

The inverse agonist DG172 triggers a PPAR β/δ -independent myeloid lineage shift and promotes GM-CSF/IL-4-induced dendritic cell differentiation

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ABBREVIATIONS: Angptl4, angiopoietin-like 4; BMC, bone marrow cell; DC, dendritic cell; DG172, (Z)-2-(2-bromophenyl)-3-[(4-(1-methylpiperazine)amino)phenyl]acrylonitrile; DG195, (Z)-2-(2-chlorophenyl)-3-[4-(4-methylpiperazine-1-yl)phenyl]acrylonitrile; DG228, (Z)-2-(4-chlorophenyl)-3-[4-(4-methylpiperazine-1-yl)phenyl]acrylonitrile; DMEM, Dulbecco's minimal essential medium; DMSO, dimethylsulfoxide; FACS, fluorescence-activated cell sorting; GM-CSF, granulocyte-macrophage-colony-stimulating factor; GW501516, [2-methyl-4-[[[4-methyl-2-[4-(trifluoromethyl)phenyl]-5-thiazolyl]methyl]thio]phenoxy]-acetic acid; M-CSF, macrophage-colony-stimulating factor; MFI, mean fluorescence intensity; PBS, phosphate-buffered saline; Pdk4, pyruvate dehydrogenase kinase 4; PPAR, peroxisome proliferator-activated receptor; RT-qPCR, real-time quantitative polymerase chain reaction; ChIP, chromatin immunoprecipitation; TR-FRET, time-resolved fluorescence resonance energy transfer; ST247, methyl 3-(*N*-(4-(hexylamino)-2-methoxyphenyl)sulfamoyl)thiophene-2-carboxylate.

ABSTRACT

The stilbene derivative DG172 was developed as a highly selective inhibitory PPAR β/δ ligand. Here, we describe a novel PPAR β/δ -independent, yet highly specific effect of DG172 on the differentiation of bone marrow cells (BMCs). DG172 strongly augmented GM-CSF-induced differentiation of primary BMCs from *Ppard* null mice into two specific populations, characterized as mature (CD11c^{hi}MHCII^{hi}) and immature (CD11c^{hi}MHCII^{lo}) dendritic cells. IL-4 synergized with DG172 to shift the differentiation from MHCII^{lo} cells to mature dendritic cells in vitro. The promotion of DC differentiation occurred at the expense of differentiation to granulocytic Gr1⁺Ly6B⁺ cells. In agreement with these findings, transcriptome analyses showed a strong DG172-mediated repression of genes encoding neutrophilic markers in both differentiating wildtype and *Ppard* null cells, while macrophage/DC marker genes were upregulated. DG172 also inhibited the expression of transcription factors driving granulocytic differentiation (*Cebpe*, *Gfi1*, *Klf5*), and increased the levels of transcription factors promoting macrophage/DC differentiation (*Irf4*, *Irf8*, *Spib*, *Spic*). DG172 exerted these effects only at an early stage of BMC differentiation induced by GM-CSF, did not affect M-CSF triggered differentiation to macrophages and had no detectable PPAR β/δ -independent effect on other cell types tested. Structure-function analyses demonstrated that the 4-methylpiperazine moiety in DG172 is required for its effect on DC differentiation, but is dispensable for PPAR β/δ binding. Based on this data we developed a new compound, DG228, which enhances DC differentiation in the absence of significant PPAR β/δ binding.

Introduction

Peroxisome proliferator-activated receptors (PPARs) are nuclear receptors that function as ligand-inducible transcription factors in lipid metabolism and immune regulation (Kostadinova et al., 2005; Wahli and Michalik, 2012; Yang et al., 2010). Consistent with their physiological functions PPARs are associated with major human diseases, including hyperlipidemia, diabetes, arteriosclerosis, inflammatory disorders and cancer (Desvergne et al., 2006; Peters et al., 2012; Wahli and Michalik, 2012). Consequently, their potential as therapeutic targets has led to the development of subtype-selective, high affinity ligands (Peraza et al., 2006).

PPAR β/δ serves as a receptor for a broad range of natural agonistic ligands with function in inflammatory processes, including unsaturated fatty acids (Xu et al., 1999), prostaglandin I₂ (prostacyclin) (Lim et al., 1999) and 15-hydroxyeicosatetraenoic acid (15-HETE) (Naruhn et al., 2010). Different laboratories and companies have developed a number of PPAR β/δ -specific agonistic ligands (Peraza et al., 2006), several of which are well characterized and have been used in numerous experimental studies. Synthetic antagonistic ligands for PPAR β/δ have explored to a much lesser extent, but several inhibitory compounds have been described over the past years. These include the irreversible inhibitor and partial PPAR γ agonist GSK3787 (Palkar et al., 2010; Shearer et al., 2010), the PPAR β/δ -specific GSK0660 (Shearer et al., 2008) and its improved derivative ST247 (Naruhn et al., 2011; Toth et al., 2012), and the stilbene DG172 (Lieber et al., 2012). These ligands act as inverse agonists, as indicated by their inhibitory effect on the basal expression of PPAR β/δ target genes and an increased recruitment of transcriptional corepressors (Naruhn et al., 2011). DG172 is a PPAR β/δ -selective compound characterized by a high affinity and potent repressive effects on PPAR β/δ target genes (Lieber et al., 2012).

There is a large body of evidence implicating PPAR β/δ in inflammation-associated processes (Kostadinova et al., 2005; Wahli and Michalik, 2012; Yang et al., 2010), including T-helper cell function (Kanakasabai et al., 2010) and macrophage polarization (Kang et al., 2008; Odegaard et al., 2008). Nevertheless, the precise role of PPAR β/δ in immune cell differentiation and regulation is still poorly understood. We therefore sought to analyze the effect of PPAR β/δ ligands on differentiating bone marrow cells from wild type and *Ppard* null mice. At an early stage of this study it became evident that DG172 strongly influenced bone marrow cell (BMC) differentiation induced by granulocyte-macrophage-colony-stimulating factor (GM-CSF), whereas the genetic disruption of *Ppard*, the agonist GW501516 and the inverse agonist ST247 affected differentiation only to a marginal extent, indicating a PPAR β/δ -independent mechanism.

Exposure of mouse bone marrow cells to GM-CSF as the only growth factor or cytokine

results in a mixed population of adherent and non-adherent cells consisting of macrophages, dendritic cells and neutrophils (Inaba et al., 1992). While the numbers of non-adherent granulocytic cells decrease in these cultures within a few days, loosely adhering immature dendritic cells and strongly adherent macrophages increase. Inclusion of IL-4 strongly shifts the balance towards the differentiation to immature dendritic cells (Schuler et al., 1999), while the addition of macrophage-colony-stimulating factor (M-CSF; CSF-1) instead of GM-CSF produces a basically pure population of macrophages (Weischenfeldt and Porse, 2008). The different myeloid cell types can be identified by selectively expressed surface markers, such as Gr1 (Ly6G) on neutrophils and MHCII, CD11c and F4/80 on dendritic cells and macrophages (Inaba et al., 1992; Lee et al., 2013; Leon et al., 2004; Schuler et al., 1999; Weischenfeldt and Porse, 2008). Lineage specification is determined by key transcription factors that drive differentiation along a specific path, such as C/EBP ϵ and Gfi1 for neutrophils or Spi1 (PU.1) and Irf8 for monocytic cells (Rosenbauer and Tenen, 2007). We used this experimental system in the present study to investigate in detail the DG172-induced lineage shift in BMC differentiation.

Materials and Methods

Cell culture

Bone marrow cells were isolated from mice as described (Resnitzky et al., 1986) and cultured in RPMI 1640 supplemented with 10% fetal calf serum, 25 mM HEPES, 100U/ml penicillin, 100 μ g/ml streptomycin, 1mM sodium pyruvate and recombinant GM-CSF (20 ng/ml) (PeproTech, Hamburg, Germany) for 6 days, if not indicated otherwise. In some experiments IL-4 (5 or 200 ng/ml, as indicated) (PeproTech, Hamburg, Germany) and/or lipopolysaccharide (LPS; 100 ng/ml) (Sigma-Aldrich, Taufkirchen, Germany) were added, or M-CSF (Biomol, Hamburg, Germany; 20 ng/ml) was used instead of GM-CSF. Thioglycollate-elicited macrophages were obtained as described (Naruhn et al., 2011). NIH3T3 cells were cultured in Dulbecco's modified Eagle's medium (DMEM), complemented with 10% fetal calf serum, 2mM L-glutamine, 100U/ml penicillin, 100 μ g/ml streptomycin. Cells were maintained in a humidified incubator at 37 °C and 5% CO₂.

Ligands

DG172, its derivatives and ST247 were synthesized as previously described (Toth et al., 2012; Lieber et al., 2012). GW501516 was purchased from Axxora (Lörrach, Germany). Synthesis and experimental details for DG195 and DG228 are described in Supplemental Methods.

Mice

C57Bl6 mice were purchased from Jackson Laboratory (Bar Harbor, Maine). *Ppard* null (epiblast-specific disruption of *Ppard*) and wt mice were generated by crossing floxed *Ppard* mice (Barak et al., 2002) and Sox2-Cre mice (Hayashi et al., 2002) as described (Scholtysek et al., 2013). The floxed *Ppard* mice were kindly provided by Dr. R. Evans (Salk Institute, La Jolla, CA). Sox2-Cre mice were obtained from Jackson Laboratory (Bar Harbor, Maine). Genotyping was performed with the following primers: *Ppard* intron 3 (forward: GGC TGG GTC ACA AGA GCT ATT GTC TC), *Ppard* exon 4 (forward: GGC GTG GGG ATT TGC CTG CTT CA); *Ppard* intron 4 (reverse: GAG CCG CCT CTC GCC ATC CTT TCA G; fragment sizes: *Ppard* wt: 360 bp; *Ppard* floxed: 400 bp; *Ppard* ko: 240 bp; *Cre* (forward: CCT GGA AAA TGC TTC TGT CCG; reverse: CAG GGT GTT ATA AGC AAT CCC); fragment size: 390 bp.

FACS analyses

Cells were washed with PBS incubated with 10 µg/ml TruStain fcX (BioLegend, San Diego, CA) for 10 min at 4°C to block unspecific Fc-binding, and subsequently stained with the following antibodies for 30 min at 4°C: FITC-labeled anti-mouse CD14 (Sa14-2), APC/Cy7-labeled anti-mouse F4/80 (BM8), APC-labeled anti-mouse MHCII (I-A/I-E) (M5/114.15.2), Pe-Cy7-labeled anti-mouse CD11c (N418), Pacific blue-labeled anti-mouse Ly-6G (1A8), PerCP-Cy5.5-labeled anti-mouse CD14 (Sa2-8), PE-labeled anti-mouse F4/80 (BM8) (BioLegend, San Diego, CA) and FITC-labeled anti-mouse Ly-6B.2 (7/4) (Biozol, Eching, Germany). Isotype control antibodies were as follows: FITC-labeled rat IgG2α,κ, APC/Cy7-labeled rat IgG2β,κ, APC-labeled rat IgG2β,κ, PeCy7-labeled Hamster IgG, Pacific blue-labeled rat IgG2α,κ, PerCP-Cy5.5-labeled rat IgGα,κ, PE-labeled rat IgG2β,κ and FITC-labeled rat IgG2α (BioLegend, San Diego, CA). Cells were analyzed using a FACSCanto flow cytometer and FlowJo 9.5.1 software (BD Biosciences). Data were plotted using biexponential transformation.

Immunoblotting of S100A8

Cells were lysed in (60mM TrisHCl, pH 7.5, 30mM NaCl, 0,1mM EGTA, 1% Triton X-100, and a Roche protease inhibitor mix). Cell lysates were subjected to SDS-PAGE on 20% gels and immunoblotting was performed with the Trans-Blot Turbo Transfer System (BioRad, München, Germany) using the optimized protocol for low MW proteins, a rat anti-mouse monoclonal antibody against S100a8/Mrp8 (Biozol, Eching, Germany) and a HRP-labeled second antibody (Cell Signaling Technology, Leiden, Netherlands). Bands were visualized by ChemiDoc MP Imaging System and quantified using Image Lab 5.0 software (BioRad, München, Germany).

Quantitative RT-PCR

cDNA was synthesized from 0.1-1 µg of RNA using oligo(dT) and random primers and the iScript kit (Biorad, Germany). qPCR was performed in a Mx3000P Real-Time PCR system (Stratagene, La Jolla, CA) for 40 cycles at an annealing temperature of 60 °C. PCR reactions were carried out using the Absolute QPCR SYBR Green Mix (Abgene, Hamburg, Germany) and a primer concentration of 0.2 µM following the manufacturer's instructions. *L27* was used as normalizer. Comparative expression analyses were statistically analyzed by Student's *t*-test (two-tailed, equal variance) and corrected for multiple hypothesis testing via the Bonferroni method. RT-qPCR primer sequences are listed in Supplemental Table 1.

Microarrays

Mouse Agilent 4-plex Array 44K, design id 028005, were used for the analysis of the gene expression of the different samples in a reference-design assay as previously published (Kaddatz et al., 2010). Raw microarray data were normalized using the 'loess' method implemented within the limma package of R/Bioconductor (Smyth, 2005). Probes were assigned to genes as described (Adhikary et al., 2011) using Ensembl release 70. Probes were considered regulated if they had a minimum intensity value of 5 and a comparison specific change as specified in the Results. Raw and normalized microarray data from this publication have been submitted to the EBI ArrayExpress and assigned the identifier [accession: E-MTAB-2628vi]. All data is MIAME compliant.

Time-Resolved Fluorescence Resonance Energy Transfer TR-FRET assay

Ligand binding was determined by TR-FRET in vitro using the Lanthascreen TR-FRET PPARβ/δ competitive binding assay (Life Technologies, Darmstadt, Germany) as described (Naruhn et al., 2011).

Results

DG172 promotes the differentiation of DCs from GM-CSF-induced mouse BMCs and reduces Ly6b⁺/Gr1⁺ granulocytic cells

After differentiation of BMCs for 9 days in the presence of GM-CSF, IL-4 and/or DG172 the loosely attached and floating cells were collected and cultured for another 3 days under the same conditions. Compared to cells with GM-CSF only (Fig. 1A), cells showed morphological alterations upon co-treatment with DG172 (more spindle-shaped cells; panel B) or IL-4 (larger, rounded cells; panel C). Addition of LPS to the latter triggered a mature dendritic cells morphology (Fig. 1D), as described (Dearman et al., 2009). A very similar effect was observed when DG172 was used instead of LPS (Fig. 1E), while no further morphological

changes were seen when both DG172 and IL-4 were added (Fig. 1F). These observations suggested that DG172 synergizes with IL-4 to promote the differentiation into mature DC.

FACS analysis of DC surface markers CD11c and MHCII confirmed the morphological observations. Fig. 2 shows three distinct populations: MHCII⁻, CD11c^{hi}/MHCII^{lo} and CD11c^{hi}/MHCII^{hi}, subsequently referred to as P1, P2 and P3, respectively (Fig. 2A). DG172 increased both P2 and P3. This effect was observed in both wt (Fig. 2A, B) and *Ppard* null cultures (Fig. 2C, D) and was therefore independent of PPAR β/δ . IL-4 at a low concentration of 1 ng/ml synergized with DG172 by further increasing P3 (Fig. 2-D).

This data supports the view that DG172 promotes DC differentiation, which was further investigated by additional FACS phenotyping using the myeloid surface markers CD14 and F4/80. As shown in Fig. 3A and B, P3 cells exhibited a lower mean fluorescence intensity (MFI) for CD14 than P1 and P2 cells. In P2 cells the CD14 MFI level decreased further upon DG172 treatment, consistent with the promotion of their differentiation to DCs (Mahnke et al., 1997). In contrast, the MFI measured for F4/80 was higher on P2 and P3 compared to P1 cells, but was reduced by DG172 in both P2 and P3 (Fig. 3C, D). Decreasing F4/80 surface expression has previously been reported for differentiating DCs (Leon et al., 2004). The P2 and P3 populations thus likely comprise CD11c^{hi}/MHCII^{lo} immature and CD11c^{hi}/MHCII^{hi} mature DCs, respectively. These are clearly distinguished from the P1 population, which is composed of MHCII⁻ cells and presumably represent cells at an early stage of differentiation. The described effects were specific for GM-CSF induced dendritic cell differentiation, since no DG172 effects were observed on differentiation to macrophages triggered by M-CSF (Supplemental Figure 1).

To analyze the fate of granulocytic cells we determined the surface markers Ly6B and Gr1 (LY6C) in the same samples. FACS analysis identified 3 distinct subpopulations in cells treated with DG172 (day 1-6): Ly6B⁻Gr1⁻, Ly6B⁺Gr1⁻ and Ly6B⁺Gr1⁺, defined as populations PA, PB and PC in Fig. 4A, with PC cells representing differentiated neutrophils. Gating for these subpopulations showed that only the double-negative PA cells were positive for CD11c and MHCII expression, which is in agreement with the conclusion that the P3 cells defined in Fig. 2 represent mature DCs.

Granulocytic cells decreased in GM-CSF-induced BMC cultures after 48 h, as shown by the shrinking number of Ly6b⁺/Gr1⁺ cells (Fig. 4B, top) (Lee et al., 2013), an effect that was clearly enhanced by DG172 (Fig. 4B, bottom). These observations are consistent with the conclusion that DG172 promotes DC differentiation at the expense of granulocytes.

DG172-induced transcriptome changes in GM-CSF-induced mouse BMCs

To gain further insight into the DG172-triggered alterations to BMC differentiation we performed microarray analyses of cells exposed to GM-CSF in the presence or absence of the ligand (5 days incubation; sample subsequently referred to as d1-6). To be able to identify PPAR β/δ -independent effects of DG172 in this system we included in this study the inverse PPAR β/δ agonist ST247 and the PPAR β/δ agonist GW501516. As shown by the Venn diagram in Fig. 5A, only a small fraction ($n=66$; threshold 2-fold) of all DG172-repressed genes ($n=598$) was also repressed by ST247, and an even smaller number ($n=19$) was activated by GW501516. In addition, we compared the effect of DG172 on BMCs from both wild type and *Ppard* null mice and found a substantial number of genes to be repressed by DG172 irrespective of the *Ppard* status ($n=227$). An analogous situation was found with DG172-activated genes ($n=702$; Fig. 5B). Of these genes, only a small fraction was also activated by ST247 ($n=40$) or repressed by GW501516 ($n=31$). Furthermore, a large fraction of genes ($n=162$) was induced by DG172 in a PPAR β/δ -independent fashion. Supplemental Datasets 1A and 1B list all genes repressed or activated by DG-172 in cells from *Ppard* null mice.

To gain further insights into the effect of DG172 on differentiation, we performed microarray analyses on BMC cultures that were exposed to DG172 for only 1 day, either from day 2 to 3 (2-3d) or from day 5 to 6 (5-6d), and then harvested for microarray analysis. The data in Fig. 5C and Supplemental Datasets 2 and 3 clearly suggest a stage-specific effect of DG172: while more than 20% ($n=108$) of all genes ($n=511$ in total in the d1-6 sample) were repressed in the d2-3 sample, only a marginal number of genes ($n=15$) in the d5-6 sample coincided with those in the d1-6 sample ($n=389$ in total).

Both the DG172-repressed and DG172-activated genes (d2-3 *Ppard* null BMCs) were functionally annotated according to “functions and diseases” using Ingenuity Pathway Analysis (Fig. 5D, E). Top categories according to p-values were “Inflammatory Response”, “Cellular Movement”, “Hematological System Development and Function” and “Immune Cell Trafficking”, associated with the functions listed in Figure 5 D and E. This data clearly connect the DG172-regulated genes to the observed effect on GM-CSF-induced BMC differentiation.

This conclusion is clearly supported when the regulated genes are analyzed according to their functions in cells of the two major myeloid lineages. The summary of microarray data in Fig. 6A shows a strong down-regulation of genes selectively expressed by neutrophils, such as *S100A8*, *S100A9*, *Ltf* (lactoferrin), *Mpo* (myeloperoxidase) and *Hp* (haptoglobin). In contrast, genes characteristic of the antigen-presenting cells were upregulated, including five

different H2 MHC genes, *CD80* (B7-1), *CD86* (B7-2) and *CD209* (DC-SIGN). These results were confirmed by RT-qPCR in all instances tested (Fig. 6B). We also detected a strong PPAR β/δ -independent DG172-mediated repression of *S100A8* protein expression by immunoblot analysis (≥ 10 -fold; Fig. 6C).

Myeloid differentiation is governed by several key transcription factors (Rosenbauer and Tenen, 2007). We therefore analyzed the regulation of the corresponding genes by DG172 in our experimental system. While *Klf5*, *Gfi1* and *Cebpe*, which are selective for the granulocytic lineage, were down-regulated in both d0-6 and d2-3 DG172-exposed BMC cultures, the macrophage/DC-associated genes *Spib*, *Spic*, *Irf4* and *Irf8* were up-regulated (Fig. 7A). The fact that these genes were not regulated in d5-6 cells indicates that this DG172 effect is restricted to an early stage of differentiation. Several of these transcription factors indeed represent master switches for lineage determination (see Fig. 7B). The microarray data could also be confirmed by RT-qPCR (Fig. 7C). These results thus strongly confirm the conclusion that DG172 switches the GM-CSF-induced differentiation of BMCs in favor of APCs.

DG172 acts at a specific stage of GM-CSF-induced differentiation

We next sought to identify the critical stage of differentiation affected by DG172. The expression data in Figs. 5 and 7 strongly suggested that the effect of DG172 on BMC differentiation is restricted to an early stage around day 2. FACS analyses of CD11c and MHCII on day 6 BMCs exposed to DG172 at different times after initiating GM-CSF-induced differentiation confirmed this conclusion. As shown in Fig. 8, the DG172-induced increase in CD11c^{hi}MHCII^{hi} cells was observed only, when DG was added prior to day 4. In the same experimental setting, a clearly stage-dependent effect was also seen on the repression of granulocytic marker genes *S100a8*, *S100a9* and *Mmp9* (Fig. 9A, top).

Differentiation of BMCs with M-CSF to macrophages had no significant effect on *S100a8*, although the canonical PPAR β/δ target gene *Adrp* was strongly repressed (Fig. 9B). Consistent with this result, no DG172 effect on *S100a8* was observed with primary macrophages obtained from either wild type or *Ppard* null mice (Fig. 9C, left panel) in the presence of a strong repression of the PPAR β/δ target gene *Angptl4* (Fig. 9C, right panel). Likewise, *Angptl4*, but not *S100a8* was repressed by DG172 in NIH3T3 fibroblasts (Fig. 9C, rightmost bars). Taken together these results clearly demonstrate that the PPAR β/δ independent effect of DG172 is both cell type and differentiation stage specific.

Differential effects of structural derivatives of DG172 on DC differentiation and PPAR β/δ binding

Finally, we investigated whether the PPAR β/δ dependent and independent effects of DG172 could be associated with specific structural features, and might thus be potentially separable. To address this issue we synthesized 6 derivatives of DG172 (highlighted in blue in Fig. 10) and analyzed the potential of these compounds (i) to promote GM-CSF-induced BMC differentiation (FACS analysis of CD11c and MHCII expression) and (ii) to interact with the PPAR β/δ ligand binding domain *in vitro* (competitive TR-FRET). The data in Fig. 10 indicate that the *N*-methylpiperazine residue is required for the enhanced differentiation into P2 and P3 cells, since a significant effect was observed only with those 3 compounds carrying this moiety (DG132, DG172, DG195). In contrast, PPAR β/δ binding was affected to a considerably lesser extent, as long as a halogen atom was introduced in the ortho (DG138, DG195) or meta (DG208) position of the opposing phenyl substituent. Consequently, DG139, bearing a para chloro and a *N*-dimethylamino substituent, not only lacked the effect on BMC differentiation, but also failed to interact with PPAR β/δ . These results suggested that a separation of the two activities exerted by DG172 is possible. We therefore replaced the *N*-dimethylamino moiety in DG139 with a *N*-methylpiperazine residue yielding DG228 (red in Fig. 10). In agreement with our prediction, DG228 had a strong effect on BMC differentiation, but only weakly bound to PPAR β/δ (IC₅₀ >10 μ M compared to the parent compound 27 nM for DG172). Collectively, these data indicate that the *N*-methylpiperazine residue is essential for the PPAR β/δ -independent effect of DG172 on BMC differentiation, while the position of the halogen atom in the phenyl substituent is crucial for PPAR β/δ binding.

Discussion

Our FACS data show that DG172 strongly augments CD11c^{hi}MHCII^{hi} cells in GM-CSF-induced BMC cultures, in particular in the presence of IL-4 (population P3; Fig. 2). Furthermore, exposure of GM-CSF/IL-4-treated cultures to DG172 induced tightly adherent cells displaying the typical morphology of mature DCs (Fig. 1). DG172 also induced a second population in GM-CSF-induced BMC cultures, which we characterized as CD11c^{hi}MHCII^{lo} cells (population P2; Figs. 2 and 3). MHCII^{lo} cells have previously been described in early GM-CSF-induced bone marrow cultures (Masurier et al., 1999). It is likely that this population comprises immature DCs, as suggested by their apparent conversion to P3 cells by IL-4 (Fig. 2). This may also explain the synergistic action of the two mediators: DG172 promotes the differentiation from P1 to P2 cells, and from P2 to P3 cells, with the latter further promoted by IL-4. However, adherent cells represent a substantial fraction of the P2 population (not shown), suggesting that these are macrophages rather than undifferentiated DCs. It is

therefore likely that P2 cells present a mixed population of committed monocytic cells with the potential to differentiate to DCs, as previously suggested by others (Masurier et al., 1999). DG172 treatment also led to a reduction of granulocytic cells in GM-CSF-induced BMC cultures (Figs. 4B and 6), indicating that DG172 induces a lineage switch by favoring the DC lineage at the expense of granulocytic differentiation. In contrast to macrophages and DCs, neutrophils are present in freshly isolated BMCs (see early time points in Fig. 4B) and are partly replaced by BMCs differentiating along the granulocytic lineage after a few days of culture (Inaba et al., 1992). This replenishment by new granulocytes is apparently prevented by DG172, which can be explained by at least two different models. DG172 either pushes cells around the stage of the granulocyte macrophage progenitor (GMP) into the monocytic lineage, thereby depleting the progenitor pool for granulocytic differentiation, or alternatively, DG172 actively blocks differentiation to granulocytes, thus favoring monocytic/DC differentiation. As DC differentiation is promoted by pro-inflammatory stimuli (Dearman et al., 2009), it is important to note that we did not observe any effect on the expression of genes encoding pro-inflammatory cytokines, including *Tnf* and *Il1b* (Fig. 6A).

DG172 acts at a relatively early stage of differentiation, i.e. during the first 2 days of exposing BMCs to GM-CSF, as shown by its effect on the expression of genes coding for myeloid transcriptional regulators (Fig. 7) and the DC surface markers CD11c and MHCII (Fig. 8). While the granulocytic transcription factor genes *Cepbe*, *Gfi1* and *Klf5* were down-regulated by DG172 on day 2, factors associated with the macrophage/DC lineage, such as *Spib*, *Spic*, *Irf4* and *Irf8*, were up-regulated (Diakiw et al., 2012; Halene et al., 2010; Rosenbauer and Tenen, 2007; Schotte et al., 2004; Tamura et al., 2005; Yamanaka et al., 1997). Several of these transcriptional regulators have lineage determining functions. *Gfi1*, for instance, is not only indispensable for granulocyte differentiation (Hock et al., 2003), but also inhibits macrophage differentiation by repressing the activity of *Spi1* (Pu.1) (Dahl et al., 2007). Vice versa, high levels of *Spi1* inhibit the transcription of *Gfi1* by inducing the repressors *Egr2* and *Nab2*, thereby blocking neutrophil differentiation (Laslo et al., 2006). RT-qPCR showed only a weak DG172 effect on *Spi1* (data not shown; *Spi1* is not represented in the microarray). However, the partial redundancy of *Spi* subtypes suggest that *SpiB* and *SpiC* have similarly crucial functions in myeloid differentiation (Garrett-Sinha et al., 2001).

Other examples are C/EBP ϵ , whose different isoforms are endowed with the ability to specifically reprogram myeloid lineage commitment (Bedi et al., 2009; Halene et al., 2010) and *Irf8*, which extinguishes neutrophil production and promotes dendritic cell lineage commitment (Becker et al., 2012). These and other studies have clearly shown that hematopoietic cell fate is dependent on several key transcription factors, and that the dosage of each of these factors and their expression relative to each other plays a pivotal role (Mak

et al., 2011). The fact that DG172 influences the expression of these transcription factors is consistent with its presumed action at an early stage of GM-CSF-induced differentiation, perhaps around the stage of the GMP, which would also provide a likely explanation for its profound effect on myeloid lineage determination. Ingenuity Upstream Regulator Analysis (Fig. S2) identified the SRF and its coactivators MKL1 and MKL2 and the transcription factors C/EBP α and C/EBP ϵ as the most significantly affected pathways in DG172-treated cells (d2-3). Although the latter finding is consistent with our data showing a strong repression of the *Cebpe* gene by DG172, a potential involvement of SRF is difficult to judge at present, since this transcription factor has previously not been associated with myeloid differentiation.

An important issue is the open question which protein is targeted by DG172 to achieve its effect on BMC differentiation. Since DG172 is a stilbene and thus bears some structural resemblance to tamoxifen, we tested its binding to the estrogen receptor in vitro using a competitive TR-FRET assay, but were unable to detect any interaction (data not shown). Likewise, no binding was measurable to PPAR α , PPAR γ and RAR α in analogous assays. We also asked, whether DG172 might be a ligand for aryl hydrocarbon receptor (AhR) because the structurally similar stilbene 4-hydroxytamoxifen can induce AhR target genes (DuSell et al., 2010), and AhR is required for DC differentiation in mice (Nguyen et al., 2010; Vogel et al., 2013). However, we did not see any agonistic or antagonistic effect of DG172 on *Cyp1a1*, one of the major AhR target genes, in cells with functional AhR signaling (data not shown). Furthermore, AhR ligands are known to regulate AhR target genes in differentiated macrophages (Bessede et al., 2014), which does not apply to DG172 (Fig. 9).

The nuclear receptor Nur77 (Nr4a1) plays an essential role in myeloid differentiation in mice (Hanna et al., 2011), and its target genes overlap with those identified in our microarray analyses (Fig. 5-7). However, DG172 had no detectable effect on Nur77 target genes in cell types other than GM-CSF-induced BMCs, although these genes responded to the Nur77 ligand DIM-C-pPhOCH(3) (Cho et al., 2008) (data not shown). We also tested the possibility that DG172 is an antagonist of Nur77 by applying DG172 together with DIM-C-pPhOCH(3), but could not detect any effect. It is therefore unlikely that Nur77 is a target of DG172.

It is also possible that the PPAR β/δ -independent function of DG172 is not mediated by a nuclear receptor, as has been reported for the regulation of AMPK by PPAR ligands (Lee and Kim, 2010). A systematic approach to identify the relevant DG172 target(s) will require a cellular system that is amenable to genome-wide RNA interference experiments or the biochemical purification of drug-protein complexes, which, due to the highly selective nature of DG172's effect on myeloid differentiation, is currently not available.

Since DG172 is orally bioavailable we also tested its potential effect in mice, but were unable

to detect any alterations to the composition of the bone marrow by FACS analysis using the same markers as in Figs. 2-4 (data not shown). It is therefore possible that the effects seen in BMC cultures occur in vivo only in specific conditions, e.g. certain disease-associated processes. The use of DG172 in mouse models of inflammation, infection or cancer may shed some light on this question in the future. Notwithstanding these open questions pertaining to its effects in vivo, DG172 (or its novel more selective derivative DG228; Fig. 10) may also prove useful to improve the generation of DCs from human BMCs or monocytes, for instance for therapeutic applications.

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Authorship Contributions

Participated in research design: Diederich, Brendel, Müller-Brüsselbach, Müller.

Conducted experiments: Lieber, Scheer, Meissner, Giehl.

Contributed new reagents or analytic tools: Diederich, Brendel.

Performed data analysis: Finkernagel, Müller-Brüsselbach, Müller.

Wrote or contributed to the writing of the manuscript: Lieber, Müller-Brüsselbach, Müller.

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FOOTNOTES

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FIGURE LEGENDS

Fig. 1. Effect of DG172 on the morphology of BMCs differentiated in vitro. BMCs were differentiated for 9 days in the presence of GM-CSF. IL-4 (200 ng/ml) and/or DG172 (1 μ M) were added as indicated. Loosely attached and floating cells were collected, cultured for another 3 days under the same conditions. In panels E and F, LPS (100 ng/ml) was added for the last 2 days of culture.

Fig. 2. Effect of DG172 on the dendritic cell surface markers CD11c and MHCII by differentiating BMCs. BMCs from wt (A, B) and *Ppard* null (C, D) mice were differentiated with GM-CSF \pm IL-4 (1 ng/ml) in the absence or presence of DG172 for 6 days. Surface expression of CD11c and MHCII was determined by FACS in non-adherent cells. Three cell population showing distinct expression patterns were identified (P1, P2, P3) and the fractions of these cells relative to the total population are indicated (%). Panels A and C show representative experiments and panels B and D the data from three independent experiments (average \pm SD). *: $p < 0.05$; **: $p < 0.01$ by t-test.

Fig. 3. CD14 and F4/80 levels on subpopulations of differentiating BMCs differing in dendritic surface marker expression. Surface expression of CD14 (A, B) and F4/80 (C, D) on differentiating non-adherent BMCs (GM-CSF) from *Ppard* null mice was determined by FACS and gated to the P1, P2 and P3 populations defined in Figure 2. The data are presented as histograms of CD14 and F4/80 surface expression levels. Numbers represent MFI values. Panels A and C show representative experiments and panels B and D the data from three independent experiments (average \pm SD). *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$ by t-test.

Fig. 4. Effect of DG172 on the granulocytic surface markers Ly6B and Gr1 (Ly6G) on differentiating BMCs. (A) CD11c and MHCII levels in relation to Ly6B and Gr1 surface expression. BMCs treated with GM-CSF and DG172 (day 1-6; combined adherent and floating cells) were gated for the PA, PB and PC subpopulations defined in the left panel and analyzed for surface expression of CD11c and MHCII. (B) BMCs were exposed to in GM-CSF for 1 day, followed by cultivation in GM-CSF \pm DG172 for the indicated times. Surface expression of Ly6B and Gr1 on non-adherent cells was determined by FACS. Dot plots show the results of a representative experiment; numbers next to the PC area are the average of three independent experiments (\pm SD). **: $p < 0.01$ by t-test between DMSO and DG172-treated cells.

Fig. 5. Effect of PPAR β/δ ligands on the transcriptome of GM-CSF differentiated BMCs from wt and *Ppard* null mice.

A, BMCs from wt and *Ppard* null mice were differentiated with GM-CSF for 6 days in the presence of the agonist GW501516 or the inverse agonists DG172 or ST247. The Venn diagram shows the overlap of genes induced by GW501516 and repressed by DG172 or ST247. **B**, Venn diagram as in panel a, except that the directions of regulation are opposite. **C**, Venn diagram showing the stage-specific effect of DG172. BMCs from *Ppard* null mice were differentiated with GM-CSF for 3 (top left) or 6 days (top right, bottom) in the presence of DG172 from day 2-3, day 5-6 or during the entire culture period (day 1-6). **D**, Annotation of DG172-repressed genes (day 2-3; ≥ 2 -fold) according to “functions and diseases” using Ingenuity Pathway Analysis. **E**, Annotation of DG172-activated genes (day 2-3; ≥ 1.5 -fold).

Fig. 6. Effect of DG172 on specific target genes in GM-CSF treated BMCs.

A, Summary bar plot of microarray data for neutrophil markers, APC markers and activation markers. nc, no change. **B**, RT-qPCR validation for individual genes. Values are the average of triplicates; error bars represent the standard deviation. *: $p < 0.05$ by t-test relative to solvent control; **: $p < 0.01$; ***: $p < 0.001$. **C**, Validation of S100A8 protein down-regulation by DG172. A quantitation of the data is shown below the immunoblot (normalized to 1.0 for untreated wt or null cells).

Fig. 7. Effect of DG172 on genes encoding myeloid transcription factors in GM-CSF treated BMCs.

A, Summary bar plot of microarray data. nc, no change. **B**, Schematic representation of the role of transcription factors in myeloid differentiation pathways. **C**, RT-qPCR validation for individual genes in d2-3 cells. Values are the average of triplicates; error bars represent the standard deviation. *: $p < 0.05$ by t-test relative to solvent control; **: $p < 0.01$; ***: $p < 0.001$.

Fig. 8. Stage-dependent effect of DG172 on dendritic cell surface markers on differentiating BMCs.

BMCs from wt mice were differentiated with GM-CSF for 6 days and solvent (DMSO; panel A and B) or DG172 (panel C and D) was added at the indicated times after initiating GM-CSF treatment. Surface expression of CD11c and MHCII on non-adherent cells was determined by FACS. Subpopulations were defined as in Fig. 2. Panels A and C show representative experiments and panels B and D the data from three independent experiments (average \pm SD). *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$ by t-test between DMSO and DG172 treated cells.

Fig. 9. Stage- and cell type-specific effects of DG172 on transcription of myeloid marker genes but not on PPAR β/δ target genes.

A, BMCs from wt mice were differentiated with GM-CSF for 6 days and DG172 was added at the indicated times after initiating GM-CSF treatment. Expression of the granulocytic marker genes *S100a8*, *S100a9* and *Mmp9* was determined by RT-qPCR and normalized to *L27*

(relative expression = 1.0 for DMSO on day 1). **B**, Repression of *S100a8* expression in BMCs differentiated with GM-CSF, but not after M-CSF-induced differentiation to macrophages, while the direct PPAR β/δ target gene *Adrp* is repressed in both conditions. **C**, Repression of *Angptl4*, but not *S100a8*, in thioglycollate-elicited peritoneal macrophages from wt or *Ppard* null mice and in NIH3T3 fibroblasts. Data in B and C are represented as the ratio of expression in DG172 and DMSO treated cells (average of triplicate). Error bars indicate the standard deviation. **: p<0.01; ***: p<0.001 by t-test.

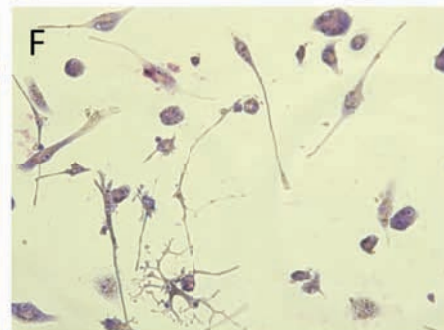
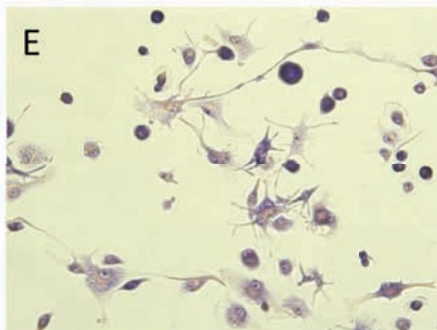
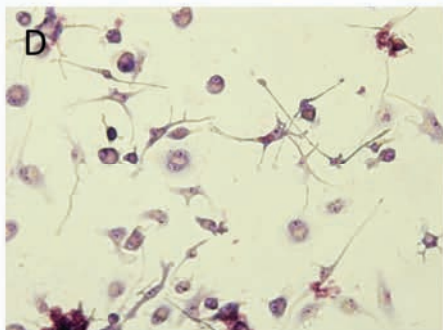
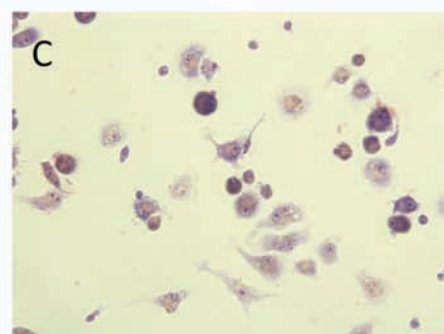
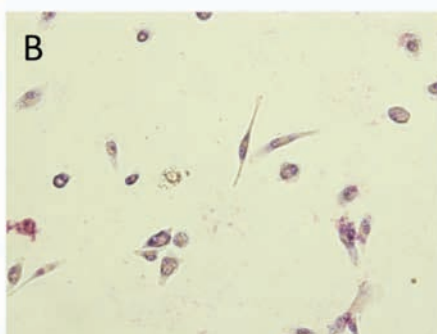
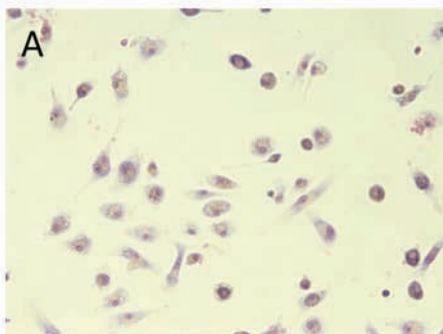
Fig. 10. Differential effects of structural alterations to DG172 on GM-CSF-induced BMC differentiation and PPAR β/δ binding.

