
6_Member	GO Biological Processes	GO:0060295
6_Member	GO Biological Processes	GO:1902019
7_Summary	GO Biological Processes	GO:0009566
7_Member	GO Biological Processes	GO:0009566

7_Member	GO Biological Processes	GO:0007339
7_Member	GO Biological Processes	GO:0007338
7_Member	GO Biological Processes	GO:0007340
8_Summary	Reactome Gene Sets	R-HSA-1247
8_Member	Reactome Gene Sets	R-HSA-1247
8_Member	Reactome Gene Sets	R-HSA-1237
8_Member	Reactome Gene Sets	R-HSA-1480
8_Member	GO Biological Processes	GO:0015701
9_Summary	GO Biological Processes	GO:2000243
9_Member	GO Biological Processes	GO:2000243
10_Summar	GO Biological Processes	GO:0003018
10_Membe	GO Biological Processes	GO:0003018
11_Summar	Reactome Gene Sets	R-HSA-1300
11_Membe	Reactome Gene Sets	R-HSA-1300
11_Membe	Reactome Gene Sets	R-HSA-1187
11_Membe	Reactome Gene Sets	R-HSA-1474
12_Summar	GO Biological Processes	GO:0003044
12_Membe	GO Biological Processes	GO:0003044
12_Membe	GO Biological Processes	GO:0007263
12_Membe	GO Biological Processes	GO:0001990
12_Membe	GO Biological Processes	GO:0061098
12_Membe	GO Biological Processes	GO:0050433
12_Membe	GO Biological Processes	GO:0050886
13_Summar	GO Biological Processes	GO:0006165
13_Membe	GO Biological Processes	GO:0006165
13_Membe	GO Biological Processes	GO:0006096
13_Membe	GO Biological Processes	GO:0006757
13_Membe	GO Biological Processes	GO:0046939
13_Membe	GO Biological Processes	GO:0009135
13_Membe	GO Biological Processes	GO:0009179
13_Membe	KEGG Pathway	hsa00010
13_Membe	GO Biological Processes	GO:0009132
13_Membe	GO Biological Processes	GO:0046031
13_Membe	GO Biological Processes	GO:0009185
13_Membe	Reactome Gene Sets	R-HSA-7017
13_Membe	KEGG Pathway	hsa04066
14_Summar	GO Biological Processes	GO:0007140
14_Membe	GO Biological Processes	GO:0007140
15_Summar	GO Biological Processes	GO:0035640
15_Membe	GO Biological Processes	GO:0035640
16_Summar	KEGG Pathway	hsa00591
16_Membe	KEGG Pathway	hsa00591

Description	LogP	Log(q-value	InTerm_InLi
male gamete generation	-24.27772	-20.016	58/486
male gamete generation	-24.27772	-20.016	58/486
spermatogenesis	-23.3345	-19.374	56/471
gamete generation	-20.67481	-16.890	59/592
spermatid development	-19.45918	-15.799	31/156
spermatid differentiation	-19.03423	-15.471	31/161
germ cell development	-15.51046	-12.027	33/242
cellular process involved in reproduction in multicellular organism	-14.46198	-11.045	37/332
cilium or flagellum-dependent cell motility	-12.55747	-9.250	21/115
cilium or flagellum-dependent cell motility	-12.55747	-9.250	21/115
cilium-dependent cell motility	-12.55747	-9.250	21/115
cilium movement	-10.53946	-7.278	21/145
flagellated sperm motility	-9.013904	-5.831	16/97
sperm motility	-9.013904	-5.831	16/97
cilium movement involved in cell motility	-8.492089	-5.344	16/105
sperm capacitation	-5.303586	-2.364	6/20
microtubule-based movement	-5.227664	-2.308	23/338
cell maturation	-2.089155	0.000	8/121
epithelial cilium movement involved in extracellular fluid movement	-7.179845	-4.064	9/34
epithelial cilium movement involved in extracellular fluid movement	-7.179845	-4.064	9/34
extracellular transport	-6.832	-3.749	9/37
microtubule-based transport	-2.330582	0.000	11/185
acrosome assembly	-6.806991	-3.749	7/19
acrosome assembly	-6.806991	-3.749	7/19
cellular component assembly involved in morphogenesis	-4.125781	-1.279	9/76
secretory granule organization	-3.7287	-0.898	7/51
microtubule bundle formation	-6.597814	-3.566	14/108
microtubule bundle formation	-6.597814	-3.566	14/108
microtubule-based process	-6.148035	-3.141	39/705
axonemal dynein complex assembly	-5.908071	-2.925	8/35
axoneme assembly	-5.672542	-2.712	11/78
cilium organization	-3.320891	-0.521	18/312
microtubule cytoskeleton organization	-3.047519	-0.291	23/472
inner dynein arm assembly	-2.313057	0.000	3/15
cilium assembly	-2.085966	0.000	14/285
motile cilium assembly	-2.08481	0.000	5/53
regulation of microtubule-based movement	-4.424823	-1.525	7/40
regulation of microtubule-based movement	-4.424823	-1.525	7/40
regulation of cilium movement	-4.385519	-1.504	6/28
epithelial cilium movement involved in determination of left/right asy	-2.723036	-0.084	3/11
regulation of cilium beat frequency	-2.313057	0.000	3/15
regulation of cilium movement involved in cell motility	-2.015143	0.000	3/19
regulation of cilium-dependent cell motility	-2.015143	0.000	3/19
fertilization	-4.32391	-1.460	13/147
fertilization	-4.32391	-1.460	13/147

binding of sperm to zona pellucida	-2.229731	0.000	4/31
single fertilization	-2.152748	0.000	8/118
acrosome reaction	-2.015143	0.000	3/19
Erythrocytes take up oxygen and release carbon dioxide	-3.6011	-0.786	3/6
Erythrocytes take up oxygen and release carbon dioxide	-3.6011	-0.786	3/6
Erythrocytes take up carbon dioxide and release oxygen	-3.000912	-0.283	3/9
O2/CO2 exchange in erythrocytes	-3.000912	-0.283	3/9
bicarbonate transport	-2.082191	0.000	3/18
positive regulation of reproductive process	-3.284568	-0.500	7/60
positive regulation of reproductive process	-3.284568	-0.500	7/60
vascular process in circulatory system	-3.126797	-0.356	14/219
vascular process in circulatory system	-3.126797	-0.356	14/219
Sperm Motility And Taxes	-3.000912	-0.283	3/9
Sperm Motility And Taxes	-3.000912	-0.283	3/9
Fertilization	-2.95335	-0.248	4/20
Reproduction	-2.06144	0.000	7/98
regulation of systemic arterial blood pressure mediated by a chemical	-2.93943	-0.246	5/34
regulation of systemic arterial blood pressure mediated by a chemical	-2.93943	-0.246	5/34
nitric oxide mediated signal transduction	-2.605748	0.000	3/12
regulation of systemic arterial blood pressure by hormone	-2.57707	0.000	4/25
positive regulation of protein tyrosine kinase activity	-2.389037	0.000	5/45
regulation of catecholamine secretion	-2.335771	0.000	4/29
endocrine process	-2.040688	0.000	4/35
nucleoside diphosphate phosphorylation	-2.816615	-0.135	6/53
nucleoside diphosphate phosphorylation	-2.816615	-0.135	6/53
glycolytic process	-2.769683	-0.110	5/37
ATP generation from ADP	-2.769683	-0.110	5/37
nucleotide phosphorylation	-2.732471	-0.084	6/55
purine nucleoside diphosphate metabolic process	-2.652107	-0.034	6/57
purine ribonucleoside diphosphate metabolic process	-2.652107	-0.034	6/57
Glycolysis / Gluconeogenesis	-2.538056	0.000	6/60
nucleoside diphosphate metabolic process	-2.454065	0.000	7/83
ADP metabolic process	-2.389037	0.000	5/45
ribonucleoside diphosphate metabolic process	-2.29831	0.000	6/67
Glycolysis	-2.235744	0.000	6/69
HIF-1 signaling pathway	-2.01536	0.000	7/100
male meiotic nuclear division	-2.191619	0.000	5/50
male meiotic nuclear division	-2.191619	0.000	5/50
exploration behavior	-2.153777	0.000	3/17
exploration behavior	-2.153777	0.000	3/17
Linoleic acid metabolism	-2.015143	0.000	3/19
Linoleic acid metabolism	-2.015143	0.000	3/19

Genes	Symbols
480,676,16	ATP1A4,BRDT,ACE,GALNT3,HSPA2,LIMK2,ODF2,CLDN11,PGAM2,SPAG4,SLC22A14,SY
480,676,16	ATP1A4,BRDT,ACE,GALNT3,HSPA2,LIMK2,ODF2,CLDN11,PGAM2,SPAG4,SLC22A14,SY
480,676,16	ATP1A4,BRDT,ACE,GALNT3,HSPA2,LIMK2,ODF2,CLDN11,PGAM2,SPAG4,SLC22A14,TC
480,676,16	ATP1A4,BRDT,ACE,GALNT3,HSPA2,LIMK2,NOS3,ODF2,CLDN11,PGAM2,SPAG4,SLC22A
676,3306,4	BRDT,HSPA2,ODF2,SLC22A14,SOX30,OSBP2,DNAH1,CHD5,CABYR,HOOK1,CFAP44,RN
676,3306,4	BRDT,HSPA2,ODF2,SLC22A14,SOX30,OSBP2,DNAH1,CHD5,CABYR,HOOK1,CFAP44,RN
676,3306,4	BRDT,HSPA2,ODF2,SLC22A14,SOX30,OSBP2,DNAH1,CHD5,CABYR,YBX2,HOOK1,PIWIL
676,3306,4	BRDT,HSPA2,ODF2,SLC22A14,SYCP2,SOX30,OSBP2,DNAH1,CHD5,CABYR,YBX2,HOOK1
480,1769,9	ATP1A4,DNAH8,SLC22A14,CFAP45,DNAH1,TEKT2,CCDC40,CFAP44,CFAP69,EFHC2,RO
480,1769,9	ATP1A4,DNAH8,SLC22A14,CFAP45,DNAH1,TEKT2,CCDC40,CFAP44,CFAP69,EFHC2,RO
480,1769,9	ATP1A4,DNAH8,SLC22A14,CFAP45,DNAH1,TEKT2,CCDC40,CFAP44,CFAP69,EFHC2,RO
480,9389,2	ATP1A4,SLC22A14,CFAP45,DNAH1,CABYR,TEKT2,SPA17,CCDC40,KIF27,CFAP44,ADCY
480,9389,2	ATP1A4,SLC22A14,CFAP45,DNAH1,TEKT2,CCDC40,CFAP44,CFAP69,ROPN1L,TTC21A,E
480,9389,2	ATP1A4,SLC22A14,CFAP45,DNAH1,TEKT2,CCDC40,CFAP44,CFAP69,ROPN1L,TTC21A,E
480,9389,2	ATP1A4,SLC22A14,CFAP45,DNAH1,TEKT2,CCDC40,CFAP44,CFAP69,ROPN1L,TTC21A,E
9389,26256	SLC22A14,CABYR,ROPN1L,CATSPERD,EFCAB9,CATSPER3
480,1769,9	ATP1A4,DNAH8,SLC22A14,CFAP45,DNAH1,CABYR,TEKT2,SPA17,CCDC40,KIF27,CFAP4
7422,9389,2	VEGFA,SLC22A14,CABYR,ROPN1L,PLD6,CATSPERD,EFCAB9,CATSPER3
25790,2598	CFAP45,DNAH1,CABYR,SPA17,CCDC40,KIF27,ADCY10,ODAD4,ROPN1L,LCA5L,TTC21A
25790,2598	CFAP45,DNAH1,CABYR,SPA17,CCDC40,KIF27,ADCY10,ODAD4,ROPN1L
25790,2598	CFAP45,DNAH1,CABYR,SPA17,CCDC40,KIF27,ADCY10,ODAD4,ROPN1L
25790,2598	CFAP45,DNAH1,CABYR,SPA17,CCDC40,KIF27,ADCY10,ODAD4,ROPN1L,LCA5L,TTC21A
11063,6475	SOX30,CCDC136,SPACA1,ACRBP,ZPBP2,GARIN1A,FABP9,GPC1,TPPP
11063,6475	SOX30,CCDC136,SPACA1,ACRBP,ZPBP2,GARIN1A,FABP9
2817,11063	GPC1,SOX30,TPPP,CCDC136,SPACA1,ACRBP,ZPBP2,GARIN1A,FABP9
11063,6475	SOX30,CCDC136,SPACA1,ACRBP,ZPBP2,GARIN1A,FABP9
1769,4133,1	DNAH8,MAP2,TPPP,DNAH1,TEKT2,CCDC40,CFAP44,CFAP69,ODAD4,CCDC65,RSPH1,D
1769,4133,1	DNAH8,MAP2,TPPP,DNAH1,TEKT2,CCDC40,CFAP44,CFAP69,ODAD4,CCDC65,RSPH1,D
480,1769,3	ATP1A4,DNAH8,LIMK2,MAP2,ODF2,MAP7,SLC22A14,TPPP,CFAP45,DNAH1,CABYR,TE
1769,25981	DNAH8,DNAH1,TEKT2,CCDC40,ODAD4,CCDC65,DRC1,DNAAF3
1769,25981	DNAH8,DNAH1,TEKT2,CCDC40,CFAP44,CFAP69,ODAD4,CCDC65,RSPH1,DRC1,DNAAF
1769,4957,2	DNAH8,ODF2,DNAH1,TEKT2,CCDC40,KIF27,CFAP44,CFAP69,ODAD4,CCDC65,RSPH1,D
1769,3985,4	DNAH8,LIMK2,MAP2,ODF2,MAP7,TPPP,DNAH1,TEKT2,HOOK1,ULK4,CCDC40,TRIM36
25981,2728	DNAH1,TEKT2,CCDC40
1769,25981	DNAH8,DNAH1,TEKT2,CCDC40,KIF27,CFAP44,CFAP69,ODAD4,CCDC65,RSPH1,DRC1,U
25981,5503	DNAH1,CCDC40,CFAP44,CFAP69,DNAAF3
4133,25790	MAP2,CFAP45,CCDC40,CFAP69,CCDC65,DRC1,TTLL6,ODAD4
4133,25790	MAP2,CFAP45,CCDC40,CFAP69,CCDC65,DRC1,TTLL6
25790,5503	CFAP45,CCDC40,CFAP69,CCDC65,DRC1,TTLL6
25790,5503	CFAP45,CCDC40,ODAD4
25790,5503	CFAP45,CCDC40,TTLL6
25790,7984	CFAP45,CFAP69,TTLL6
25790,7984	CFAP45,CFAP69,TTLL6
49,480,330	ACR,ATP1A4,HSPA1L,SYCP2,SPA17,EQTN,CCDC87,TRIM36,CCDC136,ACRBP,ZPBP2,TS
49,480,330	ACR,ATP1A4,HSPA1L,SYCP2,SPA17,EQTN,CCDC87,TRIM36,CCDC136,ACRBP,ZPBP2,TS

