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Sex- and region-specific differences in the transcriptomes of rat microglia from the brainstem and cervical spinal cord

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False Discovery Rate (FDR)

Dyskerin 1 (Dkc1)

Early B cell factor 1 (EBF1)

T cell factor 3 (TCF3)

Nuclear factor kappa B (NF- κ B)

Early growth response factor 1 (EGR1)

Sudden Infant Death Syndrome (SIDS)

Polycomb repressive complex 2 (PRC2)

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ABSTRACT

The neural control system underlying breathing is sexually dimorphic with males being more vulnerable to dysfunction. Microglia also display sex differences, and their role in the architecture of brainstem respiratory rhythm circuitry and modulation of cervical spinal cord respiratory plasticity is becoming better appreciated. To further understand the molecular underpinnings of these sex differences, we performed RNA-sequencing of immunomagnetically-isolated microglia from brainstem and cervical spinal cord of adult male and female rats. We used various bioinformatics tools (GO, KEGG, Reactome, STRING, MAGICRICKS) to functionally categorize identified gene sets, as well as to pinpoint common transcriptional gene drivers that may be responsible for the observed transcriptomic differences. We found few sex differences in the microglial transcriptomes derived from the brainstem, but several hundred genes were differentially expressed by sex in cervical spinal microglia. Comparing brainstem and spinal microglia within and between sexes, we found that the major factor guiding transcriptomic differences was CNS location rather than sex. We further identified key transcriptional drivers that may be responsible for the transcriptomic differences observed between sexes and CNS regions; EZH2 emerged as the predominant driver of the differentially downregulated genes. We suggest that functional gene alterations identified in metabolism, transcription and intercellular communication underlie critical microglial heterogeneity and sex differences in CNS regions that contribute to respiratory disorders categorized by dysfunction in neural control. These data will also serve as an important resource database to advance our understanding of innate immune cell contributions to sex differences and the field of respiratory neural control.

Significance statement: The contributions of CNS innate immune cells to sexually dimorphic differences in the neural circuitry controlling breathing are poorly understood. We identify key transcriptomic differences, and their transcriptional drivers, in microglia derived from the brainstem and the C3-C6 cervical spinal cord of healthy adult male and female rats. Gene alterations identified in metabolism, gene transcription and intercellular communication likely underlie critical microglial heterogeneity and sex differences in these key CNS regions that contribute to the neural control of breathing.

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INTRODUCTION

Breathing is a critical physiological process that must be fully operational at birth and adapt to ever changing needs throughout the lifespan, until death. Regardless of its necessity in both sexes, the respiratory system displays significant sex differences including airway and lung anatomy, respiratory muscle oxygen consumption, and importantly, the respiratory-related neuronal network (Becklake and Kauffmann, 1999; Behan and Wenninger, 2008; Dominelli et al., 2015; Dougherty et al., 2017; Iturri et al., 2017; Lozo et al., 2017; Rousseau et al., 2017; LoMauro and Aliverti, 2018). Despite these well-known differences, comparatively little is known regarding sex-dependent dimorphisms in the respiratory control system, although reports suggest dimorphisms in response to ventilatory challenges (Jensen et al., 2005; Ahuja et al., 2007) and the capacity for respiratory plasticity (Zabka et al., 2006; Dougherty et al., 2017). There is also clear evidence of sex differences in some ventilatory control disorders, such as sudden infant death syndrome and central sleep apnea, which are more prevalent in males (Rousseau et al., 2017; Townsel et al., 2017). Disruptions in brainstem respiratory rhythm generation and pattern formation circuits contribute to these pathologies (Benarroch, 2018; Kinney and Haynes, 2019).

Little is known about the mechanistic underpinnings of sexual dimorphism in the neural circuits controlling breathing, including the role of intercellular communication between respiratory neurons and other cell types. CNS resident innate immune cells (microglia) are becoming better appreciated as important players both in the architecture of the medullary respiratory rhythm generator (Thoby Brisson et al., 2019) as well as potentially contributing to neuroinflammation induced by various stimuli that is now well-established to impair respiratory plasticity in adult animals and humans (Huxtable et al., 2013; Huxtable et al., 2015; Hocker et al., 2017; Lynch et al., 2017; Agosto-Marlin et al., 2018; Hocker and Huxtable, 2019; Sandhu et al., 2019). An adverse maternal and/or early life environment can also negatively impact the developing respiratory control system (Fournier et al., 2013; Gulemetova et al., 2013; Delhaes et al., 2014; Fournier et al., 2015; Soliz et al., 2016; Baldy et al., 2018), an effect that may be due to inflammation (Johnson et al., 2018; Hocker et al., 2019; Kiernan et al., 2019;

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Knutson and Watters, 2020). Interestingly, these early life exposures appear to impact the male respiratory neural control system more severely than the female.

Based on the expression of select markers and morphology, microglia have long been believed to be functionally heterogeneous (Lawson et al., 1990; Schmid et al., 2002; Hanisch, 2013; De Biase et al., 2017; McCarthy, 2017) and sexually dimorphic cells, showing alterations in morphology and transcriptomes in various forebrain regions (Schwarz et al., 2012; Hanamsagar and Bilbo, 2016; Hanamsagar et al., 2017; Bordeleau et al., 2019; Kodama and Gan, 2019). Although the molecular and functional contributions of microglia to neural function have been widely studied in forebrain CNS regions (like the cortex and hippocampus), the same is not true of microglia from CNS regions in which the respiratory neural control circuitry is housed. Nevertheless, evidence is emerging to suggest that microglia also locally impact the neural control of breathing and physiologic adaptations to respiratory challenge (Stokes et al., 2017; Tenorio-Lopes et al., 2017; Baldy et al., 2018), although to our knowledge, no studies have investigated the microglial transcriptome in CNS regions responsible for respiratory rhythm and patterning, or sex or region-specific differences in microglial transcriptomes in respiratory control regions.

Here, we investigated the transcriptomes of microglia derived from two regions important for respiratory control, the brainstem and the cervical spinal cord in adult male and female rats. The brainstem houses the neuronal circuitry responsible for generating and sculpting the neuronal signal to breathe (Ikeda et al., 2017; Del Negro et al., 2018), which is then transmitted to inspiratory motor neurons, the most important of which reside in the cervical spinal cord (Fogarty et al., 2018; Shinozaki et al., 2019). We report that while there were significant sexual dimorphisms in the genes expressed in microglia derived from the cervical spinal cord, few sex differences were noted in brainstem microglia. Moreover, the greatest factor driving transcriptomic differences between microglia from both sexes and regions appeared to be the CNS region from which they were derived. Interestingly, there were significant sex differences in the functional classes of genes expressed by microglia derived from the cervical spinal cord compared to those from the brainstem; however, most of the functional gene categories lacked overlap between sexes. Lastly, we identified unique transcriptional drivers responsible for the region- and sex-dependent differences in microglial gene signatures.

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MATERIALS AND METHODS

Animal procedures

All animal experimental procedures were performed according to the NIH guidelines set forth in the Guide for the Care and Use of Laboratory Animals. All protocols were approved by the University of Wisconsin-Madison Institutional Animal Care and Use Committee. Rats were housed in AAALAC-accredited facilities on a 12:12 light:dark cycle, with food and water ad libitum. Because maternal inflammation can impact respiratory frequency and tidal volume in newborn pups (Ramirez et al., 2019) and maternal breathing dysfunction is thought to cause maternal inflammation that can cause fetal growth restriction, low birth weights and premature birth in some human studies (reviewed in (Izci Balserak, 2015)), we used adult rats born from dams that were reared in controlled room air conditions during their pregnancy. Due to our interest in studying microglia from CNS regions involved in respiratory neural control, we housed timed pregnant Sprague-Dawley rats (Charles River; Wilmington, MA; arrived day E9) in environmentally controlled conditions from gestational days 10 through 21. The conditions consisted of computer-controlled room air delivery to maintain CO₂ levels below 0.3%. Pups were birthed in filter-topped cages and each litter was culled to 8 (4 males and 4 females whenever possible) by postnatal day 3 to control for potential differences arising due to maternal care. Microglia from ~8 wk old young adult rats (1 male and 1 female from each of 5 independent litters; n=5 each sex) were immunomagnetically isolated and sent for RNA sequencing (Novogene, Sacramento, CA).

Data presented in this study represent a sub-analysis of a larger study investigating the impact of maternal intermittent hypoxia on microglia from respiratory control regions in adult offspring. Here, we describe results from the control animals which were exposed to normoxia.

CD11b⁺ cell isolation

Offspring were euthanized and perfused with cold phosphate buffered saline (PBS) to remove circulating immune cells from the vasculature of the central nervous system. Whole brainstems were dissected between the pontomedullary junction and the obex. Spinal cervical C2-C6 vertebrae were removed, and dorsal/ventral C3-

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C6 cervical spinal segments were extracted based on identification of the spinal roots. Tissues were dissociated into single cell suspensions using papain enzymatic digestion. CD11b⁺ cells were immunomagnetically isolated as previously described (Crain et al., 2009; Crain and Watters, 2009; Nikodemova and Watters, 2012; Crain et al., 2013). Isolated CD11b⁺ cells will be hereafter referred to as “microglia”.

RNA Sequencing and Analysis

Total RNA was extracted from freshly isolated microglia with TriReagent according to the manufacturer’s protocol (Sigma-Aldrich, St. Louis, MO) as we have done before (Crain et al., 2009; Crain and Watters, 2009; Nikodemova and Watters, 2012; Crain et al., 2013). Total RNA was submitted to Novogene (Sacramento, CA) for library construction and paired-end (PE-150) sequencing with an Illumina NovaSeq. Index of the reference Rnor6.0 genome was built using Bowtie v2.2.3. Reads were aligned using TopHat v2.0.12. Gene counts were made using HTSeq v0.6.1. Count files were imported to R and filtered such that only genes with a CPM >1 expressed in three samples were retained. Counts were normalized using the Trimmed Mean of M-Values method (TMM), and analyzed for differential expression using EdgeR (Robinson et al., 2010). Differentially expressed genes were identified as statistically significant if the false discovery rate (FDR) was < 5%. Results were uploaded to NCBI GEO Datasets GSE142478 (<https://www.ncbi.nlm.nih.gov/gds>). The STRING database (Szklarczyk et al., 2019) was utilized to visualize functional network associations and to perform gene ontology analyses for KEGG Pathway enrichment (Kanehisa et al., 2019), Reactome Pathway enrichment (Fabregat et al., 2018), and GO class Biological Process (The Gene Ontology Consortium, 2018).

MAGICTRICKS Analysis

To determine if there were common transcriptional drivers of the observed gene expression differences between sexes and CNS regions, differentially expressed genes were evaluated for putative regulatory factors using MAGICTRICKS (Khan et al., 2019; Roopra, 2019). Background lists of genes were created based off the criteria used for differential expression analyses (CPM >1 in 3 samples). The list of background genes and the list of upregulated or downregulated genes for each comparison were used as MAGICTRICKS input according the software instructions. Cumulative distribution graphs and summary scores were generated by the MAGICTRICKS software, and the top 30 transcriptional drivers are shown.

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RESULTS

The transcriptomes of adult brainstem-derived microglia are similar between males and females

To examine microglia in regions of respiratory control, CD11b⁺ cells were immunomagnetically isolated from the brainstem (n=5 independent adult male and female rats). We first compared microglial gene expression in the brainstem between males and females (Fig. 1). In brainstem-derived microglia, principle component analysis showed no major overall difference between male and female transcriptomes (Fig. 1A), indicating that both transcriptomes were nearly identical. Of the total genes expressed in males and females, we found that while >13,500 of them were shared, only 28 were differentially expressed by sex (FDR < 0.05; Fig. 1B). Of these differentially expressed genes, 12 were upregulated in females compared to males (Fig. 1C), and 16 were downregulated in females compared to males (Fig. 1D). Interestingly, several of the upregulated genes (*Stab1*, *Mrc1*, *Lyve1*, *Cd163*, and *F13a1*) were related to angiogenesis and lymphocyte homing, and have been described to be expressed in different functional populations of macrophages derived from the lung (Poczobutt et al., 2016). Conversely, within the downregulated genes, several (*Lcn2*, *Defa5*, *Np4* and *Irf3*) were involved in the immune response to bacterial and fungal infections (Takeuchi and Akira, 2010; Chakraborty et al., 2012; Zhao and Lu, 2014). As expected, approximately 40% of the differentially expressed genes were encoded on sex chromosomes. For example, of the 12 upregulated genes, four (*Eif2s*, AABR07039356.2, Gm27733, LOC680227) were X chromosome-linked; *Eif2s* is involved in initiation of protein translation and this gene escapes X-chromosome inactivation (Ehrmann et al., 1998). Of the 16 downregulated genes, only one gene (*Dkc1*; dyskerin 1, involved in maintaining telomere length (Chatterjee, 2017)) was encoded on the X chromosome (pink shading), and six (AC2392701.1, AC2392701.4, AC24187.1, *Ddx3*, *Eif2s3y*, *Kdm5d*) were Y chromosome-linked (blue shading). *Ddx3* encodes an RNA helicase involved in viral innate immunity (Fullam and Schroder, 2013), *Eif2s3y* encodes a Y-chromosome-specific initiation factor involved in protein translation (Armoskus et al., 2014) and *Kdm5d* encodes a Jumonji family histone demethylase that targets di- and trimethylated histone 3 lysine 4 (H3K4 me2/me3) to repress gene transcription (Wynder et al., 2010).

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The transcriptomes of adult cervical spinal cord-derived microglia are sexually dimorphic

We next examined sex differences in the transcriptomes of microglia immunomagnetically isolated from a region of the cervical spinal cord containing the phrenic motor neurons that innervate the diaphragm, the major inspiratory muscle (Fig. 2). In contrast to the brainstem, principle component analysis of microglia from the male and female cervical spinal cord displayed no overlap (Fig. 2A), suggesting significant sex differences in their transcriptomes. Of the 12,517 total genes expressed in males and 12,534 genes expressed in females, a volcano plot of the RNA-seq analyses revealed that 906 of these genes were differentially expressed between male and female microglia. Of these, 395 genes were upregulated compared to males, and 511 genes were downregulated compared to males (Fig. 2B; Supplemental Tables 1 and 2). We performed Gene Ontology (GO, Biological Process Category), KEGG and Reactome analyses on the 395 genes that were upregulated in female spinal microglia to determine whether they segregated into specific functional gene categories. Neither GO nor Reactome analyses pinpointed functional gene categories, although KEGG analysis identified mTOR and breast cancer signaling pathways as common functional categories into which several of the upregulated genes fell (Fig. 2C, red bars). Conversely, there were several functional categories identified for the 511 downregulated genes in females (Fig. 2C, blue bars). For example, processes involved in cellular and protein metabolism were identified by GO. Genes involved in ribosome and proteasome function, oxidative phosphorylation and neurodegenerative diseases were identified by KEGG, and RNA splicing and metabolism as well as ribosome activity were pinpointed by Reactome analysis. We next performed STRING analyses to identify putative relationships between the proteins encoded by the differentially expressed genes. First, we examined the genes that were differentially upregulated in female microglia, and identified a very small network of nodes, with proteins such as the monomeric G protein Nras, the microtubule associated dynein complex, and the p300 histone acetyltransferase being at the hubs (Fig. 2D). On the other hand, several large gene network clusters appeared upon STRING analysis of the downregulated genes including hubs involved in oxidative phosphorylation, ribosome, and proteasome function (Fig. 2E). The gene networks identified to be downregulated in female cervical spinal microglia suggest that male spinal microglia may have higher protein synthesis and post-translational protein regulatory capacity, as well as higher oxidative metabolism than female microglia from the same region.

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MAGIC analysis indicated that the top-most major transcriptional drivers (MAFK, BATF, SP1, FOXA1, TAL1) of the differentially upregulated genes (Fig. 2F) differed significantly from those (TAF1, PHF8, GABPA, TBP, PLU1) driving the expression of the differentially downregulated genes (Fig. 2G; Supplemental Table 9).

Microglia derived from the cervical spinal cord and brainstem are transcriptomically distinct in males

Given the region-specific sexual dimorphism in brainstem and cervical spinal cord microglia, we next interrogated whether within the same sex, there were general transcriptomic differences between brainstem and cervical spinal microglia (Fig. 3). Principle component analysis of male brainstem and cervical microglial transcriptomes indicated significant differences between both regions (Fig. 3A). We found that over 1400 genes were differentially expressed between the two CNS regions, 826 of which were higher in cervical spinal microglia, and 636 of which were lower, relative to expression in brainstem microglia (Fig. 3B; Supplemental Tables 3 and 4). GO, KEGG and Reactome analyses were performed to determine whether the 826 differentially upregulated genes were segregated into specific functional gene categories (Fig. 3C, red bars). GO analysis indicated that the most upregulated functional gene categories included DNA and RNA synthesis, metabolism and transcription, while KEGG analysis identified proinflammatory cytokine and NF- κ B (nuclear factor kappa B) signaling as common functional categories into which the upregulated genes fell; Reactome analysis identified no functional gene categories. Of the 636 differentially downregulated genes in male cervical spinal microglia, GO analysis pinpointed cell communication, signaling/signal transduction and response to stimulus as functional gene categories (Fig. 3C, blue bars). KEGG analysis identified cytoskeleton and extracellular matrix functional gene categories, and Reactome analysis pinpointed extracellular matrix and receptor tyrosine kinase signaling. STRING analyses of the differentially upregulated genes showed clustering into distinct hubs at which complement C3, RhoB GTPase, and transcriptional regulators such as c-Jun, and TFIIIF were at the nodes (Fig. 3D). Conversely, analyses of the 636 genes that were lower in spinal microglia compared to brainstem microglia had multiple small, loosely grouped gene clusters, some of which had nodes revolving around cytoskeletal protein paxillin, thrombospondin 1, the extracellular matrix protein laminin subunit beta 2 and the complement component 5a receptor (Fig. 3E). Together, these data suggest that cervical microglia may be more metabolically

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and transcriptionally active than brainstem microglia, and perhaps less mobile and interactive with other cells as well.

Interestingly, MAGIC analysis identified that the differentially upregulated genes were driven by multiple transcriptional regulators including EBF1 (early B cell factor-1), NF- κ B, the glucocorticoid receptor and EGR1 (early growth response factor 1) (Fig. 3F; Supplemental Table 10), whereas the most significant transcriptional driver of the differentially downregulated genes in cervical spinal microglia was identified as the repressive histone H3 lysine 27 (H3K27) histone methylase EZH2 (Nutt et al., 2020) (Fig. 3G; Supplemental Table 10).

Microglia derived from the cervical spinal cord and brainstem are transcriptomically distinct in females

We next evaluated microglial transcriptomic differences between respiratory control regions in females (Fig. 4). Principle component analysis of female brainstem and cervical microglial transcriptomes indicated significant differences between both regions (Fig. 4A). We found that over 1900 genes were differentially expressed, 1167 of which were differentially upregulated, and 786 which were downregulated in female cervical spinal microglia compared to brainstem microglia (Fig. 4B; Supplemental Tables 5 and 6). GO, KEGG and Reactome analyses were performed to determine whether the 1167 differentially upregulated genes segregated into specific functional gene categories (Fig. 4C, red bars). GO analysis indicated that the most upregulated functional gene categories included regulation of RNA transcription and gene expression, together with macromolecule metabolism, while KEGG analysis identified proinflammatory cytokine viral infection and spliceosome as common functional categories into which the upregulated genes fell. Reactome analyses identified mRNA processing and termination as well as chromatin modifying enzymes as key functional categories that were upregulated in female spinal microglia. Of the 786 differentially downregulated genes in female cervical spinal microglia, GO analysis pinpointed nitrogen compound biosynthesis, protein translation and peptide metabolism as functional gene categories. KEGG analysis identified oxidative phosphorylation, ribosome and neurodegenerative disease categories while Reactome analysis pinpointed mitochondrial electron transport and RNA splicing as functional gene categories into which the differentially expressed genes fell (Fig. 4C, blue bars). STRING analyses of the upregulated genes revealed several clusters with ubiquitin E3 ligase, complement C3,

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c-Jun, Crebbp, histone H3.3 at their hubs (Fig. 4D) whereas STRING analysis of the downregulated genes demonstrated multiple, larger gene network clusters with protein phosphatase 2A, ndufc2 mitochondrial respiratory chain protein and the complement C5a receptor at their hubs (Fig. 4E). These data imply that in females, cervical spinal microglia are more transcriptionally active and may have higher resting levels of pro-inflammatory cytokines than brainstem microglia, but that they are less metabolically active.

MAGIC analysis of the upregulated genes in females showed that they were driven by multiple transcriptional drivers, some of which were similar to those found in males. The top driver identified was TCF3 (T cell factor 3) and others included SP1 and other interacting factors such as ZBTB7a, EBF1 and NF- κ B (Fig. 4F; Supplemental Table 11). Interestingly, for the differentially downregulated genes, MAGIC identified only a single transcriptional driver, EZH2, similar to what was observed in male cervical spinal microglia (Fig. 4G).

Gene Ontology, KEGG and Reactome functional gene categories poorly overlap in males and females

An initial principle component analysis of both sexes and CNS regions, revealed that CNS region was a stronger driver of differential gene expression than was sex (Fig. 5A). We found that 13,120 genes were expressed both in male and female spinal microglia. Male spinal microglia expressed 826 differentially upregulated genes compared to male brainstem microglia, and females 1167 genes (Figs. 3 and 4). Of these upregulated genes, 304 were shared between male (green) and female (purple) spinal microglia (Fig. 5B, Supplemental Table 7). Male spinal microglia expressed 636 differentially downregulated genes compared to male brainstem microglia, and females 786 genes (Figs. 3 and 4). Of these downregulated genes, 514 were shared between male (green) and female (purple) spinal microglia (Fig. 5C, Supplemental Table 8). However, to determine whether the gene categories into which the most differentially expressed genes fell were similar between the sexes, we compared the top five up- and down-regulated GO (Fig. 5D), KEGG (Fig. 5E) and Reactome pathway (Fig. 5F) categories in spinal microglia (compared to expression in brainstem microglia) derived from data in figures 3 (males) and 4 (females). Upregulated (red) and downregulated (blue) gene categories are shown in males (left column) and females (right column). We noted in all cases, that functional gene categories into which the differentially expressed genes fell, differed between males and females, with the exception of two overlapping categories in

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GO Biological Process terms and three terms in the KEGG pathway analysis. The very slight overlap in functional gene categories between male and female microglia suggests that there is significant functional divergence between male and female cervical microglia, perhaps underscoring potential functional differences between the sexes.

DISCUSSION

Microglia, resident CNS macrophages, play a role in both respiratory rhythm generation and the neuroinflammation that can impair respiratory motor neuronal control. Although microglia make up 5-10% of all CNS cells (diminishing in the rostral-caudal direction), they have the ability to alter brain architecture in all brain regions, including in the vicinity of brainstem respiratory neurons (Thoby Brisson et al., 2019). While microglial number and morphology has been studied in brainstem regions involved in autonomic regulation of cardiovascular function (Kapoor et al., 2016a; Kapoor et al., 2016b; Cohen et al., 2019), here, we analyze the transcriptomes of microglia isolated from the brainstem and cervical spinal cord, and report significant sexual dimorphism in cervical spinal microglial gene signatures. These observations are consistent with the profound differences in morphology and transcriptome in male and female forebrain microglia (Schwarz et al., 2012; Hanamsagar and Bilbo, 2016; Hanamsagar et al., 2017; Bordeleau et al., 2019; Kodama and Gan, 2019). Sex differences in respiratory anatomy and function are well-known, including the tendency for the female diaphragm to be shorter (Bellemare et al., 2003) and a higher ratio of large to small airways in females, enabling higher flow rates than in males (Becklake and Kauffmann, 1999). Males also have larger nasal cavities and longer nasal floors than females of comparable size (Garcia-Martinez et al., 2016).

Despite these significant and well-studied anatomic differences in breathing between the sexes, comparatively less is understood about sexual dimorphisms in respiratory neural control, including responses to ventilatory challenges (Jensen et al., 2005; Ahuja et al., 2007) and the capacity for respiratory plasticity (Zabka et al., 2006; Dougherty et al., 2017). The transcriptomic differences identified here may begin to shed light on cellular mechanisms underlying these differences. Indeed the impact of stress and neuroinflammatory challenge on the developing respiratory control system also differ by sex; early life stress more strongly impacts respiratory control

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in male offspring (Fournier et al., 2013; Fournier et al., 2015; Rousseau et al., 2017), effects which were associated with alterations in microglial density and morphology in the medulla of both sexes (Baldy et al., 2018). While sex differences in brainstem microglial responses to early life stress were not detected in this model (Baldy et al., 2018), male and female microglia from the ventrolateral periaqueductal grey of adult rats (another brainstem region involved in respiratory neural control), do behave dimorphically following endotoxin challenge (Doyle et al., 2017). Profound sex-specific differences have also been reported in microglial inflammatory responses from non-respiratory associated spinal regions (Sorge et al., 2011; Nacka-Aleksic et al., 2015; Mapplebeck et al., 2016; Taves et al., 2016; Fernandez-Zafra et al., 2019), suggesting that sex differences may also exist in spinal microglia from breathing associated regions. It is not yet clear how microglia impact normal respiratory function or neuroplasticity; studies are underway to evaluate this.

Here we report that the microglial transcriptome exhibits both sex- and region-specific differences in CNS regions important for respiratory rhythm generation and patterning. Because male-prevalent breathing disorders such as SIDS, and central sleep apnea among others, may result from irregularity or interruption in the drive to breathe, often attributed to brainstem dysfunction (Benarroch, 2018; Kinney and Haynes, 2019), we initially predicted considerable sex differences in brainstem microglial gene signatures. Surprisingly, we found that brainstem microglia exhibited few gene expression differences based on sex (only 28 genes were differentially expressed between males and females). Also, unexpectedly, unlike brainstem microglia, we found marked sex differences in the transcriptomes of microglia isolated from the cervical spinal cord. Principal component analyses indicated a greater impact of CNS region than sex on the microglial transcriptome. We surmise that transcriptomic conservation in brainstem microglia between the sexes may sub serve the importance of maintaining universal cardio-respiratory control in both sexes. One caveat to our study is that due to technical limitations, microglia were harvested from the entirety of the brainstem and cervical spinal cord, and as such, do not necessarily represent exclusively “respiratory” regions. A more detailed analysis of microglia isolated solely from the vicinity of respiratory neurons would be of considerable interest in future studies.

The functional gene categories into which the differentially expressed genes in male and female cervical spinal microglia segregated suggest that male spinal microglia may have greater capacities for oxidative metabolism,

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protein synthesis and post-translational protein regulation than female spinal microglia, potentially indicating that they may be more robust than female microglia. When comparing cervical spinal to brainstem microglia in males, brainstem microglia appeared to be less metabolically and transcriptionally active than cervical microglia, and potentially more mobile and interactive with other CNS cell types, indicating that brainstem microglia may be more readily impacted by disruptions in brainstem function. This was similar in females as well, where brainstem microglia were less transcriptionally, but more metabolically active. However, when compared to spinal microglia, female brainstem microglia appeared to have lower basal transcript levels of pro-inflammatory cytokines, possibly indicating that brainstem microglia may be more sensitive to the impact of inflammation than spinal microglia. Nonetheless, the near absence of overlap in functional gene categories between the differentially expressed genes in male and female cervical spinal microglia suggests that microglial activities in the cervical spinal cord in each sex likely differs. Consistent with this notion is the observation that phrenic nerve neuroplasticity appears to be more labile in males than females. For example, phrenic long-term facilitation diminishes with age in males (Zabka et al., 2001a) while it increases with age in females (Zabka et al., 2001b). Since pro-inflammatory microglia impair phrenic long-term facilitation in males (Huxtable et al., 2011; Huxtable et al., 2013; Huxtable et al., 2015), future studies should address a specific role for microglia in their sexually dimorphic contributions to spinal respiratory plasticity.

We performed bioinformatic analyses to identify whether common transcriptional drivers of the differentially expressed genes in microglia from both sexes and CNS regions. To our surprise, although there were significant sex differences in cervical spinal microglial transcriptomes, we found that the primary transcriptional modulator driving repression of the differentially downregulated genes in spinal microglia in both sexes was the histone methylase EZH2, an enzymatic subunit of the polycomb repressive complex 2 (PRC2) that catalyzes the trimethylation of H3K27(me3) involved in gene silencing. EZH2 plays an important role in microglial plasticity and the rapid changes in gene expression that support their phenotype adaptations in different environmental situations (Cheray and Joseph, 2018). Conversely, the differentially upregulated genes in spinal microglia of both sexes were driven by combinations of essentially the same transcriptional regulators; in males EBF1 and TCF3 were the first and second most influential gene drivers, whereas in females, the top two drivers were TCF3 and SP1. Multiple other factors within the top several transcriptional regulators overlapped in both sexes. EBF1 is

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well known to regulate diversity in immune and inflammatory gene expression in microglia (Natoli et al., 2011; Griffin et al., 2013; Grabert et al., 2016). TCF3 often functions as a repressor that interacts with the Wnt signaling pathway to enhance the Th2 T cell response (Cadigan and Waterman, 2012; Marchetti and Pluchino, 2013). SP1 is a pleiotropic repressive transcription factor that controls microglial development and expression of multiple genes including immune genes (Delpech et al., 2016). It is interesting to note that our MAGIC analyses indicated that some of the major transcriptional factors driving differentially upregulated genes in both sexes often appear to function as transcriptional repressors; perhaps their binding is relieved to enable upregulation of these genes, or their binding removes another repressive factor to enable transcription. Additional studies are necessary to further distinguish these mechanisms.

One caveat important to mention here is that although the brainstem and cervical spinal cord house circuitry integral to breathing, these regions are also involved in other important physiological systems, such as cardiovascular function, neuromodulation and forelimb control. Thus, the differences in microglia that we report here will likely also impact several other critical physiologic systems in addition to breathing. Although females were included in all analyses in the present studies, we did not control for estrous cycle stage which may contribute to the biological variability observed in the principle component analyses of female transcriptomes in both CNS regions. This may be especially relevant to respiratory neuroplasticity given that it varies across the estrous cycle (Dougherty et al., 2017) as does the microglial transcriptome in cortical brain regions (Duclot and Kabbaj, 2015).

In summary, we provide an important transcriptomic resource database to the field of respiratory neural control. The significant variations in microglial transcriptomes between male and female brainstem and cervical spinal cord, and differences in their functional gene categories, may underlie important, sexually dimorphic physiological divergences in the control of breathing. We also identify novel transcriptional drivers that may be important for regulating these sex- and CNS region-specific differences in microglial transcriptomes. This information will be useful for future studies aimed at harnessing advantageous sex and regional differences in microglial gene expression to treat breathing disorders.

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AUTHOR CONTRIBUTIONS:

Participated in research design: Ewald, Kiernan, Baker, and Watters

Conducted experiments: Ewald and Timko

Contributed new reagents or analytic tools: Roopra

Performed data analysis: Ewald, Kiernan, Radcliff and Roopra

Wrote or contributed to the writing of the manuscript: Ewald, Kiernan, Radcliff, Baker, and Watters

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FOOTNOTES:

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FIGURE LEGENDS

Figure 1. Female and male brainstem microglia share similar transcriptomes. **A)** Principle component analysis of male and female brainstem microglia (n=5/treatment). **B)** Venn diagram showing the total numbers of shared and unique genes between males and females. There were 13,517 shared genes that did not significantly differ in either sex. There were 28 differentially expressed genes that significantly differed (FDR < 0.05) between females and males. Upregulated genes are shown in red, and downregulated genes are shown in blue. **C)** Significantly upregulated genes (12) in female brainstem microglia vs. males. Genes highlighted in pink are X chromosome-linked. **D)** Significantly downregulated genes (16) in female brainstem microglia vs. males. Genes highlighted in pink are X chromosome-linked, and those in blue are Y chromosome-linked.