The DG172 derivatives indicated on the left were tested for their effects to promote BMC differentiation to P2 and P3 cells (CD11c^{hi}MHCII^{lo} and CD11c^{hi}MHCII^{hi} cells) and interaction with the PPAR β/δ ligand binding domain in vitro (competitive TR-FRET). All values represented by bars were calculated relative to the effect of DG172 (DG172 value – DMSO value normalized to 100%) at a concentration of 1 μ M for all compounds. IC₅₀ values were determined by titration over a range of 0.1 nM – 10 μ M (competitive TR-FRET) as previously described (Lieber et al., 2012). n.d., not determined. Data represent the average of triplicates. Error bars indicate the standard deviation. *: p<0.05 by t-test; **: p<0.01; ***: p<0.001 relative to DG172.

Untreated (solvent control)

DG172

IL-4

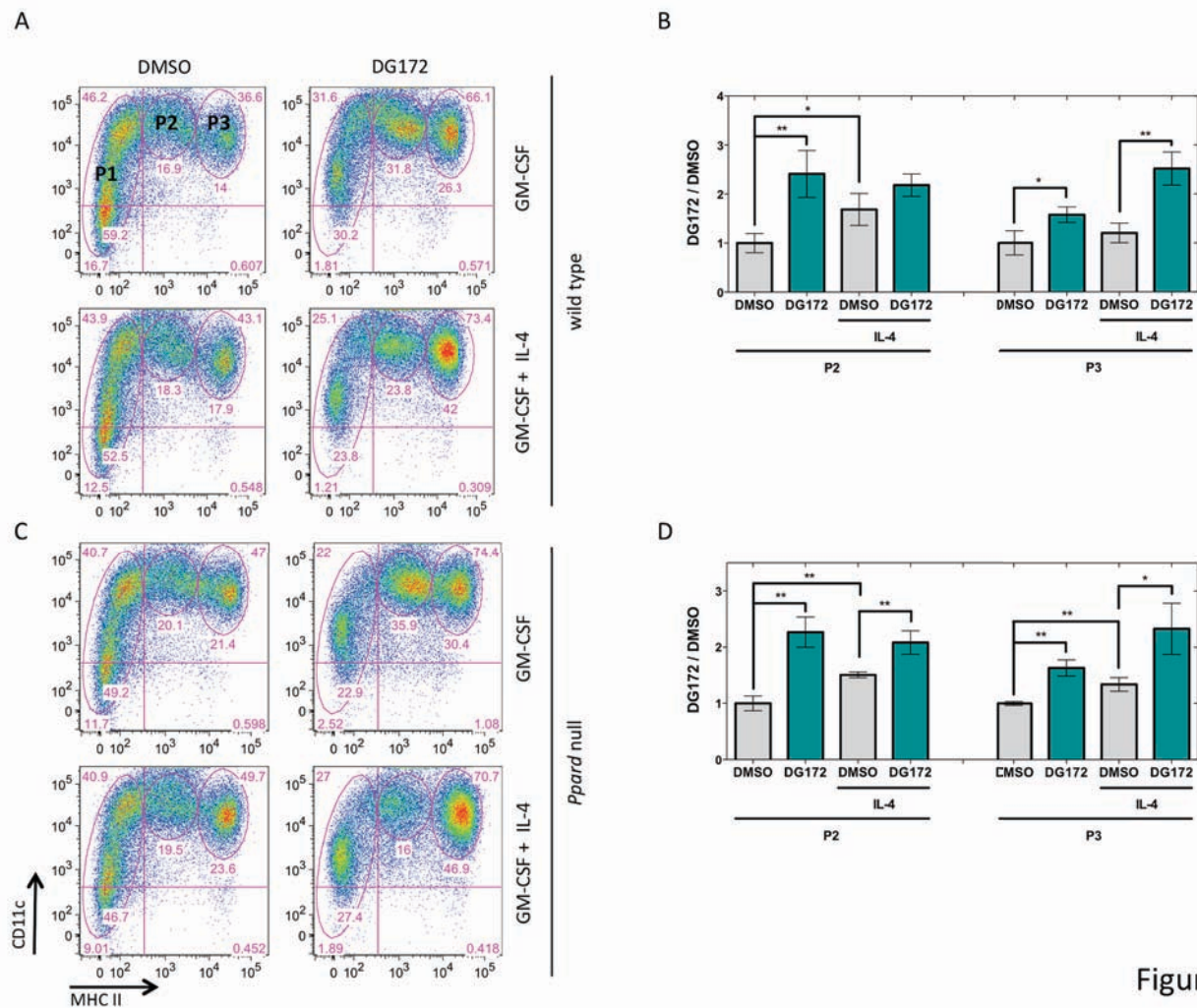


IL-4 + LPS

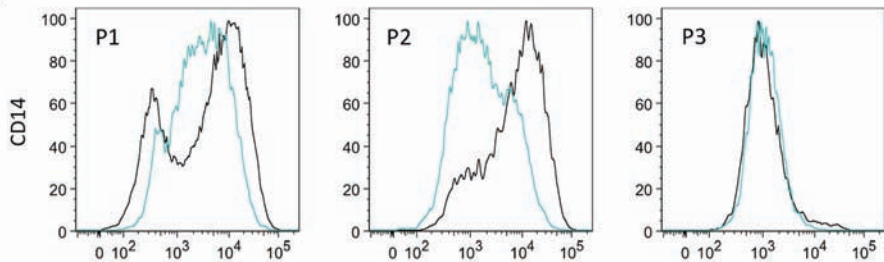
IL-4 + DG172

IL-4 + LPS + DG172

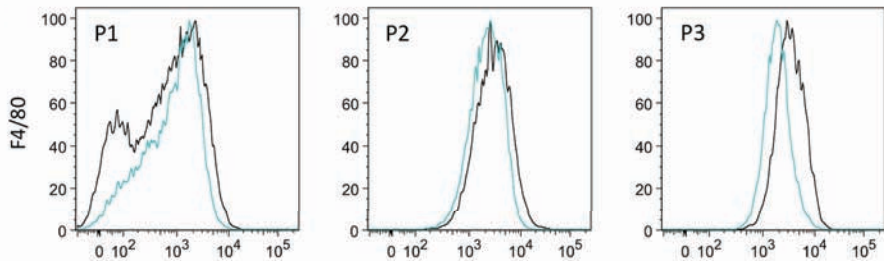
Figure 1



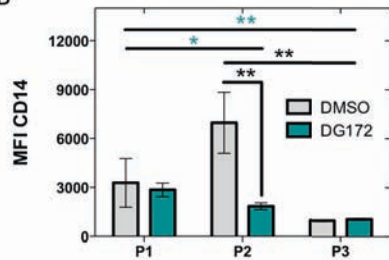
A



C



B



D

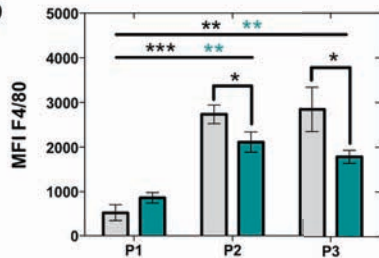


Figure 3

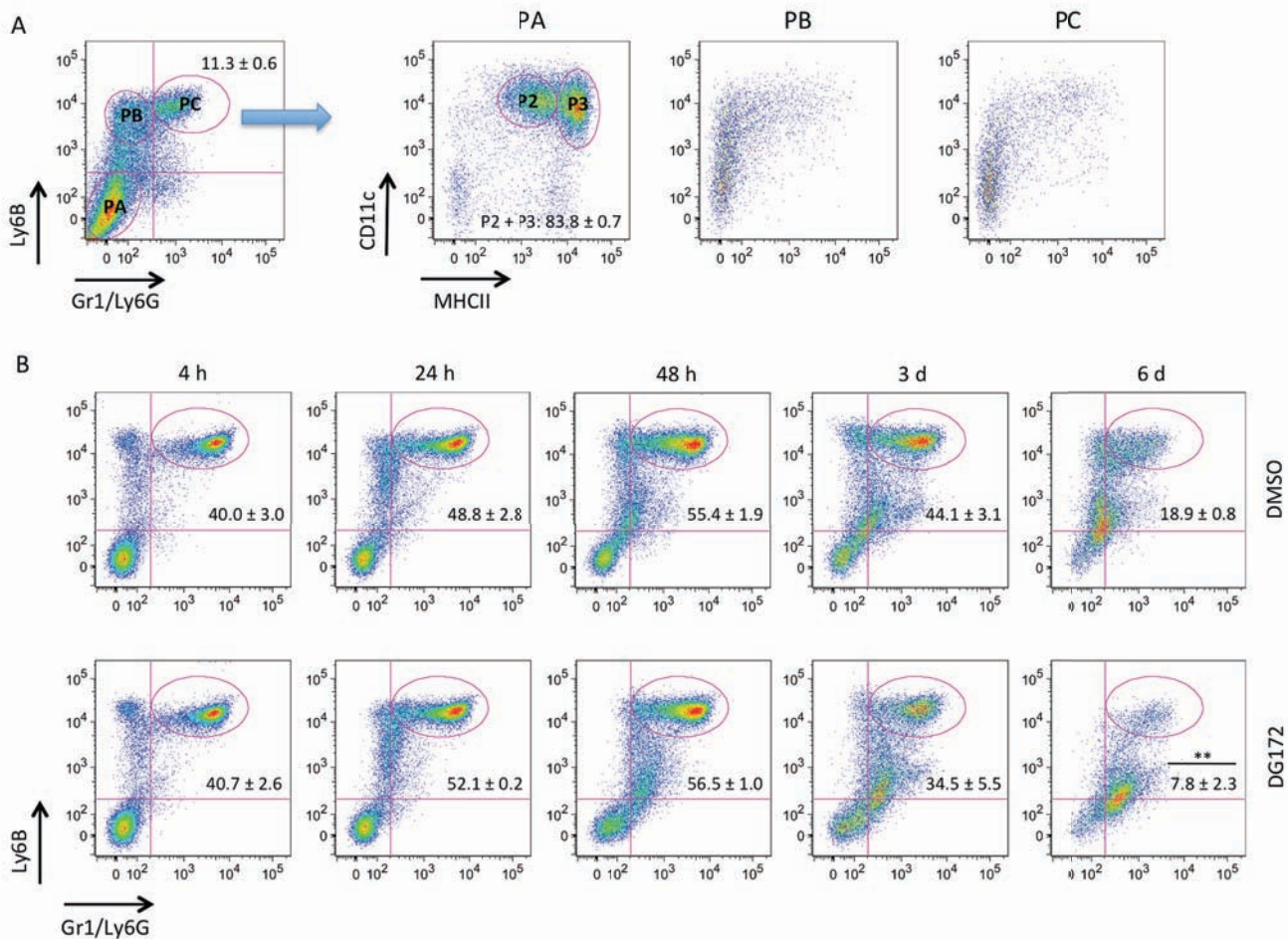


Figure 4

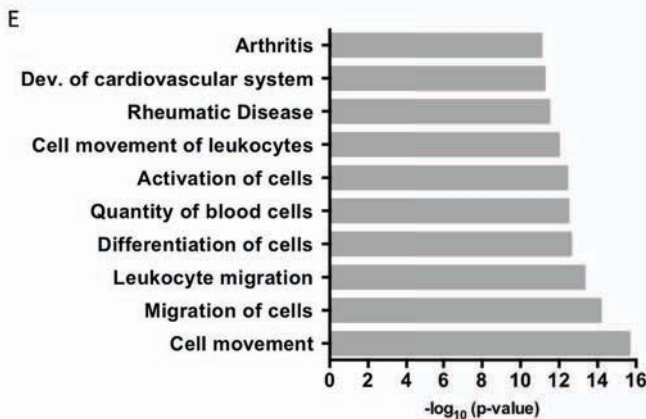
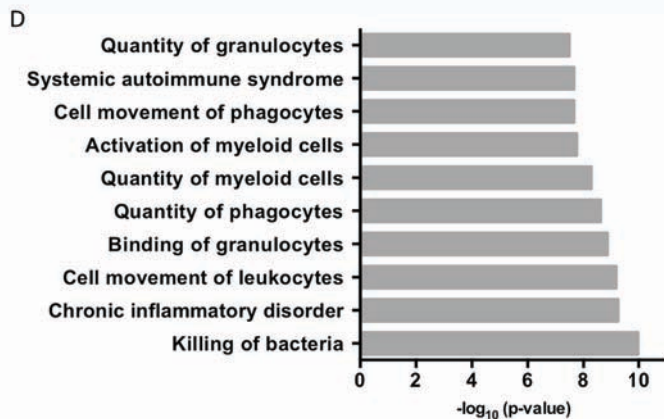
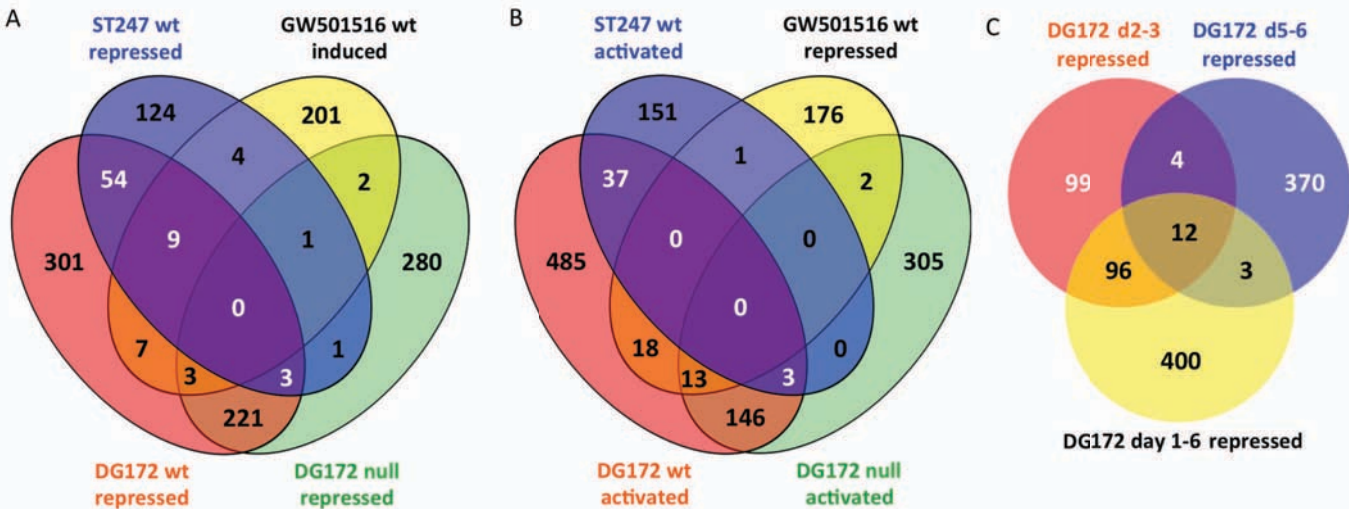


Figure 5

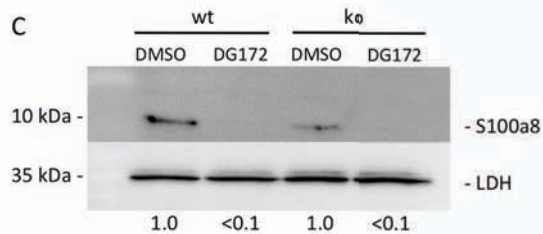
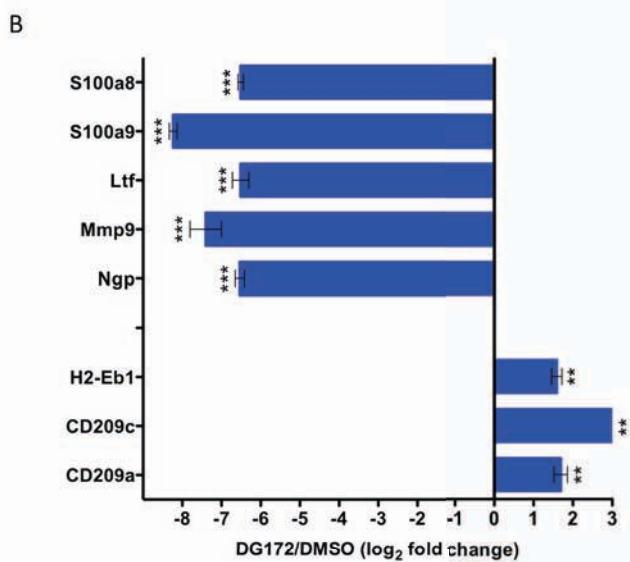
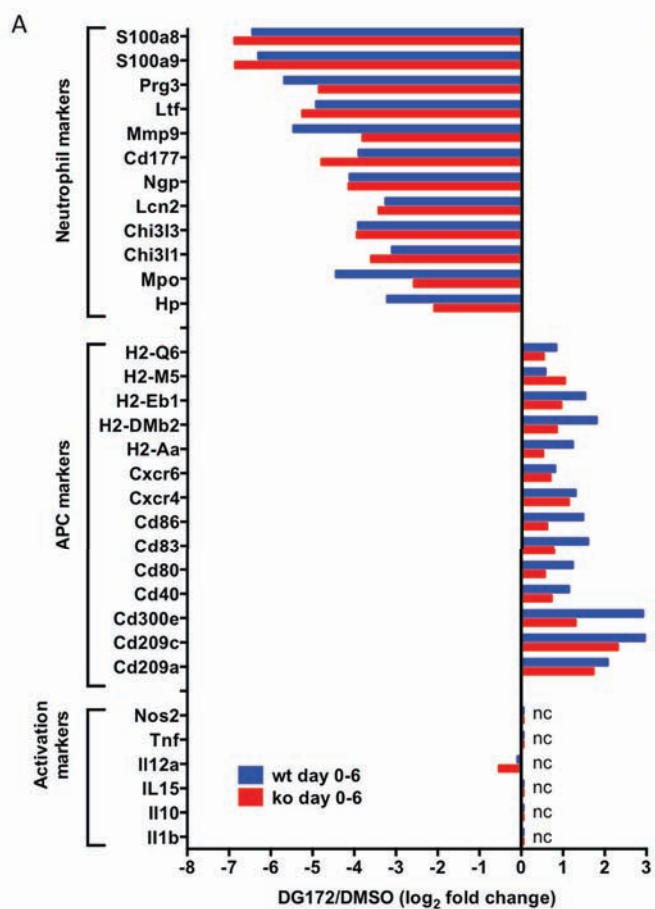
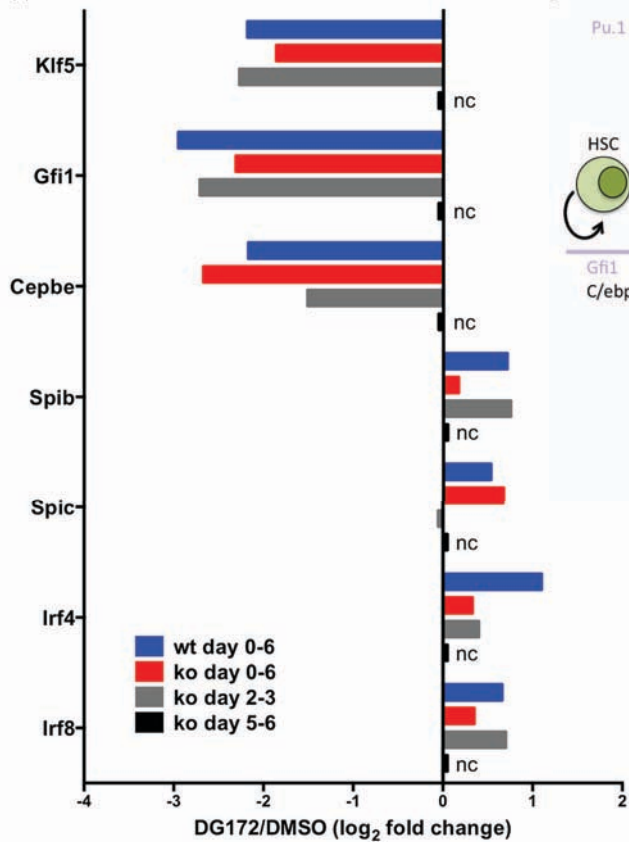
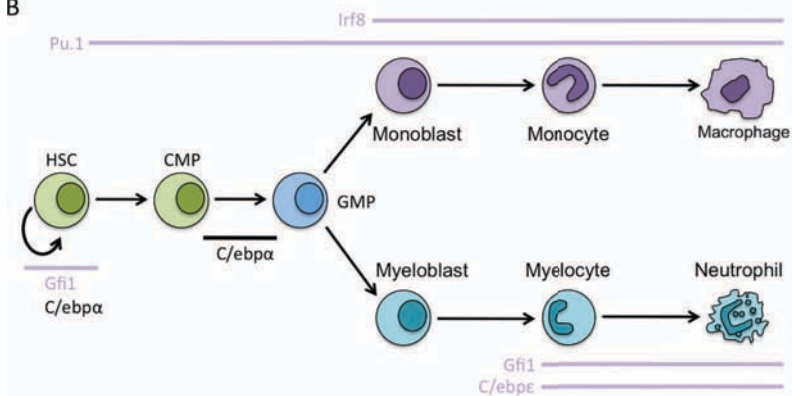


Figure 6

A



B



C

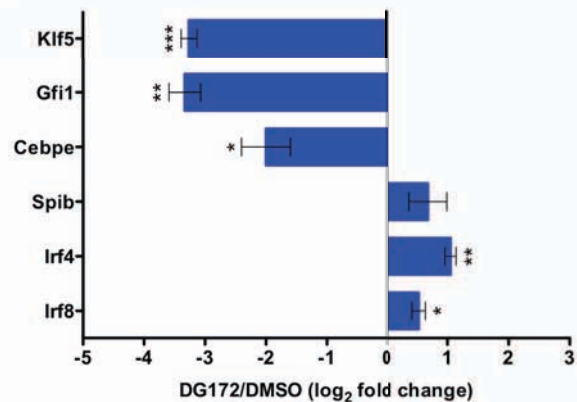


Figure 7

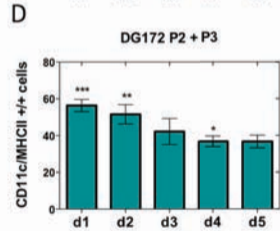
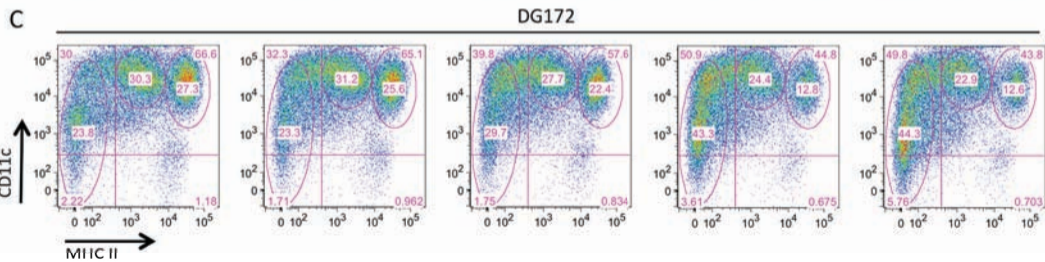
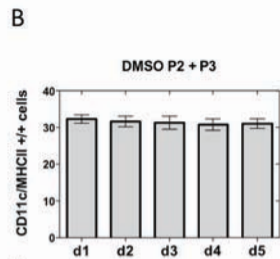
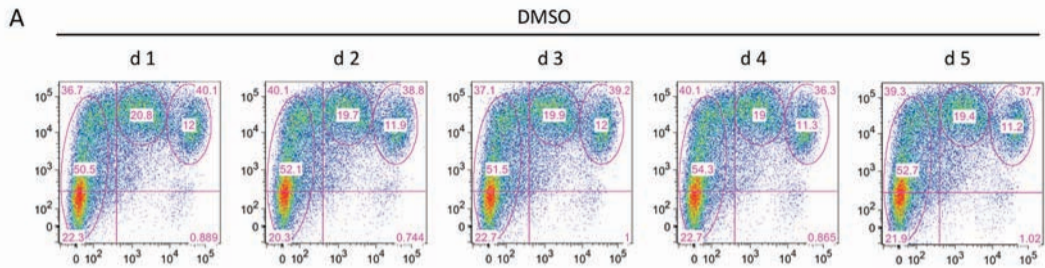


Figure 8

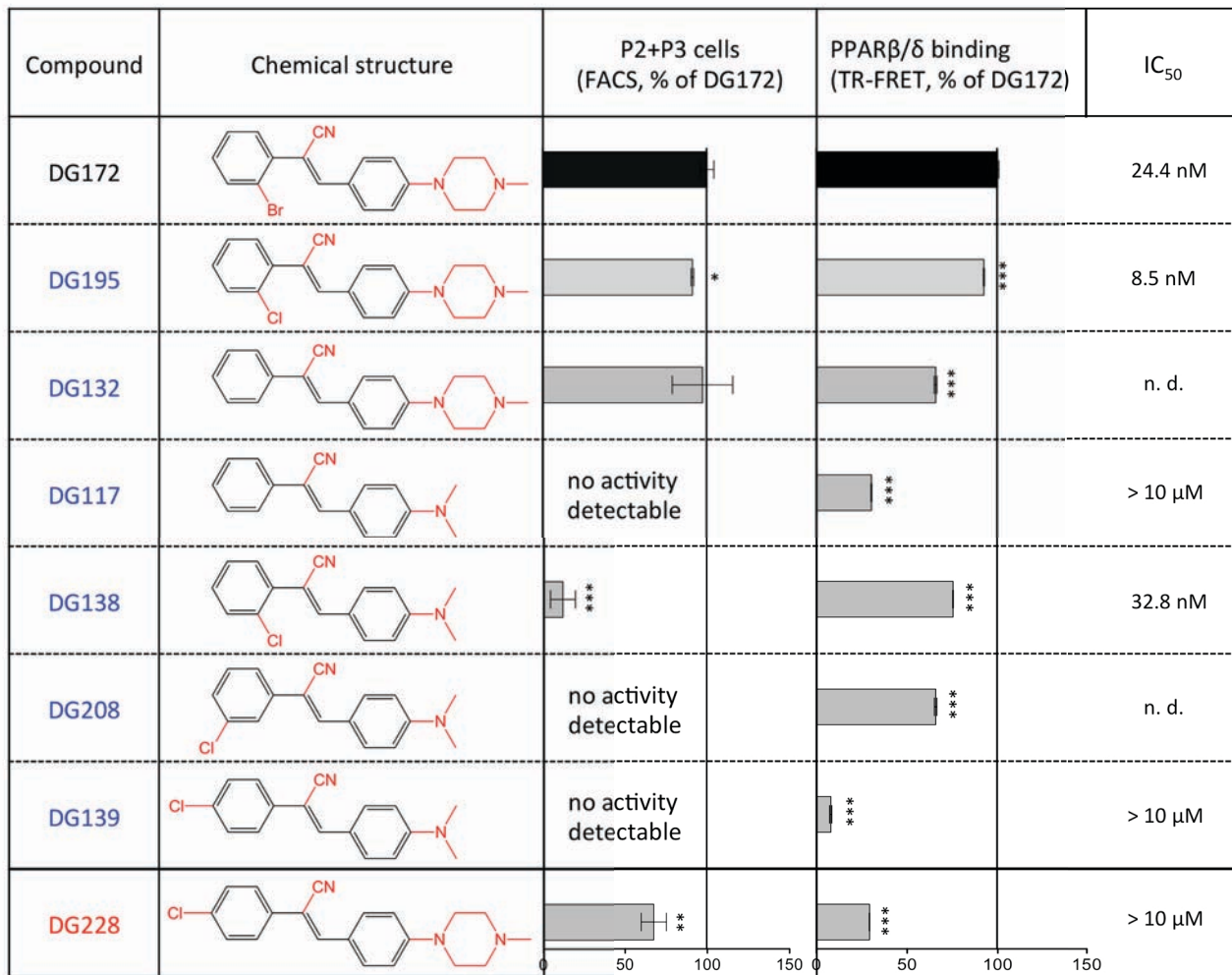


Figure 10

Molecular Pharmacology

SUPPLEMENTAL DATA:

The inverse agonist DG172 triggers a PPAR β / δ -independent lineage shift and promotes GM-CSF/IL-4-induced dendritic cell differentiation

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Supplemental Methods

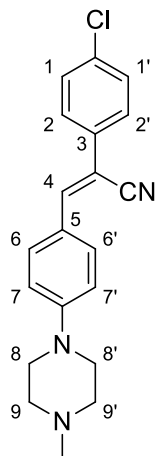
Supplemental Figure 1

Supplemental Table 1

Supplemental Datasets 1-3

Supplemental Methods

Synthesis and characterization of (Z)-2-(4-chlorophenyl)-3-(4-(4-methylpiperazin-1-yl)phenyl)acrylonitrile (DG228)



To a solution of 4-chlorophenylacetonitrile (303 mg, 2.0 mmol, 1 eq.) and 4-(4-methylpiperazino)benzaldehyde (408 mg, 2.0 mmol, 1 eq.) in MeOH (0.6 M), pyrrolidine (164 μ L, 2.0 mmol, 1 eq.) was added and the reaction mixture was stirred for 12 h at ambient temperature. The precipitated solid was collected, washed with water, and dried in vacuo to give the title compound (458 mg, 1.3 mmol) in 68 % yield.

¹H-NMR (CDCl₃, 21 °C, 400 MHz):

δ_{H} (ppm) = 2.35 (s, 3H, CH₃), 2.35–2.56 (sm, 4H, H-9), 3.33–3.36 (sm, 4H, H-8), 6.90 (psd, 2H, ³J + ⁵J = 8.9 Hz; H-7), 7.35 (psd, 2H, ³J + ⁵J = 8.5 Hz; H-2), 7.35 (s, 1H, H-4), 7.54 (psd, 2H, ³J + ⁵J = 8.5 Hz; H-1), 7.82 (psd, 2H, ³J + ⁵J = 8.9 Hz; H-6).

¹³C-NMR (CDCl₃, 21 °C, 100 MHz):

δ_{C} (ppm) = 46.2 (CH₃), 47.5 (C-8), 54.8 (C-9), 105.1 (C-CN), 114.4 (C-7), 118.9 (CN), 123.7 (C-5), 126.9 (C-2), 129.2 (C-1), 131.3 (C-6), 133.8 (C-N), 134.2 (C-3), 142.4 (C-4), 152.5 (C-Cl).

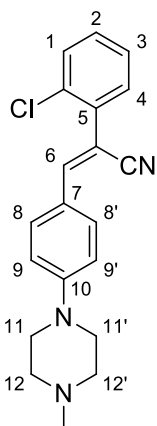
MS (ESI+):

m/z (%) = 338 (100, [M+H]⁺)

melting point:

148 °C

Synthesis and characterization of (Z)-2-(2-Chloro-phenyl)-3-[4-(4-methyl-piperazin-1-yl)-phenyl]-acrylonitrile dihydrochloride (DG195)



To a solution of 2-chlorobenzyl cyanide (149 mg, 0.98 mmol, 1 eq.) and 4-(4-methyl-piperazino)benzaldehyde (200 mg, 2.45 mmol, 1 eq.) in MeOH (1,5 ml), pyrrolidine (70 mg, 0.98 mmol, 1 eq.) was added and the reaction mixture was stirred for 50 h at 60 °C. Absorption of the reaction mixture onto silica gel followed by flash chromatography (DCM/MeOH, gradient 0–25 % MeOH) yielded (Z)-2-(2-chloro-phenyl)-3-[4-(4-methyl-piperazin-1-yl)-phenyl]-acrylonitrile which was isolated as its colorless dihydrochloride salt (181 mg, 0.44 mmol, 45 % yield) after treatment with HCl in *i*-PrOH (5-6 M)

¹H-NMR (*d*₆-DMSO, 30 °C, 400 MHz):

δ_{H} (ppm) = 2.77 (d, 3H, $J = 4.8$ Hz; CH₃), 3.03–3.15 (sm, 2H, H-12/12'), 3.22–3.31 (sm, 2H, H-12/12'), 3.41–3.49 (sm, 2H, H-11/11'), 4.00–4.08 (sm, 2H, H-11/11'), 7.12 (psd, 2H, $^3J + ^5J = 9.2$ Hz; H-9/9'), 7.41–7.47 (m, 3H, H-2+3+6), 7.52–7.58 (m, 2H, H-1+4), 7.86 (psd, 2H, $^3J + ^5J = 9.2$ Hz; H-8/8'), 11.20 (bs, 1H, HCl).

¹³C-NMR (*d*₆-DMSO, 30 °C, 100 MHz):

δ_{C} (ppm) = 42.4 (CH₃), 44.6 (C-11/11'), 52.1 (C-12/12'), 103.5 (C-CN), 115.3 (C-9/9'), 118.6 (CN), 124.2 (C-7), 128.6 (C-3), 130.5 (C-4), 131.1 (C-2), 131.4 (C-8/8'), 132.0 (C-1), 132.4 (C-Cl), 135.0 (C-5), 148.8 (C-6), 151.7 (C-10).

MS (EI+):

m/z (%) = 337 (100, M⁺)

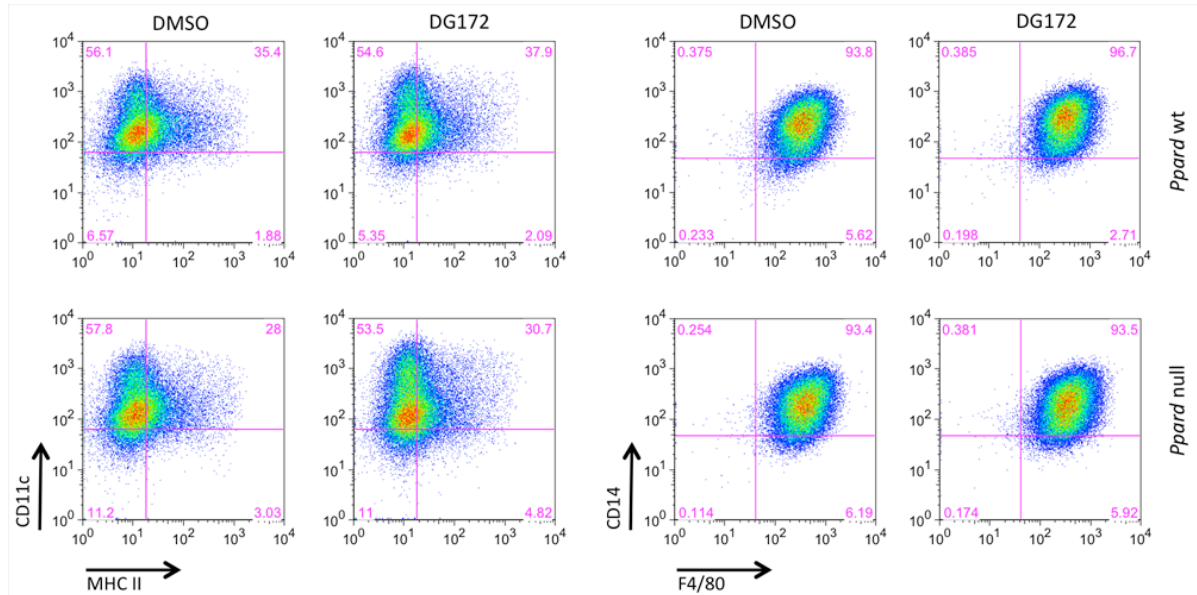
HRMS (EI+):

m/z	C ₂₀ H ₂₀ ClN ₃	calc.:	337.134576
		found.:	337.134666

EA	C ₂₀ H ₂₂ Cl ₃ N ₃	calc.:	C: 58.48	H: 5.40	N: 10.23
		found.:	C: 58.02	H: 5.84	N: 10.10

melting point :

above decomposition



Supplemental Figure 1.

Effect of DG172 on myeloid cell surface markers on M-CSF-induced BMCs.

BMCs from wt and *Ppard* null mice were differentiated with M-CSF (20 ng/ml) in the absence or presence of DG172 for 6 days. Surface expression of CD14 and F4/80 or CD11C and MHCII was determined by FACS in adherent cells. Fractions of cells relative to the total population are indicated in magenta (%). Isotype controls were used to set the quadrant boundaries. Macrophages are represented by the cells in the upper right quadrants.