49,3305,533 ACR,HSPA1L,SPA17,ZPBP2
49,3305,533 ACR,HSPA1L,SPA17,EQTN,CCDC87,TRIM36,CCDC136,ZPBP2
49,54586,55 ACR,EQTN,TRIM36
762,3043,65 CA4,HBB,SLC4A1,BEST1
762,3043,65 CA4,HBB,SLC4A1
762,3043,65 CA4,HBB,SLC4A1
762,3043,65 CA4,HBB,SLC4A1
762,6521,74 CA4,SLC4A1,BEST1
5021,7422,5 OXTR,VEGFA,PIWIL2,CCDC87,RETN,CFAP69,PLB1
5021,7422,5 OXTR,VEGFA,PIWIL2,CCDC87,RETN,CFAP69,PLB1
183,480,489 AGT,ATP1A4,ATP2A3,COMP,ACE,KCNJ8,NOS3,OXTR,SLC2A3,SLC6A13,VEGFA,SLC16A
183,480,489 AGT,ATP1A4,ATP2A3,COMP,ACE,KCNJ8,NOS3,OXTR,SLC2A3,SLC6A13,VEGFA,SLC16A
157855,257 KCNU1,CATSPERD,CATSPER3,ACR,HSPA2,SYCP2,STAG3
157855,257 KCNU1,CATSPERD,CATSPER3
49,157855,2 ACR,KCNU1,CATSPERD,CATSPER3
49,3306,103 ACR,HSPA2,SYCP2,STAG3,KCNU1,CATSPERD,CATSPER3
183,1636,48 AGT,ACE,NOS3,OXTR,SLC2A5,RASD1,NEDD9,UNC119,SRCIN1,ABAT,SYT12
183,1636,48 AGT,ACE,NOS3,OXTR,SLC2A5
183,4846,51 AGT,NOS3,RASD1
183,1636,48 AGT,ACE,NOS3,OXTR
183,1636,47 AGT,ACE,NEDD9,UNC119,SRCIN1
18,183,5021 ABAT,AGT,OXTR,SYT12
183,1636,48 AGT,ACE,NOS3,OXTR
669,3098,52 BPGM,HK1,PFKL,PGAM2,AK8,ENO4,NUDT18,ALDH3B2,NUP210,PGP,NOS3,SERPINE1,
669,3098,52 BPGM,HK1,PFKL,PGAM2,AK8,ENO4
669,3098,52 BPGM,HK1,PFKL,PGAM2,ENO4
669,3098,52 BPGM,HK1,PFKL,PGAM2,ENO4
669,3098,52 BPGM,HK1,PFKL,PGAM2,AK8,ENO4
669,3098,52 BPGM,HK1,PFKL,PGAM2,NUDT18,ENO4
669,3098,52 BPGM,HK1,PFKL,PGAM2,NUDT18,ENO4
222,669,309 ALDH3B2,BPGM,HK1,PFKL,PGAM2,ENO4
669,3098,52 BPGM,HK1,PFKL,PGAM2,NUDT18,AK8,ENO4
669,3098,52 BPGM,HK1,PFKL,PGAM2,ENO4
669,3098,52 BPGM,HK1,PFKL,PGAM2,NUDT18,ENO4
669,3098,52 BPGM,HK1,PFKL,PGAM2,NUP210,PGP
3098,4846,5 HK1,NOS3,SERPINE1,PFKL,VEGFA,VHL,ENO4
676,3306,10 BRDT,HSPA2,SYCP2,TEX14,SHCBP1L
676,3306,10 BRDT,HSPA2,SYCP2,TEX14,SHCBP1L
18,5581,107 ABAT,PRKCE,CHL1
18,5581,107 ABAT,PRKCE,CHL1
1557,5322,1 CYP2C19,PLA2G5,PLB1
1557,5322,1 CYP2C19,PLA2G5,PLB1

YCP2,TCFL5,SOX30,OSBP2,DNAH1,CHD5,CABYR,YBX2,HOOK1,OAZ3,SPA17,PIWIL2,CCDC87,CFAP4
YCP2,TCFL5,SOX30,OSBP2,DNAH1,CHD5,CABYR,YBX2,HOOK1,OAZ3,SPA17,PIWIL2,CCDC87,CFAP4
CFL5,SOX30,OSBP2,DNAH1,CHD5,CABYR,YBX2,HOOK1,OAZ3,SPA17,PIWIL2,CCDC87,CFAP44,ADCY
A14,SYCP2,TCFL5,SOX30,OSBP2,DNAH1,CHD5,CABYR,YBX2,HOOK1,OAZ3,SPA17,PIWIL2,CCDC87,C
NF17,CCDC136,CFAP69,SPACA1,ROPN1L,TSSK1B,ACRBP,RSPH1,ZPBP2,PACRG,CCDC42,TTC21A,PLD
NF17,CCDC136,CFAP69,SPACA1,ROPN1L,TSSK1B,ACRBP,RSPH1,ZPBP2,PACRG,CCDC42,TTC21A,PLD
L2,CFAP44,RNF17,CCDC136,CFAP69,SPACA1,ROPN1L,TSSK1B,ACRBP,RSPH1,ZPBP2,PACRG,CCDC4
1,EQTN,PIWIL2,CFAP44,TEX14,RNF17,CCDC136,CFAP69,SHCBP1L,SPACA1,ROPN1L,TSSK1B,ACRBP
OPN1L,CCDC65,DRC1,EFHC1,TTC21A,ENKUR,CATSPERD,TSSK4,EFCAB9,CATSPER3,ENO4,CABYR,SPA
OPN1L,CCDC65,DRC1,EFHC1,TTC21A,ENKUR,CATSPERD,TSSK4,EFCAB9,CATSPER3,ENO4
OPN1L,CCDC65,DRC1,EFHC1,TTC21A,ENKUR,CATSPERD,TSSK4,EFCAB9,CATSPER3,ENO4
'10,CFAP69,ODAD4,ROPN1L,TTC21A,ENKUR,CATSPERD,TSSK4,EFCAB9,CATSPER3,ENO4
ENKUR,CATSPERD,TSSK4,EFCAB9,CATSPER3,ENO4
ENKUR,CATSPERD,TSSK4,EFCAB9,CATSPER3,ENO4
ENKUR,CATSPERD,TSSK4,EFCAB9,CATSPER3,ENO4

44,ADCY10,CFAP69,ODAD4,ROPN1L,LCA5L,TTC21A,ENKUR,CATSPERD,TSSK4,EFCAB9,CATSPER3,EN

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DRC1,TTLL6,DNAAF3,ATP1A4,LIMK2,ODF2,MAP7,SLC22A14,CFAP45,CABYR,HOOK1,SPA17,ULK4,TF
DRC1,TTLL6,DNAAF3
EKT2,HOOK1,SPA17,ULK4,CCDC40,TRIM36,KIF27,CFAP44,ADCY10,CLIP4,CFAP69,EFHC2,ODAD4,RC

:3
DRC1,UBXN10,LCA5L,TTC21A,CCDC96,DNAAF3,ENO4
5,CFAP44,CLIP4,CFAP69,EFHC2,ODAD4,CCDC65,RSPH1,DRC1,EFHC1,TTLL6,DNAAF3

JBXN10,CCDC96,DNAAF3

SSK4,KLHL10
SSK4,KLHL10

.7,PTP4A3,PLVAP
.7,PTP4A3,PLVAP

,VEGFA,VHL

4,ADCY10,TEX14,RNF17,CCDC136,CFAP69,SHCBP1L,SPACA1,PMFBP1,ROPN1L,SPATA9,TSSK1B,MY
4,ADCY10,TEX14,RNF17,CCDC136,CFAP69,SHCBP1L,SPACA1,PMFBP1,ROPN1L,SPATA9,TSSK1B,MY
'10,RNF17,CCDC136,CFAP69,SHCBP1L,SPACA1,PMFBP1,ROPN1L,SPATA9,TSSK1B,MYCBPAP,ACRBF
CFAP44,ADCY10,TEX14,RNF17,CCDC136,CFAP69,SHCBP1L,SPACA1,PMFBP1,ROPN1L,SPATA9,TSSK
)6,CATSPERD,TSSK4,EFCAB9,KLHL10,GARIN1A,CATSPER3,FABP9
)6,CATSPERD,TSSK4,EFCAB9,KLHL10,GARIN1A,CATSPER3,FABP9
2,TTC21A,PLD6,CATSPERD,TSSK4,EFCAB9,KLHL10,GARIN1A,CATSPER3,FABP9
',RSPH1,ZPBP2,PACRG,CCDC42,TTC21A,PLD6,CATSPERD,TSSK4,EFCAB9,KLHL10,GARIN1A,CATSPEF
A17,KIF27,ADCY10,ODAD4,LCA5L,VEGFA,PLD6

NO4

RIM36,KIF27,ADCY10,CLIP4,EFHC2,ROPN1L,EFHC1,LCA5L,TTC21A,ENKUR,CATSPERD,TSSK4,EFCAB

)PN1L,CCDC65,RSPH1,DRC1,EFHC1,LCA5L,TTC21A,ENKUR,CATSPERD,TSSK4,TTLL6,EFCAB9,CATSPE

/CBPAP,ACRBP,RSPH1,ZPBP2,PACRG,PSMA8,CCDC42,CREB3L4,TTC21A,GGN,PLD6,SPATA24,TBATA
/CBPAP,ACRBP,RSPH1,ZPBP2,PACRG,PSMA8,CCDC42,CREB3L4,TTC21A,GGN,PLD6,SPATA24,TBATA
P,RSPH1,ZPBP2,PACRG,PSMA8,CCDC42,CREB3L4,TTC21A,GGN,PLD6,SPATA24,TBATA,CATSPERD,T
:1B,MYCBPAP,ACRBP,RSPH1,ZPBP2,PACRG,PSMA8,CCDC42,CREB3L4,TTC21A,GGN,PLD6,SPATA24,

R3,FABP9

9,CATSPER3,ENO4,UBXN10,CCDC96

ER3,DNAAF3,ENO4

ᴬ,CATSPERD,TSSK4,EFCAB9,KLHL10,GARIN1A,CATSPER3,C3orf62,FAM209B,FABP9,NOS3,EQTN
ᴬ,CATSPERD,TSSK4,EFCAB9,KLHL10,GARIN1A,CATSPER3,C3orf62,FAM209B,FABP9
ˈSSK4,EFCAB9,KLHL10,GARIN1A,CATSPER3,C3orf62,FAM209B,FABP9
,TBATA,CATSPERD,TSSK4,EFCAB9,KLHL10,GARIN1A,CATSPER3,C3orf62,FAM209B,FABP9

GroupID	Category	Term
1_Summary	Reactome Gene Sets	R-HSA-1474
1_Member	Reactome Gene Sets	R-HSA-1474
1_Member	Reactome Gene Sets	R-HSA-2160
1_Member	GO Biological Processes	GO:0030198
1_Member	GO Biological Processes	GO:0045229
1_Member	GO Biological Processes	GO:0043062
1_Member	Reactome Gene Sets	R-HSA-1474
1_Member	Reactome Gene Sets	R-HSA-1442
1_Member	Reactome Gene Sets	R-HSA-3000
1_Member	Reactome Gene Sets	R-HSA-3000
1_Member	GO Biological Processes	GO:0030199
1_Member	Reactome Gene Sets	R-HSA-8948
1_Member	Reactome Gene Sets	R-HSA-2022
1_Member	Reactome Gene Sets	R-HSA-1650
1_Member	Reactome Gene Sets	R-HSA-3000
1_Member	Reactome Gene Sets	R-HSA-1474
1_Member	GO Biological Processes	GO:0097435
1_Member	KEGG Pathway	hsa04974
1_Member	Reactome Gene Sets	R-HSA-8875
1_Member	Reactome Gene Sets	R-HSA-8874
1_Member	Reactome Gene Sets	R-HSA-6806
1_Member	Reactome Gene Sets	R-HSA-1867
1_Member	GO Biological Processes	GO:0043588
1_Member	Reactome Gene Sets	R-HSA-4190
1_Member	Reactome Gene Sets	R-HSA-3751
1_Member	GO Biological Processes	GO:0071230
2_Summary	GO Biological Processes	GO:0006954
2_Member	GO Biological Processes	GO:0006954
2_Member	GO Biological Processes	GO:0001819
2_Member	GO Biological Processes	GO:0010942
3_Summary	Reactome Gene Sets	R-HSA-3814
3_Member	Reactome Gene Sets	R-HSA-3814
3_Member	Reactome Gene Sets	R-HSA-8957
4_Summary	KEGG Pathway	hsa04610
4_Member	KEGG Pathway	hsa04610
4_Member	KEGG Pathway	hsa05150
4_Member	GO Biological Processes	GO:0010575
4_Member	GO Biological Processes	GO:1905521
4_Member	GO Biological Processes	GO:0010574
4_Member	Reactome Gene Sets	R-HSA-1666
4_Member	Reactome Gene Sets	R-HSA-3752
4_Member	GO Biological Processes	GO:1902624
4_Member	GO Biological Processes	GO:1905523
4_Member	Reactome Gene Sets	R-HSA-9776
4_Member	GO Biological Processes	GO:0032494

4_Member	KEGG Pathway	hsa04936
4_Member	GO Biological Processes	GO:000268
4_Member	GO Biological Processes	GO:000268
4_Member	Reactome Gene Sets	R-HSA-5007
4_Member	GO Biological Processes	GO:009002
4_Member	GO Biological Processes	GO:190262
5_Summary	Reactome Gene Sets	R-HSA-6798
5_Member	Reactome Gene Sets	R-HSA-6798
6_Summary	Reactome Gene Sets	R-HSA-1146
6_Member	Reactome Gene Sets	R-HSA-1146
6_Member	Reactome Gene Sets	R-HSA-1095
6_Member	Reactome Gene Sets	R-HSA-7600
6_Member	GO Biological Processes	GO:000961
6_Member	GO Biological Processes	GO:000759
6_Member	GO Biological Processes	GO:005081
6_Member	GO Biological Processes	GO:004206
6_Member	GO Biological Processes	GO:000759
6_Member	Reactome Gene Sets	R-HSA-7600
6_Member	GO Biological Processes	GO:005087
6_Member	GO Biological Processes	GO:003019
6_Member	GO Biological Processes	GO:003019
6_Member	GO Biological Processes	GO:190004
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6_Member	GO Biological Processes	GO:005081
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6_Member	GO Biological Processes	GO:190303
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6_Member	GO Biological Processes	GO:005191
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6_Member	GO Biological Processes	GO:190004
6_Member	GO Biological Processes	GO:005082
6_Member	Reactome Gene Sets	R-HSA-7520
6_Member	GO Biological Processes	GO:190303
6_Member	GO Biological Processes	GO:009030
6_Member	GO Biological Processes	GO:200004
7_Summary	GO Biological Processes	GO:003015
7_Member	GO Biological Processes	GO:003015
7_Member	GO Biological Processes	GO:004578
7_Member	GO Biological Processes	GO:001081
7_Member	GO Biological Processes	GO:001081
7_Member	GO Biological Processes	GO:006028
7_Member	GO Biological Processes	GO:002260