Figure 2. Cervical spinal cord microglial transcriptomes vary in females compared to males. **A)** Principle component analysis of male and female cervical spinal cord microglia (n=5/treatment). **B)** Volcano plot of differentially expressed genes in female vs. male cervical spinal cord microglia. Red dots represent significantly (FDR < 0.05) upregulated genes, while blue dots represent significantly downregulated genes. **C)** Functional enrichment analyses of differentially expressed genes from biological process (Gene ontology (GO); left), KEGG pathway (middle), and Reactome pathway (right). Shown are the top 5 most significant functional enrichments in upregulated genes (red) and in downregulated genes (blue). Enrichment categories are displayed on the y-axis and graphed by FDR, with lower FDR values indicating greater significance. Parentheses show the number of genes differentially expressed compared to the number of total background genes expressed in that category. Biological Process (GO) categories: translation; peptide metabolic process (Pep Met Proc); cellular amide metabolic process (Cell Am Met Proc); organonitrogen compound biosynthetic process (Org Comp Bio Proc); organonitrogen compound metabolic process (Org Comp Met Proc). KEGG pathway categories: mTOR signaling pathway (mTOR); breast cancer; ribosome; proteasome; oxidative phosphorylation (Ox Phos); Huntington's disease (Huntington's); Alzheimer's disease (Alzheimer's). Reactome pathway categories: nonsense mediated decay enhanced by the exon junction complex (NMD En EJC); antigen processing – cross presentation (Antigen Proc – Cross Pres); metabolism of RNA (RNA Met); formation of the ternary complex, and subsequently, the 43S complex (Ternary Complex). **D)** STRING network analyses of the 395 upregulated genes. **E)** STRING

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network analyses of the 511 downregulated genes. **F)** MAGICTRICKS summary output for upregulated genes in female cervical spinal microglia (top 30 factors). **G)** MAGICTRICKS summary output for downregulated genes in female cervical spinal microglia (top 30 factors).

Figure 3. Transcriptomic divergence between male cervical spinal and brainstem microglia. **A)** Principle component analysis of male cervical spinal cord and brainstem microglia (n=5/treatment). **B)** Volcano plot of differentially expressed genes in male cervical spinal cord microglia. Red dots represent significantly (FDR < 0.05) upregulated genes, blue dots represent significantly downregulated genes. **C)** Functional enrichment analyses of differentially expressed genes from biological process (Gene ontology (GO); left), KEGG pathway (middle), and Reactome pathway (right). Shown are the top 5 most significant functional enrichments in upregulated genes (red) and in downregulated genes (blue). Enrichment categories are displayed on the y-axis and graphed by FDR, with lower FDR values indicating greater significance. Parentheses show the number of genes differentially expressed in that category compared to the number of total background genes expressed in the category. Biological Process (GO) categories: positive regulation of nucleic acid-templated transcription (Pos Reg NA Trans); positive regulation of RNA metabolic process (Pos Reg RNA Met Proc); positive regulation of transcription by RNA polymerase II (Pos Reg RNA Poly II Trans); positive regulation of transcription; DNA templated (Pos Reg DNA Trans); positive regulation of nucleobase-containing metabolic compound (Pos Reg Nuc Met Proc); cell communication (Cell Comm); ion transmembrane transport (Ion Transm Transport); signaling; response to stimulus (Resp to Stim); signal transduction (Sig Transd). KEGG pathway categories: TNF signaling pathway (TNF); IL-17 signaling pathway (IL-17); osteoclast differentiation (Osteo Diff); NF-kappa B signaling pathway (NF-kappa B); hepatitis B; focal adhesion; ECM-receptor interaction (ECM Int); regulation of actin cytoskeleton (Reg Act Cyto); arrhythmogenic right ventricular cardiomyopathy (ARVC); hypertrophic cardiomyopathy (HCM). Reactome pathway categories: extracellular matrix organization (Extra Mat Org); signaling by receptor tyrosine kinases (Sig Rec Tyr Kin); transport of small molecules (Trans Sm Molec). **D)** STRING network analyses of the 826 upregulated genes. **E)** STRING network analyses of the 636 downregulated genes. **F)** MAGICTRICKS summary output for upregulated genes in male cervical spinal microglia (top 30 factors). **G)** MAGICTRICKS summary output for downregulated genes in male cervical spinal microglia (all 22 factors).

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Figure 4. Transcriptomic divergence between female cervical spinal and brainstem microglia. A) Principle component analysis of female cervical spinal cord and brainstem microglia (n=5/treatment). **B)** Volcano plot of differential gene expression changes in female C3-C6 cervical spinal cord vs. brainstem microglia. Red dots represent significantly (FDR < 0.05) upregulated genes and blue dots represent significantly downregulated genes. **C)** Functional enrichment analyses of differentially expressed genes from biological process (Gene ontology (GO); left), KEGG pathway (middle), and Reactome pathway (right). Shown are the top 5 most significant functional enrichments in upregulated genes (red) and in downregulated genes (blue). Enrichment categories are displayed on the y-axis and graphed by FDR, with lower FDR values indicating greater significance. Parentheses show the number of genes differentially expressed in that category compared to the number of total background genes expressed in the category. Biological Process (GO) categories: positive regulation of transcription by RNA polymerase II (Pos Reg RNA Poly II Trans); regulation of RNA metabolic process (Reg RNA Met Proc); regulation of gene expression (Reg Gene Exp); regulation of macromolecule metabolic process (Reg Macro Met Proc); positive regulation of macromolecule metabolic process (Pos Reg Macro Met Proc); organonitrogen compound biosynthetic process (Org Comp Bio Proc); translation; cellular process; cation transport; peptide metabolic process (Pep Met Proc). KEGG pathway categories: TNF signaling pathway (TNF); Epstein-Barr virus signaling pathway (EBV); IL-17 signaling pathway (IL-17); osteoclast differentiation (Osteo Diff); spliceosome; oxidative phosphorylation (Ox Phos); Parkinson's disease (Parkinson's); ribosome; Alzheimer's disease (Alzheimer's); Huntington's disease (Huntington's). Reactome pathway categories: mRNA 3'-end processing (mRNA 3' Proc); chromatin modifying enzymes (Chrom Mod Enz); cleavage of the growing transcript in the termination region (Transcript cleavage); respiratory electron transport, ATP synthesis by chemiosmotic coupling, and heat production by uncoupling proteins (Elect. Transp. Chain); the citric acid cycle and respiratory electron transport (TCA and Resp ET); respiratory electron transport (Resp ET); complex I biogenesis (Comp Bio); nonsense mediated decay enhanced by the exon junction complex (NMD Enh EJC). **D)** STRING network analyses of the 1167 upregulated genes. **E)** STRING network analyses of the 786 downregulated genes. **F)** MAGICTRICKS summary output for cervical spinal cord upregulated genes (top 30 factors). **G)** EZH2 is the sole factor identified from MAGICTRICKS summary output for downregulated genes in cervical spinal microglia.

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Figure 5. Functional gene categories have little overlap between males and females. **A)** Principle component analyses of microglia from male and female brainstem and cervical spinal cord (n=5/treatment) show that CNS region, not sex, is the stronger driver of differential gene expression. **B)** Venn diagram showing the total number of differentially upregulated genes in male and female spinal microglia compared to brainstem microglia. Of the differentially upregulated genes in spinal compared to brainstem microglia, 304 were shared by both sexes, and 522 genes were unique to males, and 863 unique to females. Genes expressed in males are shown in green, and genes expressed in females are shown in purple. **C)** Venn diagram showing the total number of differentially upregulated genes in male and female spinal microglia compared to brainstem microglia. Of the differentially upregulated genes in spinal compared to brainstem microglia, 514 were shared by both sexes, and 122 genes were unique to males, and 272 unique to females. Genes expressed in males are shown in green, and genes expressed in females are shown in purple. **D)** Biological process (GO class), **E)** KEGG Pathway, and **F)** Reactome Pathway summarize the top 5 functional gene categories into which the differentially expressed genes in spinal microglia fall, among both both sexes. Categories which are comparatively upregulated (↑ red shading) and downregulated (↓ blue shading) in male and female spinal microglia (relative to the expression of those genes in male and female brainstem microglia) are shown separately, and demonstrate that very few functional gene categories overlap between the sexes.

Supplemental Table 1: Upregulated genes female vs. male cervical spinal cord microglia

Supplemental Table 2: Downregulated genes female vs. male cervical spinal cord microglia

Supplemental Table 3: Upregulated genes male cervical spinal cord vs. brainstem microglia

Supplemental Table 4: Downregulated genes male cervical spinal cord vs. brainstem microglia

Supplemental Table 5: Upregulated genes female cervical spinal cord vs. brainstem microglia.

Supplemental Table 6: Downregulated genes female cervical spinal cord vs. brainstem microglia

Supplemental Table 7: Upregulated genes in spinal vs brainstem microglia shared between males and females

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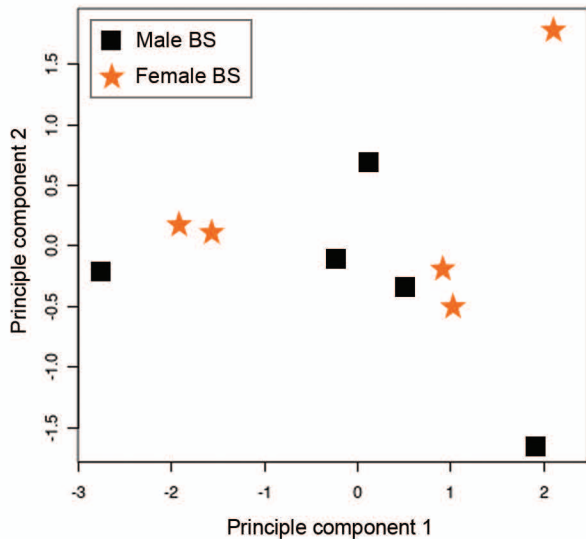
Supplemental Table 8: Downregulated genes in spinal vs brainstem microglia shared between males and females

Supplemental Table 9: MAGICTRICKS enriched transcriptional factors for differentially expressed genes in female vs. male cervical spinal cord microglia

Supplemental Table 10: MAGICTRICKS enriched factors for differentially expressed genes in male cervical spinal cord vs. brainstem microglia

Supplemental Table 11: MAGICTRICKS enriched factors for differentially expressed genes in female cervical spinal cord vs. brainstem microglia

A. Principle Component Analysis



C. Upregulated genes

Gene Name	Ensembl ID	FDR
AABR07000398.1	ENSRNOG00000047746	0.02190981
AABR07015081.1	ENSRNOG00000047351	0.03864032
AABR07039356.2	ENSRNOG00000051257	4.26E-143
AC134224.2	ENSRNOG00000062155	0.0459529
Cd163	ENSRNOG00000010253	0.01822507
Eif2s3	ENSRNOG00000060793	0.00093298
F13a1	ENSRNOG00000015957	0.00265053
Gm27733	ENSRNOG00000055225	7.18E-103
LOC680227	ENSRNOG00000037911	3.29E-108
Lyve1	ENSRNOG00000026902	0.00154428
Mrc1	ENSRNOG00000018251	0.02190981
Stab1	ENSRNOG00000018434	0.04603883

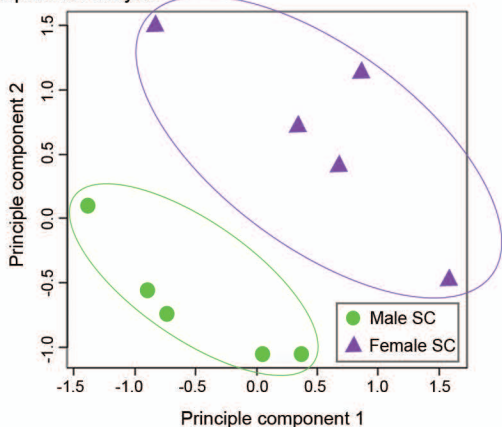
B. Female gene alterations



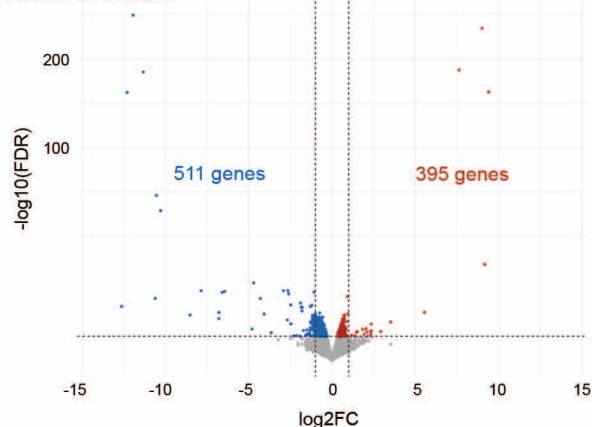
D. Downregulated genes

Gene Name	Ensembl ID	FDR
AC239701.1	ENSRNOG00000060437	2.90E-41
AC239701.4	ENSRNOG00000062152	4.84E-18
AC241873.1	ENSRNOG00000060617	2.56E-40
Ch25h	ENSRNOG00000019141	0.01349334
Comm4	ENSRNOG00000018671	0.03187829
Ddx3	ENSRNOG00000057231	2.14E-203
Defa5	ENSRNOG00000030093	0.0378198
Dkc1	ENSRNOG00000055562	1.06E-05
Eif2s3y	ENSRNOG00000060048	8.07E-139
Irf3	ENSRNOG00000043388	0.0378198
Jchain	ENSRNOG00000003666	0.00869532
Kdm5d	ENSRNOG00000060496	1.78E-148
Lcn2	ENSRNOG00000013973	0.04603883
Np4	ENSRNOG00000028707	0.04603883
Rab24	ENSRNOG00000016539	0.04603883
Rsrp1	ENSRNOG00000017309	0.04603883

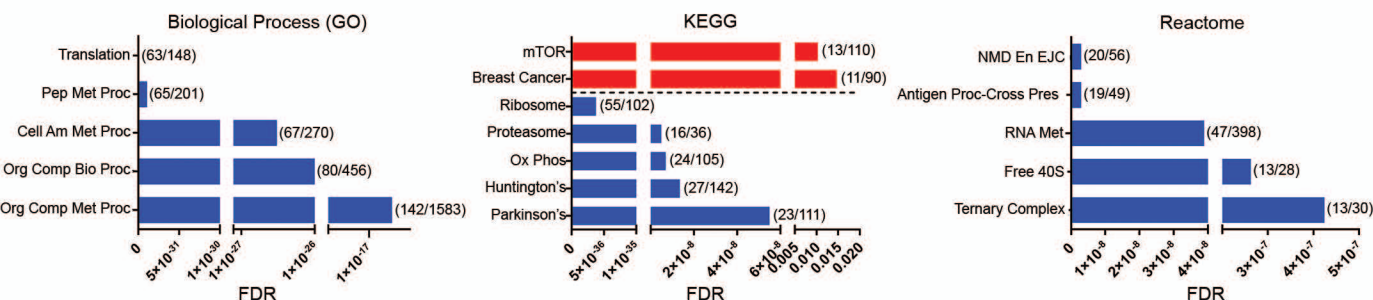
A. Principle Component Analysis



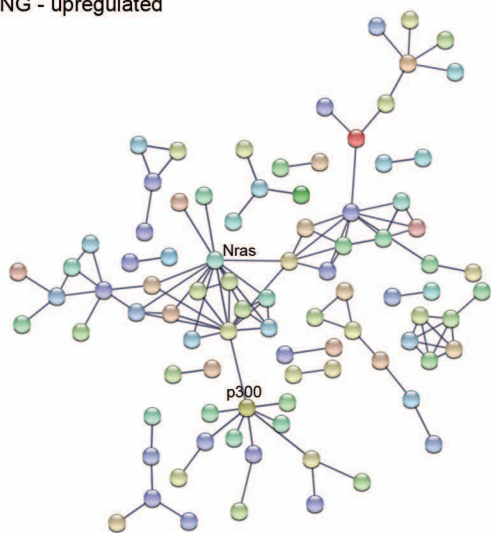
B. Females vs Males



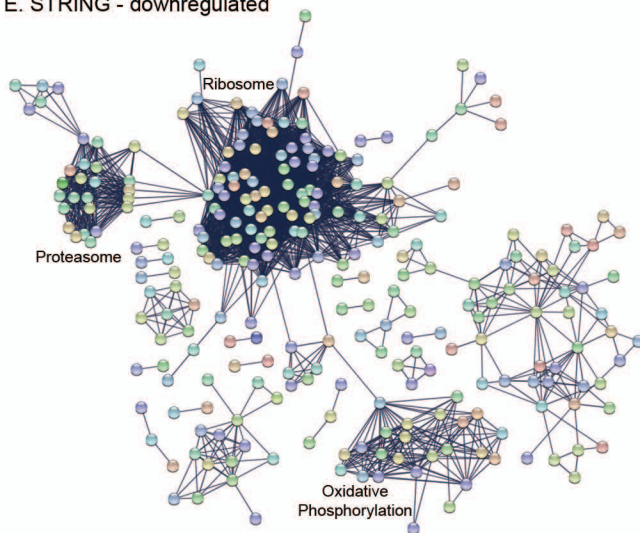
C. Functional Enrichments



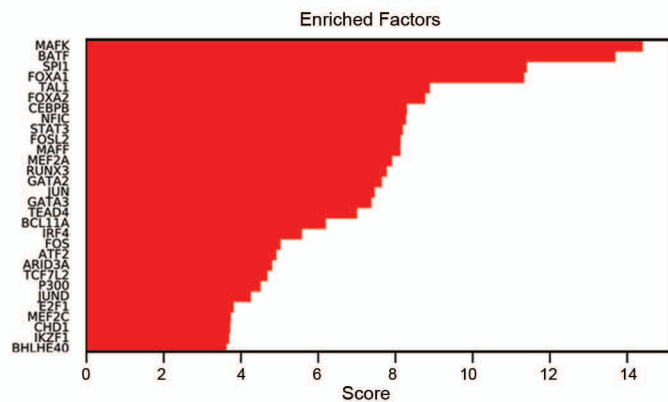
D. STRING - upregulated



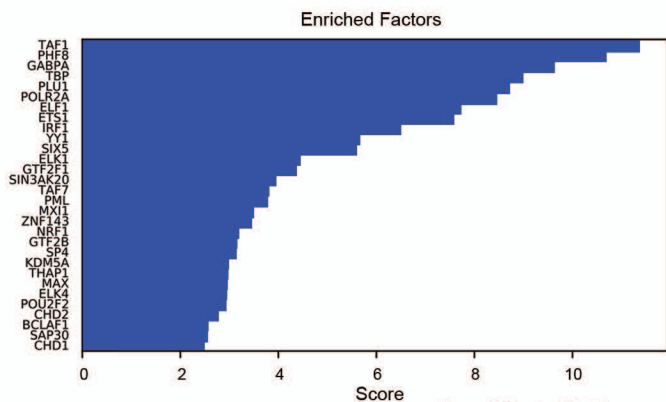
E. STRING - downregulated



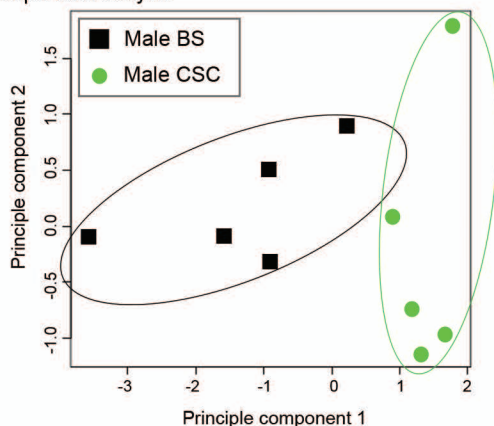
F. MAGIC - upregulated TFs



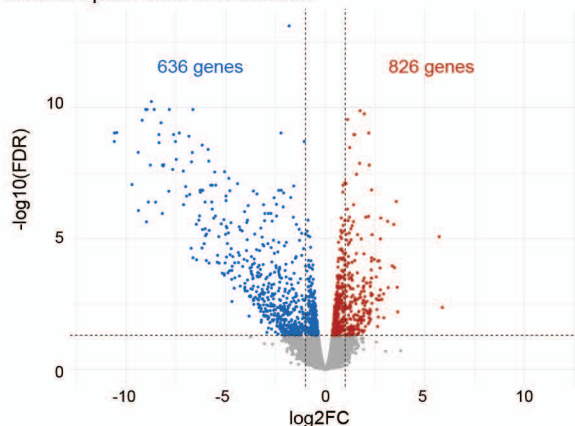
G. MAGIC - downregulated TFs



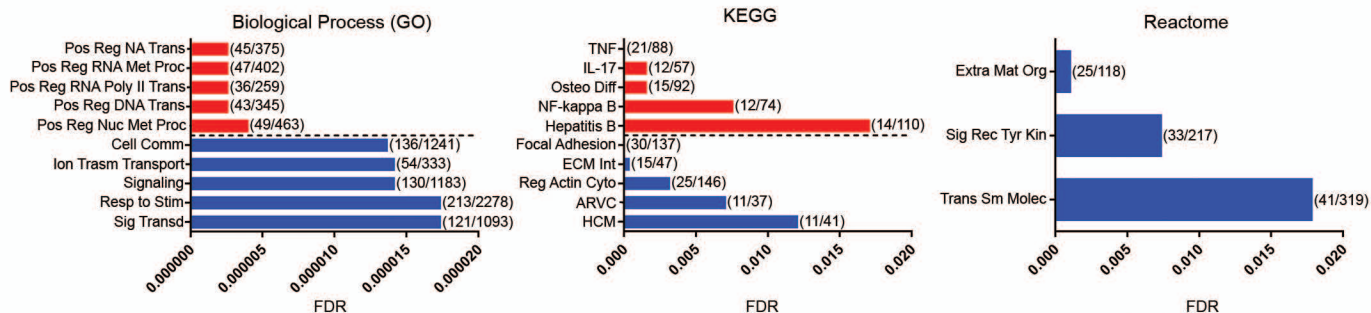
A. Principle Component Analysis



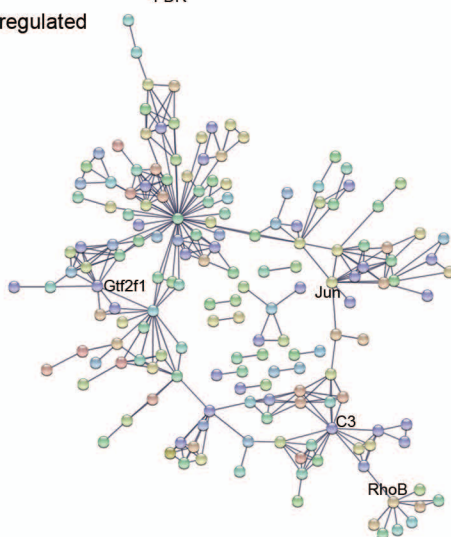
B. Cervical spinal cord vs brainstem



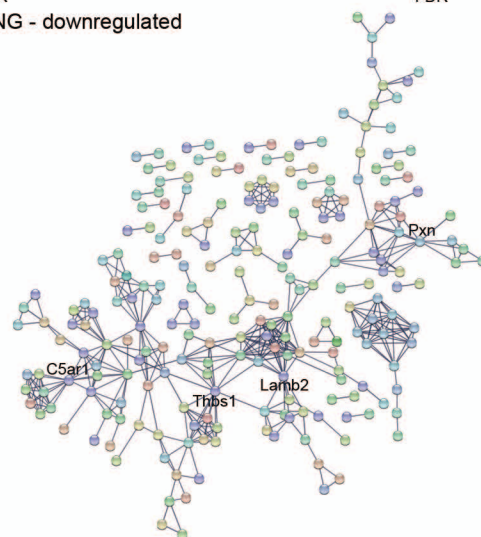
C. Functional Enrichments



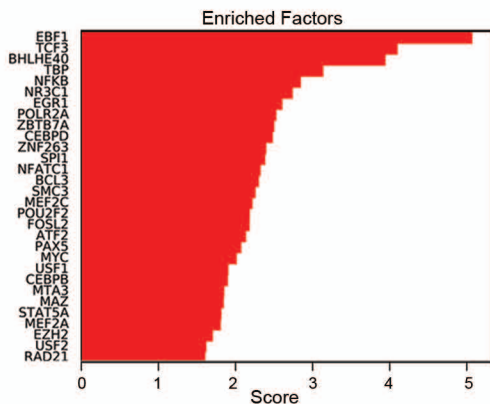
D. STRING - upregulated



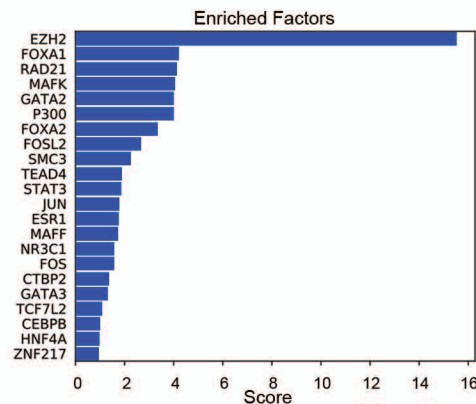
E. STRING - downregulated



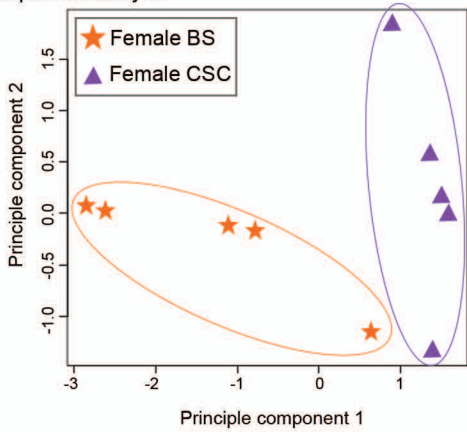
F. MAGIC - upregulated TFs



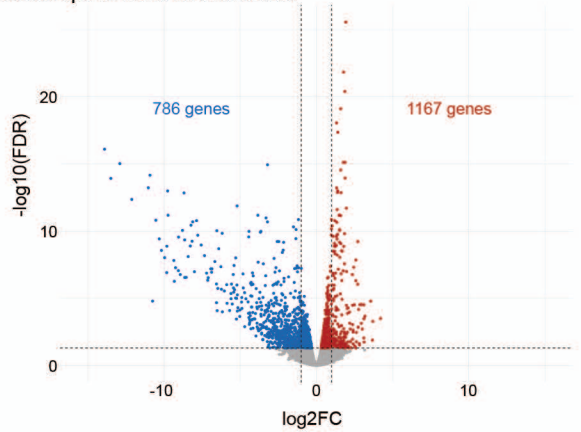
G. MAGIC - downregulated TFs



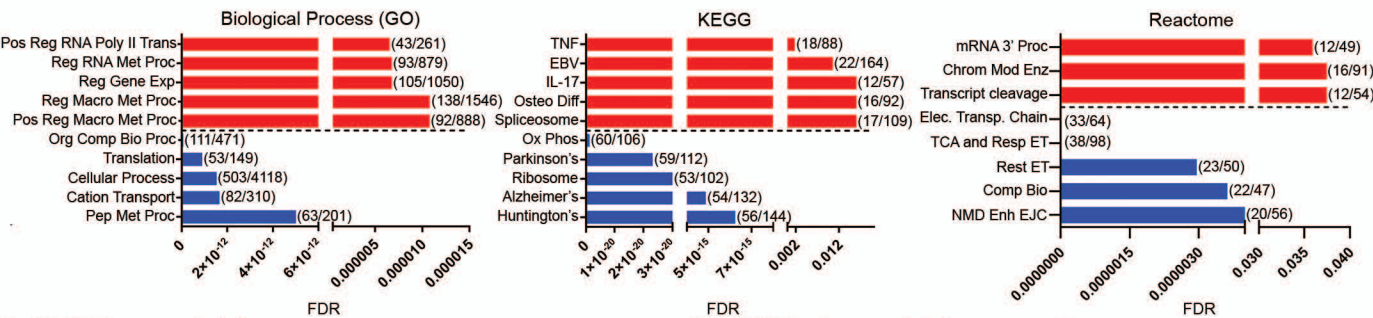
A. Principle Component Analysis



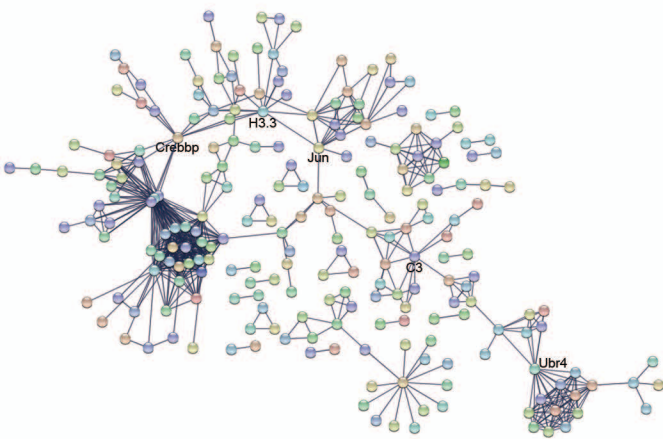
B. Cervical spinal cord vs brainstem



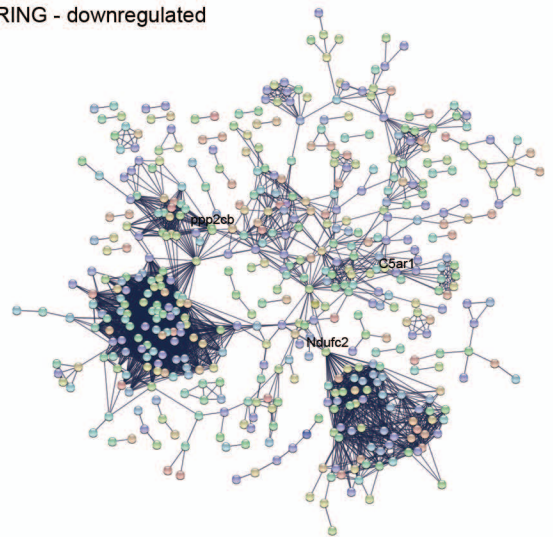
C. Functional Enrichments



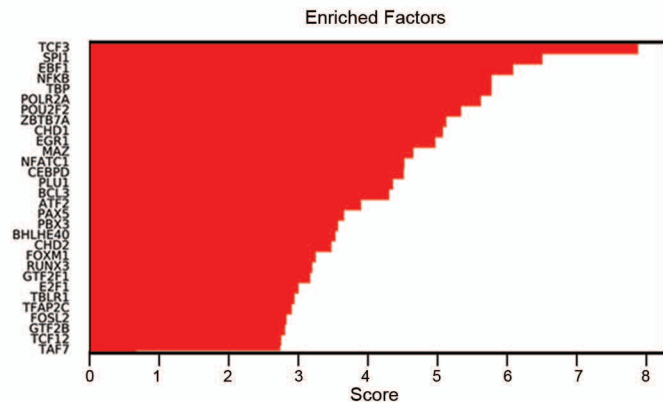
D. STRING - upregulated



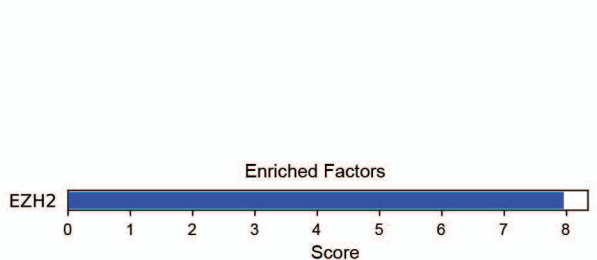
E. STRING - downregulated



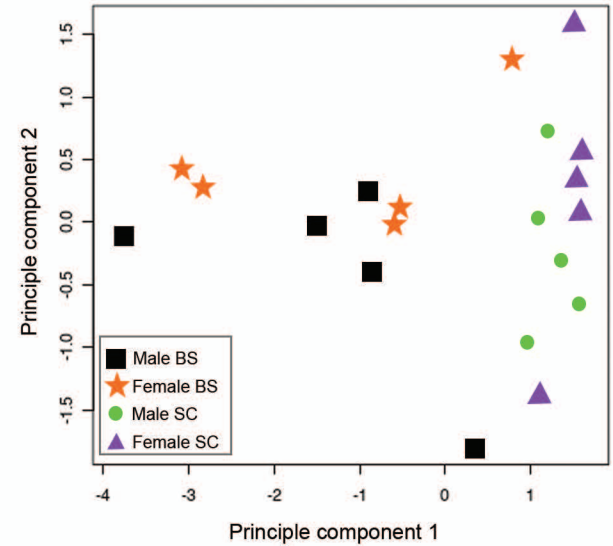
F. MAGIC upregulated TFs



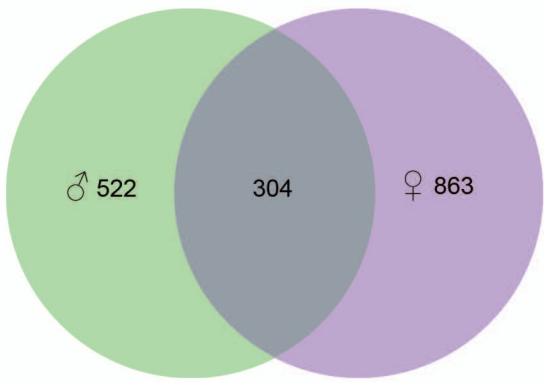
G. MAGIC downregulated TFs



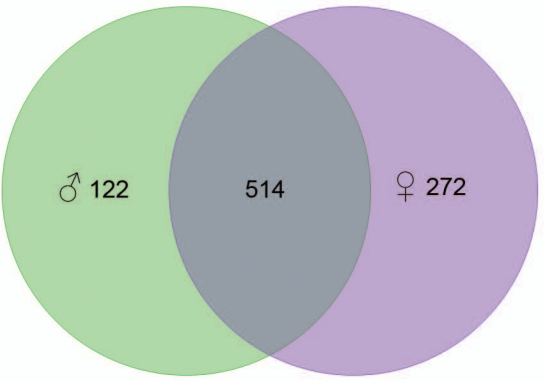
A. Principle Component Analysis



B. Male and Female Upregulated Genes



C. Male and Female Downregulated Genes



D. Biological Process (GO) Comparisons

Pathway description	Males	Females
Pos. reg. of nucleic-acid templated transcription	↑	
Pos. reg. of RNA metabolic process	↑	↑
Pos. reg. of transcription by RNA polymerase II	↑	↑
Pos. reg. of transcription, DNA templated	↑	
Pos. reg. of nuc.-containing compound metabolic process	↑	
Reg. of gene expression		↑
Reg. of macromolecule metabolic process		↑
Pos. reg. of macromolecule metabolic process		↑
Cell communication	↓	
Ion transmembrane transport	↓	
Signaling	↓	
Response to stimulus	↓	
Signal transduction	↓	
Organonitrogen compound biosynthetic process		↓
Translation		↓
Cellular process		↓
Cation transport		↓
Peptide metabolic process		↓

