

Supplemental Material and Methods

Animals: For global Dusp8 KO mice excision of exons 5 and 6 includes all Dusp8 transcript variants currently listed as NCBI reference sequences, and suggests that Dusp8 functionality is completely ablated from our KO model.

For generating the Dusp8 conditional knockout line, the Dusp8^{tm1a}(EUCOMM)Hmgu embryonic stem (ES) cell clone HEPD0822-2-A10 was obtained from the European Mammalian Mutant Cell Repository (EUCOMM). The ES cells harbor a KO first allele (reporter-tagged insertion with conditional potential) of Dusp8 containing a Frt-flanked LacZ reporter and neomycin selection cassette in intron 2 and a LoxP-flanked exon 3. To generate chimeric animals, ES cells were injected into albino BALB/c (Charles River, Germany) derived blastocysts and transferred to pseudo pregnant foster mothers. Male chimeras were bred to wild type C57BL/6N females to obtain germline transmission. To convert the KO first allele (tm1a) into a conditional KO allele (tm1c) F2 animals were bred to Gt(ROSA)^{26Sortm1}(FLP1)^{Dym} (MGI:2429412). The Flp-recombinase mediated removal of the LacZ reporter and neomycin selection cassette was confirmed and positive animals subsequently backcrossed to C57BL/6J wild type breeders to remove the tm1(FLP1)^{Dym} expression allele.

Metabolic studies: Food intake, energy expenditure, respiratory exchange ratio and locomotor activity were analyzed by a custom-made 32-cage calorimetry system (TSE Systems, Bad Homburg, Germany). Prior to data collection, all mice were acclimatized to the calorimetry system for 24 h.

Assessment of leptin sensitivity: To assess biochemical responses to leptin stimulation, leptin was administered intraperitoneally at a dose of 3 mg/kg BW (R & D system, Minneapolis, MN, USA) in age-matched DIO WT and Dusp8 KO littermates. Control mice received vehicle phosphate buffered saline (PBS) instead. Mice were sacrificed 30 min after leptin administration by CO₂ followed by perfusions and measurement of signal transduction markers by immunohistochemistry.

To assess the effect of leptin stimulation on food intake, HFD-fed Dusp8 WT and KO males were fasted 3 hours prior to the dark cycle. 30 min prior the dark cycle, mice were injected intraperitoneally with 5 mg/kg leptin or PBS. At the start of the dark cycle, all mice were allowed to eat, and food intake was measured throughout the dark and subsequent light period.

Adeno-associated virus (AAV) infusion in mice: Surgeries were performed using a mixture of ketamine and xylazine (100 mg/kg and 7 mg/kg, respectively) as anesthetic agents and Metamizol (50 mg/kg s.c.) and Meloxicam (1mg/kg, s.c., for 3 days postoperatively) for analgesia. Stereotaxic coordinates were -1.5 mm posterior and -0.3 mm lateral to bregma, and -5.8 mm ventral from the dura. Fluorescence microscopy of hypothalamus slices confirmed GFP expression in a restricted area of the mediobasal hypothalamus. Overexpression of Dusp8 was confirmed by qPCR from whole hypothalami; two weeks after AAV administration, Dusp8 mRNA levels were increased 4.2 fold.

Islet isolation and insulin secretion assay: Mouse islets were isolated by collagenase digestion as previously described (1). Equal-number batches of islets were washed twice with HEPES-balanced Krebs-Ringer (KRH) bicarbonate buffer supplemented with 0.2% (weight for volume) BSA and 2 mmol/L glucose. The islets were starved in the same buffer for 1 h at 37°C. Later, starvation buffer was aspirated, and islets were incubated in KRH bicarbonate buffer with 16.5 mM glucose for 1 h at 37°C. Thereafter, the supernatants were collected and centrifuged at 760x g for 5 min for determination of insulin concentration using a mouse ultrasensitive insulin ELISA kit (Alpco). Following the secretion assay, islets were washed twice with Dulbecco's PBS, and ice-cold RIPA lysis buffer was added. Islet homogenates were collected, centrifuged at 12,000x g for 10 min, and assayed for total insulin content by radioimmunoassay. For normalization, DNA content was measured using the Quant-it Pico Green DNA assay kit (Invitrogen). Each independent experiment was performed with three technical replicates.

Catecholamine turnover rate determination: Age matched DIO WT and Dusp8 KO littermates (6-months-old) were subjected to 3 h of fasting one hour after the onset of the light phase. Subsequently, WT and Dusp8 KO mice were injected intraperitoneally either with saline or with 200 mg/kg body weight α -MPT. Tissues were removed 3 h after injection and flash frozen in liquid nitrogen and stored at -80°C for further analyses. Because the concentration of catecholamine in tissues declined exponentially, we could obtain the rate constant of NE efflux (expressed in h^{-1}).

Comprehensive analysis of monoamines and metabolites was carried out by reverse-phase liquid chromatography with electrochemical detection as described by Nagler et al. (2). The values obtained were expressed as pg/mg wet tissue. The values for the tissue levels of NE and dopamine were logarithmically

transformed for calculation of linearity of regression, standard error of the regression coefficients and significance of differences between regression coefficients.

Dex/CRH test: Seven days before the actual test, a blood sample was taken from the tail of the animals at 3 p.m. in order to get a basal reference value ('untreated'). On the day of testing, the mice received an intraperitoneal injection of Dex at 9 a.m. (0.05 mg/kg BW, Dexa-ratiopharm, Ratiopharm GmbH, Ulm, Germany), followed by an injection of CRH at 3 p.m. (0.15 mg/kg BW, CRH Ferring Arzneimittel GmbH, Kiel, Germany). Immediately before CRH injection, a tail blood sample was collected as described above ('after Dex' value) and a second one 30 min later ('after CRH' value). Plasma samples were stored at -20°C and plasma corticosterone concentrations were measured as described below.

Immunohistochemistry and Immunofluorescence: Mice were euthanized in CO₂ and perfused with saline, followed by a solution of 4% paraformaldehyde in 0.1 M PBS (pH 7.4) cooled to 4°C. Brains were removed and kept in fixative at 4°C for 6 h or overnight post-fixation, then equilibrated for 48 h with 30% sucrose in 0.1 M Tris-buffered saline (TBS; pH 7.2). Brains were cut coronally in a cryostat into 30 µm sections; sections used for immunohistochemistry were collected and rinsed in 0.1 M TBS. For immunostaining, sections were sequentially pretreated with 1% NaOH with 1% H₂O₂ solution, 0.3% glycine, and 0.3% SDS, and blocked with SUMI (0.25% gelantine, 0.5% TritonX-100 in TBS pH 7.6). Subsequently, sections were incubated overnight with primary antibody (**Supplemental Table 4**) in SUMI at 4°C. After several TBS washes, sections were incubated with secondary antibody (**Supplemental Table 4**) diluted in SUMI.

For immunohistochemistry, another round of TBS washes was followed by amplification of the signal using the avidine-biotin conjugates, and subsequent DAB-H₂O₂ staining for 10 min. Sections were washed with TBS, mounted on gelatin-pre-coated glass slides, and kept for air-drying. Dried sections were further dehydrated by immersion in a series of alcohol (50-100%) followed by two incubation steps with 100% xylene before being mounted with a coverslip using mounting solution. Images were captured by a BZ-9000 microscope (Keyence Corporation Itasca, IL, USA).

Immunofluorescent stainings were captured at the Leica TCS SP5 confocal laser scanning microscope (Leica microsystems, Wetzlar, Germany). Fluorophores were excited using 405 diode, 488 argon and DPSS 561 laser lines. Fluorescence was detected using PMT and hybrid detectors. Identical acquisition settings were

used for all images recorded. Fluorescence images were analyzed using the ImageJ based software Fiji (Fiji Is Just ImageJ) (3).

Cells were either manually counted in a blinded fashion or the activation scoring of astrocytosis and microgliosis images was applied as described previously (4). Per mouse 2 brain sections were analysed and averaged. The ARC was defined by drawing a region of interest (ROI) based on the DAPI staining and the known structure of the ARC. Average fluorescence intensity of the ROI was measured and activation scores were assigned in a blinded fashion.

In situ hybridization: The hybridization was performed as described previously (5): The frozen sections were fixed with 4% paraformaldehyde in 0.1 M phosphate buffer (pH 7.4) at room temperature for 30 min. They were then dehydrated using 70, 80, 90, and 95%, and absolute ethanol (5 min each). The hybridization was performed overnight at 45°C in a moist chamber. Hybridization solution contained 1x 10⁶ cpm per slide of the labeled probe, 4x standard saline citrate (SSC), 50% deionized formamide, 1x Denhardt's solution, 10% dextran sulfate, and 10 µg/ml sheared, single-stranded salmon sperm DNA. Afterward, the hybridization sections were sequentially washed in 1x SSC at room temperature, four times in 1x SSC at 42°C (30 min/wash), and once in 1x SSC at room temperature (1 h), and then rinsed in water and ethanol. Finally, the sections were air-dried and exposed to Hyperfilm β-Max (Amersham Intl., Little Chalfont, UK) at room temperature for 3 weeks. The slides were then developed in Kodak D-19 developer (Eastman Kodak Co., Rochester, NY) and fixed (Kodak fixer).

Protein extraction and concentration determination: Cells and murine tissues (whole hypothalamus or 30-50 mg tissue) were lysed in RiPa buffer (Sigma-Aldrich, Darmstadt, Germany) containing 1x protease phosphatase inhibitor cocktail (Promega). Lysates were sonicated 2x 5 sec and then rotated at 4°C for 30 min. After centrifugation at 10,000x g for 10 min, protein concentrations of the supernatants were determined using the bicinchoninic acid (BCA) kit from Pierce (Rockford, IL) following the manufacturer's instructions.

Western blotting analysis: Protein lysates were prepared as described above. Protein samples of equal concentration were mixed with 4x NuPage sample buffer and subjected to SDS-PAGE. The separated proteins were then electrophoretically transferred onto a PVDF membrane. The membrane was blocked for 1

h in a 5% BSA/TBS-T solution, and then incubated in the presence of the primary antibody (**Supplemental Table 4**) overnight at 4°C. The washed membrane was then incubated with the secondary antibody (**Supplemental Table 4**) for 1 h at RT. Chemiluminescence was developed with the Clarity Western ECL Substrate (BioRad, Germany) and exposed to autoradiographic film (Life technologies GmbH, Darmstadt, Germany) or detected on a Li-Cor Odyssey instrument (Li-Cor Bioscience, Lincoln, NE, USA). Densitometric quantifications were performed using ImageJ 1.47v software (<https://imagej.nih.gov/ij/docs/guide/user-guide.pdf>).

Phosphoproteomics: Flash-frozen hypothalami of global Dusp8 WT and KO males were processed for protein extraction, digestion and phospho-peptide enrichment as follows. 475 µg of protein was heated for 5 min at 95 °C, and sonicated (Diagenode Bioruptor Plus, high intensity, 10x 30s ON / 30s OFF) in 4% SDC (sodium deoxycholate), 100 mM Tris pH 8.5. After alkylation and reduction with 10 mM tris-(2-carboxyethyl)-phosphin-hydrochlorid (TCEP), 40 mM 2-chloroacetamide (CAA), proteins were digested over night with 1:100 (enzyme:protein) LysC and Trypsin at 37 °C. Peptides were acidified with trifluoroacetic acid (TFA) to a final concentration of 1% (v/v) and stored at -20°C before phosphopeptide enrichment using the Easyphos protocol (6).

For MS analysis peptides were loaded onto a 50-cm column at 60 °C with a 75 µM inner diameter, packed in-house with 1.9 µM C18 ReproSil particles (Dr. Maisch GmbH). Peptides were separated by reversed-phase chromatography using a binary buffer system consisting of 0.1% formic acid (buffer A) and 80% ACN in 0.1% formic acid (buffer B). MS data were acquired on a Thermo Orbitrap Exploris 480 mass spectrometer equipped with a FAIMS Pro device. Acquisition was performed using a data-dependent 1 sec cycle time method with a maximum injection time of 100 ms, a scan range of 300–1650 Th, and an AGC target of 300%. Compensation voltages (CVs) of -50 and -70 were used for intra-analysis CV switching. Sequencing was performed via higher energy collisional dissociation fragmentation with a target value of 1e5, and a window of 1.4 Th. Survey scans were acquired at a resolution of 60,000. Resolution for HCD spectra was set to 15,000 with a maximum ion injection time of 100 ms, and an underfill ratio of 40%. Dynamic exclusion was set to 30 s, and apex trigger was enabled.

Raw mass spectrometry data were processed with MaxQuant version 1.6.14.0 with “match between runs” enabled. “Max. missed cleavages” were set to 4. Default settings were used if not stated otherwise.

Laser-capture microdissection microscopy: Cut sections were directly mounted on polyethylene naphthalate membrane frame slides from Applied Biosystems and stored at -80°C . In total, the arcuate nuclei of 16 hypothalamic slides per animal were excised and collected by using a Leica laser capture microdissection microscope. Microdissected tissues were processed for RNA isolation using the Arcturus® Paradise kit (#KIT0312I, Life technologies GmbH, Darmstadt, Germany). In brief, sections were first treated with proteinase K followed by binding of RNA to the column, DNA digestion, washing and finally elution of RNA in small amounts of bidestH₂O. RNA quality and quantity were analyzed by nanodrop. Equal amounts of RNA were translated to cDNA using Superscript III (#18080093, Invitrogen, Darmstadt, Germany) reverse transcriptase.

Microarray analysis: Total RNA (2 ng, RIN>7) was amplified using the Ovation PicoSL WTA System V2 in combination with the Encore BiotinIL Module (Nugen). 750 ng of amplified cDNA was hybridised to Mouse Ref-8 v2.0 Expression BeadChips (Illumina, San Diego, CA, USA). Staining and scanning were done according to the Illumina expression protocol. Data was processed using the GenomeStudioV2010.1 software (gene expression module version 1.6.0) in combination with the MouseRef-8_V2_0_R3_11278551_A.bgx annotation file, which was manually updated. The background subtraction option was used and an offset to remove remaining negative expression values was introduced. CARMAweb (7) was used for quartile normalisation. Statistical analyses were performed by utilizing the statistical programming environment R (8) implemented in CARMAweb. A set of 893 significantly regulated genes was defined by the following criteria: limma *t*-test *p*-value <0.05, linear fold-change>1.3x, and detection *p*-value <0.05 in at least half of the samples in at least one group (**Supplemental Table 2**). MAPK signaling heatmap was done in R and pathway enrichment analyses were generated through the use of QIAGEN's Ingenuity Pathway Analysis (IPA®, QIAGEN Redwood City, www.qiagen.com/ingenuity). Fisher's Exact Test *p*-value <0.05 was used as criteria for significance and selected terms are shown in **Fig. 6D**.

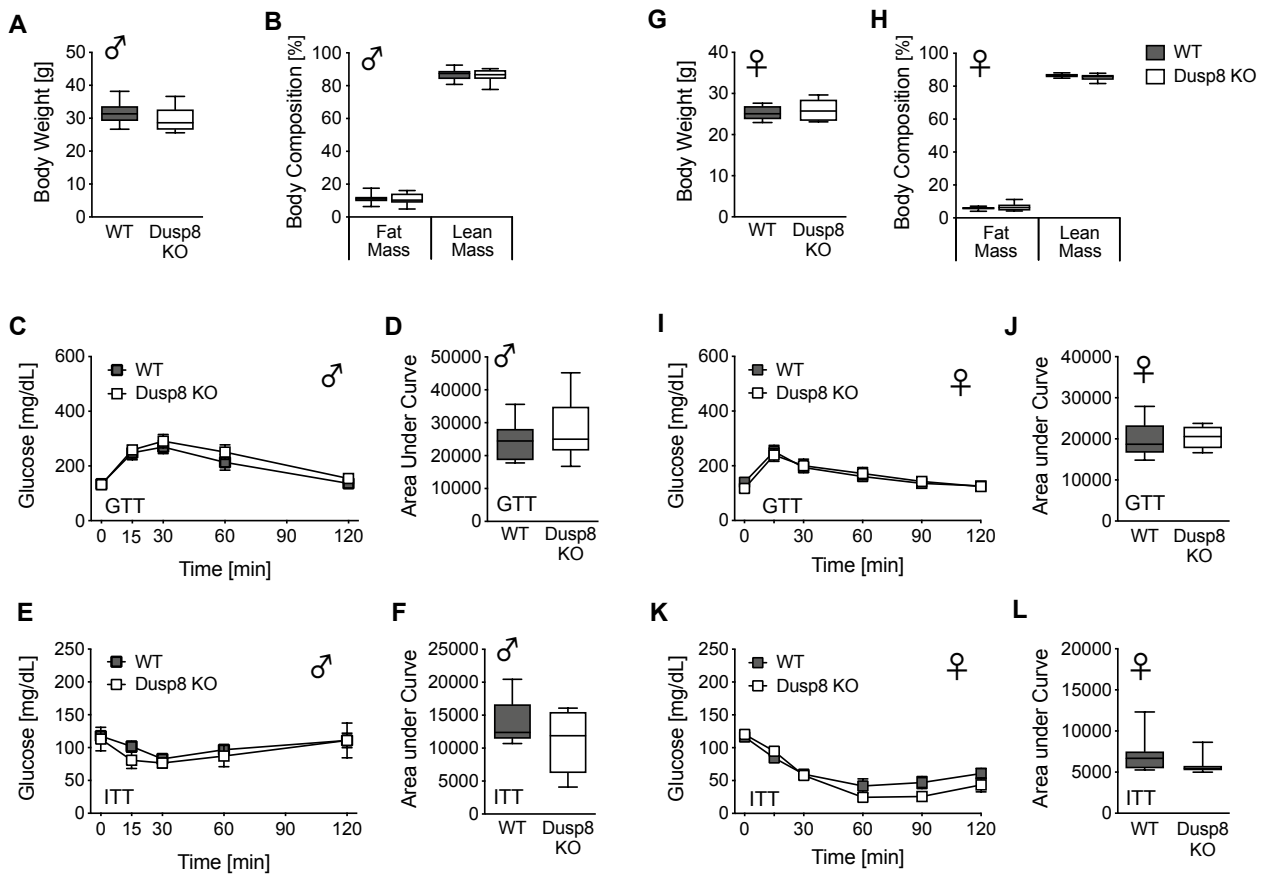
RNA isolation and qPCR analysis: RNA was isolated from murine tissues using a commercially available kit (NucleoSpin RNA, #740955, Macherey-Nagel, Düren, Germany). For qPCR analyses, equal amounts of RNA were transcribed to cDNA using the QuantiTect Reverse Transcription Kit (#205313, Qiagen, Hilden, Germany). RNA from the formalin-fixed, paraffin-embedded (FFPE) human brain tissue was isolated with the RNeasy FFPE Kit (#73504, Qiagen) and reverse transcribed into cDNA using the high-capacity cDNA

Reverse Transcription Kit (#4368814, Applied Biosystems, Darmstadt, Germany). Gene expression was analyzed using either TaqMan probes (#4331182, Applied Biosystems; **Supplemental Table 5**) or custom-made primers (Sigma-Aldrich; **Supplemental Table 6**) and the respective TaqMan (#4440040) or SYBR green mastermixes (#4367659, Applied Biosystems). qPCRs were carried out using a ViiA™ 7 Real Time PCR System (Applied Biosystems). Gene expression was evaluated using the $\Delta\Delta\text{-C}_T$ method and HPRT, RPL127, PPIB or GAPDH was used as housekeeping gene.

References for Supplemental methods:

1. Carter JD, Dula SB, Corbin KL, Wu R, and Nunemaker CS. A practical guide to rodent islet isolation and assessment. *Biol Proced Online*. 2009;11(3-31).
2. Nagler J, Schriever SC, De Angelis M, Pfluger PT, and Schramm KW. Comprehensive analysis of nine monoamines and metabolites in small amounts of peripheral murine (C57Bl/6 J) tissues. *Biomed Chromatogr*. 2018;32(4):e4151.
3. Schindelin J, Arganda-Carreras I, Frise E, Kaynig V, Longair M, Pietzsch T, Preibisch S, Rueden C, Saalfeld S, Schmid B, et al. Fiji: an open-source platform for biological-image analysis. *Nat Methods*. 2012;9(7):676-82.
4. Harrison L, Pfuhlmann K, Schriever SC, and Pfluger PT. Profound weight loss induces reactive astrogliosis in the arcuate nucleus of obese mice. *Mol Metab*. 2019;24(149-55).
5. Nogueiras R, Lopez M, Lage R, Perez-Tilve D, Pfluger P, Mendieta-Zeron H, Sakkou M, Wiedmer P, Benoit SC, Datta R, et al. Bsx, a novel hypothalamic factor linking feeding with locomotor activity, is regulated by energy availability. *Endocrinology*. 2008;149(6):3009-15.
6. Humphrey SJ, Karayel O, James DE, and Mann M. High-throughput and high-sensitivity phosphoproteomics with the EasyPhos platform. *Nat Protoc*. 2018;13(9):1897-916.
7. Rainer J, Sanchez-Cabo F, Stocker G, Sturn A, and Trajanoski Z. CARMAweb: comprehensive R- and bioconductor-based web service for microarray data analysis. *Nucleic Acids Res*. 2006;34(Web Server issue):W498-503.
8. Team RDC. R: A language and environment for statistical computing. *R Foundation for Statistical Computing, Vienna, Austria*. 2011;ISBN 3-900051-07-0(URL <http://www.R-project.org>).

Supplemental Figures and Legends

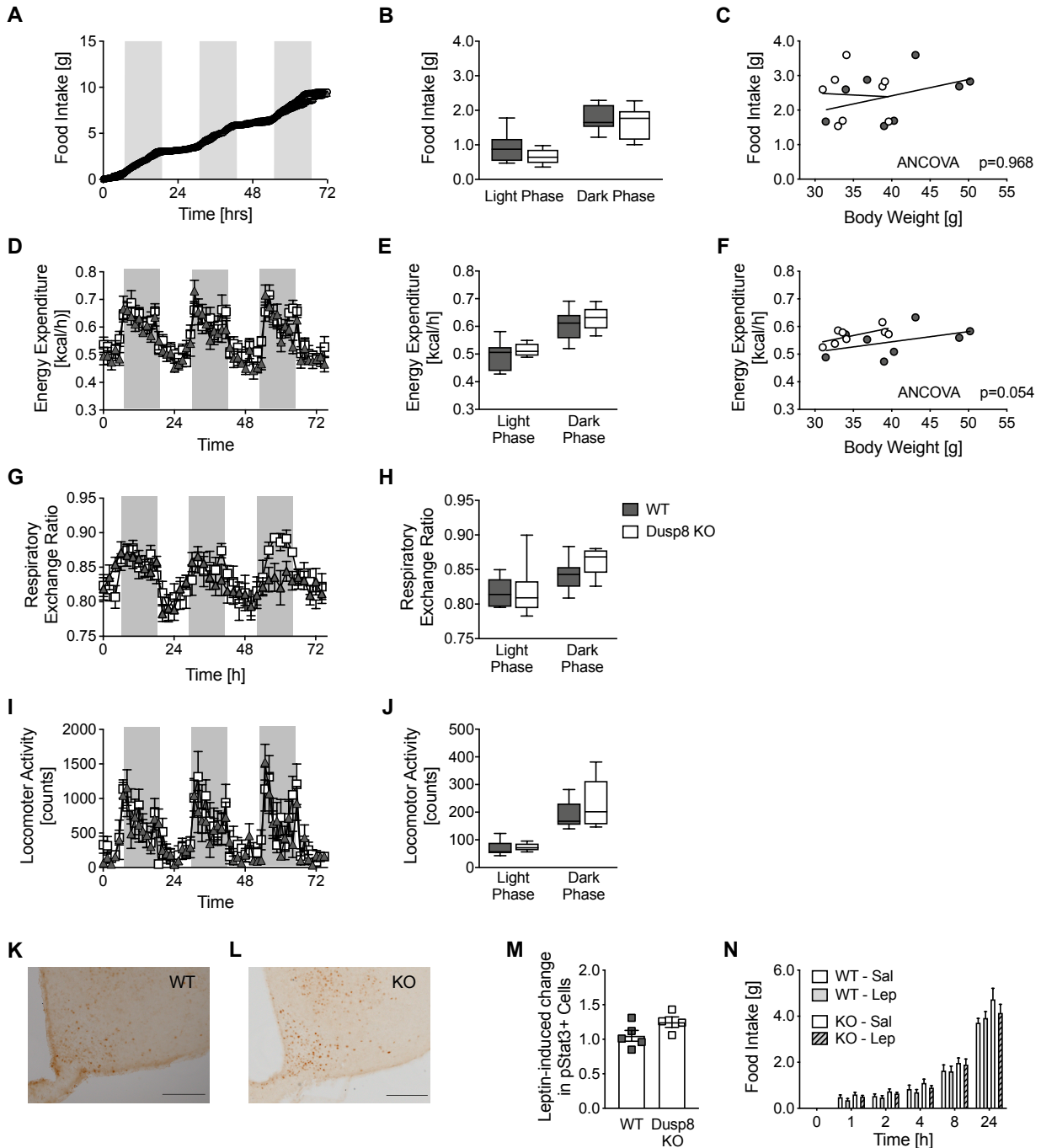


Supplemental Figure 1: Unaltered body composition and glucose homeostasis in male and female Dusp8 KO mice on Chow diet.

Male Dusp8 WT (n=6) and KO (n=14) littermates were subjected to Chow feeding for 12 wks and evaluated for **A**) body weight and **B**) fat and lean mass. **C-F**) Glucose tolerance (GTT) and insulin tolerance tests (ITT) were carried out after 12 wks or 13 wks on Chow diet, respectively (n=6 WT, n=14 Dusp8 KO males).

Female Dusp8 WT (n=8) and KO (n=9) littermates were subjected to Chow feeding for 14 wks and evaluated for **G**) body weight and **H**) fat and lean mass. **I-L**) Glucose tolerance (GTT) and insulin tolerance tests (ITT) were carried out after 14 wks or 15 wks on Chow diet, respectively (n=8 WT, n=9 Dusp8 KO females).

Data are shown as box-and-whisker-plots (A,B,D,F-H,J,L) or as means \pm s.e.m. (C,E,I,K). Student's t-test (A,B,D,F-H,J,L) or Two-Way ANOVA (C,E,I,K).



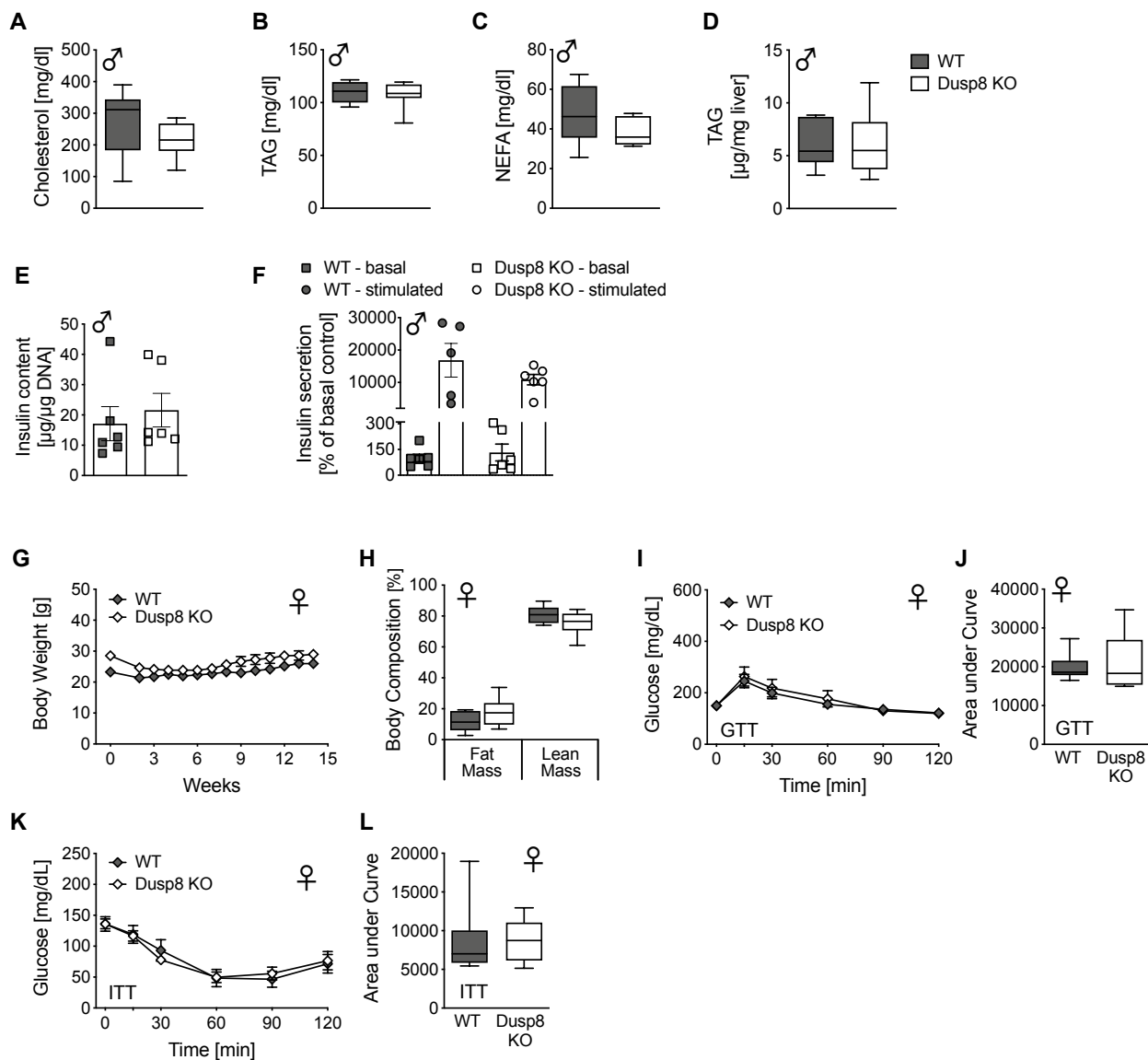
Supplemental Figure 2: Dusp8 ablation does not affect food intake, energy expenditure, respiratory exchange ratio, locomotor activity or leptin sensitivity in male mice on HFD.

A) Cumulative food intake, **B)** day and night food intake, **C)** average daily food intake relative to body weight, **D)** daily energy expenditure, **E)** day and night energy expenditure, **F)** average daily energy expenditure relative to body weight, **G)** respiratory exchange ratio (RER) over 3 days, **H)** average night and day RER, **I)** locomotor activity and **J)** average day and night locomotor activity were assessed in male Dusp8 KO mice compared to WT controls after 10 wks of HFD feeding (n=8 WT, n=8 Dusp8 KO) in indirect calorimetry chambers.