8_Summary	GO Biological Processes	GO:0008202
8_Member	GO Biological Processes	GO:0008202
8_Member	GO Biological Processes	GO:1901615
8_Member	GO Biological Processes	GO:0016125
8_Member	GO Biological Processes	GO:0008203
8_Member	GO Biological Processes	GO:1902652
8_Member	GO Biological Processes	GO:0006066
8_Member	GO Biological Processes	GO:0006694
9_Summary	GO Biological Processes	GO:0002683
9_Member	GO Biological Processes	GO:0002683
9_Member	GO Biological Processes	GO:0032103
9_Member	GO Biological Processes	GO:0007162
9_Member	GO Biological Processes	GO:0031341
9_Member	GO Biological Processes	GO:0002697
9_Member	GO Biological Processes	GO:0031343
9_Member	GO Biological Processes	GO:0031349
9_Member	GO Biological Processes	GO:0002833
9_Member	GO Biological Processes	GO:0001910
9_Member	GO Biological Processes	GO:0001912
9_Member	GO Biological Processes	GO:0002703
9_Member	GO Biological Processes	GO:0002699
9_Member	GO Biological Processes	GO:0022407
9_Member	GO Biological Processes	GO:0050777
9_Member	GO Biological Processes	GO:0045089
9_Member	GO Biological Processes	GO:0002705
9_Member	GO Biological Processes	GO:0045088
9_Member	GO Biological Processes	GO:0050865
9_Member	GO Biological Processes	GO:0002698
9_Member	GO Biological Processes	GO:0050866
9_Member	GO Biological Processes	GO:0002831
9_Member	GO Biological Processes	GO:0002704
9_Member	GO Biological Processes	GO:0022409
9_Member	GO Biological Processes	GO:0022408
9_Member	GO Biological Processes	GO:0002706
9_Member	GO Biological Processes	GO:0002710
9_Member	GO Biological Processes	GO:0002694
9_Member	GO Biological Processes	GO:0002695
9_Member	GO Biological Processes	GO:0032703
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9_Member	GO Biological Processes	GO:0002696
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9_Member	GO Biological Processes	GO:0002707
9_Member	GO Biological Processes	GO:1903037
9_Member	GO Biological Processes	GO:0032689
9_Member	GO Biological Processes	GO:0002820
9_Member	GO Biological Processes	GO:0051251

10_Summar	GO Biological Processes	GO:0001775
10_Membe	GO Biological Processes	GO:0001775
10_Membe	GO Biological Processes	GO:0002274
10_Membe	GO Biological Processes	GO:0045321
10_Membe	GO Biological Processes	GO:0002252
10_Membe	GO Biological Processes	GO:0002366
10_Membe	GO Biological Processes	GO:0002263
10_Membe	GO Biological Processes	GO:0002275
10_Membe	GO Biological Processes	GO:0002521
10_Membe	GO Biological Processes	GO:0046649
10_Membe	GO Biological Processes	GO:0030097
10_Membe	GO Biological Processes	GO:1903131
10_Membe	GO Biological Processes	GO:0002520
10_Membe	GO Biological Processes	GO:0048534
10_Membe	GO Biological Processes	GO:0042110
10_Membe	GO Biological Processes	GO:0002285
10_Membe	GO Biological Processes	GO:0030217
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11_Summar	GO Biological Processes	GO:1905952
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11_Membe	GO Biological Processes	GO:0032368
11_Membe	GO Biological Processes	GO:1905954
11_Membe	GO Biological Processes	GO:0032370
11_Membe	GO Biological Processes	GO:0032371
11_Membe	GO Biological Processes	GO:0032374
11_Membe	Reactome Gene Sets	R-HSA-5568
11_Membe	GO Biological Processes	GO:0032373
11_Membe	GO Biological Processes	GO:0032376
11_Membe	Reactome Gene Sets	R-HSA-1989
11_Membe	Reactome Gene Sets	R-HSA-4002
12_Summar	GO Biological Processes	GO:0051346
12_Membe	GO Biological Processes	GO:0051346
12_Membe	GO Biological Processes	GO:0010951
12_Membe	GO Biological Processes	GO:0006953
12_Membe	GO Biological Processes	GO:0010466
12_Membe	GO Biological Processes	GO:0045861
12_Membe	GO Biological Processes	GO:0002526
12_Membe	GO Biological Processes	GO:0052547
12_Membe	GO Biological Processes	GO:0052548
12_Membe	GO Biological Processes	GO:0030162
12_Membe	GO Biological Processes	GO:0043086
13_Summar	GO Biological Processes	GO:0050778
13_Membe	GO Biological Processes	GO:0050778
13_Membe	GO Biological Processes	GO:0002764
13_Membe	GO Biological Processes	GO:0002768
13_Membe	GO Biological Processes	GO:0030595

13_Member	GO Biological Processes	GO:0050900
13_Member	GO Biological Processes	GO:0002253
13_Member	GO Biological Processes	GO:0006935
13_Member	GO Biological Processes	GO:0042330
13_Member	GO Biological Processes	GO:0002429
13_Member	GO Biological Processes	GO:0002757
13_Member	GO Biological Processes	GO:0060326
13_Member	GO Biological Processes	GO:0097529
13_Member	GO Biological Processes	GO:0030593
13_Member	GO Biological Processes	GO:0071621
13_Member	GO Biological Processes	GO:1990266
13_Member	GO Biological Processes	GO:0097530
14_Summar	GO Biological Processes	GO:1901605
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14_Member	GO Biological Processes	GO:0009072
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14_Member	GO Biological Processes	GO:0006558
14_Member	GO Biological Processes	GO:0006559
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14_Member	GO Biological Processes	GO:1902222
14_Member	GO Biological Processes	GO:0016054
14_Member	GO Biological Processes	GO:1901606
14_Member	GO Biological Processes	GO:0009063
14_Member	GO Biological Processes	GO:0044282
14_Member	Reactome Gene Sets	R-HSA-8963
14_Member	Reactome Gene Sets	R-HSA-8963
14_Member	GO Biological Processes	GO:0006572
14_Member	Reactome Gene Sets	R-HSA-7129
14_Member	KEGG Pathway	hsa00360
15_Summar	GO Biological Processes	GO:0120254
15_Member	GO Biological Processes	GO:0120254
15_Member	Reactome Gene Sets	R-HSA-2118
15_Member	GO Biological Processes	GO:0019373
15_Member	Reactome Gene Sets	R-HSA-2142
15_Member	GO Biological Processes	GO:0006690
15_Member	Reactome Gene Sets	R-HSA-2119
15_Member	KEGG Pathway	hsa05204
15_Member	Reactome Gene Sets	R-HSA-2118
15_Member	GO Biological Processes	GO:0001676
15_Member	GO Biological Processes	GO:0006805
15_Member	GO Biological Processes	GO:0033559
15_Member	GO Biological Processes	GO:0019369
15_Member	Reactome Gene Sets	R-HSA-2119

15_Member	Reactome Gene Sets	R-HSA-2142
15_Member	KEGG Pathway	hsa00982
15_Member	GO Biological Processes	GO:003278
15_Member	GO Biological Processes	GO:009726
15_Member	Reactome Gene Sets	R-HSA-8978
15_Member	GO Biological Processes	GO:007146
15_Member	GO Biological Processes	GO:000941
15_Member	KEGG Pathway	hsa00980
15_Member	Reactome Gene Sets	R-HSA-2119
15_Member	GO Biological Processes	GO:004217
15_Member	GO Biological Processes	GO:000663
16_Summar	GO Biological Processes	GO:000716
16_Member	GO Biological Processes	GO:000716
16_Member	GO Biological Processes	GO:000722
16_Member	GO Biological Processes	GO:003158
16_Member	GO Biological Processes	GO:003362
16_Member	GO Biological Processes	GO:003411
16_Member	KEGG Pathway	hsa04514
16_Member	KEGG Pathway	hsa04810
17_Summar	GO Biological Processes	GO:009860
17_Member	GO Biological Processes	GO:009860
17_Member	GO Biological Processes	GO:009874
18_Summar	GO Biological Processes	GO:003210
18_Member	GO Biological Processes	GO:003210
18_Member	GO Biological Processes	GO:003134
18_Member	GO Biological Processes	GO:005072
18_Member	GO Biological Processes	GO:003134
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19_Summar	Reactome Gene Sets	R-HSA-1989
19_Member	Reactome Gene Sets	R-HSA-1989
19_Member	Reactome Gene Sets	R-HSA-1280
20_Summar	Reactome Gene Sets	R-HSA-3000
20_Member	Reactome Gene Sets	R-HSA-3000
20_Member	Reactome Gene Sets	R-HSA-2173
20_Member	Reactome Gene Sets	R-HSA-2168

Description	LogP	Log(q-value	InTerm_InLi
Extracellular matrix organization	-27.34334	-23.081	47/240
Extracellular matrix organization	-27.34334	-23.081	47/240
Integrin cell surface interactions	-18.35969	-14.399	23/74
extracellular matrix organization	-14.56811	-11.025	31/208
external encapsulating structure organization	-14.56811	-11.025	31/208
extracellular structure organization	-14.50861	-11.025	31/209
Degradation of the extracellular matrix	-12.85329	-9.591	21/102
Collagen degradation	-11.7621	-8.579	15/51
ECM proteoglycans	-11.6544	-8.506	16/61
Syndecan interactions	-10.76153	-7.646	11/26
collagen fibril organization	-10.69141	-7.606	14/50
Collagen chain trimerization	-9.274168	-6.427	11/34
Assembly of collagen fibrils and other multimeric structures	-9.178202	-6.408	13/53
Collagen biosynthesis and modifying enzymes	-9.06881	-6.312	13/54
Non-integrin membrane-ECM interactions	-8.961914	-6.232	13/55
Collagen formation	-8.092764	-5.422	14/76
supramolecular fiber organization	-7.539929	-4.941	33/431
Protein digestion and absorption	-6.519563	-4.177	12/72
MET promotes cell motility	-5.318678	-3.247	8/38
MET activates PTK2 signaling	-5.249844	-3.184	7/28
Signaling by MET	-4.58484	-2.630	10/76
Signaling by PDGF	-3.277768	-1.618	7/55
skin development	-3.106008	-1.479	12/156
NCAM1 interactions	-2.947504	-1.356	5/31
NCAM signaling for neurite out-growth	-2.062796	-0.667	5/49
cellular response to amino acid stimulus	-2.045706	-0.656	6/69
inflammatory response	-15.27877	-11.494	43/386
inflammatory response	-15.27877	-11.494	43/386
positive regulation of cytokine production	-5.75266	-3.591	26/352
positive regulation of cell death	-2.161051	-0.747	22/477
Regulation of Insulin-like Growth Factor (IGF) transport and uptake by	-14.27455	-10.864	22/98
Regulation of Insulin-like Growth Factor (IGF) transport and uptake by	-14.27455	-10.864	22/98
Post-translational protein phosphorylation	-14.22236	-10.864	21/88
Complement and coagulation cascades	-14.16394	-10.856	19/69
Complement and coagulation cascades	-14.16394	-10.856	19/69
Staphylococcus aureus infection	-5.633149	-3.495	9/46
positive regulation of vascular endothelial growth factor production	-3.673763	-1.928	5/22
regulation of macrophage migration	-3.66554	-1.922	6/34
regulation of vascular endothelial growth factor production	-3.396808	-1.704	5/25
Complement cascade	-3.150422	-1.516	6/42
Peptide ligand-binding receptors	-2.887535	-1.314	8/82
positive regulation of neutrophil migration	-2.721454	-1.194	4/21
positive regulation of macrophage migration	-2.721454	-1.194	4/21
Regulation of Complement cascade	-2.647541	-1.132	5/36
response to peptidoglycan	-2.607819	-1.103	3/11

Alcoholic liver disease	-2.510343	-1.020	9/115
regulation of leukocyte migration	-2.364178	-0.909	11/167
positive regulation of leukocyte migration	-2.144997	-0.733	8/108
GPCR ligand binding	-2.126421	-0.717	12/205
positive regulation of neutrophil chemotaxis	-2.043029	-0.656	3/17
regulation of neutrophil migration	-2.040183	-0.656	4/32
Neutrophil degranulation	-12.37954	-9.159	40/408
Neutrophil degranulation	-12.37954	-9.159	40/408
Platelet degranulation	-10.48273	-7.425	20/120
Platelet degranulation	-10.48273	-7.425	20/120
Hemostasis	-10.37723	-7.346	42/514
Response to elevated platelet cytosolic Ca2+	-10.14888	-7.167	20/125
response to wounding	-10.12773	-7.167	34/360
blood coagulation	-9.618561	-6.718	21/148
coagulation	-9.618561	-6.718	21/148
wound healing	-9.572692	-6.691	29/282
hemostasis	-9.398719	-6.535	21/152
Platelet activation, signaling and aggregation	-9.20078	-6.408	26/238
regulation of body fluid levels	-9.178721	-6.408	29/293
negative regulation of blood coagulation	-7.389855	-4.809	10/39
regulation of blood coagulation	-7.353197	-4.790	12/61
negative regulation of hemostasis	-7.274986	-4.740	10/40
regulation of hemostasis	-7.269943	-4.740	12/62
negative regulation of coagulation	-7.163633	-4.650	10/41
regulation of coagulation	-7.108329	-4.625	12/64
regulation of response to wounding	-7.013907	-4.537	17/137
negative regulation of response to wounding	-6.730346	-4.301	12/69
regulation of wound healing	-6.695759	-4.287	15/112
negative regulation of wound healing	-6.616441	-4.241	11/58
fibrinolysis	-6.125432	-3.880	6/14
negative regulation of fibrinolysis	-4.900786	-2.872	5/13
regulation of fibrinolysis	-4.398105	-2.502	5/16
positive regulation of blood coagulation	-4.256186	-2.394	6/27
positive regulation of hemostasis	-4.256186	-2.394	6/27
positive regulation of coagulation	-4.160998	-2.324	6/28
Dissolution of Fibrin Clot	-3.723424	-1.969	4/12
positive regulation of response to wounding	-3.570395	-1.839	8/65
positive regulation of wound healing	-3.327236	-1.656	7/54
regulation of cell-cell adhesion mediated by cadherin	-2.043029	-0.656	3/17
regulation of cell adhesion	-10.20053	-7.194	46/608
regulation of cell adhesion	-10.20053	-7.194	46/608
positive regulation of cell adhesion	-6.035539	-3.811	27/362
regulation of cell-substrate adhesion	-5.200441	-3.143	17/184
positive regulation of cell-substrate adhesion	-4.750188	-2.758	12/105
regulation of cell development	-2.057719	-0.663	18/372
regulation of cell morphogenesis	-2.028065	-0.645	14/264