E. KEGG Pathway Comparisons

Pathway description	Males	Females
TNF signaling pathway	↑	↑
IL-17 signaling pathway	↑	↑
Osteoclast differentiation	↑	↑
NF-kappa B signaling pathway	↑	
Hepatitis B	↑	
Epstein-Barr virus signaling pathway		↑
Spliceosome		↑
Focal adhesion	↓	
ECM-receptor interaction	↓	
Regulation of actin cytoskeleton	↓	
Arrhythmogenic right ventricular cardiomyopathy (ARVC)	↓	
Hypertrophic cardiomyopathy (HCM)	↓	
Oxidative phosphorylation		↓
Parkinson's disease		↓
Ribosome		↓
Alzheimer's disease		↓
Huntington's disease		↓

F. Reactome Pathway Comparisons

Pathway description	Males	Females
mRNA 3'-end processing		↑
Chromatin modifying enzymes		↑
Cleavage of growing transcript in the termination region		↑
Extracellular matrix organization	↓	
Signaling by receptor tyrosine kinases	↓	
Transport of small molecules	↓	
Electron transport chain		↓
TCA cycle and respiratory electron transport		↓
Respiratory electron transport		↓
Complex I biogenesis		↓
NMD enhanced by the exon junction complex (EJC)		↓

Sex- and region-specific differences in the transcriptomes of rat microglia from the brainstem and cervical spinal cord

Andrea C. Ewald¹, Elizabeth A. Kiernan¹, Avtar S. Roopra², Abigail B. Radcliff¹, Rebecca R. Timko¹, Tracy L. Baker¹ and Jyoti J. Watters^{1*}

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Supplemental Table 1: Female compared to male cervical spinal cord microglia upregulated genes

Gene name	Ensembl ID	FDR
7SK	ENSRNOG00000058555	0.001080791
AABR07002627.1	ENSRNOG00000060587	0.044563287
AABR07019085.1	ENSRNOG00000059113	0.012861891
AABR07028615.1	ENSRNOG00000018500	0.040386374
AABR07028902.1	ENSRNOG00000058094	2.52E-05
AABR07029605.1	ENSRNOG00000009104	0.007293928
AABR07031756.1	ENSRNOG00000048800	0.011185146
AABR07033887.1	ENSRNOG00000045728	0.028870157
AABR07034438.1	ENSRNOG00000046969	0.021925098
AABR07037528.1	ENSRNOG00000061366	0.007264829
AABR07039210.1	ENSRNOG00000037951	0.02043811
AABR07039356.2	ENSRNOG00000051257	2.52E-243
AABR07043133.1	ENSRNOG00000055707	0.015459605
AABR07047789.1	ENSRNOG00000047513	0.042827048
AABR07068161.1	ENSRNOG00000053200	0.015471721
Abcc1	ENSRNOG00000022305	0.031285234
Abhd2	ENSRNOG00000017120	0.035824683
AC094053.1	ENSRNOG00000030704	0.029601628
AC094348.5	ENSRNOG00000054091	0.013451988
AC120949.4	ENSRNOG00000060539	0.049140324
Acap2	ENSRNOG00000001730	0.005943495
Adam9	ENSRNOG00000017231	0.015794184
Adgra3	ENSRNOG00000004279	0.034001649
Afdn	ENSRNOG00000023753	0.015471721
Aff4	ENSRNOG00000006965	0.006221554
Ago3	ENSRNOG00000034269	0.041416167
Ahnak	ENSRNOG00000057569	0.041877899
Akap9	ENSRNOG00000026319	0.030601677
Alg10	ENSRNOG00000014511	0.02027869
Ampd3	ENSRNOG00000018262	0.019032799
Ankfy1	ENSRNOG00000016212	0.033375552
Ankrd44	ENSRNOG00000021384	0.015402982
Apaf1	ENSRNOG00000008022	0.01477589
Apc	ENSRNOG00000020423	0.017260947
Arfgef1	ENSRNOG00000005703	0.004835956
Arhgef12	ENSRNOG00000008924	0.044704307
Arid2	ENSRNOG00000004831	0.001918996
Arl5b	ENSRNOG00000018714	0.011769201
Arrdc3	ENSRNOG00000045649	0.045593486
Ascc3	ENSRNOG00000037604	0.036451062
Ass1	ENSRNOG00000008837	0.044707622
Asxl2	ENSRNOG00000011908	0.028915851
Atm	ENSRNOG00000029773	0.005277465
Atp7a	ENSRNOG00000061367	0.006221554

Avl9	ENSRNOG00000013314	0.001745858
Bclaf1	ENSRNOG00000058050	0.02879028
Birc6	ENSRNOG00000027191	0.003673174
Bmp2k	ENSRNOG00000002040	0.009622266
Bmpr2	ENSRNOG00000022196	0.029601628
Braf	ENSRNOG00000010957	0.049574841
Brca2	ENSRNOG00000001111	0.048413536
Brwd3	ENSRNOG00000002291	0.008033924
Btbd7	ENSRNOG00000008598	0.012973348
C3ar1	ENSRNOG00000009211	0.036792951
Casp8ap2	ENSRNOG00000006487	0.018992417
Cbfa2t2	ENSRNOG00000016352	0.037873815
Cbl	ENSRNOG00000008444	0.002628029
Ccdc50	ENSRNOG00000001930	0.013613175
Ccser2	ENSRNOG00000022781	0.013743841
Cdc42bpa	ENSRNOG00000002841	0.00401535
Cdk12	ENSRNOG00000006000	0.029455757
Cdon	ENSRNOG00000011789	0.043180119
Celf1	ENSRNOG00000010379	0.037831975
Celf2	ENSRNOG00000023661	0.009425879
Cep192	ENSRNOG000000042879	0.039827976
Cep350	ENSRNOG00000003882	0.002177132
Cep85l	ENSRNOG00000000414	0.002313996
Cert1	ENSRNOG00000015686	0.049650765
Chd1	ENSRNOG00000014434	0.014569951
Chd2	ENSRNOG00000012716	0.021023555
Chd9	ENSRNOG00000049302	0.001066761
Chm	ENSRNOG00000000161	0.011498606
Clock	ENSRNOG00000002175	0.045939336
Cnot1	ENSRNOG00000012271	0.013608626
Cog3	ENSRNOG00000000155	0.049093001
Col1a1	ENSRNOG00000003897	0.0107397
Cpd	ENSRNOG00000003873	0.001787193
Cpeb2	ENSRNOG00000005043	0.000334679
Cpeb4	ENSRNOG00000033169	0.001293775
Cped1	ENSRNOG00000021840	0.038081912
Cpne3	ENSRNOG00000006298	0.000427822
Creb3l2	ENSRNOG00000012826	0.005441847
Crim1	ENSRNOG00000004208	0.00533912
Csgalnact2	ENSRNOG00000014713	0.015994955
Cul5	ENSRNOG00000008039	0.041453979
Cysltr1	ENSRNOG000000037845	0.00512632
Dcp2	ENSRNOG00000045895	0.011845841
Ddx17	ENSRNOG00000051170	0.040535121
Ddx3x	ENSRNOG00000023383	0.008143853
Ddx6	ENSRNOG00000053932	0.030738802
Dennd1b	ENSRNOG00000011063	0.003309279
Dennd4a	ENSRNOG00000011739	0.029499187
Dennd4c	ENSRNOG00000008036	0.000179613
Dip2b	ENSRNOG00000056106	0.00533912
Dmxl1	ENSRNOG00000024671	0.005597299
Dmxl2	ENSRNOG00000009170	0.003454762
Dnajc13	ENSRNOG00000011491	0.017421991

Dock11	ENSRNOG00000013321	0.037341729
Dock4	ENSRNOG00000004823	0.035373158
Dst	ENSRNOG00000012207	0.023058793
Dvl3	ENSRNOG00000001708	0.009047946
Dync1h1	ENSRNOG00000006178	0.015944197
Edem1	ENSRNOG000000055365	0.003970025
Edem3	ENSRNOG00000028358	0.049574841
Egr3	ENSRNOG00000017828	0.007186679
Emp1	ENSRNOG00000008676	0.0172989
Enc1	ENSRNOG00000016541	0.039426288
Ep300	ENSRNOG00000000190	0.038563276
Ep400	ENSRNOG00000037483	0.04182387
Epb4112	ENSRNOG00000012346	0.002313996
Epg5	ENSRNOG000000052894	0.003918997
Erb3	ENSRNOG00000004964	0.043180119
Esyt2	ENSRNOG00000032391	0.013608626
Etnk1	ENSRNOG00000014856	0.042277032
Etv3	ENSRNOG00000043095	0.012919577
Fam102b	ENSRNOG00000027540	0.000762407
Fam160b1	ENSRNOG00000017225	0.007023469
Fam168a	ENSRNOG00000018873	0.004569188
Fam8a1	ENSRNOG00000026120	0.03717395
Fer	ENSRNOG00000015898	0.047627459
Fgd4	ENSRNOG00000059491	0.004982379
Fndc3b	ENSRNOG00000024089	0.024779492
Fnip2	ENSRNOG00000027833	0.022868208
Frs2	ENSRNOG00000005642	0.040669908
Gask1b	ENSRNOG00000010183	0.03512331
Gm27733	ENSRNOG000000055225	2.07E-159
Gpr155	ENSRNOG00000018485	0.020471157
Hectd1	ENSRNOG00000006905	0.027863313
Hif1an	ENSRNOG00000014234	0.009275832
Hipk1	ENSRNOG00000019333	0.043937403
Hipk3	ENSRNOG00000011358	0.001787193
Hps3	ENSRNOG00000031406	0.0269652
Htt	ENSRNOG00000011073	0.044363496
Huwe1	ENSRNOG000000061262	0.014685123
Ids	ENSRNOG00000001465	0.000472057
Igf1	ENSRNOG00000004517	0.039944747
Il6st	ENSRNOG00000013963	0.000699529
Ino80d	ENSRNOG00000024272	0.019049369
Inpp4b	ENSRNOG00000018382	0.005600049
Itch	ENSRNOG00000059043	0.04182387
Itga6	ENSRNOG00000001518	0.035316242
Itgav	ENSRNOG00000004912	0.017139151
Jmjd1c	ENSRNOG00000000648	0.008799994
Kat6b	ENSRNOG00000012850	0.023180111
Kcnj15	ENSRNOG00000001656	0.03717395
Kdm5c	ENSRNOG000000057706	0.000276958
Kdm6a	ENSRNOG000000052721	8.74E-10
Kdm7a	ENSRNOG000000052445	0.002177132
Kif21b	ENSRNOG00000008471	0.041928282
Kif5b	ENSRNOG00000017466	0.011321429

Klf13	ENSRNOG00000015822	0.034088847
Klf4	ENSRNOG00000016299	0.027459934
Klf6	ENSRNOG00000016885	0.007941074
Klf7	ENSRNOG00000046242	0.013451988
Kmt2a	ENSRNOG00000015133	0.029192755
Kmt2c	ENSRNOG00000061080	0.014102851
Kras	ENSRNOG00000009338	0.004576006
Larp4b	ENSRNOG00000015888	0.037415393
Lcor	ENSRNOG00000042679	0.000344035
Lig3	ENSRNOG00000021815	0.044382241
Lims1	ENSRNOG00000037765	0.001292675
Lmbrd2	ENSRNOG00000054751	0.002860467
Lmtk2	ENSRNOG00000025155	0.044055634
LOC100910181	ENSRNOG00000051439	3.97E-21
LOC100910481	ENSRNOG00000052159	6.82E-06
LOC102549842	ENSRNOG00000049259	0.030106261
LOC102551340	ENSRNOG00000047145	0.015944197
LOC102553088	ENSRNOG00000053168	0.045939336
LOC103692471	ENSRNOG00000058834	0.036286654
LOC108348118	ENSRNOG00000055229	0.009638925
LOC680227	ENSRNOG00000037911	2.69E-186
LOC691170	ENSRNOG00000022871	0.044363496
Lpp	ENSRNOG00000031669	0.049716245
Lrch3	ENSRNOG00000001774	0.028284367
Lrp1	ENSRNOG00000025053	0.018838495
Lrp6	ENSRNOG00000006338	0.005902324
Lysmd3	ENSRNOG00000016298	0.029774598
Macf1	ENSRNOG00000016047	0.004569188
Magi3	ENSRNOG00000019885	0.043444257
Malt1	ENSRNOG00000017181	0.021227904
Man1a2	ENSRNOG00000015226	0.028915851
Map3k2	ENSRNOG00000014089	0.039543119
Map7d2	ENSRNOG00000005176	0.013498649
Mapk6	ENSRNOG00000009381	0.027037889
Marchf6	ENSRNOG00000011066	0.02523152
Marchf7	ENSRNOG00000006241	0.0107397
Mbnl1	ENSRNOG00000014076	0.038117377
Mbtd1	ENSRNOG00000049988	0.031285234
Mctp1	ENSRNOG00000013282	0.01381101
Mctp2	ENSRNOG00000009932	0.017536855
Med12l	ENSRNOG00000010680	0.016550621
Med13l	ENSRNOG00000001120	0.035316242
Med14	ENSRNOG00000003792	0.012973348
Mef2a	ENSRNOG00000047756	0.002628029
Mex3b	ENSRNOG00000025142	0.020024922
Mindy2	ENSRNOG00000061337	0.013074808
Mlxip	ENSRNOG00000001255	0.020024922
Mob1b	ENSRNOG00000010996	0.000813908
Mon2	ENSRNOG00000004185	0.019021086
Mt-nd4l	ENSRNOG00000031053	0.040915232
Mt-nd5	ENSRNOG00000029971	0.004729143
Mtpn	ENSRNOG00000011857	0.04077403
Myo1c	ENSRNOG00000004072	0.047830295

Myo5a	ENSRNOG00000058866	0.021227904
Myo9a	ENSRNOG00000011619	0.012398551
Mysm1	ENSRNOG00000026299	0.021023555
Nav3	ENSRNOG00000052157	0.000695755
Ncoa2	ENSRNOG00000007975	0.01642486
Ncoa3	ENSRNOG00000005616	0.015778099
Ncor1	ENSRNOG00000055246	0.023070721
Nfic	ENSRNOG00000004505	0.045745297
Nfkbiz	ENSRNOG00000031163	0.030738802
Nipa1	ENSRNOG00000042702	0.015877169
Nipbl	ENSRNOG00000056907	0.015877169
Nktr	ENSRNOG00000049128	0.044707622
Nlrp1a	ENSRNOG00000023143	0.03066434
Notch1	ENSRNOG00000019322	0.014725228
Nr2c2	ENSRNOG00000010536	0.027703638
Nras	ENSRNOG00000023079	0.044707622
Nsd1	ENSRNOG00000016680	0.0172989
Nsd3	ENSRNOG00000015621	0.030906614
Nup160	ENSRNOG00000028215	0.011310928
Nup98	ENSRNOG00000020347	0.041901485
Osbp18	ENSRNOG00000026962	0.000830754
Pag1	ENSRNOG000000061328	0.011894804
Pan3	ENSRNOG00000000942	0.048116615
Paxbp1	ENSRNOG00000002036	0.02027869
Pbrm1	ENSRNOG00000028227	0.003675029
Pcnx1	ENSRNOG00000007459	0.024346772
Pdlim5	ENSRNOG00000016419	0.044363496
Pdpk1	ENSRNOG00000006136	0.012919577
Pds5a	ENSRNOG00000002541	0.01716494
Pdzd8	ENSRNOG00000009460	0.013922468
Pgap1	ENSRNOG00000013388	0.029911809
Phc3	ENSRNOG00000009491	0.044216663
Phf2011	ENSRNOG00000046527	0.02027869
Phip	ENSRNOG00000008652	0.000122896
Pi4k2b	ENSRNOG00000003924	0.040915232
Pign	ENSRNOG00000014866	0.021445296
Pik3c2a	ENSRNOG00000020479	0.017305661
Plcb4	ENSRNOG00000033119	0.014880828
Polr2a	ENSRNOG00000028834	0.024303933
Ppm1e	ENSRNOG00000024730	0.047223169
Primpol	ENSRNOG00000022320	0.012541504
Prkd3	ENSRNOG00000005289	0.000134823
Prkdc	ENSRNOG00000025028	0.007615549
Prpf39	ENSRNOG00000004521	0.039160342
Prpf8	ENSRNOG00000003495	0.040593632
Psme4	ENSRNOG000000060340	0.046441481
Ptar1	ENSRNOG00000014891	0.005043619
Ptbp3	ENSRNOG00000016334	0.014149954
Rab11fip2	ENSRNOG00000009523	0.01477589
Rab43	ENSRNOG00000037768	0.038117377
Ralgapa1	ENSRNOG00000046256	0.00035275
Ralgapa2	ENSRNOG00000036964	0.022075842
Ralgapb	ENSRNOG00000014836	0.040837797

Rapgef5	ENSRNOG00000005271	0.027602658
Rapgef6	ENSRNOG00000009995	0.049140324
Raph1	ENSRNOG00000014722	0.019564635
Rasa1	ENSRNOG00000029185	0.043863437
Rasa2	ENSRNOG00000011909	0.040535121
Rasal2	ENSRNOG00000004917	0.012005207
Rasgrp4	ENSRNOG00000033744	0.047642012
Rb1	ENSRNOG00000016029	0.008001632
Rbl1	ENSRNOG00000006921	0.048378376
Rbm33	ENSRNOG00000006718	0.042954268
Rbp4	ENSRNOG00000015518	0.029214345
Rc3h1	ENSRNOG00000002750	0.000231836
Reep3	ENSRNOG00000000645	0.024779492
Rfx2	ENSRNOG00000045846	0.005469103
Rfx7	ENSRNOG00000060367	0.035395007
RGD1305110	ENSRNOG00000054669	0.039132628
RGD1307100	ENSRNOG00000038436	0.003676492
RGD1562339	ENSRNOG00000001767	0.044826908
RGD1565616	ENSRNOG00000021237	0.007776733
Rictor	ENSRNOG00000011341	0.000130596
Rif1	ENSRNOG00000054901	0.004488215
Rmnd5a	ENSRNOG00000028422	0.046535269
RNase_MRP	ENSRNOG00000057527	0.02879028
Rnf213	ENSRNOG00000029658	0.049574841
Rnft1	ENSRNOG00000003805	0.040535121
Ro60	ENSRNOG00000003434	0.04477975
Rock1	ENSRNOG00000031092	0.037843142
Rps6ka3	ENSRNOG00000006632	0.049757305
Rreb1	ENSRNOG00000015701	0.023464697
Rsbn1	ENSRNOG00000019671	0.037862579
Rttm	ENSRNOG00000038200	0.012919577
Sacs	ENSRNOG00000014509	0.033817104
Sbf2	ENSRNOG00000009812	0.005508562
Scai	ENSRNOG00000025278	0.00043518
Scarna10	ENSRNOG00000060559	0.000501763
Scarna2	ENSRNOG00000051850	0.007130357
Secisbp2l	ENSRNOG00000008629	0.047627459
Sema3c	ENSRNOG00000006526	0.026044813
Sema6a	ENSRNOG00000004033	0.03738122
Senp7	ENSRNOG00000001616	0.021821944
Sertad2	ENSRNOG00000005393	0.049014313
Sesn3	ENSRNOG00000008173	0.013506494
Sgk1	ENSRNOG00000011815	0.004576006
Shprh	ENSRNOG00000014450	0.035316242
Skil	ENSRNOG00000009899	0.000125553
Slc12a6	ENSRNOG00000005196	0.028081692
Slc16a7	ENSRNOG00000007839	0.044826908
Slc25a36	ENSRNOG00000013802	0.023181918
Slmap	ENSRNOG00000011307	0.02901948
Smchd1	ENSRNOG00000014319	0.042941337
Smcr8	ENSRNOG00000005165	0.009975368
Smg1	ENSRNOG00000047386	0.002965057
Snhg11	ENSRNOG00000036802	0.012260948

Snx30	ENSRNOG00000017132	0.008198668
Socs2	ENSRNOG00000008965	0.017260947
Socs4	ENSRNOG00000011377	0.013608626
Son	ENSRNOG00000002021	0.009785533
Sos2	ENSRNOG00000004826	0.044682688
Sowahc	ENSRNOG000000048831	0.034088847
Sp4	ENSRNOG00000005472	0.019531642
Spty2d1	ENSRNOG000000050806	0.043863437
Srgap2	ENSRNOG00000006733	0.04077403
Ssh1	ENSRNOG00000000695	0.018155265
Ssh2	ENSRNOG00000014285	0.026104299
Stam2	ENSRNOG00000027447	0.037110566
Stox2	ENSRNOG00000009590	0.018059337
Strn	ENSRNOG00000004806	0.011542244
Stxbp4	ENSRNOG00000032768	0.043799594
Susd6	ENSRNOG00000045941	0.020770393
Synj1	ENSRNOG00000002051	0.001901629
Tanc2	ENSRNOG000000052840	0.001729596
Tasor	ENSRNOG00000014750	0.007500087
Tasor2	ENSRNOG00000018011	0.037831975
Tbc1d2b	ENSRNOG00000014543	0.043937403
Tcf12	ENSRNOG000000057754	0.003758054
Tet2	ENSRNOG00000023579	2.95E-05
Thap2	ENSRNOG00000003993	0.037081548
Thoc2	ENSRNOG00000007315	0.010340168
Tiparp	ENSRNOG00000011238	0.003992759
Tmc7	ENSRNOG00000016679	0.024189723
Tmed8	ENSRNOG00000045857	0.048413536
Tmem245	ENSRNOG00000026271	0.011824299
Tmem64	ENSRNOG00000007426	0.019780517
Tnpo1	ENSRNOG00000014999	0.004668501
Topbp1	ENSRNOG00000009789	0.0107397
Trdmt1	ENSRNOG00000026132	0.01918942
Trib1	ENSRNOG00000004100	0.042277032
Trim25	ENSRNOG00000002341	0.019048522
Trio	ENSRNOG00000012148	0.030106261
Trip11	ENSRNOG00000005292	0.042205014
Trpm7	ENSRNOG000000057806	0.005597299
Trps1	ENSRNOG00000024998	0.01998907
Trrap	ENSRNOG00000025244	0.044704307
Ttbk2	ENSRNOG00000011059	0.040535121
Tubgcp6	ENSRNOG00000006028	0.027639142
Tulp4	ENSRNOG00000018012	0.006520675
Ubr1	ENSRNOG00000037207	0.010309424
Ubr2	ENSRNOG00000015813	0.030738802
Ubr3	ENSRNOG00000008616	0.003404512
Ubr5	ENSRNOG00000006816	0.042066802
Ubxn2b	ENSRNOG00000009137	0.043845155
Uhmk1	ENSRNOG00000002941	0.004136129
Usp22	ENSRNOG000000032492	0.000762407
Usp24	ENSRNOG00000005802	0.031301774
Usp31	ENSRNOG00000025793	8.58E-05
Usp34	ENSRNOG000000051889	0.042966008

Vcl	ENSRNOG00000010765	0.040669908
Vps13a	ENSRNOG00000025539	0.00629308
Wasf2	ENSRNOG00000009805	0.000164462
Washc4	ENSRNOG00000008331	0.044216663
Wdfy1	ENSRNOG00000015080	0.018427028
Wdfy3	ENSRNOG000000061121	0.034280707
Wdr44	ENSRNOG00000029068	0.004609514
Wsb1	ENSRNOG00000012929	0.013585833
Xiap	ENSRNOG00000006967	0.006093541
Yes1	ENSRNOG000000037227	0.03717395
Zbtb25	ENSRNOG00000006441	0.016034244
Zbtb37	ENSRNOG00000026907	0.003861576
Zbtb38	ENSRNOG00000012386	0.005469103
Zdhhc17	ENSRNOG00000003803	0.007500087
Zdhhc21	ENSRNOG00000010484	1.50E-05
Zeb2	ENSRNOG00000004677	0.000801778
Zfp136	ENSRNOG00000016417	0.037415393
Zfp148	ENSRNOG00000001789	0.03717395
Zfp236	ENSRNOG00000016303	0.004576006
Zfp275	ENSRNOG000000061073	0.013613175
Zfp281	ENSRNOG000000058643	0.003172103
Zfp292	ENSRNOG000000031031	0.040669908
Zfp3611	ENSRNOG000000058646	0.044055634
Zfp445	ENSRNOG00000025554	0.009275832
Zfp51	ENSRNOG000000043341	0.040674676
Zfp516	ENSRNOG00000016258	0.008033924
Zfp518a	ENSRNOG000000036592	0.009801781
Zfp518b	ENSRNOG00000028534	0.049346903
Zfp597	ENSRNOG00000007576	0.04077403
Zfp62	ENSRNOG000000051756	0.042966008
Zkscan1	ENSRNOG00000001335	0.010314193
Zmiz1	ENSRNOG00000010488	0.00470166
Zswim6	ENSRNOG00000014528	0.047642012

Supplemental Table 2: Female compared to male cervical spinal cord microglia downregulated genes

Gene name	Gene stable ID	FDR
5_8S_rRNA	ENSRNOG000000051831	0.019049976
AABR07000398.1	ENSRNOG000000047746	4.93E-14
AABR07015057.1	ENSRNOG000000060518	2.86E-11
AABR07015079.1	ENSRNOG000000046081	2.90E-09
AABR07015080.1	ENSRNOG000000057514	2.52E-05
AABR07015081.1	ENSRNOG000000047351	7.67E-06
AABR07015081.2	ENSRNOG000000054945	5.78E-11
AABR07035787.1	ENSRNOG000000048277	0.037081548
AABR07042821.1	ENSRNOG000000054489	0.008033924
AABR07044711.1	ENSRNOG000000047276	0.010334887
AABR07053687.1	ENSRNOG00000015756	0.00337256
AABR07063425.2	ENSRNOG000000050156	3.32E-07
AABR07065406.1	ENSRNOG000000005718	0.043863437
AABR07070599.1	ENSRNOG000000059112	0.020471774
Aarsd1	ENSRNOG00000020658	0.004488215
Abhd17a	ENSRNOG00000018212	0.014725228
AC141102.1	ENSRNOG000000059750	0.004378755

AC239701.1	ENSRNOG00000060437	3.78E-50
AC239701.4	ENSRNOG00000062152	1.67E-11
AC241873.1	ENSRNOG00000060617	1.07E-60
Acads	ENSRNOG00000001177	0.019780517
Acp5	ENSRNOG00000046261	0.013995648
Adap1	ENSRNOG00000054033	0.045617893
Aif1	ENSRNOG00000000853	0.000231836
Aip	ENSRNOG00000022289	0.039426288
Akr1a1	ENSRNOG00000016727	0.000579762
Akr1b1	ENSRNOG00000009513	0.043473053
Anapc15	ENSRNOG00000019936	0.02027869
Anp32b	ENSRNOG00000009266	0.020176382
Antkmt	ENSRNOG00000019684	0.005667566
Anxa7	ENSRNOG00000007136	0.044363496
Ap1s1	ENSRNOG00000001415	0.019357587
Ap2s1	ENSRNOG00000015865	0.012009439
Apeh	ENSRNOG00000029572	0.033983549
Apex1	ENSRNOG00000009663	0.026832843
Apoe	ENSRNOG00000018454	0.020726946
Apol9a	ENSRNOG00000023410	0.047627459
Aprt	ENSRNOG00000014405	0.01207765
Arf5	ENSRNOG00000007806	0.016550621
Arl11	ENSRNOG00000014653	0.042768783
Arl3	ENSRNOG00000019973	0.012009439
Arl6ip4	ENSRNOG00000001080	0.008033924
Arpc1a	ENSRNOG00000000996	0.009275832
Arpc3	ENSRNOG00000008673	0.002947019
Arse	ENSRNOG00000028350	0.012338397
Asmtl	ENSRNOG00000028166	0.037843142
Aspscr1	ENSRNOG00000036678	0.014154295
Atf5	ENSRNOG00000020060	0.019021086
Atg101	ENSRNOG00000007756	0.049624298
Atox1	ENSRNOG00000013118	0.0107397
Atp5f1d	ENSRNOG00000014625	0.000334679
Atp5f1e	ENSRNOG00000049912	0.000126489
Atp5if1	ENSRNOG00000013300	0.008921384
Atp5mc1	ENSRNOG00000007235	0.037341729
Atp5me	ENSRNOG00000000064	0.000517389
Atp5mf	ENSRNOG00000027049	0.037832487
Atp5pd	ENSRNOG00000003626	0.003172103
Atp5pf	ENSRNOG00000001551	0.037031783
Atp6v1g1	ENSRNOG00000008163	0.011927403
Axl	ENSRNOG00000020716	0.009844098
AY172581.24	ENSRNOG00000043866	0.039160342
AY172581.9	ENSRNOG00000030478	3.16E-09
B2m	ENSRNOG00000017123	0.014102851
Bag1	ENSRNOG00000008277	0.033650035
Banf1	ENSRNOG00000020460	0.037506248
Batf3	ENSRNOG00000003716	0.003449271
Bax	ENSRNOG00000020876	0.005347139
Bcl2a1	ENSRNOG00000047606	0.005783046
Bcl7c	ENSRNOG00000018916	0.01381101
Bloc1s1	ENSRNOG00000007784	0.04991262