Representative immunohistochemical detection of leptin-induced Stat3 phosphorylation in hypothalamic slices of 18-wks-HFD-fed male **K)** WT and **L)** Dusp8 KO littermates following 30 min of treatment with a bolus ip injection of vehicle or 3 mg leptin / kg body weight. **M)** fold change in positively stained nuclei relative to vehicle (n=5 WT + Saline, n=5 WT + Leptin, n=4 Dusp8 KO + Saline, n=4 Dusp8 KO + Leptin). **N)** Food intake was measured over 24h after injection of leptin (5 mg/kg BW) or saline in Dusp8 KO males

and WT controls (n=7 WT + Saline, n=7 WT + Leptin, n=5 Dusp8 KO + Saline, n=5 Dusp8 KO + Leptin; 22 wks HFD feeding).

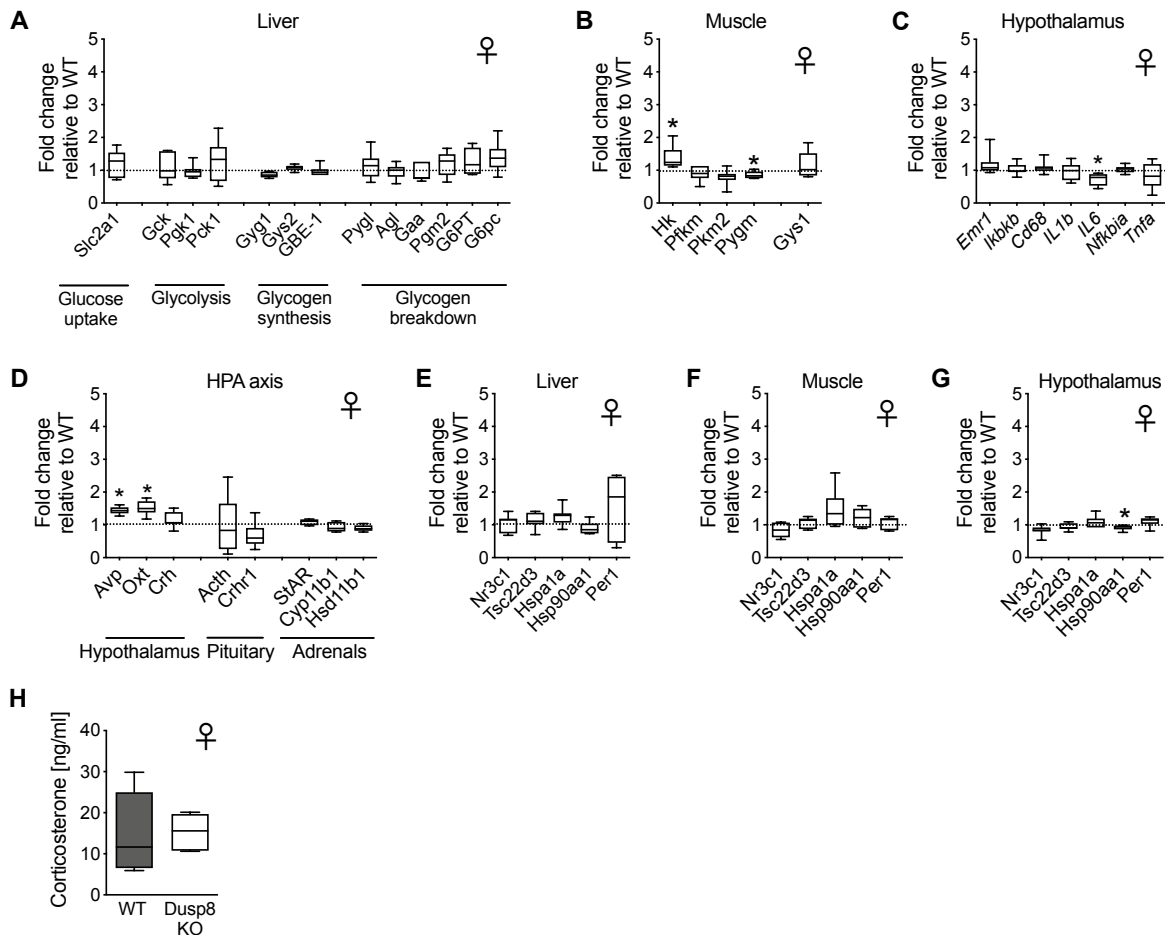
Data are shown as means \pm s.e.m. (A,D,G,I,N), as box-and-whisker-plots (B,E,H,J) or as scatter dot plots (C,F,M). Scale bar = 200 μ M. Two-Way ANOVA (A,D,G,I,N), Student's t-test (B,E,H,J,M) or ANCOVA (C,F).



Supplemental Figure 3: Dusp8 ablation has no effect on plasma lipid species and islet insulin secretion in HFD-fed male mice, or on body weight and glucose control in HFD-fed female mice.

In male WT (n=6) and Dusp8 KO (n=7) mice plasma **A**) cholesterol, **B**) triglyceride, **C**) nonesterified fatty acid levels and **D**) hepatic triglyceride content were measured after 18 wks of HFD exposure. Ex vivo, **E**) insulin content and **F**) glucose-stimulated insulin secretion were measured in isolated islets of male Dusp8 WT or KO mice exposed to HFD feeding for 20 wks (n=6 each).

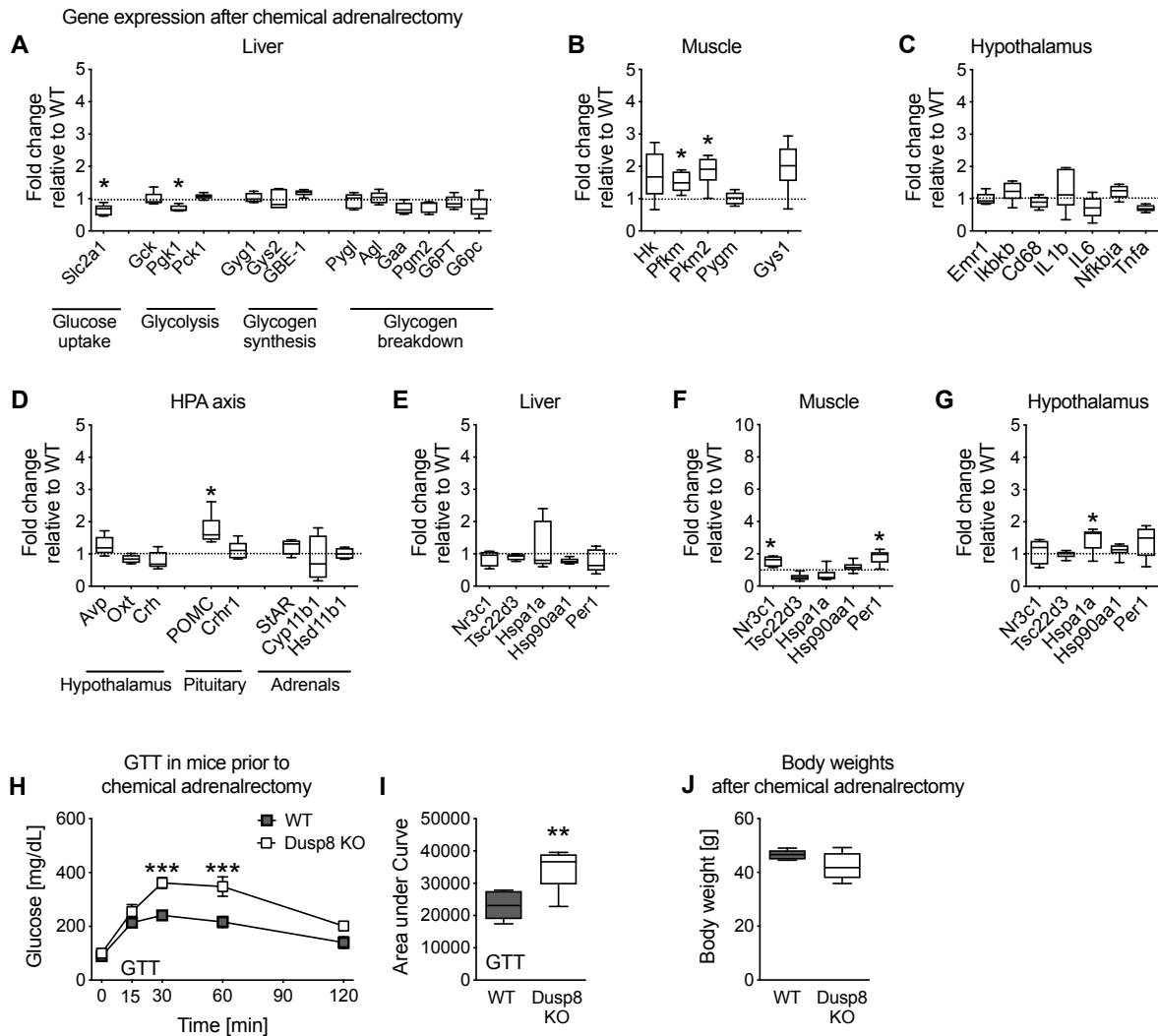
Female Dusp8 WT and KO mice were subjected to HFD feeding for 14 wks and evaluated for **G**) body weight gain and **H**) body composition and then subjected to **I-L**) glucose tolerance (GTT) and insulin tolerance tests (ITT) after 14 wks or 15 wks of HFD feeding, respectively (n=8 WT, n=8 Dusp8 KO females). Data are shown as box-and-whisker-plots (A-D,H,J,L), as scatter dot plots (E,F) or as means \pm s.e.m. (G,I,K). Student's t-test (A-E,H,J,L), One-Way ANOVA (F) or Two-Way ANOVA (G,I,K).



Supplemental Figure 4: Ablation of Dusp8 does not affect peripheral glucose metabolism or glucocorticoid action in female mice on HFD.

Gene expression analyses of **A,B**) glucoregulatory genes in the liver and quadriceps, **C**) inflammatory markers in the hypothalamus, of **D**) HPA axis-related genes in the hypothalamus, pituitary and adrenals and of **E-G**) glucocorticoid signalling-related targets in liver, quadriceps and hypothalamus taken from a cohort of Dusp8 WT and KO female mice after 15 weeks of HFD exposure (n=5 WT, n=6 KO). **H**) Plasma corticosterone levels were analysed in female mice after 15 weeks of HFD exposure, sacrificed under basal conditions at 9 am (n=6 WT, n=6 Dusp8 KO).

Data are shown as box-and-whisker-plots. *p<0.05; Student's t-tests.

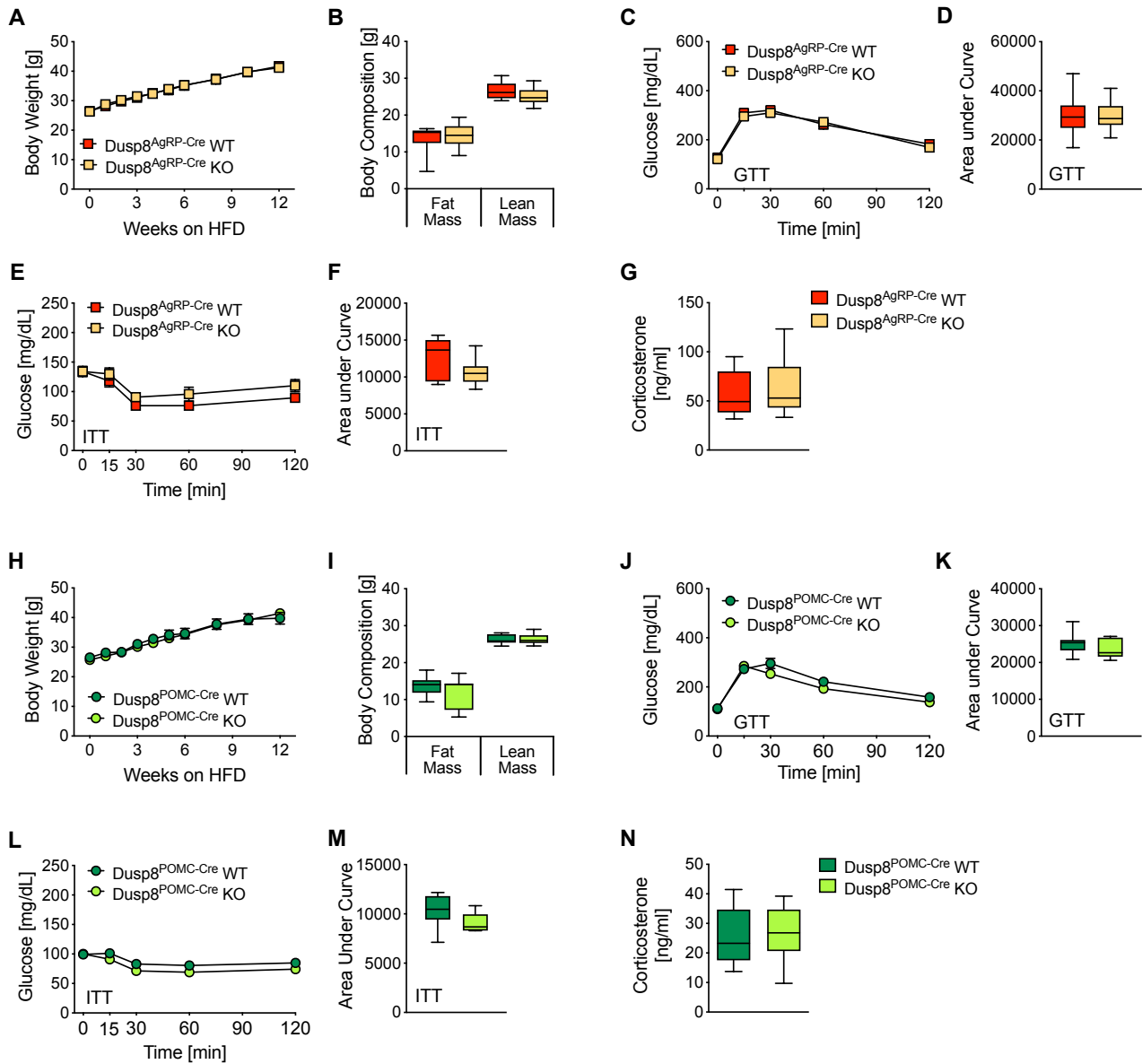


Supplemental Figure 5: Chemical adrenalectomy abrogates expression changes of glucoregulatory genes and GR targets in HFD-fed Dusp8 KO mice.

Gene expression analyses of glucoregulatory genes in **A)** liver and **B)** quadriceps, of inflammatory markers in **C)** hypothalamus, of HPA axis related genes in **D)** hypothalamus, pituitary and adrenals and of GR signalling-related targets in **E)** liver, **F)** quadriceps and **G)** hypothalamus taken from the metyrapone-treated cohort of Dusp8 WT (n=5, n=4 for adrenals) and KO (n=6, n=4 for adrenals) mice.

H,I) A glucose tolerance test was performed prior to metyrapone injections in Dusp8 WT (n=5) and KO (n=6) mice that had been exposed to HFD for 30 wks. **J)** Body weight of diet-induced obese Dusp8 WT and KO mice that had been treated with metyrapone for 14 days (n=5 WT, n=6 KO).

Data are shown as box-and-whisker-plots (A-G,I,J) or as means \pm s.e.m. (H). *p<0.05, **p<0.01 and ***p<0.001; Student's t-tests (A-G,I,J) or Two-Way ANOVA (H).

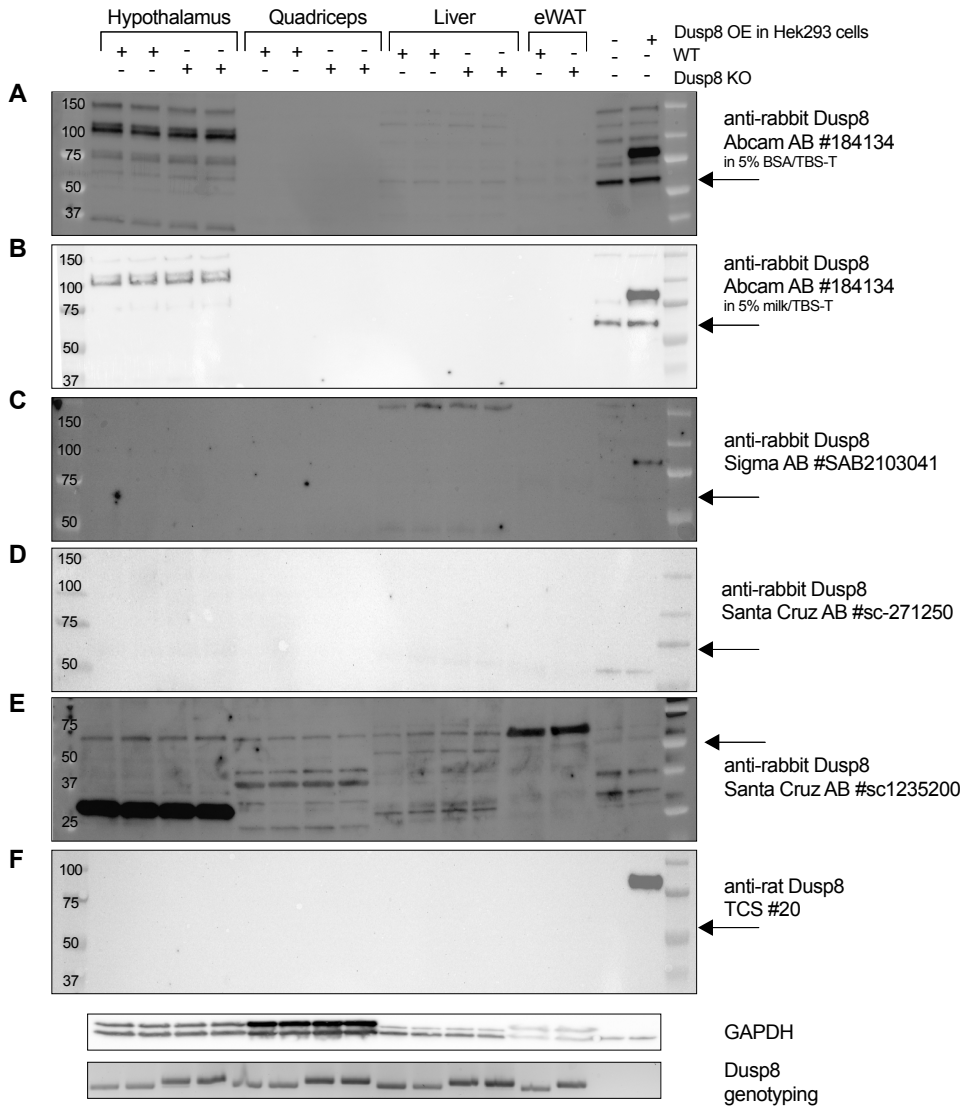


Supplemental Figure 6: Ablation of Dusp8 specifically from AgRP or POMC neurons does not alter glucose metabolism or corticosterone levels in male mice on HFD.

A) Body weight gain over a total of 12 wks, and **B)** fat and lean mass of male $Dusp8^{AgRP-Cre}$ WT (n=8) and KO (n=12) littermates after 12 wks of HFD exposure. **C-F)** Glucose tolerance (GTT) and insulin tolerance tests (ITT) were carried out after 12 or 13 wks of HFD exposure, respectively (n=8 WT, n=12 $Dusp8^{AgRP-Cre}$ KO). **G)** Plasma corticosterone levels of male $Dusp8^{AgRP-Cre}$ WT (n=5) and KO mice (n=7) after HFD exposure.

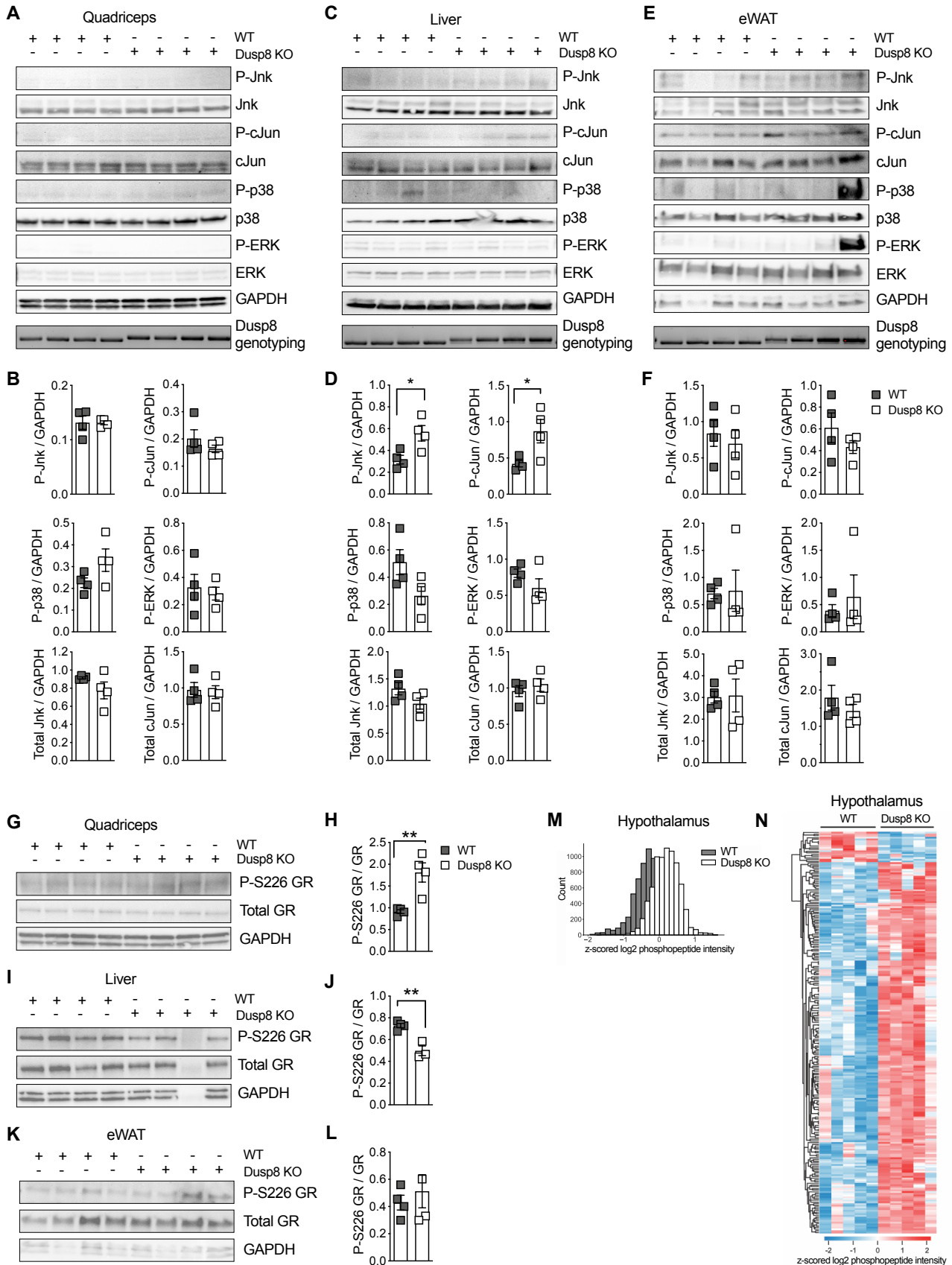
H) Body weight gain over 12 wks, and **I)** fat and lean mass of male $Dusp8^{POMC-Cre}$ WT (n=10) and KO (n=7) littermates after 12 wks of HFD exposure. **J-M)** Glucose tolerance (GTT) and insulin tolerance tests (ITT) were carried out after 12 wks or 13 wks of HFD exposure, respectively (n=10 WT, n=7 $Dusp8^{POMC-Cre}$ KO). **N)** Plasma corticosterone levels of male $Dusp8^{POMC-Cre}$ WT (n=5) and KO mice (n=6) after HFD exposure.

Data are shown as means \pm s.e.m. (A,C,E,H,J,L) or as box-and-whisker-plots (B,D,F,G,I,K,M,N). Two-Way ANOVA (A,C,E,H,J,L) or Student's t-test (B,D,F,G,I,K,M,N).



Supplemental Figure 7: Detection of Dusp8 protein levels in tissues of HFD-fed Dusp8 WT and KO males and in cells overexpressing Dusp8.

Western Blot analysis of proteins extracted from hypothalamus, quadriceps, liver and epididymal white adipose tissue (eWAT) of HFD-fed Dusp8 WT and KO male mice and from Hek293 cells transfected with control or Dusp8 overexpressing (OE) plasmid. Commercial antibodies against Dusp8 from **A)** Abcam #184134 in 5% BSA/TBS-T, **B)** Abcam #184134 in 5% milk/TBS-T, **C)** Sigma #SAB2103041, **D)** Santa Cruz #sc-271250 or **E)** Santa Cruz #sc-1235200 were tested as well as the **F)** selected Dusp8 clone #20 from our Antibody Core Facility. None of the tested Dusp8 antibodies detected a protein with 66 kDa (indicated by the arrow) that was absent in the Dusp8 KO samples. GAPDH was detected as loading control. Genotypes were confirmed by PCR followed by agarose gel electrophoresis (WT =370 bp, KO=430 bp).



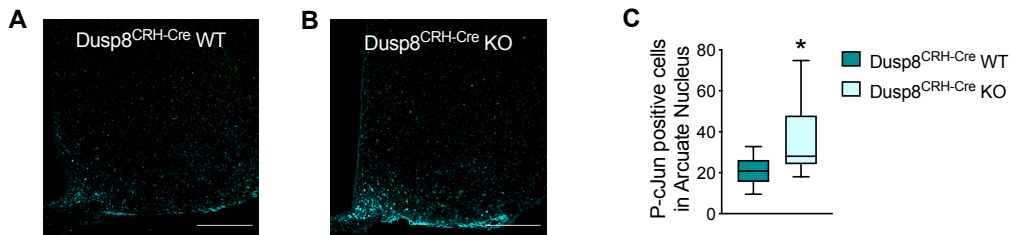
Supplemental Figure 8: Ablation of Dusp8 increases the phosphorylation of Jnk and cJun in liver as well as phosphorylation of GR in quadriceps and the number of phosphorylated peptides in hypothalami of HFD-fed male mice.

Western Blot and densitometric analysis of phosphorylated and total MAPK proteins relative to GAPDH in quadriceps (A,B), liver (C,D) and eWAT (E,F) of male Dusp8 KO (n=4) and WT mice (n=4) after 16 wks of HFD exposure. The genotypes of male mice were confirmed by PCR followed by agarose gel electrophoresis

to detect the WT (370 bp) and KO (430 bp) bands. Western Blot and densitometric analysis of GR phosphorylated at Ser226 relative to total GR in **G,H** quadriceps, **I,J** liver and **K,L** eWAT of male Dusp8 KO (n=4) and WT mice (n=4) after 16 wks of HFD exposure.

M) Higher phosphorylation levels of hypothalamic proteins in Dusp8 KO males on HFD (n=5) vs WT controls (n=5) based on log₂ transformed peptide intensities. **N**) Heat map of significantly changed phosphopeptides from Easyphos analyses of hypothalami of HFD-fed male Dusp8 KO (n=5) and WT (n=5) mice.

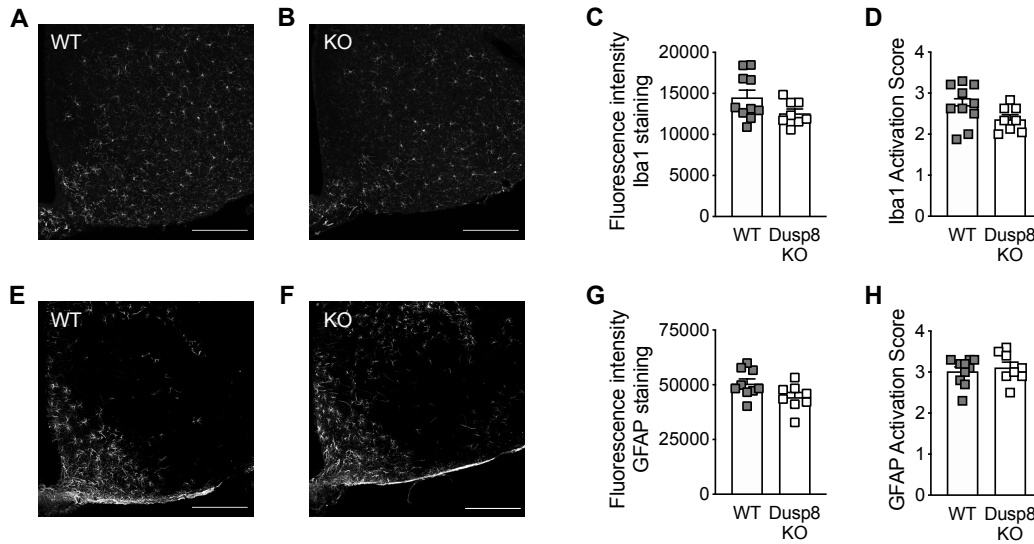
Data are shown as scatter dot plots (B,D,F,H,J,L) or as means (M). *p<0.05 and **p<0.01; Student's t-tests.



Supplemental Figure 9: Increased P-cJun positive nuclei in the arcuate nucleus of HFD-fed Dusp8^{CRH-Cre} KO males.

Representative immunofluorescence detection of of cJun phosphorylation in hypothalamic slices of male **A**) Dusp8^{CRH-Cre} WT (n=7) and **B**) Dusp8^{CRH-Cre} KO (n=10) littermates after 14 wks of HFD feeding and **C**) counting of positive stained nuclei.

Data are shown as box-and-whisker-plots. Scale bar = 200 μ M. *p<0.05; Student's t-tests.