steroid metabolic process	-9.887534	-6.948	25/205
steroid metabolic process	-9.887534	-6.948	25/205
organic hydroxy compound metabolic process	-6.702147	-4.287	29/378
sterol metabolic process	-5.870036	-3.687	14/113
cholesterol metabolic process	-4.835902	-2.826	12/103
secondary alcohol metabolic process	-4.505369	-2.586	12/111
alcohol metabolic process	-4.221646	-2.368	19/263
steroid biosynthetic process	-2.42528	-0.956	8/97
negative regulation of immune system process	-9.246679	-6.416	31/329
negative regulation of immune system process	-9.246679	-6.416	31/329
positive regulation of response to external stimulus	-9.19852	-6.408	32/350
negative regulation of cell adhesion	-7.330685	-4.781	23/234
regulation of cell killing	-7.108329	-4.625	12/64
regulation of immune effector process	-6.977253	-4.515	24/264
positive regulation of cell killing	-6.601647	-4.237	9/36
positive regulation of defense response	-6.33146	-4.024	21/226
positive regulation of response to biotic stimulus	-6.227741	-3.939	16/138
regulation of leukocyte mediated cytotoxicity	-5.965066	-3.760	10/54
positive regulation of leukocyte mediated cytotoxicity	-5.926816	-3.737	8/32
regulation of leukocyte mediated immunity	-5.669237	-3.528	17/170
positive regulation of immune effector process	-5.462086	-3.356	17/176
regulation of cell-cell adhesion	-4.828027	-2.826	24/349
negative regulation of immune response	-4.665292	-2.693	14/143
positive regulation of innate immune response	-4.585002	-2.630	12/109
positive regulation of leukocyte mediated immunity	-4.497884	-2.584	11/94
regulation of innate immune response	-4.455781	-2.552	16/189
regulation of cell activation	-4.199506	-2.352	28/482
negative regulation of immune effector process	-4.030055	-2.220	10/88
negative regulation of cell activation	-4.008215	-2.203	14/164
regulation of response to biotic stimulus	-3.861351	-2.082	19/280
negative regulation of leukocyte mediated immunity	-3.593138	-1.859	7/49
positive regulation of cell-cell adhesion	-3.565458	-1.836	16/225
negative regulation of cell-cell adhesion	-3.310437	-1.647	12/148
regulation of lymphocyte mediated immunity	-2.994381	-1.389	10/118
negative regulation of T cell mediated immunity	-2.986038	-1.386	4/18
regulation of leukocyte activation	-2.9017	-1.315	23/441
negative regulation of leukocyte activation	-2.891732	-1.314	11/143
negative regulation of interleukin-2 production	-2.804313	-1.247	4/20
positive regulation of cell activation	-2.80211	-1.245	17/290
positive regulation of leukocyte activation	-2.573269	-1.073	16/279
negative regulation of adaptive immune response based on somatic r	-2.541635	-1.048	5/38
negative regulation of lymphocyte mediated immunity	-2.491248	-1.012	5/39
regulation of leukocyte cell-cell adhesion	-2.438538	-0.966	15/262
negative regulation of interferon-gamma production	-2.368313	-0.913	4/26
negative regulation of adaptive immune response	-2.349285	-0.896	5/42
positive regulation of lymphocyte activation	-2.00463	-0.625	13/239

cell activation	-8.975868	-6.233	38/482
cell activation	-8.975868	-6.233	38/482
myeloid leukocyte activation	-7.797262	-5.169	16/107
leukocyte activation	-7.139759	-4.634	30/382
immune effector process	-6.288787	-3.995	22/247
leukocyte activation involved in immune response	-6.112626	-3.875	15/124
cell activation involved in immune response	-5.934288	-3.741	15/128
myeloid cell activation involved in immune response	-4.975476	-2.936	8/42
leukocyte differentiation	-4.069091	-2.253	19/270
lymphocyte activation	-3.950324	-2.154	20/299
hemopoiesis	-3.459514	-1.745	26/480
mononuclear cell differentiation	-3.289857	-1.629	15/215
immune system development	-3.215978	-1.574	28/553
hematopoietic or lymphoid organ development	-2.956598	-1.361	26/519
T cell activation	-2.952058	-1.358	13/185
lymphocyte activation involved in immune response	-2.887535	-1.314	8/82
T cell differentiation	-2.485064	-1.008	9/116
lymphocyte differentiation	-2.439955	-0.966	12/187
regulation of lipid localization	-8.806838	-6.089	19/133
regulation of lipid localization	-8.806838	-6.089	19/133
regulation of lipid transport	-7.797262	-5.169	16/107
positive regulation of lipid localization	-6.500272	-4.166	13/86
positive regulation of lipid transport	-5.201545	-3.143	10/65
regulation of sterol transport	-4.895356	-2.872	9/56
regulation of cholesterol transport	-4.895356	-2.872	9/56
Metabolism of lipids	-3.274779	-1.616	32/660
positive regulation of sterol transport	-2.760988	-1.213	5/34
positive regulation of cholesterol transport	-2.760988	-1.213	5/34
PPARA activates gene expression	-2.588094	-1.087	9/112
Regulation of lipid metabolism by PPARalpha	-2.535937	-1.043	9/114
negative regulation of hydrolase activity	-8.607341	-5.902	27/272
negative regulation of hydrolase activity	-8.607341	-5.902	27/272
negative regulation of endopeptidase activity	-7.662562	-5.048	20/172
acute-phase response	-7.656183	-5.048	9/28
negative regulation of peptidase activity	-7.32709	-4.781	20/180
negative regulation of proteolysis	-6.526309	-4.178	23/259
acute inflammatory response	-6.124718	-3.880	10/52
regulation of peptidase activity	-5.987252	-3.775	26/342
regulation of endopeptidase activity	-5.024038	-2.982	23/317
regulation of proteolysis	-4.751844	-2.758	34/601
negative regulation of catalytic activity	-4.312373	-2.434	33/605
positive regulation of immune response	-8.530568	-5.837	31/352
positive regulation of immune response	-8.530568	-5.837	31/352
immune response-regulating signaling pathway	-7.910079	-5.261	23/218
immune response-regulating cell surface receptor signaling pathway	-6.058724	-3.826	16/142
leukocyte chemotaxis	-5.780963	-3.605	13/99

leukocyte migration	-5.776569	-3.605	17/167
activation of immune response	-5.761582	-3.595	18/186
chemotaxis	-5.572086	-3.450	26/360
taxis	-5.572086	-3.450	26/360
immune response-activating cell surface receptor signaling pathway	-5.467987	-3.358	14/122
immune response-activating signal transduction	-5.467987	-3.358	14/122
cell chemotaxis	-5.141245	-3.092	15/148
myeloid leukocyte migration	-4.388085	-2.494	10/80
neutrophil chemotaxis	-4.332101	-2.450	8/51
granulocyte chemotaxis	-4.148337	-2.315	8/54
neutrophil migration	-3.868795	-2.087	8/59
granulocyte migration	-3.665835	-1.922	8/63
alpha-amino acid metabolic process	-8.219731	-5.538	21/176
alpha-amino acid metabolic process	-8.219731	-5.538	21/176
aromatic amino acid family metabolic process	-7.003046	-4.534	8/24
tyrosine metabolic process	-6.618098	-4.241	6/12
cellular amino acid metabolic process	-6.024492	-3.804	22/256
carboxylic acid catabolic process	-4.610335	-2.645	17/204
aromatic amino acid family catabolic process	-4.551497	-2.608	5/15
L-phenylalanine metabolic process	-4.536955	-2.608	4/8
L-phenylalanine catabolic process	-4.536955	-2.608	4/8
erythrose 4-phosphate/phosphoenolpyruvate family amino acid meta	-4.536955	-2.608	4/8
erythrose 4-phosphate/phosphoenolpyruvate family amino acid catab	-4.536955	-2.608	4/8
organic acid catabolic process	-4.502077	-2.585	17/208
alpha-amino acid catabolic process	-4.248613	-2.388	10/83
cellular amino acid catabolic process	-4.246191	-2.387	11/100
small molecule catabolic process	-4.19894	-2.352	21/310
Phenylalanine and tyrosine metabolism	-3.890533	-2.103	4/11
Tyrosine catabolism	-3.774667	-2.011	3/5
tyrosine catabolic process	-3.482104	-1.767	3/6
Metabolism of amino acids and derivatives	-3.252606	-1.602	20/338
Phenylalanine metabolism	-2.119006	-0.714	3/16
olefinic compound metabolic process	-7.97965	-5.320	16/104
olefinic compound metabolic process	-7.97965	-5.320	16/104
Cytochrome P450 - arranged by substrate type	-6.292155	-3.995	10/50
epoxygenase P450 pathway	-6.125432	-3.880	6/14
Arachidonic acid metabolism	-6.124718	-3.880	10/52
icosanoid metabolic process	-5.718842	-3.570	12/85
Xenobiotics	-5.718664	-3.570	6/16
Chemical carcinogenesis - DNA adducts	-5.717736	-3.570	9/45
Biological oxidations	-5.530055	-3.414	17/174
long-chain fatty acid metabolic process	-5.349254	-3.269	12/92
xenobiotic metabolic process	-5.340831	-3.264	11/77
unsaturated fatty acid metabolic process	-5.122406	-3.075	11/81
arachidonic acid metabolic process	-4.895932	-2.872	8/43
Phase I - Functionalization of compounds	-4.867917	-2.847	11/86

Synthesis of (16-20)-hydroxyeicosatetraenoic acids (HETE)	-4.536955	-2.608	4/8
Drug metabolism - cytochrome P450	-4.462252	-2.554	8/49
monocarboxylic acid metabolic process	-4.322945	-2.443	26/424
omega-hydroxylase P450 pathway	-4.290688	-2.418	4/9
Fatty acid metabolism	-4.008215	-2.203	14/164
cellular response to xenobiotic stimulus	-3.996767	-2.194	12/125
response to xenobiotic stimulus	-3.539858	-1.815	20/321
Metabolism of xenobiotics by cytochrome P450	-3.429732	-1.724	7/52
CYP2E1 reactions	-3.247522	-1.602	3/7
xenobiotic catabolic process	-2.892303	-1.314	4/19
fatty acid metabolic process	-2.527315	-1.036	16/282
cell-matrix adhesion	-7.507224	-4.917	16/112
cell-matrix adhesion	-7.507224	-4.917	16/112
integrin-mediated signaling pathway	-6.685976	-4.287	13/83
cell-substrate adhesion	-6.651508	-4.259	18/162
cell adhesion mediated by integrin	-5.318678	-3.247	8/38
heterotypic cell-cell adhesion	-4.835074	-2.826	7/32
Cell adhesion molecules	-3.638028	-1.897	10/98
Regulation of actin cytoskeleton	-2.089578	-0.691	11/182
cell-cell adhesion	-7.368141	-4.796	29/352
cell-cell adhesion	-7.368141	-4.796	29/352
cell-cell adhesion via plasma-membrane adhesion molecules	-2.078062	-0.680	9/134
negative regulation of response to external stimulus	-7.247934	-4.726	27/315
negative regulation of response to external stimulus	-7.247934	-4.726	27/315
regulation of defense response	-6.493345	-4.166	34/501
regulation of inflammatory response	-4.426565	-2.526	21/299
negative regulation of defense response	-3.164044	-1.529	14/198
negative regulation of inflammatory response	-2.830006	-1.265	10/124
Immunoregulatory interactions between a Lymphoid and a non-Lymp	-7.108329	-4.625	12/64
Immunoregulatory interactions between a Lymphoid and a non-Lymp	-7.108329	-4.625	12/64
Adaptive Immune System	-4.335817	-2.452	34/630
Scavenging by Class A Receptors	-6.926932	-4.471	7/17
Scavenging by Class A Receptors	-6.926932	-4.471	7/17
Binding and Uptake of Ligands by Scavenger Receptors	-6.601647	-4.237	9/36
Scavenging of heme from plasma	-2.73771	-1.203	3/10

Genes	Symbols
2,101,633,1	A2M,ADAM8,BGN,COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,COL6A3,COL8A1,COL15
2,101,633,1	A2M,ADAM8,BGN,COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,COL6A3,COL8A1,COL15
1277,1278,1	COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,COL6A3,COL8A1,FBN1,FGA,FGB,FGG,FN1,
101,538,127	ADAM8,ATP7A,COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,COL8A1,COL15A1,CTSK,CY
101,538,127	ADAM8,ATP7A,COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,COL8A1,COL15A1,CTSK,CY
101,538,127	ADAM8,ATP7A,COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,COL8A1,COL15A1,CTSK,CY
2,101,1277,	A2M,ADAM8,COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,COL6A3,COL8A1,COL15A1,C
1277,1278,1	COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,COL6A3,COL8A1,COL15A1,CTSK,MMP12,M
633,1277,12	BGN,COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,COL6A3,FMOD,FN1,TNC,ITGAV,ITGAX
1277,1278,1	COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,FN1,TNC,ITGAV,SDC1,VTN,SDC3
538,1277,12	ATP7A,COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,CYP1B1,FMOD,LOXL2,LUM,SERPINI
1277,1278,1	COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,COL6A3,COL8A1,COL15A1,COL14A1,COL1
1277,1278,1	COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,COL6A3,COL8A1,COL15A1,LOXL2,PCOLCE,
1277,1278,1	COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,COL6A3,COL8A1,COL15A1,PCOLCE,PLOD1,
1277,1278,1	COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,FN1,TNC,ITGAV,LAMA2,SDC1,TTR,VTN,SDC
1277,1278,1	COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,COL6A3,COL8A1,COL15A1,LOXL2,PCOLCE,
538,822,127	ATP7A,CAPG,COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,CYP1B1,EPS8,FLNC,FMOD,HC
1277,1278,1	COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,COL6A3,COL8A1,COL15A1,KCNN4,COL14A
1277,1278,1	COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,FN1,LAMA2,TNS3
1277,1278,1	COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,FN1,LAMA2
1277,1278,1	COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,FN1,HGFAC,LAMA2,PTPRJ,TNS3
1281,1289,1	COL3A1,COL5A1,COL5A2,COL6A3,PLG,SPP1,COL6A5
538,1277,12	ATP7A,COL1A1,COL1A2,COL3A1,COL5A1,COL5A2,KRT7,KRT8,STMN1,MAFB,CD109,AS
1281,1289,1	COL3A1,COL5A1,COL5A2,COL6A3,COL6A5
1281,1289,1	COL3A1,COL5A1,COL5A2,COL6A3,COL6A5
445,538,127	ASS1,ATP7A,COL1A1,COL1A2,COL3A1,COL5A2
2,12,101,19	A2M,SERPINA3,ADAM8,AHSG,APOA2,ASS1,C3AR1,C5,C5AR1,CD14,CD68,CCR5,FN1,F
2,12,101,19	A2M,SERPINA3,ADAM8,AHSG,APOA2,ASS1,C3AR1,C5,C5AR1,CD14,CD68,CCR5,FN1,F
101,336,719	ADAM8,APOA2,C3AR1,C5,C5AR1,CD14,CYP1B1,EGR1,FCER1G,IRF5,LUM,MMP12,SER
101,467,154	ADAM8,ATF3,CYP1B1,EGR1,FOS,HRG,IGF2R,IRF5,ITGAM,ITGB2,KNG1,PTGS2,PTPRC,S
197,335,336	AHSG,APOA1,APOA2,APOB,SERPINC1,FBN1,FGA,FGG,FN1,TNC,KNG1,SERPINA1,PLG,I
197,335,336	AHSG,APOA1,APOA2,APOB,SERPINC1,FBN1,FGA,FGG,FN1,TNC,KNG1,SERPINA1,PLG,I
197,335,336	AHSG,APOA1,APOA2,APOB,SERPINC1,FBN1,FGA,FGG,FN1,TNC,KNG1,SERPINA1,PROC
2,462,719,7	A2M,SERPINC1,C3AR1,C5,C5AR1,FGA,FGB,FGG,CFH,ITGAM,ITGAX,ITGB2,KNG1,MBL2
2,462,719,7	A2M,SERPINC1,C3AR1,C5,C5AR1,FGA,FGB,FGG,CFH,ITGAM,ITGAX,ITGB2,KNG1,MBL2
719,727,728	C3AR1,C5,C5AR1,FGG,CFH,ITGAM,ITGB2,MBL2,PLG
719,727,728	C3AR1,C5,C5AR1,CYP1B1,PTGS2
719,727,728	C3AR1,C5,C5AR1,MMP14,EMILIN1,TREM2
719,727,728	C3AR1,C5,C5AR1,CYP1B1,PTGS2
719,727,728	C3AR1,C5,C5AR1,CFH,MBL2,VTN
719,727,728	C3AR1,C5,C5AR1,CCR5,CXCL3,KNG1,NPY,CXCR4
101,719,728	ADAM8,C3AR1,C5AR1,NCKAP1L
719,728,432	C3AR1,C5AR1,MMP14,TREM2
719,727,728	C3AR1,C5,C5AR1,CFH,VTN
728,3663,54	C5AR1,IRF5,TREM2