Bola2	ENSRNOG00000047988	0.01082362
Borcs6	ENSRNOG00000006513	0.027037889
Bri3	ENSRNOG00000001009	0.02329266
Bsg	ENSRNOG00000008414	0.001474943
Bst2	ENSRNOG00000059900	0.002123266
Btf3	ENSRNOG00000016912	0.049093001
C1qa	ENSRNOG00000012807	0.000292815
C1qb	ENSRNOG00000012749	0.00129927
C1qc	ENSRNOG00000012804	0.018409023
Calr	ENSRNOG00000003029	0.017246727
Ccdc124	ENSRNOG00000018932	0.000130255
Ccdc152	ENSRNOG00000039473	0.018611448
Cd4	ENSRNOG00000016294	0.037831975
Cd74	ENSRNOG00000018735	0.024998286
Cd82	ENSRNOG00000000047	0.037831975
Cd99	ENSRNOG00000050735	0.024964434
Cdc37	ENSRNOG00000033426	0.011946468
Cdk5rap3	ENSRNOG00000048747	0.008699088
Cetn2	ENSRNOG00000059593	0.02378572
Cfp	ENSRNOG00000025811	0.006807053
Cgrrf1	ENSRNOG00000010178	0.035601023
Chchd3	ENSRNOG00000013211	0.003923275
Chchd6	ENSRNOG00000060248	0.02523152
Chmp2a	ENSRNOG00000043328	0.008313925
Cisd3	ENSRNOG00000036894	0.012919577
Ckb	ENSRNOG00000010872	0.001170622
Clec2l	ENSRNOG00000029644	0.036021037
Clic1	ENSRNOG00000029682	0.015801093
Clta	ENSRNOG00000014635	0.025270508
Cltb	ENSRNOG00000017506	0.030738802
Cmc1	ENSRNOG00000010149	0.00829929
Cmtr1	ENSRNOG00000000532	1.15E-05
Cnpy2	ENSRNOG00000003549	0.027909707
Cnpy3	ENSRNOG00000016315	0.035395007
Col9a2	ENSRNOG00000011502	0.005043619
Commd4	ENSRNOG00000018671	0.013995648
Cope	ENSRNOG00000020178	0.004668501
Coro1a	ENSRNOG00000019430	0.020604706
Cotl1	ENSRNOG00000016257	0.022016096
Cox4i1	ENSRNOG00000017817	0.030738802
Cox6c	ENSRNOG00000010807	0.021755951
Cox7a2l	ENSRNOG00000004526	0.037110566
Cox7b	ENSRNOG00000054689	0.041679921
Crel1	ENSRNOG00000009414	0.049140324
Csnk2b	ENSRNOG00000000847	0.049061618
Cst3	ENSRNOG00000005195	0.001170622
Ctnnb1	ENSRNOG00000012021	0.024751245
Ctsb	ENSRNOG00000010331	0.007337958
Ctsd	ENSRNOG00000020206	0.001474943
Ctsh	ENSRNOG00000014064	0.002947019
Ctsz	ENSRNOG00000050697	7.68E-05
Cuta	ENSRNOG00000000481	0.040535121
Cxcl10	ENSRNOG00000022256	0.008033924

Cyba	ENSRNOG00000013014	0.001320214
Dapk3	ENSRNOG00000020383	0.003449271
Dbi	ENSRNOG00000046889	0.037843142
Dcxr	ENSRNOG00000050315	0.012005207
Ddrgk1	ENSRNOG00000021232	0.030983407
Ddx3	ENSRNOG00000057231	5.31E-263
Ddx49	ENSRNOG00000022368	0.028958634
Dhrs3	ENSRNOG00000015736	0.047627459
Dhrs4	ENSRNOG00000018239	0.043863437
Dhrsx	ENSRNOG00000028323	0.041901485
Diablo	ENSRNOG00000029197	0.033513562
Dkc1	ENSRNOG00000055562	4.57E-11
Dnase2	ENSRNOG00000023830	0.01318146
Dnpep	ENSRNOG00000019772	0.031846983
Dohh	ENSRNOG00000004259	0.037087876
Dph3	ENSRNOG00000019727	0.01477589
Dpp7	ENSRNOG00000012640	0.00330577
Drap1	ENSRNOG00000020527	0.024488452
Edf1	ENSRNOG00000016272	0.000472057
Eef1b2	ENSRNOG00000024186	0.000540663
Eef1d	ENSRNOG00000021638	0.000312892
Eef1g	ENSRNOG00000020075	0.006093541
Egfl7	ENSRNOG00000019388	0.017398045
Eid1	ENSRNOG00000008452	0.011426913
Eif2b2	ENSRNOG00000006467	0.003992759
Eif2s3y	ENSRNOG00000060048	1.03E-183
Eif3f	ENSRNOG00000015221	0.01381101
Eif3g	ENSRNOG00000020619	0.001064134
Eif3k	ENSRNOG00000020495	0.024295539
Eif5a	ENSRNOG00000016478	0.018172607
Eif6	ENSRNOG00000049497	0.004505234
Elob	ENSRNOG00000004814	0.025363908
Elp6	ENSRNOG00000020847	0.016954349
Emg1	ENSRNOG00000012828	0.00470166
Ergic3	ENSRNOG00000031085	0.001182999
Erp29	ENSRNOG00000001348	0.000762407
Exosc5	ENSRNOG00000020635	5.65E-07
F10	ENSRNOG00000033444	0.00342808
Fance	ENSRNOG00000000504	0.040013477
Fbxl15	ENSRNOG00000019509	0.024964434
Fbxo31	ENSRNOG00000042274	0.017803152
Fcgr1a	ENSRNOG00000021199	0.009187336
Fcgr3a	ENSRNOG00000024382	0.007500087
Fcna	ENSRNOG00000017063	0.001474943
Fcrla	ENSRNOG00000003136	0.011429023
Fis1	ENSRNOG00000001420	0.001787193
Fkbp2	ENSRNOG00000021153	0.005882667
Fkbp8	ENSRNOG00000058359	0.004378755
Fuca1	ENSRNOG00000009325	0.001428438
Fxyd5	ENSRNOG00000021062	0.047685003
Gabarap	ENSRNOG00000017417	0.000893315
Galk1	ENSRNOG00000006359	0.044363496
Gamt	ENSRNOG00000024577	0.01581227

Gatd3a	ENSRNOG00000001211	0.019049369
Gemin7	ENSRNOG00000049772	0.012260948
Glo1	ENSRNOG00000000541	0.00508174
Glod4	ENSRNOG00000007788	0.017260947
Glrx5	ENSRNOG00000004206	0.02543044
Gngt2	ENSRNOG00000006108	0.011321429
Gnptg	ENSRNOG00000024455	0.01295575
Gpank1	ENSRNOG00000000848	0.012802851
Grcc10	ENSRNOG00000025810	0.012260948
Grn	ENSRNOG00000021031	0.038143325
Grpel1	ENSRNOG00000006593	0.006221554
Gtf2h5	ENSRNOG00000018007	0.016324445
H2aj	ENSRNOG00000033045	0.049093001
Hint1	ENSRNOG00000000622	0.033795519
Hint2	ENSRNOG00000015866	0.044055634
Hsd17b8	ENSRNOG00000000466	0.033794338
Hsp90aa1	ENSRNOG00000059714	3.51E-06
Ifi27	ENSRNOG00000009263	0.007872107
Ifi27l2b	ENSRNOG00000026605	0.009975368
Ifi30	ENSRNOG00000019387	0.008561389
Ifi35	ENSRNOG00000020678	0.005101112
Il11ra1	ENSRNOG00000015068	0.004505234
Iscu	ENSRNOG00000000701	0.021528067
Itpa	ENSRNOG00000021233	0.015564151
Kdm5d	ENSRNOG00000060496	9.42E-159
Lage3	ENSRNOG00000053456	0.040669908
Lamp1	ENSRNOG00000019629	0.017398045
Lgals3bp	ENSRNOG00000003217	0.008670834
Lilrb3a	ENSRNOG00000053260	0.042966008
Limd2	ENSRNOG00000025448	0.01839246
LOC100359922	ENSRNOG00000006283	0.000120051
LOC100359951	ENSRNOG00000029627	0.002643088
LOC100360057	ENSRNOG00000011104	0.000286354
LOC100360117	ENSRNOG00000032635	0.003970025
LOC100360449	ENSRNOG00000026716	0.001280209
LOC100360841	ENSRNOG00000033803	0.043863437
LOC100361854	ENSRNOG00000029512	0.003454762
LOC100362027	ENSRNOG00000032825	0.00470166
LOC100362333	ENSRNOG00000055277	0.014725228
LOC100362366	ENSRNOG00000028690	0.005469103
LOC100363469	ENSRNOG00000031579	0.003970025
LOC100364435	ENSRNOG00000042499	0.000148438
LOC100910944	ENSRNOG00000045555	0.040915232
LOC100911847	ENSRNOG00000018774	0.004668501
LOC102555453	ENSRNOG00000028993	4.53E-07
LOC102555453	ENSRNOG00000029115	5.73E-07
LOC103689961	ENSRNOG00000051483	0.000778959
LOC103690005	ENSRNOG00000045655	0.042277032
LOC108348287	ENSRNOG00000031022	0.002486255
LOC108352650	ENSRNOG00000004196	0.000164462
LOC498555	ENSRNOG00000038074	0.014302394
LOC680491	ENSRNOG00000062084	0.036000581
LOC685963	ENSRNOG00000030747	0.000363358

LOC687679	ENSRNOG00000016507	0.007749497
LOC687780	ENSRNOG00000020982	0.001064134
LOC690617	ENSRNOG00000039861	0.039426288
LOC691427	ENSRNOG00000031802	0.049093001
Lrrc42	ENSRNOG00000009983	0.012260948
Lsm10	ENSRNOG00000025716	0.008198668
Lsm3	ENSRNOG00000008733	0.016444942
Lsm7	ENSRNOG00000019552	0.032290097
Ltbr	ENSRNOG00000019264	0.04466569
Manf	ENSRNOG00000014201	0.020471157
Map1lc3a	ENSRNOG00000025443	0.003404512
Mea1	ENSRNOG00000017144	0.013417143
Med10	ENSRNOG00000017150	0.028585782
Med31	ENSRNOG00000014618	0.044363496
Mesd	ENSRNOG00000012366	0.040454582
Micos13	ENSRNOG00000046002	2.96E-05
Mien1	ENSRNOG00000007227	0.041333781
Mlf2	ENSRNOG00000016589	0.043653613
Mrpl12	ENSRNOG00000036695	0.002046464
Mrpl27	ENSRNOG00000003724	0.007542249
Mrpl28	ENSRNOG00000042720	0.0107397
Mrpl52	ENSRNOG00000039297	0.004410905
Mrpl54	ENSRNOG00000020464	0.031078872
Mrps34	ENSRNOG00000015479	0.001474943
Mvb12a	ENSRNOG00000017949	0.03717395
Mvd	ENSRNOG00000013376	0.001705663
Myl6	ENSRNOG00000054140	0.007355373
Naa38	ENSRNOG00000009823	0.043444257
Naca	ENSRNOG00000002632	0.002455186
Nagpa	ENSRNOG00000002895	0.030601677
Nat9	ENSRNOG00000003264	0.033328891
Ndufa11	ENSRNOG00000048320	0.021131561
Ndufa13	ENSRNOG00000020602	0.000249568
Ndufa2	ENSRNOG00000017571	0.010334887
Ndufa6	ENSRNOG00000008569	0.021821393
Ndufa8	ENSRNOG00000005668	0.035316242
Ndufa9	ENSRNOG000000061684	0.045663995
Ndufaf8	ENSRNOG00000042653	0.007355373
Ndufb11	ENSRNOG00000008329	0.018611448
Ndufb2	ENSRNOG00000026616	0.030738802
Ndufb7	ENSRNOG00000028717	0.026044813
Ndufb9	ENSRNOG00000009364	0.030739534
Ndufs3	ENSRNOG00000009155	0.043863437
Ndufs8	ENSRNOG00000017446	0.029510567
Nedd8	ENSRNOG00000019895	0.012802851
Nelfe	ENSRNOG00000000420	0.01103264
Nenf	ENSRNOG00000003833	0.03229186
Neurl3	ENSRNOG00000015366	0.044533761
Nme2	ENSRNOG00000002671	0.00070897
Nop2	ENSRNOG00000018453	1.62E-11
Nop53	ENSRNOG00000013023	0.030738802
Nosip	ENSRNOG00000020543	0.000673939
Npc2	ENSRNOG00000012062	6.50E-05

Nudt9	ENSRNOG00000002186	0.002930401
Oaf	ENSRNOG00000009243	0.049014313
Oaz1	ENSRNOG00000019459	0.030738802
Ogfr	ENSRNOG00000009355	0.001474943
Os9	ENSRNOG00000025570	0.026673425
Ost4	ENSRNOG00000008605	0.015313983
Ostc	ENSRNOG00000023322	0.024466749
Otub1	ENSRNOG00000021175	0.026832843
Paf1	ENSRNOG00000019746	0.047574416
Park7	ENSRNOG00000018289	1.01E-05
Pdap1	ENSRNOG00000000990	0.022058065
Pdia3	ENSRNOG00000015018	0.047627459
Pdia6	ENSRNOG00000050197	0.044824004
Pdrg1	ENSRNOG00000008845	0.005676814
Pfdn1	ENSRNOG00000018653	0.044826908
Pfdn5	ENSRNOG00000012985	0.020604706
Pfdn6	ENSRNOG00000000473	0.01128308
Pgls	ENSRNOG00000018326	0.000922454
Phb	ENSRNOG00000046799	0.002313996
Phb2	ENSRNOG00000012999	0.026832843
Phf23	ENSRNOG00000017657	0.044363496
Phgdh	ENSRNOG00000019328	0.047642012
Pigp	ENSRNOG00000039850	0.043274027
Pla2g7	ENSRNOG00000025691	0.013995648
Plac8	ENSRNOG00000002217	0.02523152
Pld4	ENSRNOG00000028566	0.016311974
Plekho1	ENSRNOG00000021170	0.027863313
Plvap	ENSRNOG00000017676	0.042092082
Pmvk	ENSRNOG00000020696	0.005165909
Poll	ENSRNOG00000016748	0.037415393
Polr1d	ENSRNOG00000000954	0.040669908
Polr2e	ENSRNOG00000013545	0.040535121
Ppia	ENSRNOG00000027864	0.029774598
Ppib	ENSRNOG00000016781	0.001320214
Ppie	ENSRNOG00000014762	0.035685955
Ppp1r14b	ENSRNOG00000021151	0.004488215
Ppp1r9b	ENSRNOG00000052113	0.027853432
Prdx2	ENSRNOG00000003520	0.045136002
Prdx4	ENSRNOG00000003763	0.005508562
Prmt1	ENSRNOG00000026109	0.047627459
Psap	ENSRNOG00000000571	0.045593486
Psm6	ENSRNOG00000007114	0.043274027
Psm7	ENSRNOG00000056853	0.001549362
Psm1	ENSRNOG00000001488	0.014546903
Psm10	ENSRNOG00000019494	0.001705663
Psm3	ENSRNOG00000052730	0.017421991
Psm4	ENSRNOG00000020979	0.004668501
Psm6	ENSRNOG00000019551	0.031036477
Psm7	ENSRNOG00000011732	0.000432348
Psm8	ENSRNOG00000000456	0.007500087
Psm9	ENSRNOG00000000459	0.004982379
Psmc2	ENSRNOG00000012026	0.006610226
Psmc3	ENSRNOG00000011414	0.009975368

Psmc4	ENSRNOG00000018994	0.011321429
Psmc5	ENSRNOG00000010038	0.03064432
Psmc13	ENSRNOG00000014109	0.037102559
Psmc4	ENSRNOG00000021042	0.001467555
Psmc2	ENSRNOG00000019246	0.011542244
Ptms	ENSRNOG00000060098	0.016550621
Pycard	ENSRNOG00000019675	0.018568048
Rab13	ENSRNOG00000016733	0.037831975
Rabac1	ENSRNOG00000020233	0.015778099
Rack1	ENSRNOG00000052620	0.000762407
Ranbp1	ENSRNOG00000001884	0.044541734
Rcn3	ENSRNOG00000043007	0.011498606
Rdh11	ENSRNOG00000054770	0.014102851
RGD1562114	ENSRNOG00000016193	0.010074116
Rgs10	ENSRNOG00000042592	0.00671067
Rhoh	ENSRNOG00000002540	0.033328891
Ring1	ENSRNOG00000000467	0.047197418
Rnaset2	ENSRNOG00000013190	0.002313996
Rnd2	ENSRNOG00000020698	0.015016723
Rpl10	ENSRNOG00000056765	0.010777012
Rpl11	ENSRNOG00000026260	0.000915592
Rpl12	ENSRNOG00000016220	1.54E-11
Rpl13	ENSRNOG00000015335	0.000900676
Rpl14	ENSRNOG00000019007	5.84E-05
Rpl15	ENSRNOG00000008140	0.001064134
Rpl17	ENSRNOG00000018680	0.0107397
Rpl18	ENSRNOG00000021035	0.004410905
Rpl18a	ENSRNOG00000018795	0.000762407
Rpl19	ENSRNOG00000004741	1.80E-07
Rpl21	ENSRNOG00000000957	0.000306309
Rpl21	ENSRNOG00000032803	0.000922454
Rpl23	ENSRNOG00000004107	0.012919577
Rpl24	ENSRNOG00000001611	0.01047414
Rpl26	ENSRNOG00000004214	0.002695491
Rpl27	ENSRNOG00000020674	0.012060986
Rpl27a	ENSRNOG00000014214	0.013608626
Rpl28	ENSRNOG00000017127	0.002850255
Rpl29	ENSRNOG00000011138	0.008001632
Rpl3	ENSRNOG00000016896	0.004120671
Rpl30	ENSRNOG00000005975	0.009801781
Rpl31	ENSRNOG00000013508	0.003309279
Rpl32	ENSRNOG00000010746	0.001047308
Rpl34	ENSRNOG00000016387	5.76E-05
Rpl35	ENSRNOG00000014272	0.000231879
Rpl36	ENSRNOG00000033473	0.000922454
Rpl36a	ENSRNOG00000011494	0.000193835
Rpl37	ENSRNOG00000034180	0.00629308
Rpl37a	ENSRNOG00000023385	0.000690599
Rpl4	ENSRNOG00000009378	0.002828451
Rpl41	ENSRNOG00000042233	0.000673939
Rpl5	ENSRNOG00000023529	0.001554809
Rpl6	ENSRNOG00000025936	0.009627197
Rpl7	ENSRNOG00000006992	0.014302394

Rplp0	ENSRNOG00000001148	0.002651438
Rplp1	ENSRNOG00000013874	3.39E-07
Rps10	ENSRNOG00000000490	0.000164143
Rps10	ENSRNOG000000052141	5.76E-05
Rps11	ENSRNOG00000020595	0.001830495
Rps12	ENSRNOG00000016411	2.21E-05
Rps13	ENSRNOG00000028021	0.006389774
Rps15	ENSRNOG00000024603	0.000131732
Rps15a	ENSRNOG00000018320	0.00101258
Rps16	ENSRNOG00000019578	0.000312892
Rps17	ENSRNOG00000019106	4.50E-05
Rps18	ENSRNOG00000028505	0.000117625
Rps19l2	ENSRNOG00000037897	0.002370587
Rps2	ENSRNOG00000014179	0.004410905
Rps20	ENSRNOG00000008555	0.000111215
Rps21	ENSRNOG00000060449	0.001080791
Rps23	ENSRNOG00000016580	0.000673939
Rps24	ENSRNOG00000010189	0.000673939
Rps25	ENSRNOG00000027503	0.001787193
Rps27	ENSRNOG00000016961	0.008001632
Rps27a	ENSRNOG00000004426	0.000126076
Rps28	ENSRNOG00000042886	0.000231836
Rps3	ENSRNOG00000017418	0.000762407
Rps3a	ENSRNOG00000011893	0.001869541
Rps4x	ENSRNOG00000003201	0.001705663
Rps5	ENSRNOG00000019453	0.000922454
Rps7	ENSRNOG00000008551	0.002860467
Rps8	ENSRNOG00000054626	0.001292675
Rps9	ENSRNOG00000058909	0.00470166
Rpsa	ENSRNOG00000018645	5.76E-05
Rnad1	ENSRNOG00000011645	0.002828451
Rrp1	ENSRNOG00000001203	1.43E-10
Rrp12	ENSRNOG00000048495	5.02E-08
Rrp15	ENSRNOG00000002450	0.001032875
Rrp1b	ENSRNOG00000001194	1.48E-07
Rrp36	ENSRNOG00000017836	0.020604706
Rrp7a	ENSRNOG00000022896	1.64E-05
Rrp8	ENSRNOG00000018766	0.008921384
Rrp9	ENSRNOG00000012927	0.000231836
RT1-A1	ENSRNOG00000038999	0.026213074
RT1-A2	ENSRNOG00000030712	0.000778959
RT1-CE5	ENSRNOG00000000723	0.000890618
RT1-Da	ENSRNOG00000032844	0.022016096
RT1-S3	ENSRNOG00000000777	0.029214345
RT1-T24-3	ENSRNOG00000045924	0.008317617
Rtraf	ENSRNOG00000000340	0.031167409
Sars1	ENSRNOG00000020255	0.005904679
Sdc1	ENSRNOG00000059947	0.001787193
Sdf2	ENSRNOG00000012121	0.004852836
Sdf2l1	ENSRNOG00000001859	0.001918996
Sdf4	ENSRNOG00000019981	0.008001632
Sec61g	ENSRNOG00000005203	0.007194758
Selenof	ENSRNOG00000055257	0.037831975

Selenom	ENSRNOG00000061231	0.000279445
Selenos	ENSRNOG00000012576	0.02027869
Sem1	ENSRNOG00000010420	0.027251778
Sf3b5	ENSRNOG00000014908	0.007749497
Sh3gl3	ENSRNOG00000019776	0.03717395
Sil1	ENSRNOG00000019826	0.03180658
Slc25a28	ENSRNOG00000016751	0.011503628
Slc25a4	ENSRNOG00000010830	0.038117377
Slc39a7	ENSRNOG00000000465	0.007186679
SNORD14	ENSRNOG00000060267	0.02523152
Snrnp25	ENSRNOG00000020626	0.021821393
Snrpd2	ENSRNOG00000015844	0.005101112
Snx20	ENSRNOG00000014202	0.047627459
Snx8	ENSRNOG00000001258	0.037415393
Spcs1	ENSRNOG00000018075	0.022342115
Spr	ENSRNOG00000015455	0.049574841
Sry	ENSRNOG00000062090	0.000125553
Ssbp4	ENSRNOG00000019698	0.036451062
Ssna1	ENSRNOG00000011093	0.042966008
Stub1	ENSRNOG00000019798	0.045617893
Sub1	ENSRNOG00000050563	0.037299057
Swi5	ENSRNOG00000022860	0.004569188
Syf2	ENSRNOG00000060597	0.044824004
Tac4	ENSRNOG00000004404	0.032857268
Taf10	ENSRNOG00000019178	0.006182445
Tapbp	ENSRNOG00000029500	0.015778099
Tapbpl	ENSRNOG00000027552	0.024355468
Tbca	ENSRNOG00000048342	0.017122297
Tcte1	ENSRNOG00000019961	0.03717395
Tmbim4	ENSRNOG00000004312	0.049140324
Tmed3	ENSRNOG00000013889	0.042748695
Tmem141	ENSRNOG00000028254	0.030738802
Tmem147	ENSRNOG00000021006	0.029774598
Tmem160	ENSRNOG00000015304	0.013608626
Tmem176b	ENSRNOG00000008465	0.001855404
Tmem223	ENSRNOG00000019266	0.016954349
Tmem254	ENSRNOG00000011276	0.047763579
Tmem256	ENSRNOG00000037540	0.005176177
Tmsb4x	ENSRNOG00000047931	0.000432348
Tnfaip8l2	ENSRNOG00000021100	0.005006749
Tnfrsf13c	ENSRNOG00000007664	0.004668501
Tnfsf13b	ENSRNOG00000014464	0.00462693
Tomm6	ENSRNOG00000046316	0.001670941
Tomm7	ENSRNOG00000043114	0.020604706
Tor2a	ENSRNOG00000022514	0.023699811
Tor3a	ENSRNOG00000004307	0.011498606
Tpt1	ENSRNOG00000001049	0.008392207
Traf2	ENSRNOG00000006238	0.043863437
Trappc6a	ENSRNOG00000017468	0.032290097
Trem2	ENSRNOG00000013578	0.004378755
Tssc4	ENSRNOG00000032677	0.025131215
Tsta3	ENSRNOG00000009020	0.043444257
Ttr	ENSRNOG00000016275	0.006182445

Txn2	ENSRNOG00000005614	0.011498606
Txndc15	ENSRNOG00000000133	0.009383996
Tyrobp	ENSRNOG00000020845	0.004142662
Uba52	ENSRNOG00000019974	0.015056077
Ube2m	ENSRNOG00000027514	0.04077403
Ubtd1	ENSRNOG00000013813	0.030237373
Ubxn1	ENSRNOG00000019666	0.006766805
Ufc1	ENSRNOG00000003706	0.043274027
Uqcrh	ENSRNOG00000012550	0.002842951
Uqcrq	ENSRNOG00000048174	0.005597299
Urm1	ENSRNOG00000026636	0.028873366
Use1	ENSRNOG00000016619	0.002235787
Vamp8	ENSRNOG00000012748	0.009067721
Vbp1	ENSRNOG00000050401	0.002625577
Vkorc1	ENSRNOG00000050828	0.025070648
Vps28	ENSRNOG00000014633	0.002235787
Wdr18	ENSRNOG00000012379	0.01839246

Supplemental Table 3: Male cervical spinal cord compared to brainstem microglia upregulated genes

Gene name	Gene stable ID	FDR
5S_rRNA	ENSRNOG00000041857	0.011956904
5S_rRNA	ENSRNOG00000046358	0.031585774
7SK	ENSRNOG00000058555	0.002223573
7SK	ENSRNOG00000058835	7.06E-06
AABR07000398.1	ENSRNOG00000047746	2.20E-06
AABR07000629.3	ENSRNOG00000050801	0.010439963
AABR07001477.1	ENSRNOG00000058103	0.006040539
AABR07001573.1	ENSRNOG00000052521	0.022995665
AABR07001573.2	ENSRNOG00000057484	0.00041089
AABR07004891.1	ENSRNOG00000033196	0.020538173
AABR07005794.1	ENSRNOG00000060009	0.012860565
AABR07006111.1	ENSRNOG00000020409	0.000687388
AABR07006624.1	ENSRNOG00000062156	0.006053965
AABR07006625.2	ENSRNOG00000062136	0.003660227
AABR07006888.1	ENSRNOG00000061256	0.002121847
AABR07007000.1	ENSRNOG00000013993	0.028314835
AABR07007121.1	ENSRNOG00000033843	0.013978147
AABR07007905.2	ENSRNOG00000053229	0.001797606
AABR07007997.1	ENSRNOG00000061053	8.58E-05
AABR07009377.1	ENSRNOG00000055011	0.033293453
AABR07010030.1	ENSRNOG00000041989	0.046122073
AABR07010878.1	ENSRNOG00000051664	0.027407483
AABR07011700.1	ENSRNOG00000057979	0.029219202
AABR07011857.1	ENSRNOG00000045839	0.003375842
AABR07012583.2	ENSRNOG00000059093	0.016509137
AABR07013065.1	ENSRNOG00000055846	1.39E-05
AABR07013566.1	ENSRNOG00000056490	0.001068641
AABR07014289.1	ENSRNOG00000058935	0.028169537
AABR07014996.1	ENSRNOG00000032160	0.006410297
AABR07015057.1	ENSRNOG00000060518	0.000128576
AABR07015079.1	ENSRNOG00000046081	0.00430118
AABR07015081.1	ENSRNOG00000047351	8.45E-06
AABR07015081.2	ENSRNOG00000054945	0.012771407

AABR07018132.1	ENSRNOG00000045597	0.000299098
AABR07018556.1	ENSRNOG00000049650	0.030956027
AABR07019088.1	ENSRNOG00000057291	0.002652094
AABR07027267.1	ENSRNOG00000060618	0.016890183
AABR07027902.1	ENSRNOG00000050847	0.000611201
AABR07028414.1	ENSRNOG00000049178	0.029668828
AABR07028615.1	ENSRNOG00000018500	0.018892978
AABR07029269.1	ENSRNOG00000032329	1.53E-06
AABR07029272.1	ENSRNOG00000006932	0.048596586
AABR07029970.1	ENSRNOG00000061976	0.000293172
AABR07030085.3	ENSRNOG00000053589	0.017049237
AABR07031521.1	ENSRNOG00000062247	0.009617582
AABR07032392.1	ENSRNOG00000048704	7.06E-05
AABR07032393.1	ENSRNOG00000055190	0.000158058
AABR07033540.1	ENSRNOG00000054029	0.03116022
AABR07034393.1	ENSRNOG00000052264	0.012273595
AABR07035456.1	ENSRNOG00000026725	0.001519963
AABR07035461.1	ENSRNOG00000024342	0.006369429
AABR07035470.1	ENSRNOG00000024277	2.82E-10
AABR07035471.1	ENSRNOG00000062094	0.000786633
AABR07036007.1	ENSRNOG00000053790	0.001884838
AABR07039111.1	ENSRNOG00000051289	0.013373965
AABR07039112.2	ENSRNOG00000051279	0.001041298
AABR07039694.1	ENSRNOG00000057430	0.000187503
AABR07040430.1	ENSRNOG00000056486	0.017960268
AABR07041237.1	ENSRNOG00000061985	0.002517628
AABR07043115.1	ENSRNOG00000047294	0.033992119
AABR07044404.1	ENSRNOG00000061639	0.002306991
AABR07044421.1	ENSRNOG00000061998	0.037872977
AABR07044520.1	ENSRNOG00000060173	0.010698417
AABR07044980.1	ENSRNOG00000061835	0.034071162
AABR07048397.1	ENSRNOG00000038905	0.044015812
AABR07050487.1	ENSRNOG00000054768	0.005810505
AABR07051326.1	ENSRNOG00000055302	0.02086283
AABR07053179.1	ENSRNOG00000054519	0.00267107
AABR07053509.2	ENSRNOG00000059260	0.049911325
AABR07053516.2	ENSRNOG00000060187	0.001066317
AABR07054361.1	ENSRNOG00000031275	0.006682206
AABR07057617.1	ENSRNOG00000057824	0.040829839
AABR07058158.1	ENSRNOG00000062170	0.001848174
AABR07060133.1	ENSRNOG00000054990	1.03E-05
AABR07060293.1	ENSRNOG00000027445	0.045184756
AABR07060920.1	ENSRNOG00000054587	0.002132319
AABR07061825.1	ENSRNOG00000011606	0.032081632
AABR07063314.1	ENSRNOG00000061354	0.013005414
AABR07063893.1	ENSRNOG00000058209	0.037392745
AABR07064257.1	ENSRNOG00000053367	0.003864549
AABR07064304.1	ENSRNOG00000046049	7.36E-05
AABR07065124.1	ENSRNOG00000055422	0.000133294
AABR07065352.1	ENSRNOG00000059223	0.001490318
AABR07066522.1	ENSRNOG00000049511	6.10E-05
AABR07068127.1	ENSRNOG00000025970	3.13E-06
AABR07069218.2	ENSRNOG00000053722	0.032565476