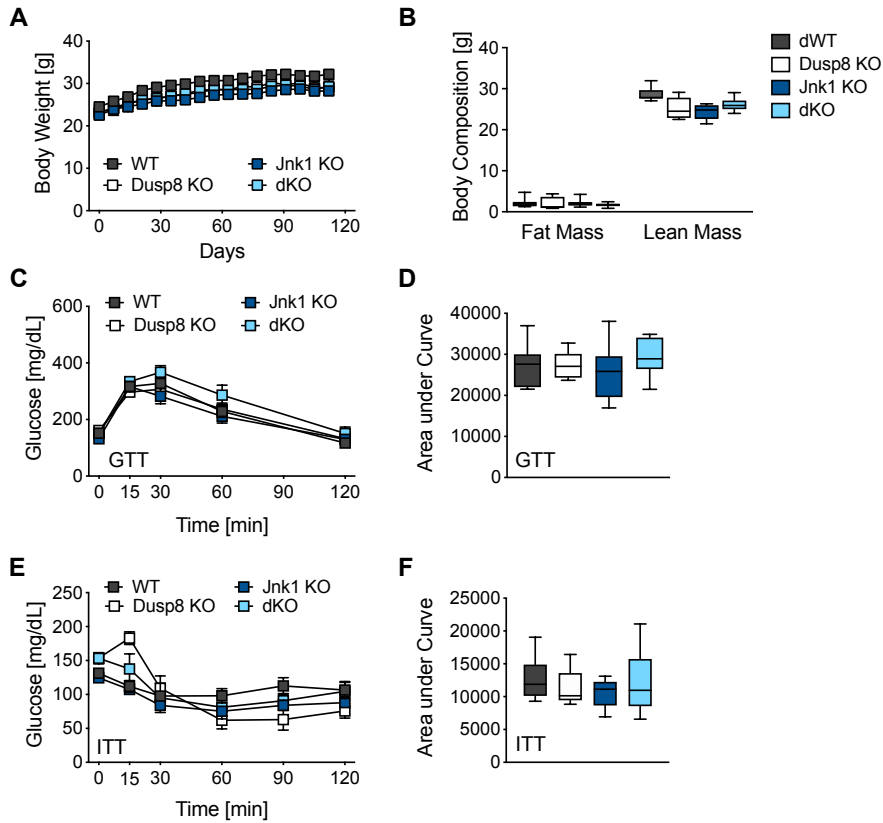


Supplemental Figure 10: Ablation of Dusp8 does not induce hypothalamic astrocytosis or microgliosis.

Representative immunohistochemical detection of Iba1⁺ microglia in hypothalamic slices of male **A**) WT (n=10) and **B**) Dusp8 KO (n=8) mice after 28 wks of HFD exposure. **C**) Average Iba1 fluorescence intensity in the ARC. **D**) Blinded assignment of the microglia activation score of Iba1⁺ cells within the ARC.

Representative immunohistochemical detection of GFAP⁺ astrocytes in hypothalamic slices of male **E**) WT (n=10) and **F**) Dusp8 KO (n=8) mice after 28 wks of HFD exposure. **G**) The average GFAP fluorescence intensity was measured in the ARC. **H**) Blinded assignment of the astrocyte activation score.

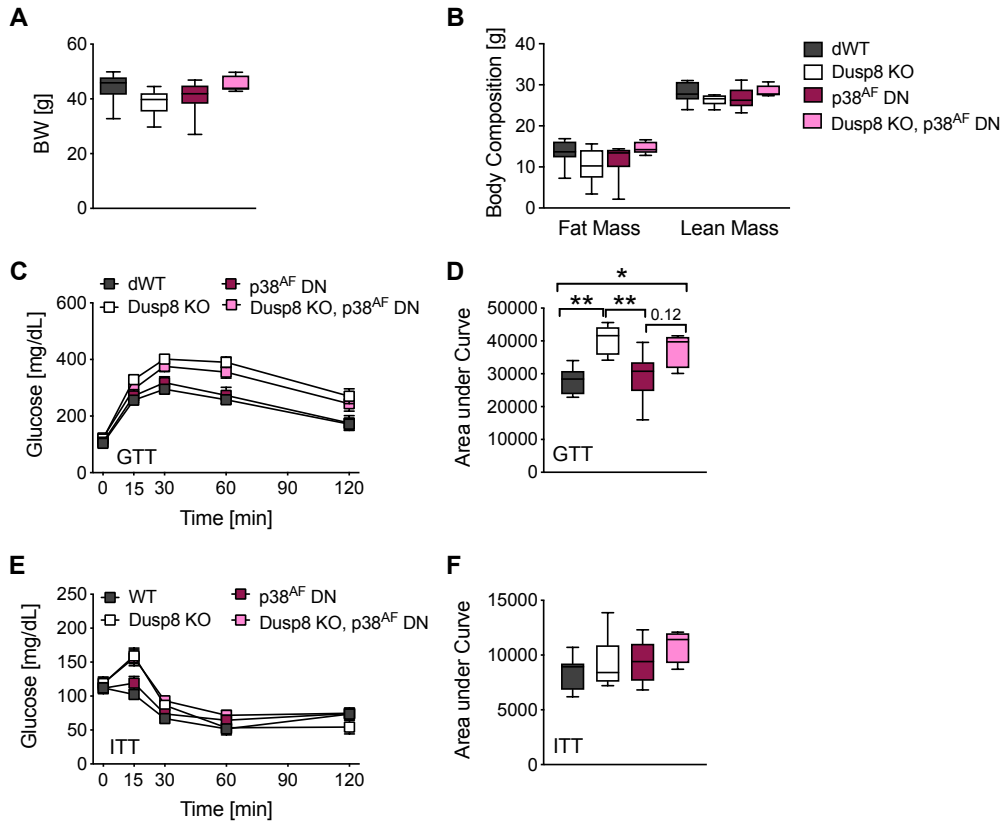
Data are shown as scatter dot plots. Scale bar = 200 μ M. *p<0.05; Student's t-tests.



Supplemental Figure 11: Unaltered body composition and glucose homeostasis in Jnk1-Dusp8 dKO mice on Chow diet.

A) Body weight of male Dusp8 KO (n=5), Jnk1-Dusp8 dKO (n=10) and Jnk1 KO (n=11) mice relative to WT controls (n=10) was measured over 16 wks of Chow feeding. **B)** Male WT (n=10), Dusp8 KO (n=5), Jnk1-Dusp8 dKO (n=10) and Jnk1 KO mice (n=11) were analysed for their body composition at week 16. **C-F)** Glucose tolerance (GTT) and insulin tolerance (ITT) were evaluated at 12 wks or 13 wks, respectively, of Chow diet exposure in male Dusp8 KO (n=5), Jnk1-Dusp8 dKO (n=10) and Jnk1 KO (n=11) mice relative to WT controls (n=10).

Data are shown as means \pm s.e.m (A,C,E) or as box-and-whisker-plots (B,D,F). Two-Way ANOVA (A,C,E) or One-Way ANOVA (B,D,F).



Supplemental Figure 12: Glucose intolerance in HFD-fed Dusp8 KO mice is not mediated by p38.

A) Comparable body weights and **B)** body composition in Dusp8 KO mice (n=6), mice with a single dominant negative allele of p38 (p38^{AF} DN; n=7), double mutants (Dusp8 KO, p38^{AF} DN; n=5) and dWT controls (n=7) subjected to 20 wks of HFD exposure.

C-F) Glucose tolerance (GTT) and insulin tolerance tests (ITT) were carried out after 18 wks or 19 wks of HFD exposure, respectively (n=7 dWT, n=6 Dusp8 KO, n=7 p38^{AF} DN HET, n=5 Dusp8 KO, p38^{AF} DN).

Data are shown as box-and-whisker-plots (A,B,D,F) or as means \pm s.e.m. (C,E). * p <0.05 and ** p <0.01; One-Way ANOVA (A,B,D,F) or Two-Way ANOVA (C,E).

Supplemental Table 1: Easyphos proteome analyses of hypothalami from HFD-fed Dusp8 WT and KO mice. By phospho-proteome analysis a set of 237 significantly regulated phospho-sites was defined by the following criteria: Student's t-test p-value < 0.01.

Symbol	Protein name	Position in protein	Amino acid	Mean log2 Intensity in WT	Mean log2 intensity in Dusp8 KO	# of phospho-sites on peptide	p-value	log2 fold change (KO vs WT)	Uniprot ID
Mtmr2	Myotubularin-related protein 2	9	S	21.35246	27.5702	2	1.14E-07	6.22	Q9Z2D1
Gap43	Neuromodulin	193	S	21.6414	25.44018	2	1.73E-06	3.80	P06837
Ctnna2	Catenin alpha-2	275	S	27.34554	22.70766	1	1.53E-05	-4.64	E0CXB9
Dpysl4	Dihydropyrimidinase-related protein 4	527	S	21.45674	23.54756	2	1.01E-04	2.09	Q3TMU8
Gtpbp1	GTP-binding protein 1	47	S	22.24962	27.95328	2	1.32E-04	5.70	O08582
Ndrg2	Protein NDRG2	332	S	21.59674	26.7207	1	1.34E-04	5.12	Q9QYG0-2
Pclo	Protein piccolo	4293	S	21.63444	25.47146	3	1.96E-04	3.84	Q9QYX7
Gtpbp1	GTP-binding protein 1	44	S	22.03184	27.95328	2	2.05E-04	5.92	O08582
Pde4b;Pde4d	phosphodiesterase 4B, cAMP specific	68	S	23.60718	26.24242	2	2.26E-04	2.64	B1AWC8
Bcas1	Breast carcinoma-amplified sequence 1 homolog	523	T	22.25196	24.99	1	2.62E-04	2.74	Q80YN3
Scn1a	Sodium channel protein	623	S	21.21624	24.2119	1	3.12E-04	3.00	A2APX7
Rtn1	Reticulon-1	332	T	27.646	28.58256	2	3.94E-04	0.94	Q8K0T0
Prrt3	Proline-rich transmembrane protein 3	898	S	21.86106	27.17458	2	4.79E-04	5.31	Q6PE13
Igsf11	Immunoglobulin superfamily member 11	363	S	22.04126	24.47824	1	4.95E-04	2.44	D3Z6S7
Kbtbd11	Kelch repeat and BTB domain-containing protein 11	62	S	21.06632	24.73242	1	5.21E-04	3.67	Q8BNW9
Tjp2	Tight junction protein ZO-2	1044	S	21.84848	24.16438	1	5.59E-04	2.32	Q9Z0U1
Bsn	Protein bassoon	1100	S	21.59462	25.81456	3	5.71E-04	4.22	O88737
Map1a	Microtubule-associated protein 1A	1233	S	21.57896	25.63536	2	6.25E-04	4.06	A2ARP8
Cdkn1b	Cyclin-dependent kinase inhibitor 1B	106	S	21.70388	25.58044	1	6.58E-04	3.88	P46414
Map7d2	MAP7 domain-containing protein 2	62	S	21.8899	24.29272	1	6.80E-04	2.40	A2AG50-2
Lpar1	Lysophosphatidic acid receptor 1	328	S	21.74484	24.10924	2	7.61E-04	2.36	P61793-2
Cep120	Centrosomal protein of 120 kDa	380	S	20.70736	23.1632	2	7.64E-04	2.46	Q7TSG1-2
Pde4b;Pde4d	cAMP-specific 3',5'-cyclic phosphodiesterase 4D	63	S	22.93448	26.24242	2	8.12E-04	3.31	B1AWC8
Snx19	sorting nexin 19	704	S	21.02916	24.21682	1	8.25E-04	3.19	Q6P4T1
Bcas1	brain enriched myelin associated protein 1	269	T	22.02586	24.99	1	9.12E-04	2.96	F7BNZ5
Ralbp1	RalA-binding protein 1	93	S	21.0758	23.85064	3	9.20E-04	2.77	Q62172
Map2	Microtubule-associated protein 2	1140	S	26.7584	28.7815	3	9.73E-04	2.02	P20357
Eps8	Epidermal growth factor receptor kinase substrate 8	684	S	21.07272	23.8943	1	9.78E-04	2.82	Q08509

Rims1	Regulating synaptic membrane exocytosis protein 1	1010	S	21.10656	24.187	1	9.98E-04	3.08	F6VBR4
Dnal1	Dynein light chain 1, axonemal	56	S	22.17384	26.54536	1	1.02E-03	4.37	D3YYU7
Map1b	Microtubule-associated protein 1B	25	S	21.19544	24.17592	2	1.02E-03	2.98	P14873
Gm13889	predicted gene 13889	113	S	21.25488	22.25016	2	1.04E-03	1.00	A0A087WSH6
Adam22	Disintegrin and metalloproteinase domain-containing protein 22	858	T	21.49246	24.27496	2	1.17E-03	2.78	Q9R1V6
Chm	choroideremia (RAB escort protein 1)	622	S	21.26414	24.34652	1	1.23E-03	3.08	Q3UR39
Erbp2ip	Protein LAP2	595	S	21.63238	24.95996	3	1.34E-03	3.33	B2RUJ2
Lphn1	Latrophilin-1	1177	S	22.0828	25.01464	2	1.35E-03	2.93	Q80TR1-2
Ndrp2	Protein NDRG2	321	S	21.5529	26.80604	1	1.49E-03	5.25	Q9QYG0-2
Ybx3	Y-box-binding protein 3	259	S	22.16538	25.61934	1	1.53E-03	3.45	Q9JKB3-2
Nasp	nuclear autoantigenic sperm protein	114	S	21.18412	24.2267	2	1.56E-03	3.04	Q99MD9-2
Dlgap4	Disks large-associated protein 4	970	S	21.31144	23.4599	2	1.59E-03	2.15	B1AZP2-2
Fam134b	Protein FAM134B	264	S	22.40262	24.96734	2	1.63E-03	2.56	E9QPM1
Sik3	Serine/threonine-protein kinase SIK3	591	S	25.19542	26.91546	2	1.65E-03	1.72	E9PU87
Sik3	Serine/threonine-protein kinase SIK3	592	S	25.19542	26.91546	2	1.65E-03	1.72	E9PU87
Rims1	Regulating synaptic membrane exocytosis protein 1	514	S	27.06688	28.18896	1	1.66E-03	1.12	Q99NE5-7
Phldb1	Pleckstrin homology-like domain family B member 1	325	S	22.0394	25.41614	2	1.67E-03	3.38	F6RUK9
Ccar2	Cell cycle and apoptosis regulator protein 2	674	S	25.83452	28.9305	3	1.72E-03	3.10	Q8VDP4
Ccar2	Cell cycle and apoptosis regulator protein 2	677	S	25.83452	28.9305	3	1.72E-03	3.10	Q8VDP4
Ccar2	Cell cycle and apoptosis regulator protein 2	680	S	25.83452	28.9305	3	1.72E-03	3.10	Q8VDP4
Dpysl4	Dihydropyrimidinase-related protein 4	521	S	21.41576	23.54756	2	1.77E-03	2.13	Q3TMU8
Crmp1	Dihydropyrimidinase-related protein 1	684	S	22.65642	27.80666	2	1.87E-03	5.15	Q6P1J1
Bcl9l	B-cell CLL/lymphoma 9-like protein	923	S	21.7482	24.75384	2	1.92E-03	3.01	Q67FY2
Rab11fip2	Rab11 family-interacting protein 2	135	S	21.28792	23.1958	1	1.93E-03	1.91	G3UW57
Tbc1d5	TBC1 domain family member 5	562	S	21.67298	26.05	2	1.96E-03	4.38	Q80XQ2
Erbp2ip	Protein LAP2	599	S	21.82568	24.95996	3	2.03E-03	3.13	B2RUJ2
Bcl9l	B-cell CLL/lymphoma 9-like protein	912	S	21.67662	24.75384	2	2.05E-03	3.08	Q67FY2
Phldb1	Pleckstrin homology-like domain family B member 1	330	S	21.63578	25.41614	2	2.05E-03	3.78	F6RUK9
Fam134b	Protein FAM134B	269	S	22.14782	24.96734	2	2.08E-03	2.82	E9QPM1
Mapk8ip1	C-Jun-amino-terminal kinase-interacting protein 1	14	S	21.64144	27.04482	2	2.09E-03	5.40	Q9WVI9-2
Ralbp1	RalA-binding protein 1	99	S	21.5331	23.85064	3	2.20E-03	2.32	Q62172
Crmp1	Dihydropyrimidinase-related protein 1	680	S	22.59302	27.80666	2	2.27E-03	5.21	Q6P1J1
Nasp	nuclear autoantigenic sperm protein	111	T	21.18196	24.2201	2	2.31E-03	3.04	Q99MD9-2

Kat7	Histone acetyltransferase KAT7	128	T	22.554	25.90062	3	2.33E-03	3.35	Q5SVQ0-4
Cpne6	Copine-6	548	T	27.0809	26.8094	2	2.33E-03	-0.27	Q9Z140
Epb4113	erythrocyte membrane protein band 4.1 like 3	520	S	21.4197	24.82094	2	2.36E-03	3.40	Q9WV92-8
Pagr1a	PAXIP1-associated glutamate-rich protein 1A	147	S	22.03874	24.0513	3	2.37E-03	2.01	Q99L02
Tmem19	Transmembrane protein 19	294	S	21.08302	22.89886	1	2.37E-03	1.82	Q91W52
Pak3	Serine/threonine-protein kinase PAK 3	241	S	21.3765	23.73558	1	2.42E-03	2.36	A3KGC5
Stk32c	Serine/threonine-protein kinase 32C	18	S	27.47958	22.95766	1	2.43E-03	-4.52	Q8QZV4
Prpf4b	Serine/threonine-protein kinase PRP4 homolog	368	S	22.1484	27.08416	2	2.44E-03	4.94	Q61136
Stk32c	Serine/threonine-protein kinase 32C	10	S	22.12478	25.9006	2	2.52E-03	3.78	Q8QZV4
Trp53bp1;Tp53bp1	Tumor suppressor p53-binding protein 1	716	S	22.59584	24.5734	2	2.54E-03	1.98	A2AU89
Gnl1	Guanine nucleotide-binding protein-like 1	50	T	22.87718	26.12694	3	2.75E-03	3.25	P36916
Add3	Gamma-adducin	649	S	21.85344	24.75646	1	2.76E-03	2.90	Q9QYB5-2
Nfib	Nuclear factor 1;Nuclear factor 1 B-type	332	S	21.07826	23.40334	2	2.81E-03	2.33	A2BG76
Rere	Arginine-glutamic acid dipeptide repeats protein	839	S	22.11034	24.50938	3	2.83E-03	2.40	A2A7T3
Bsn	Protein bassoon	1486	S	21.71884	24.00528	3	2.88E-03	2.29	O88737
Gapdh,Gm3839	Glyceraldehyde-3-phosphate dehydrogenase	165	S	21.20106	25.73152	1	2.90E-03	4.53	S4R257
Ank2	Ankyrin-2	2206	S	22.39566	25.23722	3	2.92E-03	2.84	Q8C8R3-4
Erb2ip	Protein LAP2	600	S	22.11914	24.95996	3	2.94E-03	2.84	B2RUJ2
Cnr1	Cannabinoid receptor 1	323	S	20.61994	21.95588	2	2.94E-03	1.34	P47746
Kat7	Histone acetyltransferase KAT7	124	S	22.23112	25.90062	3	2.96E-03	3.67	Q5SVQ0-4
Rtl1	Retrotransposon-like protein 1	1739	S	21.54532	23.73618	2	2.96E-03	2.19	Q7M732
Crmp1	Dihydropyrimidinase-related protein 1	654	S	22.53664	26.12118	2	2.96E-03	3.58	Q6P1J1
Intu	Protein inturned	678	S	21.31472	22.86116	2	3.07E-03	1.55	Q059U7
Add3	Gamma-adducin	42	S	20.60708	24.99394	1	3.11E-03	4.39	Q9QYB5-2
Nbea	Neurobeachin	1004	S	26.32288	27.49464	2	3.14E-03	1.17	Q9EPN1
Srrm2	Serine/arginine repetitive matrix protein 2	453	S	25.6084	21.19234	2	3.21E-03	-4.42	Q8BTI8
Vat11	Synaptic vesicle membrane protein VAT-1 homolog-like	390	S	27.5651	29.72896	3	3.31E-03	2.16	Q80TB8
Rimbp2	RIMS-binding protein 2	793	T	21.30842	24.01946	2	3.39E-03	2.71	A0A0G2JGW5
Map1b	Microtubule-associated protein 1B	1616	S	30.79682	31.33548	2	3.39E-03	0.54	P14873
Mapt	Microtubule-associated protein	497	T	28.56146	30.15026	2	3.40E-03	1.59	A0A0A0MQC7
Rere	Arginine-glutamic acid dipeptide repeats protein	830	S	21.821	24.50938	3	3.44E-03	2.69	A2A7T3
Numbl	Numb-like protein	270	S	21.38036	29.81918	2	3.50E-03	8.44	O08919

Akap10	A-kinase anchor protein 10, mitochondrial	52	S	21.67248	23.45964	1	3.51E-03	1.79	O88845
Git1	ARF GTPase-activating protein GIT1	388	S	21.99116	25.73254	3	3.60E-03	3.74	Q5F258
Gnl1	Guanine nucleotide-binding protein-like 1	48	T	22.53576	26.12694	3	3.69E-03	3.59	P36916
Mylk	Myosin light chain kinase, smooth muscle	1810	S	21.32224	23.68076	2	3.75E-03	2.36	B1B1A8
Rbm28	RNA-binding protein 28	239	S	22.44726	26.39722	2	3.76E-03	3.95	Q8CGC6
Rbm28	RNA-binding protein 28	231	S	22.35398	26.39722	2	3.91E-03	4.04	Q8CGC6
Mtmr2	Myotubularin-related protein 2	4	S	22.15694	24.48588	3	3.96E-03	2.33	Q9Z2D1
Gnl1	Guanine nucleotide-binding protein-like 1	51	S	22.67722	26.12694	3	3.97E-03	3.45	P36916
Map1b	Microtubule-associated protein 1B	1639	S	21.52842	26.1923	2	3.98E-03	4.66	P14873
Prpf4b	Serine/threonine-protein kinase PRP4 homolog	366	S	22.88244	27.08416	2	4.02E-03	4.20	Q61136
Dpysl4	Dihydropyrimidinase-related protein 4	566	S	22.39332	25.05452	2	4.05E-03	2.66	Q3TMU8
Vat1l	Synaptic vesicle membrane protein VAT-1 homolog-like	393	T	27.18086	29.72896	3	4.12E-03	2.55	Q80TB8
Apex1	apurinic/apyrimidinic endonuclease 1	18	S	21.62048	24.91622	1	4.23E-03	3.30	D3Z6R9
Sorbs2	Sorbin and SH3 domain-containing protein 2	443	S	21.41482	23.78102	2	4.25E-03	2.37	Q3UTJ2-2
Rnf214	RING finger protein 214	27	S	21.15114	26.01288	1	4.40E-03	4.86	Q8BFU3-4
Dmd	Dystrophin	542	S	21.10126	24.4569	1	4.40E-03	3.36	A2A9Z1
Git1	ARF GTPase-activating protein GIT1	392	T	21.87562	25.73254	3	4.46E-03	3.86	Q5F258
Nefm	Neurofilament medium polypeptide	550	S	23.00618	27.98332	3	4.52E-03	4.98	P08553
F11r	Junctional adhesion molecule A	285	S	21.4003	23.07784	2	4.55E-03	1.68	O88792
Lpin2	Phosphatidate phosphatase LPIN2	225	S	22.16852	24.41174	2	4.68E-03	2.24	E9PWN0
2310035C23Rik;Kiaa1468	LisH domain and HEAT repeat-containing protein KIAA1468	193	S	22.30312	26.4614	2	4.69E-03	4.16	A0A087WRM8
Fam111a	Protein FAM111A	8	T	21.92628	22.8433	2	4.70E-03	0.92	D3YYD2
Rab8a	Ras-related protein Rab-8A	185	S	26.84214	21.2381	2	4.71E-03	-5.60	P55258
Nefm	Neurofilament medium polypeptide	565	T	22.54386	27.98332	3	4.76E-03	5.44	P08553
Ppp1r2	Protein phosphatase inhibitor 2	122	S	23.98814	25.42342	3	4.79E-03	1.44	D3Z3A0
Ppp1r2	Protein phosphatase inhibitor 2	123	S	23.98814	25.42342	3	4.79E-03	1.44	D3Z3A0
Ppp1r2	Protein phosphatase inhibitor 2	131	S	23.98814	25.42342	3	4.79E-03	1.44	D3Z3A0
Akt1s1	Proline-rich AKT1 substrate 1	239	S	23.3751	25.59248	3	4.81E-03	2.22	E9QKI5
Nefm	Neurofilament medium polypeptide	551	S	22.81054	27.98332	3	4.83E-03	5.17	P08553
Mtmr2	Myotubularin-related protein 2	5	S	21.93836	24.48588	3	4.85E-03	2.55	Q9Z2D1
Snn	Stannin	49	S	21.22464	25.20736	1	4.93E-03	3.98	P61807
Rpap3	RNA polymerase II-associated protein 3	120	S	21.70706	24.44852	3	4.95E-03	2.74	Q9D706
Camk2n2	Calcium/calmodulin-dependent protein kinase II	25	S	21.86918	23.86772	1	5.01E-03	2.00	Q78WH7

	inhibitor 2								
Pdlim4	PDZ and LIM domain protein 4	59	S	20.98758	23.42264	1	5.01E-03	2.44	A8Y5C3
Nucks1	Nuclear ubiquitous casein and cyclin-dependent kinase substrate 1	214	S	26.93758	27.92444	3	5.02E-03	0.99	Q80XU3
Nucks1	Nuclear ubiquitous casein and cyclin-dependent kinase substrate 1	204	S	26.93758	27.92444	3	5.02E-03	0.99	Q80XU3
Nucks1	Nuclear ubiquitous casein and cyclin-dependent kinase substrate 1	202	T	26.93758	27.92444	3	5.02E-03	0.99	Q80XU3
Snx27	Sorting nexin-27	49	S	21.41044	24.14808	1	5.04E-03	2.74	A0A0G2JG07
Git1	ARF GTPase-activating protein GIT1	385	S	22.09804	25.73254	3	5.09E-03	3.63	Q5F258
Dopey2	Protein dopey-2	601	S	22.41266	21.7489	2	5.10E-03	-0.66	Q3UHQ6-2
Mink1	Misshapen-like kinase 1	793	S	23.12748	24.86152	1	5.17E-03	1.73	F7AMS7
Marcks	Myristoylated alanine-rich C-kinase substrate	126	T	22.7265	25.74244	3	5.21E-03	3.02	P26645
Ralbp1	RalA-binding protein 1	92	S	21.88882	23.85064	3	5.24E-03	1.96	Q62172
Tpd52	Tumor protein D52	246	S	22.95496	29.66772	1	5.26E-03	6.71	F8WHQ1
Bcl9	B-cell CLL/lymphoma 9 protein	872	S	23.44492	21.4369	3	5.28E-03	-2.01	Q9D219
Ash2l	ASH2 like histone lysine methyltransferase complex subunit	96	S	22.22196	24.0347	1	5.29E-03	1.81	D6RI55
Slc20a1	Sodium-dependent phosphate transporter 1	269	S	21.54832	24.77158	1	5.41E-03	3.22	Q61609
Fam169a	Soluble lamin-associated protein of 75 kDa	630	S	25.44	27.63628	2	5.49E-03	2.20	Q5XG69
Fam169a	Soluble lamin-associated protein of 75 kDa	631	S	25.44	27.63628	2	5.49E-03	2.20	Q5XG69
Pbxip1	Pre-B-cell leukemia transcription factor-interacting protein 1	151	S	21.22914	23.21366	3	5.51E-03	1.98	D3YUE1
Apba1	Amyloid beta A4 precursor protein-binding family A member 1	246	S	26.30454	24.8859	3	5.57E-03	-1.42	B2RUJ5
Apba1	Amyloid beta A4 precursor protein-binding family A member 1	250	S	26.30454	24.8859	3	5.57E-03	-1.42	B2RUJ5
Apba1	Amyloid beta A4 precursor protein-binding family A member 1	252	S	26.30454	24.8859	3	5.57E-03	-1.42	B2RUJ5
Zfp423;Znf423	Zinc finger protein 423	487	S	22.38772	23.23492	2	5.59E-03	0.85	G3UW89
Nrcam	Neuronal cell adhesion molecule	1251	S	21.7674	25.3428	2	5.67E-03	3.58	Q810U4-3
Penk	preproenkephalin	252	S	21.98608	23.69206	2	5.68E-03	1.71	P22005
Rtl1	Retrotransposon-like protein 1	1737	S	22.0014	23.73618	2	5.71E-03	1.73	Q7M732
Cers2	Ceramide synthase 2	341	S	21.59614	25.6424	3	5.75E-03	4.05	Q924Z4
Rplp2	60S acidic ribosomal protein P2	105	S	21.92594	24.91438	2	5.80E-03	2.99	P99027
Heph	Hephaestin	1143	S	22.2135	23.7311	2	5.83E-03	1.52	Q9Z0Z4-2
Rpap3	RNA polymerase II-associated protein 3	122	S	22.06756	24.44852	3	5.86E-03	2.38	Q9D706

Ncl	Nucleolin	145	S	21.9254	26.30454	2	5.94E-03	4.38	P09405
Foxk1	Forkhead box protein K1	422	T	21.9596	23.23072	2	6.05E-03	1.27	P42128
Snx11	Sorting nexin-11	192	S	22.7396	26.25084	2	6.15E-03	3.51	Q91WL6
Dnajc6	Putative tyrosine-protein phosphatase auxilin	695	S	21.38496	26.04012	1	6.15E-03	4.66	Q80TZ3-2
Ppp1r11	Protein phosphatase 1 regulatory subunit 11	69	T	21.37386	23.48518	2	6.18E-03	2.11	G3UZ30
Gabbr2	Gamma-aminobutyric acid type B receptor subunit 2	762	T	23.15576	27.14376	1	6.20E-03	3.99	Q80T41
Zdhhc5	Palmitoyltransferase ZDHHC5	345	S	23.27124	21.23488	2	6.24E-03	-2.04	Q8VDZ4-2
Camk2a	Calcium/calmodulin-dependent protein kinase type II subunit alpha	341	S	23.00406	24.99494	3	6.25E-03	1.99	F8WIS9
Fam219a	Protein FAM219A	85	T	22.98238	25.84486	2	6.29E-03	2.86	A2ANP2
Map1b	Microtubule-associated protein 1B	888	S	22.93772	26.18102	3	6.32E-03	3.24	P14873
Map1a	Microtubule-associated protein 1A	2006	S	25.06844	27.6398	3	6.51E-03	2.57	A2ARP8
Map1a	Microtubule-associated protein 1A	2010	S	25.06844	27.6398	3	6.51E-03	2.57	A2ARP8
Stk32c	Serine/threonine-protein kinase 32C	17	S	21.55384	26.36558	1	6.57E-03	4.81	Q8QZV4
Vat1l	Synaptic vesicle membrane protein VAT-1 homolog-like	394	S	27.64078	29.72896	3	6.67E-03	2.09	Q80TB8
Vat1l	Synaptic vesicle membrane protein VAT-1 homolog-like	391	T	27.64078	29.72896	3	6.67E-03	2.09	Q80TB8
Cers2	Ceramide synthase 2	346	T	22.13126	25.6424	3	6.74E-03	3.51	Q924Z4
Nrcam	Neuronal cell adhesion molecule	1247	S	21.8295	25.32642	2	6.89E-03	3.50	Q810U4-3
Arhgap32	Rho GTPase-activating protein 32	360	S	21.20414	25.1296	2	7.05E-03	3.93	Q811P8-2
Pclo	Protein piccolo	860	T	22.74114	25.38926	2	7.09E-03	2.65	Q9QYX7
Gnl1	Guanine nucleotide-binding protein-like 1	51	S	26.00072	27.5241	2	7.13E-03	1.52	P36916
Cers2	Ceramide synthase 2	349	S	21.99988	25.6424	3	7.15E-03	3.64	Q924Z4
Ranbp2	E3 SUMO-protein ligase RanBP2	2729	S	21.66282	26.82876	1	7.15E-03	5.17	Q9ERU9
Snx11	Sorting nexin-11	194	S	22.5621	26.25084	2	7.17E-03	3.69	Q91WL6
Gripap1	GRIP1-associated protein 1	606	S	21.69976	23.08722	1	7.17E-03	1.39	A2AEW9
Kidins220	kinase D-interacting substrate 220	1551	T	22.38344	24.21764	2	7.20E-03	1.83	E9Q9B7
Fam171a2	Protein FAM171A2	604	S	24.80246	21.57824	2	7.28E-03	-3.22	A2A699-2
Svop	Synaptic vesicle 2-related protein	546	S	21.43808	23.8349	2	7.39E-03	2.40	Q8BFT9
Mff	Mitochondrial fission factor	151	S	25.3269	26.7452	2	7.46E-03	1.42	Q6PCP5
Mbp	Myelin basic protein	46	T	21.83494	24.32478	2	7.53E-03	2.49	F7A0B0
Ank2	Ankyrin-2	3764	S	26.20374	26.86604	3	7.55E-03	0.66	Q8C8R3-4
Ank2	Ankyrin-2	3760	S	26.20374	26.86604	3	7.55E-03	0.66	Q8C8R3-4
Ank2	Ankyrin-2	3756	T	26.20374	26.86604	3	7.55E-03	0.66	Q8C8R3-4