595,719,727	CCND1,C3AR1,C5,C5AR1,CD14,FABP1,CXCL3,TLR4,LPIN2
101,719,727	ADAM8,C3AR1,C5,C5AR1,DUSP1,NCKAP1L,MMP14,SPI1,THY1,EMILIN1,TREM2
101,719,728	ADAM8,C3AR1,C5AR1,NCKAP1L,MMP14,SPI1,THY1,TREM2
719,727,728	C3AR1,C5,C5AR1,CCR5,ADGRE1,CXCL3,KNG1,NPY,P2RY6,WNT2B,CXCR4,CALCRL
719,728,307	C3AR1,C5AR1,NCKAP1L
101,719,728	ADAM8,C3AR1,C5AR1,NCKAP1L
12,101,197,	SERPINA3,ADAM8,AHSG,ANPEP,ARG1,ARSB,C3AR1,C5AR1,CD14,CD53,CD68,DOCK2,I
12,101,197,	SERPINA3,ADAM8,AHSG,ANPEP,ARG1,ARSB,C3AR1,C5AR1,CD14,CD53,CD68,DOCK2,I
2,12,197,33	A2M,SERPINA3,AHSG,APOA1,APOH,FGA,FGB,FGG,FN1,HRG,ITIH3,ITIH4,KNG1,PCDH7
2,12,197,33	A2M,SERPINA3,AHSG,APOA1,APOH,FGA,FGB,FGG,FN1,HRG,ITIH3,ITIH4,KNG1,PCDH7
2,12,197,33	A2M,SERPINA3,AHSG,APOA1,APOB,APOH,SERPINC1,COL1A1,COL1A2,DOCK2,FCER1G
2,12,197,33	A2M,SERPINA3,AHSG,APOA1,APOH,FGA,FGB,FGG,FN1,HRG,ITIH3,ITIH4,KNG1,PCDH7
350,383,462	APOH,ARG1,SERPINC1,CLIC1,COL1A1,COL3A1,COL5A1,FBLN1,FGA,FGB,FGG,FN1,HGF
350,462,119	APOH,SERPINC1,CLIC1,COL3A1,FBLN1,FGA,FGB,FGG,FN1,HGFAC,HNF4A,HRG,KNG1,S
350,462,119	APOH,SERPINC1,CLIC1,COL3A1,FBLN1,FGA,FGB,FGG,FN1,HGFAC,HNF4A,HRG,KNG1,S
350,462,119	APOH,SERPINC1,CLIC1,COL1A1,COL3A1,COL5A1,FBLN1,FGA,FGB,FGG,FN1,HGFAC,HN
350,462,119	APOH,SERPINC1,CLIC1,COL3A1,FBLN1,FGA,FGB,FGG,FN1,HGFAC,HNF4A,HRG,KNG1,S
2,12,197,33	A2M,SERPINA3,AHSG,APOA1,APOH,COL1A1,COL1A2,FCER1G,FGA,FGB,FGG,FN1,HRG
350,462,538	APOH,SERPINC1,ATP7A,CCND1,CLIC1,COL3A1,CYP4A11,FBLN1,FGA,FGB,FGG,FN1,HG
350,2243,22	APOH,FGA,FGB,FGG,HRG,KNG1,PLG,SERPINF2,PROC,VTN
350,462,224	APOH,SERPINC1,FGA,FGB,FGG,HRG,KNG1,PLG,SERPINF2,PROC,VTN,EMILIN1
350,2243,22	APOH,FGA,FGB,FGG,HRG,KNG1,PLG,SERPINF2,PROC,VTN
350,462,224	APOH,SERPINC1,FGA,FGB,FGG,HRG,KNG1,PLG,SERPINF2,PROC,VTN,EMILIN1
350,2243,22	APOH,FGA,FGB,FGG,HRG,KNG1,PLG,SERPINF2,PROC,VTN
350,462,224	APOH,SERPINC1,FGA,FGB,FGG,HRG,KNG1,PLG,SERPINF2,PROC,VTN,EMILIN1
350,462,538	APOH,SERPINC1,ATP7A,FGA,FGB,FGG,HRG,KNG1,PLG,SERPINF2,PROC,SPP1,VTN,CXC
350,2243,22	APOH,FGA,FGB,FGG,HRG,KNG1,PLG,SERPINF2,PROC,SPP1,VTN,CD109
350,462,224	APOH,SERPINC1,FGA,FGB,FGG,HRG,KNG1,PLG,SERPINF2,PROC,VTN,CXCR4,EMILIN1,(
350,2243,22	APOH,FGA,FGB,FGG,HRG,KNG1,PLG,SERPINF2,PROC,VTN,CD109
2243,2244,2	FGA,FGB,FGG,HRG,PLG,SERPINF2
350,3273,53	APOH,HRG,PLG,SERPINF2,VTN
350,3273,53	APOH,HRG,PLG,SERPINF2,VTN
350,3273,53	APOH,HRG,PLG,SERPINF2,VTN,EMILIN1
350,3273,53	APOH,HRG,PLG,SERPINF2,VTN,EMILIN1
350,3273,53	APOH,HRG,PLG,SERPINF2,VTN,EMILIN1
3273,5269,5	HRG,SERPINB6,PLG,SERPINF2
350,538,327	APOH,ATP7A,HRG,PLG,SERPINF2,VTN,CXCR4,EMILIN1
350,3273,53	APOH,HRG,PLG,SERPINF2,VTN,CXCR4,EMILIN1
5340,5345,8	PLG,SERPINF2,ADAM19
101,335,383	ADAM8,APOA1,ARG1,ASS1,COL1A1,COL8A1,CYP1B1,DAB2,DUSP1,FBLN1,FGA,FGB,FG
101,335,383	ADAM8,APOA1,ARG1,ASS1,COL1A1,COL8A1,CYP1B1,DAB2,DUSP1,FBLN1,FGA,FGB,FG
101,335,129	ADAM8,APOA1,COL8A1,DAB2,FGA,FGB,FGG,FN1,NCKAP1L,HRG,ITGAV,ITGB2,LAMA2
335,1277,12	APOA1,COL1A1,COL8A1,DAB2,FBLN1,FGA,FGB,FGG,FN1,HRG,MMP12,MMP14,NPY,P
335,1295,16	APOA1,COL8A1,DAB2,FGA,FGB,FGG,FN1,HRG,NPY,PTPRJ,THY1,EMILIN1
335,1601,21	APOA1,DAB2,FBLN1,FBN1,FGA,FGB,FGG,FN1,LDLR,MAN2A1,PROC,SPP1,THY1,TTPA,T
335,1601,20	APOA1,DAB2,EPS8,FBLN1,FGA,FGB,FGG,FN1,HEXB,ITGB2,ENPP2,CXCR4,CORO1A,PLX

335,336,33{ APOA1,APOA2,APOB,CYP1B1,CYP2A6,CYP3A7,CYP2C19,CYP3A4,CYP3A5,CYP8B1,G6P
335,336,33{ APOA1,APOA2,APOB,CYP1B1,CYP2A6,CYP3A7,CYP2C19,CYP3A4,CYP3A5,CYP8B1,G6P
335,336,33{ APOA1,APOA2,APOB,ATP7A,CTSK,CYP1B1,CYP3A7,CYP3A4,CYP3A5,CYP4A11,CYP8B1
335,336,33{ APOA1,APOA2,APOB,CYP1B1,CYP3A4,CYP8B1,LCAT,LDLR,PON1,MSMO1,SQLE,SREBF
335,336,33{ APOA1,APOA2,APOB,CYP3A4,LCAT,LDLR,PON1,MSMO1,SQLE,SREBF2,APOBR,APOA5
335,336,33{ APOA1,APOA2,APOB,CYP3A4,LCAT,LDLR,PON1,MSMO1,SQLE,SREBF2,APOBR,APOA5
335,336,33{ APOA1,APOA2,APOB,CYP1B1,CYP3A7,CYP3A4,CYP3A5,LCAT,LDLR,PON1,MSMO1,SQL
335,1551,1{ APOA1,CYP3A7,CYP3A4,CYP8B1,MSMO1,SQLE,SLC27A2,APOA5
2,259,335,3 A2M,AMBP,APOA1,APOA2,ARG1,C5,CD68,COL3A1,DUSP1,FBN1,FGL1,NCKAP1L,LDLR
2,259,335,3 A2M,AMBP,APOA1,APOA2,ARG1,C5,CD68,COL3A1,DUSP1,FBN1,FGL1,NCKAP1L,LDLR
101,350,38{ ADAM8,APOH,ARG1,C3AR1,C5AR1,NCKAP1L,HPX,HRG,LDLR,CD180,MBL2,MMP12,NI
335,383,44{ APOA1,ARG1,ASS1,COL1A1,CYP1B1,DUSP1,FBLN1,FGG,FGL1,NCKAP1L,HRG,IL1RN,KN
383,563,30{ ARG1,AZGP1,NCKAP1L,CFH,ITGAM,PTPRC,SPI1,SYK,TYROBP,VAV1,CADM1,HAVCR2
2,335,336,3 A2M,APOA1,APOA2,ARG1,AZGP1,NCKAP1L,CFH,HPX,ITGAM,ITGB2,MBL2,PTPRC,PTPI
383,563,36{ ARG1,AZGP1,ITGAM,PTPRC,SPI1,SYK,TYROBP,VAV1,CADM1
101,383,32{ ADAM8,ARG1,HPX,LDLR,MBL2,MMP12,PTGS2,S100A9,SPI1,SYK,TLR4,TYROBP,VAV1,T
101,383,32{ ADAM8,ARG1,HPX,HRG,CD180,MBL2,MMP12,SPI1,SYK,TLR4,TYROBP,VAV1,EMILIN1,
383,563,30{ ARG1,AZGP1,NCKAP1L,ITGAM,PTPRC,SPI1,TYROBP,VAV1,CADM1,HAVCR2
383,563,36{ ARG1,AZGP1,ITGAM,PTPRC,SPI1,TYROBP,VAV1,CADM1
383,563,30{ ARG1,AZGP1,NCKAP1L,HPX,ITGAM,ITGB2,PTPRC,SPI1,SYK,TLR4,TYROBP,VAV1,CD84,I
383,563,32{ ARG1,AZGP1,HPX,ITGAM,ITGB2,MBL2,PTPRC,PTPRJ,SPI1,SYK,TLR4,TYROBP,VAV1,LAP
101,335,38{ ADAM8,APOA1,ARG1,ASS1,FGA,FGB,FGG,FGL1,NCKAP1L,IL1RN,ITGB2,PLG,SERPINF2,
2,259,383,1 A2M,AMBP,ARG1,COL3A1,NCKAP1L,MMP12,NPY,PTPRC,SPI1,SYK,CD84,LILRB4,TREM
101,3263,41 ADAM8,HPX,MBL2,MMP12,SPI1,SYK,TLR4,TYROBP,VAV1,CADM1,TLR8,HAVCR2
383,563,32{ ARG1,AZGP1,HPX,ITGAM,ITGB2,PTPRC,SPI1,TYROBP,VAV1,CADM1,TREM2
2,101,383,3 A2M,ADAM8,ARG1,CFH,HPX,MBL2,MMP12,SPI1,SYK,TLR4,TYROBP,VAV1,CADM1,TLF
101,383,22{ ADAM8,ARG1,FCER1G,FGG,FGL1,FN1,NCKAP1L,HRG,ITGAM,ITGB2,LDLR,MMP14,PLE
2,335,336,3 A2M,APOA1,APOA2,ARG1,NCKAP1L,PTPRC,SPI1,CD84,LILRB4,HAVCR2
383,2266,22 ARG1,FGG,FGL1,NCKAP1L,LDLR,PTPRC,SPI1,TYROBP,LAPTM5,CD84,LILRB4,EMILIN1,T
2,101,383,3 A2M,ADAM8,ARG1,CFH,HPX,HRG,CD180,MBL2,MMP12,SPI1,SYK,TLR4,TYROBP,VAV1
383,3071,57 ARG1,NCKAP1L,PTPRC,SPI1,CD84,LILRB4,HAVCR2
101,2243,22 ADAM8,FGA,FGB,FGG,NCKAP1L,ITGB2,SERPINF2,PTPRC,SYK,THY1,VAV1,ADAM19,LIL
335,383,44{ APOA1,ARG1,ASS1,FGG,FGL1,NCKAP1L,IL1RN,PLG,SPI1,LAPTM5,LILRB4,HAVCR2
383,563,30{ ARG1,AZGP1,NCKAP1L,HPX,PTPRC,VAV1,LILRB4,CADM1,TREM2,HAVCR2
383,3071,57 ARG1,NCKAP1L,PTPRC,LILRB4
101,383,22{ ADAM8,ARG1,FGL1,FN1,NCKAP1L,ITGAM,ITGB2,LDLR,MMP14,PTPRC,SPI1,SYK,THY1,
383,2267,3{ ARG1,FGL1,NCKAP1L,LDLR,PTPRC,SPI1,TYROBP,LAPTM5,CD84,LILRB4,HAVCR2
5788,7805,1 PTPRC,LAPTM5,LILRB4,HAVCR2
101,3071,3{ ADAM8,NCKAP1L,ITGAM,ITGB2,MMP14,PLEK,PTPRC,SYK,THY1,TLR4,TYROBP,VAV1,LI
101,3071,3{ ADAM8,NCKAP1L,ITGAM,ITGB2,MMP14,PTPRC,SYK,THY1,TLR4,TYROBP,VAV1,LILRB4
383,3071,57 ARG1,NCKAP1L,PTPRC,LILRB4,HAVCR2
383,3071,57 ARG1,NCKAP1L,PTPRC,LILRB4,HAVCR2
101,383,44{ ADAM8,ARG1,ASS1,FGL1,NCKAP1L,ITGB2,PTPRC,SYK,THY1,VAV1,LAPTM5,LILRB4,COI
7099,7805,1 TLR4,LAPTM5,LILRB4,HAVCR2
383,3071,57 ARG1,NCKAP1L,PTPRC,LILRB4,HAVCR2
101,3071,4{ ADAM8,NCKAP1L,MMP14,PTPRC,SYK,THY1,TLR4,TYROBP,VAV1,LILRB4,CORO1A,HAV