AABR07070704.1	ENSRNOG00000058223	0.009860356
AABR07072152.1	ENSRNOG00000051188	0.000392386
AABR07072449.1	ENSRNOG00000011809	0.003621119
Abcc3	ENSRNOG00000002948	0.007941846
Abcf1	ENSRNOG00000000799	0.028113823
Abl2	ENSRNOG00000004305	0.007539361
Abr	ENSRNOG00000056837	0.011478461
AC094246.1	ENSRNOG00000020492	0.000111074
AC098008.3	ENSRNOG00000051318	0.007966868
AC098180.1	ENSRNOG00000060606	1.38E-07
AC102976.1	ENSRNOG00000057798	0.025743578
AC106909.1	ENSRNOG00000057415	0.001523821
AC107531.3	ENSRNOG00000059786	0.00654805
AC109048.1	ENSRNOG00000018801	0.022995665
AC111632.2	ENSRNOG00000056033	0.021535497
AC111804.2	ENSRNOG00000062261	0.000346116
AC112624.1	ENSRNOG00000056438	0.024286711
AC113837.9	ENSRNOG00000061854	0.005175964
AC114233.1	ENSRNOG00000051046	1.14E-05
AC115509.1	ENSRNOG00000049126	0.022646967
AC118802.1	ENSRNOG00000057672	0.002191448
AC123253.2	ENSRNOG00000052774	0.011374476
AC125565.1	ENSRNOG00000062290	0.014241596
AC125873.1	ENSRNOG00000056094	0.005094115
AC126530.2	ENSRNOG00000053576	0.000741016
AC128154.1	ENSRNOG00000060588	0.000500779
AC130162.1	ENSRNOG00000034030	0.003869218
AC132740.1	ENSRNOG00000054780	0.029993387
AC134224.1	ENSRNOG00000062127	1.69E-10
AC134224.2	ENSRNOG00000062155	9.19E-10
AC134224.3	ENSRNOG00000062158	6.90E-05
Acin1	ENSRNOG00000013533	0.049575161
Acox2	ENSRNOG00000007378	0.006163782
Adap1	ENSRNOG00000054033	0.000724449
Adgrg5	ENSRNOG00000039891	0.012308486
Adm	ENSRNOG00000027030	0.005175964
Aff1	ENSRNOG00000002232	0.020599074
Agap2	ENSRNOG00000025584	2.44E-05
Ago1	ENSRNOG00000055915	0.015922827
Akap6	ENSRNOG00000004841	0.001504762
Akap8	ENSRNOG00000006559	0.006300003
Akap8l	ENSRNOG00000006355	0.040517725
Alpk3	ENSRNOG00000011659	3.30E-09
Anapc7	ENSRNOG00000001283	0.012822897
Angptl7	ENSRNOG00000009589	0.008042834
Ankrd13b	ENSRNOG00000014742	0.038151341
Ankrd61	ENSRNOG00000001048	0.024121268
Ankrd63	ENSRNOG00000042446	0.001481714
Ap3d1	ENSRNOG00000018977	0.0207795
Ap4m1	ENSRNOG00000001353	0.033818492
Apod	ENSRNOG00000048273	0.000832746
Arap1	ENSRNOG00000019555	0.03116022
Arhgap45	ENSRNOG00000013220	0.013118058

Arhgdib	ENSRNOG00000005809	0.02092487
Arid5a	ENSRNOG00000015382	0.049526766
Arl5c	ENSRNOG00000036880	0.026460227
Arrdc2	ENSRNOG00000019009	0.009215409
Arrdc3	ENSRNOG00000045649	2.73E-05
Arse	ENSRNOG00000028350	0.00691219
Aspscr1	ENSRNOG00000036678	0.02959671
Atf3	ENSRNOG0000003745	1.55E-08
Atf4	ENSRNOG00000017801	0.001054258
Atf6b	ENSRNOG00000000431	0.048496597
Atic	ENSRNOG00000015511	0.017393784
Atp1a3	ENSRNOG00000020263	0.036970927
Atrx	ENSRNOG00000056703	0.010461059
Atxn7	ENSRNOG00000007246	0.008445715
Atxn7l3	ENSRNOG00000020930	0.025661209
Bag1	ENSRNOG00000008277	0.009712906
Bag3	ENSRNOG00000020298	0.002411694
Baz1a	ENSRNOG00000006828	0.007553348
Bcl6	ENSRNOG00000001843	0.009332735
Best1	ENSRNOG00000020346	1.06E-09
Birc3	ENSRNOG00000005731	0.033726262
Bptf	ENSRNOG00000047296	0.026027956
Bri3bp	ENSRNOG00000000979	0.022239674
Brwd1	ENSRNOG00000001632	0.00397009
Btbd19	ENSRNOG00000042163	0.001519963
Btg1	ENSRNOG00000004284	0.007448317
Btg2	ENSRNOG00000003300	1.11E-05
C3	ENSRNOG00000046834	2.08E-06
C6	ENSRNOG00000024115	2.87E-06
Calca	ENSRNOG00000011130	0.001300966
Ccdc102a	ENSRNOG00000025843	0.033204348
Ccdc136	ENSRNOG00000007100	0.006053965
Ccdc62	ENSRNOG00000038002	0.035033524
Ccdc80	ENSRNOG00000002052	0.000776522
Ccdc88b	ENSRNOG00000024931	0.002018189
Cck	ENSRNOG00000019321	0.001519963
Ccl4	ENSRNOG00000011406	0.000159362
Ccl2	ENSRNOG00000033234	0.00025135
Cd163	ENSRNOG00000010253	0.003917352
Cd4	ENSRNOG00000016294	0.001423976
Cd6	ENSRNOG00000020884	0.023726133
Cd83	ENSRNOG00000018092	0.000656276
Cdc42bpb	ENSRNOG00000009675	0.003607451
Cds2	ENSRNOG00000021265	0.024153184
Cebpb	ENSRNOG00000057347	0.004335268
Cep128	ENSRNOG00000003908	0.017634809
Cep131	ENSRNOG00000004430	0.024354489
Cep164	ENSRNOG00000029826	0.030703333
Cep250	ENSRNOG00000019340	0.006573798
Cep295nl	ENSRNOG00000033143	7.06E-06
Ces1a	ENSRNOG00000039725	0.002856973
Cfap70	ENSRNOG00000007046	0.004590532
Cflar	ENSRNOG00000012473	0.018755606

Chad	ENSRNOG00000003304	0.001010191
Chd3	ENSRNOG00000009722	0.01516142
Chd4	ENSRNOG00000018309	0.001503504
Chd7	ENSRNOG00000006689	0.002517628
Chka	ENSRNOG00000016791	0.010585171
Ciart	ENSRNOG00000042717	0.023726133
Cldn11	ENSRNOG00000010263	0.001909144
Clip2	ENSRNOG00000021611	0.023176208
Cmip	ENSRNOG00000013178	4.91E-06
Col11a2	ENSRNOG00000000463	0.048934881
Col9a2	ENSRNOG00000011502	2.04E-06
Cramp1	ENSRNOG00000024635	0.029278529
Crebbp	ENSRNOG00000005330	9.06E-08
Crem	ENSRNOG00000014900	0.002921674
Csf1	ENSRNOG00000018659	0.016149953
Csf2ra	ENSRNOG00000049782	0.046614113
Csnk1g1	ENSRNOG00000016620	0.005655041
Cspp1	ENSRNOG00000021718	0.023147762
Csrnp1	ENSRNOG00000033433	0.045580031
Ctnnbl1	ENSRNOG00000012021	0.00383208
Ctsd	ENSRNOG00000020206	0.000752772
Cul9	ENSRNOG00000018372	0.01610696
Cux1	ENSRNOG00000001424	0.011432991
Cwc25	ENSRNOG00000004091	0.036705798
Cxcl1	ENSRNOG00000002802	0.049863681
Cxcl10	ENSRNOG00000022256	1.70E-05
Cxcl2	ENSRNOG00000002792	4.20E-06
Dazap1	ENSRNOG00000031387	0.018347314
Dctn1	ENSRNOG00000010048	0.016609389
Ddit3	ENSRNOG00000006789	0.001289179
Ddx50	ENSRNOG00000000396	0.029610471
Deaf1	ENSRNOG00000017960	0.036306503
Dedd2	ENSRNOG00000046112	0.019433491
Def6	ENSRNOG00000000502	0.005262321
Depdc5	ENSRNOG00000018144	0.001493802
Dgka	ENSRNOG00000022943	0.003399021
Disc1	ENSRNOG00000019779	0.009024806
Dkc1	ENSRNOG00000005562	0.03199897
Dnaaf2	ENSRNOG00000028155	0.005181696
Dnaja1	ENSRNOG00000007029	0.000345963
Dnaja4	ENSRNOG00000012106	0.004618657
Dnajb1	ENSRNOG00000021824	0.008601453
Dnajb3	ENSRNOG00000023172	0.013080516
Dnajb4	ENSRNOG00000013011	0.000304912
Dnajc2	ENSRNOG00000012392	0.001649653
Dnmt3a	ENSRNOG00000026649	1.00E-05
Dok5	ENSRNOG00000013196	0.001370099
Donson	ENSRNOG00000002012	0.007694318
Dpysl3	ENSRNOG00000018992	0.004061784
Drg2	ENSRNOG00000005309	0.010697727
Dusp5	ENSRNOG00000014061	0.000205776
Dyrk2	ENSRNOG00000007821	0.008422182
Eea1	ENSRNOG00000021681	0.025468227

Eef1d	ENSRNOG00000021638	0.026860608
Egr1	ENSRNOG00000019422	0.000832746
Egr2	ENSRNOG00000000640	0.004393685
Egr3	ENSRNOG00000017828	2.22E-06
Egr4	ENSRNOG00000015719	0.012073503
Ehmt2	ENSRNOG00000030630	0.032817518
Eif5b	ENSRNOG00000023356	0.001710997
Eil2	ENSRNOG00000027089	0.014878315
Epha1	ENSRNOG00000017525	0.018498154
Ephb3	ENSRNOG00000031801	0.000164389
Erf	ENSRNOG00000020426	0.003869218
Esf1	ENSRNOG0000004777	0.030868774
Evc	ENSRNOG00000007564	0.000275739
Evc2	ENSRNOG00000007025	0.012678552
F13a1	ENSRNOG00000015957	1.53E-06
Fabp5	ENSRNOG00000049075	0.004215619
Fabp7	ENSRNOG00000000814	0.047109641
Fam151a	ENSRNOG00000007799	0.022960134
Fam20c	ENSRNOG00000001314	1.67E-07
Fbf1	ENSRNOG00000008577	0.002169579
Fbxo40	ENSRNOG00000002459	0.010671713
Fbxw4	ENSRNOG00000046211	0.007868426
Fcmr	ENSRNOG00000004441	1.33E-08
Fcna	ENSRNOG00000017063	0.003702382
Fgd2	ENSRNOG00000000528	0.028103672
Fkbp5	ENSRNOG00000022523	0.025829894
Fkbp8	ENSRNOG00000058359	0.029549501
Fos	ENSRNOG00000008015	0.002294828
Fosb	ENSRNOG00000046667	0.001719086
Fosl2	ENSRNOG00000052357	0.029027249
Fxyd2	ENSRNOG00000016469	0.014442937
Fyb1	ENSRNOG00000013886	0.030703333
Gab2	ENSRNOG00000011882	0.025468227
Gadd45b	ENSRNOG00000019822	0.013149913
Gatad2b	ENSRNOG00000015553	0.000259806
Gbp2	ENSRNOG00000031743	0.00796365
Gfap	ENSRNOG00000002919	8.77E-05
Gigyf1	ENSRNOG00000001410	0.000276345
Gjb1	ENSRNOG00000003746	0.007077806
Gjc2	ENSRNOG00000038328	0.024343937
Gm22748	ENSRNOG00000055217	0.000904808
Gm25994	ENSRNOG00000045884	0.000676589
Gmip	ENSRNOG00000027257	0.035482074
Gnas	ENSRNOG00000025889	0.025659592
Golga2	ENSRNOG00000011884	0.022995665
Golm1	ENSRNOG00000018400	0.01448123
Gon4l	ENSRNOG00000020297	0.015832507
Gpatch3	ENSRNOG00000007097	0.008730596
Gpr132	ENSRNOG00000013914	0.021810911
Grasp	ENSRNOG00000007346	0.000696164
Gripap1	ENSRNOG00000009071	0.049000133
Grk6	ENSRNOG00000014615	0.01953534
Gsap	ENSRNOG00000028801	0.038071461

Gtf2f1	ENSRNOG00000047134	0.007804915
Gtf2ird2	ENSRNOG00000001482	0.005285878
Gxylt1	ENSRNOG00000005234	0.030956027
Gys1	ENSRNOG00000020812	0.003864549
Hapln2	ENSRNOG00000018870	0.028239753
Hcar2	ENSRNOG00000026653	0.022054117
Hectd4	ENSRNOG00000001352	0.016606583
Herpud1	ENSRNOG00000018796	0.000496992
Hexd	ENSRNOG00000036667	0.012735522
Hipk2	ENSRNOG00000007034	0.00631171
Hist1h2an	ENSRNOG00000056411	0.013613034
Hivep3	ENSRNOG00000009341	0.003869218
Hlx	ENSRNOG00000002309	3.78E-05
Hmox1	ENSRNOG00000014117	0.03467978
Hnrnpab	ENSRNOG00000003645	0.003568299
Hnrnpdl	ENSRNOG00000002270	0.024469939
Hook2	ENSRNOG00000003682	0.018027835
Hsd11b1	ENSRNOG00000005861	0.028801207
Hsp90ab1	ENSRNOG00000019834	0.00135162
Hspa8	ENSRNOG00000034066	0.000517038
Hspb1	ENSRNOG00000023546	0.029295646
Hspd1	ENSRNOG00000014525	0.02314531
Hsph1	ENSRNOG00000000902	0.00463554
Icam1	ENSRNOG00000020679	3.61E-05
Icam4	ENSRNOG00000042078	0.000478551
Icoslg	ENSRNOG000000023109	0.02672954
Idi1	ENSRNOG00000016690	0.002372279
Ier2	ENSRNOG00000054344	0.000115187
Ier3	ENSRNOG00000000827	0.003864549
Ier5	ENSRNOG00000059406	0.002132319
Ifit2	ENSRNOG00000036604	0.044643236
Ifnlr1	ENSRNOG00000033984	1.06E-09
Ifrd1	ENSRNOG00000050997	0.008092304
Il1a	ENSRNOG00000004575	0.002197332
Il1b	ENSRNOG00000004649	1.29E-10
Insig1	ENSRNOG00000006859	0.00905419
Insyn2a	ENSRNOG00000033881	0.001663335
Irf2bp2	ENSRNOG00000049900	0.016606583
Itgb3	ENSRNOG00000048449	0.045522515
Iws1	ENSRNOG00000014630	0.01880767
Jarid2	ENSRNOG00000045918	0.01104339
Jun	ENSRNOG00000026293	0.001051818
Junb	ENSRNOG00000042838	0.010197374
Jund	ENSRNOG00000019568	6.11E-06
Kansl3	ENSRNOG00000015417	0.014224392
Kdm6b	ENSRNOG00000037613	6.89E-06
Khynyn	ENSRNOG00000020506	0.014214381
Khsrp	ENSRNOG00000047628	2.60E-05
Kif13b	ENSRNOG00000013089	0.004364228
Klc2	ENSRNOG00000020299	0.029810581
Klf2	ENSRNOG00000014205	0.00122442
Klf4	ENSRNOG00000016299	0.000252258
Klf6	ENSRNOG00000016885	0.015364066

Klk6	ENSRNOG00000031927	0.00135162
Kmt2d	ENSRNOG00000061499	0.000791248
Ksr1	ENSRNOG00000012818	0.001369217
Ktn1	ENSRNOG00000012255	0.014129388
Lag3	ENSRNOG00000021334	0.04882426
Las1l	ENSRNOG00000021748	0.017518228
Lif	ENSRNOG00000007002	0.001227758
Limk1	ENSRNOG00000001470	0.013342832
Lmbr1l	ENSRNOG00000061607	0.01342038
LOC100360087	ENSRNOG00000020843	6.03E-06
LOC100361645	ENSRNOG00000031951	0.044599899
LOC100364435	ENSRNOG00000042499	0.040794947
LOC100909712	ENSRNOG00000011586	0.014442937
LOC100910446	ENSRNOG00000048248	0.038071461
LOC102546889	ENSRNOG00000059087	1.42E-06
LOC103690035	ENSRNOG00000050760	0.028005829
LOC103690164	ENSRNOG00000048357	0.008422182
LOC103692471	ENSRNOG00000058834	0.006410297
LOC103692984	ENSRNOG00000060019	0.049526766
LOC499407	ENSRNOG00000058912	0.005972203
LOC680491	ENSRNOG00000062084	0.000325394
LOC689757	ENSRNOG00000037076	0.042023027
LOC690617	ENSRNOG00000039861	0.00035913
Lrrc29	ENSRNOG00000025231	0.003103006
Lrrc4	ENSRNOG00000008098	0.01237208
Lrrc45	ENSRNOG00000045926	0.020599074
Lrrtm2	ENSRNOG00000047085	0.006309529
Lsm14b	ENSRNOG00000054557	0.004353804
Lsp1	ENSRNOG00000020300	0.004742454
Ltp2	ENSRNOG00000012094	0.001638365
Luc7l2	ENSRNOG00000006001	0.003002104
Lyve1	ENSRNOG00000026902	5.31E-05
Madd	ENSRNOG00000012568	0.006197727
Maff	ENSRNOG00000012886	0.000498016
Mafg	ENSRNOG00000036697	0.024103318
Mafk	ENSRNOG0000001277	6.23E-05
Mag	ENSRNOG00000021023	0.002386596
Map2k6	ENSRNOG00000004437	0.043434288
Map3k1	ENSRNOG00000013177	0.023481317
Map3k4	ENSRNOG00000017419	0.014129388
Map4	ENSRNOG00000020748	0.008539062
Map7d1	ENSRNOG00000010237	0.041910465
Mat2a	ENSRNOG00000013520	0.002017193
Maz	ENSRNOG00000055082	0.038071461
Med29	ENSRNOG00000019702	0.033728592
Megf8	ENSRNOG00000052687	0.004461862
Metazoa_SRP	ENSRNOG00000048993	0.000657063
Mfsd12	ENSRNOG00000039858	0.000319973
Mical1	ENSRNOG00000000307	0.018724294
Mical2	ENSRNOG00000016244	0.017642143
Mical3	ENSRNOG00000053203	7.20E-08
Midn	ENSRNOG00000015434	0.024038117
Mink1	ENSRNOG00000033508	0.017642143

Mir142	ENSRNOG00000035633	3.75E-05
Mir207	ENSRNOG00000035596	1.63E-06
Mir23a	ENSRNOG00000035644	3.82E-07
Mir24-2	ENSRNOG00000035501	0.000203923
Mllt6	ENSRNOG00000053285	0.014926749
Mob3c	ENSRNOG00000037620	0.011974654
Mog	ENSRNOG00000000775	0.031493642
Mroh2a	ENSRNOG00000042182	0.040829839
Mtmr12	ENSRNOG00000022929	0.004483337
Muc6	ENSRNOG00000056817	0.002968791
Myo18a	ENSRNOG00000033101	0.000253746
Myo1e	ENSRNOG00000061928	0.03545977
Myo7a	ENSRNOG00000013641	0.006270447
N5	ENSRNOG00000054042	0.000656276
Naa50	ENSRNOG00000039017	0.028169537
Nat10	ENSRNOG00000008663	0.022995027
Ncf1	ENSRNOG00000001480	0.027162395
Ncl	ENSRNOG00000018273	0.007410001
Ncor2	ENSRNOG00000001004	0.024022554
Nefh	ENSRNOG00000008716	0.03467978
Nefl	ENSRNOG00000013658	0.032469301
Nefm	ENSRNOG00000013916	0.00233699
Nes	ENSRNOG00000018681	0.000353415
Nf1	ENSRNOG00000013780	0.042645635
Nfatc2	ENSRNOG00000012175	0.002172338
Nfkbia	ENSRNOG00000007390	4.84E-05
Nfkbid	ENSRNOG00000025111	3.83E-05
Nfkbie	ENSRNOG00000019907	0.049262293
Nfkbiz	ENSRNOG00000031163	3.20E-06
Niban2	ENSRNOG00000015845	0.001205481
Nop14	ENSRNOG00000012147	0.007607499
Nop53	ENSRNOG00000013023	0.006197727
Nop56	ENSRNOG00000007128	0.035453294
Nr4a1	ENSRNOG00000007607	0.00481157
Nr4a2	ENSRNOG00000005600	0.013941937
Nr4a3	ENSRNOG00000005964	0.010193981
Nrdc	ENSRNOG00000007111	0.028271318
Nron	ENSRNOG00000058888	0.02921442
Numa1	ENSRNOG00000000417	0.00738861
Olr1	ENSRNOG00000056219	0.000639921
Omg	ENSRNOG00000014107	0.002705142
Os9	ENSRNOG00000025570	0.017634809
Osgin1	ENSRNOG00000014948	0.000324183
Otulin	ENSRNOG00000012017	0.041679885
Padi2	ENSRNOG00000007574	0.000759949
Paf1	ENSRNOG00000019746	0.026664557
Pcna	ENSRNOG00000021264	0.038008869
Pdcd4	ENSRNOG00000014779	0.048934881
Pde4a	ENSRNOG00000020828	0.020441315
Pdlim1	ENSRNOG00000016166	0.033617111
Peli2	ENSRNOG00000012363	0.001304618
Per1	ENSRNOG00000007387	8.69E-05
Pfkl	ENSRNOG00000001214	0.022412337

Phlda1	ENSRNOG00000004019	0.014214381
Phospho1	ENSRNOG00000005569	0.000478551
Pi16	ENSRNOG00000000525	0.002311787
Pik3c2b	ENSRNOG00000029938	0.021980061
Pik3r1	ENSRNOG00000018903	1.38E-05
Pim1	ENSRNOG00000000529	0.0001025
Pkn1	ENSRNOG00000004131	0.014133549
Pkp4	ENSRNOG00000005504	0.004810463
Plec	ENSRNOG00000023781	0.004682001
Plekha5	ENSRNOG00000008747	0.014878315
Plekho2	ENSRNOG00000029242	0.01700139
Plk2	ENSRNOG00000011951	0.000346116
Plk3	ENSRNOG00000018484	7.49E-07
Plp1	ENSRNOG00000002419	0.003750876
Plxna4	ENSRNOG00000013072	0.049940237
Poldip3	ENSRNOG00000022877	0.041009718
Polg2	ENSRNOG00000013728	0.022302746
Pou2f2	ENSRNOG000000055650	5.74E-05
Ppm1j	ENSRNOG00000012481	0.022646967
Ppp1r14a	ENSRNOG00000020676	0.010121596
Ppp1r15a	ENSRNOG00000020938	3.48E-08
Ppp1r21	ENSRNOG00000016528	0.006890634
Ppp1r3c	ENSRNOG00000018494	0.049491349
Ppp1r9b	ENSRNOG000000052113	0.001379648
Ppp2r5d	ENSRNOG00000016849	0.048240731
Prdm8	ENSRNOG00000002004	0.015636036
Prkag2	ENSRNOG00000009085	0.007376939
Prox1	ENSRNOG00000003694	0.013553334
Prpf40b	ENSRNOG000000052539	0.001543107
Psd	ENSRNOG00000019435	7.21E-05
Pspc1	ENSRNOG00000020782	0.012978729
Pstpip1	ENSRNOG00000016413	0.007068888
Ptp4a1	ENSRNOG00000011771	0.035036422
Ptpn7	ENSRNOG00000005807	0.049242162
Rabep1	ENSRNOG00000005015	0.035482074
Rabl6	ENSRNOG00000016795	0.041134157
Rack1	ENSRNOG000000049070	0.006405649
Rap1gds1	ENSRNOG00000015987	0.039353536
Rapgef1	ENSRNOG00000014316	0.008256108
Rapgef3	ENSRNOG000000059961	0.002386596
Rasgef1b	ENSRNOG00000002345	0.000657063
Rbm6	ENSRNOG00000018333	0.004136714
Rdh5	ENSRNOG000000053850	0.007122736
Recql5	ENSRNOG00000005107	0.044627412
Rel	ENSRNOG000000054437	0.000345963
Relb	ENSRNOG000000033235	3.04E-05
Renbp	ENSRNOG000000054765	0.003958657
RGD1305298	ENSRNOG00000007184	0.005820481
RGD1305464	ENSRNOG00000018689	0.017493394
RGD1306556	ENSRNOG000000052424	0.003864549
RGD1359449	ENSRNOG000000059240	0.033354176
RGD1562310	ENSRNOG00000001123	0.007611787
RGD1564541	ENSRNOG00000012564	0.014360634

Rgs1	ENSRNOG00000003895	5.60E-05
Rgs2	ENSRNOG00000003687	0.000318096
Rhob	ENSRNOG000000021403	0.003631453
Riok1	ENSRNOG00000014049	0.033232981
RNase_MRP	ENSRNOG000000057527	0.000731025
RNaseP_nuc	ENSRNOG000000054461	0.002971481
Rnf19b	ENSRNOG00000000123	0.002763554
Rnf39	ENSRNOG00000000781	0.008732159
Rnf40	ENSRNOG00000018840	8.45E-06
Rpl19	ENSRNOG00000004741	0.003243616
Rpl3	ENSRNOG00000016896	0.041830971
Rpph1	ENSRNOG000000054493	0.022976241
Rpsa	ENSRNOG00000018645	0.002236463
Rrbp1	ENSRNOG000000005958	0.004057225
RT1-CE3	ENSRNOG000000031607	0.021398125
RT1-CE5	ENSRNOG00000000723	0.047563741
Rtf1	ENSRNOG000000005183	0.032924817
Rufy1	ENSRNOG000000003536	0.002326538
Samd4a	ENSRNOG00000010489	0.000791248
Samd4b	ENSRNOG00000019831	0.045839091
Sart3	ENSRNOG00000000702	0.03116022
Sat1	ENSRNOG000000003809	0.000268762
Sde2	ENSRNOG000000003247	0.028420236
Sema4c	ENSRNOG00000016254	0.005535427
Sema4d	ENSRNOG00000013679	0.011524705
Serpind1	ENSRNOG00000001865	6.23E-05
Setd7	ENSRNOG00000013045	5.21E-06
Setx	ENSRNOG00000013491	0.012512868
Sh3gl3	ENSRNOG00000019776	8.05E-05
Shisa8	ENSRNOG000000049407	0.000248564
Sik1	ENSRNOG00000001189	7.13E-05
Ski	ENSRNOG00000005340	7.47E-05
Slc10a1	ENSRNOG000000005794	0.000731901
Slc16a3	ENSRNOG000000036677	0.030290722
Slfn4	ENSRNOG000000057092	0.004057225
Smad7	ENSRNOG00000018359	0.000283166
Smarca2	ENSRNOG00000011931	0.000353415
Smarcc2	ENSRNOG000000031135	0.029027249
Smc2	ENSRNOG000000022325	0.020629656
Smox	ENSRNOG000000021255	0.013468378
Smyd2	ENSRNOG000000003583	0.037215835
SNORA70	ENSRNOG0000000057605	0.002816426
SNORD14	ENSRNOG0000000054774	0.03116022
Snord17	ENSRNOG0000000052573	0.047531116
Snx29	ENSRNOG000000002294	0.000656276
Snx32	ENSRNOG0000000026527	0.000653319
Snx8	ENSRNOG00000001258	0.018892978
Socs3	ENSRNOG000000002946	0.004775786
Soga1	ENSRNOG0000000053240	0.001573328
Sowahc	ENSRNOG000000048831	0.002058547
Sp100	ENSRNOG0000000022769	0.027982821
Sp140	ENSRNOG0000000022800	0.012012254
Spn	ENSRNOG0000000033556	0.046122073

Sptan1	ENSRNOG00000015396	0.045755528
Src	ENSRNOG00000009495	0.035879708
Srcap	ENSRNOG00000050282	0.012871343
Sry	ENSRNOG00000062090	0.005181696
Stat5b	ENSRNOG00000019075	0.040886764
Stk4	ENSRNOG00000013529	0.000123549
Stmn4	ENSRNOG00000053334	0.040697161
Supt16h	ENSRNOG00000011953	0.023264524
Supt5h	ENSRNOG00000032034	0.007035479
Supt6h	ENSRNOG00000012240	0.044120129
Tafa3	ENSRNOG00000030253	0.004619383
Taok3	ENSRNOG00000001138	0.006388206
Tbc1d22b	ENSRNOG00000059458	0.04746649
Tbc1d9b	ENSRNOG00000003050	0.036568445
Tbl3	ENSRNOG00000013429	0.026458897
Tcirg1	ENSRNOG00000017220	0.029424788
Tctex1d4	ENSRNOG00000018463	1.03E-05
Tgfb1i1	ENSRNOG00000019965	0.043434288
Tgfb1	ENSRNOG00000012216	0.038476454
Themis2	ENSRNOG00000012965	0.036148804
Thrap3	ENSRNOG00000009977	0.036606099
Tmem151b	ENSRNOG00000019958	0.003127476
Tnfaip3	ENSRNOG00000049517	0.036148804
Tnfrsf13c	ENSRNOG00000007664	5.07E-07
Tnnc2	ENSRNOG00000015155	0.009042427
Tnr	ENSRNOG00000002468	0.000752772
Tnrc6a	ENSRNOG00000024737	0.014361281
Tnrc6c	ENSRNOG00000022395	0.038387457
Tpm3	ENSRNOG00000017441	0.00691219
Traf1	ENSRNOG00000048914	0.011830317
Traf3	ENSRNOG00000008145	0.000791248
Trak1	ENSRNOG00000019262	0.004781989
Trim28	ENSRNOG00000027487	0.03172137
Trim3	ENSRNOG00000018356	0.00754259
Trim30c	ENSRNOG00000031202	0.021496881
Trpm2	ENSRNOG0000001216	7.97E-08
Tspyl2	ENSRNOG00000061782	0.000346116
Tuba1a	ENSRNOG00000060728	0.014442937
Tulp2	ENSRNOG00000020927	5.45E-05
Tyw1	ENSRNOG00000024352	0.043056238
U4	ENSRNOG00000053866	0.010005643
U4	ENSRNOG00000057388	0.000324183
U6	ENSRNOG00000060163	0.002018189
Ubc	ENSRNOG00000057823	0.003640839
Ube2r2	ENSRNOG00000010727	0.043878669
Ubn2	ENSRNOG00000005564	0.004033706
Ubr4	ENSRNOG00000018183	0.008334223
Ubxn4	ENSRNOG00000003625	0.049924635
Unc13d	ENSRNOG00000007439	0.037134239
Upf1	ENSRNOG00000020134	0.0052238
Upf2	ENSRNOG00000023593	0.008422182
Uri1	ENSRNOG00000014463	0.005972203
Usf2	ENSRNOG00000053725	0.036686769