Ank2	Ankyrin-2	3759	T	26.20374	26.86604	3	7.55E-03	0.66	Q8C8R3-4
Fam219a	Protein FAM219A	87	S	22.7684	25.84486	2	7.57E-03	3.08	A2ANP2
Dmtn	Dematin	11	S	21.31788	22.94036	2	7.60E-03	1.62	Q9WV69
Slc12a5	Solute carrier family 12 member 5	1044	S	26.70182	22.20638	1	7.60E-03	-4.50	Q91V14
Pagr1a	PAXIP1-associated glutamate-rich protein 1A	142	S	22.09024	24.0513	3	7.64E-03	1.96	Q99L02
Cep170b	Centrosomal protein of 170 kDa protein B	478	S	21.3236	23.35406	1	7.65E-03	2.03	Q80U49
Arhgap32	Rho GTPase-activating protein 32	363	S	21.23992	24.27832	3	7.74E-03	3.04	Q811P8-2
Rasgrf1	Ras-specific guanine nucleotide-releasing factor 1	837	S	22.22296	25.02336	3	7.77E-03	2.80	P27671
Epb4.111;Epb4111	Band 4.1-like protein 1	466	S	23.15678	21.26984	1	7.82E-03	-1.89	A2AUK5
Map1a	Microtubule-associated protein 1A;MAP1A heavy chain;MAP1 light chain LC2	2000	S	24.16148	27.62436	3	7.82E-03	3.46	A2ARP8
Mfap1	Microfibrillar-associated protein 1	52	S	24.49378	26.6004	2	7.85E-03	2.11	Q9CQU1
Mfap1	Microfibrillar-associated protein 1	53	S	24.49378	26.6004	2	7.85E-03	2.11	Q9CQU1
Cers2	Ceramide synthase 2	348	S	22.3003	25.6424	3	7.86E-03	3.34	Q924Z4
2310035C23Rik;Kiaa1468	LisH domain and HEAT repeat-containing protein KIAA1468	243	S	28.20074	22.26164	1	7.95E-03	5.94	A0A087WRM8
Lpar1	Lysophosphatidic acid receptor 1	333	T	21.84402	24.10924	2	8.03E-03	2.27	P61793-2
Mtmr2	Myotubularin-related protein 2	6	S	21.90464	24.48588	3	8.13E-03	2.58	Q9Z2D1
Map2	Microtubule-associated protein 2	1781	T	24.81142	21.18818	1	8.30E-03	-3.62	P20357
G3bp2	Ras GTPase-activating protein-binding protein 2	225	S	21.52364	24.2242	1	8.37E-03	2.70	P97379-2
Sorbs2	Sorbin and SH3 domain-containing protein 2	494	S	21.88858	24.82596	1	8.40E-03	2.94	Q3UTJ2-2
A830010M20Rik;Kiaa1107	Uncharacterized protein KIAA1107	783	S	25.79398	27.1359	2	8.46E-03	1.34	G3X9V7
A830010M20Rik;Kiaa1107	Uncharacterized protein KIAA1107	785	S	25.79398	27.1359	2	8.46E-03	1.34	G3X9V7
Dpysl3	Dihydropyrimidinase-related protein 3	677	S	21.65326	26.61428	2	8.49E-03	4.96	E9PWE8
Tmpo	thymopoietin	74	T	21.943	23.61936	2	8.55E-03	1.68	Q61033-2
Begain	Brain-enriched guanylate kinase-associated protein	298	S	21.78756	24.92276	2	8.56E-03	3.14	A0A087WQY4
Pclo	Protein piccolo	856	S	23.01246	25.38926	2	8.57E-03	2.38	Q9QYX7
Fam169a	Soluble lamin-associated protein of 75 kDa	610	S	22.65038	25.72956	3	8.60E-03	3.08	Q5XG69
Snip1	Smad nuclear-interacting protein 1	50	S	21.35408	23.40528	2	8.64E-03	2.05	Q8BIZ6
Slc12a5	Solute carrier family 12 member 5	57	T	26.50146	22.55398	2	8.65E-03	-3.95	Q91V14
Map2	Microtubule-associated protein 2	1145	S	27.58234	28.56712	3	8.76E-03	0.98	P20357
Map1b	Microtubule-associated protein 1B	1325	S	21.14108	27.70624	2	8.83E-03	6.57	P14873
Slc9a1	Sodium/hydrogen exchanger 1	730	S	27.18352	23.71112	2	8.83E-03	-3.47	Q61165

Rpap3	RNA polymerase II-associated protein 3	117	S	22.05378	24.44852	3	8.85E-03	2.39	Q9D706
Scn2a1	Sodium channel protein	558	S	21.75736	25.2653	2	8.96E-03	3.51	B1AWN6
Kcnt1	Potassium channel subfamily T member 1	47	S	21.60344	23.61418	2	9.07E-03	2.01	A2AHB6
Dnm1	Dynamamin-1	851	S	23.75788	27.32808	1	9.28E-03	3.57	P39053-4
Map2	Microtubule-associated protein 2	1620	T	27.17254	29.58212	2	9.32E-03	2.41	P20357
Map2	Microtubule-associated protein 2	1623	T	27.17254	29.58212	2	9.32E-03	2.41	P20357
Csnk1d	Casein kinase I isoform delta	383	S	21.66004	23.8197	2	9.34E-03	2.16	Q9DC28-2
Csnk1d	Casein kinase I isoform delta	384	S	21.38128	23.7796	2	9.35E-03	2.40	Q9DC28-2
Rplp2	60S acidic ribosomal protein P2	102	S	21.40472	24.91438	2	9.37E-03	3.51	P99027
Mark4	MAP/microtubule affinity-regulating kinase 4	2	S	21.6819	23.36052	2	9.48E-03	1.68	Q8CIP4
Gm10108;Cy cs	Cytochrome c, somatic	48	S	21.47282	22.94844	1	9.51E-03	1.48	G3UWG1
Rlim	E3 ubiquitin-protein ligase RLIM	229	S	21.27094	22.90822	2	9.52E-03	1.64	Q9WTV7
Pbxip1	Pre-B-cell leukemia transcription factor-interacting protein 1	149	S	20.97976	23.20448	3	9.60E-03	2.22	D3YUE1
Kcnd3	Potassium voltage-gated channel subfamily D member 3	153	S	24.86112	25.4231	1	9.61E-03	0.56	Q9Z0V1
Rasgrf1	Ras-specific guanine nucleotide-releasing factor 1	852	T	21.71096	25.02336	3	9.73E-03	3.31	P27671
Slc9a1	Sodium/hydrogen exchanger 1	727	S	22.82828	26.48262	1	9.79E-03	3.65	Q61165
Myo18a	Unconventional myosin-XVIIIa	2037	S	26.2124	27.47928	2	9.84E-03	1.27	Q9JMH9
Myo18a	Unconventional myosin-XVIIIa	2039	S	26.2124	27.47928	2	9.84E-03	1.27	Q9JMH9
Map1b	Microtubule-associated protein 1B	905	T	22.70568	26.18102	3	9.87E-03	3.48	P14873
Cspg5	Chondroitin sulfate proteoglycan 5	465	T	22.8948	21.4166	1	9.91E-03	-1.48	Q71M36

Supplemental Table 2: Microarray analyses of laser-capture-microdissected ARC from HFD-fed Dusp8 WT and KO mice. By microarray analysis a set of 893 significantly regulated genes was defined by the following criteria: limma t-test p-value < 0.05, linear fold-change>1.3x, and detection p-value <0.05 in at least half of the samples in at least one group.

Symbol	Gene name	Illumina PROBE_ID	Linear average expression Dusp8 KO	Linear average expression WT	Linear fold-change, Dusp8 KO vs WT
Mup1	Mus musculus major urinary protein 1 (Mup1), mRNA.	ILMN_2875730	148	25	5.91
Mup2	Mus musculus major urinary protein 2 (Mup2), transcript variant 1, mRNA.	ILMN_3143404	96	20	4.90
Mup20	major urinary protein 20	ILMN_2881950	56	12	4.75
Apoa2	apolipoprotein A-II [Source:MGI Symbol;Acc:MGI:88050]	ILMN_1247156	45	11	4.22
Serpina1b	serine (or cysteine) preptidase inhibitor, clade A, member 1B [Source:MGI Symbol;Acc:MGI:891970]	ILMN_2659680	53	13	4.07
Serpina1b	serine (or cysteine) preptidase inhibitor, clade A, member 1B [Source:MGI Symbol;Acc:MGI:891970]	ILMN_1215859	60	15	3.88
Pvalb	parvalbumin [Source:MGI Symbol;Acc:MGI:97821]	ILMN_1218223	79	20	3.86
Mup2	Mus musculus major urinary protein 2 (Mup2), transcript variant 1, mRNA.	ILMN_3065459	76	23	3.37
Serpina1c	serine (or cysteine) peptidase inhibitor, clade A, member 1C [Source:MGI Symbol;Acc:MGI:891969]	ILMN_3004600	54	17	3.28
Ccdc151	coiled-coil domain containing 151 [Source:MGI Symbol;Acc:MGI:1924859]	ILMN_2987394	95	30	3.15
Mup5	major urinary protein 5 [Source:MGI Symbol;Acc:MGI:104974]	ILMN_3158509	45	14	3.08
Ttyh2	tweety family member 2 [Source:MGI Symbol;Acc:MGI:2157091]	ILMN_2522155	74	25	2.94
Syt12	synaptotagmin XII [Source:MGI Symbol;Acc:MGI:2159601]	ILMN_1246560	56	20	2.78
Evi2a	ecotropic viral integration site 2a [Source:MGI Symbol;Acc:MGI:95458]	ILMN_1251669	74	28	2.61
Plekhf2	pleckstrin homology domain containing, family F (with FYVE domain) member 2 [Source:MGI Symbol;Acc:MGI:1919051]	ILMN_2798694	81	31	2.61
Supv311	suppressor of var1, 3-like 1 (S. cerevisiae) [Source:MGI Symbol;Acc:MGI:2441711]	ILMN_2618745	113	44	2.60
Cyp2e1	cytochrome P450, family 2, subfamily e, polypeptide 1 [Source:MGI Symbol;Acc:MGI:88607]	ILMN_2687014	38	15	2.60
Krtap19-4	keratin associated protein 19-4 [Source:MGI Symbol;Acc:MGI:2157757]	ILMN_2645563	48	19	2.58
Zic1	zinc finger protein of the cerebellum 1 [Source:MGI Symbol;Acc:MGI:106683]	ILMN_2491186	153	59	2.58
Caap1	caspase activity and apoptosis inhibitor 1 [Source:MGI Symbol;Acc:MGI:1915020]	ILMN_1217473	80	31	2.57
Trim59	tripartite motif-containing 59 [Source:MGI Symbol;Acc:MGI:1914199]	ILMN_2993661	85	33	2.56
Matn1	matrilin 1, cartilage matrix protein [Source:MGI Symbol;Acc:MGI:106591]	ILMN_1219993	36	14	2.50
Ggct	gamma-glutamyl cyclotransferase [Source:MGI Symbol;Acc:MGI:95700]	ILMN_2766493	100	40	2.50

Lgi3	leucine-rich repeat LGI family, member 3 [Source:MGI Symbol;Acc:MGI:2182619]	ILMN_2994995	53	21	2.48
Nfkbid	nuclear factor of kappa light polypeptide gene enhancer in B cells inhibitor, delta [Source:MGI Symbol;Acc:MGI:3041243]	ILMN_1225192	60	24	2.47
Eva1b	eva-1 homolog B (C. elegans)	ILMN_2890357	38	16	2.33
Serpina1a	serine (or cysteine) peptidase inhibitor, clade A, member 1A [Source:MGI Symbol;Acc:MGI:891971]	ILMN_1225699	39	17	2.32
Clk3	CDC-like kinase 3 [Source:MGI Symbol;Acc:MGI:1098670]	ILMN_2801404	50	22	2.32
Ghrl	ghrelin [Source:MGI Symbol;Acc:MGI:1930008]	ILMN_2643658	37	16	2.32
Adh1	alcohol dehydrogenase 1 (class I) [Source:MGI Symbol;Acc:MGI:87921]	ILMN_2850077	29	13	2.29
Mup4	major urinary protein 4 [Source:MGI Symbol;Acc:MGI:97236]	ILMN_2592166	36	16	2.28
Itsn1	intersectin 1 (SH3 domain protein 1A) [Source:MGI Symbol;Acc:MGI:1338069]	ILMN_2627268	42	18	2.27
Pck1	phosphoenolpyruvate carboxykinase 1, cytosolic [Source:MGI Symbol;Acc:MGI:97501]	ILMN_1213632	104	46	2.26
Atg4d	autophagy related 4D, cysteine peptidase [Source:MGI Symbol;Acc:MGI:2444308]	ILMN_2601710	32	14	2.26
3110040N11Rik	RIKEN cDNA 3110040N11 gene [Source:MGI Symbol;Acc:MGI:1914540]	ILMN_1255496	53	23	2.24
Serpina1a	serine (or cysteine) peptidase inhibitor, clade A, member 1A [Source:MGI Symbol;Acc:MGI:891971]	ILMN_2777493	37	17	2.23
Rnf150	ring finger protein 150 [Source:MGI Symbol;Acc:MGI:2443860]	ILMN_3032501	45	20	2.22
Pdlim5	PDZ and LIM domain 5 [Source:MGI Symbol;Acc:MGI:1927489]	ILMN_2771219	40	18	2.22
Naa16	N(alpha)-acetyltransferase 16, NatA auxiliary subunit [Source:MGI Symbol;Acc:MGI:1914147]	ILMN_2956741	44	20	2.21
Ptpmt1	protein tyrosine phosphatase, mitochondrial 1 [Source:MGI Symbol;Acc:MGI:1913711]	ILMN_2602406	123	56	2.20
Kcnmb2	potassium large conductance calcium-activated channel, subfamily M, beta member 2 [Source:MGI Symbol;Acc:MGI:1919663]	ILMN_1259717	32	15	2.18
Acadvl	acyl-Coenzyme A dehydrogenase, very long chain [Source:MGI Symbol;Acc:MGI:895149]	ILMN_2956932	36	17	2.17
Gdf9	growth differentiation factor 9 [Source:MGI Symbol;Acc:MGI:95692]	ILMN_1225090	30	14	2.17
Gnpda1	glucosamine-6-phosphate deaminase 1 [Source:MGI Symbol;Acc:MGI:1347054]	ILMN_2750548	80	37	2.16
Mpped1	metallophosphoesterase domain containing 1 [Source:MGI Symbol;Acc:MGI:106316]	ILMN_2760540	38	18	2.15
Lcorl	ligand dependent nuclear receptor corepressor-like [Source:MGI Symbol;Acc:MGI:2651932]	ILMN_1238589	32	15	2.15
Cdh11	cadherin 11 [Source:MGI Symbol;Acc:MGI:99217]	ILMN_2737073	27	13	2.12
Usp9x	ubiquitin specific peptidase 9, X chromosome [Source:MGI Symbol;Acc:MGI:894681]	ILMN_2503651	42	20	2.11

Dnajc24	DnaJ heat shock protein family (Hsp40) member C24 [Source:MGI Symbol;Acc:MGI:1919522]	ILMN_2839310	32	15	2.11
Alb	albumin [Source:MGI Symbol;Acc:MGI:87991]	ILMN_2651160	28	13	2.10
Srprb	Mus musculus signal recognition particle receptor, B subunit (Srprb), mRNA.	ILMN_1244768	40	19	2.09
Aldob	aldolase B, fructose-bisphosphate [Source:MGI Symbol;Acc:MGI:87995]	ILMN_1224012	72	34	2.08
Rtn1	reticulon 1 [Source:MGI Symbol;Acc:MGI:1933947]	ILMN_3040710	61	29	2.08
Zcchc11	zinc finger, CCHC domain containing 11 [Source:MGI Symbol;Acc:MGI:2445126]	ILMN_1231967	29	14	2.07
Arpc3	actin related protein 2/3 complex, subunit 3 [Source:MGI Symbol;Acc:MGI:1928375]	ILMN_2603725	63	31	2.06
Egfl7	Mus musculus EGF-like domain 7 (Egfl7), transcript variant c, mRNA.	ILMN_3163288	41	20	2.06
Fbxo32	F-box protein 32 [Source:MGI Symbol;Acc:MGI:1914981]	ILMN_2752994	43	21	2.06
Pex5l	peroxisomal biogenesis factor 5-like [Source:MGI Symbol;Acc:MGI:1916672]	ILMN_2617930	33	16	2.05
Hira	histone cell cycle regulator	ILMN_2651880	32	16	2.04
Mfsd7c	major facilitator superfamily domain containing 7C [Source:MGI Symbol;Acc:MGI:2384974]	ILMN_1248190	55	27	2.04
Myg1	melanocyte proliferating gene 1 [Source:MGI Symbol;Acc:MGI:1929864]	ILMN_1219703	28	14	2.04
Hbp1	high mobility group box transcription factor 1 [Source:MGI Symbol;Acc:MGI:894659]	ILMN_1230323	50	25	2.03
Tmem120b	transmembrane protein 120B [Source:MGI Symbol;Acc:MGI:3603158]	ILMN_2909283	38	19	2.03
Mfng	MFNG O-fucosylpeptide 3-beta-N-acetylglucosaminyltransferase [Source:MGI Symbol;Acc:MGI:1095404]	ILMN_2687661	44	21	2.03
Edn1	endothelin 1 [Source:MGI Symbol;Acc:MGI:95283]	ILMN_2737713	38	18	2.03
Gsta3	glutathione S-transferase, alpha 3 [Source:MGI Symbol;Acc:MGI:95856]	ILMN_1241437	70	34	2.03
Mettl1	methyltransferase like 1 [Source:MGI Symbol;Acc:MGI:1339986]	ILMN_2732419	36	18	2.02
Iah1	isoamyl acetate-hydrolyzing esterase 1 homolog [Source:MGI Symbol;Acc:MGI:1914982]	ILMN_2620803	26	13	2.02
Mllt10	myeloid/lymphoid or mixed-lineage leukemia; translocated to, 10 [Source:MGI Symbol;Acc:MGI:1329038]	ILMN_2630536	82	41	2.01
Dennd5b	DENN/MADD domain containing 5B [Source:MGI Symbol;Acc:MGI:2444273]	ILMN_2700354	71	36	1.99
Sept6	septin 6 [Source:MGI Symbol;Acc:MGI:1888939]	ILMN_2992517	68	34	1.99
Ankrd49	ankyrin repeat domain 49 [Source:MGI Symbol;Acc:MGI:1930842]	ILMN_2592358	70	35	1.99
Smardc3	SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily d, member 3 [Source:MGI Symbol;Acc:MGI:1914243]	ILMN_1248397	41	21	1.99
Zfx4	zinc finger homeodomain 4 [Source:MGI Symbol;Acc:MGI:2137668]	ILMN_2520592	48	24	1.99
Fhad1	forkhead-associated (FHA) phosphopeptide binding domain 1 [Source:MGI Symbol;Acc:MGI:1920323]	ILMN_3000155	45	23	1.97

Tmem51	transmembrane protein 51 [Source:MGI Symbol;Acc:MGI:2384874]	ILMN_2589741	75	38	1.97
Vps26a	VPS26 retromer complex component A [Source:MGI Symbol;Acc:MGI:1353654]	ILMN_1251809	29	15	1.96
Plin3	perilipin 3 [Source:MGI Symbol;Acc:MGI:1914155]	ILMN_1245528	97	50	1.96
Etfα	electron transferring flavoprotein, alpha polypeptide [Source:MGI Symbol;Acc:MGI:106092]	ILMN_2649966	146	75	1.95
Tref1	transcriptional regulating factor 1 [Source:MGI Symbol;Acc:MGI:2442086]	ILMN_1227770	89	46	1.94
Map2k3	mitogen-activated protein kinase kinase 3 [Source:MGI Symbol;Acc:MGI:1346868]	ILMN_2659644	30	15	1.94
Irf6	interferon regulatory factor 6 [Source:MGI Symbol;Acc:MGI:1859211]	ILMN_1216279	27	14	1.94
Mcm2	minichromosome maintenance complex component 2 [Source:MGI Symbol;Acc:MGI:105380]	ILMN_1250907	31	16	1.94
Ppfp2	PTPRF interacting protein, binding protein 2 (liprin beta 2) [Source:MGI Symbol;Acc:MGI:894649]	ILMN_2760001	31	16	1.94
Rad23a	RAD23 homolog A, nucleotide excision repair protein [Source:MGI Symbol;Acc:MGI:105126]	ILMN_2637052	120	62	1.94
Mdm1	transformed mouse 3T3 cell double minute 1 [Source:MGI Symbol;Acc:MGI:96951]	ILMN_2727628	34	18	1.94
Trnaulap	tRNA selenocysteine 1 associated protein 1 [Source:MGI Symbol;Acc:MGI:1919037]	ILMN_2595530	78	40	1.93
Bcl11b	B cell leukemia/lymphoma 11B [Source:MGI Symbol;Acc:MGI:1929913]	ILMN_2611022	44	23	1.93
Mrpl46	mitochondrial ribosomal protein L46	ILMN_2740922	84	43	1.93
Pex26	peroxisomal biogenesis factor 26 [Source:MGI Symbol;Acc:MGI:1921293]	ILMN_2652077	40	21	1.93
Tln1	talin 1 [Source:MGI Symbol;Acc:MGI:1099832]	ILMN_2605679	47	25	1.93
Rad23a	RAD23 homolog A, nucleotide excision repair protein [Source:MGI Symbol;Acc:MGI:105126]	ILMN_1216295	138	72	1.92
Dcps	decapping enzyme, scavenger [Source:MGI Symbol;Acc:MGI:1916555]	ILMN_2720770	38	20	1.92
Kcnab3	potassium voltage-gated channel, shaker-related subfamily, beta member 3 [Source:MGI Symbol;Acc:MGI:1336208]	ILMN_2655386	32	17	1.91
Ufsp2	UFM1-specific peptidase 2 [Source:MGI Symbol;Acc:MGI:1913679]	ILMN_2717569	33	17	1.91
Mtmr14	myotubularin related protein 14 [Source:MGI Symbol;Acc:MGI:1916075]	ILMN_2689062	33	17	1.91
Olfm3	olfactomedin 3 [Source:MGI Symbol;Acc:MGI:2387329]	ILMN_2710095	44	23	1.91
Eif4a3	eukaryotic translation initiation factor 4A3 [Source:MGI Symbol;Acc:MGI:1923731]	ILMN_2588254	54	28	1.90
Rabac1	Rab acceptor 1 (prenylated) [Source:MGI Symbol;Acc:MGI:1201692]	ILMN_2710112	51	27	1.90
Gpr68	G protein-coupled receptor 68 [Source:MGI Symbol;Acc:MGI:2441763]	ILMN_2732996	32	17	1.90
Phf11d	PHD finger protein 11D [Source:MGI Symbol;Acc:MGI:1277133]	ILMN_2684848	22	12	1.90
Thtpa	thiamine triphosphatase [Source:MGI Symbol;Acc:MGI:2446078]	ILMN_2794825	86	45	1.90

Als2	amyotrophic lateral sclerosis 2 (juvenile) [Source:MGI Symbol;Acc:MGI:1921268]	ILMN_2620053	71	37	1.90
Zdhhc15	zinc finger, DHHC domain containing 15 [Source:MGI Symbol;Acc:MGI:1915336]	ILMN_2798576	24	13	1.89
Trim33	tripartite motif-containing 33 [Source:MGI Symbol;Acc:MGI:2137357]	ILMN_1259222	64	34	1.89
E430018J23Rik	RIKEN cDNA E430018J23 gene	ILMN_2881039	23	12	1.89
Arc	activity regulated cytoskeletal-associated protein [Source:MGI Symbol;Acc:MGI:88067]	ILMN_2597827	31	17	1.88
P2rx4	purinergic receptor P2X, ligand-gated ion channel 4 [Source:MGI Symbol;Acc:MGI:1338859]	ILMN_1237644	25	13	1.88
Elm1	engulfment and cell motility 1 [Source:MGI Symbol;Acc:MGI:2153044]	ILMN_1235672	27	14	1.88
Taf11	TATA-box binding protein associated factor 11 [Source:MGI Symbol;Acc:MGI:1916026]	ILMN_2946281	111	59	1.88
Abhd5	abhydrolase domain containing 5 [Source:MGI Symbol;Acc:MGI:1914719]	ILMN_2739295	54	29	1.88
Pank4	pantothenate kinase 4 [Source:MGI Symbol;Acc:MGI:2387466]	ILMN_2644140	62	33	1.87
Slc24a2	solute carrier family 24 (sodium/potassium/calcium exchanger), member 2 [Source:MGI Symbol;Acc:MGI:1923626]	ILMN_1216404	179	96	1.87
Mustn1	musculoskeletal, embryonic nuclear protein 1 [Source:MGI Symbol;Acc:MGI:1913425]	ILMN_2658461	47	25	1.86
Plekhf2	pleckstrin homology domain containing, family F (with FYVE domain) member 2 [Source:MGI Symbol;Acc:MGI:1919051]	ILMN_1237736	28	15	1.86
Pard3	par-3 family cell polarity regulator [Source:MGI Symbol;Acc:MGI:2135608]	ILMN_2648709	34	18	1.86
Srsf1	serine/arginine-rich splicing factor 1	ILMN_3142235	147	79	1.86
Akap9	A kinase (PRKA) anchor protein (yotiao) 9 [Source:MGI Symbol;Acc:MGI:2178217]	ILMN_2678495	91	49	1.86
H13	histocompatibility 13 [Source:MGI Symbol;Acc:MGI:95886]	ILMN_2742160	43	23	1.86
Pou2f1	POU domain, class 2, transcription factor 1 [Source:MGI Symbol;Acc:MGI:101898]	ILMN_2718359	27	15	1.85
Cryz1	crystallin, zeta (quinone reductase)-like 1 [Source:MGI Symbol;Acc:MGI:1913859]	ILMN_2648695	73	40	1.85
Stard4	StAR-related lipid transfer (START) domain containing 4 [Source:MGI Symbol;Acc:MGI:2156764]	ILMN_1240445	28	15	1.85
Gm10146	predicted gene 10146	ILMN_1233901	20	11	1.85
Shisa7	shisa family member 7 [Source:MGI Symbol;Acc:MGI:3605641]	ILMN_2606540	63	34	1.84
Bex2	brain expressed X-linked 2 [Source:MGI Symbol;Acc:MGI:1338017]	ILMN_3143078	104	57	1.84
Lrpprc	leucine-rich PPR-motif containing [Source:MGI Symbol;Acc:MGI:1919666]	ILMN_2845208	32	17	1.84
Glr3	glutaredoxin 3 [Source:MGI Symbol;Acc:MGI:1353653]	ILMN_2925066	59	32	1.83
Trim66	tripartite motif-containing 66 [Source:MGI Symbol;Acc:MGI:2152406]	ILMN_1249793	23	13	1.82
Smdt1	single-pass membrane protein with aspartate rich tail 1 [Source:MGI	ILMN_2648580	35	19	1.82

	Symbol;Acc:MGI:1916279]				
Usp9x	ubiquitin specific peptidase 9, X chromosome [Source:MGI Symbol;Acc:MGI:894681]	ILMN_2470287	58	32	1.82
2610042L04Rik	RIKEN cDNA 2610042L04 gene [Source:MGI Symbol;Acc:MGI:1914305]	ILMN_2814258	52	29	1.82
Kdm1b	lysine (K)-specific demethylase 1B [Source:MGI Symbol;Acc:MGI:2145261]	ILMN_3007898	73	40	1.82
Numb	numb homolog (Drosophila) [Source:MGI Symbol;Acc:MGI:107423]	ILMN_2727687	37	20	1.81
Cfap65	cilia and flagella associated protein 65 [Source:MGI Symbol;Acc:MGI:2444274]	ILMN_3162084	50	28	1.81
Uprt	uracil phosphoribosyltransferase [Source:MGI Symbol;Acc:MGI:2685620]	ILMN_2936221	110	61	1.81
Dhrs7b	dehydrogenase/reductase (SDR family) member 7B [Source:MGI Symbol;Acc:MGI:2384931]	ILMN_3114114	84	47	1.80
Zfp386	zinc finger protein 386 (Kruppel-like) [Source:MGI Symbol;Acc:MGI:1930708]	ILMN_3142440	29	16	1.80
Acsl6	acyl-CoA synthetase long-chain family member 6 [Source:MGI Symbol;Acc:MGI:894291]	ILMN_2621697	33	18	1.79
Ppp1cb	protein phosphatase 1, catalytic subunit, beta isoform [Source:MGI Symbol;Acc:MGI:104871]	ILMN_2724066	89	50	1.79
Sorbs3	sorbin and SH3 domain containing 3 [Source:MGI Symbol;Acc:MGI:700013]	ILMN_2618221	35	20	1.79
Dram1	DNA-damage regulated autophagy modulator 1 [Source:MGI Symbol;Acc:MGI:1918962]	ILMN_1219820	29	16	1.78
Bbc3	BCL2 binding component 3 [Source:MGI Symbol;Acc:MGI:2181667]	ILMN_2920736	169	95	1.78
Gnl3	guanine nucleotide binding protein-like 3 (nucleolar)	ILMN_2601639	94	53	1.78
Ubxn4	UBX domain protein 4 [Source:MGI Symbol;Acc:MGI:1915062]	ILMN_2422153	35	20	1.78
Accs	l-aminocyclopropane-1-carboxylate synthase (non-functional) [Source:MGI Symbol;Acc:MGI:1919717]	ILMN_2776485	37	21	1.78
4933434E20Rik	RIKEN cDNA 4933434E20 gene [Source:MGI Symbol;Acc:MGI:1914027]	ILMN_2594807	62	35	1.78
Ddb2	damage specific DNA binding protein 2 [Source:MGI Symbol;Acc:MGI:1355314]	ILMN_2621160	23	13	1.78
Dhx38	DEAH (Asp-Glu-Ala-His) box polypeptide 38 [Source:MGI Symbol;Acc:MGI:1927617]	ILMN_3161767	105	59	1.78
Prkd3	protein kinase D3 [Source:MGI Symbol;Acc:MGI:1922542]	ILMN_1221007	76	43	1.78
Mtus1	mitochondrial tumor suppressor 1 [Source:MGI Symbol;Acc:MGI:2142572]	ILMN_3162801	67	38	1.78
Zfp763	zinc finger protein 763 [Source:MGI Symbol;Acc:MGI:1920701]	ILMN_2645368	69	39	1.77
Des	desmin [Source:MGI Symbol;Acc:MGI:94885]	ILMN_2836982	55	31	1.77
B3gnt8	UDP-GlcNAc:betaGal beta-1,3-N-acetylglucosaminyltransferase 8 [Source:MGI Symbol;Acc:MGI:2385269]	ILMN_2614889	33	19	1.77
Ints3	integrator complex subunit 3 [Source:MGI Symbol;Acc:MGI:2140050]	ILMN_2711570	141	79	1.77
Col6a1	collagen, type VI, alpha 1 [Source:MGI Symbol;Acc:MGI:88459]	ILMN_2768087	39	22	1.77