Supplemental Table 1: Primers used for RT-qPCR

Primer	forward	reverse
<i>L27</i>	AAAGCCGTCATCGTCAACAAC	GCTGTCACTTTCCCGGGGATAG
<i>S100a8</i>	AAATCACCATGCCCTCTACAAG	CCCACCTTTATCACCATCGCAA
<i>S100a9</i>	CACCCTGAGCAAGAAGGAAT	TGTCATTTATGAGGGCTTCATTT
<i>Ltf</i>	AAATCCTCCAAAAGCAATGG	CCATTGCTTTTGGAGGATTT
<i>Mmp9</i>	GTGTGCCCTGGAActCACACGACAT	CCACCTGGTTCACCTCATGGTCCAC
<i>Ngp</i>	TCCCACCTCCAGTTCAGGATTA	CCGCCTTCTGAAGAATTTCCC
<i>H2-Eb1</i>	CGGGGCTGTTTCATCTACTTC	CAGCCTTGTTACTTCATCTCAGC
<i>CD209c</i>	CTCTGTCAATGCCTGCAGAA	TCCAGGCATAGCCTTTCTCT
<i>CD209a</i>	CAGTTGAAGGCTGGCGTAG	TGGAAGTGCGTCCAGTCC
<i>Klf5</i>	CCGGAGACGATCTGAAACAC	CAGATACTTCTCCATTCACATCTTG
<i>Gfi1</i>	GGCCACACAAACATTGGGAC	CCCAGCGCAGGCATCTAATA
<i>Cebpe</i>	TGTGGGCACCAGACCCTAAG	GCTGCCATTGTCCACGATCT
<i>Spib</i>	GCCCACACTTAAGCTGTTTGTA	CCCCATCTGAATCTGGGTAA
<i>Irf4</i>	GGAGTTTCCAGACCCTCAGA	CTGGCTAGCAGAGGTTCCAC
<i>Irf8</i>	ACCAAGAGGAGCCCATCC	GGCATATCCGGTCACCAGT

Supplemental Dataset 1A: Genes repressed by DG172 in *Ppard* null BMCs after exposure to ligands from day 1 to day 6) harvested on day 6; threshold 2-fold change).

stable_id	name	description	logFC
ENSMUSG00000097792	AC142101.1	--	-9.58
ENSMUSG00000051506	Wdfy4	WD repeat and FYVE domain containing 4 [Source:MGI Symbol;Acc:MGI:3584510]	-7.27
ENSMUSG00000038357	Camp	cathelicidin antimicrobial peptide [Source:MGI Symbol;Acc:MGI:108443]	-7.15
ENSMUSG00000015437	Gzmb	granzyme B [Source:MGI Symbol;Acc:MGI:109267]	-7.11
ENSMUSG00000056054	S100a8	S100 calcium binding protein A8 (calgranulin A) [Source:MGI Symbol;Acc:MGI:88244]	-6.88
ENSMUSG00000056071	S100a9	S100 calcium binding protein A9 (calgranulin B) [Source:MGI Symbol;Acc:MGI:1338947]	-6.86
ENSMUSG00000031434	Morc4	microrhodia 4 [Source:MGI Symbol;Acc:MGI:1922996]	-6.82
ENSMUSG00000086405	9330198N18Rik	RIKEN cDNA 9330198N18 gene [Source:MGI Symbol;Acc:MGI:1924766]	-6.07
ENSMUSG00000071562	Stfa1	stefin A1 [Source:MGI Symbol;Acc:MGI:106198]	-5.99
ENSMUSG00000024774	Ankrd22	ankyrin repeat domain 22 [Source:MGI Symbol;Acc:MGI:1277101]	-5.63
ENSMUSG00000032496	Ltf	lactotransferrin [Source:MGI Symbol;Acc:MGI:96837]	-5.25
ENSMUSG00000052234	Epx	eosinophil peroxidase [Source:MGI Symbol;Acc:MGI:107569]	-5.24
ENSMUSG00000052396	Mogat2	monoacylglycerol O-acyltransferase 2 [Source:MGI Symbol;Acc:MGI:2663253]	-4.94
ENSMUSG00000044040	Olfir1497	olfactory receptor 1497 [Source:MGI Symbol;Acc:MGI:3031331]	-4.89
ENSMUSG00000027072	Prg3	proteoglycan 3 [Source:MGI Symbol;Acc:MGI:1858200]	-4.85
ENSMUSG00000052212	Cd177	CD177 antigen [Source:MGI Symbol;Acc:MGI:1916141]	-4.79
ENSMUSG00000033508	Asprv1	aspartic peptidase, retroviral-like 1 [Source:MGI Symbol;Acc:MGI:1915105]	-4.77
ENSMUSG00000054905	Stfa3	stefin A3 [Source:MGI Symbol;Acc:MGI:106196]	-4.74
ENSMUSG00000010609	Psen2	presenilin 2 [Source:MGI Symbol;Acc:MGI:109284]	-4.74
ENSMUSG00000022651	Retnlg	resistin like gamma [Source:MGI Symbol;Acc:MGI:2667763]	-4.73
ENSMUSG00000032484	Ngp	neutrophilic granule protein [Source:MGI Symbol;Acc:MGI:105983]	-4.15
ENSMUSG00000026835	Fcnb	ficolin B [Source:MGI Symbol;Acc:MGI:1341158]	-3.97
ENSMUSG00000040809	Chi313	chitinase 3-like 3 [Source:MGI Symbol;Acc:MGI:1330860]	-3.94
ENSMUSG00000092920	7SK	7SK RNA [Source:RFAM;Acc:RF00100]	-3.90
ENSMUSG00000049653	Spatc1	spermatogenesis and centriole associated 1 [Source:MGI Symbol;Acc:MGI:1921531]	-3.90
ENSMUSG00000037095	Lrg1	leucine-rich alpha-2-glycoprotein 1 [Source:MGI Symbol;Acc:MGI:1924155]	-3.88
ENSMUSG00000060743	H3f3a	H3 histone, family 3A [Source:MGI Symbol;Acc:MGI:1097686]	-3.76
ENSMUSG00000017737	Mmp9	matrix metalloproteinase 9 [Source:MGI Symbol;Acc:MGI:97011]	-3.68
ENSMUSG00000054169	Ceacam10	carcinoembryonic antigen-related cell adhesion molecule 10 [Source:MGI Symbol;Acc:MGI:1347248]	-3.63
ENSMUSG00000064246	Chi311	chitinase 3-like 1 [Source:MGI Symbol;Acc:MGI:1340899]	-3.61
ENSMUSG00000031137	Fgf13	fibroblast growth factor 13 [Source:MGI Symbol;Acc:MGI:109178]	-3.51
ENSMUSG00000052926	Rnaseh2a	ribonuclease H2, large subunit [Source:MGI Symbol;Acc:MGI:1916974]	-3.51
ENSMUSG00000090356	2310042E22Rik	RIKEN cDNA 2310042E22 gene [Source:MGI Symbol;Acc:MGI:1913811]	-3.48
ENSMUSG00000026822	Lcn2	lipocalin 2 [Source:MGI Symbol;Acc:MGI:96757]	-3.43
ENSMUSG00000032437	Stt3b	STT3, subunit of the oligosaccharyltransferase complex, homolog B (<i>S. cerevisiae</i>)	-3.42
ENSMUSG00000097211	CT954326.1	--	-3.38
ENSMUSG00000095033	U6	U6 spliceosomal RNA [Source:RFAM;Acc:RF00026]	-3.35
ENSMUSG00000022902	Stfa2	stefin A2 [Source:MGI Symbol;Acc:MGI:106197]	-3.35
ENSMUSG00000094772	AC164613.1	--	-3.35
ENSMUSG00000059108	Ifitm6	interferon induced transmembrane protein 6 [Source:MGI Symbol;Acc:MGI:2686976]	-3.13
ENSMUSG00000025330	Padi4	peptidyl arginine deiminase, type IV [Source:MGI Symbol;Acc:MGI:1338898]	-3.13
ENSMUSG00000030785	Cox6a2	cytochrome c oxidase, subunit VI a, polypeptide 2 [Source:MGI Symbol;Acc:MGI:104649]	-3.12
ENSMUSG00000031870	Pgr	progesterone receptor [Source:MGI Symbol;Acc:MGI:97567]	-3.10
ENSMUSG00000027073	Prg2	proteoglycan 2, bone marrow [Source:MGI Symbol;Acc:MGI:103294]	-3.09
ENSMUSG00000030413	Pglyrp1	peptidoglycan recognition protein 1 [Source:MGI Symbol;Acc:MGI:1345092]	-3.07
ENSMUSG00000087203	Gm13986	predicted gene 13986 [Source:MGI Symbol;Acc:MGI:3651937]	-2.94
ENSMUSG00000000157	Itgb2l	integrin beta 2-like [Source:MGI Symbol;Acc:MGI:1277979]	-2.92
ENSMUSG00000039126	Prune2	prune homolog 2 (<i>Drosophila</i>) [Source:MGI Symbol;Acc:MGI:1925004]	-2.92
ENSMUSG00000062345	Serpinb2	serine (or cysteine) peptidase inhibitor, clade B, member 2 [Source:MGI Symbol;Acc:MGI:97609]	-2.83
ENSMUSG00000068407	Rnase12	ribonuclease, RNase A family, 12 (non-active) [Source:MGI Symbol;Acc:MGI:3528588]	-2.81

ENSMUSG00000093973	Mrgpra2a	MAS-related GPR, member A2A [Source:MGI Symbol;Acc:MGI:3821888]	-2.80
ENSMUSG00000096719	Mrgpra2b	MAS-related GPR, member A2B [Source:MGI Symbol;Acc:MGI:3033098]	-2.80
ENSMUSG00000097758	AL591207.1	--	-2.79
ENSMUSG00000027962	Vcam1	vascular cell adhesion molecule 1 [Source:MGI Symbol;Acc:MGI:98926]	-2.76
ENSMUSG00000067615	Krt81	keratin 81 [Source:MGI Symbol;Acc:MGI:1928858]	-2.75
ENSMUSG00000067614	Krt86	keratin 86 [Source:MGI Symbol;Acc:MGI:109362]	-2.75
ENSMUSG00000026180	Cxcr2	chemokine (C-X-C motif) receptor 2 [Source:MGI Symbol;Acc:MGI:105303]	-2.72
ENSMUSG00000045551	Fpr1	formyl peptide receptor 1 [Source:MGI Symbol;Acc:MGI:107443]	-2.70
ENSMUSG00000052435	Cebpe	CCAAT/enhancer binding protein (C/EBP), epsilon [Source:MGI Symbol;Acc:MGI:103572]	-2.67
ENSMUSG00000031610	Scrg1	scrapie responsive gene 1 [Source:MGI Symbol;Acc:MGI:1328308]	-2.60
ENSMUSG00000090176	Cd200r2	Cd200 receptor 2 [Source:MGI Symbol;Acc:MGI:3042847]	-2.60
ENSMUSG00000009350	Mpo	myeloperoxidase [Source:MGI Symbol;Acc:MGI:97137]	-2.58
ENSMUSG00000028972	Car6	carbonic anhydrase 6 [Source:MGI Symbol;Acc:MGI:1333786]	-2.57
ENSMUSG00000092572	Serp1b10	serine (or cysteine) peptidase inhibitor, clade B (ovalbumin), member 10 [Source:MGI Symbol;Acc:MGI:2138648]	-2.57
ENSMUSG00000022582	Ly6g	lymphocyte antigen 6 complex, locus G [Source:MGI Symbol;Acc:MGI:109440]	-2.53
ENSMUSG00000023046	Igf1bp6	insulin-like growth factor binding protein 6 [Source:MGI Symbol;Acc:MGI:96441]	-2.52
ENSMUSG00000039960	Rhou	ras homolog gene family, member U [Source:MGI Symbol;Acc:MGI:1916831]	-2.51
ENSMUSG00000040026	Saa3	serum amyloid A 3 [Source:MGI Symbol;Acc:MGI:98223]	-2.47
ENSMUSG00000039270	Megf9	multiple EGF-like-domains 9 [Source:MGI Symbol;Acc:MGI:1918264]	-2.45
ENSMUSG00000071561	BC100530	cDNA sequence BC100530 [Source:MGI Symbol;Acc:MGI:3696883]	-2.37
ENSMUSG00000042031	Lce3b	late cornified envelope 3B [Source:MGI Symbol;Acc:MGI:1913594]	-2.33
ENSMUSG00000075192	Olf1053	olfactory receptor 1053 [Source:MGI Symbol;Acc:MGI:3030887]	-2.32
ENSMUSG00000067767	Clec4b2	C-type lectin domain family 4, member b2 [Source:MGI Symbol;Acc:MGI:3588267]	-2.30
ENSMUSG00000023045	Soat2	sterol O-acetyltransferase 2 [Source:MGI Symbol;Acc:MGI:1332226]	-2.30
ENSMUSG00000071275	Fpr-rs6	formyl peptide receptor, related sequence 6 [Source:MGI Symbol;Acc:MGI:2448176]	-2.28
ENSMUSG00000053773	Rdh8	retinol dehydrogenase 8 [Source:MGI Symbol;Acc:MGI:2685028]	-2.27
ENSMUSG00000005474	My110	myosin, light chain 10, regulatory [Source:MGI Symbol;Acc:MGI:1891705]	-2.25
ENSMUSG00000004612	Nkg7	natural killer cell group 7 sequence [Source:MGI Symbol;Acc:MGI:1931250]	-2.24
ENSMUSG00000070858	Gm1673	predicted gene 1673 [Source:MGI Symbol;Acc:MGI:2686519]	-2.19
ENSMUSG00000028356	Ambp	alpha 1 microglobulin/bikunin [Source:MGI Symbol;Acc:MGI:88002]	-2.19
ENSMUSG00000019769	Syne1	synaptic nuclear envelope 1 [Source:MGI Symbol;Acc:MGI:1927152]	-2.18
ENSMUSG00000027474	BC020535	cDNA sequence BC020535 [Source:MGI Symbol;Acc:MGI:2385159]	-2.17
ENSMUSG00000040693	Slico4c1	solute carrier organic anion transporter family, member 4C1 [Source:MGI Symbol;Acc:MGI:2442784]	-2.17
ENSMUSG00000020325	Fstl3	follicle-stimulating hormone-like 3 [Source:MGI Symbol;Acc:MGI:1890391]	-2.16
ENSMUSG00000020323	Prss57	protease, serine 57 [Source:MGI Symbol;Acc:MGI:1920356]	-2.16
ENSMUSG00000029275	Gfi1	growth factor independent 1 [Source:MGI Symbol;Acc:MGI:103170]	-2.13
ENSMUSG00000073386	9830107B12Rik	RIKEN cDNA 9830107B12 gene [Source:MGI Symbol;Acc:MGI:3608415]	-2.11
ENSMUSG000000052270	Fpr2	formyl peptide receptor 2 [Source:MGI Symbol;Acc:MGI:1278319]	-2.11
ENSMUSG000000032715	Trib3	tribbles homolog 3 (Drosophila) [Source:MGI Symbol;Acc:MGI:1345675]	-2.10
ENSMUSG000000031722	Hp	haptoglobin [Source:MGI Symbol;Acc:MGI:96211]	-2.09
ENSMUSG000000030340	Scnn1a	sodium channel, nonvoltage-gated 1 alpha [Source:MGI Symbol;Acc:MGI:101782]	-2.09
ENSMUSG00000009633	G0s2	G0/G1 switch gene 2 [Source:MGI Symbol;Acc:MGI:1316737]	-2.09
ENSMUSG00000005339	Fcgr1a	Fc receptor, IgE, high affinity I, alpha polypeptide [Source:MGI Symbol;Acc:MGI:95494]	-2.09
ENSMUSG00000022865	Cxadr	coxsackievirus and adenovirus receptor [Source:MGI Symbol;Acc:MGI:1201679]	-2.07
ENSMUSG00000022157	Mcpt8	mast cell protease 8 [Source:MGI Symbol;Acc:MGI:1261780]	-2.06
ENSMUSG00000066760	Psg16	pregnancy specific glycoprotein 16 [Source:MGI Symbol;Acc:MGI:1347249]	-2.05
ENSMUSG000000038463	Olfml2b	olfactomedin-like 2B [Source:MGI Symbol;Acc:MGI:2443310]	-2.05
ENSMUSG00000079597	Gm5483	predicted gene 5483 [Source:MGI Symbol;Acc:MGI:3645124]	-2.04
ENSMUSG000000041754	Trem3	triggering receptor expressed on myeloid cells 3 [Source:MGI Symbol;Acc:MGI:1930003]	-2.02
ENSMUSG00000021791	Dydc2	DPY30 domain containing 2 [Source:MGI Symbol;Acc:MGI:1918450]	-2.02
ENSMUSG000000082248	Gm13161	predicted gene 13161 [Source:MGI Symbol;Acc:MGI:3650656]	-2.02
ENSMUSG000000039840	Epg5	ectopic P-granules autophagy protein 5 homolog (C. elegans) [Source:MGI Symbol;Acc:MGI:1918673]	-2.01
ENSMUSG00000079481	Nhs12	NHS-like 2 [Source:MGI Symbol;Acc:MGI:3645090]	-2.00
ENSMUSG000000041471	Fam35a	family with sequence similarity 35, member A [Source:MGI Symbol;Acc:MGI:1922948]	-1.97

ENSMUSG00000074361	Gpr77	G protein-coupled receptor 77 [Source:MGI Symbol;Acc:MGI:2442013]	-1.96
ENSMUSG00000080413	U6atac	U6atac minor spliceosomal RNA [Source:RFAM;Acc:RF00619]	-1.96
ENSMUSG00000004668	Abca13	ATP-binding cassette, sub-family A (ABC1), member 13 [Source:MGI Symbol;Acc:MGI:2388707]	-1.96
ENSMUSG00000052303	Mrgpra6	MAS-related GPR, member A6 [Source:MGI Symbol;Acc:MGI:3033107]	-1.94
ENSMUSG00000047641	Krt83	keratin 83 [Source:MGI Symbol;Acc:MGI:3665486]	-1.94
ENSMUSG00000051439	Cd14	CD14 antigen [Source:MGI Symbol;Acc:MGI:88318]	-1.94
ENSMUSG00000059657	Stfa2l1	stefin A2 like 1 [Source:MGI Symbol;Acc:MGI:3524944]	-1.92
ENSMUSG00000042417	Ccno	cyclin O [Source:MGI Symbol;Acc:MGI:2145534]	-1.91
ENSMUSG00000032420	Nt5e	5' nucleotidase, ecto [Source:MGI Symbol;Acc:MGI:99782]	-1.90
ENSMUSG00000056399	Prss34	protease, serine, 34 [Source:MGI Symbol;Acc:MGI:2681414]	-1.90
ENSMUSG00000074115	Saa1	serum amyloid A 1 [Source:MGI Symbol;Acc:MGI:98221]	-1.89
ENSMUSG00000005148	Klf5	Kruppel-like factor 5 [Source:MGI Symbol;Acc:MGI:1338056]	-1.86
ENSMUSG00000071256	Zfp213	zinc finger protein 213 [Source:MGI Symbol;Acc:MGI:3053094]	-1.84
ENSMUSG00000026193	Fn1	fibronectin 1 [Source:MGI Symbol;Acc:MGI:95566]	-1.81
ENSMUSG00000058981	Olf1406	olfactory receptor 1406 [Source:MGI Symbol;Acc:MGI:3031240]	-1.81
ENSMUSG00000043939	A530064D06Rik	RIKEN cDNA A530064D06 gene [Source:MGI Symbol;Acc:MGI:2443476]	-1.78
ENSMUSG00000024011	Pi16	peptidase inhibitor 16 [Source:MGI Symbol;Acc:MGI:1921366]	-1.77
ENSMUSG00000040152	Thbs1	thrombospondin 1 [Source:MGI Symbol;Acc:MGI:98737]	-1.76
ENSMUSG00000024171	Prss28	protease, serine, 28 [Source:MGI Symbol;Acc:MGI:2149951]	-1.76
ENSMUSG00000027398	Il1b	interleukin 1 beta [Source:MGI Symbol;Acc:MGI:96543]	-1.75
ENSMUSG00000031740	Mmp2	matrix metalloproteinase 2 [Source:MGI Symbol;Acc:MGI:97009]	-1.73
ENSMUSG00000034403	Pja1	praja1, RING-H2 motif containing [Source:MGI Symbol;Acc:MGI:1101765]	-1.73
ENSMUSG00000037451	Slc22a20	solute carrier family 22 (organic anion transporter), member 20 [Source:MGI Symbol;Acc:MGI:2685809]	-1.73
ENSMUSG00000063785	Utp14a	UTP14, U3 small nucleolar ribonucleoprotein, homolog A (yeast) [Source:MGI Symbol;Acc:MGI:1919804]	-1.73
ENSMUSG00000020604	Arsrg	arylsulfatase G [Source:MGI Symbol;Acc:MGI:1921258]	-1.73
ENSMUSG00000030470	Csrp3	cysteine and glycine-rich protein 3 [Source:MGI Symbol;Acc:MGI:1330824]	-1.72
ENSMUSG00000032561	Acpp	acid phosphatase, prostate [Source:MGI Symbol;Acc:MGI:1928480]	-1.72
ENSMUSG00000029379	Cxcl3	chemokine (C-X-C motif) ligand 3 [Source:MGI Symbol;Acc:MGI:3037818]	-1.72
ENSMUSG00000037463	Fbxo27	F-box protein 27 [Source:MGI Symbol;Acc:MGI:2685007]	-1.70
ENSMUSG00000024680	Ms4a2	membrane-spanning 4-domains, subfamily A, member 2 [Source:MGI Symbol;Acc:MGI:95495]	-1.69
ENSMUSG00000070532	1700084C01Rik	RIKEN cDNA 1700084C01 gene [Source:MGI Symbol;Acc:MGI:1925715]	-1.67
ENSMUSG00000004552	Ctse	cathepsin E [Source:MGI Symbol;Acc:MGI:107361]	-1.67
ENSMUSG00000042367	Gjb3	gap junction protein, beta 3 [Source:MGI Symbol;Acc:MGI:95721]	-1.66
ENSMUSG00000020709	Adap2	ArfGAP with dual PH domains 2 [Source:MGI Symbol;Acc:MGI:2663075]	-1.66
ENSMUSG00000043740	B430306N03Rik	RIKEN cDNA B430306N03 gene [Source:MGI Symbol;Acc:MGI:2443478]	-1.66
ENSMUSG00000028497	Ptplad2	protein tyrosine phosphatase-like A domain containing 2 [Source:MGI Symbol;Acc:MGI:1914025]	-1.65
ENSMUSG00000016194	Hsd11b1	hydroxysteroid 11-beta dehydrogenase 1 [Source:MGI Symbol;Acc:MGI:103562]	-1.64
ENSMUSG00000068587	Mgam	maltase-glucoamylase [Source:MGI Symbol;Acc:MGI:1203495]	-1.64
ENSMUSG00000004814	Ccl24	chemokine (C-C motif) ligand 24 [Source:MGI Symbol;Acc:MGI:1928953]	-1.63
ENSMUSG00000060956	Gm10092	predicted gene 10092 [Source:MGI Symbol;Acc:MGI:3642362]	-1.63
ENSMUSG00000029086	Prom1	prominin 1 [Source:MGI Symbol;Acc:MGI:1100886]	-1.62
ENSMUSG00000051748	1100001G20Rik	RIKEN cDNA 1100001G20 gene [Source:MGI Symbol;Acc:MGI:1913357]	-1.62
ENSMUSG00000045038	Prkce	protein kinase C, epsilon [Source:MGI Symbol;Acc:MGI:97599]	-1.62
ENSMUSG00000021322	Aoah	acyloxyacyl hydrolase [Source:MGI Symbol;Acc:MGI:1350928]	-1.61
ENSMUSG00000032591	Mst1	macrophage stimulating 1 (hepatocyte growth factor-like) [Source:MGI Symbol;Acc:MGI:96080]	-1.60
ENSMUSG00000042349	Ikbke	inhibitor of kappaB kinase epsilon [Source:MGI Symbol;Acc:MGI:1929612]	-1.58
ENSMUSG00000049130	C5ar1	complement component 5a receptor 1 [Source:MGI Symbol;Acc:MGI:88232]	-1.58
ENSMUSG00000042286	Stab1	stabilin 1 [Source:MGI Symbol;Acc:MGI:2178742]	-1.58
ENSMUSG00000016024	Lbp	lipopolysaccharide binding protein [Source:MGI Symbol;Acc:MGI:1098776]	-1.57
ENSMUSG00000028730	Wdr65	WD repeat domain 65 [Source:MGI Symbol;Acc:MGI:2686209]	-1.57
ENSMUSG00000091230	Gm6970	predicted gene 6970 [Source:MGI Symbol;Acc:MGI:3645322]	-1.56
ENSMUSG00000021751	Acox2	acyl-Coenzyme A oxidase 2, branched chain [Source:MGI Symbol;Acc:MGI:1934852]	-1.56
ENSMUSG00000042246	Tmc7	transmembrane channel-like gene family 7 [Source:MGI Symbol;Acc:MGI:2443317]	-1.56
ENSMUSG00000001768	Rin2	Ras and Rab interactor 2 [Source:MGI Symbol;Acc:MGI:1921280]	-1.55

ENSMUSG00000027360	Hdc	histidine decarboxylase [Source:MGI Symbol;Acc:MGI:96062]	-1.55
ENSMUSG00000039578	Fam190a	family with sequence similarity 190, member A [Source:MGI Symbol;Acc:MGI:3045354]	-1.55
ENSMUSG00000036172	Cd200r3	CD200 receptor 3 [Source:MGI Symbol;Acc:MGI:1921853]	-1.55
ENSMUSG00000029314	Agpat9	1-acylglycerol-3-phosphate O-acyltransferase 9 [Source:MGI Symbol;Acc:MGI:3603816]	-1.54
ENSMUSG00000037820	Tgm2	transglutaminase 2, C polypeptide [Source:MGI Symbol;Acc:MGI:98731]	-1.54
ENSMUSG00000013974	1810033B17Rik	RIKEN cDNA 1810033B17 gene [Source:MGI Symbol;Acc:MGI:1916439]	-1.54
ENSMUSG00000033453	Adamts15	a disintegrin-like and metalloproteinase (repolysin type) with thrombospondin type 1 motif, 15 [Source:MGI Symbol;Acc:MGI:2449569]	-1.53
ENSMUSG000000086221	4930412B13Rik	RIKEN cDNA 4930412B13 gene [Source:MGI Symbol;Acc:MGI:1921188]	-1.53
ENSMUSG00000060002	Chpt1	choline phosphotransferase 1 [Source:MGI Symbol;Acc:MGI:2384841]	-1.52
ENSMUSG00000045092	S1pr1	sphingosine-1-phosphate receptor 1 [Source:MGI Symbol;Acc:MGI:1096355]	-1.52
ENSMUSG00000044719	E230025N22Rik	Riken cDNA E230025N22 gene [Source:MGI Symbol;Acc:MGI:3687212]	-1.52
ENSMUSG00000097561	AC171500.2	--	-1.52
ENSMUSG00000030747	Dgat2	diacylglycerol O-acyltransferase 2 [Source:MGI Symbol;Acc:MGI:1915050]	-1.52
ENSMUSG00000020315	Spnb2	spectrin beta 2 [Source:MGI Symbol;Acc:MGI:98388]	-1.51
ENSMUSG00000097050	AC163291.1	--	-1.51
ENSMUSG00000022555	Dgat1	diacylglycerol O-acyltransferase 1 [Source:MGI Symbol;Acc:MGI:1333825]	-1.51
ENSMUSG00000036918	Ttc7	tetratricopeptide repeat domain 7 [Source:MGI Symbol;Acc:MGI:1920999]	-1.51
ENSMUSG00000030187	Klra2	killer cell lectin-like receptor, subfamily A, member 2 [Source:MGI Symbol;Acc:MGI:101906]	-1.50
ENSMUSG00000044734	Serpnb1a	serine (or cysteine) peptidase inhibitor, clade B, member 1a [Source:MGI Symbol;Acc:MGI:1913472]	-1.50
ENSMUSG00000030034	Ino80b	INO80 complex subunit B [Source:MGI Symbol;Acc:MGI:1917270]	-1.50
ENSMUSG00000053168	9030619P08Rik	RIKEN cDNA 9030619P08 gene [Source:MGI Symbol;Acc:MGI:3612405]	-1.49
ENSMUSG00000035011	Zbtb7a	zinc finger and BTB domain containing 7a [Source:MGI Symbol;Acc:MGI:1335091]	-1.49
ENSMUSG00000028860	Syt11	synaptotagmin-like 1 [Source:MGI Symbol;Acc:MGI:1933365]	-1.49
ENSMUSG00000032776	Mctp2	multiple C2 domains, transmembrane 2 [Source:MGI Symbol;Acc:MGI:2685335]	-1.49
ENSMUSG00000062694	Cav3	caveolin 3 [Source:MGI Symbol;Acc:MGI:107570]	-1.47
ENSMUSG00000030653	Pde2a	phosphodiesterase 2A, cGMP-stimulated [Source:MGI Symbol;Acc:MGI:2446107]	-1.47
ENSMUSG00000064368	mt-Nd6	mitochondrially encoded NADH dehydrogenase 6 [Source:MGI Symbol;Acc:MGI:102495]	-1.47
ENSMUSG00000078117	Gm16485	predicted gene 16485 [Source:MGI Symbol;Acc:MGI:3642771]	-1.46
ENSMUSG00000094690	1600014C23Rik	RIKEN cDNA 1600014C23 gene [Source:MGI Symbol;Acc:MGI:1919490]	-1.46
ENSMUSG00000069873	4930438A08Rik	RIKEN cDNA 4930438A08 gene [Source:MGI Symbol;Acc:MGI:1921238]	-1.45
ENSMUSG00000086841	2410006H16Rik	RIKEN cDNA 2410006H16 gene [Source:MGI Symbol;Acc:MGI:1916471]	-1.45
ENSMUSG00000035085	1700020L24Rik	RIKEN cDNA 1700020L24 gene [Source:MGI Symbol;Acc:MGI:1913580]	-1.45
ENSMUSG00000020682	Mmp28	matrix metalloproteinase 28 (epilysin) [Source:MGI Symbol;Acc:MGI:2153062]	-1.45
ENSMUSG00000058773	Hist1h1b	histone cluster 1, H1b [Source:MGI Symbol;Acc:MGI:1861461]	-1.44
ENSMUSG00000017466	Timp2	tissue inhibitor of metalloproteinase 2 [Source:MGI Symbol;Acc:MGI:98753]	-1.44
ENSMUSG00000063142	Kcnma1	potassium large conductance calcium-activated channel, subfamily M, alpha member 1 [Source:MGI Symbol;Acc:MGI:99923]	-1.44
ENSMUSG00000009292	Trpm2	transient receptor potential cation channel, subfamily M, member 2 [Source:MGI Symbol;Acc:MGI:1351901]	-1.43
ENSMUSG00000038259	Gdf5	growth differentiation factor 5 [Source:MGI Symbol;Acc:MGI:95688]	-1.43
ENSMUSG00000055639	Dach1	dachshund 1 (Drosophila) [Source:MGI Symbol;Acc:MGI:1277991]	-1.43
ENSMUSG00000043962	Thrap3	thyroid hormone receptor associated protein 3 [Source:MGI Symbol;Acc:MGI:2442637]	-1.42
ENSMUSG00000081788	Gm5898	predicted gene 5898 [Source:MGI Symbol;Acc:MGI:3644921]	-1.42
ENSMUSG00000024164	C3	complement component 3 [Source:MGI Symbol;Acc:MGI:88227]	-1.41
ENSMUSG00000042507	C130039O16Rik	RIKEN cDNA C130039O16 gene [Source:MGI Symbol;Acc:MGI:2685106]	-1.41
ENSMUSG00000068348	Gm10238	predicted pseudogene 10238 [Source:MGI Symbol;Acc:MGI:3641620]	-1.41
ENSMUSG00000045932	Ifit2	interferon-induced protein with tetratricopeptide repeats 2 [Source:MGI Symbol;Acc:MGI:99449]	-1.40
ENSMUSG00000032500	Dclk3	doublecortin-like kinase 3 [Source:MGI Symbol;Acc:MGI:3039580]	-1.40
ENSMUSG00000058427	Cxcl2	chemokine (C-X-C motif) ligand 2 [Source:MGI Symbol;Acc:MGI:1340094]	-1.40
ENSMUSG00000040283	Btn19	butyrophilin-like 9 [Source:MGI Symbol;Acc:MGI:2442439]	-1.40
ENSMUSG00000030142	Clec4e	C-type lectin domain family 4, member e [Source:MGI Symbol;Acc:MGI:1861232]	-1.39
ENSMUSG00000072950	Gm10444	predicted pseudogene 10444 [Source:MGI Symbol;Acc:MGI:3642569]	-1.39
ENSMUSG00000027313	Chac1	ChaC, cation transport regulator 1 [Source:MGI Symbol;Acc:MGI:1916315]	-1.39
ENSMUSG00000001739	Cldn15	claudin 15 [Source:MGI Symbol;Acc:MGI:1913103]	-1.39
ENSMUSG00000056050	MIA3	melanoma inhibitory activity protein 3 precursor [Source:RefSeq peptide;Acc:NP_796363]	-1.39
ENSMUSG00000043099	Hic1	hypermethylated in cancer 1 [Source:MGI Symbol;Acc:MGI:1338010]	-1.38

ENSMUSG00000061100	Retnla	resistin like alpha [Source:MGI Symbol;Acc:MGI:1888504]	-1.38
ENSMUSG00000022534	Mefv	Mediterranean fever [Source:MGI Symbol;Acc:MGI:1859396]	-1.38
ENSMUSG00000040990	Sh3kbp1	SH3-domain kinase binding protein 1 [Source:MGI Symbol;Acc:MGI:1889583]	-1.38
ENSMUSG00000035557	Krt17	keratin 17 [Source:MGI Symbol;Acc:MGI:96691]	-1.37
ENSMUSG00000025268	Maged2	melanoma antigen, family D, 2 [Source:MGI Symbol;Acc:MGI:1933391]	-1.37
ENSMUSG00000037759	Ptger2	prostaglandin E receptor 2 (subtype EP2) [Source:MGI Symbol;Acc:MGI:97794]	-1.37
ENSMUSG00000095870	Lce1k	late cornified envelope 1K [Source:MGI Symbol;Acc:MGI:3702534]	-1.36
ENSMUSG00000023963	Cyp39a1	cytochrome P450, family 39, subfamily a, polypeptide 1 [Source:MGI Symbol;Acc:MGI:1927096]	-1.36
ENSMUSG00000044309	Apol7c	apolipoprotein L 7c [Source:MGI Symbol;Acc:MGI:1920912]	-1.36
ENSMUSG00000049313	Sorl1	sortilin-related receptor, LDLR class A repeats-containing [Source:MGI Symbol;Acc:MGI:1202296]	-1.36
ENSMUSG00000090468	Gm5331	predicted gene 5331 [Source:MGI Symbol;Acc:MGI:3647739]	-1.36
ENSMUSG00000037486	Asxl2	additional sex combs like 2 (Drosophila) [Source:MGI Symbol;Acc:MGI:1922552]	-1.36
ENSMUSG00000055900	Tmem40	transmembrane protein 40 [Source:MGI Symbol;Acc:MGI:2137870]	-1.36
ENSMUSG00000022469	Rapgef3	Rap guanine nucleotide exchange factor (GEF) 3 [Source:MGI Symbol;Acc:MGI:2441741]	-1.36
ENSMUSG00000048924	Ccdc125	coiled-coil domain containing 125 [Source:MGI Symbol;Acc:MGI:1923291]	-1.35
ENSMUSG00000069089	Cdk7	cyclin-dependent kinase 7 [Source:MGI Symbol;Acc:MGI:102956]	-1.35
ENSMUSG00000030069	Prok2	prokineticin 2 [Source:MGI Symbol;Acc:MGI:1354178]	-1.35
ENSMUSG00000075602	Ly6a	lymphocyte antigen 6 complex, locus A [Source:MGI Symbol;Acc:MGI:107527]	-1.35
ENSMUSG00000024155	Meiob	meiosis specific with OB domains [Source:MGI Symbol;Acc:MGI:1922428]	-1.35
ENSMUSG00000031314	Taf1	TAF1 RNA polymerase II, TATA box binding protein (TBP)-associated factor [Source:MGI Symbol;Acc:MGI:1336878]	-1.35
ENSMUSG00000040037	Negr1	neuronal growth regulator 1 [Source:MGI Symbol;Acc:MGI:2444846]	-1.34
ENSMUSG00000081405	Gm13142	predicted gene 13142 [Source:MGI Symbol;Acc:MGI:3651745]	-1.34
ENSMUSG00000052414	Atf7	activating transcription factor 7 [Source:MGI Symbol;Acc:MGI:2443472]	-1.34
ENSMUSG00000052812	Atad2b	ATPase family, AAA domain containing 2B [Source:MGI Symbol;Acc:MGI:2444798]	-1.34
ENSMUSG00000087192	4930412L05Rik	RIKEN cDNA 4930412L05 gene [Source:MGI Symbol;Acc:MGI:1921191]	-1.33
ENSMUSG00000027074	Slc43a3	solute carrier family 43, member 3 [Source:MGI Symbol;Acc:MGI:1931054]	-1.33
ENSMUSG00000054733	Msra	methionine sulfoxide reductase A [Source:MGI Symbol;Acc:MGI:106916]	-1.33
ENSMUSG00000039760	Il22ra2	interleukin 22 receptor, alpha 2 [Source:MGI Symbol;Acc:MGI:2665114]	-1.33
ENSMUSG00000079484	Phyhhd1	phytanoyl-CoA dioxygenase domain containing 1 [Source:MGI Symbol;Acc:MGI:3612860]	-1.33
ENSMUSG00000033107	Rnf125	ring finger protein 125 [Source:MGI Symbol;Acc:MGI:1914914]	-1.33
ENSMUSG00000006005	Tpr	translocated promoter region [Source:MGI Symbol;Acc:MGI:1922066]	-1.33
ENSMUSG00000053062	Jam2	junction adhesion molecule 2 [Source:MGI Symbol;Acc:MGI:1933820]	-1.32
ENSMUSG00000086425	F730016J06Rik	RIKEN cDNA F730016J06 gene [Source:MGI Symbol;Acc:MGI:2443559]	-1.32
ENSMUSG00000050931	Sgms2	sphingomyelin synthase 2 [Source:MGI Symbol;Acc:MGI:1921692]	-1.32
ENSMUSG00000018907	Alox12e	arachidonate lipoxygenase, epidermal [Source:MGI Symbol;Acc:MGI:1274790]	-1.32
ENSMUSG00000090637	Gm6189	predicted gene 6189 [Source:MGI Symbol;Acc:MGI:3643154]	-1.32
ENSMUSG00000026809	1700026L06Rik	RIKEN cDNA 1700026L06 gene [Source:MGI Symbol;Acc:MGI:1917237]	-1.32
ENSMUSG00000029716	Tfr2	transferrin receptor 2 [Source:MGI Symbol;Acc:MGI:1354956]	-1.32
ENSMUSG00000068697	Myoz1	myozenin 1 [Source:MGI Symbol;Acc:MGI:1929471]	-1.32
ENSMUSG00000027845	Dclre1b	DNA cross-link repair 1B, PSO2 homolog (S. cerevisiae) [Source:MGI Symbol;Acc:MGI:2156057]	-1.31
ENSMUSG00000038884	A230050P20Rik	RIKEN cDNA A230050P20 gene [Source:MGI Symbol;Acc:MGI:2441788]	-1.31
ENSMUSG00000038742	Angptl6	angiopoietin-like 6 [Source:MGI Symbol;Acc:MGI:1917976]	-1.31
ENSMUSG00000047034	Ankrd33	ankyrin repeat domain 33 [Source:MGI Symbol;Acc:MGI:2443398]	-1.31
ENSMUSG00000035047	Kri1	KRI1 homolog (S. cerevisiae) [Source:MGI Symbol;Acc:MGI:2384899]	-1.30
ENSMUSG00000093514	Gm9320	predicted gene 9320 [Source:MGI Symbol;Acc:MGI:3645000]	-1.30
ENSMUSG00000027890	Gstm4	glutathione S-transferase, mu 4 [Source:MGI Symbol;Acc:MGI:95862]	-1.30
ENSMUSG00000031825	Crispld2	cysteine-rich secretory protein LCCL domain containing 2 [Source:MGI Symbol;Acc:MGI:1926142]	-1.30
ENSMUSG00000018363	Smurf2	SMAD specific E3 ubiquitin protein ligase 2 [Source:MGI Symbol;Acc:MGI:1913563]	-1.29
ENSMUSG00000015053	Gata2	GATA binding protein 2 [Source:MGI Symbol;Acc:MGI:95662]	-1.29
ENSMUSG00000003617	Cp	ceruloplasmin [Source:MGI Symbol;Acc:MGI:88476]	-1.29
ENSMUSG00000097789	AC129605.1	--	-1.28
ENSMUSG00000014599	Csf1	colony stimulating factor 1 (macrophage) [Source:MGI Symbol;Acc:MGI:1339753]	-1.28
ENSMUSG00000043873	Chi317	chitinase 3-like 7 [Source:MGI Symbol;Acc:MGI:2676649]	-1.28
ENSMUSG00000028436	Dcaf12	DDB1 and CUL4 associated factor 12 [Source:MGI Symbol;Acc:MGI:1916220]	-1.28