Usp36	ENSRNOG00000028255	0.006693567
Wnk1	ENSRNOG00000009956	0.043878669
Wnt4	ENSRNOG00000013166	0.012625652
Wscd2	ENSRNOG00000053045	0.027561104
Xylb	ENSRNOG00000014168	0.012107559
Ylpm1	ENSRNOG00000027317	0.026027956
Zbp1	ENSRNOG00000006314	0.03227946
Zc3h12a	ENSRNOG00000009131	0.018498154
Zc3h13	ENSRNOG00000011237	0.001523821
Zc3h18	ENSRNOG00000028501	0.011374476
Zdhhc14	ENSRNOG00000029049	0.020466572
Zeb1	ENSRNOG00000017863	0.033221858
Zfand2a	ENSRNOG00000032917	0.001760505
Zfand5	ENSRNOG00000018107	0.012174349
Zfhx3	ENSRNOG00000014452	1.63E-06
Zfp395	ENSRNOG00000014191	0.036148804
Zfp653	ENSRNOG00000014065	0.042526584
Zfp827	ENSRNOG00000011697	0.00168111
Zfp871	ENSRNOG00000004947	0.00252638
Znrf1	ENSRNOG00000019028	0.043133622

Supplemental Table 4: Male cervical spinal cord compared to brainstem microglia downregulated genes

Gene name	Gene stable ID	FDR
A2m	ENSRNOG00000028896	0.000225085
AABR07002627.1	ENSRNOG00000060587	0.001469375
AABR07007032.1	ENSRNOG00000046333	0.019971183
AABR07015165.1	ENSRNOG00000057821	0.028599185
AABR07019403.1	ENSRNOG00000058057	0.047008064
AABR07021759.1	ENSRNOG00000023269	0.000465456
AABR07030823.1	ENSRNOG00000046001	4.15E-05
AABR07031193.1	ENSRNOG00000011300	1.09E-08
AABR07031491.2	ENSRNOG00000049681	0.027407483
AABR07042821.1	ENSRNOG00000054489	0.030703333
AABR07044388.2	ENSRNOG00000033581	0.005184604
AABR07049085.1	ENSRNOG00000006956	2.85E-08
AABR07049499.1	ENSRNOG00000030938	2.28E-06
AABR07050646.1	ENSRNOG00000053592	0.000248893
AABR07058699.2	ENSRNOG00000060211	7.49E-07
AABR07058914.1	ENSRNOG00000032026	0.012553017
AABR07060872.1	ENSRNOG00000049829	0.004753784
AABR07070043.1	ENSRNOG00000050630	0.044627412
AABR07070307.1	ENSRNOG00000053753	0.002223573
AABR07073038.1	ENSRNOG00000017708	0.003790531
AABR07073181.1	ENSRNOG00000021437	0.000304912
Abat	ENSRNOG00000002636	5.10E-06
Abca4	ENSRNOG00000012892	9.31E-07
Abcc4	ENSRNOG00000010064	0.018705253
Abhd2	ENSRNOG00000017120	0.010347412
Abhd3	ENSRNOG00000029370	0.040663198
Abhd4	ENSRNOG00000009244	0.012564121
AC108574.1	ENSRNOG00000057903	0.009863034
AC120486.10	ENSRNOG00000059066	0.004461862
AC141489.1	ENSRNOG00000033916	0.036568445

Ace	ENSRNOG00000062101	1.16E-10
Ackr3	ENSRNOG00000019622	8.78E-06
Acsl6	ENSRNOG00000026745	0.00013423
Acsm5	ENSRNOG00000031211	0.000210854
Acss3	ENSRNOG00000004448	0.001250758
Acta2	ENSRNOG00000058039	1.57E-05
Actl6a	ENSRNOG00000011553	0.006682206
Adamts1	ENSRNOG00000001607	2.21E-05
Adamts15	ENSRNOG00000009892	0.005534502
Adgra3	ENSRNOG00000004279	0.005175964
Afap1l2	ENSRNOG00000017164	0.021390433
Aff2	ENSRNOG00000052572	8.53E-05
Ahcy12	ENSRNOG00000039300	0.035631978
Aifm3	ENSRNOG00000037957	0.004735295
Ajuba	ENSRNOG00000012791	0.02199411
Aldh5a1	ENSRNOG00000023538	0.049488235
Alg10	ENSRNOG00000014511	0.041765657
Alg14	ENSRNOG00000011528	0.021390433
Alox5	ENSRNOG00000012972	0.000692804
Alox5ap	ENSRNOG00000000907	0.004286292
Amotl1	ENSRNOG00000008990	0.042746
Ano1	ENSRNOG00000020865	0.004311546
Ano6	ENSRNOG00000006995	0.000682591
Anpep	ENSRNOG00000014610	0.041765657
Antxr1	ENSRNOG00000008678	1.10E-05
Apmap	ENSRNOG00000006795	0.029424788
Aqp1	ENSRNOG00000011648	1.42E-07
Arhgap1	ENSRNOG00000016610	0.003270226
Arhgap44	ENSRNOG00000003603	0.002081673
Arhgef17	ENSRNOG00000053502	1.39E-05
Arhgef5	ENSRNOG00000005506	0.044627412
Arl6	ENSRNOG00000001689	0.033668427
Arl6ip1	ENSRNOG00000017751	0.014510505
Armcx2	ENSRNOG00000025705	0.010676612
Armcx4	ENSRNOG00000043128	0.001598127
Asah1	ENSRNOG00000010034	1.98E-06
Astn1	ENSRNOG00000005667	0.019450861
Atp11c	ENSRNOG00000003472	0.005154877
Atp1a2	ENSRNOG00000007290	0.010415605
Atp1b2	ENSRNOG00000011227	1.16E-05
Atp2b2	ENSRNOG00000030269	3.90E-06
Atp2b3	ENSRNOG00000061304	9.06E-08
Atp5md	ENSRNOG00000042869	0.01610696
Atp6v0b	ENSRNOG00000019655	0.004774061
Atp6v1a	ENSRNOG00000001992	0.001719086
Avl9	ENSRNOG00000013314	0.009575209
AY172581.2	ENSRNOG00000029145	0.000856995
Baiap2l1	ENSRNOG00000001007	0.035482074
Bcam	ENSRNOG00000029399	0.004033706
Bcar1	ENSRNOG00000019253	0.000346616
Bcl10	ENSRNOG00000042389	0.003864549
Bloc1s4	ENSRNOG00000054224	0.018877893
Bmp6	ENSRNOG00000013717	0.000706333

Bmp7	ENSRNOG00000053384	2.84E-06
Bpnt1	ENSRNOG00000002378	0.014878315
Brs3	ENSRNOG00000000873	0.035959608
Btbd10	ENSRNOG00000014341	0.030212469
C1qtnf3	ENSRNOG00000018570	5.07E-07
C1qtnf5	ENSRNOG00000007613	0.003869218
C5ar1	ENSRNOG00000047800	0.003126645
C5ar2	ENSRNOG00000049028	0.02859194
C7	ENSRNOG00000061379	0.047565186
Ca12	ENSRNOG00000017766	9.19E-10
Ca13	ENSRNOG00000021323	8.28E-05
Ca14	ENSRNOG00000023162	0.007788346
Cachd1	ENSRNOG00000010514	0.046614113
Cacna1h	ENSRNOG00000033893	0.018120925
Cacnb4	ENSRNOG00000007666	0.000857428
Cald1	ENSRNOG00000010233	1.80E-07
Calhm2	ENSRNOG00000020325	0.002454965
Calml4	ENSRNOG00000038202	0.000202964
Capn13	ENSRNOG00000032375	0.004618657
Car2	ENSRNOG00000009629	1.43E-07
Casc4	ENSRNOG00000016357	5.99E-05
Cat	ENSRNOG00000008364	1.95E-09
Cav1	ENSRNOG00000056836	0.024469939
Cavin1	ENSRNOG00000019778	0.01149078
Cavin2	ENSRNOG00000025895	0.007077806
Cavin3	ENSRNOG00000017914	0.027600062
Ccdc114	ENSRNOG00000021109	0.000718127
Ccdc141	ENSRNOG00000012580	0.000791248
Ccdc39	ENSRNOG00000011440	0.020122336
Ccdc40	ENSRNOG00000059401	0.000361085
Ccn1	ENSRNOG00000014350	0.005820481
Ccnd3	ENSRNOG00000050258	0.026027956
Ccpg1os	ENSRNOG00000052869	0.006380044
Cd164	ENSRNOG00000000304	0.017547759
Cd47	ENSRNOG00000001964	0.00126234
Cd48	ENSRNOG00000004737	0.001010191
Cd53	ENSRNOG00000017874	7.06E-05
Cd59	ENSRNOG00000042821	0.000353415
Cd93	ENSRNOG00000024799	0.001543107
Cd99l2	ENSRNOG00000023841	0.009860356
Cdh1	ENSRNOG00000020151	0.042173698
Cdh2	ENSRNOG00000015602	0.038358439
Cdh3	ENSRNOG00000020129	8.90E-10
Cdh5	ENSRNOG00000013324	0.000102053
Cdkn1c	ENSRNOG00000059500	0.000856622
Cdr2	ENSRNOG00000017260	0.012700597
Cebpd	ENSRNOG00000050869	0.032859663
Cep170b	ENSRNOG00000033688	0.040992338
Cers2	ENSRNOG00000021138	2.15E-05
Cfap126	ENSRNOG00000034221	0.002025171
Cfap300	ENSRNOG00000043410	2.06E-07
Cfap43	ENSRNOG00000036585	0.005744648
Cfap52	ENSRNOG00000037718	0.000114305

Cfap65	ENSRNOG00000056996	0.003270226
Cfap69	ENSRNOG00000006114	0.005608195
Cfp	ENSRNOG00000025811	0.0116448
Cggbp1	ENSRNOG00000000718	0.023264524
Cgn	ENSRNOG00000020952	0.007410001
Cgnl1	ENSRNOG00000054080	1.10E-06
Chst14	ENSRNOG00000045997	0.000353415
Cib1	ENSRNOG00000033498	0.035344997
Cklf	ENSRNOG00000012752	0.015364066
Clcn4	ENSRNOG00000003533	0.018566455
Clcn5	ENSRNOG00000002862	0.045748134
Cldn1	ENSRNOG00000001926	2.42E-05
Cldn19	ENSRNOG00000007922	1.10E-06
Cldn2	ENSRNOG00000054495	1.55E-08
Clec14a	ENSRNOG00000022697	0.024304383
Clec18a	ENSRNOG00000022721	6.73E-06
Clec2g	ENSRNOG00000059538	0.000135919
Clec9a	ENSRNOG00000051690	0.000866924
Clic6	ENSRNOG00000026870	1.16E-10
Clint1	ENSRNOG00000005406	0.005941131
Clmn	ENSRNOG00000011044	0.02959671
Clnk	ENSRNOG00000051169	0.005245932
Clu	ENSRNOG00000016460	1.98E-06
Cmtm4	ENSRNOG00000011009	0.011795308
Cndp1	ENSRNOG00000027739	0.048496597
Cnn1	ENSRNOG00000027736	0.005993307
Cnn3	ENSRNOG00000011559	3.67E-05
Cnpy2	ENSRNOG00000003549	0.010492877
Cntn1	ENSRNOG00000004438	3.90E-09
Cobll1	ENSRNOG00000027016	0.020690048
Col27a1	ENSRNOG00000007657	0.009024806
Col4a5	ENSRNOG00000018951	0.00032701
Col4a6	ENSRNOG00000056772	0.024103318
Col8a1	ENSRNOG00000039668	4.39E-05
Col8a2	ENSRNOG00000010841	4.62E-06
Col9a3	ENSRNOG00000009531	0.002517628
Coro2b	ENSRNOG00000015257	0.012273595
Cox7c	ENSRNOG00000030237	6.30E-06
Cox8a	ENSRNOG00000021177	0.01442015
Cpd	ENSRNOG00000003873	0.007493775
Cpe	ENSRNOG00000043387	0.000234859
Cpeb2	ENSRNOG00000005043	0.001573328
Cpne2	ENSRNOG00000043286	0.0048559
Cpne3	ENSRNOG00000006298	0.037215835
Cpsf6	ENSRNOG00000005927	0.02199411
Crb2	ENSRNOG00000025498	0.013048539
Crb3	ENSRNOG00000047322	0.026982497
Creg1	ENSRNOG00000003291	0.045072278
Crip2	ENSRNOG00000005041	0.016134116
Crispld2	ENSRNOG00000016752	0.027600062
Crk	ENSRNOG00000025792	0.036500886
Crppa	ENSRNOG00000006199	0.000268762
Crtac1	ENSRNOG00000015220	0.015763123

Ctdsp2	ENSRNOG00000047598	0.028218418
Ctnb2	ENSRNOG00000061845	0.025223896
Cx3cr1	ENSRNOG00000018509	0.017547759
Cxcl9	ENSRNOG00000022242	0.046303287
Cyb561	ENSRNOG00000007433	2.77E-08
Cyb5a	ENSRNOG00000015205	0.006628576
Cyfip2	ENSRNOG00000006557	0.008042834
Cysl1r1	ENSRNOG00000037845	0.006053965
Cyth3	ENSRNOG00000001065	0.045755528
Dab2ip	ENSRNOG00000055226	0.000992088
Dad1	ENSRNOG00000009090	0.041966674
Dag1	ENSRNOG00000019400	0.00122442
Dapk1	ENSRNOG00000018198	0.038358439
Dclk1	ENSRNOG00000032922	0.000574828
Ddah1	ENSRNOG00000014613	0.000265879
Degs1	ENSRNOG00000003223	5.22E-06
Dennd4c	ENSRNOG00000008036	0.012978729
Des	ENSRNOG00000019810	0.005444324
Dhrs9	ENSRNOG00000058568	0.037215835
Dkk3	ENSRNOG00000016343	0.002025058
Dlgap1	ENSRNOG00000016196	1.37E-06
Dmd	ENSRNOG00000046366	0.005181696
Dmpk	ENSRNOG00000015085	0.00365262
Dmtn	ENSRNOG00000012273	2.66E-05
Dmxl2	ENSRNOG00000009170	0.008614705
Dnah11	ENSRNOG00000005451	8.45E-06
Dnah12	ENSRNOG00000059865	0.000513732
Dnah9	ENSRNOG00000004171	0.006034746
Dnal4	ENSRNOG00000015583	0.046122073
Dnase1l3	ENSRNOG00000009291	0.002018189
Dock5	ENSRNOG00000024703	0.03303549
Dock9	ENSRNOG00000011969	0.023264524
Dpm3	ENSRNOG00000029077	0.038346371
Dpy19l3	ENSRNOG00000021573	0.003869218
Drc1	ENSRNOG00000024905	6.23E-05
Dsg2	ENSRNOG00000016526	0.009194509
Dsp	ENSRNOG00000013928	0.028289417
Dtna	ENSRNOG00000016671	0.001427807
Dusp14	ENSRNOG00000030091	0.006372923
Dzip1	ENSRNOG00000010311	0.037856832
Dzip1l	ENSRNOG00000014746	0.003463202
Ece1	ENSRNOG00000014241	0.048304193
Ecr4	ENSRNOG00000023576	0.016509137
Edem1	ENSRNOG00000055365	0.002976459
Ednra	ENSRNOG00000012721	0.003437186
Efcab1	ENSRNOG00000050091	1.57E-05
Efhc1	ENSRNOG00000042729	0.000116434
Efs	ENSRNOG00000042029	0.003158595
Elovl7	ENSRNOG00000010450	0.003864549
Emc3	ENSRNOG00000009934	0.047716615
Enah	ENSRNOG00000031934	0.000595571
Enkur	ENSRNOG00000018631	0.005700533
Enpp2	ENSRNOG00000004089	4.96E-08

Epas1	ENSRNOG00000021318	0.00632513
Epb4112	ENSRNOG00000012346	0.015364066
Ephb4	ENSRNOG00000045952	0.025456414
Ephx1	ENSRNOG00000003515	2.42E-06
Epm2aip1	ENSRNOG00000043006	0.035482074
Epn3	ENSRNOG00000003284	0.000169834
Eps8l2	ENSRNOG00000018336	6.83E-06
Etl4	ENSRNOG00000008666	0.010084
Evi2b	ENSRNOG00000014125	0.004802546
Exd2	ENSRNOG00000027707	0.006628782
F2r	ENSRNOG00000048043	0.033671026
F3	ENSRNOG00000011800	0.038712468
F5	ENSRNOG00000057855	5.49E-07
Faah	ENSRNOG00000045949	0.001704285
Fads1	ENSRNOG00000020480	0.001885537
Fam107a	ENSRNOG00000033261	0.000130974
Fam160a1	ENSRNOG00000048256	7.73E-06
Fam160b1	ENSRNOG00000017225	0.033597049
Fam167a	ENSRNOG00000011316	0.047427222
Fam168a	ENSRNOG00000018873	0.034247165
Fam171b	ENSRNOG00000004783	0.00931976
Fam81a	ENSRNOG00000057501	5.08E-05
Fam8a1	ENSRNOG00000026120	0.012801753
Fbxo8	ENSRNOG00000010502	0.040188692
Fcgrt	ENSRNOG00000020583	0.017049237
Fermt2	ENSRNOG00000009102	0.005451788
Fgf1	ENSRNOG00000013867	0.000283166
Fgfr2	ENSRNOG00000016374	0.00012403
Fgfr3	ENSRNOG00000016818	0.036094133
Fhad1	ENSRNOG00000028064	0.028781765
Fkbp9	ENSRNOG00000005478	0.001573328
Flnb	ENSRNOG00000009470	0.022710231
Flrt2	ENSRNOG00000003732	0.000346116
Flt3	ENSRNOG00000054764	2.70E-07
Fmod	ENSRNOG00000003183	3.55E-06
Folr1	ENSRNOG00000019902	3.52E-07
Foxs1	ENSRNOG00000008529	0.028218418
Frem1	ENSRNOG00000022309	1.02E-07
Frrmpd4	ENSRNOG00000004118	2.63E-08
Fstl1	ENSRNOG00000002746	0.00842468
Fxyd1	ENSRNOG00000021079	0.000590976
Fzd4	ENSRNOG00000016848	0.036281884
Fzd6	ENSRNOG00000004660	0.035176405
G6pc3	ENSRNOG00000020902	0.03560847
Gabpa	ENSRNOG00000053205	0.003864549
Gal3st4	ENSRNOG00000001375	0.017493394
Gas6	ENSRNOG00000018233	0.005451788
Gcsam	ENSRNOG00000022110	0.003016062
Gdf11	ENSRNOG00000007610	0.02079051
Gja4	ENSRNOG00000014357	0.046692422
Gjc1	ENSRNOG00000048838	0.030405614
Glb1l	ENSRNOG00000019243	0.048941609
Glis3	ENSRNOG00000014768	0.040663198

Gosr1	ENSRNOG00000003971	0.008820516
Gpc4	ENSRNOG00000002413	2.87E-05
Gpm6a	ENSRNOG00000010731	7.06E-05
Gpr155	ENSRNOG00000018485	0.000113238
Gpr160	ENSRNOG00000009487	0.000123549
Gprc5c	ENSRNOG00000003144	0.022054117
Grem1	ENSRNOG00000026053	0.029481099
Gsta1	ENSRNOG00000013484	0.000832746
Gsta4	ENSRNOG00000030449	0.043434288
Gucy1a1	ENSRNOG00000012302	0.015798165
Gucy1b1	ENSRNOG00000012060	0.006628782
Gulp1	ENSRNOG00000003242	0.000791248
Havcr1	ENSRNOG00000007243	0.012908565
Heg1	ENSRNOG00000001793	0.018755606
Hey2	ENSRNOG00000013364	0.00233699
Higd2a	ENSRNOG00000017372	0.002332142
Hmgcs2	ENSRNOG00000019120	0.01295361
Hspa12a	ENSRNOG00000018019	0.038346371
Hspa4l	ENSRNOG00000010819	0.003684942
Hspb8	ENSRNOG00000022392	0.001204331
Htr2c	ENSRNOG00000030877	1.06E-09
Hyal1	ENSRNOG00000015858	0.000123366
Hyal2	ENSRNOG00000031420	0.021443023
Hydin	ENSRNOG00000017178	4.88E-05
Ica1	ENSRNOG00000008628	0.018513337
Id3	ENSRNOG00000026124	0.046356365
Id4	ENSRNOG00000016099	0.00938609
Ids	ENSRNOG00000001465	0.039706906
Ifitm1	ENSRNOG00000004273	0.000489648
Ifitm2	ENSRNOG00000014936	0.005534502
Ifitm3	ENSRNOG00000015078	0.038602581
Igf1	ENSRNOG00000004517	6.59E-06
Igf2	ENSRNOG00000020369	9.14E-08
Igf2r	ENSRNOG00000014997	0.000293172
Igfbp2	ENSRNOG00000016957	9.06E-08
Igfbp4	ENSRNOG00000010635	0.036970927
Igfbp7	ENSRNOG00000002050	6.15E-07
Igfbp11	ENSRNOG00000011320	5.42E-05
Igsf1	ENSRNOG00000007600	1.42E-07
Impa1	ENSRNOG00000010482	0.038476454
Inf2	ENSRNOG00000028650	0.032181127
Inpp4b	ENSRNOG00000018382	0.029810722
Iqca	ENSRNOG00000019592	6.46E-05
Iqub	ENSRNOG00000021729	0.011958801
Itfg1	ENSRNOG00000015843	0.0124836
Itga3	ENSRNOG00000004276	0.004763184
Itga7	ENSRNOG00000007905	0.000187503
Itgb6	ENSRNOG00000008346	1.66E-08
Itgb8	ENSRNOG00000006569	0.000239017
Itm2c	ENSRNOG00000017359	0.021173368
Jam3	ENSRNOG00000009149	0.012032833
Jchain	ENSRNOG00000003666	0.02859194
Kcne2	ENSRNOG00000029811	2.38E-07

Kcnj13	ENSRNOG00000016057	4.39E-05
Kcnj15	ENSRNOG00000001656	0.023147564
Kcnk1	ENSRNOG000000019937	3.44E-05
Kcnk13	ENSRNOG000000047363	0.005902522
Kcnq1	ENSRNOG000000020532	4.51E-06
Kdelr2	ENSRNOG000000001083	7.82E-06
Kdm6a	ENSRNOG000000052721	0.006943739
Kif1a	ENSRNOG000000023993	0.021135581
Kif27	ENSRNOG000000019257	0.049881238
Kirrel1	ENSRNOG000000016408	6.71E-06
Kit	ENSRNOG000000002227	0.000220368
Kl	ENSRNOG000000001092	5.77E-11
Klf12	ENSRNOG000000009145	0.004920187
Klhdc7a	ENSRNOG000000018867	4.20E-06
Klhl23	ENSRNOG000000007981	0.029027249
Klhl9	ENSRNOG000000006335	0.038358439
Klrc2	ENSRNOG000000052467	0.001051359
Krt18	ENSRNOG000000047393	8.49E-07
Krt8	ENSRNOG000000009779	0.001010191
Lama1	ENSRNOG000000017237	0.049102996
Lama2	ENSRNOG000000011134	0.001283899
Lama5	ENSRNOG000000053691	2.87E-06
Lamb2	ENSRNOG000000047768	0.001523821
Large1	ENSRNOG000000013742	0.035485352
Lats2	ENSRNOG000000056343	0.002821696
Ldb3	ENSRNOG000000059166	0.024304383
Lfng	ENSRNOG000000001250	0.000560639
Lgalsl	ENSRNOG000000005464	0.007327136
Lhfpl2	ENSRNOG000000011032	0.042297688
Lims1	ENSRNOG000000037765	0.000495852
Litaf	ENSRNOG000000002520	0.035175098
Lman1	ENSRNOG000000024470	0.034930462
Lmbrd2	ENSRNOG000000054751	0.005212183
Lmtk2	ENSRNOG000000025155	0.038787032
Lmx1a	ENSRNOG000000004642	8.58E-08
LOC100360413	ENSRNOG000000051885	0.000213552
LOC100362432	ENSRNOG000000019811	0.02864876
LOC100911248	ENSRNOG000000001868	0.004353804
LOC100912181	ENSRNOG000000051251	0.042526584
LOC103694328	ENSRNOG000000038766	0.042815811
LOC108348144	ENSRNOG000000052226	0.045638438
LOC108351584	ENSRNOG000000037087	0.006410297
LOC686087	ENSRNOG000000058316	0.038008869
Lox	ENSRNOG000000014426	0.003923054
Lox1	ENSRNOG000000008680	0.000246274
Lpl	ENSRNOG000000012181	0.000193574
Lrp8	ENSRNOG000000013064	0.000125351
Lrrc32	ENSRNOG000000015310	0.037673403
Lrrc58	ENSRNOG000000027151	0.002234057
Lrrc8c	ENSRNOG000000002122	0.021390433
Lrrk2	ENSRNOG000000004048	5.64E-05
Lrrn2	ENSRNOG000000009691	0.008583202
Lrrn4cl	ENSRNOG000000026302	0.041679885

Ltbp1	ENSRNOG00000033090	0.002156488
Ltbp4	ENSRNOG00000020871	0.023726133
Ltc4s	ENSRNOG00000003244	0.011509503
Lyz2	ENSRNOG00000005825	0.005897759
Mab21l4	ENSRNOG00000023557	4.05E-07
Maged1	ENSRNOG00000006756	0.007783568
Mak	ENSRNOG00000015101	0.015707666
Manea	ENSRNOG00000008626	0.018877893
Maoa	ENSRNOG00000002848	0.035823297
Map2	ENSRNOG00000011841	0.040663198
Map3k7cl	ENSRNOG00000001584	0.013106018
Mapk4	ENSRNOG00000015401	1.95E-09
Marchf6	ENSRNOG00000011066	0.005993307
Matn2	ENSRNOG00000006060	2.73E-06
Mboat2	ENSRNOG000000061050	0.000176649
Mcam	ENSRNOG00000007726	0.001665175
Mdk	ENSRNOG00000017560	7.97E-08
Me1	ENSRNOG00000009715	0.041966674
Megf9	ENSRNOG00000005932	0.02672954
Mest	ENSRNOG00000048088	0.000319973
Mettl7a	ENSRNOG00000001376	0.040667328
Mfrp	ENSRNOG000000039107	1.16E-10
Mgat3	ENSRNOG00000017434	0.000687388
Mgat4a	ENSRNOG00000018276	0.041332237
Mgp	ENSRNOG00000005695	0.000815303
Micu1	ENSRNOG000000043436	0.049526766
Mill1	ENSRNOG00000017699	0.00220387
Mmadhc	ENSRNOG00000004740	0.009673692
Mme	ENSRNOG00000009514	9.19E-10
Mmp14	ENSRNOG00000010947	0.000776522
Mmp15	ENSRNOG00000012622	0.023119526
Mmut	ENSRNOG000000050843	0.038787032
Mns1	ENSRNOG000000057867	0.021471294
Mospd1	ENSRNOG00000002332	0.04165921
Mospd2	ENSRNOG00000003350	0.001201999
Mospd3	ENSRNOG00000001396	0.038909961
Mpdz	ENSRNOG00000007894	0.027494767
Mplkip	ENSRNOG00000013806	0.028195414
Mrpl20	ENSRNOG00000018647	0.016550343
Mrpl33	ENSRNOG000000025388	0.019450861
Msi1	ENSRNOG00000001156	0.001068641
Msx1	ENSRNOG00000006876	1.17E-08
Mt-atp6	ENSRNOG000000031979	0.002336155
Mt-co1	ENSRNOG000000034234	0.000346116
Mt-cyb	ENSRNOG000000031766	9.73E-08
Mt-nd1	ENSRNOG000000030644	1.17E-05
Mt-nd2	ENSRNOG000000031033	9.19E-10
Mt-nd4	ENSRNOG000000029707	4.39E-05
Mt-nd4l	ENSRNOG000000031053	1.53E-06
Mt-nd5	ENSRNOG000000029971	7.38E-14
Mt-nd6	ENSRNOG000000029042	2.42E-05
Mtss2	ENSRNOG00000017500	0.021508092
Mustn1	ENSRNOG00000017369	0.014087556

Mxra7	ENSRNOG00000042915	0.007994967
Mxra8	ENSRNOG00000019244	0.007667229
Mycl	ENSRNOG00000014259	0.002573386
Myh11	ENSRNOG00000057880	0.00121794
Myl12a	ENSRNOG00000015278	0.004061784
MyI9	ENSRNOG00000020246	1.10E-06
Myo1d	ENSRNOG00000003276	0.017364052
Myo5b	ENSRNOG00000014104	6.90E-05
Myo5c	ENSRNOG00000008356	4.01E-07
Naaa	ENSRNOG00000002273	0.033843065
Nav2	ENSRNOG00000014530	3.45E-06
Nckap1	ENSRNOG00000007518	0.000164389
Ncoa4	ENSRNOG00000019768	0.011821597
Ncstn	ENSRNOG00000005355	0.001182217
Ndfip2	ENSRNOG00000024022	0.029222361
Ndrq2	ENSRNOG00000010389	0.003911247
Ndufb11	ENSRNOG00000008329	0.015092561
Nedd4	ENSRNOG00000058898	0.000345963
Nell2	ENSRNOG00000006235	0.043446258
Neurl1	ENSRNOG00000020339	1.55E-05
NEWGENE_1308171	ENSRNOG00000029792	0.000318096
NEWGENE_620180	ENSRNOG00000003872	0.007327136
Nfic	ENSRNOG00000004505	0.027296005
Ninj1	ENSRNOG00000016587	0.038071461
Nipa1	ENSRNOG00000042702	0.017642143
Nos1	ENSRNOG00000001130	0.001112363
Notch3	ENSRNOG00000004346	1.42E-07
Npas2	ENSRNOG00000013408	0.027310759
Npc1	ENSRNOG00000012016	0.002960929
Npnt	ENSRNOG00000052873	0.01776746
Npy1r	ENSRNOG00000014149	0.021390433
Nr2f2	ENSRNOG00000010308	0.037165999
Nrarp	ENSRNOG00000009354	0.026453547
Nsg2	ENSRNOG00000020644	2.36E-07
Nsun7	ENSRNOG00000025494	0.012601127
Nt5dc2	ENSRNOG00000018358	0.020461531
Ntn4	ENSRNOG00000005573	0.03116022
Ntnq1	ENSRNOG00000031136	8.67E-05
Ntrk2	ENSRNOG00000018839	1.52E-07
Obsl1	ENSRNOG00000015346	0.020195869
Olfml1	ENSRNOG00000056562	0.001010191
Olr59	ENSRNOG00000018606	8.69E-05
Osbpl5	ENSRNOG00000020713	0.031936369
P2rx6	ENSRNOG00000001873	0.01066299
P2ry13	ENSRNOG00000029756	6.86E-05
Paip2	ENSRNOG00000019934	0.021810911
Paqr5	ENSRNOG00000014164	0.001469375
Parm1	ENSRNOG00000002579	2.08E-06
Parva	ENSRNOG00000015713	1.70E-05
Pcmt2	ENSRNOG00000017404	0.000437271
Pcnx1	ENSRNOG00000007459	0.003922063
Pcp411	ENSRNOG00000003209	0.001370099
Pde3a	ENSRNOG00000025042	0.000554921