Dclre1b	DNA cross-link repair 1B [Source:MGI Symbol;Acc:MGI:2156057]	ILMN_2638404	52	30	1.77
Creb1	cAMP responsive element binding protein 1 [Source:MGI Symbol;Acc:MGI:88494]	ILMN_2657709	123	69	1.77
Cnp	2',3'-cyclic nucleotide 3' phosphodiesterase [Source:MGI Symbol;Acc:MGI:88437]	ILMN_2802263	133	75	1.77
Numb	numb homolog (Drosophila) [Source:MGI Symbol;Acc:MGI:107423]	ILMN_2727692	30	17	1.77
Mtss1l	metastasis suppressor 1-like [Source:MGI Symbol;Acc:MGI:3039591]	ILMN_2635848	63	36	1.76
Raly	hnRNP-associated with lethal yellow [Source:MGI Symbol;Acc:MGI:97850]	ILMN_2684494	36	20	1.76
Sec23b	SEC23 homolog B, COPII coat complex component [Source:MGI Symbol;Acc:MGI:1350925]	ILMN_1245383	24	13	1.76
Ctnnb1	catenin, beta like 1 [Source:MGI Symbol;Acc:MGI:1913892]	ILMN_1249568	32	18	1.76
Ctdspl2	CTD (carboxy-terminal domain, RNA polymerase II, polypeptide A) small phosphatase like 2 [Source:MGI Symbol;Acc:MGI:1196405]	ILMN_3154869	96	55	1.76
Gnpda1	glucosamine-6-phosphate deaminase 1 [Source:MGI Symbol;Acc:MGI:1347054]	ILMN_1228139	67	38	1.76
Vps16	VSP16 CORVET/HOPS core subunit [Source:MGI Symbol;Acc:MGI:2136772]	ILMN_1230082	40	23	1.76
Egfl8	EGF-like domain 8	ILMN_2593188	26	15	1.75
Babam2	BRISC and BRCA1 A complex member 2 [Source:MGI Symbol;Acc:MGI:1333875]	ILMN_3139800	33	19	1.75
Phospho2	phosphatase, orphan 2 [Source:MGI Symbol;Acc:MGI:1920623]	ILMN_2596007	40	23	1.75
Ndrp1	N-myc downstream regulated gene 1 [Source:MGI Symbol;Acc:MGI:1341799]	ILMN_1250195	46	26	1.75
Arhgap24	Rho GTPase activating protein 24 [Source:MGI Symbol;Acc:MGI:1922647]	ILMN_2728038	100	57	1.74
Osbpl2	oxysterol binding protein-like 2 [Source:MGI Symbol;Acc:MGI:2442832]	ILMN_1259132	143	83	1.73
Ccp110	centriolar coiled coil protein 110 [Source:MGI Symbol;Acc:MGI:2141942]	ILMN_1224182	43	25	1.73
Ssh2	slingshot homolog 2 (Drosophila) [Source:MGI Symbol;Acc:MGI:2679255]	ILMN_2713231	45	26	1.73
Atpaf2	ATP synthase mitochondrial F1 complex assembly factor 2 [Source:MGI Symbol;Acc:MGI:2180561]	ILMN_2601118	33	19	1.73
Mfsd7a	major facilitator superfamily domain containing 7A	ILMN_2877581	109	63	1.72
Meis1	Meis homeobox 1 [Source:MGI Symbol;Acc:MGI:104717]	ILMN_1218266	42	24	1.72
Atf4	activating transcription factor 4 [Source:MGI Symbol;Acc:MGI:88096]	ILMN_2642681	201	117	1.72
Ldah	lipid droplet associated hydrolase [Source:MGI Symbol;Acc:MGI:1916082]	ILMN_2756686	74	43	1.72
Rbm10	RNA binding motif protein 10 [Source:MGI Symbol;Acc:MGI:2384310]	ILMN_1242598	58	34	1.72
Cxcl12	chemokine (C-X-C motif) ligand 12 [Source:MGI Symbol;Acc:MGI:103556]	ILMN_2737302	78	46	1.71
Mtap	methylthioadenosine phosphorylase [Source:MGI Symbol;Acc:MGI:1914152]	ILMN_2742867	30	18	1.71
Ppp4r1	protein phosphatase 4, regulatory subunit 1 [Source:MGI Symbol;Acc:MGI:1917601]	ILMN_2659108	30	17	1.71
Eif5	eukaryotic translation initiation factor 5	ILMN_1240466	49	29	1.71

Arfgap2	ADP-ribosylation factor GTPase activating protein 2	ILMN_2853409	37	21	1.71
Nme3	NME/NM23 nucleoside diphosphate kinase 3	ILMN_2744414	47	27	1.71
Atp2b3	ATPase, Ca ⁺⁺ transporting, plasma membrane 3 [Source:MGI Symbol;Acc:MGI:1347353]	ILMN_2677687	33	19	1.71
Luzp1	leucine zipper protein 1 [Source:MGI Symbol;Acc:MGI:107629]	ILMN_2942276	150	88	1.71
Luzp2	leucine zipper protein 2 [Source:MGI Symbol;Acc:MGI:1889615]	ILMN_1256309	405	237	1.71
Atl3	atlastin GTPase 3 [Source:MGI Symbol;Acc:MGI:1924270]	ILMN_1241909	35	21	1.70
Tpm2	tropomyosin 2, beta [Source:MGI Symbol;Acc:MGI:98810]	ILMN_2487170	62	36	1.70
Slc44a1	solute carrier family 44, member 1 [Source:MGI Symbol;Acc:MGI:2140592]	ILMN_1254938	64	38	1.70
Agbl5	ATP/GTP binding protein-like 5 [Source:MGI Symbol;Acc:MGI:2441745]	ILMN_2752600	44	26	1.70
Gtf3c6	general transcription factor IIIC, polypeptide 6, alpha [Source:MGI Symbol;Acc:MGI:1914621]	ILMN_1257110	167	99	1.70
Galk1	galactokinase 1 [Source:MGI Symbol;Acc:MGI:95730]	ILMN_2721360	120	71	1.69
Unc45b	unc-45 myosin chaperone B [Source:MGI Symbol;Acc:MGI:2443377]	ILMN_3153940	26	15	1.69
Psmb1	proteasome (prosome, macropain) subunit, beta type 1 [Source:MGI Symbol;Acc:MGI:104884]	ILMN_1239724	110	65	1.69
Apoa1	apolipoprotein A-I [Source:MGI Symbol;Acc:MGI:88049]	ILMN_2623393	39	23	1.69
Heph	hephaestin [Source:MGI Symbol;Acc:MGI:1332240]	ILMN_2726128	30	18	1.69
Anln	anillin, actin binding protein [Source:MGI Symbol;Acc:MGI:1920174]	ILMN_2595597	25	15	1.68
Tbca	tubulin cofactor A [Source:MGI Symbol;Acc:MGI:107549]	ILMN_2747103	281	167	1.68
Med12	mediator complex subunit 12	ILMN_2468617	48	28	1.68
Ptpre	protein tyrosine phosphatase, receptor type, E [Source:MGI Symbol;Acc:MGI:97813]	ILMN_2826916	52	31	1.68
Phf24	PHD finger protein 24 [Source:MGI Symbol;Acc:MGI:2140712]	ILMN_1251756	99	59	1.68
Cabyr	calcium-binding tyrosine-(Y)-phosphorylation regulated (fibrousheathin 2) [Source:MGI Symbol;Acc:MGI:1918382]	ILMN_3157530	86	51	1.68
Pi4ka	phosphatidylinositol 4-kinase alpha [Source:MGI Symbol;Acc:MGI:2448506]	ILMN_2998870	73	44	1.68
Sept9	septin 9 [Source:MGI Symbol;Acc:MGI:1858222]	ILMN_2602185	40	24	1.68
Mrgprf	MAS-related GPR, member F [Source:MGI Symbol;Acc:MGI:2384823]	ILMN_2760254	31	19	1.68
Stk36	serine/threonine kinase 36 [Source:MGI Symbol;Acc:MGI:1920831]	ILMN_2989871	36	21	1.67
Trnp1	TMF1-regulated nuclear protein 1 [Source:MGI Symbol;Acc:MGI:1916789]	ILMN_1253600	43	26	1.67
AU019823	expressed sequence AU019823 [Source:MGI Symbol;Acc:MGI:2143205]	ILMN_2875915	24	14	1.67
Emcn	endomucin [Source:MGI Symbol;Acc:MGI:1891716]	ILMN_1259365	29	17	1.67
Ccng1	cyclin G1 [Source:MGI Symbol;Acc:MGI:102890]	ILMN_2710229	102	61	1.67
Eif3j1	eukaryotic translation initiation factor 3, subunit J1 [Source:MGI Symbol;Acc:MGI:1925905]	ILMN_2832228	64	38	1.67

Rpp30	ribonuclease P/MRP 30 subunit [Source:MGI Symbol;Acc:MGI:1859683]	ILMN_1232428	48	29	1.67
Naa35	N(alpha)-acetyltransferase 35, NatC auxiliary subunit [Source:MGI Symbol;Acc:MGI:1925939]	ILMN_2828599	53	32	1.67
Nfatc2	nuclear factor of activated T cells, cytoplasmic, calcineurin dependent 2 [Source:MGI Symbol;Acc:MGI:102463]	ILMN_2761672	27	16	1.67
Pitpnm2	phosphatidylinositol transfer protein, membrane-associated 2 [Source:MGI Symbol;Acc:MGI:1336192]	ILMN_2747507	61	37	1.67
Gab2	growth factor receptor bound protein 2-associated protein 2 [Source:MGI Symbol;Acc:MGI:1333854]	ILMN_2833573	61	37	1.67
Spaca9	sperm acrosome associated 9 [Source:MGI Symbol;Acc:MGI:1917237]	ILMN_2720572	31	18	1.66
Ppp2r5e	protein phosphatase 2, regulatory subunit B', epsilon	ILMN_1217444	104	62	1.66
Acbd4	acyl-Coenzyme A binding domain containing 4 [Source:MGI Symbol;Acc:MGI:1914381]	ILMN_2689540	63	38	1.66
Rnf4	ring finger protein 4 [Source:MGI Symbol;Acc:MGI:1201691]	ILMN_1259754	59	36	1.66
Heph	hephaestin [Source:MGI Symbol;Acc:MGI:1332240]	ILMN_2734252	34	20	1.66
Abhd6	abhydrolase domain containing 6 [Source:MGI Symbol;Acc:MGI:1913332]	ILMN_2853619	36	22	1.66
Sh3rf1	SH3 domain containing ring finger 1 [Source:MGI Symbol;Acc:MGI:1913066]	ILMN_2602597	205	124	1.66
Ube2g1	ubiquitin-conjugating enzyme E2G 1 [Source:MGI Symbol;Acc:MGI:1914378]	ILMN_2482026	48	29	1.66
Kbtbd7	kelch repeat and BTB (POZ) domain containing 7 [Source:MGI Symbol;Acc:MGI:2685141]	ILMN_3077630	54	33	1.65
Rnf225	ring finger protein 225	ILMN_2946672	26	16	1.65
Hs6st1	heparan sulfate 6-O-sulfotransferase 1 [Source:MGI Symbol;Acc:MGI:1354958]	ILMN_3158500	49	30	1.65
Rab34	RAB34, member RAS oncogene family [Source:MGI Symbol;Acc:MGI:104606]	ILMN_3029294	31	19	1.64
Dhrs7b	dehydrogenase/reductase (SDR family) member 7B [Source:MGI Symbol;Acc:MGI:2384931]	ILMN_1255146	22	13	1.64
Ddah2	dimethylarginine dimethylaminohydrolase 2 [Source:MGI Symbol;Acc:MGI:1859016]	ILMN_2770183	52	32	1.64
Ankef1	ankyrin repeat and EF-hand domain containing 1 [Source:MGI Symbol;Acc:MGI:2441685]	ILMN_1229153	24	15	1.64
Gnl2	guanine nucleotide binding protein-like 2 (nucleolar) [Source:MGI Symbol;Acc:MGI:2385207]	ILMN_2798753	78	48	1.64
Cnnm1	cyclin M1 [Source:MGI Symbol;Acc:MGI:1891366]	ILMN_3001341	35	21	1.64
Ints13	integrator complex subunit 13 [Source:MGI Symbol;Acc:MGI:1918427]	ILMN_2833356	64	39	1.64
Inpp5e	inositol polyphosphate-5-phosphatase E [Source:MGI Symbol;Acc:MGI:1927753]	ILMN_2820213	48	30	1.64
Trmt6	tRNA methyltransferase 6 [Source:MGI Symbol;Acc:MGI:1914176]	ILMN_2694597	53	32	1.64
Abca9	ATP-binding cassette, sub-family A (ABC1), member 9 [Source:MGI Symbol;Acc:MGI:2386796]	ILMN_2699880	28	17	1.64

Psmid14	proteasome (prosome, macropain) 26S subunit, non-ATPase, 14 [Source:MGI Symbol;Acc:MGI:1913284]	ILMN_2933914	77	47	1.63
Abca9	ATP-binding cassette, sub-family A (ABC1), member 9 [Source:MGI Symbol;Acc:MGI:2386796]	ILMN_2699881	30	19	1.63
Ablim3	actin binding LIM protein family, member 3 [Source:MGI Symbol;Acc:MGI:2442582]	ILMN_1233130	70	43	1.63
Ctsh	cathepsin H [Source:MGI Symbol;Acc:MGI:107285]	ILMN_2872058	40	25	1.63
Mtg1	Mus musculus mitochondrial GTPase 1 homolog (S. cerevisiae) (Mtg1), nuclear gene encoding mitochondrial protein, mRNA.	ILMN_3007236	22	13	1.63
Hdhd5	haloacid dehalogenase like hydrolase domain containing 5 [Source:MGI Symbol;Acc:MGI:2136976]	ILMN_1257102	32	20	1.63
Rcan2	regulator of calcineurin 2 [Source:MGI Symbol;Acc:MGI:1858219]	ILMN_3106592	230	141	1.63
Ddr1	discoidin domain receptor family, member 1 [Source:MGI Symbol;Acc:MGI:99216]	ILMN_2713898	55	34	1.63
Sp9	trans-acting transcription factor 9 [Source:MGI Symbol;Acc:MGI:3574660]	ILMN_3029538	52	32	1.62
Snx9	sorting nexin 9 [Source:MGI Symbol;Acc:MGI:1913866]	ILMN_1231181	23	14	1.62
Slc45a4	solute carrier family 45, member 4 [Source:MGI Symbol;Acc:MGI:2146236]	ILMN_2886162	84	52	1.62
Zhx1	Mus musculus zinc fingers and homeoboxes 1 (Zhx1), transcript variant 1, mRNA.	ILMN_2510714	145	89	1.62
Mcam	melanoma cell adhesion molecule [Source:MGI Symbol;Acc:MGI:1933966]	ILMN_2955919	39	24	1.62
Yeats2	YEATS domain containing 2 [Source:MGI Symbol;Acc:MGI:2447762]	ILMN_2942588	30	19	1.62
Cep97	centrosomal protein 97 [Source:MGI Symbol;Acc:MGI:1921451]	ILMN_2750904	35	22	1.62
Atp11a	ATPase, class VI, type 11A [Source:MGI Symbol;Acc:MGI:1354735]	ILMN_2634591	29	18	1.61
Tmem128	transmembrane protein 128 [Source:MGI Symbol;Acc:MGI:1913559]	ILMN_2674032	28	18	1.61
9030025P20Rik	Mus musculus RIKEN cDNA 9030025P20 gene (9030025P20Rik), transcript variant 2, mRNA.	ILMN_3060788	26	16	1.61
Depdc5	DEP domain containing 5 [Source:MGI Symbol;Acc:MGI:2141101]	ILMN_1235098	26	16	1.61
Lypd6b	LY6/PLAUR domain containing 6B [Source:MGI Symbol;Acc:MGI:1919147]	ILMN_2596998	33	20	1.61
Atp5j	ATP synthase, H+ transporting, mitochondrial F0 complex, subunit F [Source:MGI Symbol;Acc:MGI:107777]	ILMN_2876629	107	67	1.60
Drg1	developmentally regulated GTP binding protein 1 [Source:MGI Symbol;Acc:MGI:1343297]	ILMN_1238919	67	42	1.60
Rpl21	Mus musculus ribosomal protein L21 (Rpl21), mRNA.	ILMN_1222250	25	16	1.60
Zfp385a	zinc finger protein 385A [Source:MGI Symbol;Acc:MGI:1352495]	ILMN_2462783	27	17	1.60
Lrrfip1	leucine rich repeat (in FLII) interacting protein 1 [Source:MGI Symbol;Acc:MGI:1342770]	ILMN_2647720	29	18	1.60
Pmm1	phosphomannomutase 1 [Source:MGI Symbol;Acc:MGI:1353418]	ILMN_2974041	32	20	1.60
Slc7a8	solute carrier family 7 (cationic amino acid transporter, y+ system), member 8 [Source:MGI Symbol;Acc:MGI:1355323]	ILMN_2780392	34	21	1.60

Hspb8	heat shock protein 8 [Source:MGI Symbol;Acc:MGI:2135756]	ILMN_2944366	25	16	1.60
Cops8	COP9 signalosome subunit 8 [Source:MGI Symbol;Acc:MGI:1915363]	ILMN_1218868	26	16	1.59
Snx14	sorting nexin 14 [Source:MGI Symbol;Acc:MGI:2155664]	ILMN_1236312	37	23	1.59
Abr	active BCR-related gene [Source:MGI Symbol;Acc:MGI:107771]	ILMN_2605311	63	40	1.59
Tpm1	tropomyosin 1, alpha [Source:MGI Symbol;Acc:MGI:98809]	ILMN_3007072	235	148	1.59
Pcolce2	procollagen C-endopeptidase enhancer 2 [Source:MGI Symbol;Acc:MGI:1923727]	ILMN_1238603	67	42	1.58
Nkap	NFKB activating protein [Source:MGI Symbol;Acc:MGI:1914300]	ILMN_2854659	69	44	1.58
Thns11	threonine synthase-like 1 (bacterial) [Source:MGI Symbol;Acc:MGI:2139347]	ILMN_3130652	22	14	1.58
Rbp4	retinol binding protein 4, plasma [Source:MGI Symbol;Acc:MGI:97879]	ILMN_1252185	62	39	1.58
Acot11	acyl-CoA thioesterase 11 [Source:MGI Symbol;Acc:MGI:1913736]	ILMN_2733465	29	19	1.58
Tmem216	transmembrane protein 216 [Source:MGI Symbol;Acc:MGI:1920020]	ILMN_2799217	40	26	1.57
Slc25a44	solute carrier family 25, member 44 [Source:MGI Symbol;Acc:MGI:2444391]	ILMN_2734283	150	95	1.57
Prag1	PEAK1 related kinase activating pseudokinase 1 [Source:MGI Symbol;Acc:MGI:1196223]	ILMN_2731237	58	37	1.57
Kcnh5	potassium voltage-gated channel, subfamily H (eag-related), member 5 [Source:MGI Symbol;Acc:MGI:3584508]	ILMN_1219743	24	16	1.57
Npm1	nucleophosmin 1 [Source:MGI Symbol;Acc:MGI:106184]	ILMN_2970473	319	203	1.57
Pcdh8	protocadherin 8 [Source:MGI Symbol;Acc:MGI:1306800]	ILMN_1256415	133	85	1.57
Sgp11	sphingosine phosphate lyase 1 [Source:MGI Symbol;Acc:MGI:1261415]	ILMN_2936380	122	78	1.57
Stk38l	serine/threonine kinase 38 like [Source:MGI Symbol;Acc:MGI:1922250]	ILMN_2794051	206	132	1.57
Manba	mannosidase, beta A, lysosomal [Source:MGI Symbol;Acc:MGI:88175]	ILMN_2835723	79	51	1.56
Tmco3	transmembrane and coiled-coil domains 3 [Source:MGI Symbol;Acc:MGI:2444946]	ILMN_2628744	24	15	1.56
Mprp	myosin phosphatase Rho interacting protein [Source:MGI Symbol;Acc:MGI:1349438]	ILMN_1254067	48	31	1.56
Bicd2	bicaudal D homolog 2 (Drosophila) [Source:MGI Symbol;Acc:MGI:1924145]	ILMN_3119245	39	25	1.56
Plcb3	phospholipase C, beta 3 [Source:MGI Symbol;Acc:MGI:104778]	ILMN_2637953	49	31	1.56
Celf4	CUGBP, Elav-like family member 4 [Source:MGI Symbol;Acc:MGI:1932407]	ILMN_1243635	116	74	1.56
Gpr37	G protein-coupled receptor 37 [Source:MGI Symbol;Acc:MGI:1313297]	ILMN_1213371	53	34	1.56
Hipk2	homeodomain interacting protein kinase 2 [Source:MGI Symbol;Acc:MGI:1314872]	ILMN_2705324	99	63	1.56
Armxc3	armadillo repeat containing, X-linked 3 [Source:MGI Symbol;Acc:MGI:1918953]	ILMN_1234742	64	41	1.56
Evc	EvC ciliary complex subunit 1 [Source:MGI Symbol;Acc:MGI:1890596]	ILMN_2706562	26	17	1.55
Scarb2	scavenger receptor class B, member 2 [Source:MGI Symbol;Acc:MGI:1196458]	ILMN_2907331	162	104	1.55

Rhoj	ras homolog family member J [Source:MGI Symbol;Acc:MGI:1931551]	ILMN_2653567	70	45	1.55
Cdc42se2	CDC42 small effector 2 [Source:MGI Symbol;Acc:MGI:1919979]	ILMN_1257761	26	17	1.55
Rb1	RB transcriptional corepressor 1 [Source:MGI Symbol;Acc:MGI:97874]	ILMN_2679619	43	28	1.55
H2-M10.1	histocompatibility 2, M region locus 10.1 [Source:MGI Symbol;Acc:MGI:1276522]	ILMN_2730154	38	25	1.55
Spag5	sperm associated antigen 5 [Source:MGI Symbol;Acc:MGI:1927470]	ILMN_2744217	35	23	1.55
Slc35e1	solute carrier family 35, member E1 [Source:MGI Symbol;Acc:MGI:2142403]	ILMN_2752618	48	31	1.55
Luc7l2	LUC7-like 2 (S. cerevisiae) [Source:MGI Symbol;Acc:MGI:2183260]	ILMN_2765407	143	92	1.55
Clasrp	CLK4-associating serine/arginine rich protein [Source:MGI Symbol;Acc:MGI:1855695]	ILMN_1249654	132	85	1.55
Nelfe	negative elongation factor complex member E, Rdbp [Source:MGI Symbol;Acc:MGI:102744]	ILMN_1233513	29	19	1.54
Kdm3a	lysine (K)-specific demethylase 3A [Source:MGI Symbol;Acc:MGI:98847]	ILMN_2707895	33	22	1.54
Plekhl1	pleckstrin homology domain containing, family M (with RUN domain) member 1 [Source:MGI Symbol;Acc:MGI:2443207]	ILMN_2737959	59	39	1.54
Rpf1	ribosome production factor 1 homolog [Source:MGI Symbol;Acc:MGI:1917535]	ILMN_2639271	101	66	1.54
Ap2s1	adaptor-related protein complex 2, sigma 1 subunit [Source:MGI Symbol;Acc:MGI:2141861]	ILMN_1212941	32	21	1.54
Atl3	atlastin GTPase 3 [Source:MGI Symbol;Acc:MGI:1924270]	ILMN_2936468	51	33	1.54
Atp2b2	ATPase, Ca ⁺⁺ transporting, plasma membrane 2 [Source:MGI Symbol;Acc:MGI:105368]	ILMN_2688213	142	92	1.53
P2rx7	purinergic receptor P2X, ligand-gated ion channel, 7 [Source:MGI Symbol;Acc:MGI:1339957]	ILMN_2620381	27	17	1.53
Rpl27a	ribosomal protein L27A	ILMN_2882059	32	21	1.53
Rabggtb	Rab geranylgeranyl transferase, b subunit	ILMN_2589819	73	48	1.53
Esyt1	extended synaptotagmin-like protein 1	ILMN_1240994	49	32	1.53
Dctn5	dynactin 5 [Source:MGI Symbol;Acc:MGI:1891689]	ILMN_2732536	67	43	1.53
Tmem218	transmembrane protein 218 [Source:MGI Symbol;Acc:MGI:1913529]	ILMN_2981896	47	31	1.53
Nop2	NOP2 nucleolar protein [Source:MGI Symbol;Acc:MGI:107891]	ILMN_2688378	25	16	1.53
Slc31a1	solute carrier family 31, member 1 [Source:MGI Symbol;Acc:MGI:1333843]	ILMN_1254437	30	20	1.53
Serinc3	serine incorporator 3 [Source:MGI Symbol;Acc:MGI:1349457]	ILMN_2787844	95	62	1.53
Eif2b2	eukaryotic translation initiation factor 2B, subunit 2 beta [Source:MGI Symbol;Acc:MGI:2145118]	ILMN_2762301	28	18	1.53
Ppp1ca	Mus musculus protein phosphatase 1, catalytic subunit, alpha isoform (Ppp1ca), mRNA.	ILMN_1246058	31	20	1.53
Rab4a	RAB4A, member RAS oncogene family [Source:MGI Symbol;Acc:MGI:105069]	ILMN_1212902	61	40	1.53

Slc35c2	solute carrier family 35, member C2 [Source:MGI Symbol;Acc:MGI:2385166]	ILMN_2729374	61	40	1.53
Hdac10	histone deacetylase 10 [Source:MGI Symbol;Acc:MGI:2158340]	ILMN_2731340	41	27	1.52
Sept6	septin 6 [Source:MGI Symbol;Acc:MGI:1888939]	ILMN_2663914	28	19	1.52
Ift81	intraflagellar transport 81 [Source:MGI Symbol;Acc:MGI:1098597]	ILMN_2634702	49	32	1.52
Xab2	XPA binding protein 2 [Source:MGI Symbol;Acc:MGI:1914689]	ILMN_2430673	22	15	1.52
Lsm3	LSM3 homolog, U6 small nuclear RNA and mRNA degradation associated	ILMN_2837865	91	60	1.51
Slc7a5	solute carrier family 7 (cationic amino acid transporter, y+ system), member 5 [Source:MGI Symbol;Acc:MGI:1298205]	ILMN_2711948	83	55	1.51
Sowaha	sosondawah ankyrin repeat domain family member A [Source:MGI Symbol;Acc:MGI:2687280]	ILMN_2626556	93	61	1.51
Epn2	epsin 2 [Source:MGI Symbol;Acc:MGI:1333766]	ILMN_1239027	50	33	1.51
Mrpl18	mitochondrial ribosomal protein L18 [Source:MGI Symbol;Acc:MGI:1914931]	ILMN_2823250	144	95	1.51
Ndufa1	NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 1 [Source:MGI Symbol;Acc:MGI:1929511]	ILMN_1251370	141	93	1.51
Pithd1	PITH (C-terminal proteasome-interacting domain of thioredoxin-like) domain containing 1 [Source:MGI Symbol;Acc:MGI:1913443]	ILMN_1221838	33	22	1.51
Elavl2	ELAV (embryonic lethal, abnormal vision, Drosophila)-like 2 (Hu antigen B) [Source:MGI Symbol;Acc:MGI:1100887]	ILMN_3121717	67	44	1.51
Plxdc2	plexin domain containing 2 [Source:MGI Symbol;Acc:MGI:1914698]	ILMN_2704306	28	18	1.51
Zfp760	zinc finger protein 760 [Source:MGI Symbol;Acc:MGI:2679257]	ILMN_1253678	56	37	1.50
Uts2	urotensin 2 [Source:MGI Symbol;Acc:MGI:1346329]	ILMN_1225001	26	17	1.50
Prdm16	PR domain containing 16 [Source:MGI Symbol;Acc:MGI:1917923]	ILMN_2663314	34	23	1.50
Tfip11	tuftelin interacting protein 11 [Source:MGI Symbol;Acc:MGI:1930075]	ILMN_2961179	39	26	1.50
Daam1	dishevelled associated activator of morphogenesis 1 [Source:MGI Symbol;Acc:MGI:1914596]	ILMN_3031523	33	22	1.50
Psmb4	proteasome (prosome, macropain) subunit, beta type 4 [Source:MGI Symbol;Acc:MGI:1098257]	ILMN_2671124	205	137	1.50
Rabep1	rabaptin, RAB GTPase binding effector protein 1 [Source:MGI Symbol;Acc:MGI:1860236]	ILMN_2999748	37	25	1.49
Asphd1	aspartate beta-hydroxylase domain containing 1 [Source:MGI Symbol;Acc:MGI:2685014]	ILMN_1260082	66	44	1.49
Atl3	atlastin GTPase 3 [Source:MGI Symbol;Acc:MGI:1924270]	ILMN_2635606	31	21	1.49
Il16	interleukin 16 [Source:MGI Symbol;Acc:MGI:1270855]	ILMN_2671738	30	20	1.49
Eva1a	eva-1 homolog A (C. elegans) [Source:MGI Symbol;Acc:MGI:2385247]	ILMN_2813577	21	14	1.49
Lsm8	LSM8 homolog, U6 small nuclear RNA associated [Source:MGI Symbol;Acc:MGI:1923772]	ILMN_2883907	43	29	1.49
Gpr45	G protein-coupled receptor 45 [Source:MGI Symbol;Acc:MGI:2135882]	ILMN_1228145	48	32	1.49
Scp2	sterol carrier protein 2, liver [Source:MGI Symbol;Acc:MGI:98254]	ILMN_2705886	74	50	1.49