ENSMUSG00000034730	Bai1	brain-specific angiogenesis inhibitor 1 [Source:MGI Symbol;Acc:MGI:1933736]	-1.27
ENSMUSG00000094441	Zfp955a	zinc finger protein 955A [Source:MGI Symbol;Acc:MGI:4834570]	-1.27
ENSMUSG00000096910	Zfp955b	zinc finger protein 955B [Source:MGI Symbol;Acc:MGI:4834573]	-1.27
ENSMUSG00000046908	Ltb4r1	leukotriene B4 receptor 1 [Source:MGI Symbol;Acc:MGI:1309472]	-1.27
ENSMUSG00000009734	Pou6f2	POU domain, class 6, transcription factor 2 [Source:MGI Symbol;Acc:MGI:2443631]	-1.27
ENSMUSG00000024451	Arap3	ArfGAP with RhoGAP domain, ankyrin repeat and PH domain 3 [Source:MGI Symbol;Acc:MGI:2147274]	-1.26
ENSMUSG00000028179	Cth	cystathionase (cystathionine gamma-lyase) [Source:MGI Symbol;Acc:MGI:1339968]	-1.26
ENSMUSG00000079339	Gm14446	predicted gene 14446 [Source:MGI Symbol;Acc:MGI:3650685]	-1.26
ENSMUSG00000030965	Fam175b	family with sequence similarity 175, member B [Source:MGI Symbol;Acc:MGI:1926116]	-1.26
ENSMUSG00000029761	Cald1	caldesmon 1 [Source:MGI Symbol;Acc:MGI:88250]	-1.26
ENSMUSG00000047473	Zfp30	zinc finger protein 30 [Source:MGI Symbol;Acc:MGI:99178]	-1.26
ENSMUSG00000073779	B230314M03Rik	RIKEN cDNA B230314M03 gene [Source:MGI Symbol;Acc:MGI:3588233]	-1.25
ENSMUSG00000037683	Armc3	armadillo repeat containing 3 [Source:MGI Symbol;Acc:MGI:1918132]	-1.25
ENSMUSG00000039013	Siglec5	sialic acid binding Ig-like lectin 5 [Source:MGI Symbol;Acc:MGI:2681107]	-1.25
ENSMUSG00000061718	Ppp1r1b	protein phosphatase 1, regulatory (inhibitor) subunit 1B [Source:MGI Symbol;Acc:MGI:94860]	-1.25
ENSMUSG00000003411	Rab3b	RAB3B, member RAS oncogene family [Source:MGI Symbol;Acc:MGI:1917158]	-1.25
ENSMUSG00000056643	Chst13	carbohydrate (chondroitin 4) sulfotransferase 13 [Source:MGI Symbol;Acc:MGI:1919047]	-1.25
ENSMUSG00000026258	3110079O15Rik	RIKEN cDNA 3110079O15 gene [Source:MGI Symbol;Acc:MGI:1920484]	-1.25
ENSMUSG00000028893	Sesn2	sestrin 2 [Source:MGI Symbol;Acc:MGI:2651874]	-1.24
ENSMUSG00000062328	Rpl17	ribosomal protein L17 [Source:MGI Symbol;Acc:MGI:2448270]	-1.24
ENSMUSG00000081855	Rpl17-ps5	ribosomal protein L17, pseudogene 5 [Source:MGI Symbol;Acc:MGI:3704246]	-1.24
ENSMUSG00000082035	Gm14934	predicted gene 14934 [Source:MGI Symbol;Acc:MGI:3802129]	-1.24
ENSMUSG00000001441	Npepps	aminopeptidase puromycin sensitive [Source:MGI Symbol;Acc:MGI:1101358]	-1.24
ENSMUSG00000026354	Lct	lactase [Source:MGI Symbol;Acc:MGI:104576]	-1.24
ENSMUSG00000007476	Lrrc8a	leucine rich repeat containing 8A [Source:MGI Symbol;Acc:MGI:2652847]	-1.24
ENSMUSG00000051000	Fam160a1	family with sequence similarity 160, member A1 [Source:MGI Symbol;Acc:MGI:2444746]	-1.23
ENSMUSG00000024534	Sncaip	synuclein, alpha interacting protein (synphilin) [Source:MGI Symbol;Acc:MGI:1915097]	-1.23
ENSMUSG00000024290	Rock1	Rho-associated coiled-coil containing protein kinase 1 [Source:MGI Symbol;Acc:MGI:107927]	-1.23
ENSMUSG00000023951	Vegfa	vascular endothelial growth factor A [Source:MGI Symbol;Acc:MGI:103178]	-1.23
ENSMUSG00000092622	Khdc3	KH domain containing 3, subcortical maternal complex member [Source:MGI Symbol;Acc:MGI:1914241]	-1.23
ENSMUSG00000095028	Sirpb1b	signal-regulatory protein beta 1B [Source:MGI Symbol;Acc:MGI:3779828]	-1.23
ENSMUSG00000022665	Ccdc80	coiled-coil domain containing 80 [Source:MGI Symbol;Acc:MGI:1915146]	-1.23
ENSMUSG00000097720	AC157950.1	--	-1.23
ENSMUSG00000020846	Fam101b	family with sequence similarity 101, member B [Source:MGI Symbol;Acc:MGI:1923816]	-1.23
ENSMUSG00000097518	AC159277.1	--	-1.23
ENSMUSG00000030165	Klrd1	killer cell lectin-like receptor, subfamily D, member 1 [Source:MGI Symbol;Acc:MGI:1196275]	-1.23
ENSMUSG00000020085	Aifm2	apoptosis-inducing factor, mitochondrion-associated 2 [Source:MGI Symbol;Acc:MGI:1918611]	-1.22
ENSMUSG00000031590	Frg1	FSHD region gene 1 [Source:MGI Symbol;Acc:MGI:893597]	-1.22
ENSMUSG00000042208	0610010F05Rik	RIKEN cDNA 0610010F05 gene [Source:MGI Symbol;Acc:MGI:1918925]	-1.22
ENSMUSG00000079049	Serpinb1c	serine (or cysteine) peptidase inhibitor, clade B, member 1c [Source:MGI Symbol;Acc:MGI:2445363]	-1.22
ENSMUSG00000029501	Ankle2	ankyrin repeat and LEM domain containing 2 [Source:MGI Symbol;Acc:MGI:1261856]	-1.22
ENSMUSG00000053411	Cbx7	chromobox 7 [Source:MGI Symbol;Acc:MGI:1196439]	-1.21
ENSMUSG00000031497	Tnfsf13b	tumor necrosis factor (ligand) superfamily, member 13b [Source:MGI Symbol;Acc:MGI:1344376]	-1.21
ENSMUSG00000057729	Prtn3	proteinase 3 [Source:MGI Symbol;Acc:MGI:893580]	-1.21
ENSMUSG00000037946	Fgd3	FYVE, RhoGEF and PH domain containing 3 [Source:MGI Symbol;Acc:MGI:1353657]	-1.21
ENSMUSG00000066272	Olfir559	olfactory receptor 559 [Source:MGI Symbol;Acc:MGI:3030393]	-1.21
ENSMUSG00000083929	Gm13301	predicted gene 13301 [Source:MGI Symbol;Acc:MGI:3707230]	-1.21
ENSMUSG00000035004	Igslf6	immunoglobulin superfamily, member 6 [Source:MGI Symbol;Acc:MGI:1891393]	-1.20
ENSMUSG00000034796	Cpne7	copine VII [Source:MGI Symbol;Acc:MGI:2142747]	-1.20
ENSMUSG00000020798	Spns3	spinster homolog 3 [Source:MGI Symbol;Acc:MGI:1924827]	-1.20
ENSMUSG00000095704	AL592187.1	--	-1.20
ENSMUSG00000028664	Ephb2	Eph receptor B2 [Source:MGI Symbol;Acc:MGI:99611]	-1.19
ENSMUSG00000057191	AB124611	cDNA sequence AB124611 [Source:MGI Symbol;Acc:MGI:3043001]	-1.19
ENSMUSG00000029752	Asns	asparagine synthetase [Source:MGI Symbol;Acc:MGI:1350929]	-1.19

ENSMUSG00000024953	Prdx5	peroxiredoxin 5 [Source:MGI Symbol;Acc:MGI:1859821]	-1.19
ENSMUSG00000005803	Sqrdl	sulfide quinone reductase-like (yeast) [Source:MGI Symbol;Acc:MGI:1929899]	-1.19
ENSMUSG00000022026	Olfm4	olfactomedin 4 [Source:MGI Symbol;Acc:MGI:2685142]	-1.19
ENSMUSG00000078780	Gm5150	predicted gene 5150 [Source:MGI Symbol;Acc:MGI:3779469]	-1.19
ENSMUSG00000030786	Itgam	integrin alpha M [Source:MGI Symbol;Acc:MGI:96607]	-1.18
ENSMUSG00000058794	Nfe2	nuclear factor, erythroid derived 2 [Source:MGI Symbol;Acc:MGI:97308]	-1.18
ENSMUSG00000039193	Nlrc4	NLR family, CARD domain containing 4 [Source:MGI Symbol;Acc:MGI:3036243]	-1.18
ENSMUSG00000020125	Elane	elastase, neutrophil expressed [Source:MGI Symbol;Acc:MGI:2679229]	-1.18
ENSMUSG00000040860	Crocc	ciliary rootlet coiled-coil, rootletin [Source:MGI Symbol;Acc:MGI:3529431]	-1.18
ENSMUSG00000096255	Dynlt1b	dynein light chain Tctex-type 1B [Source:MGI Symbol;Acc:MGI:98643]	-1.17
ENSMUSG00000000579	Dynlt1c	dynein light chain Tctex-type 1C [Source:MGI Symbol;Acc:MGI:3807476]	-1.17
ENSMUSG00000095677	Dynlt1f	dynein light chain Tctex-type 1F [Source:MGI Symbol;Acc:MGI:3780996]	-1.17
ENSMUSG00000082691	Dynlt1-ps1	dynein light chain Tctex-type 1, pseudogene 1 [Source:MGI Symbol;Acc:MGI:3642625]	-1.17
ENSMUSG00000054675	Tmem119	transmembrane protein 119 [Source:MGI Symbol;Acc:MGI:2385228]	-1.17
ENSMUSG00000046826	Fam187b	family with sequence similarity 187, member B [Source:MGI Symbol;Acc:MGI:1923665]	-1.17
ENSMUSG00000023982	Guca1a	guanylate cyclase activator 1a (retina) [Source:MGI Symbol;Acc:MGI:102770]	-1.17
ENSMUSG00000018339	Gpx3	glutathione peroxidase 3 [Source:MGI Symbol;Acc:MGI:105102]	-1.17
ENSMUSG00000054589	Gm9949	predicted gene 9949 [Source:MGI Symbol;Acc:MGI:3647947]	-1.17
ENSMUSG00000040564	Apoc1	apolipoprotein C-I [Source:MGI Symbol;Acc:MGI:88053]	-1.17
ENSMUSG00000052749	Trim30b	tripartite motif-containing 30B [Source:MGI Symbol;Acc:MGI:4821256]	-1.17
ENSMUSG00000000244	Tspan32	tetraspanin 32 [Source:MGI Symbol;Acc:MGI:1350360]	-1.16
ENSMUSG00000037750	BC017647	cDNA sequence BC017647 [Source:MGI Symbol;Acc:MGI:2384939]	-1.16
ENSMUSG00000022805	Spata26	spermatogenesis associated 26 [Source:MGI Symbol;Acc:MGI:2443598]	-1.16
ENSMUSG00000046311	Zfp62	zinc finger protein 62 [Source:MGI Symbol;Acc:MGI:99662]	-1.15
ENSMUSG00000045662	Henmt1	HEN1 methyltransferase homolog 1 (Arabidopsis) [Source:MGI Symbol;Acc:MGI:1913965]	-1.15
ENSMUSG00000074625	Arhgap40	Rho GTPase activating protein 40 [Source:MGI Symbol;Acc:MGI:3649852]	-1.15
ENSMUSG00000061520	Olf153	olfactory receptor 153 [Source:MGI Symbol;Acc:MGI:1313138]	-1.15
ENSMUSG00000027428	Rbbp9	retinoblastoma binding protein 9 [Source:MGI Symbol;Acc:MGI:1347074]	-1.15
ENSMUSG00000028266	Lmo4	LIM domain only 4 [Source:MGI Symbol;Acc:MGI:109360]	-1.15
ENSMUSG00000073664	Nbeal1	neurobeachin like 1 [Source:MGI Symbol;Acc:MGI:2444343]	-1.15
ENSMUSG00000046168	Kcnrg	potassium channel regulator [Source:MGI Symbol;Acc:MGI:2685591]	-1.15
ENSMUSG00000037492	Zmat4	zinc finger, matrix type 4 [Source:MGI Symbol;Acc:MGI:2443497]	-1.14
ENSMUSG00000047735	Samd9l	sterile alpha motif domain containing 9-like [Source:MGI Symbol;Acc:MGI:1343184]	-1.14
ENSMUSG00000063364	3300002I08Rik	RIKEN cDNA 3300002I08 gene [Source:MGI Symbol;Acc:MGI:1916527]	-1.14
ENSMUSG00000066516	Klk1b21	kallikrein 1-related peptidase b21 [Source:MGI Symbol;Acc:MGI:892022]	-1.14
ENSMUSG00000050623	1700019N12Rik	RIKEN cDNA 1700019N12 gene [Source:MGI Symbol;Acc:MGI:1914327]	-1.14
ENSMUSG00000040828	Tmem146	transmembrane protein 146 [Source:MGI Symbol;Acc:MGI:2147030]	-1.14
ENSMUSG00000026220	Slc16a14	solute carrier family 16 (monocarboxylic acid transporters), member 14 [Source:MGI Symbol;Acc:MGI:1919031]	-1.14
ENSMUSG00000033016	Nfatc1	nuclear factor of activated T cells, cytoplasmic, calcineurin dependent 1 [Source:MGI Symbol;Acc:MGI:102469]	-1.14
ENSMUSG00000033326	Kdm4a	lysine (K)-specific demethylase 4A [Source:MGI Symbol;Acc:MGI:2446210]	-1.13
ENSMUSG00000020034	Tcp11l2	t-complex 11 (mouse) like 2 [Source:MGI Symbol;Acc:MGI:2444679]	-1.13
ENSMUSG00000054582	Pabpc1l	poly(A) binding protein, cytoplasmic 1-like [Source:MGI Symbol;Acc:MGI:1922908]	-1.13
ENSMUSG00000029178	Klf3	Kruppel-like factor 3 (basic) [Source:MGI Symbol;Acc:MGI:1342773]	-1.13
ENSMUSG00000021506	Pitx1	paired-like homeodomain transcription factor 1 [Source:MGI Symbol;Acc:MGI:107374]	-1.13
ENSMUSG00000058748	Zfp958	zinc finger protein 958 [Source:MGI Symbol;Acc:MGI:2385298]	-1.13
ENSMUSG00000030149	Klrk1	killer cell lectin-like receptor subfamily K, member 1 [Source:MGI Symbol;Acc:MGI:1196250]	-1.13
ENSMUSG00000000838	Fmr1	fragile X mental retardation syndrome 1 [Source:MGI Symbol;Acc:MGI:95564]	-1.13
ENSMUSG00000034271	Jdp2	Jun dimerization protein 2 [Source:MGI Symbol;Acc:MGI:1932093]	-1.13
ENSMUSG00000024576	Csnk1a1	casein kinase 1, alpha 1 [Source:MGI Symbol;Acc:MGI:1934950]	-1.13
ENSMUSG00000019851	Perp	PERP, TP53 apoptosis effector [Source:MGI Symbol;Acc:MGI:1929938]	-1.13
ENSMUSG00000063234	Gpr84	G protein-coupled receptor 84 [Source:MGI Symbol;Acc:MGI:1934129]	-1.12
ENSMUSG00000053914	Kdm4d	lysine (K)-specific demethylase 4D [Source:MGI Symbol;Acc:MGI:3606484]	-1.12
ENSMUSG00000089847	Fxc1	fractured callus expressed transcript 1 [Source:MGI Symbol;Acc:MGI:1315196]	-1.12
ENSMUSG00000023031	Cela1	chymotrypsin-like elastase family, member 1 [Source:MGI Symbol;Acc:MGI:95314]	-1.12

ENSMUSG00000033595	Lgi3	leucine-rich repeat LGI family, member 3 [Source:MGI Symbol;Acc:MGI:2182619]	-1.12
ENSMUSG00000085334	Gm12940	predicted gene 12940 [Source:MGI Symbol;Acc:MGI:3702626]	-1.12
ENSMUSG00000078670	Fam174b	family with sequence similarity 174, member B [Source:MGI Symbol;Acc:MGI:3698178]	-1.12
ENSMUSG00000064345	mt-Nd2	mitochondrially encoded NADH dehydrogenase 2 [Source:MGI Symbol;Acc:MGI:102500]	-1.12
ENSMUSG00000096054	SYNE1	Nesprin-1 [Source:UniProtKB/Swiss-Prot;Acc:Q6ZWR6]	-1.12
ENSMUSG00000019920	Lims1	LIM and senescent cell antigen-like domains 1 [Source:MGI Symbol;Acc:MGI:1195263]	-1.12
ENSMUSG00000000869	Il4	interleukin 4 [Source:MGI Symbol;Acc:MGI:96556]	-1.11
ENSMUSG00000032086	Bace1	beta-site APP cleaving enzyme 1 [Source:MGI Symbol;Acc:MGI:1346542]	-1.11
ENSMUSG00000025780	Itih5	inter-alpha (globulin) inhibitor H5 [Source:MGI Symbol;Acc:MGI:1925751]	-1.11
ENSMUSG00000058447	Zfp82	zinc finger protein 82 [Source:MGI Symbol;Acc:MGI:1890753]	-1.11
ENSMUSG00000045658	Pid1	phosphotyrosine interaction domain containing 1 [Source:MGI Symbol;Acc:MGI:2138391]	-1.11
ENSMUSG00000020227	Irak3	interleukin-1 receptor-associated kinase 3 [Source:MGI Symbol;Acc:MGI:1921164]	-1.11
ENSMUSG00000071226	Cecr2	cat eye syndrome chromosome region, candidate 2 [Source:MGI Symbol;Acc:MGI:1923799]	-1.11
ENSMUSG00000085873	Gm12750	predicted gene 12750 [Source:MGI Symbol;Acc:MGI:3651956]	-1.10
ENSMUSG00000006527	Sfmbt1	Scm-like with four mbt domains 1 [Source:MGI Symbol;Acc:MGI:1859609]	-1.10
ENSMUSG00000040936	Ulk4	unc-51-like kinase 4 [Source:MGI Symbol;Acc:MGI:1921622]	-1.10
ENSMUSG00000020841	Cpd	carboxypeptidase D [Source:MGI Symbol;Acc:MGI:107265]	-1.10
ENSMUSG00000038047	Haus6	HAUS augmin-like complex, subunit 6 [Source:MGI Symbol;Acc:MGI:1923389]	-1.10
ENSMUSG00000030108	Slc6a13	solute carrier family 6 (neurotransmitter transporter, GABA), member 13 [Source:MGI Symbol;Acc:MGI:95629]	-1.10
ENSMUSG00000025094	Slc18a2	solute carrier family 18 (vesicular monoamine), member 2 [Source:MGI Symbol;Acc:MGI:106677]	-1.10
ENSMUSG00000051219	3100002H09Rik	RIKEN cDNA 3100002H09 gene [Source:MGI Symbol;Acc:MGI:1917499]	-1.10
ENSMUSG00000071517	Gm10334	predicted gene 10334 [Source:MGI Symbol;Acc:MGI:3641889]	-1.09
ENSMUSG00000042079	Hnrnpf	heterogeneous nuclear ribonucleoprotein F [Source:MGI Symbol;Acc:MGI:2138741]	-1.09
ENSMUSG00000021260	Hhip1	hedgehog interacting protein-like 1 [Source:MGI Symbol;Acc:MGI:1919265]	-1.09
ENSMUSG00000033355	Rtp4	receptor transporter protein 4 [Source:MGI Symbol;Acc:MGI:1915025]	-1.09
ENSMUSG00000000359	Rem1	rad and gem related GTP binding protein 1 [Source:MGI Symbol;Acc:MGI:1097696]	-1.09
ENSMUSG00000034460	Six4	sine oculis-related homeobox 4 [Source:MGI Symbol;Acc:MGI:106034]	-1.09
ENSMUSG00000035354	Uvrag	UV radiation resistance associated gene [Source:MGI Symbol;Acc:MGI:1925860]	-1.09
ENSMUSG00000033520	Idi2	isopentenyl-diphosphate delta isomerase 2 [Source:MGI Symbol;Acc:MGI:2444315]	-1.09
ENSMUSG00000026831	1700007K13Rik	RIKEN cDNA 1700007K13 gene [Source:MGI Symbol;Acc:MGI:1916577]	-1.09
ENSMUSG00000042439	Zfp532	zinc finger protein 532 [Source:MGI Symbol;Acc:MGI:3036282]	-1.09
ENSMUSG00000053977	Cd8a	CD8 antigen, alpha chain [Source:MGI Symbol;Acc:MGI:88346]	-1.09
ENSMUSG00000059089	Fcgr4	Fc receptor, IgG, low affinity IV [Source:MGI Symbol;Acc:MGI:2179523]	-1.09
ENSMUSG00000062604	Srpk2	serine/arginine-rich protein specific kinase 2 [Source:MGI Symbol;Acc:MGI:1201408]	-1.09
ENSMUSG00000028108	Ecm1	extracellular matrix protein 1 [Source:MGI Symbol;Acc:MGI:103060]	-1.09
ENSMUSG00000036712	Cyld	cylindromatosis (turban tumor syndrome) [Source:MGI Symbol;Acc:MGI:1921506]	-1.08
ENSMUSG00000079620	Muc4	mucin 4 [Source:MGI Symbol;Acc:MGI:2153525]	-1.08
ENSMUSG00000040463	Mybbp1a	MYB binding protein (P160) 1a [Source:MGI Symbol;Acc:MGI:106181]	-1.08
ENSMUSG00000040447	Spns2	spinster homolog 2 [Source:MGI Symbol;Acc:MGI:2384936]	-1.08
ENSMUSG00000042540	Acot5	acyl-CoA thioesterase 5 [Source:MGI Symbol;Acc:MGI:2384969]	-1.08
ENSMUSG00000036377	C530008M17Rik	RIKEN cDNA C530008M17 gene [Source:MGI Symbol;Acc:MGI:2444817]	-1.08
ENSMUSG00000062110	Sefd2	Sec1 family domain containing 2 [Source:MGI Symbol;Acc:MGI:2443446]	-1.08
ENSMUSG00000074093	Svip	small VCP/p97-interacting protein [Source:MGI Symbol;Acc:MGI:1922994]	-1.08
ENSMUSG00000038914	Dido1	death inducer-obliterator 1 [Source:MGI Symbol;Acc:MGI:1344352]	-1.07
ENSMUSG00000044485	Klk1b11	kallikrein 1-related peptidase b11 [Source:MGI Symbol;Acc:MGI:892023]	-1.07
ENSMUSG00000078122	F630028O10Rik	RIKEN cDNA F630028O10 gene [Source:MGI Symbol;Acc:MGI:3641813]	-1.07
ENSMUSG00000036835	Psenen	presenilin enhancer 2 homolog (C. elegans) [Source:MGI Symbol;Acc:MGI:1913590]	-1.07
ENSMUSG00000085148	Mir22hg	Mir22 host gene (non-protein coding) [Source:MGI Symbol;Acc:MGI:1914348]	-1.07
ENSMUSG00000046805	Mpeg1	macrophage expressed gene 1 [Source:MGI Symbol;Acc:MGI:1333743]	-1.07
ENSMUSG00000037493	Cib2	calcium and integrin binding family member 2 [Source:MGI Symbol;Acc:MGI:1929293]	-1.07
ENSMUSG00000028542	Slc6a9	solute carrier family 6 (neurotransmitter transporter, glycine), member 9 [Source:MGI Symbol;Acc:MGI:95760]	-1.07
ENSMUSG00000078588	Ccdc24	coiled-coil domain containing 24 [Source:MGI Symbol;Acc:MGI:2685874]	-1.07
ENSMUSG00000017747	Ghdc	GH3 domain containing [Source:MGI Symbol;Acc:MGI:1931556]	-1.07
ENSMUSG00000029417	Cxcl9	chemokine (C-X-C motif) ligand 9 [Source:MGI Symbol;Acc:MGI:1352449]	-1.07

ENSMUSG00000011148	Adssl1	adenylosuccinate synthetase like 1 [Source:MGI Symbol;Acc:MGI:87947]	-1.07
ENSMUSG00000029788	Cpa5	carboxypeptidase A5 [Source:MGI Symbol;Acc:MGI:1921899]	-1.07
ENSMUSG00000050966	Lin28a	lin-28 homolog A (C. elegans) [Source:MGI Symbol;Acc:MGI:1890546]	-1.07
ENSMUSG00000072501	Phf20l1	PHD finger protein 20-like 1 [Source:MGI Symbol;Acc:MGI:2444412]	-1.07
ENSMUSG00000049608	Gpr55	G protein-coupled receptor 55 [Source:MGI Symbol;Acc:MGI:2685064]	-1.07
ENSMUSG00000015340	Cybb	cytochrome b-245, beta polypeptide [Source:MGI Symbol;Acc:MGI:88574]	-1.06
ENSMUSG00000025408	Ddit3	DNA-damage inducible transcript 3 [Source:MGI Symbol;Acc:MGI:109247]	-1.06
ENSMUSG00000031449	Atp4b	ATPase, H ⁺ /K ⁺ exchanging, beta polypeptide [Source:MGI Symbol;Acc:MGI:88114]	-1.06
ENSMUSG00000060036	Rpl3	ribosomal protein L3 [Source:MGI Symbol;Acc:MGI:1351605]	-1.06
ENSMUSG00000068262	Gm5879	predicted gene 5879 [Source:MGI Symbol;Acc:MGI:3647624]	-1.06
ENSMUSG00000084349	Rpl3-ps1	ribosomal protein L3, pseudogene 1 [Source:MGI Symbol;Acc:MGI:3644217]	-1.06
ENSMUSG00000084131	Rpl3-ps2	ribosomal protein L3, pseudogene 2 [Source:MGI Symbol;Acc:MGI:3645345]	-1.06
ENSMUSG00000054414	Slc30a7	solute carrier family 30 (zinc transporter), member 7 [Source:MGI Symbol;Acc:MGI:1913750]	-1.06
ENSMUSG00000060572	Mfap2	microfibrillar-associated protein 2 [Source:MGI Symbol;Acc:MGI:99559]	-1.06
ENSMUSG00000012705	Retn	resistin [Source:MGI Symbol;Acc:MGI:1888506]	-1.06
ENSMUSG00000044122	Proca1	protein interacting with cyclin A1 [Source:MGI Symbol;Acc:MGI:1918274]	-1.06
ENSMUSG00000026456	Cyb5r1	cytochrome b5 reductase 1 [Source:MGI Symbol;Acc:MGI:1919267]	-1.06
ENSMUSG00000020687	Cdc27	cell division cycle 27 [Source:MGI Symbol;Acc:MGI:102685]	-1.05
ENSMUSG00000085852	Gm13807	predicted gene 13807 [Source:MGI Symbol;Acc:MGI:3650023]	-1.05
ENSMUSG00000032988	Slc16a8	solute carrier family 16 (monocarboxylic acid transporters), member 8 [Source:MGI Symbol;Acc:MGI:1929519]	-1.05
ENSMUSG00000051435	Fhad1	forkhead-associated (FHA) phosphopeptide binding domain 1 [Source:MGI Symbol;Acc:MGI:1920323]	-1.05
ENSMUSG00000025993	Slc40a1	solute carrier family 40 (iron-regulated transporter), member 1 [Source:MGI Symbol;Acc:MGI:1315204]	-1.05
ENSMUSG00000047787	Flrt1	fibronectin leucine rich transmembrane protein 1 [Source:MGI Symbol;Acc:MGI:3026647]	-1.05
ENSMUSG00000032384	Csnk1g1	casein kinase 1, gamma 1 [Source:MGI Symbol;Acc:MGI:2660884]	-1.05
ENSMUSG00000092192	Dyx1c1	dyslexia susceptibility 1 candidate 1 homolog (human) [Source:MGI Symbol;Acc:MGI:1914935]	-1.05
ENSMUSG00000030365	Clec2i	C-type lectin domain family 2, member i [Source:MGI Symbol;Acc:MGI:2136650]	-1.04
ENSMUSG00000075420	1110017F19Rik	RIKEN cDNA 1110017F19 gene [Source:MGI Symbol;Acc:MGI:1915778]	-1.04
ENSMUSG00000022564	Grina	glutamate receptor, ionotropic, N-methyl D-aspartate-associated protein 1 (glutamate binding) [Source:MGI Symbol;Acc:MGI:1913418]	-1.04
ENSMUSG00000040025	Ythdf2	YTH domain family 2 [Source:MGI Symbol;Acc:MGI:2444233]	-1.04
ENSMUSG00000030177	Ccdc77	coiled-coil domain containing 77 [Source:MGI Symbol;Acc:MGI:1914450]	-1.04
ENSMUSG00000019917	Sept10	septin 10 [Source:MGI Symbol;Acc:MGI:1918110]	-1.04
ENSMUSG00000020642	Rnf144a	ring finger protein 144A [Source:MGI Symbol;Acc:MGI:1344401]	-1.04
ENSMUSG00000085645	0610040B09Rik	RIKEN cDNA 0610040B09 gene [Source:MGI Symbol;Acc:MGI:1922645]	-1.04
ENSMUSG00000075425	Gm13547	predicted gene 13547 [Source:MGI Symbol;Acc:MGI:3650473]	-1.04
ENSMUSG00000048478	4732415M23Rik	RIKEN cDNA 4732415M23 gene [Source:MGI Symbol;Acc:MGI:2444920]	-1.04
ENSMUSG00000059030	Olf128	olfactory receptor 128 [Source:MGI Symbol;Acc:MGI:2177511]	-1.03
ENSMUSG00000011382	Dhdh	dihydrodiol dehydrogenase (dimeric) [Source:MGI Symbol;Acc:MGI:1919005]	-1.03
ENSMUSG00000031378	Abcd1	ATP-binding cassette, sub-family D (ALD), member 1 [Source:MGI Symbol;Acc:MGI:1349215]	-1.03
ENSMUSG00000074643	Cpne1	copine I [Source:MGI Symbol;Acc:MGI:2386621]	-1.03
ENSMUSG00000053030	Spink2	serine peptidase inhibitor, Kazal type 2 [Source:MGI Symbol;Acc:MGI:1917232]	-1.03
ENSMUSG00000022586	Ly6i	lymphocyte antigen 6 complex, locus I [Source:MGI Symbol;Acc:MGI:1888480]	-1.03
ENSMUSG00000062822	4833420G17Rik	RIKEN cDNA 4833420G17 gene [Source:MGI Symbol;Acc:MGI:1914642]	-1.03
ENSMUSG00000035093	Secisbp2l	SECIS binding protein 2-like [Source:MGI Symbol;Acc:MGI:1917604]	-1.03
ENSMUSG00000040907	Atp1a3	ATPase, Na ⁺ /K ⁺ transporting, alpha 3 polypeptide [Source:MGI Symbol;Acc:MGI:88107]	-1.03
ENSMUSG00000026576	Atp1b1	ATPase, Na ⁺ /K ⁺ transporting, beta 1 polypeptide [Source:MGI Symbol;Acc:MGI:88108]	-1.03
ENSMUSG00000023467	Tulp2	tubby-like protein 2 [Source:MGI Symbol;Acc:MGI:1861600]	-1.03
ENSMUSG00000046027	Stard5	StAR-related lipid transfer (START) domain containing 5 [Source:MGI Symbol;Acc:MGI:2156765]	-1.03
ENSMUSG00000074582	Arfgef2	ADP-ribosylation factor guanine nucleotide-exchange factor 2 (brefeldin A-inhibited) [Source:MGI Symbol;Acc:MGI:2139354]	-1.02
ENSMUSG00000085642	3110053B16Rik	RIKEN cDNA 3110053B16 gene [Source:MGI Symbol;Acc:MGI:1920435]	-1.02
ENSMUSG00000022504	Ciita	class II transactivator [Source:MGI Symbol;Acc:MGI:108445]	-1.02
ENSMUSG00000022148	Fyb	FYN binding protein [Source:MGI Symbol;Acc:MGI:1346327]	-1.02
ENSMUSG00000062353	Gm15772	predicted gene 15772 [Source:MGI Symbol;Acc:MGI:3805541]	-1.02
ENSMUSG00000096487	Olf1706	olfactory receptor 706 [Source:MGI Symbol;Acc:MGI:3030540]	-1.02
ENSMUSG00000063193	Cd300lb	CD300 antigen like family member B [Source:MGI Symbol;Acc:MGI:2685099]	-1.02

ENSMUSG00000017740	Slc12a5	solute carrier family 12, member 5 [Source:MGI Symbol;Acc:MGI:1862037]	-1.02
ENSMUSG00000040812	Agbl2	ATP/GTP binding protein-like 2 [Source:MGI Symbol;Acc:MGI:2443254]	-1.02
ENSMUSG00000025213	Kazald1	Kazal-type serine peptidase inhibitor domain 1 [Source:MGI Symbol;Acc:MGI:2147606]	-1.02
ENSMUSG00000096275	AC192778.1	LOC380994 protein; Uncharacterized protein [Source:UniProtKB/TrEMBL;Acc:Q4KL07]	-1.02
ENSMUSG00000044501	Zfp758	zinc finger protein 758 [Source:MGI Symbol;Acc:MGI:2385044]	-1.01
ENSMUSG00000060470	Gpr97	G protein-coupled receptor 97 [Source:MGI Symbol;Acc:MGI:1859670]	-1.01
ENSMUSG00000070427	Il18bp	interleukin 18 binding protein [Source:MGI Symbol;Acc:MGI:1333800]	-1.01
ENSMUSG00000040699	Limd2	LIM domain containing 2 [Source:MGI Symbol;Acc:MGI:1915053]	-1.01
ENSMUSG00000067818	Myl9	myosin, light polypeptide 9, regulatory [Source:MGI Symbol;Acc:MGI:2138915]	-1.01
ENSMUSG00000031112	2610018G03Rik	RIKEN cDNA 2610018G03 gene [Source:MGI Symbol;Acc:MGI:1917665]	-1.01
ENSMUSG00000064125	BC068157	cDNA sequence BC068157 [Source:MGI Symbol;Acc:MGI:3605626]	-1.01
ENSMUSG00000026950	Neb	nebulin [Source:MGI Symbol;Acc:MGI:97292]	-1.01
ENSMUSG00000001506	Col1a1	collagen, type I, alpha 1 [Source:MGI Symbol;Acc:MGI:88467]	-1.01
ENSMUSG00000050368	Hoxd10	homeobox D10 [Source:MGI Symbol;Acc:MGI:96202]	-1.01
ENSMUSG00000062078	Qk	quaking [Source:MGI Symbol;Acc:MGI:97837]	-1.01
ENSMUSG00000025648	Pfkfb4	6-phosphofructo-2-kinase/fructose-2,6-biphosphatase 4 [Source:MGI Symbol;Acc:MGI:2687284]	-1.01
ENSMUSG00000003484	Cyp4f18	cytochrome P450, family 4, subfamily f, polypeptide 18 [Source:MGI Symbol;Acc:MGI:1919304]	-1.01
ENSMUSG00000024330	Col11a2	collagen, type XI, alpha 2 [Source:MGI Symbol;Acc:MGI:88447]	-1.01
ENSMUSG00000087400	Gm15270	predicted gene 15270 [Source:MGI Symbol;Acc:MGI:3705149]	-1.01
ENSMUSG00000030254	Rad18	RAD18 homolog (S. cerevisiae) [Source:MGI Symbol;Acc:MGI:1890476]	-1.01
ENSMUSG00000063458	1700112E06Rik	RIKEN cDNA 1700112E06 gene [Source:MGI Symbol;Acc:MGI:1923883]	-1.01
ENSMUSG00000097855	AC093339.1	--	-1.00
ENSMUSG00000024608	Rps14	ribosomal protein S14 [Source:MGI Symbol;Acc:MGI:98107]	-1.00
ENSMUSG00000054000	Tusc1	tumor suppressor candidate 1 [Source:MGI Symbol;Acc:MGI:2684283]	-1.00
ENSMUSG00000051238	Swsap1	SWIM type zinc finger 7 associated protein 1 [Source:MGI Symbol;Acc:MGI:1914212]	-1.00
ENSMUSG00000002963	Pnkp	polynucleotide kinase 3'-phosphatase [Source:MGI Symbol;Acc:MGI:1891698]	-1.00
ENSMUSG00000040314	Ctsg	cathepsin G [Source:MGI Symbol;Acc:MGI:88563]	-1.00
ENSMUSG00000074604	Mgst2	microsomal glutathione S-transferase 2 [Source:MGI Symbol;Acc:MGI:2448481]	-1.00
ENSMUSG00000038295	Atg9b	autophagy related 9B [Source:MGI Symbol;Acc:MGI:2685420]	-1.00

Supplemental Dataset 1B: Genes activated by DG172 in *Ppard* null BMCs after exposure to ligands from day 1 to day 6) harvested on day 6; threshold 2-fold change).

stable_id	name	description	logFC
ENSMUSG00000025499	Hras1	Harvey rat sarcoma virus oncogene 1 [Source:MGI Symbol;Acc:MGI:96224]	8.58
ENSMUSG00000031166	Wdr13	WD repeat domain 13 [Source:MGI Symbol;Acc:MGI:1914661]	5.59
ENSMUSG00000056228	Cars2	cysteinyl-tRNA synthetase 2 (mitochondrial)(putative) [Source:MGI Symbol;Acc:MGI:1919191]	4.81
ENSMUSG00000057654	Olfr328	olfactory receptor 328 [Source:MGI Symbol;Acc:MGI:3030162]	3.35
ENSMUSG00000032324	Tspan3	tetraspanin 3 [Source:MGI Symbol;Acc:MGI:1928098]	3.25
ENSMUSG00000022710	Usp7	ubiquitin specific peptidase 7 [Source:MGI Symbol;Acc:MGI:2182061]	3.24
ENSMUSG00000097230	AC148089.1	--	2.94
ENSMUSG00000052187	Hbb-y	hemoglobin Y, beta-like embryonic chain [Source:MGI Symbol;Acc:MGI:96027]	2.80
ENSMUSG00000074171	Gm6658	predicted gene 6658 [Source:MGI Symbol;Acc:MGI:3645470]	2.79
ENSMUSG00000038738	Shank1	SH3/ankyrin domain gene 1 [Source:MGI Symbol;Acc:MGI:3613677]	2.76
ENSMUSG00000024990	Rbp4	retinol binding protein 4, plasma [Source:MGI Symbol;Acc:MGI:97879]	2.67
ENSMUSG00000030759	Far1	fatty acyl CoA reductase 1 [Source:MGI Symbol;Acc:MGI:1914670]	2.56
ENSMUSG00000030605	Mfge8	milk fat globule-EGF factor 8 protein [Source:MGI Symbol;Acc:MGI:102768]	2.54
ENSMUSG00000028845	Tekt2	tektin 2 [Source:MGI Symbol;Acc:MGI:1346335]	2.48
ENSMUSG00000087394	Gm12945	predicted gene 12945 [Source:MGI Symbol;Acc:MGI:3704237]	2.48
ENSMUSG00000028434	Epb4.114b	erythrocyte protein band 4.1-like 4b [Source:MGI Symbol;Acc:MGI:1859149]	2.46
ENSMUSG00000070719	Pla2g4d	phospholipase A2, group IVD [Source:MGI Symbol;Acc:MGI:1925640]	2.45
ENSMUSG00000041044	Lrit1	leucine-rich repeat, immunoglobulin-like and transmembrane domains 1 [Source:MGI Symbol;Acc:MGI:2385320]	2.44
ENSMUSG00000031826	Usp10	ubiquitin specific peptidase 10 [Source:MGI Symbol;Acc:MGI:894652]	2.43
ENSMUSG00000080717	B230307C23Rik	RIKEN cDNA B230307C23 gene [Source:MGI Symbol;Acc:MGI:3643396]	2.36
ENSMUSG00000024402	Lta	lymphotoxin A [Source:MGI Symbol;Acc:MGI:104797]	2.36
ENSMUSG00000063415	Cyp26b1	cytochrome P450, family 26, subfamily b, polypeptide 1 [Source:MGI Symbol;Acc:MGI:2176159]	2.33
ENSMUSG00000040165	Cd209c	CD209c antigen [Source:MGI Symbol;Acc:MGI:2157945]	2.31
ENSMUSG00000029063	Nadk	NAD kinase [Source:MGI Symbol;Acc:MGI:2183149]	2.31
ENSMUSG00000044707	Ccnj1	cyclin J-like [Source:MGI Symbol;Acc:MGI:2685723]	2.19
ENSMUSG00000076674	Ighv3-8	immunoglobulin heavy variable V3-8 [Source:MGI Symbol;Acc:MGI:3645298]	2.15
ENSMUSG00000096111	RP23-32P19.2	--	2.15
ENSMUSG00000034795	Ccdc122	coiled-coil domain containing 122 [Source:MGI Symbol;Acc:MGI:1918358]	2.14
ENSMUSG00000006435	Neur1a	neuronalized homolog 1A (Drosophila) [Source:MGI Symbol;Acc:MGI:1334263]	2.13
ENSMUSG00000032068	1600029D21Rik	RIKEN cDNA 1600029D21 gene [Source:MGI Symbol;Acc:MGI:1923759]	2.12
ENSMUSG00000047496	Rnf152	ring finger protein 152 [Source:MGI Symbol;Acc:MGI:2443787]	2.12
ENSMUSG00000072647	Adam1a	a disintegrin and metallopeptidase domain 1a [Source:MGI Symbol;Acc:MGI:2429504]	2.09
ENSMUSG00000048410	Zfp407	zinc finger protein 407 [Source:MGI Symbol;Acc:MGI:2685179]	2.06
ENSMUSG00000058254	Tspan7	tetraspanin 7 [Source:MGI Symbol;Acc:MGI:1298407]	2.05
ENSMUSG00000025083	Afap112	actin filament associated protein 1-like 2 [Source:MGI Symbol;Acc:MGI:2147658]	2.02
ENSMUSG00000024593	Megf10	multiple EGF-like-domains 10 [Source:MGI Symbol;Acc:MGI:2685177]	2.01
ENSMUSG00000044716	Dok7	docking protein 7 [Source:MGI Symbol;Acc:MGI:3584043]	2.01
ENSMUSG00000056089	Gm5468	predicted gene 5468 [Source:MGI Symbol;Acc:MGI:3648948]	1.98
ENSMUSG00000027318	Adam33	a disintegrin and metallopeptidase domain 33 [Source:MGI Symbol;Acc:MGI:1341813]	1.96
ENSMUSG00000071537	Klrg2	killer cell lectin-like receptor subfamily G, member 2 [Source:MGI Symbol;Acc:MGI:1921503]	1.95
ENSMUSG00000085566	A730017L22Rik	RIKEN cDNA A730017L22 gene [Source:MGI Symbol;Acc:MGI:3584452]	1.94
ENSMUSG00000054013	Tmem179	transmembrane protein 179 [Source:MGI Symbol;Acc:MGI:2144891]	1.92
ENSMUSG00000033960	9430020K01Rik	RIKEN cDNA 9430020K01 gene [Source:MGI Symbol;Acc:MGI:2685174]	1.89
ENSMUSG00000028655	Mfsd2a	major facilitator superfamily domain containing 2A [Source:MGI Symbol;Acc:MGI:1923824]	1.88
ENSMUSG00000041481	Serpina3g	serine (or cysteine) peptidase inhibitor, clade A, member 3G [Source:MGI Symbol;Acc:MGI:105046]	1.88
ENSMUSG00000041936	Agri	agrin [Source:MGI Symbol;Acc:MGI:87961]	1.88
ENSMUSG00000066319	Rtp3	receptor transporter protein 3 [Source:MGI Symbol;Acc:MGI:2446841]	1.83
ENSMUSG00000062542	Syt9	synaptotagmin IX [Source:MGI Symbol;Acc:MGI:1926373]	1.83
ENSMUSG00000056004	9330182L06Rik	RIKEN cDNA 9330182L06 gene [Source:MGI Symbol;Acc:MGI:2443264]	1.82
ENSMUSG00000026009	Icos	inducible T cell co-stimulator [Source:MGI Symbol;Acc:MGI:1858745]	1.82