Pde4c	ENSRNOG00000019518	0.000517038
Pde5a	ENSRNOG00000014443	0.001009967
Pde6d	ENSRNOG00000018610	0.015500162
Pdgfd	ENSRNOG00000029148	0.001283899
Pdgfra	ENSRNOG00000002244	1.89E-06
Pdgfrb	ENSRNOG00000018461	0.02580072
Pdzd2	ENSRNOG00000013140	9.84E-05
Pdzd8	ENSRNOG00000009460	0.024572734
Pear1	ENSRNOG00000014243	0.001848174
Pex14	ENSRNOG00000013498	0.047181158
Pfn1	ENSRNOG00000003975	0.006053965
Phactr2	ENSRNOG00000015473	0.027755959
Phf5a	ENSRNOG00000024170	0.033567204
Phlda3	ENSRNOG00000009068	0.048238395
Phldb2	ENSRNOG00000002171	0.008594442
Pias3	ENSRNOG00000021218	0.001068641
Piezo2	ENSRNOG00000038784	0.028169537
Pigm	ENSRNOG00000007735	0.001736938
Pip5k1b	ENSRNOG00000015232	1.10E-06
Pitpnm2	ENSRNOG00000029260	0.003416214
Pitpnm3	ENSRNOG00000008323	0.002667995
Pla2g5	ENSRNOG00000016838	1.95E-09
Plce1	ENSRNOG00000014276	0.005148705
Plcl1	ENSRNOG00000032659	0.024584353
Pld3	ENSRNOG00000018390	0.001702771
Plekha7	ENSRNOG00000024602	0.0124836
Plekhb2	ENSRNOG00000014162	0.038790042
Plod2	ENSRNOG00000030183	0.00038391
Plpp3	ENSRNOG00000008116	0.000108765
Plxnb1	ENSRNOG00000029510	5.07E-07
Pnkd	ENSRNOG00000014806	0.002427115
Pnma8b	ENSRNOG00000016863	0.021506732
Podxl	ENSRNOG00000012495	0.023406496
Pomc	ENSRNOG00000012686	0.021762836
Ppfibp2	ENSRNOG00000019667	0.041009718
Pphln1	ENSRNOG00000022778	0.040161229
Ppm1f	ENSRNOG00000037909	0.042815811
Ppm1l	ENSRNOG00000046168	0.017137033
Ppp1r1a	ENSRNOG00000036827	0.00342555
Ppp1r1b	ENSRNOG00000028404	1.66E-06
Ppp2r1a	ENSRNOG00000011282	0.005417471
Ppt2	ENSRNOG00000000435	0.01880767
Prdm16	ENSRNOG00000045913	1.42E-07
Prdx3	ENSRNOG00000010958	0.010049995
Prelp	ENSRNOG00000003120	1.48E-07
Primpol	ENSRNOG00000022320	0.032817518
Prkaa2	ENSRNOG00000007706	1.55E-08
Prkd3	ENSRNOG00000005289	0.005370566
Prkx	ENSRNOG00000060168	0.020671297
Prlr	ENSRNOG00000057557	1.50E-08
Prpf8	ENSRNOG00000003495	0.013941937
Prr32	ENSRNOG00000049388	1.55E-07
Psenen	ENSRNOG00000020941	0.020168545

Pskh1	ENSRNOG00000019290	0.049881238
Psma2	ENSRNOG00000049920	0.021135581
Psemb2	ENSRNOG00000011463	0.000653319
Ptafr	ENSRNOG00000013231	0.02580072
Ptar1	ENSRNOG00000014891	0.000174559
Ptgfrn	ENSRNOG00000015655	0.007616789
Ptpn13	ENSRNOG00000002061	0.014442937
Ptprb	ENSRNOG00000055293	0.002427115
Ptprf	ENSRNOG00000019977	0.004847036
Ptprk	ENSRNOG00000047605	0.007083152
Pxdn	ENSRNOG00000060614	0.00365262
Pxn	ENSRNOG00000001149	0.037422767
Pxylp1	ENSRNOG00000012480	0.001073402
Rab11fip1	ENSRNOG00000058940	0.027880598
Rab11fip4	ENSRNOG00000014135	0.020065569
Rab1a	ENSRNOG00000004992	0.001899068
Rab5b	ENSRNOG00000006130	0.0001025
Raf1	ENSRNOG00000010153	0.003127476
Ralgapa1	ENSRNOG00000046256	0.032279601
Ralgapb	ENSRNOG00000014836	0.045755528
Rasd1	ENSRNOG00000003348	0.02209363
Rbm15b	ENSRNOG00000014161	0.032981759
Rbp1	ENSRNOG00000013794	0.005993307
Rbpms	ENSRNOG00000013328	0.042467423
Rbpms2	ENSRNOG00000015896	1.90E-05
Rdh14	ENSRNOG00000039551	0.005148705
Reck	ENSRNOG00000014863	9.60E-05
Reep3	ENSRNOG00000000645	0.001006806
Reln	ENSRNOG00000021441	2.47E-06
Rem1	ENSRNOG00000007567	0.01610696
Rfx2	ENSRNOG00000045846	0.041009718
RGD1308430	ENSRNOG00000029146	0.013715789
RGD1561149	ENSRNOG00000008113	0.000822312
RGD1561161	ENSRNOG00000039582	0.040161229
RGD1561916	ENSRNOG00000013320	0.002326538
RGD1562029	ENSRNOG00000022723	6.11E-06
RGD1564664	ENSRNOG00000055564	0.037026912
RGD1566359	ENSRNOG00000047934	0.004061784
Rgs19	ENSRNOG00000016547	0.038358439
Rgs5	ENSRNOG00000002730	0.001255979
Rhbdl3	ENSRNOG00000005515	0.011010224
Rhpn1	ENSRNOG00000007597	0.008754786
Rhpn2	ENSRNOG00000011885	0.007255847
Rnf139	ENSRNOG00000008987	0.021390433
Rnf152	ENSRNOG00000014859	0.000276345
Rnf181	ENSRNOG00000012035	0.038008869
Ro60	ENSRNOG00000003434	0.009420857
Rph3al	ENSRNOG00000061429	0.003432795
Rps27a	ENSRNOG00000034246	0.014442937
Rrad	ENSRNOG00000011901	0.004322957
Rraga	ENSRNOG00000007051	0.021978177
Rragd	ENSRNOG00000007331	0.038014819
Rsph10b	ENSRNOG00000001036	0.000656276

Rsph9	ENSRNOG00000019474	0.0377091
Rtn4rl1	ENSRNOG00000003121	0.00736926
Rxylt1	ENSRNOG00000004421	0.033355121
Rybp	ENSRNOG00000005353	0.013423317
S1pr3	ENSRNOG00000014524	0.011547415
Saraf	ENSRNOG00000012329	0.013556327
Sash3	ENSRNOG00000004409	0.032924817
Sbf2	ENSRNOG00000009812	0.015525278
Sbspon	ENSRNOG00000007258	0.009350464
Scai	ENSRNOG00000025278	0.001642947
Scamp2	ENSRNOG00000019136	0.00126234
Scara5	ENSRNOG00000014398	1.37E-06
Scgb1c1	ENSRNOG00000012847	0.000870496
Scrn1	ENSRNOG00000009636	0.001797606
Sdc2	ENSRNOG00000004936	0.028113823
Sdhaf4	ENSRNOG00000028087	0.010575202
Sdhc	ENSRNOG00000003163	0.008256108
Sec61b	ENSRNOG00000006345	0.00691219
Sema3f	ENSRNOG00000017704	0.003399021
Sema4b	ENSRNOG00000025167	0.033354176
Sema5a	ENSRNOG00000011977	0.00401846
Sema6a	ENSRNOG00000004033	0.009719029
Sf3b4	ENSRNOG00000021181	0.003578503
Sf3b6	ENSRNOG00000046172	0.027652739
Sfrp1	ENSRNOG00000017783	1.43E-07
Sfrp2	ENSRNOG00000009465	0.003038652
Sft2d1	ENSRNOG00000024140	0.003808445
Sh2b3	ENSRNOG00000028198	0.043928444
Sh3bp4	ENSRNOG00000019316	0.010257543
Sh3d19	ENSRNOG00000011752	0.021019179
Shisal1	ENSRNOG00000052725	0.001760505
Sinhcaf	ENSRNOG00000049943	0.044599899
Slamf7	ENSRNOG00000023209	0.000165168
Slc10a3	ENSRNOG00000060580	0.024992006
Slc10a7	ENSRNOG00000011991	0.016691695
Slc13a4	ENSRNOG00000011184	1.06E-09
Slc16a12	ENSRNOG00000021916	0.000293172
Slc16a2	ENSRNOG00000002832	7.89E-05
Slc19a2	ENSRNOG00000002839	0.038151341
Slc20a2	ENSRNOG00000019490	0.010193981
Slc22a17	ENSRNOG00000016414	0.002326538
Slc22a8	ENSRNOG00000018086	0.025661209
Slc24a4	ENSRNOG00000006729	4.01E-07
Slc26a10	ENSRNOG00000029465	0.023264524
Slc29a4	ENSRNOG00000001115	0.000164389
Slc2a12	ENSRNOG00000011161	0.000105533
Slc30a7	ENSRNOG00000013912	0.00312126
Slc31a1	ENSRNOG00000014475	0.010812289
Slc33a1	ENSRNOG00000010023	0.004204753
Slc35a2	ENSRNOG00000024801	0.014243968
Slc38a3	ENSRNOG00000016827	0.001902736
Slc43a3	ENSRNOG00000061768	0.000109005
Slc46a1	ENSRNOG00000010291	0.027001168

Slc4a10	ENSRNOG00000005307	2.99E-10
Slc4a2	ENSRNOG00000014347	0.03116022
Slc4a3	ENSRNOG00000020138	0.036148804
Slc4a5	ENSRNOG00000010378	5.11E-09
Slc5a5	ENSRNOG00000018822	0.000213552
Slc6a17	ENSRNOG00000050090	0.012801753
Slc7a4	ENSRNOG00000001874	0.008601453
Slc7a8	ENSRNOG00000014311	0.004631192
Slc9a3r1	ENSRNOG00000003232	0.003201742
Slco1a2	ENSRNOG000000031249	9.44E-09
Slco1c1	ENSRNOG00000009740	0.004057225
Slco3a1	ENSRNOG000000032798	0.000517038
Slit2	ENSRNOG00000003840	0.0207795
Slpi	ENSRNOG00000046699	1.40E-05
Smcr8	ENSRNOG00000005165	0.042746
Smo	ENSRNOG00000008332	0.012801753
Smpd4	ENSRNOG00000001875	0.023481317
Snrpd3	ENSRNOG00000050410	0.019418563
Socs2	ENSRNOG00000008965	0.001619408
Sod3	ENSRNOG00000003869	2.66E-09
Sorbs2	ENSRNOG00000013391	2.75E-07
Sostdc1	ENSRNOG00000005770	1.16E-10
Sox9	ENSRNOG00000002607	0.003864549
Spag8	ENSRNOG00000032539	0.006332703
Sparcl1	ENSRNOG00000015093	4.92E-05
Spart	ENSRNOG00000014155	0.017991924
Spcs1	ENSRNOG00000018075	0.030532843
Srgap3	ENSRNOG00000006509	0.044599899
St8sia4	ENSRNOG00000019128	0.02854689
Steap2	ENSRNOG00000006076	0.004461862
Stk39	ENSRNOG00000024808	2.87E-05
Ston1	ENSRNOG00000016688	0.022960134
Stpg1	ENSRNOG00000031448	0.026394705
Stra6	ENSRNOG00000008312	0.002208473
Strip2	ENSRNOG00000057729	0.03938702
Stt3a	ENSRNOG00000031896	0.00838597
Sulf1	ENSRNOG00000009037	0.002856973
Susd3	ENSRNOG00000016525	0.023264524
Syde1	ENSRNOG00000007307	0.020195869
Synj1	ENSRNOG00000002051	0.016393182
Synm	ENSRNOG00000014030	0.000260079
Synpo	ENSRNOG00000019181	0.026529239
Synpo2	ENSRNOG00000014867	0.021018528
Synpo2l	ENSRNOG00000008949	0.000199421
Sypl1	ENSRNOG00000009856	8.53E-06
Syt13	ENSRNOG00000008000	0.008684175
Tagln	ENSRNOG00000017628	4.90E-07
Tasor2	ENSRNOG00000018011	0.04751333
Tax1bp3	ENSRNOG00000019357	0.000899302
Tbp	ENSRNOG00000001489	0.036453358
Tc2n	ENSRNOG00000004754	4.01E-07
Tcaf1	ENSRNOG00000017911	0.02864876
Tcf12	ENSRNOG000000057754	0.044582982

Tead1	ENSRNOG00000015488	0.001649083
Tekt1	ENSRNOG00000014973	0.036932001
Tenm3	ENSRNOG00000012802	0.000151537
Tenm4	ENSRNOG00000011151	8.05E-05
Tex15	ENSRNOG00000007748	2.15E-09
Tfg	ENSRNOG00000001633	0.007077806
Tgibr3	ENSRNOG00000002093	3.97E-06
Thbs1	ENSRNOG00000045829	0.016393182
Thbs2	ENSRNOG00000010529	4.88E-05
Tifab	ENSRNOG00000011947	0.01442258
Timp3	ENSRNOG00000004303	1.97E-07
Tinagl1	ENSRNOG00000013179	3.24E-05
Tjp1	ENSRNOG00000011077	0.004215619
Tjp3	ENSRNOG00000020501	0.003660227
Tlr12	ENSRNOG00000042455	0.040886764
Tm4sf1	ENSRNOG00000015812	0.004353804
Tm9sf1	ENSRNOG00000019710	0.036502115
Tm9sf2	ENSRNOG00000012751	0.005993307
Tmed4	ENSRNOG00000005016	0.013106018
Tmed7	ENSRNOG00000003691	0.001547695
Tmem108	ENSRNOG00000010911	0.005148332
Tmem115	ENSRNOG00000021899	0.000283275
Tmem126a	ENSRNOG00000022748	0.046651947
Tmem179b	ENSRNOG00000019341	0.008051444
Tmem18	ENSRNOG00000005144	0.016185978
Tmem203	ENSRNOG00000010894	0.026530328
Tmem258b	ENSRNOG00000032740	0.034068045
Tmem37	ENSRNOG00000047714	0.028884356
Tmem38b	ENSRNOG00000028063	0.023147762
Tmem47	ENSRNOG00000030418	9.84E-05
Tmem59	ENSRNOG00000009778	0.028589642
Tmem64	ENSRNOG00000007426	0.003864549
Tmem72	ENSRNOG00000023340	3.73E-10
Tmem86a	ENSRNOG00000013663	0.000359176
Tmem9	ENSRNOG00000010204	0.01238817
Tmem98	ENSRNOG00000021316	0.029676888
Tmtc1	ENSRNOG00000001854	0.008385713
Tmtc4	ENSRNOG00000014310	0.041656813
Tmx3	ENSRNOG00000045740	0.021940181
Tnfrsf25	ENSRNOG00000021814	0.024466937
Tnpo1	ENSRNOG00000014999	0.00365262
Tns1	ENSRNOG00000014182	8.05E-05
Toe1	ENSRNOG00000017561	0.005192869
Tomm22	ENSRNOG00000014058	0.025459184
Tor1a	ENSRNOG00000006894	0.004263707
Tp53i11	ENSRNOG00000008738	0.002154934
Tp73	ENSRNOG00000024707	0.000656276
Tpm1	ENSRNOG00000018184	0.023264524
Tpm2	ENSRNOG00000016731	1.37E-06
Tpst1	ENSRNOG00000000900	0.049281193
Trarg1	ENSRNOG00000022239	0.000205776
Trim2	ENSRNOG00000010124	0.024199968
Trim35	ENSRNOG00000009449	0.020195869

Trpc3	ENSRNOG00000016070	0.007448317
Trpm3	ENSRNOG00000027770	1.22E-09
Trpv4	ENSRNOG00000001195	0.000299811
Tspan12	ENSRNOG00000059016	0.006389001
Tspan18	ENSRNOG00000008758	0.011923889
Tspan31	ENSRNOG00000025592	0.0368564
Tspan33	ENSRNOG00000007900	8.43E-05
Tspan6	ENSRNOG00000003786	0.028829278
Tspan7	ENSRNOG00000003229	4.41E-06
Ttc9	ENSRNOG00000007254	4.89E-06
Ttr	ENSRNOG00000016275	5.04E-09
Ttyh3	ENSRNOG00000055583	0.000149231
Tug1	ENSRNOG00000051135	0.046614113
Tusc3	ENSRNOG00000013061	0.008754786
Twsg1	ENSRNOG00000013340	2.14E-06
Txnip	ENSRNOG00000021201	0.006096317
Ugt1a6	ENSRNOG00000018740	0.045580031
Uhmk1	ENSRNOG00000002941	0.012308486
Usp13	ENSRNOG00000030639	0.020393147
Usp2	ENSRNOG00000006663	0.013342832
Vat1l	ENSRNOG00000011989	2.28E-08
Vav3	ENSRNOG00000020485	0.000143609
Vldlr	ENSRNOG00000027491	0.011355044
Vta1	ENSRNOG00000011540	0.03116022
Vwa3a	ENSRNOG00000025110	0.002025171
Vwa3b	ENSRNOG00000023566	0.001621348
Vwa5b1	ENSRNOG00000016553	0.002553716
Wasf2	ENSRNOG00000009805	0.005700533
Wdr63	ENSRNOG00000014893	2.30E-05
Wdr66	ENSRNOG00000001342	0.001519963
Wdr78	ENSRNOG00000006999	8.82E-05
Wfikkn2	ENSRNOG00000002831	1.16E-10
Wipf3	ENSRNOG00000009571	1.69E-07
Wls	ENSRNOG00000036816	0.000346116
Wnk2	ENSRNOG00000016684	0.00365262
Wwc1	ENSRNOG00000008065	1.98E-06
Xcr1	ENSRNOG00000006620	1.90E-05
Xiap	ENSRNOG00000006967	0.042467423
Yap1	ENSRNOG00000005933	0.001438165
Zbtb37	ENSRNOG00000026907	0.003864549
Zcchc18	ENSRNOG00000055939	0.047057862
Zdhhc21	ENSRNOG00000010484	0.006888503
Zfp263	ENSRNOG00000007678	0.044582982
Zfp366	ENSRNOG00000017249	0.01442258
Zfp462	ENSRNOG00000032048	0.030703333
Zfp518a	ENSRNOG00000036592	0.01295361
Zfp521	ENSRNOG00000016874	0.039805209
Zic1	ENSRNOG00000014644	0.000248564
Zic2	ENSRNOG00000054879	0.039329449
Zic3	ENSRNOG00000000861	0.02510937
Zic4	ENSRNOG00000014871	0.014050316
Zkscan1	ENSRNOG00000001335	0.028884356
Zkscan3	ENSRNOG00000055000	0.00654805

Supplemental Table 5: Female cervical spinal cord compared to brainstem microglia upregulated genes

Gene name	Gene stable ID	FDR
7SK	ENSRNOG00000058555	2.95E-05
AABR07000629.3	ENSRNOG00000050801	0.027305531
AABR07011951.1	ENSRNOG00000034093	0.011212584
AABR07012583.2	ENSRNOG00000059093	3.34E-05
AABR07018438.2	ENSRNOG00000055553	0.007647523
AABR07019086.1	ENSRNOG00000053968	0.017101769
AABR07025140.1	ENSRNOG00000059097	0.031539206
AABR07027902.1	ENSRNOG00000050847	0.034560165
AABR07028615.1	ENSRNOG00000018500	0.003758262
AABR07029856.1	ENSRNOG00000057490	0.000334187
AABR07029863.3	ENSRNOG00000058245	0.025888795
AABR07030085.3	ENSRNOG00000053589	0.007713753
AABR07035470.1	ENSRNOG00000024277	1.10E-06
AABR07035717.1	ENSRNOG00000060527	0.014500832
AABR07035839.1	ENSRNOG00000046171	7.32E-05
AABR07035955.1	ENSRNOG00000062144	0.008008433
AABR07036007.1	ENSRNOG00000053790	0.008158589
AABR07039356.2	ENSRNOG00000051257	0.002167186
AABR07039446.2	ENSRNOG00000061403	0.031714011
AABR07044001.2	ENSRNOG00000055320	3.04E-05
AABR07044412.1	ENSRNOG00000061483	0.004476866
AABR07044421.1	ENSRNOG00000061998	0.003206163
AABR07044454.1	ENSRNOG00000053516	0.048592645
AABR07044980.1	ENSRNOG00000061835	0.013659405
AABR07050161.1	ENSRNOG00000051842	0.009034214
AABR07053509.2	ENSRNOG00000059260	0.003943124
AABR07058158.1	ENSRNOG00000062170	0.002547955
AABR07059004.1	ENSRNOG00000051731	0.007779245
AABR07060341.3	ENSRNOG00000061613	0.049676692
AABR07060872.1	ENSRNOG00000049829	0.02983905
AABR07060920.1	ENSRNOG00000054587	0.00013298
AABR07064304.1	ENSRNOG00000046049	0.004671874
AABR07065078.1	ENSRNOG00000002874	0.015822155
AABR07065091.1	ENSRNOG00000057609	0.001428251
AABR07065124.1	ENSRNOG00000055422	0.003469587
AABR07065448.1	ENSRNOG00000060974	0.031208999
AABR07065593.1	ENSRNOG00000055908	0.018546116
AABR07066522.1	ENSRNOG00000049511	9.70E-06
AABR07067401.1	ENSRNOG00000046298	0.008676368
AABR07068127.1	ENSRNOG00000025970	0.010815135
AABR07071512.1	ENSRNOG00000055306	0.029854538
AABR07072449.1	ENSRNOG00000011809	0.031297113
Abca13	ENSRNOG00000025645	0.038777617
Abcc3	ENSRNOG00000002948	0.014345341
Abr	ENSRNOG00000056837	0.006357514
AC098008.3	ENSRNOG00000051318	0.032157723
AC111804.2	ENSRNOG00000062261	8.97E-11
AC114233.1	ENSRNOG00000051046	8.52E-10
AC115420.4	ENSRNOG00000060308	0.016959325

AC125873.1	ENSRNOG00000056094	2.99E-05
AC134224.1	ENSRNOG00000062127	0.00047841
AC134224.2	ENSRNOG00000062155	0.001861825
AC134224.3	ENSRNOG00000062158	7.01E-05
AC135826.1	ENSRNOG00000033693	0.006904283
AC139608.2	ENSRNOG00000054905	0.016377596
Acap1	ENSRNOG00000015674	0.040669177
Acap3	ENSRNOG00000022307	0.028264135
Acin1	ENSRNOG00000013533	0.010591317
Acp4	ENSRNOG00000021659	0.045765441
Actg1	ENSRNOG00000036701	0.005528629
Adam11	ENSRNOG0000002753	0.01714879
Adamts10	ENSRNOG00000008857	0.000593331
Adap1	ENSRNOG00000054033	0.030381785
Adap2	ENSRNOG00000037148	0.011392149
Adcy4	ENSRNOG00000020401	0.018688204
Adcy7	ENSRNOG00000014776	0.004761052
Adgrg5	ENSRNOG00000039891	8.83E-09
Adm	ENSRNOG00000027030	0.041720197
Agap2	ENSRNOG00000025584	0.005458882
Ago1	ENSRNOG00000055915	0.016064624
Agtppb1	ENSRNOG00000018651	0.046232526
Ahsa2	ENSRNOG00000052142	0.02782658
Akap13	ENSRNOG00000010964	0.010114698
Akap6	ENSRNOG00000004841	0.002883417
Akap8	ENSRNOG00000006559	0.005190714
Akap8l	ENSRNOG00000006355	0.001219771
Alpk3	ENSRNOG00000011659	2.47E-10
Ankrd11	ENSRNOG00000027906	0.037414816
Ap4m1	ENSRNOG00000001353	0.001922559
Apbb3	ENSRNOG00000017849	0.008649957
Arap1	ENSRNOG00000019555	0.026992025
Arap3	ENSRNOG00000055527	0.00438202
Arglu1	ENSRNOG00000024142	0.049529859
Arhgap27	ENSRNOG00000028569	0.022276606
Arhgap39	ENSRNOG00000016566	0.031354885
Arhgap4	ENSRNOG00000058545	0.014275013
Arhgef1	ENSRNOG00000020130	0.015315154
Arhgef40	ENSRNOG00000052354	0.007507792
Arid3a	ENSRNOG00000026435	0.034721085
Arl5b	ENSRNOG00000018714	0.013394927
Arrdc2	ENSRNOG00000019009	0.002543584
Arrdc3	ENSRNOG00000045649	3.14E-09
Asb2	ENSRNOG00000051619	0.043103708
Ash1l	ENSRNOG00000020386	0.042476103
Atad2b	ENSRNOG00000058973	0.009084823
Atf3	ENSRNOG00000003745	2.74E-08
Atf4	ENSRNOG00000017801	2.79E-07
Atp11b	ENSRNOG00000052116	0.034082968
Atxn7	ENSRNOG00000007246	0.009208136
Atxn7l3	ENSRNOG00000020930	0.015048254
Aurkaip1	ENSRNOG00000018691	0.00736916
Bag3	ENSRNOG00000020298	0.001305301

Baz1a	ENSRNOG00000006828	0.000334187
Baz2a	ENSRNOG000000053881	0.000135434
Baz2b	ENSRNOG000000056984	0.005006472
Bcl6	ENSRNOG00000001843	0.000924713
Best1	ENSRNOG000000020346	1.57E-10
Bicral	ENSRNOG000000016229	0.039185971
Bptf	ENSRNOG000000047296	0.033211916
Brd1	ENSRNOG00000004538	0.012316442
Brd4	ENSRNOG000000006770	0.023224425
Brwd1	ENSRNOG000000001632	0.00015132
Btaf1	ENSRNOG000000017938	0.032407303
Btbd19	ENSRNOG000000042163	0.000154045
Btg1	ENSRNOG000000004284	6.34E-06
Btg2	ENSRNOG000000003300	4.19E-21
Btn2a2	ENSRNOG000000038877	0.018662437
C3	ENSRNOG000000046834	0.007641431
C6	ENSRNOG000000024115	0.001953268
Camsap1	ENSRNOG000000017883	0.046407947
Camta2	ENSRNOG000000004283	0.006306081
Casr	ENSRNOG000000002265	0.04778962
Cbx4	ENSRNOG000000046207	0.043185425
Ccdc102a	ENSRNOG000000025843	0.013505342
Ccdc62	ENSRNOG000000038002	0.047422206
Ccdc88b	ENSRNOG000000024931	0.012338427
Ccdc9	ENSRNOG000000048848	0.000150445
Ccl3	ENSRNOG000000011205	1.74E-10
Ccl4	ENSRNOG000000011406	1.52E-22
Ccnt2	ENSRNOG000000017113	0.007267141
Ccrl2	ENSRNOG000000033234	6.85E-08
Cd244	ENSRNOG000000004698	0.01999021
Cd55	ENSRNOG000000003927	0.046064698
Cd83	ENSRNOG000000018092	0.002993323
Cdc42bpb	ENSRNOG000000009675	0.013913912
Cdk11b	ENSRNOG000000017213	0.002086576
Cdk12	ENSRNOG000000006000	0.00513975
Cdk17	ENSRNOG000000004148	0.002167186
Cdk5r1	ENSRNOG000000021685	0.004992358
Ceacam1	ENSRNOG000000020578	0.045440185
Cebpa	ENSRNOG000000010918	0.005378921
Cebpb	ENSRNOG000000057347	0.003370871
Celf1	ENSRNOG000000010379	0.010807575
Cenpj	ENSRNOG000000022597	0.022727954
Cep164	ENSRNOG000000029826	0.017918231
Cep250	ENSRNOG000000019340	0.048159464
Cep85l	ENSRNOG000000000414	0.036134584
Ces1a	ENSRNOG000000039725	0.002688209
Cflar	ENSRNOG000000012473	0.031539206
Ch25h	ENSRNOG000000019141	0.002144312
Chad	ENSRNOG000000003304	0.000805993
Chd1	ENSRNOG000000014434	0.003814458
Chd3	ENSRNOG000000009722	0.03305901
Chd7	ENSRNOG000000006689	0.000993615
Chd9	ENSRNOG000000049302	0.019457269

Chi3l1	ENSRNOG00000053272	0.023881003
Ciart	ENSRNOG00000042717	0.039185971
Cit	ENSRNOG00000001143	0.013874064
Cited2	ENSRNOG00000056940	0.002068787
Ckap2l	ENSRNOG00000026143	0.014218361
Clasrp	ENSRNOG00000046000	0.047283175
Clec3b	ENSRNOG00000004540	0.000521378
Clec4d	ENSRNOG00000010181	0.0070469
Clk1	ENSRNOG00000025768	0.01114971
Cmip	ENSRNOG00000013178	0.001629002
Cntrl	ENSRNOG00000022015	0.002836168
Col11a2	ENSRNOG00000000463	0.040713696
Col1a1	ENSRNOG00000003897	0.001428251
Coro6	ENSRNOG00000014496	0.020055673
Cpsf7	ENSRNOG00000020668	0.003476304
Cramp1	ENSRNOG00000024635	0.007779245
Crebbp	ENSRNOG00000005330	0.001524467
Crem	ENSRNOG00000014900	0.000496006
Csnk1e	ENSRNOG00000013076	0.027496713
Cspp1	ENSRNOG00000021718	0.005462436
Csrnp1	ENSRNOG00000033433	4.88E-09
Cul9	ENSRNOG00000018372	0.049827976
Cux2	ENSRNOG00000001259	0.020708512
Cxcl2	ENSRNOG00000002792	1.51E-07
Cxxc1	ENSRNOG00000014614	0.045699617
Cyp4f18	ENSRNOG00000015751	0.033619998
Dcaf1	ENSRNOG00000013841	0.036231468
Dclre1c	ENSRNOG00000015980	0.036437407
Ddit3	ENSRNOG00000006789	1.07E-06
Ddit4	ENSRNOG00000057078	0.036978155
Ddx39b	ENSRNOG00000000841	0.000701668
Ddx5	ENSRNOG00000030680	0.031442659
Dennd1c	ENSRNOG00000046050	4.04E-05
Dennd4b	ENSRNOG00000022373	0.01343161
Dgka	ENSRNOG00000022943	0.000857024
Dgkd	ENSRNOG00000023238	0.038777617
Dhx9	ENSRNOG00000002735	0.027914718
Disc1	ENSRNOG00000019779	0.017728669
Dnaaf2	ENSRNOG00000028155	7.47E-06
Dnaja1	ENSRNOG00000007029	4.60E-05
Dnaja4	ENSRNOG00000012106	0.018126794
Dnajb1	ENSRNOG00000021824	0.001105532
Dnajb4	ENSRNOG00000013011	2.97E-09
Dnajc13	ENSRNOG00000011491	0.046206676
Dnhd1	ENSRNOG000000051291	0.000307149
Dnmt3a	ENSRNOG00000026649	0.000168869
Dock4	ENSRNOG00000004823	0.039974809
Dok2	ENSRNOG00000013922	0.000243608
Donson	ENSRNOG00000002012	8.05E-05
Dop1b	ENSRNOG000000051204	0.037336994
Dot1l	ENSRNOG00000032546	0.046807081
Dpysl3	ENSRNOG00000018992	0.01783626
Dqx1	ENSRNOG00000008062	0.047004555