Abhd2	abhydrolase domain containing 2 [Source:MGI Symbol;Acc:MGI:1914344]	ILMN_2877443	42	28	1.49
Spsb4	splA/ryanodine receptor domain and SOCS box containing 4 [Source:MGI Symbol;Acc:MGI:2183445]	ILMN_1243507	39	26	1.49
Mtch1	mitochondrial carrier 1 [Source:MGI Symbol;Acc:MGI:1929261]	ILMN_2708297	57	38	1.49
Clec3b	C-type lectin domain family 3, member b [Source:MGI Symbol;Acc:MGI:104540]	ILMN_2845778	71	48	1.49
Rrm2b	ribonucleotide reductase M2 B (TP53 inducible) [Source:MGI Symbol;Acc:MGI:2155865]	ILMN_2610847	31	21	1.49
Slc35a2	solute carrier family 35 (UDP-galactose transporter), member A2 [Source:MGI Symbol;Acc:MGI:1345297]	ILMN_2970345	38	26	1.48
Cops4	COP9 signalosome subunit 4 [Source:MGI Symbol;Acc:MGI:1349414]	ILMN_1215493	136	92	1.48
Bola2	bolA-like 2 (E. coli) [Source:MGI Symbol;Acc:MGI:1913412]	ILMN_2846368	129	87	1.48
Pde4dip	phosphodiesterase 4D interacting protein (myomegalin) [Source:MGI Symbol;Acc:MGI:1891434]	ILMN_1215884	180	122	1.48
Btf3	basic transcription factor 3 [Source:MGI Symbol;Acc:MGI:1202875]	ILMN_2720034	58	40	1.48
Rpf2	ribosome production factor 2 homolog [Source:MGI Symbol;Acc:MGI:1914489]	ILMN_1226709	95	65	1.47
Cfb	complement factor B	ILMN_1230853	26	18	1.47
Sdsl	serine dehydratase-like [Source:MGI Symbol;Acc:MGI:2182607]	ILMN_1231627	23	16	1.47
Lrrn1	leucine rich repeat protein 1, neuronal [Source:MGI Symbol;Acc:MGI:106038]	ILMN_2759736	90	61	1.47
Ssb	Sjogren syndrome antigen B [Source:MGI Symbol;Acc:MGI:98423]	ILMN_2729645	127	87	1.47
Ivns1abp	influenza virus NS1A binding protein [Source:MGI Symbol;Acc:MGI:2152389]	ILMN_3084087	64	44	1.47
Prmt5	protein arginine N-methyltransferase 5 [Source:MGI Symbol;Acc:MGI:1351645]	ILMN_2720634	37	25	1.46
Pard6a	par-6 family cell polarity regulator alpha [Source:MGI Symbol;Acc:MGI:1927223]	ILMN_3114759	61	42	1.46
Susd6	sushi domain containing 6 [Source:MGI Symbol;Acc:MGI:2444661]	ILMN_1254551	45	31	1.46
Ift52	intraflagellar transport 52 [Source:MGI Symbol;Acc:MGI:2387217]	ILMN_2788283	49	34	1.46
Rab31	RAB31, member RAS oncogene family [Source:MGI Symbol;Acc:MGI:1914603]	ILMN_2665008	90	62	1.46
Stag2	stromal antigen 2 [Source:MGI Symbol;Acc:MGI:1098583]	ILMN_1232962	87	60	1.45
Mtor	mechanistic target of rapamycin (serine/threonine kinase) [Source:MGI Symbol;Acc:MGI:1928394]	ILMN_1257068	27	19	1.45
Fbxo25	F-box protein 25 [Source:MGI Symbol;Acc:MGI:1914072]	ILMN_2762397	115	79	1.45
Pir	pirin [Source:MGI Symbol;Acc:MGI:1916906]	ILMN_2640551	35	24	1.45
Ppp1r3c	protein phosphatase 1, regulatory (inhibitor) subunit 3C [Source:MGI Symbol;Acc:MGI:1858229]	ILMN_2667091	361	250	1.44
Gpn1	GPN-loop GTPase 1 [Source:MGI Symbol;Acc:MGI:1921504]	ILMN_2921749	30	21	1.44

Ptp4a3	protein tyrosine phosphatase 4a3 [Source:MGI Symbol;Acc:MGI:1277098]	ILMN_2655260	24	16	1.44
Lsm6	LSM6 homolog, U6 small nuclear RNA and mRNA degradation associated [Source:MGI Symbol;Acc:MGI:1925901]	ILMN_1251056	74	51	1.44
Ogn	osteoglycin [Source:MGI Symbol;Acc:MGI:109278]	ILMN_2859619	73	51	1.44
Fam229b	family with sequence similarity 229, member B [Source:MGI Symbol;Acc:MGI:1913587]	ILMN_1214517	65	45	1.43
Wbp11	WW domain binding protein 11 [Source:MGI Symbol;Acc:MGI:1891823]	ILMN_1213144	48	33	1.43
Sgip1	SH3-domain GRB2-like (endophilin) interacting protein 1 [Source:MGI Symbol;Acc:MGI:1920344]	ILMN_2678327	95	67	1.43
Sdhaf1	succinate dehydrogenase complex assembly factor 1 [Source:MGI Symbol;Acc:MGI:1915582]	ILMN_2891688	47	33	1.43
1810009A15Rik	Mus musculus RIKEN cDNA 1810009A15 gene (1810009A15Rik), mRNA.	ILMN_2872246	28	20	1.43
Fbxw8	F-box and WD-40 domain protein 8 [Source:MGI Symbol;Acc:MGI:1923041]	ILMN_1251236	71	50	1.43
Spin4	spindlin family, member 4 [Source:MGI Symbol;Acc:MGI:2444925]	ILMN_2755717	23	16	1.43
Ggps1	geranylgeranyl diphosphate synthase 1 [Source:MGI Symbol;Acc:MGI:1341724]	ILMN_1237585	24	17	1.43
Arid4a	AT rich interactive domain 4A (RBP1-like) [Source:MGI Symbol;Acc:MGI:2444354]	ILMN_3127411	85	60	1.42
Tesk2	testis-specific kinase 2 [Source:MGI Symbol;Acc:MGI:2385204]	ILMN_2628330	57	41	1.41
Tmem145	transmembrane protein 145 [Source:MGI Symbol;Acc:MGI:3607779]	ILMN_1214060	123	87	1.41
Psmc6	proteasome (prosome, macropain) 26S subunit, ATPase, 6 [Source:MGI Symbol;Acc:MGI:1914339]	ILMN_2631558	163	115	1.41
Phpt1	phosphohistidine phosphatase 1	ILMN_2626143	96	68	1.41
Dclk1	doublecortin-like kinase 1 [Source:MGI Symbol;Acc:MGI:1330861]	ILMN_1217517	116	82	1.41
Sgip1	SH3-domain GRB2-like (endophilin) interacting protein 1 [Source:MGI Symbol;Acc:MGI:1920344]	ILMN_2616841	80	57	1.40
Slc5a6	solute carrier family 5 (sodium-dependent vitamin transporter), member 6 [Source:MGI Symbol;Acc:MGI:2660847]	ILMN_1225056	135	97	1.40
Cxcl14	chemokine (C-X-C motif) ligand 14 [Source:MGI Symbol;Acc:MGI:1888514]	ILMN_2659426	46	33	1.40
Dnajc19	DnaJ heat shock protein family (Hsp40) member C19 [Source:MGI Symbol;Acc:MGI:1914963]	ILMN_3103439	151	107	1.40
Rcan2	regulator of calcineurin 2 [Source:MGI Symbol;Acc:MGI:1858219]	ILMN_1212612	251	179	1.40
Ddx3y	DEAD (Asp-Glu-Ala-Asp) box polypeptide 3, Y-linked [Source:MGI Symbol;Acc:MGI:1349406]	ILMN_2899607	29	21	1.40
Mctp1	multiple C2 domains, transmembrane 1 [Source:MGI Symbol;Acc:MGI:1926021]	ILMN_2701948	35	25	1.39
Colla2	collagen, type I, alpha 2 [Source:MGI Symbol;Acc:MGI:88468]	ILMN_1253806	275	197	1.39
Ssb	Sjogren syndrome antigen B [Source:MGI Symbol;Acc:MGI:98423]	ILMN_2591749	259	186	1.39
Tbcb	tubulin folding cofactor B [Source:MGI Symbol;Acc:MGI:1913661]	ILMN_2620061	252	181	1.39

Nfat5	nuclear factor of activated T cells 5 [Source:MGI Symbol;Acc:MGI:1859333]	ILMN_2612448	120	87	1.39
Col16a1	collagen, type XVI, alpha 1 [Source:MGI Symbol;Acc:MGI:1095396]	ILMN_1248099	93	67	1.38
Glrb	glycine receptor, beta subunit [Source:MGI Symbol;Acc:MGI:95751]	ILMN_2685831	71	51	1.38
Fen1	flap structure specific endonuclease 1 [Source:MGI Symbol;Acc:MGI:102779]	ILMN_1259473	29	21	1.38
Gcnt1	glucosaminyl (N-acetyl) transferase 1, core 2 [Source:MGI Symbol;Acc:MGI:95676]	ILMN_1256299	61	44	1.38
Tarbp2	TARBP2, RISC loading complex RNA binding subunit	ILMN_2939990	44	32	1.37
Grik1	glutamate receptor, ionotropic, kainate 1 [Source:MGI Symbol;Acc:MGI:95814]	ILMN_3145360	25	18	1.37
Tmem98	transmembrane protein 98 [Source:MGI Symbol;Acc:MGI:1923457]	ILMN_2658815	29	21	1.37
Rae1	ribonucleic acid export 1 [Source:MGI Symbol;Acc:MGI:1913929]	ILMN_2713130	24	17	1.37
Tmem14c	transmembrane protein 14C [Source:MGI Symbol;Acc:MGI:1913404]	ILMN_2435206	40	29	1.37
Mfsd11	major facilitator superfamily domain containing 11 [Source:MGI Symbol;Acc:MGI:1917150]	ILMN_1216901	27	20	1.36
Evi5	ecotropic viral integration site 5 [Source:MGI Symbol;Acc:MGI:104736]	ILMN_2613546	153	113	1.36
Mboat2	membrane bound O-acyltransferase domain containing 2 [Source:MGI Symbol;Acc:MGI:1914466]	ILMN_2782248	15	20	-1.36
Lipe	lipase, hormone sensitive [Source:MGI Symbol;Acc:MGI:96790]	ILMN_3111326	16	22	-1.36
Rad51d	RAD51 paralog D [Source:MGI Symbol;Acc:MGI:1261809]	ILMN_2700533	18	24	-1.37
Rdh7	retinol dehydrogenase 7 [Source:MGI Symbol;Acc:MGI:1860517]	ILMN_2871249	20	27	-1.37
Foxj3	forkhead box J3 [Source:MGI Symbol;Acc:MGI:2443432]	ILMN_1218721	42	58	-1.38
Ttc39c	tetratricopeptide repeat domain 39C [Source:MGI Symbol;Acc:MGI:1919997]	ILMN_1216182	25	35	-1.38
March7	membrane-associated ring finger (C3HC4) 7 [Source:MGI Symbol;Acc:MGI:1931053]	ILMN_2711892	58	80	-1.38
Atg3	autophagy related 3 [Source:MGI Symbol;Acc:MGI:1915091]	ILMN_2595188	28	38	-1.38
Sema4g	sema domain, immunoglobulin domain (Ig), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 4G [Source:MGI Symbol;Acc:MGI:1347047]	ILMN_2718314	92	127	-1.38
Maob	monoamine oxidase B [Source:MGI Symbol;Acc:MGI:96916]	ILMN_2719069	79	110	-1.38
LOC333331	PREDICTED: Mus musculus similar to medium-chain acyl-CoA dehydrogenase (LOC333331), misc RNA.	ILMN_1256019	22	30	-1.39
Guca1b	guanylate cyclase activator 1B [Source:MGI Symbol;Acc:MGI:1194489]	ILMN_2754287	23	31	-1.39
Gpr3	G-protein coupled receptor 3 [Source:MGI Symbol;Acc:MGI:101908]	ILMN_2678530	20	28	-1.39
Unk	unkempt family zinc finger [Source:MGI Symbol;Acc:MGI:2442456]	ILMN_2509928	80	111	-1.39
Hipk3	homeodomain interacting protein kinase 3 [Source:MGI Symbol;Acc:MGI:1314882]	ILMN_1253204	53	74	-1.39
Nuak1	NUAK family, SNF1-like kinase, 1 [Source:MGI Symbol;Acc:MGI:1925226]	ILMN_2928720	29	40	-1.40

Zfp367	zinc finger protein 367 [Source:MGI Symbol;Acc:MGI:2442266]	ILMN_2897424	16	23	-1.40
Snx6	sorting nexin 6 [Source:MGI Symbol;Acc:MGI:1919433]	ILMN_2896582	135	189	-1.40
Tmprss6	transmembrane serine protease 6 [Source:MGI Symbol;Acc:MGI:1919003]	ILMN_2469310	16	22	-1.40
Arl5a	ADP-ribosylation factor-like 5A [Source:MGI Symbol;Acc:MGI:1922673]	ILMN_2692986	257	360	-1.40
Gsk3b	glycogen synthase kinase 3 beta [Source:MGI Symbol;Acc:MGI:1861437]	ILMN_2593888	125	176	-1.40
Lhx3	LIM homeobox protein 3 [Source:MGI Symbol;Acc:MGI:102673]	ILMN_2784382	20	29	-1.41
Prrt1	proline-rich transmembrane protein 1 [Source:MGI Symbol;Acc:MGI:1932118]	ILMN_2751486	115	161	-1.41
Ctsw	cathepsin W [Source:MGI Symbol;Acc:MGI:1338045]	ILMN_2721399	16	23	-1.41
Cep85	centrosomal protein 85 [Source:MGI Symbol;Acc:MGI:1917262]	ILMN_2759983	22	30	-1.41
Eif1a	eukaryotic translation initiation factor 1A [Source:MGI Symbol;Acc:MGI:95298]	ILMN_2698107	31	44	-1.41
Scamp3	secretory carrier membrane protein 3 [Source:MGI Symbol;Acc:MGI:1346346]	ILMN_1245139	42	59	-1.41
Zfp944	zinc finger protein 944 [Source:MGI Symbol;Acc:MGI:2442394]	ILMN_2645989	15	21	-1.41
Ncoa2	nuclear receptor coactivator 2 [Source:MGI Symbol;Acc:MGI:1276533]	ILMN_1259910	22	31	-1.41
Asap1	ArfGAP with SH3 domain, ankyrin repeat and PH domain1 [Source:MGI Symbol;Acc:MGI:1342335]	ILMN_1229593	53	75	-1.42
Zdhhc20	zinc finger, DHHC domain containing 20 [Source:MGI Symbol;Acc:MGI:1923215]	ILMN_1216728	63	89	-1.42
Gpc5	glypican 5 [Source:MGI Symbol;Acc:MGI:1194894]	ILMN_2719860	26	36	-1.42
Lrrc14b	leucine rich repeat containing 14B [Source:MGI Symbol;Acc:MGI:2145269]	ILMN_3161863	17	24	-1.42
Arl2	ADP-ribosylation factor-like 2 [Source:MGI Symbol;Acc:MGI:1928393]	ILMN_2620304	31	44	-1.42
Hoxc10	homeobox C10 [Source:MGI Symbol;Acc:MGI:96192]	ILMN_2836885	21	30	-1.42
Tulp1	tubby like protein 1 [Source:MGI Symbol;Acc:MGI:109571]	ILMN_1236774	16	23	-1.42
Msn	moesin [Source:MGI Symbol;Acc:MGI:97167]	ILMN_2694960	24	34	-1.42
Arl5a	ADP-ribosylation factor-like 5A [Source:MGI Symbol;Acc:MGI:1922673]	ILMN_1221102	264	376	-1.43
Lysmd2	LysM, putative peptidoglycan-binding, domain containing 2	ILMN_1239808	31	45	-1.43
Rrbp1	ribosome binding protein 1 [Source:MGI Symbol;Acc:MGI:1932395]	ILMN_2597686	23	32	-1.43
Srsf10	serine/arginine-rich splicing factor 10 [Source:MGI Symbol;Acc:MGI:1333805]	ILMN_3019002	55	78	-1.43
Slc35c2	solute carrier family 35, member C2 [Source:MGI Symbol;Acc:MGI:2385166]	ILMN_2895000	40	57	-1.43
Zfp709	zinc finger protein 709 [Source:MGI Symbol;Acc:MGI:2384299]	ILMN_1248268	49	71	-1.43
Ptp4a2	protein tyrosine phosphatase 4a2 [Source:MGI Symbol;Acc:MGI:1277117]	ILMN_2647282	117	168	-1.43
Tmem126a	transmembrane protein 126A [Source:MGI Symbol;Acc:MGI:1913521]	ILMN_2803627	127	183	-1.44
Fnbp4	formin binding protein 4 [Source:MGI Symbol;Acc:MGI:1860513]	ILMN_1251257	15	22	-1.44
Ccdc50	coiled-coil domain containing 50 [Source:MGI Symbol;Acc:MGI:1914751]	ILMN_2737381	29	42	-1.44
Olfm2	olfactomedin 2 [Source:MGI Symbol;Acc:MGI:3045350]	ILMN_2660009	25	35	-1.44

Vps25	vacuolar protein sorting 25	ILMN_3000008	99	142	-1.44
Snrpd2	small nuclear ribonucleoprotein D2 [Source:MGI Symbol;Acc:MGI:98345]	ILMN_2612635	109	157	-1.44
Hnrnpul1	heterogeneous nuclear ribonucleoprotein U-like 1 [Source:MGI Symbol;Acc:MGI:2443517]	ILMN_2680490	28	40	-1.44
Cdc42se1	CDC42 small effector 1 [Source:MGI Symbol;Acc:MGI:1889510]	ILMN_1259946	157	226	-1.44
Tprgl	transformation related protein 63 regulated like [Source:MGI Symbol;Acc:MGI:1915058]	ILMN_1255745	42	60	-1.44
Tmem63c	transmembrane protein 63c [Source:MGI Symbol;Acc:MGI:2444386]	ILMN_1233991	25	36	-1.45
Frg1	FSHD region gene 1 [Source:MGI Symbol;Acc:MGI:893597]	ILMN_1240867	15	22	-1.45
Klhdc3	kelch domain containing 3 [Source:MGI Symbol;Acc:MGI:2651568]	ILMN_2851023	65	95	-1.45
Tns2	tensin 2 [Source:MGI Symbol;Acc:MGI:2387586]	ILMN_2744164	56	80	-1.45
Rab5a	RAB5A, member RAS oncogene family [Source:MGI Symbol;Acc:MGI:105926]	ILMN_2786763	70	101	-1.45
Ccl12	chemokine (C-C motif) ligand 12 [Source:MGI Symbol;Acc:MGI:108224]	ILMN_2771766	19	28	-1.45
Zfp579	zinc finger protein 579 [Source:MGI Symbol;Acc:MGI:1915740]	ILMN_1222760	39	57	-1.45
Bcl2	B cell leukemia/lymphoma 2 [Source:MGI Symbol;Acc:MGI:88138]	ILMN_2682162	20	29	-1.45
Wwtr1	WW domain containing transcription regulator 1 [Source:MGI Symbol;Acc:MGI:1917649]	ILMN_2732998	34	50	-1.45
Mtg2	mitochondrial ribosome associated GTPase 2 [Source:MGI Symbol;Acc:MGI:106565]	ILMN_2759167	17	25	-1.45
Fam204a	family with sequence similarity 204, member A [Source:MGI Symbol;Acc:MGI:1289174]	ILMN_2888572	33	49	-1.46
Sdad1	SDA1 domain containing 1 [Source:MGI Symbol;Acc:MGI:2140779]	ILMN_1250278	58	84	-1.46
Vps35	VPS35 retromer complex component [Source:MGI Symbol;Acc:MGI:1890467]	ILMN_2844784	111	161	-1.46
Mzt1	mitotic spindle organizing protein 1 [Source:MGI Symbol;Acc:MGI:1924039]	ILMN_1249032	26	38	-1.46
Sphk2	sphingosine kinase 2 [Source:MGI Symbol;Acc:MGI:1861380]	ILMN_2639777	18	26	-1.46
Atxn7l1	ataxin 7-like 1 [Source:MGI Symbol;Acc:MGI:3584458]	ILMN_1246174	24	35	-1.46
Clip1	CAP-GLY domain containing linker protein 1 [Source:MGI Symbol;Acc:MGI:1928401]	ILMN_1238497	100	145	-1.46
Vmn1r69	vomer nasal 1 receptor 69 [Source:MGI Symbol;Acc:MGI:2182253]	ILMN_1233229	16	23	-1.46
Pcdhb20	protocadherin beta 20 [Source:MGI Symbol;Acc:MGI:2136758]	ILMN_2979449	20	29	-1.46
Sec22a	SEC22 homolog A, vesicle trafficking protein [Source:MGI Symbol;Acc:MGI:2447876]	ILMN_2747735	26	37	-1.46
Tmed10	transmembrane p24 trafficking protein 10 [Source:MGI Symbol;Acc:MGI:1915831]	ILMN_3002943	208	303	-1.46
Olf1008	olfactory receptor 1008 [Source:MGI Symbol;Acc:MGI:3030842]	ILMN_2764242	16	23	-1.46
Hnrnp2	heterogeneous nuclear ribonucleoprotein H2 [Source:MGI Symbol;Acc:MGI:1201779]	ILMN_2680808	23	34	-1.46

Ptp4a2	protein tyrosine phosphatase 4a2 [Source:MGI Symbol;Acc:MGI:1277117]	ILMN_1243291	98	143	-1.46
Spsb1	splA/ryanodine receptor domain and SOCS box containing 1 [Source:MGI Symbol;Acc:MGI:1921896]	ILMN_1224336	46	68	-1.46
Endov	endonuclease V [Source:MGI Symbol;Acc:MGI:2444688]	ILMN_1238805	20	29	-1.47
Myog	myogenin [Source:MGI Symbol;Acc:MGI:97276]	ILMN_2621812	16	24	-1.47
Rps6ka2	ribosomal protein S6 kinase, polypeptide 2 [Source:MGI Symbol;Acc:MGI:1342290]	ILMN_2655510	160	234	-1.47
Ethe1	ethylmalonic encephalopathy 1 [Source:MGI Symbol;Acc:MGI:1913321]	ILMN_2621074	41	60	-1.47
Ttc33	Mus musculus tetratricopeptide repeat domain 33 (Ttc33), mRNA.	ILMN_2713039	55	81	-1.47
Isca1	iron-sulfur cluster assembly 1 [Source:MGI Symbol;Acc:MGI:1916296]	ILMN_2888842	162	238	-1.47
Fam78b	family with sequence similarity 78, member B [Source:MGI Symbol;Acc:MGI:2443050]	ILMN_2590605	36	52	-1.47
Btbd6	Mus musculus BTB (POZ) domain containing 6 (Btbd6), mRNA.	ILMN_2839682	38	56	-1.47
Hsp90ab1	heat shock protein 90 alpha (cytosolic), class B member 1 [Source:MGI Symbol;Acc:MGI:96247]	ILMN_1233733	92	136	-1.47
Bet1l	Bet1 golgi vesicular membrane trafficking protein like [Source:MGI Symbol;Acc:MGI:1913128]	ILMN_2639819	137	201	-1.47
Kank2	KN motif and ankyrin repeat domains 2 [Source:MGI Symbol;Acc:MGI:2384568]	ILMN_1240266	119	176	-1.47
Ercc6l2	excision repair cross-complementing rodent repair deficiency, complementation group 6 like 2 [Source:MGI Symbol;Acc:MGI:1923501]	ILMN_2816356	15	22	-1.48
Trem1	triggering receptor expressed on myeloid cells 1 [Source:MGI Symbol;Acc:MGI:1930005]	ILMN_2428545	25	37	-1.48
Tmem176a	transmembrane protein 176A [Source:MGI Symbol;Acc:MGI:1913308]	ILMN_2795412	143	211	-1.48
Slc31a2	solute carrier family 31, member 2 [Source:MGI Symbol;Acc:MGI:1333844]	ILMN_2634656	27	41	-1.48
Ndst1	N-deacetylase/N-sulfotransferase (heparan glucosaminyl) 1 [Source:MGI Symbol;Acc:MGI:104719]	ILMN_2832641	175	260	-1.48
Lrrc1	leucine rich repeat containing 1 [Source:MGI Symbol;Acc:MGI:2442313]	ILMN_2744478	29	42	-1.48
Itih5	inter-alpha (globulin) inhibitor H5 [Source:MGI Symbol;Acc:MGI:1925751]	ILMN_1248909	28	41	-1.48
Tnfrsf11a	tumor necrosis factor receptor superfamily, member 11a, NFKB activator [Source:MGI Symbol;Acc:MGI:1314891]	ILMN_2482600	16	24	-1.48
1700123O20Rik	RIKEN cDNA 1700123O20 gene [Source:MGI Symbol;Acc:MGI:1920893]	ILMN_2999447	58	86	-1.48
Ring1	ring finger protein 1	ILMN_2932539	55	82	-1.49
Sema6b	sema domain, transmembrane domain (TM), and cytoplasmic domain, (semaphorin) 6B [Source:MGI Symbol;Acc:MGI:1202889]	ILMN_3158135	214	319	-1.49
Fam221a	family with sequence similarity 221, member A [Source:MGI Symbol;Acc:MGI:2442161]	ILMN_1217670	85	126	-1.49
Sned1	sushi, nidogen and EGF-like domains 1	ILMN_2772334	20	30	-1.49
Ranbp17	RAN binding protein 17 [Source:MGI Symbol;Acc:MGI:1929706]	ILMN_2876169	16	23	-1.49

Tnmd	tenomodulin [Source:MGI Symbol;Acc:MGI:1929885]	ILMN_1243429	16	23	-1.50
Nat8	N-acetyltransferase 8 (GCN5-related) [Source:MGI Symbol;Acc:MGI:1915646]	ILMN_1216539	26	38	-1.50
Crmp1	collapsin response mediator protein 1 [Source:MGI Symbol;Acc:MGI:107793]	ILMN_1244675	41	61	-1.50
Larp1b	La ribonucleoprotein domain family, member 1B [Source:MGI Symbol;Acc:MGI:1914604]	ILMN_1241785	21	31	-1.50
Raver2	ribonucleoprotein, PTB-binding 2 [Source:MGI Symbol;Acc:MGI:2443623]	ILMN_3009400	17	26	-1.50
Rbsn	rabenosyn, RAB effector [Source:MGI Symbol;Acc:MGI:1925537]	ILMN_1234236	138	207	-1.50
Ptbp3	polypyrimidine tract binding protein 3 [Source:MGI Symbol;Acc:MGI:1923334]	ILMN_1257327	36	54	-1.50
Mmp19	matrix metalloproteinase 19 [Source:MGI Symbol;Acc:MGI:1927899]	ILMN_2595908	15	23	-1.50
H1fx	H1 histone family, member X [Source:MGI Symbol;Acc:MGI:2685307]	ILMN_1247646	47	70	-1.51
Recql	RecQ protein-like [Source:MGI Symbol;Acc:MGI:103021]	ILMN_1249655	16	25	-1.51
Spryd7	SPRY domain containing 7 [Source:MGI Symbol;Acc:MGI:1913924]	ILMN_2704715	232	349	-1.51
Bbx	bobby sox HMG box containing [Source:MGI Symbol;Acc:MGI:1917758]	ILMN_2669461	312	469	-1.51
Igf2r	insulin-like growth factor 2 receptor [Source:MGI Symbol;Acc:MGI:96435]	ILMN_2931096	24	36	-1.51
Jmy	junction-mediating and regulatory protein [Source:MGI Symbol;Acc:MGI:1913096]	ILMN_2437714	57	86	-1.51
Nxf1	nuclear RNA export factor 1 [Source:MGI Symbol;Acc:MGI:1858330]	ILMN_2896528	115	174	-1.51
A530099J19Rik	RIKEN cDNA A530099J19 gene [Source:MGI Symbol;Acc:MGI:2441809]	ILMN_1221040	17	25	-1.51
Akap6	A kinase (PRKA) anchor protein 6 [Source:MGI Symbol;Acc:MGI:3050566]	ILMN_3005211	312	471	-1.51
Nedd4	neural precursor cell expressed, developmentally down-regulated 4 [Source:MGI Symbol;Acc:MGI:97297]	ILMN_2594344	188	283	-1.51
Jak2	Janus kinase 2 [Source:MGI Symbol;Acc:MGI:96629]	ILMN_1245579	17	26	-1.51
Kctd14	potassium channel tetramerisation domain containing 14 [Source:MGI Symbol;Acc:MGI:1289222]	ILMN_2533104	14	21	-1.51
Ncoa4	nuclear receptor coactivator 4 [Source:MGI Symbol;Acc:MGI:1350932]	ILMN_3132361	16	24	-1.51
Gm28373	predicted gene 28373 [Source:MGI Symbol;Acc:MGI:5579079]	ILMN_1257115	15	23	-1.51
Camk1g	calcium/calmodulin-dependent protein kinase I gamma [Source:MGI Symbol;Acc:MGI:2388073]	ILMN_2856865	31	46	-1.51
Crtap	cartilage associated protein [Source:MGI Symbol;Acc:MGI:1891221]	ILMN_2877541	41	62	-1.51
Vcan	versican [Source:MGI Symbol;Acc:MGI:102889]	ILMN_2865704	38	57	-1.51
Mgat1	mannoside acetylglucosaminyltransferase 1 [Source:MGI Symbol;Acc:MGI:96973]	ILMN_3058137	15	22	-1.52
Srsf3	serine/arginine-rich splicing factor 3 [Source:MGI Symbol;Acc:MGI:98285]	ILMN_2733399	63	96	-1.52
Nfrkb	nuclear factor related to kappa B binding protein [Source:MGI Symbol;Acc:MGI:2442410]	ILMN_2830686	78	119	-1.52
Cox16	cytochrome c oxidase assembly protein 16	ILMN_2970900	17	27	-1.52