ENSMUSG00000022103	Gfra2	glial cell line derived neurotrophic factor family receptor alpha 2 [Source:MGI Symbol;Acc:MGI:1195462]	1.80
ENSMUSG00000096464	AC090887.7	--	1.79
ENSMUSG00000031382	Asb11	ankyrin repeat and SOCS box-containing 11 [Source:MGI Symbol;Acc:MGI:1916104]	1.79
ENSMUSG00000041202	Pla2g2d	phospholipase A2, group IID [Source:MGI Symbol;Acc:MGI:1341796]	1.79
ENSMUSG00000028517	Ppap2b	phosphatidic acid phosphatase type 2B [Source:MGI Symbol;Acc:MGI:1915166]	1.78
ENSMUSG00000024245	Tmem178	transmembrane protein 178 [Source:MGI Symbol;Acc:MGI:1915277]	1.78
ENSMUSG00000076749	Tcrg-C1	T cell receptor gamma, constant 1 [Source:MGI Symbol;Acc:MGI:98625]	1.77
ENSMUSG00000063060	Sox7	SRY-box containing gene 7 [Source:MGI Symbol;Acc:MGI:98369]	1.75
ENSMUSG00000031494	Cd209a	CD209a antigen [Source:MGI Symbol;Acc:MGI:2157942]	1.73
ENSMUSG00000082964	Rpl13-ps5	ribosomal protein L13, pseudogene 5 [Source:MGI Symbol;Acc:MGI:3648527]	1.73
ENSMUSG00000097340	CR293526.1	--	1.73
ENSMUSG00000029844	Hoxa1	homeobox A1 [Source:MGI Symbol;Acc:MGI:96170]	1.72
ENSMUSG00000031997	Trpc6	transient receptor potential cation channel, subfamily C, member 6 [Source:MGI Symbol;Acc:MGI:109523]	1.71
ENSMUSG00000074505	Fat3	FAT tumor suppressor homolog 3 (Drosophila) [Source:MGI Symbol;Acc:MGI:2444314]	1.70
ENSMUSG00000028523	Tctex1d1	Tctex1 domain containing 1 [Source:MGI Symbol;Acc:MGI:1914594]	1.70
ENSMUSG00000085041	BB031773	expressed sequence BB031773 [Source:MGI Symbol;Acc:MGI:2140631]	1.70
ENSMUSG00000030877	4933427G17Rik	RIKEN cDNA 4933427G17 gene [Source:MGI Symbol;Acc:MGI:1921716]	1.69
ENSMUSG00000058050	Gm9234	predicted pseudogene 9234 [Source:MGI Symbol;Acc:MGI:3648545]	1.69
ENSMUSG00000038866	Zcchc2	zinc finger, CCHC domain containing 2 [Source:MGI Symbol;Acc:MGI:2444114]	1.69
ENSMUSG00000095079	AC160982.1	--	1.67
ENSMUSG00000079427	Gm2382	predicted gene 2382 [Source:MGI Symbol;Acc:MGI:3780550]	1.66
ENSMUSG00000020590	Snx13	sorting nexin 13 [Source:MGI Symbol;Acc:MGI:2661416]	1.66
ENSMUSG00000095285	AC090887.3	--	1.66
ENSMUSG00000041696	Rasl12	RAS-like, family 12 [Source:MGI Symbol;Acc:MGI:1918034]	1.65
ENSMUSG00000044026	Tmem20	transmembrane protein 20 [Source:MGI Symbol;Acc:MGI:2444789]	1.65
ENSMUSG00000086665	Gm13067	predicted gene 13067 [Source:MGI Symbol;Acc:MGI:3651968]	1.65
ENSMUSG00000041272	Tox	thymocyte selection-associated high mobility group box [Source:MGI Symbol;Acc:MGI:2181659]	1.64
ENSMUSG00000049709	Nlrp10	NLR family, pyrin domain containing 10 [Source:MGI Symbol;Acc:MGI:2444084]	1.63
ENSMUSG00000073555	Gm4951	predicted gene 4951 [Source:MGI Symbol;Acc:MGI:3644953]	1.63
ENSMUSG00000002847	Pla1a	phospholipase A1 member A [Source:MGI Symbol;Acc:MGI:1934677]	1.63
ENSMUSG00000072437	Nanos1	nanos homolog 1 (Drosophila) [Source:MGI Symbol;Acc:MGI:2669254]	1.62
ENSMUSG00000057182	Scn3a	sodium channel, voltage-gated, type III, alpha [Source:MGI Symbol;Acc:MGI:98249]	1.61
ENSMUSG00000075133	Olfir1170	olfactory receptor 1170 [Source:MGI Symbol;Acc:MGI:3031004]	1.60
ENSMUSG00000054510	Gm14461	predicted gene 14461 [Source:MGI Symbol;Acc:MGI:3651589]	1.60
ENSMUSG00000032373	Car12	carbonic anhydrase 12 [Source:MGI Symbol;Acc:MGI:1923709]	1.60
ENSMUSG00000035274	Tpbp	trophoblast glycoprotein [Source:MGI Symbol;Acc:MGI:1341264]	1.59
ENSMUSG00000038246	Fam50b	family with sequence similarity 50, member B [Source:MGI Symbol;Acc:MGI:1351640]	1.58
ENSMUSG00000059022	Kcp	kielin/chordin-like protein [Source:MGI Symbol;Acc:MGI:2141640]	1.58
ENSMUSG00000050473	Slc35d3	solute carrier family 35, member D3 [Source:MGI Symbol;Acc:MGI:1923407]	1.58
ENSMUSG00000029913	Prdm5	PR domain containing 5 [Source:MGI Symbol;Acc:MGI:1918029]	1.58
ENSMUSG00000024600	Slc27a6	solute carrier family 27 (fatty acid transporter), member 6 [Source:MGI Symbol;Acc:MGI:3036230]	1.57
ENSMUSG00000021675	F2r12	coagulation factor II (thrombin) receptor-like 2 [Source:MGI Symbol;Acc:MGI:1298208]	1.57
ENSMUSG00000048349	Pou4f1	POU domain, class 4, transcription factor 1 [Source:MGI Symbol;Acc:MGI:102525]	1.57
ENSMUSG00000067149	Igj	immunoglobulin joining chain [Source:MGI Symbol;Acc:MGI:96493]	1.56
ENSMUSG00000000303	Cdh1	cadherin 1 [Source:MGI Symbol;Acc:MGI:88354]	1.56
ENSMUSG00000027298	Tyro3	TYRO3 protein tyrosine kinase 3 [Source:MGI Symbol;Acc:MGI:104294]	1.56
ENSMUSG00000043439	E130012A19Rik	RIKEN cDNA E130012A19 gene [Source:MGI Symbol;Acc:MGI:2143991]	1.56
ENSMUSG00000019841	Rev3l	REV3-like, catalytic subunit of DNA polymerase zeta RAD54 like (S. cerevisiae) [Source:MGI Symbol;Acc:MGI:1337131]	1.56
ENSMUSG00000046844	Vat1l	vesicle amine transport protein 1 homolog-like (T. californica) [Source:MGI Symbol;Acc:MGI:2142534]	1.55
ENSMUSG00000022763	Aifm3	apoptosis-inducing factor, mitochondrion-associated 3 [Source:MGI Symbol;Acc:MGI:1919418]	1.55
ENSMUSG00000040441	Slc26a10	solute carrier family 26, member 10 [Source:MGI Symbol;Acc:MGI:2143920]	1.55
ENSMUSG00000076540	Igkv4-80	immunoglobulin kappa variable 4-80 [Source:MGI Symbol;Acc:MGI:4439653]	1.55
ENSMUSG00000045318	Adra2c	adrenergic receptor, alpha 2c [Source:MGI Symbol;Acc:MGI:87936]	1.54
ENSMUSG00000066363	Serpina3f	serine (or cysteine) peptidase inhibitor, clade A, member 3F [Source:MGI Symbol;Acc:MGI:2182838]	1.54

ENSMUSG00000062190	Lanc2	LanC (bacterial lantibiotic synthetase component C)-like 2 [Source:MGI Symbol;Acc:MGI:1919085]	1.53
ENSMUSG00000040372	Gpr63	G protein-coupled receptor 63 [Source:MGI Symbol;Acc:MGI:2135884]	1.53
ENSMUSG00000033207	Mamdc2	MAM domain containing 2 [Source:MGI Symbol;Acc:MGI:1918988]	1.52
ENSMUSG00000031520	Vegfc	vascular endothelial growth factor C [Source:MGI Symbol;Acc:MGI:109124]	1.52
ENSMUSG00000031342	Gpm6b	glycoprotein m6b [Source:MGI Symbol;Acc:MGI:107672]	1.52
ENSMUSG00000021118	Plek2	pleckstrin 2 [Source:MGI Symbol;Acc:MGI:1351466]	1.52
ENSMUSG00000051980	Casr	calcium-sensing receptor [Source:MGI Symbol;Acc:MGI:1351351]	1.52
ENSMUSG00000021866	Anxa11	annexin A11 [Source:MGI Symbol;Acc:MGI:108481]	1.51
ENSMUSG00000028347	Tmeff1	transmembrane protein with EGF-like and two follistatin-like domains 1 [Source:MGI Symbol;Acc:MGI:1926810]	1.51
ENSMUSG00000043298	C030030A07Rik	RIKEN cDNA C030030A07 gene [Source:MGI Symbol;Acc:MGI:2443451]	1.50
ENSMUSG00000007682	Dio2	deiodinase, iodothyronine, type II [Source:MGI Symbol;Acc:MGI:1338833]	1.50
ENSMUSG00000040606	Kazn	kazrin, periplakin interacting protein [Source:MGI Symbol;Acc:MGI:1918779]	1.50
ENSMUSG00000038402	Foxf2	forkhead box F2 [Source:MGI Symbol;Acc:MGI:1347479]	1.49
ENSMUSG00000063727	Tnfrsf11b	tumor necrosis factor receptor superfamily, member 11b (osteoprotegerin) [Source:MGI Symbol;Acc:MGI:109587]	1.49
ENSMUSG00000028197	Col24a1	collagen, type XXIV, alpha 1 [Source:MGI Symbol;Acc:MGI:1918605]	1.49
ENSMUSG00000034522	Zfp395	zinc finger protein 395 [Source:MGI Symbol;Acc:MGI:2682318]	1.48
ENSMUSG00000025823	Pdia4	protein disulfide isomerase associated 4 [Source:MGI Symbol;Acc:MGI:104864]	1.48
ENSMUSG000000094692	Olfir738	olfactory receptor 738 [Source:MGI Symbol;Acc:MGI:3030572]	1.48
ENSMUSG00000032769	Trpa1	transient receptor potential cation channel, subfamily A, member 1 [Source:MGI Symbol;Acc:MGI:3522699]	1.47
ENSMUSG00000022512	Cldn1	claudin 1 [Source:MGI Symbol;Acc:MGI:1276109]	1.47
ENSMUSG00000022246	Rai14	retinoic acid induced 14 [Source:MGI Symbol;Acc:MGI:1922896]	1.46
ENSMUSG00000022949	Clic6	chloride intracellular channel 6 [Source:MGI Symbol;Acc:MGI:2146607]	1.46
ENSMUSG00000028597	Gpx7	glutathione peroxidase 7 [Source:MGI Symbol;Acc:MGI:1914555]	1.45
ENSMUSG00000057135	Scimp	SLP adaptor and CSK interacting membrane protein [Source:MGI Symbol;Acc:MGI:3610314]	1.45
ENSMUSG00000022840	Adcy5	adenylate cyclase 5 [Source:MGI Symbol;Acc:MGI:99673]	1.45
ENSMUSG00000038736	Nudcd1	NudC domain containing 1 [Source:MGI Symbol;Acc:MGI:1914679]	1.45
ENSMUSG00000076576	Igkv6-32	immunoglobulin kappa variable 6-32 [Source:MGI Symbol;Acc:MGI:3641634]	1.45
ENSMUSG00000021278	Amn	amniotically expressed [Source:MGI Symbol;Acc:MGI:1934943]	1.45
ENSMUSG00000084128	Esrp2	epithelial splicing regulatory protein 2 [Source:MGI Symbol;Acc:MGI:1924661]	1.44
ENSMUSG00000086390	1810019D21Rik	RIKEN cDNA 1810019D21 gene [Source:MGI Symbol;Acc:MGI:1917021]	1.44
ENSMUSG00000022346	Myc	myelocytomatosis oncogene [Source:MGI Symbol;Acc:MGI:97250]	1.43
ENSMUSG00000094356	AC159715.1	--	1.43
ENSMUSG00000097491	AC119214.1	--	1.43
ENSMUSG00000036585	Fgf1	fibroblast growth factor 1 [Source:MGI Symbol;Acc:MGI:95515]	1.43
ENSMUSG00000074075	Gm10621	predicted gene 10621 [Source:MGI Symbol;Acc:MGI:3642291]	1.43
ENSMUSG00000019806	Aig1	androgen-induced 1 [Source:MGI Symbol;Acc:MGI:1913503]	1.42
ENSMUSG00000020599	Rgs9	regulator of G-protein signaling 9 [Source:MGI Symbol;Acc:MGI:1338824]	1.42
ENSMUSG00000028973	Abcb8	ATP-binding cassette, sub-family B (MDR/TAP), member 8 [Source:MGI Symbol;Acc:MGI:1351667]	1.42
ENSMUSG00000022500	Litaf	LPS-induced TN factor [Source:MGI Symbol;Acc:MGI:1929512]	1.42
ENSMUSG00000059336	Slc14a1	solute carrier family 14 (urea transporter), member 1 [Source:MGI Symbol;Acc:MGI:1351654]	1.42
ENSMUSG00000072822	BC061212	cDNA sequence BC061212 [Source:MGI Symbol;Acc:MGI:2681870]	1.42
ENSMUSG00000055945	Prr18	proline rich region 18 [Source:MGI Symbol;Acc:MGI:2443403]	1.42
ENSMUSG00000040963	Asgr2	asialoglycoprotein receptor 2 [Source:MGI Symbol;Acc:MGI:88082]	1.42
ENSMUSG00000006378	Gcat	glycine C-acetyltransferase (2-amino-3-ketobutyrate-coenzyme A ligase) [Source:MGI Symbol;Acc:MGI:1349389]	1.41
ENSMUSG00000038587	Akap12	A kinase (PRKA) anchor protein (gravin) 12 [Source:MGI Symbol;Acc:MGI:1932576]	1.41
ENSMUSG00000020317	Theg	testicular haploid expressed gene [Source:MGI Symbol;Acc:MGI:1338756]	1.41
ENSMUSG00000041757	Plekha6	pleckstrin homology domain containing, family A member 6 [Source:MGI Symbol;Acc:MGI:2388662]	1.40
ENSMUSG00000021482	1110018J18Rik	RIKEN cDNA 1110018J18 gene [Source:MGI Symbol;Acc:MGI:1913379]	1.40
ENSMUSG00000029705	Cux1	cut-like homeobox 1 [Source:MGI Symbol;Acc:MGI:88568]	1.40
ENSMUSG00000079428	Tceal7	transcription elongation factor A (SII)-like 7 [Source:MGI Symbol;Acc:MGI:1915746]	1.40
ENSMUSG00000020121	Srgap1	SLIT-ROBO Rho GTPase activating protein 1 [Source:MGI Symbol;Acc:MGI:2152936]	1.40
ENSMUSG00000028019	Pdgfc	platelet-derived growth factor, C polypeptide [Source:MGI Symbol;Acc:MGI:1859631]	1.39
ENSMUSG00000032578	Cish	cytokine inducible SH2-containing protein [Source:MGI Symbol;Acc:MGI:103159]	1.37
ENSMUSG00000026833	Olfm1	olfactomedin 1 [Source:MGI Symbol;Acc:MGI:1860437]	1.37

ENSMUSG00000095866	AC090887.6	--	1.37
ENSMUSG00000096498	AC090887.8	--	1.37
ENSMUSG00000021550	2210016F16Rik	RIKEN cDNA 2210016F16 gene [Source:MGI Symbol;Acc:MGI:1917403]	1.37
ENSMUSG00000026770	Il2ra	interleukin 2 receptor, alpha chain [Source:MGI Symbol;Acc:MGI:96549]	1.37
ENSMUSG00000031292	Cdkl5	cyclin-dependent kinase-like 5 [Source:MGI Symbol;Acc:MGI:1278336]	1.36
ENSMUSG00000029168	Dpysl5	dihydropyrimidinase-like 5 [Source:MGI Symbol;Acc:MGI:1929772]	1.36
ENSMUSG00000035299	Mid1	midline 1 [Source:MGI Symbol;Acc:MGI:1100537]	1.36
ENSMUSG00000062245	Olf1r170	olfactory receptor 170 [Source:MGI Symbol;Acc:MGI:3030004]	1.35
ENSMUSG00000003355	Fkbp11	FK506 binding protein 11 [Source:MGI Symbol;Acc:MGI:1913370]	1.35
ENSMUSG00000026712	Mrc1	mannose receptor, C type 1 [Source:MGI Symbol;Acc:MGI:97142]	1.35
ENSMUSG00000031174	Rpgr	retinitis pigmentosa GTPase regulator [Source:MGI Symbol;Acc:MGI:1344037]	1.35
ENSMUSG00000024597	Slc12a2	solute carrier family 12, member 2 [Source:MGI Symbol;Acc:MGI:101924]	1.34
ENSMUSG000000044156	Hepacam2	HEPACAM family member 2 [Source:MGI Symbol;Acc:MGI:2141520]	1.34
ENSMUSG00000033581	Igf2bp2	insulin-like growth factor 2 mRNA binding protein 2 [Source:MGI Symbol;Acc:MGI:1890358]	1.33
ENSMUSG00000032279	ldh3a	isocitrate dehydrogenase 3 (NAD+) alpha [Source:MGI Symbol;Acc:MGI:1915084]	1.33
ENSMUSG00000043155	Hpd1	4-hydroxyphenylpyruvate dioxygenase-like [Source:MGI Symbol;Acc:MGI:2444646]	1.33
ENSMUSG00000033799	BC016423	cDNA sequence BC016423 [Source:MGI Symbol;Acc:MGI:2145274]	1.33
ENSMUSG000000066129	Kndc1	kinase non-catalytic C-lobe domain (KIND) containing 1 [Source:MGI Symbol;Acc:MGI:1923734]	1.33
ENSMUSG00000047631	Apof	apolipoprotein F [Source:MGI Symbol;Acc:MGI:104539]	1.33
ENSMUSG00000050071	Bex1	brain expressed gene 1 [Source:MGI Symbol;Acc:MGI:1328321]	1.33
ENSMUSG00000024064	Galnt14	UDP-N-acetyl-alpha-D-galactosamine:polypeptide N-acetylgalactosaminyltransferase 14 [Source:MGI Symbol;Acc:MGI:1918935]	1.33
ENSMUSG00000076710	Ighv1-49	immunoglobulin heavy variable 1-49 [Source:MGI Symbol;Acc:MGI:4439754]	1.32
ENSMUSG00000024512	2310002L13Rik	RIKEN cDNA 2310002L13 gene [Source:MGI Symbol;Acc:MGI:1922827]	1.32
ENSMUSG00000021707	Dhfr	dihydrofolate reductase [Source:MGI Symbol;Acc:MGI:94890]	1.32
ENSMUSG00000073948	Olf1r608	olfactory receptor 608 [Source:MGI Symbol;Acc:MGI:3030442]	1.32
ENSMUSG00000095794	AC158672.3	--	1.31
ENSMUSG00000032034	Kcnj5	potassium inwardly-rectifying channel, subfamily J, member 5 [Source:MGI Symbol;Acc:MGI:104755]	1.31
ENSMUSG00000049809	Krtap9-3	keratin associated protein 9-3 [Source:MGI Symbol;Acc:MGI:1922836]	1.31
ENSMUSG00000041957	Pkp2	plakophilin 2 [Source:MGI Symbol;Acc:MGI:1914701]	1.31
ENSMUSG00000045625	Pigz	phosphatidylinositol glycan anchor biosynthesis, class Z [Source:MGI Symbol;Acc:MGI:2443822]	1.30
ENSMUSG00000027684	Mecom	MDS1 and EVI1 complex locus [Source:MGI Symbol;Acc:MGI:95457]	1.30
ENSMUSG00000021822	Plau	plasminogen activator, urokinase [Source:MGI Symbol;Acc:MGI:97611]	1.30
ENSMUSG00000048498	Cd300e	CD300e antigen [Source:MGI Symbol;Acc:MGI:2387602]	1.30
ENSMUSG00000034768	Asb16	ankyrin repeat and SOCS box-containing 16 [Source:MGI Symbol;Acc:MGI:2654437]	1.30
ENSMUSG00000022915	1700093J21Rik	RIKEN cDNA 1700093J21 gene [Source:MGI Symbol;Acc:MGI:1921546]	1.29
ENSMUSG00000005672	Kit	kit oncogene [Source:MGI Symbol;Acc:MGI:96677]	1.29
ENSMUSG00000022701	2610015P09Rik	RIKEN cDNA 2610015P09 gene [Source:MGI Symbol;Acc:MGI:1922661]	1.29
ENSMUSG00000034021	Pds5b	PDS5, regulator of cohesion maintenance, homolog B (S. cerevisiae) [Source:MGI Symbol;Acc:MGI:2140945]	1.29
ENSMUSG00000050578	Mmp13	matrix metalloproteinase 13 [Source:MGI Symbol;Acc:MGI:1340026]	1.29
ENSMUSG00000022075	Rhobtb2	Rho-related BTB domain containing 2 [Source:MGI Symbol;Acc:MGI:2180557]	1.29
ENSMUSG00000026644	Acbd7	acyl-Coenzyme A binding domain containing 7 [Source:MGI Symbol;Acc:MGI:1925495]	1.29
ENSMUSG00000033060	Lmo7	LIM domain only 7 [Source:MGI Symbol;Acc:MGI:1353586]	1.29
ENSMUSG00000021458	201011101Rik	RIKEN cDNA 201011101 gene [Source:MGI Symbol;Acc:MGI:1919311]	1.28
ENSMUSG00000033910	Gucy1a3	guanylate cyclase 1, soluble, alpha 3 [Source:MGI Symbol;Acc:MGI:1926562]	1.28
ENSMUSG00000054200	O3far1	omega-3 fatty acid receptor 1 [Source:MGI Symbol;Acc:MGI:2147577]	1.28
ENSMUSG00000021704	Mtx3	metaxin 3 [Source:MGI Symbol;Acc:MGI:2686040]	1.28
ENSMUSG00000020598	Nrcam	neuron-glia-CAM-related cell adhesion molecule [Source:MGI Symbol;Acc:MGI:104750]	1.28
ENSMUSG00000042942	Greb11	growth regulation by estrogen in breast cancer-like [Source:MGI Symbol;Acc:MGI:3576497]	1.28
ENSMUSG00000048012	Zfp473	zinc finger protein 473 [Source:MGI Symbol;Acc:MGI:2442697]	1.27
ENSMUSG00000021062	Rab15	RAB15, member RAS oncogene family [Source:MGI Symbol;Acc:MGI:1916865]	1.27
ENSMUSG00000057722	Lepr	leptin receptor [Source:MGI Symbol;Acc:MGI:104993]	1.27
ENSMUSG00000030882	Dnhd1	dynein heavy chain domain 1 [Source:MGI Symbol;Acc:MGI:1924755]	1.27
ENSMUSG00000036019	Tmtc2	transmembrane and tetratricopeptide repeat containing 2 [Source:MGI Symbol;Acc:MGI:1914057]	1.27
ENSMUSG00000026715	Serpinc1	serine (or cysteine) peptidase inhibitor, clade C (antithrombin), member 1 [Source:MGI Symbol;Acc:MGI:88095]	1.27

ENSMUSG00000034883	Lrr1	leucine rich repeat protein 1 [Source:MGI Symbol;Acc:MGI:1916956]	1.26
ENSMUSG00000076695	Ighv1-18	immunoglobulin heavy variable V1-18 [Source:MGI Symbol;Acc:MGI:4439780]	1.26
ENSMUSG00000038037	Socs1	suppressor of cytokine signaling 1 [Source:MGI Symbol;Acc:MGI:1354910]	1.26
ENSMUSG00000023025	Larp4	La ribonucleoprotein domain family, member 4 [Source:MGI Symbol;Acc:MGI:2443114]	1.26
ENSMUSG00000018906	P4ha2	procollagen-proline, 2-oxoglutarate 4-dioxygenase (proline 4-hydroxylase), alpha II polypeptide [Source:MGI Symbol;Acc:MGI:894286]	1.25
ENSMUSG00000062470	5730577103Rik	RIKEN cDNA 5730577103 gene [Source:MGI Symbol;Acc:MGI:1913912]	1.25
ENSMUSG00000095910	Olfra469	olfactory receptor 469 [Source:MGI Symbol;Acc:MGI:3030303]	1.25
ENSMUSG00000055732	Gm9979	predicted gene 9979 [Source:MGI Symbol;Acc:MGI:3642885]	1.25
ENSMUSG00000059495	Arhgef12	Rho guanine nucleotide exchange factor (GEF) 12 [Source:MGI Symbol;Acc:MGI:1916882]	1.25
ENSMUSG00000022212	Cpne6	copine VI [Source:MGI Symbol;Acc:MGI:1334445]	1.24
ENSMUSG00000036782	Klhl13	kelch-like 13 (Drosophila) [Source:MGI Symbol;Acc:MGI:1914705]	1.24
ENSMUSG00000037211	Spry1	sprouty homolog 1 (Drosophila) [Source:MGI Symbol;Acc:MGI:1345139]	1.24
ENSMUSG00000026728	Vim	vimentin [Source:MGI Symbol;Acc:MGI:98932]	1.24
ENSMUSG00000021033	Gstz1	glutathione transferase zeta 1 (maleylacetoacetate isomerase) [Source:MGI Symbol;Acc:MGI:1341859]	1.24
ENSMUSG00000041718	Alg13	asparagine-linked glycosylation 13 [Source:MGI Symbol;Acc:MGI:1914824]	1.24
ENSMUSG00000051367	Six1	sine oculis-related homeobox 1 [Source:MGI Symbol;Acc:MGI:102780]	1.24
ENSMUSG00000036330	Slc18a1	solute carrier family 18 (vesicular monoamine), member 1 [Source:MGI Symbol;Acc:MGI:106684]	1.24
ENSMUSG00000037362	Nov	nephroblastoma overexpressed gene [Source:MGI Symbol;Acc:MGI:109185]	1.23
ENSMUSG00000050244	Heatr1	HEAT repeat containing 1 [Source:MGI Symbol;Acc:MGI:2442524]	1.23
ENSMUSG00000026784	Pdss1	prenyl (solanesyl) diphosphate synthase, subunit 1 [Source:MGI Symbol;Acc:MGI:1889278]	1.23
ENSMUSG00000022816	Fstl1	follicle-stimulating factor-like 1 [Source:MGI Symbol;Acc:MGI:102793]	1.23
ENSMUSG00000056025	Clca1	chloride channel calcium activated 1 [Source:MGI Symbol;Acc:MGI:1316732]	1.23
ENSMUSG00000075006	Gm10799	predicted gene 10799 [Source:MGI Symbol;Acc:MGI:3642868]	1.23
ENSMUSG00000094694	AC073561.1	--	1.23
ENSMUSG00000022619	Mapk8ip2	mitogen-activated protein kinase 8 interacting protein 2 [Source:MGI Symbol;Acc:MGI:1926555]	1.23
ENSMUSG00000042268	Slc26a9	solute carrier family 26, member 9 [Source:MGI Symbol;Acc:MGI:2444594]	1.23
ENSMUSG00000040282	BC052040	cDNA sequence BC052040 [Source:MGI Symbol;Acc:MGI:3026886]	1.23
ENSMUSG00000029526	1700123K08Rik	RIKEN cDNA 1700123K08 gene [Source:MGI Symbol;Acc:MGI:1923908]	1.23
ENSMUSG00000033487	Fndc3a	fibronectin type III domain containing 3A [Source:MGI Symbol;Acc:MGI:1196463]	1.22
ENSMUSG00000048218	Amigo2	adhesion molecule with Ig like domain 2 [Source:MGI Symbol;Acc:MGI:2145995]	1.22
ENSMUSG00000029553	Tfec	transcription factor EC [Source:MGI Symbol;Acc:MGI:1333760]	1.22
ENSMUSG00000097160	AC126262.1	--	1.22
ENSMUSG00000050919	Zfp366	zinc finger protein 366 [Source:MGI Symbol;Acc:MGI:2178429]	1.22
ENSMUSG00000032850	Rnft2	ring finger protein, transmembrane 2 [Source:MGI Symbol;Acc:MGI:2442859]	1.22
ENSMUSG00000030409	Dmpk	dystrophin myotonic-protein kinase [Source:MGI Symbol;Acc:MGI:94906]	1.21
ENSMUSG00000081113	Gm7308	predicted pseudogene 7308 [Source:MGI Symbol;Acc:MGI:3644558]	1.21
ENSMUSG00000006310	Zbtb32	zinc finger and BTB domain containing 32 [Source:MGI Symbol;Acc:MGI:1891838]	1.21
ENSMUSG00000030666	Calcb	calcitonin-related polypeptide, beta [Source:MGI Symbol;Acc:MGI:2151254]	1.21
ENSMUSG00000026153	Fam135a	family with sequence similarity 135, member A [Source:MGI Symbol;Acc:MGI:1915437]	1.21
ENSMUSG00000058022	Adtrp	androgen dependent TFPI regulating protein [Source:MGI Symbol;Acc:MGI:1924596]	1.21
ENSMUSG00000030145	Zfp248	zinc finger protein 248 [Source:MGI Symbol;Acc:MGI:1919970]	1.21
ENSMUSG00000015176	Nolc1	nucleolar and coiled-body phosphoprotein 1 [Source:MGI Symbol;Acc:MGI:1918019]	1.21
ENSMUSG00000024511	Rab27b	RAB27b, member RAS oncogene family [Source:MGI Symbol;Acc:MGI:1931295]	1.21
ENSMUSG00000027848	Olfml3	olfactomedin-like 3 [Source:MGI Symbol;Acc:MGI:1914877]	1.21
ENSMUSG00000051480	A130050O07Rik	RIKEN cDNA A130050O07 gene [Source:MGI Symbol;Acc:MGI:2443458]	1.21
ENSMUSG00000076586	Igkv8-21	immunoglobulin kappa variable 8-21 [Source:MGI Symbol;Acc:MGI:1330840]	1.21
ENSMUSG00000028358	Zfp618	zinc finger protein 618 [Source:MGI Symbol;Acc:MGI:1919950]	1.20
ENSMUSG00000095024	Gm5458	predicted gene 5458 [Source:MGI Symbol;Acc:MGI:3646663]	1.20
ENSMUSG00000027562	Car2	carbonic anhydrase 2 [Source:MGI Symbol;Acc:MGI:88269]	1.20
ENSMUSG00000026167	Wnt10a	wingless related MMTV integration site 10a [Source:MGI Symbol;Acc:MGI:108071]	1.20
ENSMUSG00000031596	Slc7a2	solute carrier family 7 (cationic amino acid transporter, y+ system), member 2 [Source:MGI Symbol;Acc:MGI:99828]	1.20
ENSMUSG00000095130	AC079181.3	--	1.20
ENSMUSG00000055320	Tead1	TEA domain family member 1 [Source:MGI Symbol;Acc:MGI:101876]	1.20
ENSMUSG00000055593	Tead1	TEA domain family member 1 [Source:MGI Symbol;Acc:MGI:101876]	1.20

ENSMUSG00000027030	Stk39	serine/threonine kinase 39 [Source:MGI Symbol;Acc:MGI:1858416]	1.20
ENSMUSG00000054641	Mmrrn1	multimerin 1 [Source:MGI Symbol;Acc:MGI:1918195]	1.20
ENSMUSG00000024786	1700123I01Rik	RIKEN cDNA 1700123I01 gene [Source:MGI Symbol;Acc:MGI:1923913]	1.20
ENSMUSG00000080756	Gm12633	predicted gene 12633 [Source:MGI Symbol;Acc:MGI:3650768]	1.19
ENSMUSG00000089727	Klra8	killer cell lectin-like receptor, subfamily A, member 8 [Source:MGI Symbol;Acc:MGI:102968]	1.19
ENSMUSG00000029372	Ppbb	pro-platelet basic protein [Source:MGI Symbol;Acc:MGI:1888712]	1.19
ENSMUSG00000022661	Cd200	CD200 antigen [Source:MGI Symbol;Acc:MGI:1196990]	1.19
ENSMUSG00000022240	Ctnnd2	catenin (cadherin associated protein), delta 2 [Source:MGI Symbol;Acc:MGI:1195966]	1.19
ENSMUSG00000005705	Agpr	agouti related protein [Source:MGI Symbol;Acc:MGI:892013]	1.19
ENSMUSG00000000881	Dlg3	discs, large homolog 3 (Drosophila) [Source:MGI Symbol;Acc:MGI:1888986]	1.18
ENSMUSG00000076530	Igkv19-93	immunoglobulin kappa chain variable 19-93 [Source:MGI Symbol;Acc:MGI:107617]	1.18
ENSMUSG00000029238	Clock	circadian locomotor output cycles kaput [Source:MGI Symbol;Acc:MGI:99698]	1.18
ENSMUSG000000057123	Gja5	gap junction protein, alpha 5 [Source:MGI Symbol;Acc:MGI:95716]	1.18
ENSMUSG00000004768	Rab23	RAB23, member RAS oncogene family [Source:MGI Symbol;Acc:MGI:99833]	1.18
ENSMUSG00000019852	D10Bwg1379e	DNA segment, Chr 10, Brigham & Women's Genetics 1379 expressed [Source:MGI Symbol;Acc:MGI:106387]	1.18
ENSMUSG00000095981	AC073561.5	--	1.18
ENSMUSG00000043051	Disc1	disrupted in schizophrenia 1 [Source:MGI Symbol;Acc:MGI:2447658]	1.18
ENSMUSG00000051969	Tlr11	toll-like receptor 11 [Source:MGI Symbol;Acc:MGI:3045226]	1.18
ENSMUSG00000044867	Gm3345	predicted gene 3345 [Source:MGI Symbol;Acc:MGI:3781523]	1.18
ENSMUSG00000028654	Mycl1	v-myc myelocytomatosis viral oncogene homolog 1, lung carcinoma derived (avian) [Source:MGI Symbol;Acc:MGI:96799]	1.17
ENSMUSG00000024043	Arhgap28	Rho GTPase activating protein 28 [Source:MGI Symbol;Acc:MGI:2147003]	1.17
ENSMUSG00000047181	Samd14	sterile alpha motif domain containing 14 [Source:MGI Symbol;Acc:MGI:2384945]	1.17
ENSMUSG000000061780	Cfd	complement factor D (adipsin) [Source:MGI Symbol;Acc:MGI:87931]	1.17
ENSMUSG00000030553	Pgpep1l	pyroglutamyl-peptidase I-like [Source:MGI Symbol;Acc:MGI:1925694]	1.17
ENSMUSG00000026227	2810459M11Rik	RIKEN cDNA 2810459M11 gene [Source:MGI Symbol;Acc:MGI:1920042]	1.17
ENSMUSG00000024968	Rcor2	REST corepressor 2 [Source:MGI Symbol;Acc:MGI:1859854]	1.17
ENSMUSG00000030064	Frm4b	FERM domain containing 4B [Source:MGI Symbol;Acc:MGI:2141794]	1.17
ENSMUSG00000085977	Gm5970	predicted gene 5970 [Source:MGI Symbol;Acc:MGI:3646761]	1.16
ENSMUSG000000037001	Zfp39	zinc finger protein 39 [Source:MGI Symbol;Acc:MGI:99183]	1.16
ENSMUSG00000074039	4930520O04Rik	RIKEN cDNA 4930520O04 gene [Source:MGI Symbol;Acc:MGI:1922366]	1.16
ENSMUSG00000035365	Parpbb	PARP1 binding protein [Source:MGI Symbol;Acc:MGI:1922567]	1.16
ENSMUSG00000024044	Epb4.1l3	erythrocyte protein band 4.1-like 3 [Source:MGI Symbol;Acc:MGI:103008]	1.16
ENSMUSG00000005947	Itgae	integrin alpha E, epithelial-associated [Source:MGI Symbol;Acc:MGI:1298377]	1.16
ENSMUSG000000034903	Cobl1	Cobl-like 1 [Source:MGI Symbol;Acc:MGI:2442894]	1.16
ENSMUSG00000025006	Sorbs1	sorbin and SH3 domain containing 1 [Source:MGI Symbol;Acc:MGI:700014]	1.16
ENSMUSG00000047898	Ccr4	chemokine (C-C motif) receptor 4 [Source:MGI Symbol;Acc:MGI:107824]	1.16
ENSMUSG00000076547	Igkv4-70	immunoglobulin kappa chain variable 4-70 [Source:MGI Symbol;Acc:MGI:2686348]	1.16
ENSMUSG00000094006	AC156953.1	--	1.16
ENSMUSG000000031963	Bmper	BMP-binding endothelial regulator [Source:MGI Symbol;Acc:MGI:1920480]	1.15
ENSMUSG00000027340	Slc23a2	solute carrier family 23 (nucleobase transporters), member 2 [Source:MGI Symbol;Acc:MGI:1859682]	1.15
ENSMUSG00000020131	Pcsk4	proprotein convertase subtilisin/kexin type 4 [Source:MGI Symbol;Acc:MGI:97514]	1.15
ENSMUSG00000046806	3110062M04Rik	RIKEN cDNA 3110062M04 gene [Source:MGI Symbol;Acc:MGI:1925662]	1.15
ENSMUSG00000020389	Cdkl3	cyclin-dependent kinase-like 3 [Source:MGI Symbol;Acc:MGI:2388268]	1.15
ENSMUSG000000095612	AC090887.5	--	1.15
ENSMUSG00000040046	Tph1	tryptophan hydroxylase 1 [Source:MGI Symbol;Acc:MGI:98796]	1.15
ENSMUSG00000033031	C330027C09Rik	RIKEN cDNA C330027C09 gene [Source:MGI Symbol;Acc:MGI:2146335]	1.15
ENSMUSG00000036459	Wtip	WT1-interacting protein [Source:MGI Symbol;Acc:MGI:2141920]	1.15
ENSMUSG00000020193	Zpbb	zona pellucida binding protein [Source:MGI Symbol;Acc:MGI:1855701]	1.14
ENSMUSG00000032932	Hspa13	heat shock protein 70 family, member 13 [Source:MGI Symbol;Acc:MGI:1309463]	1.14
ENSMUSG00000090551	A730015C16Rik	RIKEN cDNA A730015C16 gene [Source:MGI Symbol;Acc:MGI:3704235]	1.14
ENSMUSG00000039116	Gpr126	G protein-coupled receptor 126 [Source:MGI Symbol;Acc:MGI:1916151]	1.14
ENSMUSG00000027394	Ttl	tubulin tyrosine ligase [Source:MGI Symbol;Acc:MGI:1916987]	1.14
ENSMUSG00000022123	Scel	sciellin [Source:MGI Symbol;Acc:MGI:1891228]	1.13
ENSMUSG00000028236	Sdr16c5	short chain dehydrogenase/reductase family 16C, member 5 [Source:MGI Symbol;Acc:MGI:2668443]	1.13