538,728,119	ATP7A,C5AR1,CLIC1,COL3A1,DOCK2,EGR1,FCER1G,FGA,FGB,FGG,FN1,HRG,ITGAM,ITG
538,728,119	ATP7A,C5AR1,CLIC1,COL3A1,DOCK2,EGR1,FCER1G,FGA,FGB,FGG,FN1,HRG,ITGAM,ITG
728,1794,22	C5AR1,DOCK2,FCER1G,ITGAM,ITGB2,NPY,PTGDS,SPI1,SYK,TLR4,TYROBP,LAT2,UBD,TI
538,728,179	ATP7A,C5AR1,DOCK2,EGR1,FCER1G,ITGAM,ITGB2,LCP1,CD180,NPY,PTGDS,PTPRC,PT
538,727,179	ATP7A,C5,DOCK2,FCER1G,CFH,LCP1,CD180,MBL2,MFAP4,PTGDS,SPI1,SYK,TLR4,TYRO
538,1794,22	ATP7A,DOCK2,FCER1G,LCP1,CD180,PTGDS,SPI1,SYK,TLR4,TYROBP,LAT2,CORO1A,TRE
538,1794,22	ATP7A,DOCK2,FCER1G,LCP1,CD180,PTGDS,SPI1,SYK,TLR4,TYROBP,LAT2,CORO1A,TRE
1794,2207,5	DOCK2,FCER1G,PTGDS,SYK,TYROBP,LAT2,TREM2,HAVCR2
538,1794,19	ATP7A,DOCK2,EGR1,FCER1G,PTPRC,PTPRJ,SPI1,SYK,TF,TPD52,TYROBP,VAV1,TNFRSF1
538,1794,19	ATP7A,DOCK2,EGR1,FCER1G,LCP1,CD180,PTPRC,PTPRJ,SPI1,SYK,TLR4,TPD52,VAV1,LA
538,1794,19	ATP7A,DOCK2,EGR1,FCER1G,HCLS1,NCKAP1L,MYO1E,PLEK,PTPRC,PTPRJ,SPI1,SYK,TF,
538,1794,19	ATP7A,DOCK2,EGR1,FCER1G,PTPRC,PTPRJ,SPI1,SYK,TPD52,VAV1,MAFB,UBD,BLNK,TR
538,1794,19	ATP7A,DOCK2,EGR1,FCER1G,HCLS1,NCKAP1L,MYO1E,PLEK,PTPRC,PTPRJ,SPI1,SYK,TF,
538,1794,19	ATP7A,DOCK2,EGR1,FCER1G,HCLS1,NCKAP1L,MYO1E,PLEK,PTPRC,PTPRJ,SPI1,SYK,TF,
538,1794,19	ATP7A,DOCK2,EGR1,FCER1G,LCP1,PTPRC,SPI1,SYK,VAV1,CD84,MAFB,CLEC4A,APBB1I
538,2207,39	ATP7A,FCER1G,LCP1,CD180,SPI1,TLR4,CORO1A,APBB1IP
538,1794,19	ATP7A,DOCK2,EGR1,FCER1G,PTPRC,SPI1,SYK,VAV1,MAFB
538,1794,19	ATP7A,DOCK2,EGR1,FCER1G,PTPRC,PTPRJ,SPI1,SYK,TPD52,VAV1,MAFB,BLNK
335,336,338	APOA1,APOA2,APOB,APOC3,CYP4A11,CYP8B1,DAB2,ITGAV,MSR1,ABCB4,PON1,SPP1
335,336,338	APOA1,APOA2,APOB,APOC3,CYP4A11,CYP8B1,DAB2,ITGAV,MSR1,ABCB4,PON1,SPP1
335,336,345	APOA1,APOA2,APOC3,CYP4A11,CYP8B1,DAB2,ITGAV,ABCB4,PON1,SPP1,SREBF2,SYK,
335,338,157	APOA1,APOB,CYP4A11,CYP8B1,DAB2,MSR1,ABCB4,PON1,SPP1,SREBF2,CYP4F2,TNFR
335,1579,15	APOA1,CYP4A11,CYP8B1,DAB2,ABCB4,PON1,SPP1,CYP4F2,TNFRSF11A,TREM2
335,336,345	APOA1,APOA2,APOC3,CYP8B1,ABCB4,PON1,SREBF2,TREM2,APOA5
335,336,345	APOA1,APOA2,APOC3,CYP8B1,ABCB4,PON1,SREBF2,TREM2,APOA5
335,336,411	APOA1,APOA2,ARSB,CYP1B1,CYP2C19,CYP3A4,CYP4A11,CYP8B1,EHHADH,FABP1,FHL
335,1582,52	APOA1,CYP8B1,ABCB4,PON1,TREM2
335,1582,52	APOA1,CYP8B1,ABCB4,PON1,TREM2
335,336,157	APOA1,APOA2,CYP4A11,FABP1,FHL2,FADS1,ABCB4,SREBF2,APOA5
335,336,157	APOA1,APOA2,CYP4A11,FABP1,FHL2,FADS1,ABCB4,SREBF2,APOA5
2,12,197,25	A2M,SERPINA3,AHSG,AMBP,APOA1,APOA2,APOC3,SERPINC1,C5,COL6A3,FABP1,GCH
2,12,197,25	A2M,SERPINA3,AHSG,AMBP,APOA1,APOA2,APOC3,SERPINC1,C5,COL6A3,FABP1,GCH
2,12,197,25	A2M,SERPINA3,AHSG,AMBP,SERPINC1,C5,COL6A3,FABP1,HRG,ITIH1,ITIH3,ITIH4,KNG
2,12,197,44	A2M,SERPINA3,AHSG,ASS1,FN1,ITIH4,MBL2,SERPINA1,SERPINF2
2,12,197,25	A2M,SERPINA3,AHSG,AMBP,SERPINC1,C5,COL6A3,FABP1,HRG,ITIH1,ITIH3,ITIH4,KNG
2,12,197,25	A2M,SERPINA3,AHSG,AMBP,SERPINC1,C5,COL6A3,FABP1,GAS1,HRG,ITIH1,ITIH3,ITIH
2,12,197,33	A2M,SERPINA3,AHSG,APOA2,ASS1,FN1,ITIH4,MBL2,SERPINA1,SERPINF2
2,12,197,25	A2M,SERPINA3,AHSG,AMBP,SERPINC1,C5,COL6A3,FABP1,FBLN1,FN1,HRG,ITIH1,ITIH
2,12,197,25	A2M,SERPINA3,AHSG,AMBP,SERPINC1,C5,COL6A3,FABP1,HRG,ITIH1,ITIH3,ITIH4,KNG
2,12,101,19	A2M,SERPINA3,ADAM8,AHSG,AMBP,SERPINC1,C5,COL6A3,DAB2,FABP1,FBLN1,FN1,(
2,12,197,25	A2M,SERPINA3,AHSG,AMBP,APOA1,APOA2,APOC3,SERPINC1,C5,COL6A3,DUSP1,FAB
101,563,719	ADAM8,AZGP1,C3AR1,C5,C5AR1,FCER1G,FYB1,NCKAP1L,CFH,HPX,HRG,ITGAM,ITGB2
101,563,719	ADAM8,AZGP1,C3AR1,C5,C5AR1,FCER1G,FYB1,NCKAP1L,CFH,HPX,HRG,ITGAM,ITGB2
719,728,929	C3AR1,C5AR1,CD14,FCER1G,FYB1,NCKAP1L,MBL2,PIGR,PTPRC,PTPRJ,SYK,THY1,TLR4,
719,728,220	C3AR1,C5AR1,FCER1G,FYB1,NCKAP1L,MBL2,PIGR,PTPRC,PTPRJ,SYK,THY1,TYROBP,VA
101,728,123	ADAM8,C5AR1,CCR5,FCER1G,CXCL3,NCKAP1L,ITGB2,S100A9,SYK,VAV1,CXCR4,TNFRS

101,728,123	ADAM8,C5AR1,CCR5,EPS8,FCER1G,GCNT1,CXCL3,NCKAP1L,ITGB2,PLG,S100A9,SYK,V/
719,727,728	C3AR1,C5,C5AR1,FCER1G,FYB1,NCKAP1L,CFH,MBL2,MFAP4,PTPRC,PTPRJ,SYK,THY1,T
101,214,335	ADAM8,ALCAM,APOA1,C3AR1,C5,C5AR1,CCR5,DOCK2,FCER1G,CXCL3,NCKAP1L,HRG,
101,214,335	ADAM8,ALCAM,APOA1,C3AR1,C5,C5AR1,CCR5,DOCK2,FCER1G,CXCL3,NCKAP1L,HRG,
719,728,220	C3AR1,C5AR1,FCER1G,FYB1,NCKAP1L,MBL2,PTPRC,PTPRJ,SYK,THY1,TYROBP,VAV1,LA
719,728,220	C3AR1,C5AR1,FCER1G,FYB1,NCKAP1L,MBL2,PTPRC,PTPRJ,SYK,THY1,TYROBP,VAV1,LA
101,727,728	ADAM8,C5,C5AR1,CCR5,FCER1G,CXCL3,NCKAP1L,ITGB2,S100A9,SYK,VAV1,CXCR4,TN
728,2207,29	C5AR1,FCER1G,CXCL3,NCKAP1L,ITGB2,S100A9,SYK,VAV1,TNFRSF11A,SIRPA
728,2207,29	C5AR1,FCER1G,CXCL3,NCKAP1L,ITGB2,S100A9,SYK,VAV1
728,2207,29	C5AR1,FCER1G,CXCL3,NCKAP1L,ITGB2,S100A9,SYK,VAV1
728,2207,29	C5AR1,FCER1G,CXCL3,NCKAP1L,ITGB2,S100A9,SYK,VAV1
728,2207,29	C5AR1,FCER1G,CXCL3,NCKAP1L,ITGB2,S100A9,SYK,VAV1
383,445,538	ARG1,ASS1,ATP7A,BCAT1,BHMT,HGD,HNF4A,HPD,MAT1A,PAH,TAT,AASS,SLC25A13,I
383,445,538	ARG1,ASS1,ATP7A,BCAT1,BHMT,HGD,HNF4A,HPD,MAT1A,PAH,TAT,AASS,SLC25A13,I
538,3081,32	ATP7A,HGD,HPD,PAH,TAT,HAAO,TTC36,IYD
3081,3242,5	HGD,HPD,PAH,TAT,TTC36,IYD
383,445,538	ARG1,ASS1,ATP7A,BCAT1,BHMT,HGD,HNF4A,HPD,MAT1A,PAH,TAT,AASS,SLC25A13,I
383,1579,19	ARG1,CYP4A11,EHHADH,HGD,HPD,MAT1A,PAH,PON1,TAT,CYP4F2,LPIN2,AASS,FTCD,
3081,3242,5	HGD,HPD,PAH,TAT,HAAO
3081,3242,5	HGD,HPD,PAH,TAT
3081,3242,5	HGD,HPD,PAH,TAT
3081,3242,5	HGD,HPD,PAH,TAT
3081,3242,5	HGD,HPD,PAH,TAT
383,1579,19	ARG1,CYP4A11,EHHADH,HGD,HPD,MAT1A,PAH,PON1,TAT,CYP4F2,LPIN2,AASS,FTCD,
383,3081,32	ARG1,HGD,HPD,MAT1A,PAH,TAT,AASS,HAAO,PIPOX,ALDH8A1
383,3081,32	ARG1,HGD,HPD,MAT1A,PAH,TAT,AASS,FTCD,HAAO,PIPOX,ALDH8A1
339,383,157	APOBEC1,ARG1,CYP3A4,CYP4A11,EHHADH,HGD,HK3,HPD,MAT1A,PAH,PON1,TAT,CY
3081,3242,5	HGD,HPD,PAH,TAT
3081,3242,6	HGD,HPD,TAT
3081,3242,6	HGD,HPD,TAT
191,383,445	AHCY,ARG1,ASS1,BCAT1,BHMT,CKB,HGD,HPD,MAT1A,PAH,TAT,AASS,SLC25A13,FTCD
3242,5053,6	HPD,PAH,TAT
1545,1548,1	CYP1B1,CYP2A6,CYP3A7,CYP2C19,CYP2F1,CYP3A4,CYP3A5,CYP4A11,FADS1,PTGDS,PT
1545,1548,1	CYP1B1,CYP2A6,CYP3A7,CYP2C19,CYP2F1,CYP3A4,CYP3A5,CYP4A11,FADS1,PTGDS,PT
1545,1548,1	CYP1B1,CYP2A6,CYP3A7,CYP2C19,CYP2F1,CYP3A4,CYP3A5,CYP4A11,CYP8B1,CYP4F2
1545,1548,1	CYP1B1,CYP2A6,CYP2C19,CYP2F1,CYP4A11,CYP4F2
1545,1557,1	CYP1B1,CYP2C19,CYP4A11,CYP8B1,PON1,PTGDS,PTGS2,CYP4F2,HPGDS,DPEP2
1545,1548,1	CYP1B1,CYP2A6,CYP2C19,CYP2F1,CYP4A11,FADS1,PTGDS,PTGS2,SYK,CYP4F2,HPGDS,
1548,1551,1	CYP2A6,CYP3A7,CYP2C19,CYP2F1,CYP3A4,CYP3A5
1545,1548,1	CYP1B1,CYP2A6,CYP3A7,CYP2C19,CYP3A4,CYP3A5,PTGS2,UGT2B17,HPGDS
191,1545,15	AHCY,CYP1B1,CYP2A6,CYP3A7,CYP2C19,CYP2F1,CYP3A4,CYP3A5,CYP4A11,CYP8B1,FI
1545,1548,1	CYP1B1,CYP2A6,CYP2C19,CYP2F1,CYP3A4,CYP4A11,FADS1,PTGDS,PTGS2,CYP4F2,SLC
1545,1548,1	CYP1B1,CYP2A6,CYP3A7,CYP2C19,CYP2F1,CYP3A4,CYP3A5,FMO5,HNF4A,CYP4F2,NCI
1545,1548,1	CYP1B1,CYP2A6,CYP2C19,CYP2F1,CYP4A11,FADS1,PTGDS,PTGS2,CYP4F2,HPGDS,ELO
1545,1548,1	CYP1B1,CYP2A6,CYP2C19,CYP2F1,CYP4A11,PTGDS,PTGS2,CYP4F2
1545,1548,1	CYP1B1,CYP2A6,CYP3A7,CYP2C19,CYP2F1,CYP3A4,CYP3A5,CYP4A11,CYP8B1,FMO3,C