Katnb1l	katanin p80 subunit B like 1	ILMN_1255301	27	42	-1.52
Adamts13	a disintegrin-like and metallopeptidase (reprolysin type) with thrombospondin type 1 motif, 13 [Source:MGI Symbol;Acc:MGI:2685556]	ILMN_3112856	18	28	-1.52
Kmt5b	lysine methyltransferase 5B [Source:MGI Symbol;Acc:MGI:2444557]	ILMN_2996601	81	123	-1.52
Ttc37	tetratricopeptide repeat domain 37 [Source:MGI Symbol;Acc:MGI:2679923]	ILMN_3135991	30	45	-1.52
Chp1	calcineurin-like EF hand protein 1 [Source:MGI Symbol;Acc:MGI:1927185]	ILMN_1252602	24	37	-1.52
Zc3hav1	zinc finger CCCH type, antiviral 1 [Source:MGI Symbol;Acc:MGI:1926031]	ILMN_2516157	19	28	-1.52
LOC100045617	PREDICTED: Mus musculus similar to Eukaryotic translation initiation factor 4A2 (LOC100045617), mRNA.	ILMN_2613641	210	319	-1.52
Ngb	neuroglobin [Source:MGI Symbol;Acc:MGI:2151886]	ILMN_2895873	28	42	-1.52
Aldh7a1	aldehyde dehydrogenase family 7, member A1 [Source:MGI Symbol;Acc:MGI:108186]	ILMN_2590532	16	24	-1.52
Reep6	receptor accessory protein 6 [Source:MGI Symbol;Acc:MGI:1917585]	ILMN_2661650	100	152	-1.52
Cog8	component of oligomeric golgi complex 8 [Source:MGI Symbol;Acc:MGI:2142885]	ILMN_2595383	119	182	-1.53
Aifm1	apoptosis-inducing factor, mitochondrion-associated 1 [Source:MGI Symbol;Acc:MGI:1349419]	ILMN_2881263	16	25	-1.53
Lix1	limb and CNS expressed 1	ILMN_2738146	24	36	-1.53
Tmed3	transmembrane p24 trafficking protein 3 [Source:MGI Symbol;Acc:MGI:1913361]	ILMN_2650532	28	42	-1.53
Cd37	CD37 antigen	ILMN_2929526	17	26	-1.53
Atp11c	Mus musculus ATPase, class VI, type 11C (Atp11c), transcript variant 1, mRNA.	ILMN_3073665	31	48	-1.53
Nrg1	neuregulin 1 [Source:MGI Symbol;Acc:MGI:96083]	ILMN_2971688	93	142	-1.53
Dsg1c	desmoglein 1 gamma [Source:MGI Symbol;Acc:MGI:2664358]	ILMN_3001560	18	27	-1.53
Auts2	autism susceptibility candidate 2 [Source:MGI Symbol;Acc:MGI:1919847]	ILMN_2675765	14	22	-1.53
Telo2	telomere maintenance 2 [Source:MGI Symbol;Acc:MGI:1918968]	ILMN_2734797	15	23	-1.53
Zfp395	zinc finger protein 395 [Source:MGI Symbol;Acc:MGI:2682318]	ILMN_2512442	100	153	-1.53
Mb21d2	Mab-21 domain containing 2 [Source:MGI Symbol;Acc:MGI:1917028]	ILMN_1212632	31	48	-1.53
Col11a2	collagen, type XI, alpha 2 [Source:MGI Symbol;Acc:MGI:88447]	ILMN_2865074	19	30	-1.53
Banf1	barrier to autointegration factor 1 [Source:MGI Symbol;Acc:MGI:1346330]	ILMN_2698392	88	136	-1.53
Slc25a22	solute carrier family 25 (mitochondrial carrier, glutamate), member 22 [Source:MGI Symbol;Acc:MGI:1915517]	ILMN_2737237	19	30	-1.54
Sema6b	sema domain, transmembrane domain (TM), and cytoplasmic domain, (semaphorin) 6B [Source:MGI Symbol;Acc:MGI:1202889]	ILMN_2769285	285	438	-1.54
Khdrbs3	KH domain containing, RNA binding, signal transduction associated 3 [Source:MGI Symbol;Acc:MGI:1313312]	ILMN_2590488	80	122	-1.54
Ldlrap1	low density lipoprotein receptor adaptor protein 1	ILMN_2606136	19	29	-1.54

Pon3	paraoxonase 3 [Source:MGI Symbol;Acc:MGI:106686]	ILMN_2867241	38	58	-1.54
Pomt1	protein-O-mannosyltransferase 1 [Source:MGI Symbol;Acc:MGI:2138994]	ILMN_2694092	17	26	-1.54
Utrn	utrophin [Source:MGI Symbol;Acc:MGI:104631]	ILMN_2475832	19	29	-1.54
Cenpt	centromere protein T [Source:MGI Symbol;Acc:MGI:2443939]	ILMN_2653972	38	59	-1.54
Atp2b1	ATPase, Ca ⁺⁺ transporting, plasma membrane 1 [Source:MGI Symbol;Acc:MGI:104653]	ILMN_2878021	48	74	-1.54
Nae1	NEDD8 activating enzyme E1 subunit 1 [Source:MGI Symbol;Acc:MGI:2384561]	ILMN_2955356	155	239	-1.54
Vmn1r65	vomer nasal 1 receptor 65 [Source:MGI Symbol;Acc:MGI:3033475]	ILMN_2971043	21	33	-1.55
Trem12	triggering receptor expressed on myeloid cells-like 2 [Source:MGI Symbol;Acc:MGI:2147038]	ILMN_2980379	14	21	-1.55
Dars	aspartyl-tRNA synthetase [Source:MGI Symbol;Acc:MGI:2442544]	ILMN_3102333	106	164	-1.55
Copz2	coatamer protein complex, subunit zeta 2 [Source:MGI Symbol;Acc:MGI:1929008]	ILMN_1237090	16	24	-1.55
Txn2	thioredoxin 2 [Source:MGI Symbol;Acc:MGI:1929468]	ILMN_1257624	43	67	-1.55
Cdk2	cyclin-dependent kinase 2 [Source:MGI Symbol;Acc:MGI:104772]	ILMN_2717613	16	25	-1.55
Jam2	junction adhesion molecule 2 [Source:MGI Symbol;Acc:MGI:1933820]	ILMN_2790842	65	100	-1.55
Sf3b6	splicing factor 3B, subunit 6 [Source:MGI Symbol;Acc:MGI:1913305]	ILMN_2952292	42	65	-1.55
Micu2	mitochondrial calcium uptake 2 [Source:MGI Symbol;Acc:MGI:1915764]	ILMN_2899174	142	221	-1.55
Myo3b	myosin IIIB [Source:MGI Symbol;Acc:MGI:2448580]	ILMN_2681248	16	24	-1.55
Pdpr	pyruvate dehydrogenase phosphatase regulatory subunit [Source:MGI Symbol;Acc:MGI:2442188]	ILMN_2696146	19	29	-1.55
Wdr1	WD repeat domain 1 [Source:MGI Symbol;Acc:MGI:1337100]	ILMN_2460168	94	146	-1.56
Zfp617	zinc finger protein 617 [Source:MGI Symbol;Acc:MGI:2684459]	ILMN_2503418	14	22	-1.56
Nkx2-1	NK2 homeobox 1 [Source:MGI Symbol;Acc:MGI:108067]	ILMN_1260212	278	434	-1.56
Tnrc6b	trinucleotide repeat containing 6b [Source:MGI Symbol;Acc:MGI:2443730]	ILMN_3109164	147	229	-1.56
Lurap11	leucine rich adaptor protein 1-like [Source:MGI Symbol;Acc:MGI:106510]	ILMN_2646296	21	33	-1.56
Med7	mediator complex subunit 7 [Source:MGI Symbol;Acc:MGI:1913463]	ILMN_1225666	47	73	-1.56
Dpp6	dipeptidylpeptidase 6 [Source:MGI Symbol;Acc:MGI:94921]	ILMN_2627619	41	64	-1.56
Fam171a2	family with sequence similarity 171, member A2 [Source:MGI Symbol;Acc:MGI:2448496]	ILMN_2625725	22	35	-1.56
Slc35f2	solute carrier family 35, member F2 [Source:MGI Symbol;Acc:MGI:1919272]	ILMN_1234306	20	31	-1.56
Slc25a39	solute carrier family 25, member 39	ILMN_2855261	45	70	-1.57
Sacs	sacsin [Source:MGI Symbol;Acc:MGI:1354724]	ILMN_1227736	19	29	-1.57
Mrrf	mitochondrial ribosome recycling factor	ILMN_2940766	23	37	-1.57
Acvr1c	activin A receptor, type IC [Source:MGI Symbol;Acc:MGI:2661081]	ILMN_2614086	47	73	-1.57

Wbp1	WW domain binding protein 1	ILMN_2951120	20	31	-1.57
Il20rb	interleukin 20 receptor beta [Source:MGI Symbol;Acc:MGI:2143266]	ILMN_2541562	17	27	-1.57
Ttc19	tetratricopeptide repeat domain 19 [Source:MGI Symbol;Acc:MGI:1920045]	ILMN_3141781	17	28	-1.58
Tubb2b	tubulin, beta 2B class IIB [Source:MGI Symbol;Acc:MGI:1920960]	ILMN_2598715	18	28	-1.58
Tbc1d9	TBC1 domain family, member 9 [Source:MGI Symbol;Acc:MGI:1918560]	ILMN_1228165	103	162	-1.58
Entpd5	ectonucleoside triphosphate diphosphohydrolase 5 [Source:MGI Symbol;Acc:MGI:1321385]	ILMN_3149143	24	37	-1.58
Rbfox2	RNA binding protein, fox-1 homolog (C. elegans) 2 [Source:MGI Symbol;Acc:MGI:1933973]	ILMN_2670527	52	82	-1.58
Tor1b	torsin family 1, member B [Source:MGI Symbol;Acc:MGI:1353605]	ILMN_1240146	37	59	-1.58
Sp6	trans-acting transcription factor 6 [Source:MGI Symbol;Acc:MGI:1932575]	ILMN_2993473	16	26	-1.58
Mpg	N-methylpurine-DNA glycosylase [Source:MGI Symbol;Acc:MGI:97073]	ILMN_2600753	18	28	-1.58
Igsf1	immunoglobulin superfamily, member 1 [Source:MGI Symbol;Acc:MGI:2147913]	ILMN_2759192	18	29	-1.58
Otub2	OTU domain, ubiquitin aldehyde binding 2 [Source:MGI Symbol;Acc:MGI:1915399]	ILMN_2898917	15	24	-1.59
Banf1	barrier to autointegration factor 1 [Source:MGI Symbol;Acc:MGI:1346330]	ILMN_3158909	83	132	-1.59
Irgc1	immunity-related GTPase family, cinema 1 [Source:MGI Symbol;Acc:MGI:2685948]	ILMN_2656211	16	25	-1.59
Ccdc88a	coiled coil domain containing 88A [Source:MGI Symbol;Acc:MGI:1925177]	ILMN_1258136	48	76	-1.59
Atf1	activating transcription factor 1 [Source:MGI Symbol;Acc:MGI:1298366]	ILMN_2715664	17	27	-1.59
Galc	galactosylceramidase [Source:MGI Symbol;Acc:MGI:95636]	ILMN_1247261	18	29	-1.59
Vps33a	VPS33A CORVET/HOPS core subunit [Source:MGI Symbol;Acc:MGI:1924823]	ILMN_1222817	20	31	-1.59
H2afx	H2A histone family, member X [Source:MGI Symbol;Acc:MGI:102688]	ILMN_2907878	165	263	-1.59
Ncaph2	non-SMC condensin II complex, subunit H2 [Source:MGI Symbol;Acc:MGI:1289164]	ILMN_2745532	52	83	-1.59
Tmem164	transmembrane protein 164 [Source:MGI Symbol;Acc:MGI:2148020]	ILMN_2748271	37	59	-1.59
Vps29	VPS29 retromer complex component [Source:MGI Symbol;Acc:MGI:1928344]	ILMN_2446175	129	207	-1.60
Samd7	sterile alpha motif domain containing 7 [Source:MGI Symbol;Acc:MGI:1923203]	ILMN_2741563	17	26	-1.60
G6pdx	glucose-6-phosphate dehydrogenase X-linked [Source:MGI Symbol;Acc:MGI:105979]	ILMN_2721337	82	131	-1.60
Inha	inhibin alpha [Source:MGI Symbol;Acc:MGI:96569]	ILMN_1239270	19	30	-1.60
Nucb1	nucleobindin 1 [Source:MGI Symbol;Acc:MGI:97388]	ILMN_2908735	104	166	-1.60
Gpr180	G protein-coupled receptor 180 [Source:MGI Symbol;Acc:MGI:1930949]	ILMN_3161518	25	40	-1.60
Dnaaf1	dynein, axonemal assembly factor 1 [Source:MGI Symbol;Acc:MGI:1915520]	ILMN_2696418	13	21	-1.60
Foxb1	forkhead box B1 [Source:MGI Symbol;Acc:MGI:1927549]	ILMN_2770246	13	20	-1.61

Srsf3	serine/arginine-rich splicing factor 3 [Source:MGI Symbol;Acc:MGI:98285]	ILMN_2733398	55	89	-1.61
Ppp2r5d	protein phosphatase 2, regulatory subunit B', delta [Source:MGI Symbol;Acc:MGI:2388481]	ILMN_2956881	22	36	-1.61
Trpc4ap	transient receptor potential cation channel, subfamily C, member 4 associated protein [Source:MGI Symbol;Acc:MGI:1930751]	ILMN_1225522	50	80	-1.61
Sgcb	sarcoglycan, beta (dystrophin-associated glycoprotein) [Source:MGI Symbol;Acc:MGI:1346523]	ILMN_1222716	74	119	-1.61
Morf4l1	mortality factor 4 like 1 [Source:MGI Symbol;Acc:MGI:1096551]	ILMN_3038459	130	209	-1.61
Elac2	elaC ribonuclease Z 2 [Source:MGI Symbol;Acc:MGI:1890496]	ILMN_1212672	29	46	-1.62
Pianp	PILR alpha associated neural protein [Source:MGI Symbol;Acc:MGI:2441908]	ILMN_2642091	43	70	-1.62
Slc8a3	solute carrier family 8 (sodium/calcium exchanger), member 3 [Source:MGI Symbol;Acc:MGI:107976]	ILMN_2750193	19	31	-1.62
LOC433416	Mus musculus similar to cis-Golgi matrix protein GM130 (LOC433416), mRNA.	ILMN_2881591	18	30	-1.62
Plpp3	phospholipid phosphatase 3 [Source:MGI Symbol;Acc:MGI:1915166]	ILMN_1247753	23	37	-1.62
Dnaja1	DnaJ heat shock protein family (Hsp40) member A1 [Source:MGI Symbol;Acc:MGI:1270129]	ILMN_2800446	19	30	-1.62
Abhd18	abhydrolase domain containing 18 [Source:MGI Symbol;Acc:MGI:1915468]	ILMN_1259606	48	78	-1.62
Gstm1	glutathione S-transferase, mu 1	ILMN_2626491	29	47	-1.62
1190002N15Rik	RIKEN cDNA 1190002N15 gene [Source:MGI Symbol;Acc:MGI:1916111]	ILMN_3162133	33	54	-1.62
Tmem86a	transmembrane protein 86A [Source:MGI Symbol;Acc:MGI:1915143]	ILMN_2645662	31	50	-1.62
Cnot2	CCR4-NOT transcription complex, subunit 2 [Source:MGI Symbol;Acc:MGI:1919318]	ILMN_3162796	41	66	-1.63
Cldn1	claudin 1 [Source:MGI Symbol;Acc:MGI:1276109]	ILMN_2870295	13	21	-1.63
Senp6	SUMO/sentrin specific peptidase 6 [Source:MGI Symbol;Acc:MGI:1922075]	ILMN_1254100	20	32	-1.63
Dpf1	D4, zinc and double PHD fingers family 1 [Source:MGI Symbol;Acc:MGI:1352748]	ILMN_2772803	17	27	-1.63
Maneal	mannosidase, endo-alpha-like [Source:MGI Symbol;Acc:MGI:2684896]	ILMN_3131846	123	201	-1.63
Atp11c	ATPase, class VI, type 11C	ILMN_3152506	98	160	-1.63
Ddx50	DEAD (Asp-Glu-Ala-Asp) box polypeptide 50 [Source:MGI Symbol;Acc:MGI:2182303]	ILMN_1224614	17	28	-1.63
Gpr179	G protein-coupled receptor 179 [Source:MGI Symbol;Acc:MGI:2443409]	ILMN_2756275	13	22	-1.64
Gm1604b	Mus musculus gene model 1604B, (NCBI) (Gm1604b), mRNA.	ILMN_2530415	102	167	-1.64
Hmg20a	high mobility group 20A [Source:MGI Symbol;Acc:MGI:1914117]	ILMN_2968479	30	50	-1.64
Syt9	synaptotagmin IX [Source:MGI Symbol;Acc:MGI:1926373]	ILMN_2668020	51	84	-1.64
Chrb2	cholinergic receptor, nicotinic, beta polypeptide 2 (neuronal) [Source:MGI Symbol;Acc:MGI:87891]	ILMN_2759307	66	108	-1.64
Clcn3	chloride channel, voltage-sensitive 3 [Source:MGI Symbol;Acc:MGI:103555]	ILMN_2722081	148	244	-1.64

Camkk2	calcium/calmodulin-dependent protein kinase kinase 2, beta [Source:MGI Symbol;Acc:MGI:2444812]	ILMN_1256263	15	25	-1.64
Prkca	protein kinase C, alpha [Source:MGI Symbol;Acc:MGI:97595]	ILMN_1217890	150	246	-1.65
Tmem220	transmembrane protein 220 [Source:MGI Symbol;Acc:MGI:2443691]	ILMN_1228417	30	49	-1.65
Rnf24	ring finger protein 24 [Source:MGI Symbol;Acc:MGI:1261771]	ILMN_1212840	15	25	-1.65
Slc38a4	solute carrier family 38, member 4 [Source:MGI Symbol;Acc:MGI:1916604]	ILMN_1215803	56	92	-1.65
Chchd3	coiled-coil-helix-coiled-coil-helix domain containing 3 [Source:MGI Symbol;Acc:MGI:1913325]	ILMN_1243188	14	23	-1.65
Cox6b2	cytochrome c oxidase subunit VIb polypeptide 2 [Source:MGI Symbol;Acc:MGI:3044182]	ILMN_2764551	24	40	-1.65
Ralgps2	Ral GEF with PH domain and SH3 binding motif 2 [Source:MGI Symbol;Acc:MGI:1925505]	ILMN_2705139	14	23	-1.65
Surf1	surfeit gene 1 [Source:MGI Symbol;Acc:MGI:98443]	ILMN_2657141	26	42	-1.65
BC003331	cDNA sequence BC003331 [Source:MGI Symbol;Acc:MGI:2385108]	ILMN_3021807	23	38	-1.65
Prep	prolyl endopeptidase [Source:MGI Symbol;Acc:MGI:1270863]	ILMN_1259561	21	34	-1.65
Igsf11	immunoglobulin superfamily, member 11 [Source:MGI Symbol;Acc:MGI:2388477]	ILMN_1237582	35	57	-1.65
Fabp3	fatty acid binding protein 3, muscle and heart	ILMN_2887630	110	182	-1.65
Bcat1	branched chain aminotransferase 1, cytosolic [Source:MGI Symbol;Acc:MGI:104861]	ILMN_2656827	29	48	-1.65
Tmod2	tropomodulin 2 [Source:MGI Symbol;Acc:MGI:1355335]	ILMN_3040018	19	31	-1.66
Nomo1	nodal modulator 1 [Source:MGI Symbol;Acc:MGI:2385850]	ILMN_2626389	81	134	-1.66
Fgfr3	fibroblast growth factor receptor 3 [Source:MGI Symbol;Acc:MGI:95524]	ILMN_2590766	23	39	-1.66
Ints7	integrator complex subunit 7 [Source:MGI Symbol;Acc:MGI:1924315]	ILMN_2726174	20	34	-1.66
Pde4d	phosphodiesterase 4D, cAMP specific [Source:MGI Symbol;Acc:MGI:99555]	ILMN_1215021	24	40	-1.66
Hnmt	histamine N-methyltransferase [Source:MGI Symbol;Acc:MGI:2153181]	ILMN_2713463	15	25	-1.66
Pon3	paraoxonase 3 [Source:MGI Symbol;Acc:MGI:106686]	ILMN_2659006	13	22	-1.66
Npy1r	neuropeptide Y receptor Y1 [Source:MGI Symbol;Acc:MGI:104963]	ILMN_1259965	32	53	-1.66
Scgn	secretagoin, EF-hand calcium binding protein [Source:MGI Symbol;Acc:MGI:2384873]	ILMN_1227332	15	26	-1.67
Wdr37	WD repeat domain 37 [Source:MGI Symbol;Acc:MGI:1920393]	ILMN_3047987	71	118	-1.67
Mdk	midkine	ILMN_3080012	14	24	-1.67
Phka2	phosphorylase kinase alpha 2 [Source:MGI Symbol;Acc:MGI:97577]	ILMN_2725083	21	35	-1.67
Cacng5	calcium channel, voltage-dependent, gamma subunit 5 [Source:MGI Symbol;Acc:MGI:2157946]	ILMN_1226821	44	74	-1.67
Pctp	phosphatidylcholine transfer protein [Source:MGI Symbol;Acc:MGI:107375]	ILMN_2705979	16	27	-1.67
Tepsin	TEPSIN, adaptor related protein complex 4 accessory protein [Source:MGI Symbol;Acc:MGI:1926027]	ILMN_2775300	19	32	-1.67

Srsf12	serine/arginine-rich splicing factor 12 [Source:MGI Symbol;Acc:MGI:2661424]	ILMN_2953888	78	131	-1.67
Chm	choroideremia (RAB escort protein 1) [Source:MGI Symbol;Acc:MGI:892979]	ILMN_3151210	40	67	-1.68
Snap47	synaptosomal-associated protein, 47 [Source:MGI Symbol;Acc:MGI:1915076]	ILMN_2710151	29	48	-1.68
Sdk2	sidekick cell adhesion molecule 2 [Source:MGI Symbol;Acc:MGI:2443847]	ILMN_2622241	32	55	-1.68
Chrd	chordin [Source:MGI Symbol;Acc:MGI:1313268]	ILMN_2765047	34	57	-1.68
Phka2	phosphorylase kinase alpha 2 [Source:MGI Symbol;Acc:MGI:97577]	ILMN_2725082	18	31	-1.68
St3gal1	ST3 beta-galactoside alpha-2,3-sialyltransferase 1	ILMN_2749178	16	26	-1.68
Jade3	jade family PHD finger 3 [Source:MGI Symbol;Acc:MGI:2148019]	ILMN_1238998	13	22	-1.68
Dusp2	dual specificity phosphatase 2 [Source:MGI Symbol;Acc:MGI:101911]	ILMN_1242406	12	20	-1.69
Emc1	ER membrane protein complex subunit 1 [Source:MGI Symbol;Acc:MGI:2443696]	ILMN_3158659	90	152	-1.69
Trim46	tripartite motif-containing 46 [Source:MGI Symbol;Acc:MGI:2673000]	ILMN_2521395	78	131	-1.69
Map3k1	mitogen-activated protein kinase kinase kinase 1 [Source:MGI Symbol;Acc:MGI:1346872]	ILMN_3006611	38	64	-1.69
Fbxw8	F-box and WD-40 domain protein 8 [Source:MGI Symbol;Acc:MGI:1923041]	ILMN_2708519	14	24	-1.70
Sct	secretin [Source:MGI Symbol;Acc:MGI:99466]	ILMN_2592834	40	68	-1.70
Arpc1a	actin related protein 2/3 complex, subunit 1A [Source:MGI Symbol;Acc:MGI:1928896]	ILMN_2699700	37	63	-1.70
Exosc6	exosome component 6	ILMN_2685849	37	62	-1.70
Tgs1	trimethylguanosine synthase 1 [Source:MGI Symbol;Acc:MGI:2151797]	ILMN_2588456	14	25	-1.70
Crem	cAMP responsive element modulator [Source:MGI Symbol;Acc:MGI:88495]	ILMN_1242622	51	86	-1.70
Ankrd34a	ankyrin repeat domain 34A [Source:MGI Symbol;Acc:MGI:3617846]	ILMN_3020599	59	101	-1.71
Tmem121	transmembrane protein 121 [Source:MGI Symbol;Acc:MGI:1916445]	ILMN_1231884	26	45	-1.71
8030462N17Rik	RIKEN cDNA 8030462N17 gene [Source:MGI Symbol;Acc:MGI:2444951]	ILMN_2963017	191	325	-1.71
Tut1	terminal uridylyl transferase 1, U6 snRNA-specific [Source:MGI Symbol;Acc:MGI:1917294]	ILMN_1232593	43	73	-1.71
Tmtc1	transmembrane and tetratricopeptide repeat containing 1 [Source:MGI Symbol;Acc:MGI:3039590]	ILMN_2721218	115	196	-1.71
Ldah	lipid droplet associated hydrolase [Source:MGI Symbol;Acc:MGI:1916082]	ILMN_2633457	54	92	-1.71
Pla2g15	phospholipase A2, group XV [Source:MGI Symbol;Acc:MGI:2178076]	ILMN_1257060	96	166	-1.72
Mogat1	monoacylglycerol O-acyltransferase 1 [Source:MGI Symbol;Acc:MGI:1915643]	ILMN_2635387	23	40	-1.72
Fuk	fucokinase [Source:MGI Symbol;Acc:MGI:1916071]	ILMN_2641632	31	53	-1.72
Rnf10	ring finger protein 10 [Source:MGI Symbol;Acc:MGI:1859162]	ILMN_2789888	138	238	-1.72
Pdpf	pancreatic progenitor cell differentiation and proliferation factor	ILMN_2894984	28	49	-1.73
Tsr2	TSR2 20S rRNA accumulation [Source:MGI Symbol;Acc:MGI:1916749]	ILMN_2693454	21	36	-1.73

Pcgf6	polycomb group ring finger 6 [Source:MGI Symbol;Acc:MGI:1918291]	ILMN_1251165	26	46	-1.73
She	src homology 2 domain-containing transforming protein E [Source:MGI Symbol;Acc:MGI:1099462]	ILMN_2757019	20	35	-1.73
Tbc1d14	TBC1 domain family, member 14 [Source:MGI Symbol;Acc:MGI:1098708]	ILMN_2654197	48	82	-1.73
Tas2r126	taste receptor, type 2, member 126 [Source:MGI Symbol;Acc:MGI:2681273]	ILMN_2798839	13	23	-1.73
Cltb	clathrin, light polypeptide (Lcb) [Source:MGI Symbol;Acc:MGI:1921575]	ILMN_2642012	29	51	-1.73
Esr1	estrogen receptor 1 (alpha) [Source:MGI Symbol;Acc:MGI:1352467]	ILMN_2726412	29	51	-1.73
Pum2	pumilio RNA-binding family member 2 [Source:MGI Symbol;Acc:MGI:1931751]	ILMN_1228635	47	82	-1.74
Rchyl1	ring finger and CHY zinc finger domain containing 1 [Source:MGI Symbol;Acc:MGI:1915348]	ILMN_1255376	36	63	-1.74
Mcm7	minichromosome maintenance complex component 7 [Source:MGI Symbol;Acc:MGI:1298398]	ILMN_2673889	13	22	-1.74
Pigp	phosphatidylinositol glycan anchor biosynthesis, class P [Source:MGI Symbol;Acc:MGI:1860433]	ILMN_2592239	172	300	-1.74
Otp	orthopedia homeobox [Source:MGI Symbol;Acc:MGI:99835]	ILMN_1227598	15	27	-1.74
Tpmt	thiopurine methyltransferase	ILMN_2800466	19	34	-1.74
Hnrnp3	heterogeneous nuclear ribonucleoprotein H3 [Source:MGI Symbol;Acc:MGI:1926462]	ILMN_2958912	31	55	-1.74
Plcg2	phospholipase C, gamma 2 [Source:MGI Symbol;Acc:MGI:97616]	ILMN_2601833	34	59	-1.74
Emc1	ER membrane protein complex subunit 1 [Source:MGI Symbol;Acc:MGI:2443696]	ILMN_1249433	73	127	-1.74
Sgms2	sphingomyelin synthase 2 [Source:MGI Symbol;Acc:MGI:1921692]	ILMN_1227663	14	24	-1.75
Fam49b	family with sequence similarity 49, member B [Source:MGI Symbol;Acc:MGI:1923520]	ILMN_1235939	15	27	-1.75
Sf3a2	splicing factor 3a, subunit 2 [Source:MGI Symbol;Acc:MGI:104912]	ILMN_1223689	23	39	-1.75
Arid5b	AT rich interactive domain 5B (MRF1-like) [Source:MGI Symbol;Acc:MGI:2175912]	ILMN_3031781	25	44	-1.75
Tm6sf1	transmembrane 6 superfamily member 1	ILMN_2886981	22	39	-1.75
Slc6a15	solute carrier family 6 (neurotransmitter transporter), member 15 [Source:MGI Symbol;Acc:MGI:2143484]	ILMN_1258914	21	36	-1.76
Ncoa6	nuclear receptor coactivator 6 [Source:MGI Symbol;Acc:MGI:1929915]	ILMN_1229545	21	36	-1.76
Bend7	BEN domain containing 7 [Source:MGI Symbol;Acc:MGI:2443100]	ILMN_2590042	40	71	-1.76
6430548M08Rik	RIKEN cDNA 6430548M08 gene [Source:MGI Symbol;Acc:MGI:2443793]	ILMN_2599214	66	117	-1.77
Pip4k2b	phosphatidylinositol-5-phosphate 4-kinase, type II, beta [Source:MGI Symbol;Acc:MGI:1934234]	ILMN_2623967	15	26	-1.77
D6Wsu163e	DNA segment, Chr 6, Wayne State University 163, expressed [Source:MGI Symbol;Acc:MGI:107893]	ILMN_2596324	28	49	-1.77
Kdm8	lysine (K)-specific demethylase 8 [Source:MGI Symbol;Acc:MGI:1924285]	ILMN_1244329	36	63	-1.77