ENSMUSG00000032528	Vipr1	vasoactive intestinal peptide receptor 1 [Source:MGI Symbol;Acc:MGI:109272]	1.13
ENSMUSG00000042184	1700069L16Rik	RIKEN cDNA 1700069L16 gene [Source:MGI Symbol;Acc:MGI:1920726]	1.13
ENSMUSG00000094094	AC155333.1	--	1.13
ENSMUSG00000020903	Stx8	syntaxin 8 [Source:MGI Symbol;Acc:MGI:1890156]	1.13
ENSMUSG00000030607	Acan	aggrecan [Source:MGI Symbol;Acc:MGI:99602]	1.13
ENSMUSG00000030606	Hapln3	hyaluronan and proteoglycan link protein 3 [Source:MGI Symbol;Acc:MGI:1914916]	1.13
ENSMUSG00000073414	AU023871	expressed sequence AU023871 [Source:MGI Symbol;Acc:MGI:2146995]	1.13
ENSMUSG00000028214	Gem	GTP binding protein (gene overexpressed in skeletal muscle) [Source:MGI Symbol;Acc:MGI:99844]	1.13
ENSMUSG00000048039	Isg20l2	interferon stimulated exonuclease gene 20-like 2 [Source:MGI Symbol;Acc:MGI:2140076]	1.13
ENSMUSG00000095571	AC160985.5	--	1.13
ENSMUSG00000021193	Pitrm1	pitrilysin metalloproteinase 1 [Source:MGI Symbol;Acc:MGI:1916867]	1.12
ENSMUSG00000021196	Pfkip	phosphofructokinase, platelet [Source:MGI Symbol;Acc:MGI:1891833]	1.12
ENSMUSG00000029371	Cxcl5	chemokine (C-X-C motif) ligand 5 [Source:MGI Symbol;Acc:MGI:1096868]	1.12
ENSMUSG00000041688	Amot	angiomin [Source:MGI Symbol;Acc:MGI:108440]	1.12
ENSMUSG00000018341	Il12rb2	interleukin 12 receptor, beta 2 [Source:MGI Symbol;Acc:MGI:1270861]	1.12
ENSMUSG00000001870	Ltbp1	latent transforming growth factor beta binding protein 1 [Source:MGI Symbol;Acc:MGI:109151]	1.12
ENSMUSG00000031480	Thsd1	thrombospondin, type I, domain 1 [Source:MGI Symbol;Acc:MGI:1929096]	1.12
ENSMUSG00000051313	Olfir1262	olfactory receptor 1262 [Source:MGI Symbol;Acc:MGI:3031096]	1.12
ENSMUSG00000033717	Adra2a	adrenergic receptor, alpha 2a [Source:MGI Symbol;Acc:MGI:87934]	1.12
ENSMUSG00000057914	Cacnb2	calcium channel, voltage-dependent, beta 2 subunit [Source:MGI Symbol;Acc:MGI:894644]	1.12
ENSMUSG00000033004	Mycbp2	MYC binding protein 2 [Source:MGI Symbol;Acc:MGI:2179432]	1.12
ENSMUSG00000024165	Hn1l	hematological and neurological expressed 1-like [Source:MGI Symbol;Acc:MGI:1196260]	1.12
ENSMUSG00000076614	Ighg1	immunoglobulin heavy constant gamma 1 (G1m marker) [Source:MGI Symbol;Acc:MGI:96446]	1.12
ENSMUSG00000093861	AC140374.1	--	1.11
ENSMUSG00000026525	Opn3	opsin 3 [Source:MGI Symbol;Acc:MGI:1338022]	1.11
ENSMUSG00000061878	Sphk1	sphingosine kinase 1 [Source:MGI Symbol;Acc:MGI:1316649]	1.11
ENSMUSG00000021806	Nid2	nidogen 2 [Source:MGI Symbol;Acc:MGI:1298229]	1.11
ENSMUSG00000073627	C130036L24Rik	RIKEN cDNA C130036L24 gene [Source:MGI Symbol;Acc:MGI:2441877]	1.11
ENSMUSG00000093489	Gm20625	predicted gene 20625 [Source:MGI Symbol;Acc:MGI:5313072]	1.11
ENSMUSG00000097091	AC134839.1	--	1.11
ENSMUSG00000097415	RP23-285C18.2	--	1.11
ENSMUSG00000058997	Vwa8	von Willebrand factor A domain containing 8 [Source:MGI Symbol;Acc:MGI:1919008]	1.11
ENSMUSG00000027533	Fabp5	fatty acid binding protein 5, epidermal [Source:MGI Symbol;Acc:MGI:101790]	1.11
ENSMUSG00000074280	Gm6166	predicted gene 6166 [Source:MGI Symbol;Acc:MGI:3645893]	1.11
ENSMUSG00000009145	Dqx1	DEAQ RNA-dependent ATPase [Source:MGI Symbol;Acc:MGI:2136388]	1.11
ENSMUSG00000027956	Tmem144	transmembrane protein 144 [Source:MGI Symbol;Acc:MGI:1917902]	1.11
ENSMUSG00000038115	Ano2	anoctamin 2 [Source:MGI Symbol;Acc:MGI:2387214]	1.11
ENSMUSG00000043668	Tox3	TOX high mobility group box family member 3 [Source:MGI Symbol;Acc:MGI:3039593]	1.10
ENSMUSG00000022935	Grik1	glutamate receptor, ionotropic, kainate 1 [Source:MGI Symbol;Acc:MGI:95814]	1.10
ENSMUSG00000020399	Havcr2	hepatitis A virus cellular receptor 2 [Source:MGI Symbol;Acc:MGI:2159682]	1.10
ENSMUSG00000027347	Rasgrp1	RAS guanyl releasing protein 1 [Source:MGI Symbol;Acc:MGI:1314635]	1.10
ENSMUSG00000045394	Epcam	epithelial cell adhesion molecule [Source:MGI Symbol;Acc:MGI:106653]	1.10
ENSMUSG00000019718	L3hypdh	L-3-hydroxyproline dehydratase (trans-) [Source:MGI Symbol;Acc:MGI:1914467]	1.10
ENSMUSG00000032053	Pou2af1	POU domain, class 2, associating factor 1 [Source:MGI Symbol;Acc:MGI:105086]	1.10
ENSMUSG00000001436	Slc19a1	solute carrier family 19 (folate transporter), member 1 [Source:MGI Symbol;Acc:MGI:103182]	1.09
ENSMUSG00000030255	Sspn	sarcospan [Source:MGI Symbol;Acc:MGI:1353511]	1.09
ENSMUSG00000047547	Cltb	clathrin, light polypeptide (Lcb) [Source:MGI Symbol;Acc:MGI:1921575]	1.09
ENSMUSG00000058398	Prss43	protease, serine, 43 [Source:MGI Symbol;Acc:MGI:2684822]	1.09
ENSMUSG00000022724	Mina	myc induced nuclear antigen [Source:MGI Symbol;Acc:MGI:1914264]	1.09
ENSMUSG00000085292	Gm12853	predicted gene 12853 [Source:MGI Symbol;Acc:MGI:3650185]	1.09
ENSMUSG00000041220	Elov6	ELOVL family member 6, elongation of long chain fatty acids (yeast) [Source:MGI Symbol;Acc:MGI:2156528]	1.09
ENSMUSG00000078706	Gm53	predicted gene 53 [Source:MGI Symbol;Acc:MGI:2684899]	1.09
ENSMUSG00000076677	Ighv6-3	immunoglobulin heavy variable 6-3 [Source:MGI Symbol;Acc:MGI:4439854]	1.09
ENSMUSG00000069518	Gm10271	predicted gene 10271 [Source:MGI Symbol;Acc:MGI:3642827]	1.09

ENSMUSG00000051727	Kctd14	potassium channel tetramerisation domain containing 14 [Source:MGI Symbol;Acc:MGI:1289222]	1.09
ENSMUSG00000076555	Igkv4-57-1	immunoglobulin kappa variable 4-57-1 [Source:MGI Symbol;Acc:MGI:2686264]	1.08
ENSMUSG00000004655	Aqp1	aquaporin 1 [Source:MGI Symbol;Acc:MGI:103201]	1.08
ENSMUSG00000036450	Hif1an	hypoxia-inducible factor 1, alpha subunit inhibitor [Source:MGI Symbol;Acc:MGI:2442345]	1.08
ENSMUSG00000027002	Nckap1	NCK-associated protein 1 [Source:MGI Symbol;Acc:MGI:1355333]	1.08
ENSMUSG00000030077	Chl1	cell adhesion molecule with homology to L1CAM [Source:MGI Symbol;Acc:MGI:1098266]	1.08
ENSMUSG00000024440	Pcdh12	protocadherin 12 [Source:MGI Symbol;Acc:MGI:1855700]	1.08
ENSMUSG00000089774	Slc5a3	solute carrier family 5 (inositol transporters), member 3 [Source:MGI Symbol;Acc:MGI:1858226]	1.08
ENSMUSG00000039748	Exo1	exonuclease 1 [Source:MGI Symbol;Acc:MGI:1349427]	1.08
ENSMUSG00000035805	Mlc1	megalencephalic leukoencephalopathy with subcortical cysts 1 homolog (human) [Source:MGI Symbol;Acc:MGI:2157910]	1.08
ENSMUSG00000042834	D0H4S114	DNA segment, human D4S114 [Source:MGI Symbol;Acc:MGI:99444]	1.08
ENSMUSG00000020690	Efcab3	EF-hand calcium binding domain 3 [Source:MGI Symbol;Acc:MGI:1918144]	1.08
ENSMUSG000000035171	1110059E24Rik	RIKEN cDNA 1110059E24 gene [Source:MGI Symbol;Acc:MGI:1913456]	1.08
ENSMUSG00000030268	Bcat1	branched chain aminotransferase 1, cytosolic [Source:MGI Symbol;Acc:MGI:104861]	1.07
ENSMUSG00000076609	Igkc	immunoglobulin kappa constant [Source:MGI Symbol;Acc:MGI:96495]	1.07
ENSMUSG00000027405	Nop56	NOP56 ribonucleoprotein homolog (yeast) [Source:MGI Symbol;Acc:MGI:1914384]	1.07
ENSMUSG00000024737	Slc15a3	solute carrier family 15, member 3 [Source:MGI Symbol;Acc:MGI:1929691]	1.07
ENSMUSG00000024736	Tmem132a	transmembrane protein 132A [Source:MGI Symbol;Acc:MGI:2147810]	1.07
ENSMUSG00000022247	Brix1	BRX1, biogenesis of ribosomes, homolog (S. cerevisiae) [Source:MGI Symbol;Acc:MGI:1915082]	1.07
ENSMUSG00000078810	Gp6	glycoprotein 6 (platelet) [Source:MGI Symbol;Acc:MGI:1889810]	1.07
ENSMUSG00000025216	Lbx1	ladybird homeobox homolog 1 (Drosophila) [Source:MGI Symbol;Acc:MGI:104867]	1.07
ENSMUSG00000030431	Tmem238	transmembrane protein 238 [Source:MGI Symbol;Acc:MGI:1922935]	1.07
ENSMUSG000000095263	AC181976.1	Uncharacterized protein [Source:UniProtKB/TrEMBL;Acc:J3QP42]	1.06
ENSMUSG000000095011	AC182730.1	Uncharacterized protein [Source:UniProtKB/TrEMBL;Acc:J3QP42]	1.06
ENSMUSG000000096347	AC211373.1	Uncharacterized protein [Source:UniProtKB/TrEMBL;Acc:J3QP42]	1.06
ENSMUSG000000096178	AC183902.1	Uncharacterized protein [Source:UniProtKB/TrEMBL;Acc:J3QP42]	1.06
ENSMUSG00000017176	Nt5c3l	5'-nucleotidase, cytosolic III-like [Source:MGI Symbol;Acc:MGI:1915356]	1.06
ENSMUSG00000015133	Lrrk1	leucine-rich repeat kinase 1 [Source:MGI Symbol;Acc:MGI:2142227]	1.06
ENSMUSG00000028583	Pdpn	podoplanin [Source:MGI Symbol;Acc:MGI:103098]	1.06
ENSMUSG00000059463	Spag11b	sperm associated antigen 11B [Source:MGI Symbol;Acc:MGI:3647173]	1.06
ENSMUSG00000031327	Chic1	cysteine-rich hydrophobic domain 1 [Source:MGI Symbol;Acc:MGI:1344694]	1.06
ENSMUSG00000041014	Nrg3	neuregulin 3 [Source:MGI Symbol;Acc:MGI:1097165]	1.06
ENSMUSG000000044430	Klk12	kallikrein related-peptidase 12 [Source:MGI Symbol;Acc:MGI:1916761]	1.06
ENSMUSG00000006576	Slc4a3	solute carrier family 4 (anion exchanger), member 3 [Source:MGI Symbol;Acc:MGI:109350]	1.06
ENSMUSG00000024486	Hbegf	heparin-binding EGF-like growth factor [Source:MGI Symbol;Acc:MGI:96070]	1.06
ENSMUSG00000035373	Ccl7	chemokine (C-C motif) ligand 7 [Source:MGI Symbol;Acc:MGI:99512]	1.06
ENSMUSG00000019817	Plagl1	pleiomorphic adenoma gene-like 1 [Source:MGI Symbol;Acc:MGI:1100874]	1.05
ENSMUSG00000035042	Ccl5	chemokine (C-C motif) ligand 5 [Source:MGI Symbol;Acc:MGI:98262]	1.05
ENSMUSG000000078962	4932414J04Rik	RIKEN cDNA 4932414J04 gene [Source:MGI Symbol;Acc:MGI:3605619]	1.05
ENSMUSG00000015222	Mtap2	microtubule-associated protein 2 [Source:MGI Symbol;Acc:MGI:97175]	1.05
ENSMUSG00000029819	Npy	neuropeptide Y [Source:MGI Symbol;Acc:MGI:97374]	1.05
ENSMUSG00000032494	Tdgf1	teratocarcinoma-derived growth factor 1 [Source:MGI Symbol;Acc:MGI:98658]	1.05
ENSMUSG00000033409	Syce11	synaptonemal complex central element protein 1 like [Source:MGI Symbol;Acc:MGI:1922247]	1.05
ENSMUSG000000028392	Bspry	B-box and SPRY domain containing [Source:MGI Symbol;Acc:MGI:2177191]	1.05
ENSMUSG00000058317	Ube2e2	ubiquitin-conjugating enzyme E2E 2 [Source:MGI Symbol;Acc:MGI:2384997]	1.05
ENSMUSG00000024798	Htr7	5-hydroxytryptamine (serotonin) receptor 7 [Source:MGI Symbol;Acc:MGI:99841]	1.05
ENSMUSG00000013584	Aldh1a2	aldehyde dehydrogenase family 1, subfamily A2 [Source:MGI Symbol;Acc:MGI:107928]	1.05
ENSMUSG00000062960	Kdr	kinase insert domain protein receptor [Source:MGI Symbol;Acc:MGI:96683]	1.04
ENSMUSG000000076532	Igkv4-91	immunoglobulin kappa chain variable 4-91 [Source:MGI Symbol;Acc:MGI:3642277]	1.04
ENSMUSG00000035385	Ccl2	chemokine (C-C motif) ligand 2 [Source:MGI Symbol;Acc:MGI:98259]	1.04
ENSMUSG00000025964	Adam23	a disintegrin and metallopeptidase domain 23 [Source:MGI Symbol;Acc:MGI:1345162]	1.04
ENSMUSG00000001604	Tcea3	transcription elongation factor A (SII), 3 [Source:MGI Symbol;Acc:MGI:1196908]	1.04
ENSMUSG00000094262	AC156953.2	Uncharacterized protein [Source:UniProtKB/TrEMBL;Acc:J3QNZ9]	1.04
ENSMUSG00000012422	Tmem167	transmembrane protein 167 [Source:MGI Symbol;Acc:MGI:1913324]	1.04

ENSMUSG00000037712	Fermt2	fermitin family homolog 2 (Drosophila) [Source:MGI Symbol;Acc:MGI:2385001]	1.04
ENSMUSG00000026640	Plxna2	plexin A2 [Source:MGI Symbol;Acc:MGI:107684]	1.04
ENSMUSG00000038280	Ostm1	osteopetrosis associated transmembrane protein 1 [Source:MGI Symbol;Acc:MGI:2655574]	1.04
ENSMUSG00000049723	Mmp12	matrix metalloproteinase 12 [Source:MGI Symbol;Acc:MGI:97005]	1.04
ENSMUSG00000094447	9430069I07Rik	RIKEN cDNA 9430069I07 gene [Source:MGI Symbol;Acc:MGI:1924608]	1.03
ENSMUSG00000015134	Aldh1a3	aldehyde dehydrogenase family 1, subfamily A3 [Source:MGI Symbol;Acc:MGI:1861722]	1.03
ENSMUSG00000024770	Lipn	lipase, family member N [Source:MGI Symbol;Acc:MGI:1917416]	1.03
ENSMUSG00000044149	Nkrf	NF-kappaB repressing factor [Source:MGI Symbol;Acc:MGI:1924536]	1.03
ENSMUSG00000078684	5830417110Rik	RIKEN cDNA 5830417110 gene [Source:MGI Symbol;Acc:MGI:1923272]	1.03
ENSMUSG00000054199	Gon4l	gon-4-like (C.elegans) [Source:MGI Symbol;Acc:MGI:1917579]	1.03
ENSMUSG00000040652	Oaz2	ornithine decarboxylase antizyme 2 [Source:MGI Symbol;Acc:MGI:109492]	1.03
ENSMUSG00000037977	6430571L13Rik	RIKEN cDNA 6430571L13 gene [Source:MGI Symbol;Acc:MGI:2445137]	1.03
ENSMUSG00000040213	Ccbl2	cysteine conjugate-beta lyase 2 [Source:MGI Symbol;Acc:MGI:2677849]	1.03
ENSMUSG00000087403	2900056M20Rik	RIKEN cDNA 2900056M20 gene [Source:MGI Symbol;Acc:MGI:1920247]	1.03
ENSMUSG00000051251	Nhlh1	nescient helix loop helix 1 [Source:MGI Symbol;Acc:MGI:98481]	1.02
ENSMUSG00000044303	Cdkn2a	cyclin-dependent kinase inhibitor 2A [Source:MGI Symbol;Acc:MGI:104738]	1.02
ENSMUSG00000004980	Hnrnpa2b1	heterogeneous nuclear ribonucleoprotein A2/B1 [Source:MGI Symbol;Acc:MGI:104819]	1.02
ENSMUSG00000043505	Gimap5	GTPase, IMAP family member 5 [Source:MGI Symbol;Acc:MGI:2442232]	1.02
ENSMUSG00000036158	Prickle1	prickle homolog 1 (Drosophila) [Source:MGI Symbol;Acc:MGI:1916034]	1.02
ENSMUSG00000090399	Nav1	neuron navigator 1 [Source:MGI Symbol;Acc:MGI:2183683]	1.02
ENSMUSG00000030207	8430419L09Rik	RIKEN cDNA 8430419L09 gene [Source:MGI Symbol;Acc:MGI:1921775]	1.02
ENSMUSG00000053128	Rnf26	ring finger protein 26 [Source:MGI Symbol;Acc:MGI:2388131]	1.02
ENSMUSG00000036872	Abcc12	ATP-binding cassette, sub-family C (CFTR/MRP), member 12 [Source:MGI Symbol;Acc:MGI:2441679]	1.02
ENSMUSG00000039901	9130011E15Rik	RIKEN cDNA 9130011E15 gene [Source:MGI Symbol;Acc:MGI:1918867]	1.02
ENSMUSG00000070778	Rpl7a-ps8	ribosomal protein L7A, pseudogene 8 [Source:MGI Symbol;Acc:MGI:3644288]	1.02
ENSMUSG00000031485	Prosc	proline synthetase co-transcribed [Source:MGI Symbol;Acc:MGI:1891207]	1.02
ENSMUSG00000040752	Myh6	myosin, heavy polypeptide 6, cardiac muscle, alpha [Source:MGI Symbol;Acc:MGI:97255]	1.01
ENSMUSG00000017929	B4galt5	UDP-Gal:betaGlcNAc beta 1,4-galactosyltransferase, polypeptide 5 [Source:MGI Symbol;Acc:MGI:1927169]	1.01
ENSMUSG00000020863	Luc7l3	LUC7-like 3 (S. cerevisiae) [Source:MGI Symbol;Acc:MGI:1914934]	1.01
ENSMUSG00000002007	Srpk3	serine/arginine-rich protein specific kinase 3 [Source:MGI Symbol;Acc:MGI:1891338]	1.01
ENSMUSG00000071669	Snx29	sorting nexin 29 [Source:MGI Symbol;Acc:MGI:1921728]	1.01
ENSMUSG00000027583	Zbtb46	zinc finger and BTB domain containing 46 [Source:MGI Symbol;Acc:MGI:1919397]	1.01
ENSMUSG00000025217	Btrc	beta-transducin repeat containing protein [Source:MGI Symbol;Acc:MGI:1338871]	1.01
ENSMUSG00000011263	Exoc3l2	exocyst complex component 3-like 2 [Source:MGI Symbol;Acc:MGI:1921713]	1.01
ENSMUSG00000074657	Kif5a	kinesin family member 5A [Source:MGI Symbol;Acc:MGI:109564]	1.01
ENSMUSG00000040875	Osbp10	oxysterol binding protein-like 10 [Source:MGI Symbol;Acc:MGI:1921736]	1.01
ENSMUSG00000029781	Fkbp9	FK506 binding protein 9 [Source:MGI Symbol;Acc:MGI:1350921]	1.00
ENSMUSG00000076577	Igkv8-30	immunoglobulin kappa chain variable 8-30 [Source:MGI Symbol;Acc:MGI:3642250]	1.00
ENSMUSG00000021638	Ocln	occludin [Source:MGI Symbol;Acc:MGI:106183]	1.00
ENSMUSG00000058297	Spock2	sparc/osteonectin, cwcv and kazal-like domains proteoglycan 2 [Source:MGI Symbol;Acc:MGI:1891351]	1.00
ENSMUSG00000028005	Gucy1b3	guanylate cyclase 1, soluble, beta 3 [Source:MGI Symbol;Acc:MGI:1860604]	1.00
ENSMUSG00000000561	Wdr77	WD repeat domain 77 [Source:MGI Symbol;Acc:MGI:1917715]	1.00
ENSMUSG00000035093	Secisbp2l	SECIS binding protein 2-like [Source:MGI Symbol;Acc:MGI:1917604]	-1.03
ENSMUSG00000040907	Atp1a3	ATPase, Na+/K+ transporting, alpha 3 polypeptide [Source:MGI Symbol;Acc:MGI:88107]	-1.03
ENSMUSG00000026576	Atp1b1	ATPase, Na+/K+ transporting, beta 1 polypeptide [Source:MGI Symbol;Acc:MGI:88108]	-1.03
ENSMUSG00000023467	Tulp2	tubby-like protein 2 [Source:MGI Symbol;Acc:MGI:1861600]	-1.03
ENSMUSG00000046027	Stard5	StAR-related lipid transfer (START) domain containing 5 [Source:MGI Symbol;Acc:MGI:2156765]	-1.03
ENSMUSG00000074582	Arfgaf2	ADP-ribosylation factor guanine nucleotide-exchange factor 2 (brefeldin A-inhibited) [Source:MGI Symbol;Acc:MGI:2139354]	-1.02
ENSMUSG00000085642	3110053B16Rik	RIKEN cDNA 3110053B16 gene [Source:MGI Symbol;Acc:MGI:1920435]	-1.02
ENSMUSG00000022504	Ciita	class II transactivator [Source:MGI Symbol;Acc:MGI:108445]	-1.02
ENSMUSG00000022148	Fyb	FYN binding protein [Source:MGI Symbol;Acc:MGI:1346327]	-1.02
ENSMUSG00000062353	Gm15772	predicted gene 15772 [Source:MGI Symbol;Acc:MGI:3805541]	-1.02
ENSMUSG00000096487	Olfir706	olfactory receptor 706 [Source:MGI Symbol;Acc:MGI:3030540]	-1.02
ENSMUSG00000063193	Cd300lb	CD300 antigen like family member B [Source:MGI Symbol;Acc:MGI:2685099]	-1.02

ENSMUSG00000017740	Slc12a5	solute carrier family 12, member 5 [Source:MGI Symbol;Acc:MGI:1862037]	-1.02
ENSMUSG00000040812	Agbl2	ATP/GTP binding protein-like 2 [Source:MGI Symbol;Acc:MGI:2443254]	-1.02
ENSMUSG00000025213	Kazald1	Kazal-type serine peptidase inhibitor domain 1 [Source:MGI Symbol;Acc:MGI:2147606]	-1.02
ENSMUSG00000096275	AC192778.1	LOC380994 protein; Uncharacterized protein [Source:UniProtKB/TrEMBL;Acc:Q4KL07]	-1.02
ENSMUSG00000044501	Zfp758	zinc finger protein 758 [Source:MGI Symbol;Acc:MGI:2385044]	-1.01
ENSMUSG00000060470	Gpr97	G protein-coupled receptor 97 [Source:MGI Symbol;Acc:MGI:1859670]	-1.01
ENSMUSG00000070427	Il18bp	interleukin 18 binding protein [Source:MGI Symbol;Acc:MGI:1333800]	-1.01
ENSMUSG00000040699	Limd2	LIM domain containing 2 [Source:MGI Symbol;Acc:MGI:1915053]	-1.01
ENSMUSG00000067818	Myl9	myosin, light polypeptide 9, regulatory [Source:MGI Symbol;Acc:MGI:2138915]	-1.01
ENSMUSG00000031112	2610018G03Rik	RIKEN cDNA 2610018G03 gene [Source:MGI Symbol;Acc:MGI:1917665]	-1.01
ENSMUSG00000064125	BC068157	cDNA sequence BC068157 [Source:MGI Symbol;Acc:MGI:3605626]	-1.01
ENSMUSG00000026950	Neb	nebulin [Source:MGI Symbol;Acc:MGI:97292]	-1.01
ENSMUSG00000001506	Col1a1	collagen, type I, alpha 1 [Source:MGI Symbol;Acc:MGI:88467]	-1.01
ENSMUSG00000050368	Hoxd10	homeobox D10 [Source:MGI Symbol;Acc:MGI:96202]	-1.01
ENSMUSG00000062078	Qk	quaking [Source:MGI Symbol;Acc:MGI:97837]	-1.01
ENSMUSG00000025648	Pfkfb4	6-phosphofructo-2-kinase/fructose-2,6-biphosphatase 4 [Source:MGI Symbol;Acc:MGI:2687284]	-1.01
ENSMUSG00000003484	Cyp4f18	cytochrome P450, family 4, subfamily f, polypeptide 18 [Source:MGI Symbol;Acc:MGI:1919304]	-1.01
ENSMUSG00000024330	Col11a2	collagen, type XI, alpha 2 [Source:MGI Symbol;Acc:MGI:88447]	-1.01
ENSMUSG00000087400	Gm15270	predicted gene 15270 [Source:MGI Symbol;Acc:MGI:3705149]	-1.01
ENSMUSG00000030254	Rad18	RAD18 homolog (S. cerevisiae) [Source:MGI Symbol;Acc:MGI:1890476]	-1.01
ENSMUSG00000063458	1700112E06Rik	RIKEN cDNA 1700112E06 gene [Source:MGI Symbol;Acc:MGI:1923883]	-1.01
ENSMUSG00000097855	AC093339.1	--	-1.00
ENSMUSG00000024608	Rps14	ribosomal protein S14 [Source:MGI Symbol;Acc:MGI:98107]	-1.00
ENSMUSG00000054000	Tusc1	tumor suppressor candidate 1 [Source:MGI Symbol;Acc:MGI:2684283]	-1.00
ENSMUSG00000051238	Swsap1	SWIM type zinc finger 7 associated protein 1 [Source:MGI Symbol;Acc:MGI:1914212]	-1.00
ENSMUSG00000002963	Pnkp	polynucleotide kinase 3'-phosphatase [Source:MGI Symbol;Acc:MGI:1891698]	-1.00
ENSMUSG00000040314	Ctsg	cathepsin G [Source:MGI Symbol;Acc:MGI:88563]	-1.00
ENSMUSG00000074604	Mgst2	microsomal glutathione S-transferase 2 [Source:MGI Symbol;Acc:MGI:2448481]	-1.00
ENSMUSG00000038295	Atg9b	autophagy related 9B [Source:MGI Symbol;Acc:MGI:2685420]	-1.00

Supplemental Dataset 2: Genes regulated by DG172 in *Ppard* null BMCs after exposure to ligands from day 2 to day 3 (harvested on day 3; threshold 2-fold change).

stable_id	name	description	logFC
ENSMUSG00000038357	Camp	cathelicidin antimicrobial peptide [Source:MGI Symbol;Acc:MGI:108443]	-6.40
ENSMUSG00000032496	Ltf	lactotransferrin [Source:MGI Symbol;Acc:MGI:96837]	-5.09
ENSMUSG00000052234	Epx	eosinophil peroxidase [Source:MGI Symbol;Acc:MGI:107569]	-4.56
ENSMUSG00000024774	Ankrd22	ankyrin repeat domain 22 [Source:MGI Symbol;Acc:MGI:1277101]	-4.43
ENSMUSG00000032484	Ngp	neutrophilic granule protein [Source:MGI Symbol;Acc:MGI:105983]	-4.04
ENSMUSG00000022651	Retnlg	resistin like gamma [Source:MGI Symbol;Acc:MGI:2667763]	-4.03
ENSMUSG00000052212	Cd177	CD177 antigen [Source:MGI Symbol;Acc:MGI:1916141]	-3.94
ENSMUSG00000056071	S100a9	S100 calcium binding protein A9 (calgranulin B) [Source:MGI Symbol;Acc:MGI:1338947]	-3.92
ENSMUSG00000054169	Ceacam10	carcinoembryonic antigen-related cell adhesion molecule 10 [Source:MGI Symbol;Acc:MGI:1347248]	-3.68
ENSMUSG00000026835	Fcnb	ficolin B [Source:MGI Symbol;Acc:MGI:1341158]	-3.66
ENSMUSG00000031610	Scrg1	scrapie responsive gene 1 [Source:MGI Symbol;Acc:MGI:1328308]	-3.66
ENSMUSG00000056054	S100a8	S100 calcium binding protein A8 (calgranulin A) [Source:MGI Symbol;Acc:MGI:88244]	-3.61
ENSMUSG00000052396	Mogat2	monoacylglycerol O-acyltransferase 2 [Source:MGI Symbol;Acc:MGI:2663253]	-3.49
ENSMUSG00000068587	Mgam	maltase-glucoamylase [Source:MGI Symbol;Acc:MGI:1203495]	-3.44
ENSMUSG00000027072	Prg3	proteoglycan 3 [Source:MGI Symbol;Acc:MGI:1858200]	-3.41
ENSMUSG00000004668	Abca13	ATP-binding cassette, sub-family A (ABC1), member 13 [Source:MGI Symbol;Acc:MGI:2388707]	-3.26
ENSMUSG00000000157	Itgb2l	integrin beta 2-like [Source:MGI Symbol;Acc:MGI:1277979]	-3.22
ENSMUSG00000027474	BC020535	cDNA sequence BC020535 [Source:MGI Symbol;Acc:MGI:2385159]	-3.22
ENSMUSG000000043873	Chi3l7	chitinase 3-like 7 [Source:MGI Symbol;Acc:MGI:2676649]	-3.11
ENSMUSG00000021751	Acox2	acyl-Coenzyme A oxidase 2, branched chain [Source:MGI Symbol;Acc:MGI:1934852]	-3.09
ENSMUSG00000097050	AC163291.1	--	-3.07
ENSMUSG00000027962	Vcam1	vascular cell adhesion molecule 1 [Source:MGI Symbol;Acc:MGI:98926]	-3.03
ENSMUSG00000047641	Krt83	keratin 83 [Source:MGI Symbol;Acc:MGI:3665486]	-3.00
ENSMUSG00000056973	Ces1d	carboxylesterase 1D [Source:MGI Symbol;Acc:MGI:2148202]	-2.84
ENSMUSG00000093973	Mrgpra2a	MAS-related GPR, member A2A [Source:MGI Symbol;Acc:MGI:3821888]	-2.73
ENSMUSG00000096719	Mrgpra2b	MAS-related GPR, member A2B [Source:MGI Symbol;Acc:MGI:3033098]	-2.73
ENSMUSG00000029275	Gfi1	growth factor independent 1 [Source:MGI Symbol;Acc:MGI:103170]	-2.71
ENSMUSG00000011305	Plin5	perilipin 5 [Source:MGI Symbol;Acc:MGI:1914218]	-2.67
ENSMUSG00000040809	Chi3l3	chitinase 3-like 3 [Source:MGI Symbol;Acc:MGI:1330860]	-2.66
ENSMUSG00000027073	Prg2	proteoglycan 2, bone marrow [Source:MGI Symbol;Acc:MGI:103294]	-2.59
ENSMUSG00000064246	Chi3l1	chitinase 3-like 1 [Source:MGI Symbol;Acc:MGI:1340899]	-2.50
ENSMUSG00000036111	Lmo1	LIM domain only 1 [Source:MGI Symbol;Acc:MGI:102812]	-2.50
ENSMUSG00000039960	Rhou	ras homolog gene family, member U [Source:MGI Symbol;Acc:MGI:1916831]	-2.50
ENSMUSG00000037451	Slc22a20	solute carrier family 22 (organic anion transporter), member 20 [Source:MGI Symbol;Acc:MGI:2685809]	-2.47
ENSMUSG00000071256	Zfp213	zinc finger protein 213 [Source:MGI Symbol;Acc:MGI:3053094]	-2.46
ENSMUSG00000020325	Fstl3	follicle-stimulating-like 3 [Source:MGI Symbol;Acc:MGI:1890391]	-2.46
ENSMUSG00000020323	Prss57	protease, serine 57 [Source:MGI Symbol;Acc:MGI:1920356]	-2.46
ENSMUSG00000067615	Krt81	keratin 81 [Source:MGI Symbol;Acc:MGI:1928858]	-2.44
ENSMUSG00000067614	Krt86	keratin 86 [Source:MGI Symbol;Acc:MGI:109362]	-2.44
ENSMUSG00000037095	Lrg1	leucine-rich alpha-2-glycoprotein 1 [Source:MGI Symbol;Acc:MGI:1924155]	-2.43
ENSMUSG00000009633	G0s2	G0/G1 switch gene 2 [Source:MGI Symbol;Acc:MGI:1316737]	-2.35
ENSMUSG00000028356	Ambp	alpha 1 microglobulin/bikunin [Source:MGI Symbol;Acc:MGI:88002]	-2.35
ENSMUSG00000053846	Lipg	lipase, endothelial [Source:MGI Symbol;Acc:MGI:1341803]	-2.32
ENSMUSG00000075420	1110017F19R	RIKEN cDNA 1110017F19 gene [Source:MGI Symbol;Acc:MGI:1915778]	-2.30
ENSMUSG00000005148	Klf5	Kruppel-like factor 5 [Source:MGI Symbol;Acc:MGI:1338056]	-2.27
ENSMUSG00000030413	Pglyrp1	peptidoglycan recognition protein 1 [Source:MGI Symbol;Acc:MGI:1345092]	-2.25
ENSMUSG00000044734	Serpib1a	serine (or cysteine) peptidase inhibitor, clade B, member 1a [Source:MGI Symbol;Acc:MGI:1913472]	-2.24
ENSMUSG00000035085	1700020L24R	RIKEN cDNA 1700020L24 gene [Source:MGI Symbol;Acc:MGI:1913580]	-2.20
ENSMUSG00000020682	Mmp28	matrix metalloproteinase 28 (epilysin) [Source:MGI Symbol;Acc:MGI:2153062]	-2.20
ENSMUSG00000009350	Mpo	myeloperoxidase [Source:MGI Symbol;Acc:MGI:97137]	-2.20