1545,1557,1CYP1B1,CYP2C19,CYP4A11,CYP4F2
1548,1557,1CYP2A6,CYP2C19,CYP3A4,CYP3A5,FMO3,FMO5,UGT2B17,HPGDS
229,1545,15ALDOB,CYP1B1,CYP2A6,CYP3A7,CYP2C19,CYP2F1,CYP3A4,CYP3A5,CYP4A11,CYP8B1,
1545,1557,1CYP1B1,CYP2C19,CYP4A11,CYP4F2
1545,1557,1CYP1B1,CYP2C19,CYP4A11,CYP8B1,EHHADH,FADS1,PON1,PTGDS,PTGS2,CYP4F2,SLC2
1545,1548,1CYP1B1,CYP2A6,CYP3A7,CYP2C19,CYP2F1,CYP3A4,CYP3A5,FMO5,HNF4A,CXCR4,CYP4
336,383,445APOA2,ARG1,ASS1,CCND1,COL1A1,CYP1B1,CYP2A6,CYP3A7,CYP2C19,CYP2F1,CYP3A4
1545,1548,1CYP1B1,CYP2A6,CYP2F1,CYP3A4,CYP3A5,UGT2B17,HPGDS
1548,1557,1CYP2A6,CYP2C19,CYP2F1
1548,1557,1CYP2A6,CYP2C19,CYP3A4,CYP3A5
1545,1548,1CYP1B1,CYP2A6,CYP2C19,CYP2F1,CYP3A4,CYP4A11,EHHADH,FADS1,PTGDS,PTGS2,M
1281,2243,2COL3A1,FGA,FGB,FGG,FN1,ITGAD,ITGAM,ITGAV,ITGAX,ITGB2,SIGLEC1,THY1,VTN,MSI
1281,2243,2COL3A1,FGA,FGB,FGG,FN1,ITGAD,ITGAM,ITGAV,ITGAX,ITGB2,SIGLEC1,THY1,VTN,MSI
335,1281,23APOA1,COL3A1,FN1,FYB1,ITGAD,ITGAM,ITGAV,ITGAX,ITGB2,PLEK,SYK,THY1,VAV1
1281,2243,2COL3A1,FGA,FGB,FGG,FN1,ITGAD,ITGAM,ITGAV,ITGAX,ITGB2,SIGLEC1,THY1,VTN,LPX
2200,3681,3FBN1,ITGAD,ITGAM,ITGAV,ITGAX,ITGB2,VTN,EMILIN1
3681,3685,3ITGAD,ITGAV,ITGAX,ITGB2,NRCAM,PTPRC,SIRPA
214,3684,36ALCAM,ITGAM,ITGAV,ITGB2,NRCAM,PTPRC,SDC1,SIGLEC1,SDC3,CADM1
2335,3071,3FN1,NCKAP1L,ITGAD,ITGAM,ITGAV,ITGAX,ITGB2,KNG1,VAV1,CXCR4,IQGAP3
101,214,10(ADAM8,ALCAM,CDH11,CLIC1,CYP1B1,FGA,FGB,FGG,FN1,GCNT1,ITGAD,ITGAM,ITGAV
101,214,10(ADAM8,ALCAM,CDH11,CLIC1,CYP1B1,FGA,FGB,FGG,FN1,GCNT1,ITGAD,ITGAM,ITGAV
214,1009,36ALCAM,CDH11,ITGAM,ITGB2,PCDH7,CD84,GPC6,PLXNB2,CADM1
2,335,350,3 A2M,APOA1,APOH,ARG1,C5,DUSP1,FGA,FGB,FGG,HRG,KNG1,LDLR,MMP12,NPY,PLG,
2,335,350,3 A2M,APOA1,APOH,ARG1,C5,DUSP1,FGA,FGB,FGG,HRG,KNG1,LDLR,MMP12,NPY,PLG,
2,101,197,3 A2M,ADAM8,AHSG,APOA1,ARG1,CFH,HPX,TNC,LDLR,MBL2,MMP12,NPY,PROC,PTGS2
101,197,335ADAM8,AHSG,APOA1,TNC,LDLR,NPY,PROC,PTGS2,PTPRC,S100A9,SYK,TLR4,TNFRSF11
2,335,383,3 A2M,APOA1,ARG1,LDLR,MMP12,NPY,PROC,PTPRC,SYK,CALCRL,TREM2,HAVCR2,SIRPA
335,3949,48APOA1,LDLR,NPY,PROC,PTPRC,SYK,CALCRL,TREM2,SIRPA,METRNL
1277,1278,1COL1A1,COL1A2,COL3A1,ITGB2,SIGLEC1,TYROBP,LILRB4,LILRB3,TREM2,COLEC12,CD3
1277,1278,1COL1A1,COL1A2,COL3A1,ITGB2,SIGLEC1,TYROBP,LILRB4,LILRB3,TREM2,COLEC12,CD3
899,929,127CCNF,CD14,COL1A1,COL1A2,COL3A1,CTSK,FGA,FGB,FGG,FYB1,ITGAV,ITGB2,KIF11,MI
335,338,127APOA1,APOB,COL1A1,COL1A2,COL3A1,MSR1,COLEC12,AMBP,HPX
335,338,127APOA1,APOB,COL1A1,COL1A2,COL3A1,MSR1,COLEC12
259,335,338AMBP,APOA1,APOB,COL1A1,COL1A2,COL3A1,HPX,MSR1,COLEC12
259,335,326AMBP,APOA1,HPX

5A1,CTSK,FBLN1,FBN1,FGA,FGB,FGG,FMOD,FN1,TNC,ITGAD,ITGAM,ITGAV,ITGAX,ITGB2,LAMA2,LC
5A1,CTSK,FBLN1,FBN1,FGA,FGB,FGG,FMOD,FN1,TNC,ITGAD,ITGAM,ITGAV,ITGAX,ITGB2,LAMA2,LC
TNC,ITGAD,ITGAM,ITGAV,ITGAX,ITGB2,LUM,SPP1,VTN,COL18A1,COL6A5
'P1B1,FBLN1,FMOD,LCP1,LOXL2,LUM,MFAP4,MMP12,MMP14,MYO1E,PLG,SERPINF2,COL14A1,PC
'P1B1,FBLN1,FMOD,LCP1,LOXL2,LUM,MFAP4,MMP12,MMP14,MYO1E,PLG,SERPINF2,COL14A1,PC
'P1B1,FBLN1,FMOD,LCP1,LOXL2,LUM,MFAP4,MMP12,MMP14,MYO1E,PLG,SERPINF2,COL14A1,PC
TSK,FBN1,FN1,MMP12,MMP14,PLG,SPP1,COL14A1,COL18A1,TMPRSS6,COL6A5
MMP14,COL14A1,COL18A1,TMPRSS6,COL6A5
X,LAMA2,LUM,VTN,COL6A5

F2,COL14A1,FKBP10,ADAMTS12
8A1,COL6A5
,COL14A1,COL18A1,COL6A5
.,COL14A1,COL18A1,COL6A5
C3
,PLOD1,COL14A1,COL18A1,COL6A5
CLS1,KRT7,KRT8,STMN1,LCP1,LOXL2,LUM,MARCKS,MFAP4,MYO1E,SERPINF2,TF,COL14A1,MFAP5,
A1,COL18A1,COL6A5

SPRV1

FOLR2,FOS,CXCL3,IL1RN,IRF5,ITGAM,ITGB2,ITIH4,KNG1,CD180,MBL2,SERPINA1,SERPINF2,PTGS2,S
FOLR2,FOS,CXCL3,IL1RN,IRF5,ITGAM,ITGB2,ITIH4,KNG1,CD180,MBL2,SERPINA1,SERPINF2,PTGS2,S
RPINF2,PTGS2,PTPRC,PTPRJ,SYK,TLR4,TYROBP,LAPTM5,CD84,CADM1,TLR7,TLR8,TREM2,HAVCR2
S100A9,SYK,TLR4,TOP2A,TYROBP,LAPTM5,HMGA2,RASSF2,UBD
PROC,RCN1,SPP1,TF,MSLN,CKAP4,PRSS23,FSTL1,APOA5
PROC,RCN1,SPP1,TF,MSLN,CKAP4,PRSS23,FSTL1,APOA5
C,RCN1,SPP1,TF,MSLN,CKAP4,PRSS23,FSTL1,APOA5
2,SERPINA1,PLG,SERPINF2,PROC,VTN,CYP1B1,PTGS2,MMP14,EMILIN1,TREM2,CCR5,CXCL3,NPY,CX
2,SERPINA1,PLG,SERPINF2,PROC,VTN

FCER1G,GUSB,NCKAP1L,HEXB,HK3,IGF2R,ITGAM,ITGAV,ITGAX,ITGB2,SERPINA1,SERPINB6,PIGR,PT
FCER1G,GUSB,NCKAP1L,HEXB,HK3,IGF2R,ITGAM,ITGAV,ITGAX,ITGB2,SERPINA1,SERPINB6,PIGR,PT
7,SERPINA1,PLG,PLEK,SERPINF2,TF,CD109,APOB,SERPINC1,COL1A1,COL1A2,DOCK2,FCER1G,ITGAM
7,SERPINA1,PLG,PLEK,SERPINF2,TF,CD109
G,FGA,FGB,FGG,FN1,HRG,ITGAM,ITGAV,ITGAX,ITGB2,ITIH3,ITIH4,KNG1,KIF11,PCDH7,SERPINA1,SE
7,SERPINA1,PLG,PLEK,SERPINF2,TF,CD109
FAC,HNF4A,HRG,TNC,KNG1,MMP12,SERPINA1,PLG,PLEK,PROC,SDC1,SYK,TLR4,TYROBP,VAV1,CYP4
SERPINA1,PLG,PLEK,PROC,SYK,VAV1,CYP4F2,PROZ
SERPINA1,PLG,PLEK,PROC,SYK,VAV1,CYP4F2,PROZ
NF4A,HRG,KNG1,MMP12,SERPINA1,PLG,PLEK,PROC,SDC1,SYK,TLR4,VAV1,CYP4F2,PROZ,MYOF,FKB
SERPINA1,PLG,PLEK,PROC,SYK,VAV1,CYP4F2,PROZ
G,ITIH3,ITIH4,KNG1,PCDH7,SERPINA1,PLG,PLEK,SERPINF2,SYK,TF,VAV1,APBB1IP,CD109
GFAC,HNF4A,HRG,KCNN4,KNG1,STMN1,SERPINA1,PLG,PLEK,SERPINF2,PROC,SYK,VAV1,VTN,CYP4F

CR4,EMILIN1,CD109,CADM4

CD109,CADM4

GG,FGL1,FN1,NCKAP1L,HRG,TNC,IL1RN,ITGAV,ITGB2,KNG1,LAMA2,MMP12,MMP14,NPY,PLG,SER
GG,FGL1,FN1,NCKAP1L,HRG,TNC,IL1RN,ITGAV,ITGB2,KNG1,LAMA2,MMP12,MMP14,NPY,PLG,SER
2,NPY,SERPINF2,PTPRC,PTPRJ,SYK,THY1,VAV1,ADAM19,LILRB4,EMILIN1,CORO1A,APBB1IP,HAVCR2
PLG,PTPRJ,THY1,EMILIN1

TYROBP,CXCR4,PLXNB2,TREM2
CNB2

PC1,GC,LCAT,LDLR,PON1,MSMO1,SPP1,SQLE,SREBF2,UGT2B17,RDH16,DHRS9,SLC27A2,APOBR,AP
PC1,GC,LCAT,LDLR,PON1,MSMO1,SPP1,SQLE,SREBF2,UGT2B17,RDH16,DHRS9,SLC27A2,APOBR,AP
L,GC,LCAT,LDLR,PAH,PON1,MSMO1,SQLE,SREBF2,TTPA,TTR,CYP4F2,RDH16,DHRS9,SLC27A2,ACER3
F2,APOBR,APOA5

LE,SREBF2,TTR,RDH16,DHRS9,ACER3,APOBR,APOA5

R,MMP12,NPY,PTPRC,PTPRJ,SPI1,SYK,THY1,TLR4,TYROBP,LAPTM5,CD84,LPXN,MAFB,LILRB4,LILRB3
R,MMP12,NPY,PTPRC,PTPRJ,SPI1,SYK,THY1,TLR4,TYROBP,LAPTM5,CD84,LPXN,MAFB,LILRB4,LILRB3
PY,PLG,SERPINF2,PTGS2,S100A9,SPI1,SYK,TLR4,TYROBP,VAV1,VTN,CXCR4,TNFRSF11A,EMILIN1,CA
NG1,MMP12,MMP14,PLG,PTPRC,SPI1,LAPTM5,LPXN,LILRB4,PLXNB2,HAVCR2

PRJ,SPI1,SYK,TLR4,TYROBP,VAV1,LAPTM5,CD84,LILRB4,CADM1,TREM2,HAVCR2

TNFRSF11A,EMILIN1,CADM1,TLR7,TLR8,TREM2,CREB3L3,HAVCR2
,CADM1,TLR8,HAVCR2

LILRB4,CADM1,TREM2,HAVCR2
PTM5,CD84,CADM1,TREM2
,PTPRC,SPI1,SYK,THY1,VAV1,LAPTM5,ADAM19,LILRB4,CORO1A,HAVCR2,SIRPA
M2,HAVCR2

R8,TREM2,HAVCR2
EK,PTPRC,SPI1,SYK,THY1,TLR4,TYROBP,VAV1,LAPTM5,CD84,LILRB4,EMILIN1,CORO1A,TREM2,HAVC

TREM2,HAVCR2
1,EMILIN1,CADM1,TLR8,TREM2,HAVCR2

.RB4,CORO1A,HAVCR2,SIRPA

,TLR4,TYROBP,VAV1,LAPTM5,CD84,LILRB4,CORO1A,TREM2,HAVCR2,SIRPA

.ILRB4,CORO1A,TREM2,HAVCR2,SIRPA
I,CORO1A,TREM2,HAVCR2,SIRPA

RO1A,HAVCR2,SIRPA

/CR2,SIRPA

GB2,LCP1,CD180,NPY,PLEK,PTGDS,PTPRC,PTPRJ,SPI1,SYK,TLR4,TPD52,TYROBP,VAV1,LAT2,CD84,M
GB2,LCP1,CD180,NPY,PLEK,PTGDS,PTPRC,PTPRJ,SPI1,SYK,TLR4,TPD52,TYROBP,VAV1,LAT2,CD84,M
REM2,DCSTAMP,HAVCR2
PRJ,SPI1,SYK,TLR4,TPD52,TYROBP,VAV1,LAT2,CD84,MAFB,UBD,CORO1A,BLNK,CLEC4A,TREM2,AP
BP,VAV1,LAT2,CORO1A,TLR8,TREM2,APBB1IP,HAVCR2,TUBB
EM2,APBB1IP,HAVCR2
EM2,APBB1IP,HAVCR2

11A,MAFB,UBD,BLNK,TREM2,DCSTAMP,CD109
AT2,CD84,MAFB,CORO1A,BLNK,CLEC4A,APBB1IP
,TOP2A,TPD52,TYROBP,VAV1,WNT2B,MFAP5,TNFRSF11A,MAFB,UBD,BLNK,TREM2,DCSTAMP,CD1
REM2,DCSTAMP
,TOP2A,TPD52,TYROBP,VAV1,WNT2B,MFAP5,TNFRSF11A,MAFB,UBD,LILRB4,BLNK,TREM2,DCSTAI
,TOP2A,TPD52,TYROBP,VAV1,WNT2B,MFAP5,TNFRSF11A,MAFB,UBD,BLNK,TREM2,DCSTAMP,CD1
IP

L,SREBF2,SYK,CYP4F2,TNFRSF11A,TREM2,OSBPL8,APOA5,ARSB,CYP1B1,CYP2C19,CYP3A4,EHHADH
L,SREBF2,SYK,CYP4F2,TNFRSF11A,TREM2,OSBPL8,APOA5
,CYP4F2,TNFRSF11A,TREM2,APOA5
RSF11A,TREM2