Pofut1	protein O-fucosyltransferase 1 [Source:MGI Symbol;Acc:MGI:2153207]	ILMN_2599360	26	47	-1.77
Zbtb33	zinc finger and BTB domain containing 33 [Source:MGI Symbol;Acc:MGI:1927290]	ILMN_1247277	19	33	-1.78
Sgcd	sarcoglycan, delta (dystrophin-associated glycoprotein) [Source:MGI Symbol;Acc:MGI:1346525]	ILMN_2696134	20	35	-1.78
Mrps21	mitochondrial ribosomal protein S21 [Source:MGI Symbol;Acc:MGI:1913542]	ILMN_2745555	34	60	-1.78
Pfkl	phosphofructokinase, liver, B-type [Source:MGI Symbol;Acc:MGI:97547]	ILMN_2871325	34	60	-1.78
Vps33b	vacuolar protein sorting 33B [Source:MGI Symbol;Acc:MGI:2446237]	ILMN_2422410	19	35	-1.78
Gbp2	guanylate binding protein 2 [Source:MGI Symbol;Acc:MGI:102772]	ILMN_3047389	16	28	-1.79
Atp2c1	ATPase, Ca ⁺⁺ -sequestering [Source:MGI Symbol;Acc:MGI:1889008]	ILMN_2658392	100	179	-1.79
Itgb4	integrin beta 4 [Source:MGI Symbol;Acc:MGI:96613]	ILMN_2634689	25	44	-1.79
Nr0b1	nuclear receptor subfamily 0, group B, member 1 [Source:MGI Symbol;Acc:MGI:1352460]	ILMN_2615796	31	55	-1.79
Ccdc28b	coiled coil domain containing 28B [Source:MGI Symbol;Acc:MGI:1913514]	ILMN_1220430	33	59	-1.79
Pla2g12a	phospholipase A2, group XIIA [Source:MGI Symbol;Acc:MGI:1913600]	ILMN_2636536	108	194	-1.80
Rprd2	regulation of nuclear pre-mRNA domain containing 2 [Source:MGI Symbol;Acc:MGI:1922387]	ILMN_3081402	19	34	-1.80
Grb7	growth factor receptor bound protein 7 [Source:MGI Symbol;Acc:MGI:102683]	ILMN_2773169	34	61	-1.80
Kcnj12	potassium inwardly-rectifying channel, subfamily J, member 12 [Source:MGI Symbol;Acc:MGI:108495]	ILMN_2695900	34	61	-1.80
Pmm2	phosphomannomutase 2 [Source:MGI Symbol;Acc:MGI:1859214]	ILMN_2724530	17	30	-1.80
Scnn1a	sodium channel, nonvoltage-gated 1 alpha [Source:MGI Symbol;Acc:MGI:101782]	ILMN_2729607	22	40	-1.80
Npas4	neuronal PAS domain protein 4 [Source:MGI Symbol;Acc:MGI:2664186]	ILMN_2596527	14	26	-1.80
Ms4a7	membrane-spanning 4-domains, subfamily A, member 7 [Source:MGI Symbol;Acc:MGI:1918846]	ILMN_3091003	13	23	-1.81
Lix1	limb and CNS expressed 1 [Source:MGI Symbol;Acc:MGI:1913893]	ILMN_2686593	14	25	-1.81
Ipo4	importin 4 [Source:MGI Symbol;Acc:MGI:1923001]	ILMN_2703099	45	81	-1.82
Slc11a2	solute carrier family 11 (proton-coupled divalent metal ion transporters), member 2 [Source:MGI Symbol;Acc:MGI:1345279]	ILMN_2665063	18	32	-1.82
Lcor	ligand dependent nuclear receptor corepressor [Source:MGI Symbol;Acc:MGI:2443930]	ILMN_2650511	25	45	-1.83
Rwdd3	RWD domain containing 3 [Source:MGI Symbol;Acc:MGI:1920420]	ILMN_1236100	16	29	-1.83
Htr1a	5-hydroxytryptamine (serotonin) receptor 1A [Source:MGI Symbol;Acc:MGI:96273]	ILMN_2664762	20	36	-1.83
Gart	phosphoribosylglycinamide formyltransferase [Source:MGI Symbol;Acc:MGI:95654]	ILMN_1225226	17	31	-1.83
Tbc1d2	TBC1 domain family, member 2 [Source:MGI Symbol;Acc:MGI:2652885]	ILMN_3140913	14	26	-1.83

Agfg1	ArfGAP with FG repeats 1 [Source:MGI Symbol;Acc:MGI:1333754]	ILMN_2606072	23	42	-1.83
Srp9	signal recognition particle 9 [Source:MGI Symbol;Acc:MGI:1350930]	ILMN_1260348	59	108	-1.84
Crem	cAMP responsive element modulator [Source:MGI Symbol;Acc:MGI:88495]	ILMN_2602899	38	70	-1.84
Plpp7	phospholipid phosphatase 7 (inactive) [Source:MGI Symbol;Acc:MGI:2445183]	ILMN_1215127	16	29	-1.84
Nudt6	nudix (nucleoside diphosphate linked moiety X)-type motif 6 [Source:MGI Symbol;Acc:MGI:2387618]	ILMN_1253773	27	50	-1.84
Gpr75	G protein-coupled receptor 75 [Source:MGI Symbol;Acc:MGI:2441843]	ILMN_3161775	39	71	-1.85
Zfp26	zinc finger protein 26 [Source:MGI Symbol;Acc:MGI:99173]	ILMN_2945607	33	60	-1.85
Spcs1	signal peptidase complex subunit 1 homolog (S. cerevisiae) [Source:MGI Symbol;Acc:MGI:1916269]	ILMN_2728320	31	57	-1.85
Pcdhb21	protocadherin beta 21 [Source:MGI Symbol;Acc:MGI:2136759]	ILMN_2696207	19	36	-1.85
Tnks	tankyrase, TRF1-interacting ankyrin-related ADP-ribose polymerase [Source:MGI Symbol;Acc:MGI:1341087]	ILMN_1250052	29	53	-1.85
Cacng5	calcium channel, voltage-dependent, gamma subunit 5 [Source:MGI Symbol;Acc:MGI:2157946]	ILMN_2725698	112	207	-1.85
Reck	reversion-inducing-cysteine-rich protein with kazal motifs [Source:MGI Symbol;Acc:MGI:1855698]	ILMN_2812614	19	35	-1.85
Saa1	serum amyloid A 1 [Source:MGI Symbol;Acc:MGI:98221]	ILMN_2826869	13	23	-1.85
Large2	LARGE xylosyl- and glucuronyltransferase 2 [Source:MGI Symbol;Acc:MGI:2443769]	ILMN_1235131	16	30	-1.85
Dlk1	delta-like 1 homolog (Drosophila) [Source:MGI Symbol;Acc:MGI:94900]	ILMN_1244618	205	380	-1.86
Lca5	Leber congenital amaurosis 5 (human) [Source:MGI Symbol;Acc:MGI:1923032]	ILMN_3097107	85	159	-1.86
Fgf14	fibroblast growth factor 14 [Source:MGI Symbol;Acc:MGI:109189]	ILMN_2744522	19	35	-1.86
Pum1	pumilio RNA-binding family member 1	ILMN_1223937	183	341	-1.86
Dolpp1	dolichyl pyrophosphate phosphatase 1 [Source:MGI Symbol;Acc:MGI:1914093]	ILMN_2718090	19	35	-1.87
Lrrtm4	leucine rich repeat transmembrane neuronal 4 [Source:MGI Symbol;Acc:MGI:2389180]	ILMN_2611687	23	43	-1.88
Gabra3	gamma-aminobutyric acid (GABA) A receptor, subunit alpha 3 [Source:MGI Symbol;Acc:MGI:95615]	ILMN_2595601	61	115	-1.88
4930550C14Rik	RIKEN cDNA 4930550C14 gene [Source:MGI Symbol;Acc:MGI:1922561]	ILMN_1250814	17	32	-1.88
Mapt	microtubule-associated protein tau [Source:MGI Symbol;Acc:MGI:97180]	ILMN_3034121	21	40	-1.89
Stag3	stromal antigen 3 [Source:MGI Symbol;Acc:MGI:1355311]	ILMN_2993843	13	24	-1.89
Sema6b	sema domain, transmembrane domain (TM), and cytoplasmic domain, (semaphorin) 6B [Source:MGI Symbol;Acc:MGI:1202889]	ILMN_2623920	14	26	-1.89
Nfasc	neurofascin [Source:MGI Symbol;Acc:MGI:104753]	ILMN_2648812	16	29	-1.89
Cenpx	centromere protein X [Source:MGI Symbol;Acc:MGI:894324]	ILMN_1226798	20	38	-1.90

Nans	N-acetylneuraminic acid synthase (sialic acid synthase) [Source:MGI Symbol;Acc:MGI:2149820]	ILMN_1245757	53	100	-1.90
Ngfr	nerve growth factor receptor (TNFR superfamily, member 16) [Source:MGI Symbol;Acc:MGI:97323]	ILMN_2851288	38	73	-1.90
Mars2	methionine-tRNA synthetase 2 (mitochondrial) [Source:MGI Symbol;Acc:MGI:2444136]	ILMN_2675740	27	52	-1.91
Asb7	ankyrin repeat and SOCS box-containing 7 [Source:MGI Symbol;Acc:MGI:2152835]	ILMN_2695316	23	44	-1.91
Capn7	calpain 7 [Source:MGI Symbol;Acc:MGI:1338030]	ILMN_2675535	29	55	-1.92
Elmo1	engulfment and cell motility 1 [Source:MGI Symbol;Acc:MGI:2153044]	ILMN_2745055	20	39	-1.92
Nr2f2	nuclear receptor subfamily 2, group F, member 2 [Source:MGI Symbol;Acc:MGI:1352452]	ILMN_3076625	19	37	-1.92
Spata2l	spermatogenesis associated 2-like [Source:MGI Symbol;Acc:MGI:1926029]	ILMN_1229246	16	31	-1.93
Lrrc9	leucine rich repeat containing 9 [Source:MGI Symbol;Acc:MGI:1925507]	ILMN_1226411	38	73	-1.93
Zfp422	zinc finger protein 422 [Source:MGI Symbol;Acc:MGI:1914505]	ILMN_2435673	12	23	-1.93
AW551984	expressed sequence AW551984 [Source:MGI Symbol;Acc:MGI:2143322]	ILMN_1215599	36	69	-1.93
Lst1	leukocyte specific transcript 1 [Source:MGI Symbol;Acc:MGI:1096324]	ILMN_2609323	15	28	-1.93
Neil2	nei like 2 (E. coli) [Source:MGI Symbol;Acc:MGI:2686058]	ILMN_2613131	23	44	-1.93
Get4	golgi to ER traffic protein 4 [Source:MGI Symbol;Acc:MGI:1914854]	ILMN_2745954	31	60	-1.94
2310033P09Rik	RIKEN cDNA 2310033P09 gene [Source:MGI Symbol;Acc:MGI:1915112]	ILMN_1232120	18	35	-1.95
Bbox1	butyrobetaine (gamma), 2-oxoglutarate dioxygenase 1 (gamma-butyrobetaine hydroxylase) [Source:MGI Symbol;Acc:MGI:1891372]	ILMN_2686029	47	93	-1.95
Cacnb4	calcium channel, voltage-dependent, beta 4 subunit [Source:MGI Symbol;Acc:MGI:103301]	ILMN_3047749	41	81	-1.97
Mapk11	mitogen-activated protein kinase 11 [Source:MGI Symbol;Acc:MGI:1338024]	ILMN_2614777	56	110	-1.97
Lrif1	ligand dependent nuclear receptor interacting factor 1	ILMN_2646836	18	36	-1.97
Spr2a1	small proline-rich protein 2A1	ILMN_3071908	30	59	-1.97
2610042L04Rik	Mus musculus RIKEN cDNA 2610042L04 gene (2610042L04Rik), mRNA.	ILMN_3059346	39	78	-1.98
2310011J03Rik	RIKEN cDNA 2310011J03 gene	ILMN_1219918	26	51	-1.98
Zfp300	zinc finger protein 300 [Source:MGI Symbol;Acc:MGI:3045326]	ILMN_2693330	34	67	-1.98
Fgf10	fibroblast growth factor 10 [Source:MGI Symbol;Acc:MGI:1099809]	ILMN_2736497	53	105	-1.98
Tdg	Mus musculus thymine DNA glycosylase (Tdg), transcript variant 1, mRNA.	ILMN_3102643	23	46	-1.99
Cachd1	cache domain containing 1 [Source:MGI Symbol;Acc:MGI:2444177]	ILMN_1248895	21	42	-2.00
Usp21	ubiquitin specific peptidase 21 [Source:MGI Symbol;Acc:MGI:1353665]	ILMN_2495939	69	138	-2.00
Tmem132c	transmembrane protein 132C [Source:MGI Symbol;Acc:MGI:2443061]	ILMN_2625148	27	53	-2.00
4930594M22Rik	RIKEN cDNA 4930594M22 gene [Source:MGI Symbol;Acc:MGI:1925478]	ILMN_2948344	40	80	-2.01
Fam129a	family with sequence similarity 129, member A [Source:MGI	ILMN_2591031	17	33	-2.01

	Symbol;Acc:MGI:2137237]				
Utp6	UTP6 small subunit processome component [Source:MGI Symbol;Acc:MGI:2445193]	ILMN_2750789	38	77	-2.01
Lcor	ligand dependent nuclear receptor corepressor [Source:MGI Symbol;Acc:MGI:2443930]	ILMN_2655183	21	42	-2.01
Nagk	N-acetylglucosamine kinase [Source:MGI Symbol;Acc:MGI:1860418]	ILMN_2616461	18	37	-2.01
Tpd5211	tumor protein D52-like 1 [Source:MGI Symbol;Acc:MGI:1298386]	ILMN_2434472	15	29	-2.01
Pcid2	PCI domain containing 2 [Source:MGI Symbol;Acc:MGI:2443003]	ILMN_2776271	59	119	-2.02
Elk4	ELK4, member of ETS oncogene family [Source:MGI Symbol;Acc:MGI:102853]	ILMN_1231726	18	36	-2.02
Mad212	MAD2 mitotic arrest deficient-like 2 [Source:MGI Symbol;Acc:MGI:1919140]	ILMN_2707015	37	75	-2.02
Oasl2	2'-5' oligoadenylate synthetase-like 2 [Source:MGI Symbol;Acc:MGI:1344390]	ILMN_2599154	68	138	-2.03
Pex3	peroxisomal biogenesis factor 3 [Source:MGI Symbol;Acc:MGI:1929646]	ILMN_2801934	45	91	-2.03
Eif4a1	Mus musculus eukaryotic translation initiation factor 4A1 (Eif4a1), mRNA.	ILMN_2618481	42	86	-2.04
Tmem1311	transmembrane 131 like [Source:MGI Symbol;Acc:MGI:2443399]	ILMN_2977535	17	36	-2.04
Rgp1	RAB6A GEF complex partner 1 [Source:MGI Symbol;Acc:MGI:1915956]	ILMN_2710589	23	46	-2.04
Slc9a6	solute carrier family 9 (sodium/hydrogen exchanger), member 6 [Source:MGI Symbol;Acc:MGI:2443511]	ILMN_2617843	21	44	-2.06
Pick1	protein interacting with C kinase 1 [Source:MGI Symbol;Acc:MGI:894645]	ILMN_3092815	17	35	-2.06
Cxcr4	chemokine (C-X-C motif) receptor 4 [Source:MGI Symbol;Acc:MGI:109563]	ILMN_2630459	27	55	-2.06
Sesn1	sestrin 1 [Source:MGI Symbol;Acc:MGI:2155278]	ILMN_3136744	56	115	-2.06
Dnaaf3	dynein, axonemal assembly factor 3 [Source:MGI Symbol;Acc:MGI:3588207]	ILMN_2959253	42	86	-2.06
Tbcd25	TBC1 domain family, member 25 [Source:MGI Symbol;Acc:MGI:2444862]	ILMN_2722583	31	65	-2.06
Kat6b	K(lysine) acetyltransferase 6B [Source:MGI Symbol;Acc:MGI:1858746]	ILMN_1230880	17	36	-2.07
Zfp622	zinc finger protein 622 [Source:MGI Symbol;Acc:MGI:1289282]	ILMN_2879570	14	29	-2.08
Adpgk	ADP-dependent glucokinase [Source:MGI Symbol;Acc:MGI:1919391]	ILMN_2657876	12	25	-2.08
Anxa9	annexin A9 [Source:MGI Symbol;Acc:MGI:1923711]	ILMN_2715226	23	49	-2.09
Mrps25	mitochondrial ribosomal protein S25 [Source:MGI Symbol;Acc:MGI:1928140]	ILMN_2680111	17	35	-2.09
Ascc2	activating signal cointegrator 1 complex subunit 2 [Source:MGI Symbol;Acc:MGI:1922702]	ILMN_2930922	24	50	-2.10
Kat6b	K(lysine) acetyltransferase 6B [Source:MGI Symbol;Acc:MGI:1858746]	ILMN_2743320	18	38	-2.10
Rasl2-9	RAS-like, family 2, locus 9	ILMN_1229223	14	29	-2.10
Jkamp	JNK1/MAPK8-associated membrane protein [Source:MGI Symbol;Acc:MGI:1915057]	ILMN_1223051	18	39	-2.11
Rspo4	R-spondin 4 [Source:MGI Symbol;Acc:MGI:1924467]	ILMN_1244053	17	36	-2.12
Pcbp3	poly(rC) binding protein 3 [Source:MGI Symbol;Acc:MGI:1890470]	ILMN_1213692	35	75	-2.12

Xrn1	5'-3' exoribonuclease 1 [Source:MGI Symbol;Acc:MGI:891964]	ILMN_2514674	27	58	-2.12
Arhgap6	Rho GTPase activating protein 6 [Source:MGI Symbol;Acc:MGI:1196332]	ILMN_2703171	29	62	-2.13
Ddx6	DEAD (Asp-Glu-Ala-Asp) box polypeptide 6 [Source:MGI Symbol;Acc:MGI:104976]	ILMN_3040041	25	54	-2.13
Mpp2	membrane protein, palmitoylated 2 (MAGUK p55 subfamily member 2) [Source:MGI Symbol;Acc:MGI:1858257]	ILMN_2595163	43	92	-2.14
Scn3b	sodium channel, voltage-gated, type III, beta [Source:MGI Symbol;Acc:MGI:1918882]	ILMN_3163577	21	46	-2.16
Tsga10	testis specific 10 [Source:MGI Symbol;Acc:MGI:2685063]	ILMN_2501276	32	70	-2.17
Wnk1	WNK lysine deficient protein kinase 1 [Source:MGI Symbol;Acc:MGI:2442092]	ILMN_1258991	27	58	-2.18
Fut4	fucosyltransferase 4 [Source:MGI Symbol;Acc:MGI:95594]	ILMN_2892507	20	43	-2.18
Krt73	keratin 73 [Source:MGI Symbol;Acc:MGI:3607712]	ILMN_3007409	16	36	-2.18
Tyms-ps	Mus musculus thymidylate synthase, pseudogene (Tyms-ps), non-coding RNA.	ILMN_2921303	20	45	-2.18
Fezf2	Fez family zinc finger 2 [Source:MGI Symbol;Acc:MGI:1859823]	ILMN_2932692	24	54	-2.19
Atp11a	ATPase, class VI, type 11A [Source:MGI Symbol;Acc:MGI:1354735]	ILMN_2602789	15	33	-2.20
Irf5	interferon regulatory factor 5 [Source:MGI Symbol;Acc:MGI:1350924]	ILMN_2621752	20	43	-2.21
Glce	glucuronyl C5-epimerase [Source:MGI Symbol;Acc:MGI:2136405]	ILMN_2750543	36	80	-2.22
Pak7	p21 protein (Cdc42/Rac)-activated kinase 7 [Source:MGI Symbol;Acc:MGI:1920334]	ILMN_1249906	12	27	-2.24
Dtna	dystrobrevin alpha [Source:MGI Symbol;Acc:MGI:106039]	ILMN_1221805	30	69	-2.29
Cnm3	cyclin M3 [Source:MGI Symbol;Acc:MGI:2151055]	ILMN_1216036	19	44	-2.30
Tmem138	transmembrane protein 138 [Source:MGI Symbol;Acc:MGI:1920232]	ILMN_2610554	15	36	-2.41
Zfp868	zinc finger protein 868 [Source:MGI Symbol;Acc:MGI:2142546]	ILMN_3143088	37	96	-2.59
Dtna	dystrobrevin alpha [Source:MGI Symbol;Acc:MGI:106039]	ILMN_1222187	12	34	-2.90
Nek6	NIMA (never in mitosis gene a)-related expressed kinase 6 [Source:MGI Symbol;Acc:MGI:1891638]	ILMN_2685668	41	119	-2.92
Knop1	lysine rich nucleolar protein 1 [Source:MGI Symbol;Acc:MGI:1913606]	ILMN_2699624	21	61	-2.94
Insig1	insulin induced gene 1 [Source:MGI Symbol;Acc:MGI:1916289]	ILMN_2606693	22	67	-3.03
Trappc3	trafficking protein particle complex 3 [Source:MGI Symbol;Acc:MGI:1351486]	ILMN_2503748	44	139	-3.12
Fpr2	formyl peptide receptor 2 [Source:MGI Symbol;Acc:MGI:1278319]	ILMN_1242457	12	37	-3.18
Sox6	SRY (sex determining region Y)-box 6 [Source:MGI Symbol;Acc:MGI:98368]	ILMN_2702322	17	56	-3.27
Sox6	SRY (sex determining region Y)-box 6 [Source:MGI Symbol;Acc:MGI:98368]	ILMN_1254646	17	56	-3.30
Dmrtc1a	DMRT-like family C1a [Source:MGI Symbol;Acc:MGI:1918137]	ILMN_3144535	15	50	-3.30
Sox6	SRY (sex determining region Y)-box 6 [Source:MGI Symbol;Acc:MGI:98368]	ILMN_2702323	19	62	-3.30
Dusp8	dual specificity phosphatase 8 [Source:MGI Symbol;Acc:MGI:106626]	ILMN_1228031	107	614	-5.76

Supplemental Table 3: Details on TUF Subcohort analyzed for CBF after intranasal insulin.

Dusp8 rs2334499 SNP	Total population			Males			Females		
	(C/C)	(C/C)	(C/T)	(T/T)	(C/T)	(T/T)	(C/C)	(C/T)	(T/T)
Number	15	11	10	6	20	12	4	10	6
Age (years)	27 ± 5	28 ± 5	26 ± 5	28 ± 4	26 ± 4	27 ± 3	24 ± 2	26 ± 3	26 ± 2
Body mass index (kg/m ²)	25.0 ± 5.4	25.8 ± 5.7	29.3 ± 7.9	27.3 ± 3.4	28.2 ± 5.2	25.2 ± 3.7	22.9 ± 4.7	28.6 ± 5.2	23.1 ± 2.8
Waist-to-hip ratio	0.85 ± 0.08	0.89 ± 0.06	0.91 ± 0.08	0.90 ± 0.06	0.85 ± 0.09	0.83 ± 0.09	0.76 ± 0.06	0.81 ± 0.09	0.75 ± 0.04
Body fat content (%)	23.4 ± 7.5	20.4 ± 4.3	22.4 ± 7.2	23.1 ± 4.4	32.4 ± 13.1	27.0 ± 6.3	30.8 ± 9.4	39.7 ± 11.4	31.7 ± 5.0
Fasting glucose (mmol/l)	5.0 ± 0.5	5.1 ± 0.5	5.4 ± 0.7	5.0 ± 0.6	5.2 ± 0.5	4.9 ± 0.4	4.8 ± 0.5	5.2 ± 0.3	4.9 ± 0.2
Fasting C peptide (pmol/l)	397 ± 205	362 ± 160	596 ± 350	326 ± 73	532 ± 184	340 ± 64	491 ± 308	562 ± 209	355 ± 57
Serum cortisol (nmol/l)	460 ± 211	428 ± 88	538 ± 131	377 ± 114	481 ± 170	423 ± 132	546 ± 410	423 ± 191	470 ± 143
OGTT-derived insulin sensitivity index (AU)	15.9 ± 8.0	17.4 ± 8.6	11.1 ± 9.8	14.6 ± 5.1	11.1 ± 8.8	13.1 ± 4.4	11.7 ± 4.5	10.0 ± 7.8	11.6 ± 3.4
HbA1c (%)	5.1 ± 0.3	5.2 ± 0.3	5.4 ± 0.3	5.2 ± 0.2	5.3 ± 0.2	5.2 ± 0.3	5.2 ± 0.3	5.2 ± 0.2	5.2 ± 0.3
C-reactive protein (mg/dl)	0.3 ± 0.4	0.3 ± 0.5	0.3 ± 0.8	0.3 ± 0.4	0.2 ± 0.2	0.3 ± 0.4	0.1 ± 0.2	0.2 ± 0.3	0.3 ± 0.4

Given are means ± SD.

Supplemental Table 4: Antibodies for detection of protein levels by immunohistochemistry, immunofluorescence or western blotting.

Antibody	Vendor	Catalogue number	species	Dilution for IHC/IF	Dilution for WB
P-Akt_Ser473	Cell Signaling Technology	#9271	rabbit		1:1200
P-Stat3	Cell Signaling Technology	#9145	rabbit	1:500	
P-ERK_T202/Y204	Cell Signaling Technology	#9101	rabbit		1:1000
P-p38_T180/Y182	Cell Signaling Technology	#9211	rabbit		1:1000
P-Jnk_T183/Y185	Promega	#V7931	rabbit		1:1000
P-cJun_S63	Cell Signaling Technology	#9261	rabbit	1:200	1:2000
P-GR_Ser226	Sigma-Aldrich	#SAB4503874	rabbit		1:1000
ERK	Cell Signaling Technology	#9102	rabbit		1:1200
p38	Cell Signaling Technology	#9212	rabbit		1:1000
Jnk1	Cell Signaling Technology	#3708	rabbit		1:1000
cJun	Cell Signaling Technology	#9165	rabbit		1:1200
GR	Proteintech	#24050-1-AP	rabbit		1:10'000
GFAP	Sigma-Aldrich	#G3893	mouse	1:1000	
Iba1	Synaptic system	#234003	rabbit	1:500	
Myc-Tag	Cell Signaling Technology	#2276	mouse		1:5000
β -Actin	Cell Signaling Technology	#4970	rabbit		1:10'000
GAPDH	Santa Cruz Biotechnology	#sc-166545	mouse		1:10'000
anti-rabbit IgG-HRP	Santa Cruz Biotechnology	#sc-2004	goat		1:10'000
anti-mouse IgG-HRP	Santa Cruz Biotechnology	#sc-2318	donkey		1:10'000
anti-rabbit IgG antibody (H+L), biotinylated	Vector Biolab	#BA-1000	goat	1:400	
anti-mouse Alexa Fluor 568	Thermo Fisher Scientific	#A10037	goat	1:400	
anti-rabbit Alexa Fluor 488	Thermo Fisher Scientific	#A11008	goat	1:400	

Supplemental Table 5: TaqMan probes for gene expression analysis (Applied Biosystems, Darmstadt, Germany).

Gene Name	TaqMan Probe
Mm_Acth	Mm00435874_m1
Mm_Avp	Mm00437761_g1
Mm_Crh	Mm01293920_s1
Mm_Crhr1	Mm00432670_m1
Mm_Cyp11b1	Mm01204952_m1
Mm_Dusp8	Mm01158980_m1
Mm_G6pc	Mm00839363_m1
Mm_Gck	Mm00439129_m1
Mm_Hprt	Mm01545399_m1
Mm_Hsd11b1	Mm00476182_m1
Mm_Hsp90aa1	Mm00658568_gH
Mm_Hspal1	Mm01159846_s1
Mm_Nr3c1	Mm00433832_m1
Mm_Oxt	Mm00726655_s1
Mm_Pck1	Mm01247058_m1
Mm_Per1	Mm00501813_m1
Mm_Pfkm	Mm00445453_m1
Mm_Pgk1	Mm00435617_m1
Mm_Pkm2	Mm00834102_gH
Mm_Pygm	Mm00478582_m1
Mm_Rpl127	Mm01245874_g1
Mm_Slc2a1	Mm00441480_m1
Mm_StAR	Mm00441558_m1
Mm_Tsc22d3	Mm00726417_s1

Supplemental Table 6: Primer for gene expression analysis.

Gene Name	Primer fwd	Primer rev
Mm_Agl	GAGAGTGACCGAGCTAGGAAC	GCAACCAACGAACAGCAGATT
Mm_Cd68	CTTCCCACAGGCAGCACAG	AATGATGAGAGGCAGCAAGAGG
Mm_Dusp8	TCACCTCTACCTGGGCTCTC	CACAAACCTGTATGCGTCGT
Mm_Emr1	AATCGCTGCTGGTTGAATACAG	CCAGGCAAGGAGGACAGAGTT
Mm_G6PT	GGCTACGGCTACTATCGCAC	AGGAGGGCATGACAAAGGAGA
Mm_Gaa	GGGCCTGCACCCTTATCTC	GAGGTCGGTACGTCTTCCAC
Mm_GBE-1	TTCTGACGCAGCGGAGTATG	GCCACTCGGCTTGGAAATGT
Mm_Gyg1	TGGAGTCTTTGTCTATCAACCTT	TTGCCAGCCACTAAAATATGT
Mm_Gys1	CCAGATAGTAGTTGTCACCCCAT	GAACGCAGTGATTTTCGAGG
Mm_Gys2	ACCAAGGCCAAAACGACAG	GGGCTCACATTGTTCTACTTGA
Mm_Hk	GTGTGCTCCGAGTAAGGGTG	GTCCGTAAGCCGTTACACC
Mm_Hprt	AAGCTTGCTGGTGAAAAGGA	TTGCGCTCATCTTAGGCTTT
Mm_Ikbb	GGCACCTGGATGACCTAGA	CCATCTCCTGGCTGTCACCT
Mm_Il1b	TACAAGGAGAACCAAGCAACGAC	GATCCACACTCTCCAGCTGCA
Mm_Il6	GTGGCTAAGGACCAAGACCA	GGTTTGCCGAGTAGACCTCA
Mm_Nfkb1a	TGCCTGGCCAGTGTAGCAGTCTT	CAAAGTCACCAAGTGCTCCACGAT
Mm_Pgm2	AGTGAAGACGCAGGCATATCC	GGCTCCACGGTAGAGACGA
Mm_Ppib	GCATCTATGGTGAGCGCTTC	CTCCACCTTCCGTACCACAT
Mm_Pygl	GAGAAGCGACGGCAGATCAG	CTTGACCAGAGTGAAGTGCAG
Mm_Tnfa	CATCTTCTCAAATTCGAGTGACAA	TGGGAGTAGACAAGGTACAACCC
Hs_Dusp8	AGGACACTAACCGCCTCAAG	AGGCAGACTTGATGTCCAGG
Hs_GAPDH	ACCCACTCCTCCACCTTTGA	CAAAGTGGTCGTTGAGGGCA
Mm_Dusp8_WT	AGTGAGGTCCATCAGTCTGC	TGGGCATGTCTTCTGACGAC
Mm_Dusp8_KO	CGCATCGCCTTCTATCGC	CTCCACCATGCCCTCTTC