ENSMUSG00000030340	Scnn1a	sodium channel, nonvoltage-gated 1 alpha [Source:MGI Symbol;Acc:MGI:101782]	-2.20
ENSMUSG00000026822	Lcn2	lipocalin 2 [Source:MGI Symbol;Acc:MGI:96757]	-2.17
ENSMUSG00000001739	Cldn15	claudin 15 [Source:MGI Symbol;Acc:MGI:1913103]	-2.15
ENSMUSG00000042367	Gjb3	gap junction protein, beta 3 [Source:MGI Symbol;Acc:MGI:95721]	-2.09
ENSMUSG00000022865	Cxadr	coxsackie virus and adenovirus receptor [Source:MGI Symbol;Acc:MGI:1201679]	-2.06
ENSMUSG00000069873	4930438A08F	RIKEN cDNA 4930438A08 gene [Source:MGI Symbol;Acc:MGI:1921238]	-2.05
ENSMUSG00000029086	Prom1	prominin 1 [Source:MGI Symbol;Acc:MGI:1100886]	-2.05
ENSMUSG00000016194	Hsd11b1	hydroxysteroid 11-beta dehydrogenase 1 [Source:MGI Symbol;Acc:MGI:103562]	-2.04
ENSMUSG00000097210	RP23-397L11.--		-2.02
ENSMUSG00000044465	Fam160a2	family with sequence similarity 160, member A2 [Source:MGI Symbol;Acc:MGI:1921599]	-2.02
ENSMUSG00000079049	Serpib1c	serine (or cysteine) peptidase inhibitor, clade B, member 1c [Source:MGI Symbol;Acc:MGI:2445363]	-2.01
ENSMUSG00000067767	Clec4b2	C-type lectin domain family 4, member b2 [Source:MGI Symbol;Acc:MGI:3588267]	-2.00
ENSMUSG000000004612	Nkg7	natural killer cell group 7 sequence [Source:MGI Symbol;Acc:MGI:1931250]	-1.99
ENSMUSG00000030653	Pde2a	phosphodiesterase 2A, cGMP-stimulated [Source:MGI Symbol;Acc:MGI:2446107]	-1.99
ENSMUSG00000026354	Lct	lactase [Source:MGI Symbol;Acc:MGI:104576]	-1.95
ENSMUSG00000040314	CtsG	cathepsin G [Source:MGI Symbol;Acc:MGI:88563]	-1.94
ENSMUSG00000057729	Prtn3	proteinase 3 [Source:MGI Symbol;Acc:MGI:893580]	-1.90
ENSMUSG00000079339	Gm14446	predicted gene 14446 [Source:MGI Symbol;Acc:MGI:3650685]	-1.86
ENSMUSG00000066760	Psg16	pregnancy specific glycoprotein 16 [Source:MGI Symbol;Acc:MGI:1347249]	-1.86
ENSMUSG00000070858	Gm1673	predicted gene 1673 [Source:MGI Symbol;Acc:MGI:2686519]	-1.85
ENSMUSG00000020125	Elane	elastase, neutrophil expressed [Source:MGI Symbol;Acc:MGI:2679229]	-1.85
ENSMUSG00000025236	Adpgk	ADP-dependent glucokinase [Source:MGI Symbol;Acc:MGI:1919391]	-1.83
ENSMUSG00000059108	Ifitm6	interferon induced transmembrane protein 6 [Source:MGI Symbol;Acc:MGI:2686976]	-1.81
ENSMUSG00000086425	F730016J06R	RIKEN cDNA F730016J06 gene [Source:MGI Symbol;Acc:MGI:2443559]	-1.80
ENSMUSG00000045180	Shroom2	shroom family member 2 [Source:MGI Symbol;Acc:MGI:107194]	-1.80
ENSMUSG00000024681	Ms4a3	membrane-spanning 4-domains, subfamily A, member 3 [Source:MGI Symbol;Acc:MGI:2158468]	-1.77
ENSMUSG00000069805	Fbp1	fructose bisphosphatase 1 [Source:MGI Symbol;Acc:MGI:95492]	-1.74
ENSMUSG00000072720	Myo18b	myosin XVIIIb [Source:MGI Symbol;Acc:MGI:1921626]	-1.73
ENSMUSG00000024644	Cndp2	CNDP dipeptidase 2 (metallopeptidase M20 family) [Source:MGI Symbol;Acc:MGI:1913304]	-1.72
ENSMUSG00000042417	Ccno	cyclin O [Source:MGI Symbol;Acc:MGI:2145534]	-1.72
ENSMUSG00000071562	Stfa1	stefin A1 [Source:MGI Symbol;Acc:MGI:106198]	-1.71
ENSMUSG00000030303	Far2	fatty acyl CoA reductase 2 [Source:MGI Symbol;Acc:MGI:2687035]	-1.69
ENSMUSG00000005533	Igf1r	insulin-like growth factor I receptor [Source:MGI Symbol;Acc:MGI:96433]	-1.68
ENSMUSG00000028476	Reck	reversion-inducing-cysteine-rich protein with kazal motifs [Source:MGI Symbol;Acc:MGI:1855698]	-1.67
ENSMUSG00000045942	BC049762	cDNA sequence BC049762 [Source:MGI Symbol;Acc:MGI:3039622]	-1.66
ENSMUSG00000005474	Myl10	myosin, light chain 10, regulatory [Source:MGI Symbol;Acc:MGI:1891705]	-1.65
ENSMUSG00000023393	Slc17a9	solute carrier family 17, member 9 [Source:MGI Symbol;Acc:MGI:1919107]	-1.63
ENSMUSG00000074604	Mgst2	microsomal glutathione S-transferase 2 [Source:MGI Symbol;Acc:MGI:2448481]	-1.62
ENSMUSG00000025330	Padi4	peptidyl arginine deiminase, type IV [Source:MGI Symbol;Acc:MGI:1338898]	-1.60
ENSMUSG00000017697	Ada	adenosine deaminase [Source:MGI Symbol;Acc:MGI:87916]	-1.58
ENSMUSG00000049907	Ras11b	RAS-like, family 11, member B [Source:MGI Symbol;Acc:MGI:1916189]	-1.57
ENSMUSG00000054905	Stfa3	stefin A3 [Source:MGI Symbol;Acc:MGI:106196]	-1.57
ENSMUSG00000010066	Cacna2d2	calcium channel, voltage-dependent, alpha 2/delta subunit 2 [Source:MGI Symbol;Acc:MGI:1929813]	-1.55
ENSMUSG00000038463	Olfml2b	olfactomedin-like 2B [Source:MGI Symbol;Acc:MGI:2443310]	-1.54
ENSMUSG00000022469	Rapgef3	Rap guanine nucleotide exchange factor (GEF) 3 [Source:MGI Symbol;Acc:MGI:2441741]	-1.54
ENSMUSG00000039196	Orm1	orosomuroid 1 [Source:MGI Symbol;Acc:MGI:97443]	-1.53
ENSMUSG00000033508	Asprv1	aspartic peptidase, retroviral-like 1 [Source:MGI Symbol;Acc:MGI:1915105]	-1.53
ENSMUSG00000091297	Gm8439	predicted gene 8439 [Source:MGI Symbol;Acc:MGI:3648581]	-1.52
ENSMUSG00000052435	Cebpe	CCAAT/enhancer binding protein (C/EBP), epsilon [Source:MGI Symbol;Acc:MGI:103572]	-1.51
ENSMUSG00000079481	Nhs12	NHS-like 2 [Source:MGI Symbol;Acc:MGI:3645090]	-1.49
ENSMUSG00000001506	Col1a1	collagen, type I, alpha 1 [Source:MGI Symbol;Acc:MGI:88467]	-1.49
ENSMUSG00000023185	Ceacam14	carcinoembryonic antigen-related cell adhesion molecule 14 [Source:MGI Symbol;Acc:MGI:1914334]	-1.49
ENSMUSG00000078122	F630028O10F	RIKEN cDNA F630028O10 gene [Source:MGI Symbol;Acc:MGI:3641813]	-1.46
ENSMUSG00000020642	Rnf144a	ring finger protein 144A [Source:MGI Symbol;Acc:MGI:1344401]	-1.46

ENSMUSG00000034723	Tmx4	thioredoxin-related transmembrane protein 4 [Source:MGI Symbol;Acc:MGI:106558]	-1.46
ENSMUSG00000024667	Tmem216	transmembrane protein 216 [Source:MGI Symbol;Acc:MGI:1920020]	-1.45
ENSMUSG00000022555	Dgat1	diacylglycerol O-acyltransferase 1 [Source:MGI Symbol;Acc:MGI:1333825]	-1.45
ENSMUSG00000030747	Dgat2	diacylglycerol O-acyltransferase 2 [Source:MGI Symbol;Acc:MGI:1915050]	-1.43
ENSMUSG00000023852	Chd1	chromodomain helicase DNA binding protein 1 [Source:MGI Symbol;Acc:MGI:88393]	-1.40
ENSMUSG00000049744	Arhgap15	Rho GTPase activating protein 15 [Source:MGI Symbol;Acc:MGI:1923367]	-1.39
ENSMUSG00000040537	Adam22	a disintegrin and metallopeptidase domain 22 [Source:MGI Symbol;Acc:MGI:1340046]	-1.38
ENSMUSG000000097720	AC157950.1	--	-1.38
ENSMUSG00000055102	Zfp819	zinc finger protein 819 [Source:MGI Symbol;Acc:MGI:1921650]	-1.37
ENSMUSG00000031825	Crispld2	cysteine-rich secretory protein LCCL domain containing 2 [Source:MGI Symbol;Acc:MGI:1926142]	-1.35
ENSMUSG00000084758	Gm12798	predicted gene 12798 [Source:MGI Symbol;Acc:MGI:3651483]	-1.35
ENSMUSG00000026589	Sec16b	SEC16 homolog B (S. cerevisiae) [Source:MGI Symbol;Acc:MGI:2148802]	-1.35
ENSMUSG00000004864	Mapk13	mitogen-activated protein kinase 13 [Source:MGI Symbol;Acc:MGI:1346864]	-1.35
ENSMUSG00000028730	Wdr65	WD repeat domain 65 [Source:MGI Symbol;Acc:MGI:2686209]	-1.35
ENSMUSG00000039760	Il22ra2	interleukin 22 receptor, alpha 2 [Source:MGI Symbol;Acc:MGI:2665114]	-1.34
ENSMUSG00000015889	Lta4h	leukotriene A4 hydrolase [Source:MGI Symbol;Acc:MGI:96836]	-1.33
ENSMUSG00000041754	Trem3	triggering receptor expressed on myeloid cells 3 [Source:MGI Symbol;Acc:MGI:1930003]	-1.32
ENSMUSG00000026893	Gca	granalcin [Source:MGI Symbol;Acc:MGI:1918521]	-1.32
ENSMUSG00000059742	Kcnh7	potassium voltage-gated channel, subfamily H (eag-related), member 7 [Source:MGI Symbol;Acc:MGI:2159566]	-1.32
ENSMUSG00000021765	Fst	follistatin [Source:MGI Symbol;Acc:MGI:95586]	-1.32
ENSMUSG00000055639	Dach1	dachshund 1 (Drosophila) [Source:MGI Symbol;Acc:MGI:1277991]	-1.32
ENSMUSG00000030549	Rhcg	Rhesus blood group-associated C glycoprotein [Source:MGI Symbol;Acc:MGI:1888517]	-1.31
ENSMUSG00000031824	RIKEN cDNA 6430548M08	RIKEN cDNA 6430548M08 gene [Source:MGI Symbol;Acc:MGI:2443793]	-1.31
ENSMUSG00000072601	Ear1	eosinophil-associated, ribonuclease A family, member 1 [Source:MGI Symbol;Acc:MGI:108021]	-1.30
ENSMUSG00000072600	Ear-ps9	eosinophil-associated, ribonuclease A family, pseudogene 9 [Source:MGI Symbol;Acc:MGI:3528636]	-1.30
ENSMUSG00000059089	Fcgr4	Fc receptor, IgG, low affinity IV [Source:MGI Symbol;Acc:MGI:2179523]	-1.30
ENSMUSG00000079018	Ly6c1	lymphocyte antigen 6 complex, locus C1 [Source:MGI Symbol;Acc:MGI:96882]	-1.30
ENSMUSG00000022584	Ly6c2	lymphocyte antigen 6 complex, locus C2 [Source:MGI Symbol;Acc:MGI:3712069]	-1.30
ENSMUSG00000031722	Hp	haptoglobin [Source:MGI Symbol;Acc:MGI:96211]	-1.29
ENSMUSG00000046841	Ckap4	cytoskeleton-associated protein 4 [Source:MGI Symbol;Acc:MGI:2444926]	-1.27
ENSMUSG00000051314	Ffar2	free fatty acid receptor 2 [Source:MGI Symbol;Acc:MGI:2441731]	-1.26
ENSMUSG00000075042	4930431P03	RIKEN cDNA 4930431P03 gene [Source:MGI Symbol;Acc:MGI:1921145]	-1.26
ENSMUSG00000046442	Ppm1e	protein phosphatase 1E (PP2C domain containing) [Source:MGI Symbol;Acc:MGI:2444096]	-1.26
ENSMUSG00000038473	Nos1ap	nitric oxide synthase 1 (neuronal) adaptor protein [Source:MGI Symbol;Acc:MGI:1917979]	-1.25
ENSMUSG00000035835	BC005764	cDNA sequence BC005764 [Source:MGI Symbol;Acc:MGI:2388640]	-1.23
ENSMUSG00000019982	Myb	myeloblastosis oncogene [Source:MGI Symbol;Acc:MGI:97249]	-1.23
ENSMUSG00000068348	Gm10238	predicted pseudogene 10238 [Source:MGI Symbol;Acc:MGI:3641620]	-1.23
ENSMUSG00000022707	Gbe1	glucan (1,4-alpha-), branching enzyme 1 [Source:MGI Symbol;Acc:MGI:1921435]	-1.22
ENSMUSG00000014905	Dnajb9	DnaJ (Hsp40) homolog, subfamily B, member 9 [Source:MGI Symbol;Acc:MGI:1351618]	-1.22
ENSMUSG00000090468	Gm5331	predicted gene 5331 [Source:MGI Symbol;Acc:MGI:3647739]	-1.21
ENSMUSG00000034855	Cxcl10	chemokine (C-X-C motif) ligand 10 [Source:MGI Symbol;Acc:MGI:1352450]	-1.19
ENSMUSG00000086522	Gm4473	predicted gene 4473 [Source:MGI Symbol;Acc:MGI:3782657]	-1.19
ENSMUSG00000048142	Nat8l	N-acetyltransferase 8-like [Source:MGI Symbol;Acc:MGI:2447776]	-1.19
ENSMUSG00000027858	Tspan2	tetraspanin 2 [Source:MGI Symbol;Acc:MGI:1917997]	-1.18
ENSMUSG00000021725	Parp8	poly (ADP-ribose) polymerase family, member 8 [Source:MGI Symbol;Acc:MGI:1098713]	-1.18
ENSMUSG00000042439	Zfp532	zinc finger protein 532 [Source:MGI Symbol;Acc:MGI:3036282]	-1.18
ENSMUSG00000037646	Vps13b	vacuolar protein sorting 13B (yeast) [Source:MGI Symbol;Acc:MGI:1916380]	-1.18
ENSMUSG00000022582	Ly6g	lymphocyte antigen 6 complex, locus G [Source:MGI Symbol;Acc:MGI:109440]	-1.18
ENSMUSG00000054582	Pabpc1l	poly(A) binding protein, cytoplasmic 1-like [Source:MGI Symbol;Acc:MGI:1922908]	-1.18
ENSMUSG00000028088	Fmo5	flavin containing monooxygenase 5 [Source:MGI Symbol;Acc:MGI:1310004]	-1.17
ENSMUSG00000039765	Cc2d2a	coiled-coil and C2 domain containing 2A [Source:MGI Symbol;Acc:MGI:1924487]	-1.15
ENSMUSG000000097624	AC154507.1	--	-1.15
ENSMUSG00000026853	Crat	carnitine acetyltransferase [Source:MGI Symbol;Acc:MGI:109501]	-1.14
ENSMUSG00000096958	AL627077.1	--	-1.14

ENSMUSG00000031497	Tnfsf13b	tumor necrosis factor (ligand) superfamily, member 13b [Source:MGI Symbol;Acc:MGI:1344376]	-1.14
ENSMUSG00000026922	Agpat2	1-acylglycerol-3-phosphate O-acyltransferase 2 (lysophosphatidic acid acyltransferase, beta) [Source:MGI Symbol;Acc:MGI:1914762]	-1.13
ENSMUSG00000030199	Etv6	ets variant gene 6 (TEL oncogene) [Source:MGI Symbol;Acc:MGI:109336]	-1.13
ENSMUSG00000037463	Fbxo27	F-box protein 27 [Source:MGI Symbol;Acc:MGI:2685007]	-1.12
ENSMUSG00000084799	Gm11602	predicted gene 11602 [Source:MGI Symbol;Acc:MGI:3651861]	-1.12
ENSMUSG00000096521	Gm13137	predicted gene 13137 [Source:MGI Symbol;Acc:MGI:3649289]	-1.11
ENSMUSG00000060962	Dmkn	dermokine [Source:MGI Symbol;Acc:MGI:1920962]	-1.10
ENSMUSG00000053168	9030619P08R	RIKEN cDNA 9030619P08 gene [Source:MGI Symbol;Acc:MGI:3612405]	-1.10
ENSMUSG00000015880	Ncapg	non-SMC condensin I complex, subunit G [Source:MGI Symbol;Acc:MGI:1930197]	-1.10
ENSMUSG00000032105	Pdzd3	PDZ domain containing 3 [Source:MGI Symbol;Acc:MGI:2429554]	-1.09
ENSMUSG00000092274	Neat1	nuclear paraspeckle assembly transcript 1 (non-protein coding) [Source:MGI Symbol;Acc:MGI:1914211]	-1.09
ENSMUSG00000032514	Ttc21a	tetratricopeptide repeat domain 21A [Source:MGI Symbol;Acc:MGI:1921302]	-1.09
ENSMUSG00000064179	Tnnt1	troponin T1, skeletal, slow [Source:MGI Symbol;Acc:MGI:1333868]	-1.08
ENSMUSG00000078597	Cyp4a12b	cytochrome P450, family 4, subfamily a, polypeptide 12B [Source:MGI Symbol;Acc:MGI:3611747]	-1.08
ENSMUSG00000073002	Vamp5	vesicle-associated membrane protein 5 [Source:MGI Symbol;Acc:MGI:1858622]	-1.08
ENSMUSG00000019951	Uhrf1bp1l	UHRF1 (ICBP90) binding protein 1-like [Source:MGI Symbol;Acc:MGI:2442888]	-1.08
ENSMUSG00000091183	Gm3604	predicted gene 3604 [Source:MGI Symbol;Acc:MGI:3781781]	-1.08
ENSMUSG00000075502	Gm5465	predicted gene 5465 [Source:MGI Symbol;Acc:MGI:3643058]	-1.07
ENSMUSG00000021697	Depdc1b	DEP domain containing 1B [Source:MGI Symbol;Acc:MGI:2145425]	-1.07
ENSMUSG00000024171	Prss28	protease, serine, 28 [Source:MGI Symbol;Acc:MGI:2149951]	-1.07
ENSMUSG00000034353	Ramp1	receptor (calcitonin) activity modifying protein 1 [Source:MGI Symbol;Acc:MGI:1858418]	-1.07
ENSMUSG00000047517	Dmbt1	deleted in malignant brain tumors 1 [Source:MGI Symbol;Acc:MGI:106210]	-1.06
ENSMUSG00000074340	Ovgp1	oviductal glycoprotein 1 [Source:MGI Symbol;Acc:MGI:106661]	-1.06
ENSMUSG00000094676	AC118232.1	--	-1.06
ENSMUSG00000085933	Tmem61	transmembrane protein 61 [Source:MGI Symbol;Acc:MGI:3041156]	-1.06
ENSMUSG00000025375	Aatk	apoptosis-associated tyrosine kinase [Source:MGI Symbol;Acc:MGI:1197518]	-1.06
ENSMUSG00000020034	Tcp11l2	t-complex 11 (mouse) like 2 [Source:MGI Symbol;Acc:MGI:2444679]	-1.05
ENSMUSG00000078783	Gm9733	predicted gene 9733 [Source:MGI Symbol;Acc:MGI:3780136]	-1.05
ENSMUSG00000054855	Rnd1	Rho family GTPase 1 [Source:MGI Symbol;Acc:MGI:2444878]	-1.05
ENSMUSG00000035513	Ntng2	netrin G2 [Source:MGI Symbol;Acc:MGI:2159341]	-1.05
ENSMUSG00000048856	Slc25a47	solute carrier family 25, member 47 [Source:MGI Symbol;Acc:MGI:2144766]	-1.05
ENSMUSG00000063450	Syne2	synaptic nuclear envelope 2 [Source:MGI Symbol;Acc:MGI:2449316]	-1.05
ENSMUSG00000079067	Hmgn2-ps1	high mobility group nucleosomal binding domain 2, pseudogene 1 [Source:MGI Symbol;Acc:MGI:3783162]	-1.04
ENSMUSG00000089665	Fcor	Foxo1 corepressor [Source:MGI Symbol;Acc:MGI:1915484]	-1.04
ENSMUSG00000021699	Pde4d	phosphodiesterase 4D, cAMP specific [Source:MGI Symbol;Acc:MGI:99555]	-1.04
ENSMUSG00000029322	Plac8	placenta-specific 8 [Source:MGI Symbol;Acc:MGI:2445289]	-1.04
ENSMUSG00000038375	Trp53inp2	transformation related protein 53 inducible nuclear protein 2 [Source:MGI Symbol;Acc:MGI:1915978]	-1.04
ENSMUSG00000097453	AC134530.1	--	-1.03
ENSMUSG00000014496	Ankrd28	ankyrin repeat domain 28 [Source:MGI Symbol;Acc:MGI:2145661]	-1.03
ENSMUSG00000095033	U6	U6 spliceosomal RNA [Source:RFAM;Acc:RF00026]	-1.02
ENSMUSG00000022902	Stfa2	stefin A2 [Source:MGI Symbol;Acc:MGI:106197]	-1.02
ENSMUSG00000097589	AC154660.1	--	-1.02
ENSMUSG00000094690	1600014C23F	RIKEN cDNA 1600014C23 gene [Source:MGI Symbol;Acc:MGI:1919490]	-1.02
ENSMUSG00000031112	2610018G03F	RIKEN cDNA 2610018G03 gene [Source:MGI Symbol;Acc:MGI:1917665]	-1.02
ENSMUSG00000096033	AC138594.1	--	-1.02
ENSMUSG00000087255	Gm6985	predicted pseudogene 6985 [Source:MGI Symbol;Acc:MGI:3644316]	-1.01
ENSMUSG00000020846	Fam101b	family with sequence similarity 101, member B [Source:MGI Symbol;Acc:MGI:1923816]	-1.01
ENSMUSG00000024900	Cpt1a	carnitine palmitoyltransferase 1a, liver [Source:MGI Symbol;Acc:MGI:1098296]	-1.01
ENSMUSG00000008136	Fhl2	four and a half LIM domains 2 [Source:MGI Symbol;Acc:MGI:1338762]	-1.01
ENSMUSG00000026675	Hsd17b7	hydroxysteroid (17-beta) dehydrogenase 7 [Source:MGI Symbol;Acc:MGI:1330808]	-1.01
ENSMUSG00000015340	Cybb	cytochrome b-245, beta polypeptide [Source:MGI Symbol;Acc:MGI:88574]	-1.00
ENSMUSG00000022100	Xpo7	exportin 7 [Source:MGI Symbol;Acc:MGI:1929705]	-1.00
ENSMUSG00000092622	Khdc3	KH domain containing 3, subcortical maternal complex member [Source:MGI Symbol;Acc:MGI:1914241]	-1.00

Supplemental Dataset 3: Genes regulated by DG172 in *Ppard* null BMCs after exposure to ligands from day 5 to day 6 (harvested on day 6; threshold 2-fold change).

stable_id	name	description	logFC
ENSMUSG00000079853	Klra1	killer cell lectin-like receptor, subfamily A, member 1 [Source:MGI Symbol;Acc:MGI:101907]	-3.69
ENSMUSG00000078688	Mup2	major urinary protein 2 [Source:MGI Symbol;Acc:MGI:97234]	-3.15
ENSMUSG00000073834	Mup11	major urinary protein 11 [Source:MGI Symbol;Acc:MGI:3709617]	-3.15
ENSMUSG00000073830	Mup14	major urinary protein 14 [Source:MGI Symbol;Acc:MGI:3702005]	-3.15
ENSMUSG00000078675	Mup16	major urinary protein 16 [Source:MGI Symbol;Acc:MGI:3780250]	-3.15
ENSMUSG00000090236	Car15	carbonic anhydrase 15 [Source:MGI Symbol;Acc:MGI:1931324]	-3.03
ENSMUSG00000092470	Gm20518	predicted gene 20518 [Source:MGI Symbol;Acc:MGI:5141983]	-3.03
ENSMUSG00000004768	Rab23	RAB23, member RAS oncogene family [Source:MGI Symbol;Acc:MGI:99833]	-2.91
ENSMUSG00000096632	AC140385.3	--	-2.91
ENSMUSG00000030655	Smg1	SMG1 homolog, phosphatidylinositol 3-kinase-related kinase (<i>C. elegans</i>) [Source:MGI Symbol;Acc:MGI:1919742]	-2.90
ENSMUSG00000032609	Klhdc8b	kelch domain containing 8B [Source:MGI Symbol;Acc:MGI:1925517]	-2.80
ENSMUSG00000026657	Frm4a	FERM domain containing 4A [Source:MGI Symbol;Acc:MGI:1919850]	-2.78
ENSMUSG00000011263	Exoc3I2	exocyst complex component 3-like 2 [Source:MGI Symbol;Acc:MGI:1921713]	-2.74
ENSMUSG00000086013	Gm15706	predicted gene 15706 [Source:MGI Symbol;Acc:MGI:3783146]	-2.64
ENSMUSG00000031684	Slc10a7	solute carrier family 10 (sodium/bile acid cotransporter family), member 7 [Source:MGI Symbol;Acc:MGI:1924025]	-2.63
ENSMUSG00000009828	Ick	intestinal cell kinase [Source:MGI Symbol;Acc:MGI:1934157]	-2.58
ENSMUSG00000096580	AC171501.3	--	-2.55
ENSMUSG00000028804	Csmd2	CUB and Sushi multiple domains 2 [Source:MGI Symbol;Acc:MGI:2386401]	-2.53
ENSMUSG00000042351	Grap2	GRB2-related adaptor protein 2 [Source:MGI Symbol;Acc:MGI:1333842]	-2.51
ENSMUSG00000096609	1700045I11Rik	RIKEN cDNA 1700045I11 gene [Source:MGI Symbol;Acc:MGI:1920600]	-2.48
ENSMUSG00000038623	Tm6sf1	transmembrane 6 superfamily member 1 [Source:MGI Symbol;Acc:MGI:1933209]	-2.45
ENSMUSG00000032425	Zfp949	zinc finger protein 949 [Source:MGI Symbol;Acc:MGI:1918890]	-2.30
ENSMUSG00000069830	Nlrp1a	NLR family, pyrin domain containing 1A [Source:MGI Symbol;Acc:MGI:2684861]	-2.30
ENSMUSG00000074570	Cass4	Cas scaffolding protein family member 4 [Source:MGI Symbol;Acc:MGI:2444482]	-2.30
ENSMUSG00000067274	Rplp0	ribosomal protein, large, P0 [Source:MGI Symbol;Acc:MGI:1927636]	-2.26
ENSMUSG00000097874	AC163298.1	--	-2.20
ENSMUSG00000064043	Trerf1	transcriptional regulating factor 1 [Source:MGI Symbol;Acc:MGI:2442086]	-2.18
ENSMUSG00000020792	Exoc7	exocyst complex component 7 [Source:MGI Symbol;Acc:MGI:1859270]	-2.17
ENSMUSG00000097117	AL645861.1	--	-2.17
ENSMUSG00000045636	Mtus1	mitochondrial tumor suppressor 1 [Source:MGI Symbol;Acc:MGI:2142572]	-2.16
ENSMUSG00000015709	Arnt2	aryl hydrocarbon receptor nuclear translocator 2 [Source:MGI Symbol;Acc:MGI:107188]	-2.14
ENSMUSG00000015968	Cacna1d	calcium channel, voltage-dependent, L type, alpha 1D subunit [Source:MGI Symbol;Acc:MGI:88293]	-2.14
ENSMUSG00000033364	Usp37	ubiquitin specific peptidase 37 [Source:MGI Symbol;Acc:MGI:2442483]	-2.14
ENSMUSG00000039357	Fut11	fucosyltransferase 11 [Source:MGI Symbol;Acc:MGI:1920318]	-2.13
ENSMUSG00000018411	Mapt	microtubule-associated protein tau [Source:MGI Symbol;Acc:MGI:97180]	-2.12
ENSMUSG00000024172	St6gal2	beta galactoside alpha 2,6 sialyltransferase 2 [Source:MGI Symbol;Acc:MGI:2445190]	-2.11
ENSMUSG00000094319	AC153615.1	Uncharacterized protein [Source:UniProtKB/TrEMBL;Acc:J3QMZO]	-2.09
ENSMUSG00000028434	Epb4.1I4b	erythrocyte protein band 4.1-like 4b [Source:MGI Symbol;Acc:MGI:1859149]	-2.03
ENSMUSG00000042873	Lhfp14	lipoma HMGIC fusion partner-like protein 4 [Source:MGI Symbol;Acc:MGI:3057108]	-2.00
ENSMUSG00000085241	Snhg3	small nucleolar RNA host gene (non-protein coding) 3 [Source:MGI Symbol;Acc:MGI:2684817]	-1.99
ENSMUSG00000078651	Aoc2	amine oxidase, copper containing 2 (retina-specific) [Source:MGI Symbol;Acc:MGI:2668431]	-1.99
ENSMUSG00000093530	Vmn1r-ps12	vomer nasal 1 receptor, pseudogene 12 [Source:MGI Symbol;Acc:MGI:3643065]	-1.99
ENSMUSG00000024883	Rin1	Ras and Rab interactor 1 [Source:MGI Symbol;Acc:MGI:2385695]	-1.98
ENSMUSG0000001021	S100a3	S100 calcium binding protein A3 [Source:MGI Symbol;Acc:MGI:1338849]	-1.93
ENSMUSG00000039230	Tbcd	tubulin-specific chaperone d [Source:MGI Symbol;Acc:MGI:1919686]	-1.92
ENSMUSG00000023452	Pisd	phosphatidylserine decarboxylase [Source:MGI Symbol;Acc:MGI:2445114]	-1.92
ENSMUSG00000025500	1600016N20Rik	RIKEN cDNA 1600016N20 gene [Source:MGI Symbol;Acc:MGI:1919250]	-1.91
ENSMUSG00000018341	Il12rb2	interleukin 12 receptor, beta 2 [Source:MGI Symbol;Acc:MGI:1270861]	-1.90
ENSMUSG00000076569	Igkv5-39	immunoglobulin kappa variable 5-39 [Source:MGI Symbol;Acc:MGI:2686255]	-1.88
ENSMUSG00000027198	Ext2	exostoses (multiple) 2 [Source:MGI Symbol;Acc:MGI:108050]	-1.87

ENSMUSG00000032134	Muc16	mucin 16 [Source:MGI Symbol;Acc:MGI:1920982]	-1.86
ENSMUSG00000049922	Slc35c1	solute carrier family 35, member C1 [Source:MGI Symbol;Acc:MGI:2443301]	-1.86
ENSMUSG00000036186	Fam69b	family with sequence similarity 69, member B [Source:MGI Symbol;Acc:MGI:1927576]	-1.86
ENSMUSG00000059336	Slc14a1	solute carrier family 14 (urea transporter), member 1 [Source:MGI Symbol;Acc:MGI:1351654]	-1.84
ENSMUSG00000095741	Rhox2f	reproductive homeobox 2F [Source:MGI Symbol;Acc:MGI:3770275]	-1.83
ENSMUSG00000056155	Nanos3	nanos homolog 3 (Drosophila) [Source:MGI Symbol;Acc:MGI:2675387]	-1.79
ENSMUSG00000055884	Fancm	Fanconi anemia, complementation group M [Source:MGI Symbol;Acc:MGI:2442306]	-1.79
ENSMUSG00000000204	Sifn4	schlafen 4 [Source:MGI Symbol;Acc:MGI:1329010]	-1.79
ENSMUSG00000024426	Atat1	alpha tubulin acetyltransferase 1 [Source:MGI Symbol;Acc:MGI:1913869]	-1.79
ENSMUSG00000094520	Olfir635	olfactory receptor 635 [Source:MGI Symbol;Acc:MGI:3030469]	-1.78
ENSMUSG00000006389	Mpl	myeloproliferative leukemia virus oncogene [Source:MGI Symbol;Acc:MGI:97076]	-1.78
ENSMUSG00000058661	Gm7452	predicted pseudogene 7452 [Source:MGI Symbol;Acc:MGI:3645151]	-1.78
ENSMUSG000000078779	Zfp59	zinc finger protein 59 [Source:MGI Symbol;Acc:MGI:99206]	-1.78
ENSMUSG00000086484	Nron	non-protein coding RNA, repressor of NFAT [Source:MGI Symbol;Acc:MGI:2444126]	-1.77
ENSMUSG00000035200	Chrb4	cholinergic receptor, nicotinic, beta polypeptide 4 [Source:MGI Symbol;Acc:MGI:87892]	-1.77
ENSMUSG00000084038	Gm11295	predicted gene 11295 [Source:MGI Symbol;Acc:MGI:3651595]	-1.77
ENSMUSG00000027505	1700029J11Rik	RIKEN cDNA 1700029J11 gene [Source:MGI Symbol;Acc:MGI:1923676]	-1.76
ENSMUSG00000019935	Slc17a8	solute carrier family 17 (sodium-dependent inorganic phosphate cotransporter), member 8	-1.75
ENSMUSG00000019883	Echdc1	enoyl Coenzyme A hydratase domain containing 1 [Source:MGI Symbol;Acc:MGI:1277169]	-1.75
ENSMUSG00000038876	Rnf146	ring finger protein 146 [Source:MGI Symbol;Acc:MGI:1915281]	-1.75
ENSMUSG00000027384	Ndufaf5	NADH dehydrogenase (ubiquinone) complex I, assembly factor 5 [Source:MGI Symbol;Acc:MGI:1916737]	-1.73
ENSMUSG00000050989	Sepn1	selenoprotein N, 1 [Source:MGI Symbol;Acc:MGI:2151208]	-1.73
ENSMUSG000000074591	Gm410	predicted gene 410 [Source:MGI Symbol;Acc:MGI:2685256]	-1.71
ENSMUSG00000078605	E030025P04Rik	RIKEN cDNA E030025P04 gene [Source:MGI Symbol;Acc:MGI:2685510]	-1.71
ENSMUSG00000082450	Mageb7-ps	melanoma antigen, family B, 7, pseudogene [Source:MGI Symbol;Acc:MGI:2148171]	-1.70
ENSMUSG00000044309	Apol7c	apolipoprotein L 7c [Source:MGI Symbol;Acc:MGI:1920912]	-1.69
ENSMUSG00000025958	Creb1	cAMP responsive element binding protein 1 [Source:MGI Symbol;Acc:MGI:88494]	-1.68
ENSMUSG00000022967	Ifnar1	interferon (alpha and beta) receptor 1 [Source:MGI Symbol;Acc:MGI:107658]	-1.67
ENSMUSG000000072847	A530017D24Rik	RIKEN cDNA A530017D24 gene [Source:MGI Symbol;Acc:MGI:2144320]	-1.67
ENSMUSG00000024286	Ccny	cyclin Y [Source:MGI Symbol;Acc:MGI:1915224]	-1.66
ENSMUSG00000075318	Scn2a1	sodium channel, voltage-gated, type II, alpha 1 [Source:MGI Symbol;Acc:MGI:98248]	-1.66
ENSMUSG00000078619	Smarcd2	SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily d, member 2	-1.66
ENSMUSG00000024901	Peli3	pellino 3 [Source:MGI Symbol;Acc:MGI:1924963]	-1.65
ENSMUSG000000078635	1700028N14Rik	RIKEN cDNA 1700028N14 gene [Source:MGI Symbol;Acc:MGI:1920530]	-1.64
ENSMUSG00000041975	Mettl8	methyltransferase like 8 [Source:MGI Symbol;Acc:MGI:2385142]	-1.64
ENSMUSG00000075420	1110017F19Rik	RIKEN cDNA 1110017F19 gene [Source:MGI Symbol;Acc:MGI:1915778]	-1.64
ENSMUSG00000023972	Ptk7	PTK7 protein tyrosine kinase 7 [Source:MGI Symbol;Acc:MGI:1918711]	-1.63
ENSMUSG00000018042	Cyb5r3	cytochrome b5 reductase 3 [Source:MGI Symbol;Acc:MGI:94893]	-1.62
ENSMUSG000000088088	RNase_MRP	RNase MRP [Source:RFAM;Acc:RF00030]	-1.62
ENSMUSG00000020115	Tbk1	TANK-binding kinase 1 [Source:MGI Symbol;Acc:MGI:1929658]	-1.61
ENSMUSG00000031497	Tnfsf13b	tumor necrosis factor (ligand) superfamily, member 13b [Source:MGI Symbol;Acc:MGI:1344376]	-1.61
ENSMUSG00000055553	Kxd1	KxDL motif containing 1 [Source:MGI Symbol;Acc:MGI:1922870]	-1.61
ENSMUSG00000089992	G6pd2	glucose-6-phosphate dehydrogenase 2 [Source:MGI Symbol;Acc:MGI:105977]	-1.60
ENSMUSG000000036151	Tm6sf2	transmembrane 6 superfamily member 2 [Source:MGI Symbol;Acc:MGI:1933210]	-1.60
ENSMUSG00000091363	Gm7701	predicted gene 7701 [Source:MGI Symbol;Acc:MGI:3646506]	-1.60
ENSMUSG00000094126	AC073565.3	--	-1.59
ENSMUSG00000079339	Gm14446	predicted gene 14446 [Source:MGI Symbol;Acc:MGI:3650685]	-1.59
ENSMUSG00000089963	Gm14555	predicted gene 14555 [Source:MGI Symbol;Acc:MGI:3709647]	-1.57
ENSMUSG000000094102	AC073563.1	--	-1.56
ENSMUSG00000001089	Luzp1	leucine zipper protein 1 [Source:MGI Symbol;Acc:MGI:107629]	-1.55
ENSMUSG00000070856	Olfir1115	olfactory receptor 1115 [Source:MGI Symbol;Acc:MGI:3030949]	-1.53
ENSMUSG00000036279	Zbtb20	zinc finger and BTB domain containing 20 [Source:MGI Symbol;Acc:MGI:1929213]	-1.53
ENSMUSG00000031714	Gab1	growth factor receptor bound protein 2-associated protein 1 [Source:MGI Symbol;Acc:MGI:108088]	-1.53
ENSMUSG00000024908	Ppp6r3	protein phosphatase 6, regulatory subunit 3 [Source:MGI Symbol;Acc:MGI:1921807]	-1.52