L2,GC,HEXB,FADS1,ABCB4,PON1,PTGDS,PTGS2,MSMO1,SQLE,SREBF2,CYP4F2,LPIN2,SLC27A2,PLD

HFR,NCKAP1L,HRG,ITIH1,ITIH3,ITIH4,KNG1,SERPINA1,SERPINB6,SERPINF2,PTGS2,RGS2,SLPI,VTN,R
HFR,NCKAP1L,HRG,ITIH1,ITIH3,ITIH4,KNG1,SERPINA1,SERPINB6,SERPINF2,PTGS2,RGS2,SLPI,VTN,R
G1,SERPINA1,SERPINB6,SERPINF2,PTGS2,SLPI,VTN,CD109

G1,SERPINA1,SERPINB6,SERPINF2,PTGS2,SLPI,VTN,CD109
I4,KNG1,MAP1A,SERPINA1,SERPINB6,SERPINF2,PTGS2,SLPI,VTN,CD109,TTC36

3,ITIH4,KNG1,PCOLCE,SERPINA1,SERPINB6,SERPINF2,PTGS2,S100A9,SLPI,SYK,VTN,LAPTM5,CD10
G1,SERPINA1,SERPINB6,SERPINF2,PTGS2,S100A9,SLPI,SYK,VTN,LAPTM5,CD109
GAS1,HRG,ITIH1,ITIH3,ITIH4,KNG1,MAP1A,MMP14,PCOLCE,SERPINA1,SERPINB6,SERPINF2,PTGS2,
BP1,GCHFR,NCKAP1L,HRG,ITIH1,ITIH3,ITIH4,KNG1,SERPINA1,SERPINB6,SERPINF2,PTGS2,PTPRC,PT
,KCNN4,MBL2,MFAP4,MMP12,PTPRC,PTPRJ,SPI1,SYK,THY1,TLR4,TYROBP,VAV1,LAT2,CADM1,BLN
,KCNN4,MBL2,MFAP4,MMP12,PTPRC,PTPRJ,SPI1,SYK,THY1,TLR4,TYROBP,VAV1,LAT2,CADM1,BLN
,TYROBP,VAV1,LAT2,LILRB4,BLNK,TLR7,TLR8,COLEC12,HAVCR2,PIK3AP1
AV1,LAT2,LILRB4,BLNK
SF11A,CORO1A

AV1,CXCR4,TNFRSF11A,CORO1A,SIRPA
ΓLR4,TYROBP,VAV1,LAT2,BLNK
,ITGAV,ITGB2,LAMA2,NRCAM,ENPP2,PTPRJ,S100A9,SYK,VAV1,CXCR4,TNFRSF11A,CXCL14,CORO1A
,ITGAV,ITGB2,LAMA2,NRCAM,ENPP2,PTPRJ,S100A9,SYK,VAV1,CXCR4,TNFRSF11A,CXCL14,CORO1A
ΑT2,BLNK
ΑT2,BLNK
ΙFRSF11A,CXCL14,CORO1A

FTCD,HAAO,BHMT2,GNMT,PIPOX,ALDH8A1,TTC36,IYD,UPB1,CYP4A11,EHHADH,PON1,CYP4F2,LPI
FTCD,HAAO,BHMT2,GNMT,PIPOX,ALDH8A1,TTC36,IYD

FTCD,HAAO,BHMT2,GNMT,PIPOX,UPB1,ALDH8A1,TTC36,IYD
,SLC27A2,HAAO,PIPOX,ALDH8A1

,SLC27A2,HAAO,PIPOX,ALDH8A1

'P4F2,LPIN2,AASS,FTCD,SLC27A2,HAAO,PIPOX,UPB1,ALDH8A1

Ɔ,HAAO,BHMT2,GNMT,DMGDH,PIPOX,IYD

TGS2,TTR,CYP4F2,RDH16,DHRS9,ALDH8A1,CYP8B1,PON1,HPGDS,DPEP2,SYK,UGT2B17,AHCY,FMO
TGS2,TTR,CYP4F2,RDH16,DHRS9,ALDH8A1

,DPEP2

MO3,MAT1A,UGT2B17,CYP4F2,HPGDS,DPEP2,UGT3A1
Ɔ27A2,ELOVL6
EH1
ΙVL6

ƆYP4F2

EHHADH,HK3,FADS1,PTGDS,PTGS2,MSMO1,UGT2B17,CYP4F2,LPIN2,DHRS9,FTCD,SLC27A2,HAAO

27A2,HPGDS,DPEP2,ELOVL6
4F2,NCEH1
4,CYP3A5,FMO5,FOS,NCKAP1L,HNF4A,PTGS2,CXCR4,CYP4F2,NCEH1

MSMO1,CYP4F2,LPIN2,SLC27A2,HPGDS,ELOVL6
LN,EMILIN1,ADAMTS12,APOA1,FYB1,PLEK,SYK,VAV1,LPXN,CORO1A,FBN1,NRCAM,PTPRC,SIRPA,A
LN,EMILIN1,ADAMTS12

N,MSLN,EMILIN1,CORO1A,ADAMTS12

V,ITGAX,ITGB2,NRCAM,PCDH7,PLEK,PTPRC,S100A9,SIGLEC1,SYK,THY1,COL14A1,CD84,GPC6,PLXNI
V,ITGAX,ITGB2,NRCAM,PCDH7,PLEK,PTPRC,S100A9,SIGLEC1,SYK,THY1,COL14A1,CD84,GPC6,PLXNI

,SERPINF2,PROC,PTPRC,SPP1,SYK,VTN,CALCRL,TREM2,HAVCR2,CD109,SIRPA,METRNL,ADAM8,AH
,SERPINF2,PROC,PTPRC,SPP1,SYK,VTN,CALCRL,TREM2,HAVCR2,CD109,SIRPA,METRNL
2,PTPRC,S100A9,SPI1,SYK,TLR4,TYROBP,VAV1,TNFRSF11A,CALCRL,EMILIN1,CADM1,TLR7,TLR8,TR
1A,CALCRL,TLR7,TREM2,ADAMTS12,CREB3L3,PIK3AP1,SIRPA,METRNL
A,METRNL

300LB,CD300LD,CCNF,CD14,CTSK,FGA,FGB,FGG,FYB1,ITGAV,KIF11,MRC1,PTPRC,PTPRJ,S100A9,SY
300LB,CD300LD
RC1,PTPRC,PTPRJ,S100A9,SIGLEC1,SYK,TLR4,TYROBP,VAV1,IFI30,LILRB4,LILRB3,WWP1,RACGAP1,

DXL2,LUM,MFAP4,MMP12,MMP14,PCOLCE,PLG,PLOD1,SDC1,SPP1,TTR,COL14A1,VTN,ADAM12,M
DXL2,LUM,MFAP4,MMP12,MMP14,PCOLCE,PLG,PLOD1,SDC1,SPP1,TTR,COL14A1,VTN,ADAM12,M

DSTN,EMILIN1,OLFML2B,FKBP10,COL18A1,ADAMTS12,TMPRSS6,COL6A5
DSTN,EMILIN1,OLFML2B,FKBP10,COL18A1,ADAMTS12,TMPRSS6,COL6A5
DSTN,EMILIN1,OLFML2B,FKBP10,COL18A1,ADAMTS12,TMPRSS6,COL6A5

,PSTPIP1,ARHGAP25,EMILIN1,CORO1A,TPX2,FKBP10,ADAMTS12,GAS2L3

S100A9,SDC1,SIGLEC1,SPP1,SYK,TLR4,TYROBP,CXCR4,PSTPIP1,PLD3,BLNK,TLR7,TLR8,TREM2,ACER
S100A9,SDC1,SIGLEC1,SPP1,SYK,TLR4,TYROBP,CXCR4,PSTPIP1,PLD3,BLNK,TLR7,TLR8,TREM2,ACER

XCR4,ADAM8,NCKAP1L,IRF5,CCND1,CD14,FABP1,TLR4,LPIN2,DUSP1,SPI1,THY1,ADGRE1,P2RY6,W

TPRC,PTPRJ,S100A9,SLPI,TTR,TYROBP,CKAP4,SLC27A2,LILRB3,COTL1,QPCT,HGSNAT,SIRPA,CLEC12
TPRC,PTPRJ,S100A9,SLPI,TTR,TYROBP,CKAP4,SLC27A2,LILRB3,COTL1,QPCT,HGSNAT,SIRPA,CLEC12
M,ITGAV,ITGAX,ITGB2,KIF11,SERPINB6,PROC,SDC1,SYK,VAV1,CD84,SDC3,RACGAP1,APBB1IP,TUBE

ERPINB6,PLG,PLEK,SERPINF2,PROC,SDC1,SYK,TF,VAV1,CD84,SDC3,RACGAP1,APBB1IP,TUBB6,CD1C

4F2,PROZ,NREP,MYOF,TREM2,FKBP10,DCBLD2

3P10,DCBLD2

F2,PROZ,EMILIN1

PINF2,PTPRC,PTPRJ,SPI1,SYK,THY1,VAV1,VTN,LAPTM5,CXCR4,ADAM19,LPXN,LILRB4,EMILIN1,COF
PINF2,PTPRC,PTPRJ,SPI1,SYK,THY1,VAV1,VTN,LAPTM5,CXCR4,ADAM19,LPXN,LILRB4,EMILIN1,COF
2,SIRPA

ᵖOA5,ATP7A,CTSK,CYP4A11,PAH,TTPA,TTR,CYP4F2,ACER3,IYD
ᵖOA5
3,APOBR,APOA5,IYD

3,EMILIN1,TREM2,HAVCR2,ADAM8,APOH,C3AR1,C5AR1,HPX,HRG,CD180,MBL2,PLG,SERPINF2,PT
3,EMILIN1,TREM2,HAVCR2
ᗅDM1,TLR7,TLR8,TREM2,CREB3L3,HAVCR2

CR2,SIRPA

MAFB,UBD,CORO1A,BLNK,CLEC4A,TREM2,APBB1IP,DCSTAMP,HAVCR2,C5,CFH,MBL2,MFAP4,TLR8,
MAFB,UBD,CORO1A,BLNK,CLEC4A,TREM2,APBB1IP,DCSTAMP,HAVCR2

PBB1IP,DCSTAMP,HAVCR2

109

MP,HAVCR2,CD109
109

H,FABP1,FHL2,GC,HEXB,FADS1,PTGDS,PTGS2,MSMO1,SQLE,LPIN2,SLC27A2,PLD3,HPGDS,ACER3,DI

D3,HPGDS,ACER3,DPEP2,ETNPPL,ELOVL6,OSBPL8,APOA5

RGN,CD109,ASS1,FN1,MBL2,GAS1,MAP1A,TTC36,FBLN1,PCOLCE,S100A9,SYK,LAPTM5,ADAM8,DAB
RGN,CD109

9

,S100A9,SLPI,SYK,VTN,LAPTM5,RGN,TREM2,CD109,TTC36
TPRJ,RGS2,SLPI,THY1,VTN,RGN,LILRB4,PIF1,CD109
NK,TLR8,TREM2,HAVCR2,CD14,PIGR,LILRB4,TLR7,COLEC12,PIK3AP1,CCR5,CXCL3,S100A9,CXCR4,TN
NK,TLR8,TREM2,HAVCR2

A,PLXNB2
A,PLXNB2

IN2,SLC27A2,APOBEC1,CYP3A4,HK3,AHCY,CKB,DMGDH

)3,MAT1A,UGT3A1,SLC27A2,ELOVL6,FMO5,HNF4A,NCEH1,ALDOB,EHHADH,HK3,MSMO1,LPIN2,F1

),HPGDS,ALDH8A1,ELOVL6

ALCAM,SDC1,SDC3,CADM1,NCKAP1L,KNG1,CXCR4,IQGAP3

B2,CADM1,SIRPA
B2,CADM1,SIRPA

ISG,CFH,HPX,TNC,MBL2,PTGS2,S100A9,SPI1,TLR4,TYROBP,VAV1,TNFRSF11A,EMILIN1,CADM1,TLR

EM2,ADAMTS12,CREB3L3,HAVCR2,PIK3AP1,SIRPA,METRNL

K,TLR4,VAV1,IFI30,WWP1,RACGAP1,BLNK,TUBB6,PIK3AP1

BLNK,TREM2,COLEC12,TUBB6,PIK3AP1,CD300LB,CD300LD

MFAP5,ADAM19,SDC3,EMILIN1,COL18A1,TMPRSS6,COL6A5,ATP7A,CYP1B1,LCP1,MYO1E,SERPINF2
MFAP5,ADAM19,SDC3,EMILIN1,COL18A1,TMPRSS6,COL6A5

C3,HAVCR2,CYP1B1,EGR1,FCER1G,LUM,MMP12,PTPRC,PTPRJ,LAPTM5,CD84,CADM1,ATF3,HRG,IGF
C3,HAVCR2

NT2B,CALCRL

2A,TUBB
2A,TUBB
36,SIRPA,ARG1,CLIC1,COL3A1,COL5A1,FBLN1,HGFAC,HNF4A,TNC,MMP12,TLR4,TYROBP,CYP4F2,P

09,SIRPA

RO1A,PLXNB2,APBB1IP,HAVCR2,SIRPA,FBN1,LDLR,MAN2A1,PROC,SPP1,TTPA,TYROBP,TREM2,EPS
RO1A,PLXNB2,APBB1IP,HAVCR2,SIRPA

GS2,S100A9,VAV1,VTN,CXCR4,TNFRSF11A,CADM1,TLR7,TLR8,CREB3L3,ASS1,COL1A1,CYP1B1,FBL

,TUBB,TF,TNFRSF11A,CD109,HCLS1,NCKAP1L,MYO1E,TOP2A,WNT2B,MFAP5,LILRB4

PEP2,ETNPPL,ELOVL6

B2,MMP14,TREM2,DUSP1,PTPRC,PTPRJ,THY1,LILRB4,PIF1

NFRSF11A,CORO1A,EPS8,GCNT1,PLG,SIRPA,ALCAM,APOA1,DOCK2,ITGAV,LAMA2,NRCAM,ENPP2,

TCD,HAAO,CXCR4,APOA2,ARG1,ASS1,CCND1,COL1A1,FOS,NCKAP1L

ł7,TLR8,ADAMTS12,CREB3L3,PIK3AP1

2,POSTN,OLFML2B,FKBP10,ADAMTS12,CAPG,EPS8,FLNC,HCLS1,KRT7,KRT8,STMN1,MARCKS,TF,PS

F2R,TOP2A,HMGA2,RASSF2,UBD

ROZ,NREP,MYOF,TREM2,FKBP10,DCBLD2,ATP7A,CCND1,CYP4A11,KCNN4,STMN1,VTN,EMILIN1,S

58,HEXB,ENPP2

.N1,FGG,IL1RN,KNG1,MMP14,PLXNB2,AZGP1,CFH,ITGAM,ITGB2,FGA,FGB,ADAM19,CORO1A,SIRP/

CXCL14,PLXNB2

ꜜTPIP1,ARHGAP25,CORO1A,TPX2,GAS2L3,KCNN4,TNS3,HGFAC,PTPRJ,MAFB,CD109,ASPRV1,ASS1

iPP1,CXCR4,CADM4,ADAM19

A,FCER1G,FN1,PLEK