ENSMUSG00000045333	Zfp423	zinc finger protein 423 [Source:MGI Symbol;Acc:MGI:1891217]	-1.52
ENSMUSG00000022550	Adck5	aarF domain containing kinase 5 [Source:MGI Symbol;Acc:MGI:2679274]	-1.52
ENSMUSG000000087461	C230014O12Rik	RIKEN cDNA C230014O12 gene [Source:MGI Symbol;Acc:MGI:3045377]	-1.51
ENSMUSG00000048406	B330016D10Rik	RIKEN cDNA B330016D10 gene [Source:MGI Symbol;Acc:MGI:2444063]	-1.49
ENSMUSG000000031349	Nsdhl	NAD(P) dependent steroid dehydrogenase-like [Source:MGI Symbol;Acc:MGI:1099438]	-1.49
ENSMUSG00000035984	Nme5	NME/NM23 family member 5 [Source:MGI Symbol;Acc:MGI:1922783]	-1.49
ENSMUSG00000020652	Cenpo	centromere protein O [Source:MGI Symbol;Acc:MGI:1923800]	-1.48
ENSMUSG000000028532	Cachd1	cache domain containing 1 [Source:MGI Symbol;Acc:MGI:2444177]	-1.48
ENSMUSG000000061210	Olf47	olfactory receptor 47 [Source:MGI Symbol;Acc:MGI:1333821]	-1.47
ENSMUSG000000033610	Pank1	pantothenate kinase 1 [Source:MGI Symbol;Acc:MGI:1922985]	-1.47
ENSMUSG000000057729	Prtn3	proteinase 3 [Source:MGI Symbol;Acc:MGI:893580]	-1.47
ENSMUSG000000039798	2600006K01Rik	RIKEN cDNA 2600006K01 gene [Source:MGI Symbol;Acc:MGI:1917569]	-1.46
ENSMUSG000000063260	Syt10	synaptotagmin X [Source:MGI Symbol;Acc:MGI:1859546]	-1.45
ENSMUSG00000075529	BC028471	cDNA sequence BC028471 [Source:MGI Symbol;Acc:MGI:3041249]	-1.45
ENSMUSG00000025158	Rfng	RFNG O-fucosylpeptide 3-beta-N-acetylglucosaminyltransferase [Source:MGI Symbol;Acc:MGI:894275]	-1.44
ENSMUSG000000095706	Olf209	olfactory receptor 209 [Source:MGI Symbol;Acc:MGI:3030043]	-1.44
ENSMUSG00000028088	Fmo5	flavin containing monooxygenase 5 [Source:MGI Symbol;Acc:MGI:1310004]	-1.43
ENSMUSG000000038463	Olfml2b	olfactomedin-like 2B [Source:MGI Symbol;Acc:MGI:2443310]	-1.43
ENSMUSG000000086807	C330013F16Rik	RIKEN cDNA C330013F16 gene [Source:MGI Symbol;Acc:MGI:1925776]	-1.43
ENSMUSG000000052957	Gas1	growth arrest specific 1 [Source:MGI Symbol;Acc:MGI:95655]	-1.42
ENSMUSG000000020812	1810032O08Rik	RIKEN cDNA 1810032O08 gene [Source:MGI Symbol;Acc:MGI:1913543]	-1.42
ENSMUSG000000037451	Slc22a20	solute carrier family 22 (organic anion transporter), member 20 [Source:MGI Symbol;Acc:MGI:2685809]	-1.42
ENSMUSG000000079071	Gm14085	predicted gene 14085 [Source:MGI Symbol;Acc:MGI:3702173]	-1.42
ENSMUSG000000029247	Paics	phosphoribosylaminoimidazole carboxylase, phosphoribosylaminoribosylaminoimidazole, succinocarboxamide synthetase	-1.42
ENSMUSG00000026825	Dnm1	dynamain 1 [Source:MGI Symbol;Acc:MGI:107384]	-1.41
ENSMUSG000000063358	Mapk1	mitogen-activated protein kinase 1 [Source:MGI Symbol;Acc:MGI:1346858]	-1.40
ENSMUSG000000041735	Gm13178	predicted gene 13178 [Source:MGI Symbol;Acc:MGI:3650721]	-1.40
ENSMUSG000000097365	AC140312.1	--	-1.39
ENSMUSG000000034105	4632415K11Rik	RIKEN cDNA 4632415K11 gene [Source:MGI Symbol;Acc:MGI:1921597]	-1.39
ENSMUSG000000062151	Unc13c	unc-13 homolog C (C. elegans) [Source:MGI Symbol;Acc:MGI:2149021]	-1.39
ENSMUSG000000076563	Igkv5-48	immunoglobulin kappa variable 5-48 [Source:MGI Symbol;Acc:MGI:3642817]	-1.39
ENSMUSG000000030292	1700023A16Rik	RIKEN cDNA 1700023A16 gene [Source:MGI Symbol;Acc:MGI:1916621]	-1.38
ENSMUSG000000094433	AC155333.2	--	-1.38
ENSMUSG000000020331	Hcn2	hyperpolarization-activated, cyclic nucleotide-gated K+ 2 [Source:MGI Symbol;Acc:MGI:1298210]	-1.38
ENSMUSG00000028842	Eif2c3	eukaryotic translation initiation factor 2C, 3 [Source:MGI Symbol;Acc:MGI:2446634]	-1.38
ENSMUSG000000077001	Mir544	microRNA 544 [Source:MGI Symbol;Acc:MGI:3718547]	-1.38
ENSMUSG00000010601	Apol7a	apolipoprotein L 7a [Source:MGI Symbol;Acc:MGI:1923011]	-1.37
ENSMUSG000000074406	Zfp628	zinc finger protein 628 [Source:MGI Symbol;Acc:MGI:2665174]	-1.37
ENSMUSG000000061490	Ube2d4	ubiquitin-conjugating enzyme E2D 4 [Source:MGI Symbol;Acc:MGI:3644823]	-1.37
ENSMUSG00000024900	Cpt1a	carnitine palmitoyltransferase 1a, liver [Source:MGI Symbol;Acc:MGI:1098296]	-1.37
ENSMUSG000000051802	Krtap19-5	keratin associated protein 19-5 [Source:MGI Symbol;Acc:MGI:1330295]	-1.37
ENSMUSG000000058626	Capn11	calpain 11 [Source:MGI Symbol;Acc:MGI:1352490]	-1.36
ENSMUSG000000086494	2210417A02Rik	RIKEN cDNA 2210417A02 gene [Source:MGI Symbol;Acc:MGI:1917388]	-1.36
ENSMUSG0000000031782	Coq9	coenzyme Q9 homolog (yeast) [Source:MGI Symbol;Acc:MGI:1915164]	-1.36
ENSMUSG00000028262	Clca2	chloride channel calcium activated 2 [Source:MGI Symbol;Acc:MGI:1931471]	-1.35
ENSMUSG000000053333	Dis3l2	DIS3 mitotic control homolog (S. cerevisiae)-like 2 [Source:MGI Symbol;Acc:MGI:2442555]	-1.35
ENSMUSG00000020079	Supv31	suppressor of var1, 3-like 1 (S. cerevisiae) [Source:MGI Symbol;Acc:MGI:2441711]	-1.35
ENSMUSG000000070524	Fcrlb	Fc receptor-like B [Source:MGI Symbol;Acc:MGI:3576487]	-1.35
ENSMUSG000000010529	Gm266	predicted gene 266 [Source:MGI Symbol;Acc:MGI:2685112]	-1.35
ENSMUSG000000037661	Gpr160	G protein-coupled receptor 160 [Source:MGI Symbol;Acc:MGI:1919112]	-1.35
ENSMUSG000000034071	Zfp551	zinc finger protein 551 [Source:MGI Symbol;Acc:MGI:3588205]	-1.34
ENSMUSG000000026565	Pou2f1	POU domain, class 2, transcription factor 1 [Source:MGI Symbol;Acc:MGI:101898]	-1.34
ENSMUSG000000038347	Tcte2	t-complex-associated testis expressed 2 [Source:MGI Symbol;Acc:MGI:98641]	-1.33
ENSMUSG000000085705	Gm16046	predicted gene 16046 [Source:MGI Symbol;Acc:MGI:3802093]	-1.33

ENSMUSG00000029205	Chrna9	cholinergic receptor, nicotinic, alpha polypeptide 9 [Source:MGI Symbol;Acc:MGI:1202403]	-1.33
ENSMUSG00000075609	Gm7935	predicted pseudogene 7935 [Source:MGI Symbol;Acc:MGI:3646370]	-1.33
ENSMUSG000000083798	Gm14584	predicted gene 14584 [Source:MGI Symbol;Acc:MGI:3705780]	-1.33
ENSMUSG00000045337	Defb11	defensin beta 11 [Source:MGI Symbol;Acc:MGI:2179197]	-1.33
ENSMUSG000000037243	Zfp692	zinc finger protein 692 [Source:MGI Symbol;Acc:MGI:2144276]	-1.33
ENSMUSG00000022812	Gsk3b	glycogen synthase kinase 3 beta [Source:MGI Symbol;Acc:MGI:1861437]	-1.33
ENSMUSG00000054779	Gm12541	predicted gene 12541 [Source:MGI Symbol;Acc:MGI:3649376]	-1.32
ENSMUSG000000070641	Gm16410	predicted gene 16410 [Source:MGI Symbol;Acc:MGI:3648382]	-1.32
ENSMUSG00000016756	Cmah	cytidine monophospho-N-acetylneuraminic acid hydroxylase [Source:MGI Symbol;Acc:MGI:103227]	-1.32
ENSMUSG00000000149	Gna12	guanine nucleotide binding protein, alpha 12 [Source:MGI Symbol;Acc:MGI:95767]	-1.31
ENSMUSG00000024335	Brd2	bromodomain containing 2 [Source:MGI Symbol;Acc:MGI:99495]	-1.31
ENSMUSG00000032356	Rasgrf1	RAS protein-specific guanine nucleotide-releasing factor 1 [Source:MGI Symbol;Acc:MGI:99694]	-1.31
ENSMUSG000000082061	Gm12726	predicted gene 12726 [Source:MGI Symbol;Acc:MGI:3649291]	-1.31
ENSMUSG00000023913	Pla2g7	phospholipase A2, group VII (platelet-activating factor acetylhydrolase, plasma) [Source:MGI Symbol;Acc:MGI:1351327]	-1.31
ENSMUSG00000045440	Insm2	insulinoma-associated 2 [Source:MGI Symbol;Acc:MGI:1930787]	-1.30
ENSMUSG00000023795	Pisd-ps2	phosphatidylserine decarboxylase, pseudogene 2 [Source:MGI Symbol;Acc:MGI:3612472]	-1.29
ENSMUSG00000038957	Edc3	enhancer of mRNA decapping 3 homolog (S. cerevisiae) [Source:MGI Symbol;Acc:MGI:2142951]	-1.29
ENSMUSG00000027551	Zfp64	zinc finger protein 64 [Source:MGI Symbol;Acc:MGI:107342]	-1.29
ENSMUSG00000033765	Calm4	calmodulin 4 [Source:MGI Symbol;Acc:MGI:1931464]	-1.29
ENSMUSG00000039218	Srrm2	serine/arginine repetitive matrix 2 [Source:MGI Symbol;Acc:MGI:1923206]	-1.29
ENSMUSG00000028005	Gucy1b3	guanylate cyclase 1, soluble, beta 3 [Source:MGI Symbol;Acc:MGI:1860604]	-1.29
ENSMUSG00000006920	Ezh1	enhancer of zeste homolog 1 (Drosophila) [Source:MGI Symbol;Acc:MGI:1097695]	-1.28
ENSMUSG00000054452	Aes	amino-terminal enhancer of split [Source:MGI Symbol;Acc:MGI:95806]	-1.27
ENSMUSG00000026456	Cyb5r1	cytochrome b5 reductase 1 [Source:MGI Symbol;Acc:MGI:1919267]	-1.27
ENSMUSG00000001420	Tmem79	transmembrane protein 79 [Source:MGI Symbol;Acc:MGI:1919163]	-1.27
ENSMUSG000000031758	Cdy12	chromodomain protein, Y chromosome-like 2 [Source:MGI Symbol;Acc:MGI:1923046]	-1.27
ENSMUSG00000044617	Zbtb39	zinc finger and BTB domain containing 39 [Source:MGI Symbol;Acc:MGI:2443316]	-1.25
ENSMUSG00000040584	Abcb1a	ATP-binding cassette, sub-family B (MDR/TAP), member 1A [Source:MGI Symbol;Acc:MGI:97570]	-1.25
ENSMUSG000000079608	Stard6	StAR-related lipid transfer (START) domain containing 6 [Source:MGI Symbol;Acc:MGI:2156774]	-1.24
ENSMUSG00000049649	Gpr3	G-protein coupled receptor 3 [Source:MGI Symbol;Acc:MGI:101908]	-1.24
ENSMUSG00000028865	Cd164l2	CD164 sialomucin-like 2 [Source:MGI Symbol;Acc:MGI:1916905]	-1.24
ENSMUSG00000061988	Rpl10a-ps2	ribosomal protein L10A, pseudogene 2 [Source:MGI Symbol;Acc:MGI:3646227]	-1.24
ENSMUSG00000060988	Galnt13	UDP-N-acetyl-alpha-D-galactosamine:polypeptide N-acetylgalactosaminyltransferase 13 [Source:MGI Symbol;Acc:MGI:2139447]	-1.24
ENSMUSG000000097926	RP23-345J21.2	--	-1.24
ENSMUSG00000076591	Igkv8-16	immunoglobulin kappa variable 8-16 [Source:MGI Symbol;Acc:MGI:1330843]	-1.24
ENSMUSG00000061048	Cdh3	cadherin 3 [Source:MGI Symbol;Acc:MGI:88356]	-1.23
ENSMUSG00000074771	Ankrd5	ankyrin repeat domain 5 [Source:MGI Symbol;Acc:MGI:2441685]	-1.23
ENSMUSG00000017914	BC034902	cDNA sequence BC034902 [Source:MGI Symbol;Acc:MGI:2677839]	-1.23
ENSMUSG000000078164	Gm4392	predicted gene 4392 [Source:MGI Symbol;Acc:MGI:3782577]	-1.23
ENSMUSG00000038077	Kcna6	potassium voltage-gated channel, shaker-related, subfamily, member 6 [Source:MGI Symbol;Acc:MGI:96663]	-1.23
ENSMUSG00000032561	Acpp	acid phosphatase, prostate [Source:MGI Symbol;Acc:MGI:1928480]	-1.23
ENSMUSG00000022102	Dok2	docking protein 2 [Source:MGI Symbol;Acc:MGI:1332623]	-1.23
ENSMUSG00000044430	Klk12	kallikrein related-peptidase 12 [Source:MGI Symbol;Acc:MGI:1916761]	-1.22
ENSMUSG00000055704	Gm9978	predicted gene 9978 [Source:MGI Symbol;Acc:MGI:3641806]	-1.22
ENSMUSG00000044997	E130304I02Rik	RIKEN cDNA E130304I02 gene [Source:MGI Symbol;Acc:MGI:1925797]	-1.22
ENSMUSG00000074695	Il22	interleukin 22 [Source:MGI Symbol;Acc:MGI:1355307]	-1.22
ENSMUSG00000090461	Il1f1b	interleukin 10-related T cell-derived inducible factor beta [Source:MGI Symbol;Acc:MGI:2151139]	-1.22
ENSMUSG00000033430	Terf2ip	telomeric repeat binding factor 2, interacting protein [Source:MGI Symbol;Acc:MGI:1929871]	-1.22
ENSMUSG00000041670	Rims1	regulating synaptic membrane exocytosis 1 [Source:MGI Symbol;Acc:MGI:2152971]	-1.22
ENSMUSG00000031214	Ophn1	oligophrenin 1 [Source:MGI Symbol;Acc:MGI:2151070]	-1.22
ENSMUSG00000036045	Gm12221	predicted gene 12221 [Source:MGI Symbol;Acc:MGI:3649330]	-1.21
ENSMUSG00000026115	Vwa3b	von Willebrand factor A domain containing 3B [Source:MGI Symbol;Acc:MGI:1918103]	-1.21
ENSMUSG00000051427	Ccdc157	coiled-coil domain containing 157 [Source:MGI Symbol;Acc:MGI:3041210]	-1.21
ENSMUSG00000040797	lqsec3	IQ motif and Sec7 domain 3 [Source:MGI Symbol;Acc:MGI:2677208]	-1.20

ENSMUSG00000028152	Tspan5	tetraspanin 5 [Source:MGI Symbol;Acc:MGI:1928096]	-1.20
ENSMUSG00000026429	Ube2t	ubiquitin-conjugating enzyme E2T (putative) [Source:MGI Symbol;Acc:MGI:1914446]	-1.20
ENSMUSG00000024295	Cyp4f41-ps	cytochrome P450, family 4, subfamily f, polypeptide 41 pseudogene [Source:MGI Symbol;Acc:MGI:1925125]	-1.20
ENSMUSG00000097209	AC115763.1	--	-1.20
ENSMUSG00000027936	Crtc2	CREB regulated transcription coactivator 2 [Source:MGI Symbol;Acc:MGI:1921593]	-1.20
ENSMUSG00000027488	Snta1	syntrophin, acidic 1 [Source:MGI Symbol;Acc:MGI:101772]	-1.20
ENSMUSG00000034243	Golgb1	golgi autoantigen, golgin subfamily b, macrogolgin 1 [Source:MGI Symbol;Acc:MGI:1099447]	-1.19
ENSMUSG00000078096	Golgb1	golgi autoantigen, golgin subfamily b, macrogolgin 1 [Source:MGI Symbol;Acc:MGI:1099447]	-1.19
ENSMUSG00000093656	Gm20628	predicted gene 20628 [Source:MGI Symbol;Acc:MGI:5313075]	-1.19
ENSMUSG00000044923	Olf1030	olfactory receptor 1030 [Source:MGI Symbol;Acc:MGI:3030864]	-1.19
ENSMUSG00000097621	AC163355.1	--	-1.19
ENSMUSG00000067338	Tuba3b	tubulin, alpha 3B [Source:MGI Symbol;Acc:MGI:1095408]	-1.18
ENSMUSG00000073962	Olf576	olfactory receptor 576 [Source:MGI Symbol;Acc:MGI:3030410]	-1.18
ENSMUSG00000094075	AC160990.1	--	-1.18
ENSMUSG00000038406	Scaf1	SR-related CTD-associated factor 1 [Source:MGI Symbol;Acc:MGI:2141980]	-1.18
ENSMUSG00000024970	Al846148	expressed sequence Al846148 [Source:MGI Symbol;Acc:MGI:2147611]	-1.18
ENSMUSG00000083145	Gm12579	predicted gene 12579 [Source:MGI Symbol;Acc:MGI:3651711]	-1.18
ENSMUSG00000004530	Coro1c	coronin, actin binding protein 1C [Source:MGI Symbol;Acc:MGI:1345964]	-1.18
ENSMUSG00000074634	Gm7120	predicted gene 7120 [Source:MGI Symbol;Acc:MGI:3648543]	-1.18
ENSMUSG00000094114	GM7120	Transmembrane protein C5orf28 homolog [Source:UniProtKB/Swiss-Prot;Acc:Q8VDR5]	-1.18
ENSMUSG00000029671	Wnt16	wingless-related MMTV integration site 16 [Source:MGI Symbol;Acc:MGI:2136018]	-1.17
ENSMUSG00000024163	Mapk8ip3	mitogen-activated protein kinase 8 interacting protein 3 [Source:MGI Symbol;Acc:MGI:1353598]	-1.17
ENSMUSG00000027651	Rprd1b	regulation of nuclear pre-mRNA domain containing 1B [Source:MGI Symbol;Acc:MGI:1917720]	-1.17
ENSMUSG00000027540	Ptpn1	protein tyrosine phosphatase, non-receptor type 1 [Source:MGI Symbol;Acc:MGI:97805]	-1.17
ENSMUSG00000041037	Irgq	immunity-related GTPase family, Q [Source:MGI Symbol;Acc:MGI:2667176]	-1.17
ENSMUSG00000050222	Il17d	interleukin 17D [Source:MGI Symbol;Acc:MGI:2446510]	-1.16
ENSMUSG00000024735	Prpf19	PRP19/PSO4 pre-mRNA processing factor 19 homolog (S. cerevisiae) [Source:MGI Symbol;Acc:MGI:106247]	-1.16
ENSMUSG00000045409	Trim39	tripartite motif-containing 39 [Source:MGI Symbol;Acc:MGI:1890659]	-1.16
ENSMUSG00000029581	Fscn1	fascin homolog 1, actin bundling protein (Strongylocentrotus purpuratus) [Source:MGI Symbol;Acc:MGI:1352745]	-1.16
ENSMUSG00000078504	Gm438	predicted gene 438 [Source:MGI Symbol;Acc:MGI:2685284]	-1.16
ENSMUSG00000032496	Ltf	lactotransferrin [Source:MGI Symbol;Acc:MGI:96837]	-1.16
ENSMUSG00000045999	AY036118	cDNA sequence AY036118 [Source:MGI Symbol;Acc:MGI:2158419]	-1.16
ENSMUSG00000037307	Banf2	barrier to autointegration factor 2 [Source:MGI Symbol;Acc:MGI:2684961]	-1.16
ENSMUSG000000086211	Gm12462	predicted gene 12462 [Source:MGI Symbol;Acc:MGI:3650646]	-1.15
ENSMUSG00000026024	Als2	amyotrophic lateral sclerosis 2 (juvenile) [Source:MGI Symbol;Acc:MGI:1921268]	-1.15
ENSMUSG00000089676	B230217C12Rik	RIKEN cDNA B230217C12 gene [Source:MGI Symbol;Acc:MGI:1915377]	-1.15
ENSMUSG00000050538	B230217C12Rik	RIKEN cDNA B230217C12 gene [Source:MGI Symbol;Acc:MGI:1915377]	-1.15
ENSMUSG00000080989	Gm14048	predicted gene 14048 [Source:MGI Symbol;Acc:MGI:3650660]	-1.15
ENSMUSG000000033080	Vsx1	visual system homeobox 1 homolog (zebrafish) [Source:MGI Symbol;Acc:MGI:1890816]	-1.15
ENSMUSG00000021557	Agtppb1	ATP/GTP binding protein 1 [Source:MGI Symbol;Acc:MGI:2159437]	-1.14
ENSMUSG00000025792	Slc25a10	solute carrier family 25 (mitochondrial carrier, dicarboxylate transporter), member 10 [Source:MGI Symbol;Acc:MGI:1353497]	-1.14
ENSMUSG00000030753	Prkrir	protein-kinase, interferon-inducible double stranded RNA dependent inhibitor, repressor of (P58 repressor)	-1.14
ENSMUSG00000041328	Pcf11	cleavage and polyadenylation factor subunit homolog (S. cerevisiae) [Source:MGI Symbol;Acc:MGI:1919579]	-1.14
ENSMUSG000000032511	Scn5a	sodium channel, voltage-gated, type V, alpha [Source:MGI Symbol;Acc:MGI:98251]	-1.14
ENSMUSG00000028109	Hormad1	HORMA domain containing 1 [Source:MGI Symbol;Acc:MGI:1915231]	-1.13
ENSMUSG00000028433	Ubap2	ubiquitin-associated protein 2 [Source:MGI Symbol;Acc:MGI:1916176]	-1.13
ENSMUSG00000084798	4930533B01Rik	RIKEN cDNA 4930533B01 gene [Source:MGI Symbol;Acc:MGI:1922416]	-1.13
ENSMUSG00000078249	Hmga1-rs1	high mobility group AT-hook I, related sequence 1 [Source:MGI Symbol;Acc:MGI:96161]	-1.13
ENSMUSG000000046711	Hmga1	high mobility group AT-hook 1 [Source:MGI Symbol;Acc:MGI:96160]	-1.13
ENSMUSG00000074847	Gm10775	predicted gene 10775 [Source:MGI Symbol;Acc:MGI:3642324]	-1.13
ENSMUSG00000034066	Farp2	FERM, RhoGEF and pleckstrin domain protein 2 [Source:MGI Symbol;Acc:MGI:2385126]	-1.12
ENSMUSG00000046854	Pip5k1	phosphatidylinositol-4-phosphate 5-kinase-like 1 [Source:MGI Symbol;Acc:MGI:2448520]	-1.12
ENSMUSG00000025195	Dnmbp	dynamin binding protein [Source:MGI Symbol;Acc:MGI:1917352]	-1.12
ENSMUSG00000006456	Rbm14	RNA binding motif protein 14 [Source:MGI Symbol;Acc:MGI:1929092]	-1.12

ENSMUSG00000022095	Fam160b2	family with sequence similarity 160, member B2 [Source:MGI Symbol;Acc:MGI:3036290]	-1.12
ENSMUSG00000024843	Chka	choline kinase alpha [Source:MGI Symbol;Acc:MGI:107760]	-1.12
ENSMUSG00000016255	Tubb1	tubulin, beta 1 class VI [Source:MGI Symbol;Acc:MGI:107814]	-1.11
ENSMUSG00000045968	5830403L16Rik	RIKEN cDNA 5830403L16 gene [Source:MGI Symbol;Acc:MGI:1923273]	-1.11
ENSMUSG00000026439	Rbbp5	retinoblastoma binding protein 5 [Source:MGI Symbol;Acc:MGI:1918367]	-1.11
ENSMUSG00000027801	Tm4sf4	transmembrane 4 superfamily member 4 [Source:MGI Symbol;Acc:MGI:2385173]	-1.11
ENSMUSG000000081272	Gm13509	predicted gene 13509 [Source:MGI Symbol;Acc:MGI:3649640]	-1.11
ENSMUSG000000033282	Rpgrip1l	Rpgrip1-like [Source:MGI Symbol;Acc:MGI:1920563]	-1.11
ENSMUSG00000022617	Chkb	choline kinase beta [Source:MGI Symbol;Acc:MGI:1328313]	-1.11
ENSMUSG00000078937	Cpt1b	carnitine palmitoyltransferase 1b, muscle [Source:MGI Symbol;Acc:MGI:1098297]	-1.11
ENSMUSG00000095463	ENTPD4	Ectonucleoside triphosphate diphosphohydrolase 4 [Source:UniProtKB/Swiss-Prot;Acc:Q9DBT4]	-1.11
ENSMUSG00000022066	Entpd4	ectonucleoside triphosphate diphosphohydrolase 4 [Source:MGI Symbol;Acc:MGI:1914714]	-1.11
ENSMUSG000000095669	ENTPD4	Entpd4 protein; Uncharacterized protein [Source:UniProtKB/TrEMBL;Acc:Q80WR8]	-1.11
ENSMUSG00000020668	Kif3c	kinesin family member 3C [Source:MGI Symbol;Acc:MGI:107979]	-1.11
ENSMUSG00000038888	Ctu1	cytosolic thiouridylase subunit 1 homolog (S. pombe) [Source:MGI Symbol;Acc:MGI:2385277]	-1.11
ENSMUSG00000016028	Celsr1	cadherin, EGF LAG seven-pass G-type receptor 1 (flamingo homolog, Drosophila) [Source:MGI Symbol;Acc:MGI:1100883]	-1.11
ENSMUSG00000041920	Slc16a6	solute carrier family 16 (monocarboxylic acid transporters), member 6 [Source:MGI Symbol;Acc:MGI:2144585]	-1.10
ENSMUSG000000028465	Tln1	talin 1 [Source:MGI Symbol;Acc:MGI:1099832]	-1.10
ENSMUSG00000041889	Shisa4	shisa homolog 4 (Xenopus laevis) [Source:MGI Symbol;Acc:MGI:1924802]	-1.10
ENSMUSG00000015711	Prune	prune homolog (Drosophila) [Source:MGI Symbol;Acc:MGI:1925152]	-1.10
ENSMUSG000000096014	Sox1	SRY-box containing gene 1 [Source:MGI Symbol;Acc:MGI:98357]	-1.10
ENSMUSG00000027630	Tbl1xr1	transducin (beta)-like 1X-linked receptor 1 [Source:MGI Symbol;Acc:MGI:2441730]	-1.09
ENSMUSG000000026835	Fcnb	ficolin B [Source:MGI Symbol;Acc:MGI:1341158]	-1.09
ENSMUSG00000072774	Zfp951	zinc finger protein 951 [Source:MGI Symbol;Acc:MGI:2441896]	-1.09
ENSMUSG00000037896	Rcor1	REST corepressor 1 [Source:MGI Symbol;Acc:MGI:106340]	-1.09
ENSMUSG00000028794	A3gal2	alpha 1,3-galactosyltransferase 2 (isoglobotriaosylceramide synthase) [Source:MGI Symbol;Acc:MGI:2685279]	-1.09
ENSMUSG00000047053	Teddm1	transmembrane epididymal protein 1 [Source:MGI Symbol;Acc:MGI:2668439]	-1.09
ENSMUSG000000052833	Sae1	SUMO1 activating enzyme subunit 1 [Source:MGI Symbol;Acc:MGI:1929264]	-1.09
ENSMUSG000000040462	Os9	amplified in osteosarcoma [Source:MGI Symbol;Acc:MGI:1924301]	-1.08
ENSMUSG00000097732	AC122821.2	--	-1.08
ENSMUSG000000021733	Slc4a7	solute carrier family 4, sodium bicarbonate cotransporter, member 7 [Source:MGI Symbol;Acc:MGI:2443878]	-1.08
ENSMUSG000000051910	Sox6	SRY-box containing gene 6 [Source:MGI Symbol;Acc:MGI:98368]	-1.08
ENSMUSG00000028460	Sit1	suppression inducing transmembrane adaptor 1 [Source:MGI Symbol;Acc:MGI:1889342]	-1.08
ENSMUSG000000052837	Junb	Jun-B oncogene [Source:MGI Symbol;Acc:MGI:96647]	-1.08
ENSMUSG00000022957	Itns1	intersectin 1 (SH3 domain protein 1A) [Source:MGI Symbol;Acc:MGI:1338069]	-1.08
ENSMUSG00000024277	Mapre2	microtubule-associated protein, RP/EB family, member 2 [Source:MGI Symbol;Acc:MGI:106271]	-1.07
ENSMUSG00000021061	Spnb1	spectrin beta 1 [Source:MGI Symbol;Acc:MGI:98387]	-1.07
ENSMUSG00000096948	AC163347.1	--	-1.07
ENSMUSG000000035352	Ccl12	chemokine (C-C motif) ligand 12 [Source:MGI Symbol;Acc:MGI:108224]	-1.07
ENSMUSG00000021188	Trip11	thyroid hormone receptor interactor 11 [Source:MGI Symbol;Acc:MGI:1924393]	-1.07
ENSMUSG00000030782	Tgfb1i1	transforming growth factor beta 1 induced transcript 1 [Source:MGI Symbol;Acc:MGI:102784]	-1.07
ENSMUSG000000068101	Cenpm	centromere protein M [Source:MGI Symbol;Acc:MGI:1913820]	-1.07
ENSMUSG00000040841	Six5	sine oculis-related homeobox 5 [Source:MGI Symbol;Acc:MGI:106220]	-1.07
ENSMUSG000000086522	Gm4473	predicted gene 4473 [Source:MGI Symbol;Acc:MGI:3782657]	-1.07
ENSMUSG00000067700	Gm5862	predicted gene 5862 [Source:MGI Symbol;Acc:MGI:3645135]	-1.06
ENSMUSG00000030649	3200002M19Rik	RIKEN cDNA 3200002M19 gene [Source:MGI Symbol;Acc:MGI:1922680]	-1.06
ENSMUSG00000011179	Odc1	ornithine decarboxylase, structural 1 [Source:MGI Symbol;Acc:MGI:97402]	-1.06
ENSMUSG00000029550	Sppl3	signal peptide peptidase 3 [Source:MGI Symbol;Acc:MGI:1891433]	-1.06
ENSMUSG000000072693	Gm10401	predicted gene 10401 [Source:MGI Symbol;Acc:MGI:3704254]	-1.06
ENSMUSG00000026556	Vangl2	vang-like 2 (van gogh, Drosophila) [Source:MGI Symbol;Acc:MGI:2135272]	-1.06
ENSMUSG00000038980	BC066135	cDNA sequence BC066135 [Source:MGI Symbol;Acc:MGI:3606212]	-1.06
ENSMUSG00000025609	Mkln1	muskelin 1, intracellular mediator containing kelch motifs [Source:MGI Symbol;Acc:MGI:1351638]	-1.06
ENSMUSG00000028687	Mutyh	mutY homolog (E. coli) [Source:MGI Symbol;Acc:MGI:1917853]	-1.06
ENSMUSG00000074868	Gm6478	predicted pseudogene 6478 [Source:MGI Symbol;Acc:MGI:3647766]	-1.06

ENSMUSG00000037326	Solh	small optic lobes homolog (<i>Drosophila</i>) [Source:MGI Symbol;Acc:MGI:1355075]	-1.06
ENSMUSG0000001228	Uhrf1	ubiquitin-like, containing PHD and RING finger domains, 1 [Source:MGI Symbol;Acc:MGI:1338889]	-1.05
ENSMUSG00000055805	Fmnl1	formin-like 1 [Source:MGI Symbol;Acc:MGI:1888994]	-1.05
ENSMUSG00000009350	Mpo	myeloperoxidase [Source:MGI Symbol;Acc:MGI:97137]	-1.05
ENSMUSG000000097080	AC133646.1	--	-1.05
ENSMUSG000000097554	AC092404.1	--	-1.05
ENSMUSG000000083840	Gm15459	predicted gene 15459 [Source:MGI Symbol;Acc:MGI:3705702]	-1.05
ENSMUSG00000015656	Hspa8	heat shock protein 8 [Source:MGI Symbol;Acc:MGI:105384]	-1.05
ENSMUSG000000086172	2700068H02Rik	RIKEN cDNA 2700068H02 gene [Source:MGI Symbol;Acc:MGI:1919813]	-1.05
ENSMUSG000000054364	Rhob	ras homolog gene family, member B [Source:MGI Symbol;Acc:MGI:107949]	-1.05
ENSMUSG00000011427	Zfp790	zinc finger protein 790 [Source:MGI Symbol;Acc:MGI:1923431]	-1.05
ENSMUSG000000038357	Camp	cathelicidin antimicrobial peptide [Source:MGI Symbol;Acc:MGI:108443]	-1.05
ENSMUSG000000035295	Wdr38	WD repeat domain 38 [Source:MGI Symbol;Acc:MGI:1923896]	-1.05
ENSMUSG000000033991	Ttc37	tetratricopeptide repeat domain 37 [Source:MGI Symbol;Acc:MGI:2679923]	-1.05
ENSMUSG00000004897	Hdgf	hepatoma-derived growth factor [Source:MGI Symbol;Acc:MGI:1194494]	-1.04
ENSMUSG00000019066	Rab3d	RAB3D, member RAS oncogene family [Source:MGI Symbol;Acc:MGI:97844]	-1.04
ENSMUSG000000048693	Olf435	olfactory receptor 435 [Source:MGI Symbol;Acc:MGI:3030269]	-1.04
ENSMUSG000000032085	Tagln	transgelin [Source:MGI Symbol;Acc:MGI:106012]	-1.04
ENSMUSG000000040410	Fbxl4	F-box and leucine-rich repeat protein 4 [Source:MGI Symbol;Acc:MGI:2140367]	-1.04
ENSMUSG000000022463	Srebf2	sterol regulatory element binding factor 2 [Source:MGI Symbol;Acc:MGI:107585]	-1.04
ENSMUSG000000023057	Fabp2	fatty acid binding protein 2, intestinal [Source:MGI Symbol;Acc:MGI:95478]	-1.04
ENSMUSG000000027200	Sema6d	sema domain, transmembrane domain (TM), and cytoplasmic domain, (semaphorin) 6D [Source:MGI Symbol;Acc:MGI:2387661]	-1.04
ENSMUSG000000055446	A630091E08Rik	RIKEN cDNA A630091E08 gene [Source:MGI Symbol;Acc:MGI:2442837]	-1.04
ENSMUSG000000032754	Slc24a6	solute carrier family 24 (sodium/potassium/calcium exchanger), member 6 [Source:MGI Symbol;Acc:MGI:2180781]	-1.04
ENSMUSG000000036257	Pnpla8	patatin-like phospholipase domain containing 8 [Source:MGI Symbol;Acc:MGI:1914702]	-1.04
ENSMUSG000000072772	Grccl10	gene rich cluster, C10 gene [Source:MGI Symbol;Acc:MGI:1315201]	-1.04
ENSMUSG000000034947	Tmem106a	transmembrane protein 106A [Source:MGI Symbol;Acc:MGI:1922056]	-1.04
ENSMUSG000000039936	Pik3cd	phosphatidylinositol 3-kinase catalytic delta polypeptide [Source:MGI Symbol;Acc:MGI:1098211]	-1.04
ENSMUSG000000027456	Sdcbp2	syndecan binding protein (syntenin) 2 [Source:MGI Symbol;Acc:MGI:2385156]	-1.03
ENSMUSG000000027316	Gfra4	glial cell line derived neurotrophic factor family receptor alpha 4 [Source:MGI Symbol;Acc:MGI:1341873]	-1.03
ENSMUSG000000028126	Pip5k1a	phosphatidylinositol-4-phosphate 5-kinase, type 1 alpha [Source:MGI Symbol;Acc:MGI:107929]	-1.03
ENSMUSG000000038065	2410066E13Rik	RIKEN cDNA 2410066E13 gene [Source:MGI Symbol;Acc:MGI:1915485]	-1.03
ENSMUSG000000039891	Txlnb	taxilin beta [Source:MGI Symbol;Acc:MGI:2671945]	-1.03
ENSMUSG000000020389	Cdkl3	cyclin-dependent kinase-like 3 [Source:MGI Symbol;Acc:MGI:2388268]	-1.03
ENSMUSG000000029144	Gtf3c2	general transcription factor IIIC, polypeptide 2, beta [Source:MGI Symbol;Acc:MGI:1919002]	-1.03
ENSMUSG000000073997	Olf521	olfactory receptor 521 [Source:MGI Symbol;Acc:MGI:3030355]	-1.03
ENSMUSG000000094514	AC133103.3	--	-1.02
ENSMUSG000000094915	AC168977.2	--	-1.02
ENSMUSG000000038777	Sema6c	sema domain, transmembrane domain (TM), and cytoplasmic domain, (semaphorin) 6C [Source:MGI Symbol;Acc:MGI:1338032]	-1.02
ENSMUSG000000095488	AC087166.3	--	-1.02
ENSMUSG000000034764	1700006J14Rik	RIKEN cDNA 1700006J14 gene [Source:MGI Symbol;Acc:MGI:2447818]	-1.02
ENSMUSG000000021123	Rdh12	retinol dehydrogenase 12 [Source:MGI Symbol;Acc:MGI:1925224]	-1.02
ENSMUSG000000078597	Cyp4a12b	cytochrome P450, family 4, subfamily a, polypeptide 12B [Source:MGI Symbol;Acc:MGI:3611747]	-1.02
ENSMUSG000000021255	Esrrb	estrogen related receptor, beta [Source:MGI Symbol;Acc:MGI:1346832]	-1.02
ENSMUSG000000021798	Ldb3	LIM domain binding 3 [Source:MGI Symbol;Acc:MGI:1344412]	-1.02
ENSMUSG000000047617	BC029214	cDNA sequence BC029214 [Source:MGI Symbol;Acc:MGI:2442831]	-1.02
ENSMUSG000000039768	Dnajc11	DnaJ (Hsp40) homolog, subfamily C, member 11 [Source:MGI Symbol;Acc:MGI:2443386]	-1.02
ENSMUSG000000029661	Col1a2	collagen, type I, alpha 2 [Source:MGI Symbol;Acc:MGI:88468]	-1.02
ENSMUSG000000005555	Itga5	integrin alpha 5 (fibronectin receptor alpha) [Source:MGI Symbol;Acc:MGI:96604]	-1.02
ENSMUSG000000097785	AC131756.1	--	-1.02
ENSMUSG000000030319	Cand2	cullin-associated and neddylation-dissociated 2 (putative) [Source:MGI Symbol;Acc:MGI:1914338]	-1.01
ENSMUSG000000022141	Nipbl	Nipped-B homolog (<i>Drosophila</i>) [Source:MGI Symbol;Acc:MGI:1913976]	-1.01
ENSMUSG000000032046	Abhd12	abhydrolase domain containing 12 [Source:MGI Symbol;Acc:MGI:1923442]	-1.01
ENSMUSG000000020125	Elane	elastase, neutrophil expressed [Source:MGI Symbol;Acc:MGI:2679229]	-1.01

ENSMUSG00000079186	Gzmc	granzyme C [Source:MGI Symbol;Acc:MGI:109256]	-1.01
ENSMUSG00000021751	Acox2	acyl-Coenzyme A oxidase 2, branched chain [Source:MGI Symbol;Acc:MGI:1934852]	-1.01
ENSMUSG00000037887	Dusp8	dual specificity phosphatase 8 [Source:MGI Symbol;Acc:MGI:106626]	-1.01
ENSMUSG00000037974	Muc5ac	mucin 5, subtypes A and C, tracheobronchial/gastric [Source:MGI Symbol;Acc:MGI:104697]	-1.01
ENSMUSG00000034156	Bzap1	benzodiazepine receptor associated protein 1 [Source:MGI Symbol;Acc:MGI:2450877]	-1.01
ENSMUSG00000071262	Zfp957	zinc finger protein 957 [Source:MGI Symbol;Acc:MGI:2145729]	-1.01
ENSMUSG00000079502	1700101E01Rik	RIKEN cDNA 1700101E01 gene [Source:MGI Symbol;Acc:MGI:2685669]	-1.00
ENSMUSG00000031596	Slc7a2	solute carrier family 7 (cationic amino acid transporter, y+ system), member 2 [Source:MGI Symbol;Acc:MGI:99828]	-1.00
ENSMUSG00000093452	Gm20687	predicted gene 20687 [Source:MGI Symbol;Acc:MGI:5313134]	-1.00
ENSMUSG00000029016	Clcn6	chloride channel 6 [Source:MGI Symbol;Acc:MGI:1347049]	-1.00
ENSMUSG00000056153	Socs6	suppressor of cytokine signaling 6 [Source:MGI Symbol;Acc:MGI:1924885]	-1.00
ENSMUSG00000028163	Nfkb1	nuclear factor of kappa light polypeptide gene enhancer in B cells 1, p105 [Source:MGI Symbol;Acc:MGI:97312]	-1.00
ENSMUSG00000087362	Gm13710	predicted gene 13710 [Source:MGI Symbol;Acc:MGI:3650894]	-1.00
ENSMUSG00000079179	1700012B15Rik	RIKEN cDNA 1700012B15 gene [Source:MGI Symbol;Acc:MGI:1921423]	-1.00
ENSMUSG00000030431	Tmem238	transmembrane protein 238 [Source:MGI Symbol;Acc:MGI:1922935]	-1.00