Dst	ENSRNOG00000012207	0.010218792
Dusp1	ENSRNOG00000003977	2.25E-11
Dusp5	ENSRNOG00000014061	3.14E-09
Dux4	ENSRNOG00000025408	0.009299351
Dzip3	ENSRNOG00000001956	0.02782658
Egr1	ENSRNOG00000019422	9.17E-08
Egr2	ENSRNOG00000000640	6.84E-10
Egr3	ENSRNOG00000017828	1.14E-14
Egr4	ENSRNOG00000015719	3.09E-05
Eif4a2	ENSRNOG00000001815	0.013466037
Eif4g3	ENSRNOG00000014368	0.030588327
Eif5	ENSRNOG00000010218	0.036861496
Eme2	ENSRNOG00000024867	0.005492602
Emilin2	ENSRNOG00000014837	0.027831398
Emp1	ENSRNOG00000008676	5.25E-05
Epha1	ENSRNOG00000017525	0.031739416
Ephb3	ENSRNOG00000031801	0.040779448
Epx	ENSRNOG00000008707	0.000918977
Ercc2	ENSRNOG00000017753	0.015180732
Erf	ENSRNOG00000020426	0.030015464
Errfi1	ENSRNOG00000058186	0.001185653
Etv3	ENSRNOG00000043095	0.024727068
Fam13b	ENSRNOG00000020384	0.044781448
Fam20c	ENSRNOG0000001314	0.009163706
Fam71a	ENSRNOG00000029371	0.018276882
Fastkd1	ENSRNOG00000024335	0.01040385
Fbf1	ENSRNOG00000008577	0.022492409
Fbbs	ENSRNOG00000042728	0.000880128
Fbxo40	ENSRNOG00000002459	0.017296998
Fbxw4	ENSRNOG00000046211	0.044439809
Fbxw7	ENSRNOG00000010889	0.046064698
Fermt3	ENSRNOG00000021161	0.032648494
Fes	ENSRNOG00000011683	0.015043105
Fgfr1op	ENSRNOG00000055093	0.02174757
Fgr	ENSRNOG00000009912	0.039033813
Fhod1	ENSRNOG00000054625	9.59E-05
Fnbp4	ENSRNOG00000007241	1.47E-05
Fos	ENSRNOG00000008015	6.68E-12
Fosb	ENSRNOG00000046667	1.20E-05
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Fryl	ENSRNOG00000002248	0.032753574
Fubp3	ENSRNOG00000009139	0.027333944
Fus	ENSRNOG00000023360	0.001666446
Fxr2	ENSRNOG00000011876	0.048666513
Gab2	ENSRNOG00000011882	0.004390502
Ganc	ENSRNOG00000024563	0.020789671
Gatad2b	ENSRNOG00000015553	0.006650159
Gch1	ENSRNOG00000011039	0.004158844
Gcn1	ENSRNOG00000021871	0.045210347
Gdi1	ENSRNOG00000056870	0.016259646
Gem	ENSRNOG00000015160	0.040725078
Gfap	ENSRNOG0000002919	0.038173948
Gga3	ENSRNOG00000027057	0.011143495

Gigyf1	ENSRNOG00000001410	0.003158961
Gli2	ENSRNOG00000007261	0.0029021
Gls	ENSRNOG00000056246	0.032753574
Gm22748	ENSRNOG00000055217	0.00236378
Gm23130	ENSRNOG00000057952	0.013872547
Gm25994	ENSRNOG00000045884	2.35E-06
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Gm27733	ENSRNOG00000055225	0.002097825
Gmip	ENSRNOG00000027257	0.014161839
Gnas	ENSRNOG00000025889	0.003172757
Golga1	ENSRNOG00000014493	0.041036037
Golga2	ENSRNOG00000011884	0.028911941
Gon4l	ENSRNOG00000020297	0.005293961
Gpc2	ENSRNOG00000001367	0.026206513
Gramd1a	ENSRNOG00000021106	0.041764144
Grasp	ENSRNOG00000007346	8.03E-05
Gripap1	ENSRNOG00000009071	0.01777305
Gtf3c2	ENSRNOG00000056904	0.037862023
Gxylt1	ENSRNOG00000005234	0.001445136
Gys1	ENSRNOG00000020812	0.004622702
H3f3a	ENSRNOG00000006532	0.011369255
Hcar2	ENSRNOG00000026653	0.00027809
Hdac4	ENSRNOG00000020372	0.0487915
Hdac9	ENSRNOG00000004158	0.042476103
Hectd4	ENSRNOG00000001352	0.000450014
Herc6	ENSRNOG00000023969	0.001774649
Herpud1	ENSRNOG00000018796	2.47E-06
Hes7	ENSRNOG00000007391	0.018938119
Hexd	ENSRNOG00000036667	0.010658535
Hivep3	ENSRNOG00000009341	0.005504485
Hlx	ENSRNOG00000002309	0.023975904
Hmgcs1	ENSRNOG00000016552	0.04724418
Hmox1	ENSRNOG00000014117	0.035192498
Hnrnpa1	ENSRNOG00000036839	0.002830612
Hnrnpa2b1	ENSRNOG00000011175	0.041322337
Hnrnpdl	ENSRNOG00000002270	4.06E-05
Hnrnp1	ENSRNOG00000003399	0.02343257
Hnrnpu	ENSRNOG00000033790	0.02206208
Hsh2d	ENSRNOG00000023614	0.01114971
Hsp90ab1	ENSRNOG00000019834	0.015059938
Hspa1b	ENSRNOG00000050647	0.025046068
Hspa8	ENSRNOG00000034066	0.000751
Hspb1	ENSRNOG00000023546	0.000107263
Hspd1	ENSRNOG00000014525	0.018621188
Hspe1	ENSRNOG00000051624	0.02343257
Hsph1	ENSRNOG00000000902	7.15E-05
Huwe1	ENSRNOG00000061262	0.041128693
Icam1	ENSRNOG00000020679	6.96E-11
Icam4	ENSRNOG00000042078	1.43E-08
Idi1	ENSRNOG00000016690	1.24E-05
Idua	ENSRNOG00000000043	0.004992358
Ier2	ENSRNOG00000054344	3.95E-10
Ier3	ENSRNOG00000000827	8.33E-10

ler5	ENSRNOG00000059406	1.40E-11
lfo1	ENSRNOG00000018533	0.017801251
lfit2	ENSRNOG00000036604	4.23E-08
lfnl1	ENSRNOG00000033984	7.71E-16
lfrd1	ENSRNOG00000050997	1.24E-05
lft140	ENSRNOG00000016545	0.030381785
lkbke	ENSRNOG00000025100	0.002316933
lkzf1	ENSRNOG0000004444	0.03058601
ll1a	ENSRNOG0000004575	7.04E-12
ll1b	ENSRNOG0000004649	2.88E-15
lmpact	ENSRNOG00000045844	0.008190049
lno80	ENSRNOG00000014483	0.045746182
lno80d	ENSRNOG00000024272	0.024347036
lnpp4a	ENSRNOG00000017660	0.001036429
linsig1	ENSRNOG00000006859	0.005692445
lnts6	ENSRNOG00000009873	0.008419774
lpo9	ENSRNOG00000007418	0.017598585
lqsec2	ENSRNOG00000058975	0.04918187
lrf2bp2	ENSRNOG00000049900	0.027831398
ltgb3	ENSRNOG00000048449	0.046064698
ltsn2	ENSRNOG00000046741	0.016159539
jak3	ENSRNOG00000018669	0.013044825
jchain	ENSRNOG00000003666	6.79E-05
jun	ENSRNOG00000026293	6.68E-12
junb	ENSRNOG00000042838	1.90E-06
jund	ENSRNOG00000019568	1.37E-13
kansl3	ENSRNOG00000015417	0.042013738
kat2a	ENSRNOG00000018364	0.002738368
kat6b	ENSRNOG00000012850	0.016721081
kdm2a	ENSRNOG00000019145	0.00691635
kdm6b	ENSRNOG00000037613	9.06E-19
khyn	ENSRNOG00000020506	0.001428251
kif13b	ENSRNOG00000013089	0.046878318
kif21b	ENSRNOG00000008471	0.000573644
kifc2	ENSRNOG00000060123	0.004720906
kic2	ENSRNOG00000020299	0.037541179
kif13	ENSRNOG00000015822	0.014414453
kif2	ENSRNOG00000014205	7.71E-11
kif4	ENSRNOG00000016299	1.39E-13
kif6	ENSRNOG00000016885	2.09E-07
kilhl17	ENSRNOG00000020302	0.045248664
kmt2a	ENSRNOG00000015133	0.025828115
kmt2b	ENSRNOG00000055525	0.012295011
kmt2c	ENSRNOG00000061080	0.021288516
kmt2d	ENSRNOG00000061499	0.001955384
kmt5c	ENSRNOG00000017508	0.010991162
krit1	ENSRNOG00000007937	0.020175656
ksr1	ENSRNOG00000012818	0.000161232
L3mbtl3	ENSRNOG00000011720	0.031509963
leng8	ENSRNOG00000018642	0.001512847
lif	ENSRNOG00000007002	0.035890236
lin28a	ENSRNOG00000060320	0.017140496
lmb1	ENSRNOG00000061607	0.027372171

LOC100364500	ENSRNOG00000048951	0.02474391
LOC100909595	ENSRNOG00000008376	0.00883726
LOC100909712	ENSRNOG00000011586	1.99E-10
LOC100911319	ENSRNOG00000050108	0.00236378
LOC102548682	ENSRNOG00000049198	0.029639748
LOC102549726	ENSRNOG00000054031	0.009033337
LOC102549941	ENSRNOG00000060966	0.012688228
LOC102550455	ENSRNOG00000061691	0.002270439
LOC102555924	ENSRNOG00000061754	0.00678845
LOC103689941	ENSRNOG00000049397	0.033249864
LOC103690164	ENSRNOG00000048357	0.000813136
LOC103691238	ENSRNOG00000019884	0.019267284
LOC103692471	ENSRNOG00000058834	1.41E-09
LOC108348112	ENSRNOG00000000461	0.000153681
LOC108348250	ENSRNOG00000017857	0.003815008
LOC24906	ENSRNOG00000002820	0.036370242
LOC499407	ENSRNOG00000058912	0.009299429
LOC680121	ENSRNOG00000009920	0.01660859
LOC680227	ENSRNOG00000037911	0.02570021
LOC684773	ENSRNOG00000058437	0.021863971
LOC688282	ENSRNOG00000045889	0.01392591
Lrch4	ENSRNOG00000001402	0.021365765
Lrp4	ENSRNOG00000015285	0.025046068
Lrrc45	ENSRNOG00000045926	0.019973377
Ltbp2	ENSRNOG00000012094	0.005567752
Luc7l2	ENSRNOG00000006001	0.000373325
Madd	ENSRNOG00000012568	0.029639271
Maff	ENSRNOG00000012886	0.005204261
Mafg	ENSRNOG00000036697	2.81E-05
Mafk	ENSRNOG00000001277	0.000352562
Mamdc2	ENSRNOG00000024620	0.013005642
Map3k1	ENSRNOG00000013177	0.024771458
Map3k8	ENSRNOG00000016378	0.002302598
Map4k2	ENSRNOG00000021061	0.000912734
Map4k4	ENSRNOG00000014013	0.046435205
Mapk8ip3	ENSRNOG00000033568	0.000985174
Marchf7	ENSRNOG00000006241	0.006385463
Mark2	ENSRNOG00000021184	0.00226489
Mat2a	ENSRNOG00000013520	4.41E-06
Mau2	ENSRNOG00000020526	0.031475272
Maz	ENSRNOG00000055082	0.030339201
Mbtd1	ENSRNOG00000049988	0.034700604
Mdm4	ENSRNOG00000009696	0.018205009
Med12	ENSRNOG00000003848	0.003458841
Med15	ENSRNOG00000001877	0.046870564
Mef2d	ENSRNOG00000031778	0.024132997
Mfsd12	ENSRNOG00000039858	0.041668607
Mib2	ENSRNOG00000017564	0.023478726
Mical1	ENSRNOG00000000307	0.008969335
Mical2	ENSRNOG00000016244	0.01243074
Mical3	ENSRNOG00000053203	0.003202586
Micall1	ENSRNOG00000026212	0.040606107
Midn	ENSRNOG00000015434	0.003941828

Mier2	ENSRNOG00000000175	0.017140496
Mink1	ENSRNOG00000033508	0.000132958
Mir142	ENSRNOG00000035633	4.94E-08
Mir146a	ENSRNOG00000035466	0.004311674
Mir190b	ENSRNOG00000041245	0.049090939
Mir207	ENSRNOG00000035596	4.92E-07
Mir23a	ENSRNOG00000035644	3.30E-05
Mir24-2	ENSRNOG00000035501	6.05E-10
MlIt10	ENSRNOG00000022249	0.030130585
MlIt6	ENSRNOG00000053285	0.006613737
Mob3c	ENSRNOG00000037620	0.004574262
Morc3	ENSRNOG00000026236	0.007978034
Mov10	ENSRNOG00000012946	0.002883417
Mpo	ENSRNOG00000008310	0.028987058
Mroh1	ENSRNOG00000030355	0.042013738
Msantd2	ENSRNOG00000009950	0.022083851
MtMr12	ENSRNOG00000022929	0.030794954
Mutyh	ENSRNOG00000017887	0.032719
Mxd1	ENSRNOG00000017720	0.007221722
Myc	ENSRNOG00000004500	0.000269468
Mycbp2	ENSRNOG00000010479	0.033284142
Myo18a	ENSRNOG00000033101	0.025046068
Myo5a	ENSRNOG00000058866	0.019350862
Myo7a	ENSRNOG00000013641	0.019457269
Myo9a	ENSRNOG00000011619	0.046064698
Myo9b	ENSRNOG00000016256	0.003196635
Naa25	ENSRNOG00000001350	0.048643597
Nabp1	ENSRNOG00000015416	0.042018212
Nav3	ENSRNOG00000052157	0.046064698
Ncf1	ENSRNOG00000001480	0.01936055
Ncor2	ENSRNOG00000001004	0.038881526
Nes	ENSRNOG00000018681	0.00128731
Nfat5	ENSRNOG00000011879	0.00172808
Nfatc2	ENSRNOG00000012175	0.02537393
Nfkb2	ENSRNOG00000019311	0.022601569
Nfkbia	ENSRNOG00000007390	7.96E-20
Nfkbid	ENSRNOG00000025111	1.99E-12
Nfkbie	ENSRNOG00000019907	0.022007591
Nfkbiz	ENSRNOG00000031163	7.71E-16
Nfrkb	ENSRNOG00000008278	0.015893207
Nisch	ENSRNOG00000018823	0.024592833
Nktr	ENSRNOG00000049128	0.003065138
Noc2l	ENSRNOG00000021392	0.017140496
Noct	ENSRNOG00000010799	0.040195189
Notch4	ENSRNOG00000000442	0.007156122
Nr4a1	ENSRNOG00000007607	4.77E-07
Nr4a2	ENSRNOG00000005600	5.26E-05
Nsd3	ENSRNOG00000015621	0.008840334
Ntng2	ENSRNOG00000013694	0.016863184
Ntsr1	ENSRNOG00000028708	0.000319215
Numa1	ENSRNOG00000000417	0.027831398
Nxf1	ENSRNOG00000019069	0.014738266
Olfm4	ENSRNOG00000013280	0.027849496

Olr1	ENSRNOG00000056219	1.39E-07
Oplah	ENSRNOG00000011781	0.043796265
Osbp17	ENSRNOG00000009473	0.040287172
Osgin1	ENSRNOG00000014948	5.74E-05
Osm	ENSRNOG00000024390	4.53E-18
Otud1	ENSRNOG00000016950	1.68E-11
Pabpn1	ENSRNOG00000042195	0.002229972
Pacs1	ENSRNOG00000020350	0.038777617
Pacsin1	ENSRNOG00000054603	0.00867766
Padi2	ENSRNOG00000007574	0.003220277
Pan2	ENSRNOG00000032441	0.042642027
Pan3	ENSRNOG00000000942	0.006081882
Paxbp1	ENSRNOG00000002036	0.011367774
Pcdh7	ENSRNOG00000012367	0.002097825
Pcf11	ENSRNOG00000009891	0.002270439
Pcmt1d1	ENSRNOG00000005730	0.002363616
Pcna	ENSRNOG00000021264	0.003654727
Pde4a	ENSRNOG00000020828	0.003618179
Peli2	ENSRNOG00000012363	0.02570021
Per1	ENSRNOG00000007387	2.47E-10
Phf1	ENSRNOG00000000480	0.02343257
Phf201	ENSRNOG00000005486	0.001055306
Phf201	ENSRNOG00000046527	0.048522003
Phf21a	ENSRNOG00000006063	0.049464828
Phf21b	ENSRNOG00000013067	0.012979844
Phlda1	ENSRNOG00000004019	5.99E-09
Phospho1	ENSRNOG00000005569	0.045716442
Pi16	ENSRNOG00000000525	0.034666546
Pik3c2b	ENSRNOG00000029938	0.02206208
Pik3cd	ENSRNOG00000016846	0.015876849
Pik3r1	ENSRNOG00000018903	0.047283175
Pikfyve	ENSRNOG00000015158	0.032372533
Pim1	ENSRNOG00000000529	0.002678105
Pkp4	ENSRNOG00000005504	0.011053658
Pla2g4c	ENSRNOG00000026764	0.02366169
Plaur	ENSRNOG00000037931	0.004416617
Plcb2	ENSRNOG00000058337	0.019790743
Pld2	ENSRNOG00000019604	0.015059938
Plekha5	ENSRNOG00000008747	0.022007591
Plekhh1	ENSRNOG00000010650	0.00966261
Plekhn1	ENSRNOG00000020295	0.025646238
Plekho2	ENSRNOG00000029242	0.002688209
Plk2	ENSRNOG00000011951	2.22E-10
Plk3	ENSRNOG00000018484	1.04E-13
Plppr3	ENSRNOG00000027940	0.029118261
Pmaip1	ENSRNOG00000018770	0.011369166
Pnlsr	ENSRNOG00000008782	0.032128522
Pnn	ENSRNOG00000004061	0.008142511
Pnrc1	ENSRNOG00000007793	0.000104891
Polg2	ENSRNOG00000013728	0.002982972
Pou2f2	ENSRNOG00000055650	7.93E-05
Ppm1j	ENSRNOG00000012481	0.000164532
Ppp1r10	ENSRNOG00000059268	0.012489387

Ppp1r15a	ENSRNOG00000020938	2.86E-26
Ppp1r3c	ENSRNOG00000018494	0.021286948
Ppp1r3e	ENSRNOG00000014904	0.013308941
Pram1	ENSRNOG00000039204	0.004992358
Prg2	ENSRNOG00000008394	0.032297493
Prg3	ENSRNOG000000037908	0.016983842
Prg4	ENSRNOG00000002385	0.044122277
Prkag2	ENSRNOG00000009085	0.005293961
Prok2	ENSRNOG00000010898	0.024592833
Prpf39	ENSRNOG00000004521	0.018822874
Prpf40b	ENSRNOG000000052539	0.025046068
Prr29	ENSRNOG000000060193	0.032297493
Prr33	ENSRNOG000000051534	0.008614898
Prrc2b	ENSRNOG00000010217	0.037076771
Prss53	ENSRNOG00000026040	0.038691311
Psd	ENSRNOG00000019435	0.003299704
Pspc1	ENSRNOG00000020782	0.02339169
Pstpip1	ENSRNOG00000016413	0.045762727
Ptbp2	ENSRNOG00000010827	0.022007591
Ptch2	ENSRNOG000000057616	0.03507514
Ptger4	ENSRNOG00000013240	0.004169684
Ptgs2	ENSRNOG00000002525	0.001932924
Ptp4a1	ENSRNOG00000011771	0.005403966
Ptpre	ENSRNOG00000015717	0.009684824
Pura	ENSRNOG00000019062	0.000354954
Pwwp2a	ENSRNOG00000003936	0.010149036
Pygl	ENSRNOG00000006388	2.71E-05
Rab11fip2	ENSRNOG00000009523	0.043861417
Rab44	ENSRNOG00000001869	0.011122471
Rap1gap2	ENSRNOG00000002652	0.001428251
Rapgef1	ENSRNOG00000014316	0.030339201
Rapgef3	ENSRNOG000000059961	0.013862357
Rasgrp2	ENSRNOG000000021098	0.025437066
RatNP-3b	ENSRNOG000000038135	0.046064698
Rbm25l1	ENSRNOG00000002871	0.000378413
Rbm26	ENSRNOG00000009836	0.009355464
Rbm33	ENSRNOG000000006718	0.000369763
Rdh5	ENSRNOG000000053850	0.00072343
Rel	ENSRNOG000000054437	1.27E-05
Relb	ENSRNOG000000033235	0.00793988
Rev1	ENSRNOG00000018623	0.028916517
Rexo1	ENSRNOG00000017916	0.033042523
Rfx5	ENSRNOG000000021012	0.020758073
Rgcc	ENSRNOG000000042960	0.013308941
RGD1305110	ENSRNOG000000054669	0.003470481
RGD1305464	ENSRNOG00000018689	0.004687762
RGD1306556	ENSRNOG000000052424	0.016947744
RGD1309748	ENSRNOG00000002545	0.008190049
RGD1562310	ENSRNOG00000001123	0.037684119
RGD1563917	ENSRNOG00000017273	0.048852512
Rgs1	ENSRNOG00000003895	2.42E-06
Rgs16	ENSRNOG00000027024	0.009925901
Rgs2	ENSRNOG00000003687	0.001871711

Rhob	ENSRNOG00000021403	1.40E-09
Ripk3	ENSRNOG00000020465	0.000101232
RNase_MRP	ENSRNOG00000057527	1.65E-05
Rnf111	ENSRNOG00000060750	0.030339201
Rnf123	ENSRNOG00000033378	0.033085152
Rnf19b	ENSRNOG00000000123	3.07E-07
Rnf40	ENSRNOG00000018840	0.002228087
Rpph1	ENSRNOG00000054493	0.000733649
Rps6kb2	ENSRNOG00000021689	0.040446478
Rsrp1	ENSRNOG00000017309	0.001715024
RT1-CE3	ENSRNOG00000031607	0.018054581
RT1-CE4	ENSRNOG00000039744	0.009711172
Rubcnl	ENSRNOG00000022760	0.013952531
Runx2	ENSRNOG00000020193	0.012316442
Samd4a	ENSRNOG00000010489	0.003142262
Sat1	ENSRNOG00000003809	4.11E-11
Sbf1	ENSRNOG00000008392	0.011355176
Sbno1	ENSRNOG00000001064	0.047336732
Sbno2	ENSRNOG00000013987	0.015355739
Scarna10	ENSRNOG00000060559	0.000214525
Scarna2	ENSRNOG00000051850	0.019973377
Sde2	ENSRNOG00000003247	0.021504366
Sec31b	ENSRNOG00000025781	1.34E-07
Sema4c	ENSRNOG00000016254	0.001861825
Sema4d	ENSRNOG00000013679	7.81E-06
Septin1	ENSRNOG00000017804	0.04002887
Sertad1	ENSRNOG00000024363	0.021863971
Setd1b	ENSRNOG0000001337	0.027496713
Setx	ENSRNOG00000013491	0.026419189
Sf1	ENSRNOG00000021085	0.007151352
Sfpq	ENSRNOG00000058461	0.001316191
Sfswap	ENSRNOG00000000931	0.010279878
Sgk1	ENSRNOG00000011815	0.010937608
Sh2b2	ENSRNOG00000001425	0.00987895
Sh3gl3	ENSRNOG00000019776	0.009238033
Shfl	ENSRNOG00000020580	0.030469795
Shisa8	ENSRNOG00000049407	0.02380869
Siah2	ENSRNOG00000013703	0.013880908
Sik1	ENSRNOG00000001189	3.14E-09
Ski	ENSRNOG00000055340	0.00932828
Skil	ENSRNOG00000009899	0.009497195
Slc10a1	ENSRNOG00000005794	0.00332758
Slc12a9	ENSRNOG00000048487	0.027923684
Slc16a3	ENSRNOG00000036677	0.001905627
Slc20a1	ENSRNOG00000018567	0.018744069
Slc25a36	ENSRNOG00000013802	0.016362711
Slc35e1	ENSRNOG00000012287	0.03766862
Slc36a1	ENSRNOG00000012356	0.003635511
Slc7a3	ENSRNOG00000004133	0.02215543
Slc9a5	ENSRNOG00000028844	6.40E-05
Slco4a1	ENSRNOG00000053430	1.50E-05
Slfn13	ENSRNOG00000021412	0.000111779
Slfn4	ENSRNOG00000057092	6.34E-06

Sltn	ENSRNOG00000054446	0.019314023
Slx4	ENSRNOG00000024445	0.007356239
Smad7	ENSRNOG00000018359	3.07E-07
Smarca2	ENSRNOG00000011931	0.001095345
Smarcc2	ENSRNOG00000031135	0.018225782
Smc5	ENSRNOG00000030572	0.022095088
Smg1	ENSRNOG00000047386	0.037669902
Smim5	ENSRNOG00000049642	0.035602397
Smox	ENSRNOG00000021255	2.30E-05
SNORA71	ENSRNOG00000058944	0.031539206
SNORD24	ENSRNOG00000060649	0.047283175
SNORD25	ENSRNOG00000059148	0.013805431
SNORD27	ENSRNOG00000054315	0.027566146
SNORD31	ENSRNOG00000056942	0.021415011
Snord49a	ENSRNOG00000058899	0.009734691
Snord49b	ENSRNOG00000057240	0.001087125
Snrnp70	ENSRNOG00000020763	0.004041669
Snx18	ENSRNOG00000010971	0.042018212
Snx29	ENSRNOG00000002294	0.01344009
Snx32	ENSRNOG00000026527	4.71E-06
Socs3	ENSRNOG00000002946	3.36E-07
Socs7	ENSRNOG00000059008	0.047895996
Soga1	ENSRNOG00000053240	0.048066006
Sowahc	ENSRNOG00000048831	6.20E-14
Sp140	ENSRNOG00000022800	0.011595297
Spata2L	ENSRNOG00000016167	0.018662437
Spty2d1	ENSRNOG00000050806	0.028098269
Srcap	ENSRNOG00000050282	0.008506989
Srf	ENSRNOG00000018232	0.004671874
Srrm1	ENSRNOG00000018194	0.023649295
Srrm2	ENSRNOG00000058561	0.007156122
Srsf11	ENSRNOG00000029592	0.033203952
Srsf2	ENSRNOG00000000248	0.000348186
Srsf3	ENSRNOG00000000520	0.000701668
Srsf5	ENSRNOG00000005513	0.000103503
Srsf6	ENSRNOG00000006380	0.026081146
Srsf7	ENSRNOG00000027360	0.026175865
Stk10	ENSRNOG00000004217	0.022007591
Stk38	ENSRNOG00000000519	0.001528919
Strn4	ENSRNOG00000016145	0.027432178
Stx16	ENSRNOG00000005281	0.006581526
Suco	ENSRNOG00000026542	0.030183101
Sun2	ENSRNOG00000015177	0.035141472
Svil	ENSRNOG00000018110	0.000334187
Szt2	ENSRNOG00000028659	0.015872442
Taf1d	ENSRNOG00000010921	0.048665584
Tafa3	ENSRNOG00000030253	0.000716881
Tagap	ENSRNOG00000018915	1.03E-06
Taok2	ENSRNOG00000019964	0.017485312
Taok3	ENSRNOG00000001138	0.039050653
Tbc1d16	ENSRNOG00000049758	0.000677657
Tcerg1	ENSRNOG00000018849	0.006441423
Tcf15	ENSRNOG00000000012	0.039591998

Tchp	ENSRNOG00000001191	0.02713079
Tcirg1	ENSRNOG00000017220	0.008757542
Tctex1d4	ENSRNOG00000018463	9.02E-07
Tent4b	ENSRNOG00000024212	0.007388055
Tet3	ENSRNOG00000011387	0.011355176
Tgfb1i1	ENSRNOG00000019965	0.00577357
Themis2	ENSRNOG00000012965	3.52E-06
Tinf2	ENSRNOG00000020189	0.032455386
Tmem154	ENSRNOG00000010866	0.045183383
Tmem71	ENSRNOG00000025460	0.028118932
Tmem8b	ENSRNOG00000015664	0.031156559
Tnfaip3	ENSRNOG00000049517	1.35E-09
Tnfrsf13c	ENSRNOG00000007664	0.000205051
Tnfsf9	ENSRNOG00000045595	0.000171062
Tnk2	ENSRNOG00000001769	0.023873604
Tnnt3	ENSRNOG00000020332	0.009196421
Tnrc18	ENSRNOG00000024482	0.012927967
Tnrc6a	ENSRNOG00000024737	0.003297892
Tnrc6c	ENSRNOG00000022395	0.002472996
Tob1	ENSRNOG00000002828	0.012316442
Tpcn2	ENSRNOG00000013387	0.042013738
Tpm3	ENSRNOG00000017441	0.02026751
Tra2a	ENSRNOG00000009156	0.005849673
Traf3	ENSRNOG00000008145	0.017140496
Trafd1	ENSRNOG00000001351	0.033550054
Trak1	ENSRNOG00000019262	0.006805082
Trem1	ENSRNOG00000022859	0.008689979
Trib1	ENSRNOG00000004100	0.000667653
Trim24	ENSRNOG00000013251	0.028900803
Trim3	ENSRNOG00000018356	0.003708497
Trim72	ENSRNOG00000022099	0.039950005
Troap	ENSRNOG00000006703	0.003020341
Trpm2	ENSRNOG00000001216	9.77E-08
Tsc22d2	ENSRNOG000000038044	0.010039139
Tsc22d3	ENSRNOG000000056135	0.003405218
Tspyl2	ENSRNOG000000061782	5.51E-06
Tubgcp6	ENSRNOG000000006028	0.026779373
Tulp2	ENSRNOG00000020927	1.72E-07
Tut7	ENSRNOG00000016629	0.005686674
Txlina	ENSRNOG00000048242	0.034666546
Tyk2	ENSRNOG000000032948	0.022007591
U1	ENSRNOG000000055394	0.048904782
U2af2	ENSRNOG00000015914	0.016785947
U6	ENSRNOG000000056868	0.037076771
Ubap2	ENSRNOG000000052087	0.036370242
Ubc	ENSRNOG000000057823	1.08E-05
Ubn2	ENSRNOG00000005564	0.02677675
Ubp1	ENSRNOG00000009729	0.001655606
Ubr4	ENSRNOG00000018183	0.011355176
Uhrf1bp1	ENSRNOG00000000495	0.008612984
Unkl	ENSRNOG000000054605	0.012881229
Upf2	ENSRNOG00000023593	0.00681134
Upf3b	ENSRNOG000000039994	0.000109008

Usp16	ENSRNOG00000001598	0.006920124
Usp22	ENSRNOG000000032492	0.041793809
Usp36	ENSRNOG000000028255	0.018113148
Usp8	ENSRNOG00000010729	0.040713696
Vamp2	ENSRNOG00000006989	0.001332698
Vcan	ENSRNOG000000029212	0.022007591
Vps13c	ENSRNOG000000030213	0.009835661
Vps52	ENSRNOG00000000470	0.035844351
Vps9d1	ENSRNOG000000028904	0.00047841
Wapl	ENSRNOG000000052513	0.026369299
Wdr13	ENSRNOG000000039587	0.032719
Whrn	ENSRNOG00000001700	0.004173648
Wsb1	ENSRNOG000000012929	1.58E-06
Xdh	ENSRNOG00000007081	0.013862357
Ylpm1	ENSRNOG000000027317	0.009163589
Ypel2	ENSRNOG00000005447	0.019391406
Ythdc1	ENSRNOG00000001996	0.007779245
Zbtb40	ENSRNOG000000022039	0.016263018
Zbtb7a	ENSRNOG000000020161	0.002657801
Zc3h11a	ENSRNOG000000053210	0.004950904
Zc3h12a	ENSRNOG000000009131	2.53E-12
Zc3h13	ENSRNOG000000011237	0.005620864
Zc3h7a	ENSRNOG000000002420	0.005369314
Zc3hav1	ENSRNOG000000013948	0.008676368
Zcchc2	ENSRNOG000000002882	0.001968892
Zcchc4	ENSRNOG000000029064	0.033568357
Zcchc8	ENSRNOG000000001243	0.019314023
Zeb1	ENSRNOG000000017863	0.005497406
Zfand2a	ENSRNOG000000032917	1.02E-07
Zfand5	ENSRNOG000000018107	0.004416617
Zfhx3	ENSRNOG000000014452	0.000534395
Zfp142	ENSRNOG000000022414	0.004864177
Zfp326	ENSRNOG000000047761	0.000702418
Zfp36	ENSRNOG000000058388	1.18E-09
Zfp36l1	ENSRNOG000000058646	6.05E-05
Zfp36l2	ENSRNOG00000005067	0.02713079
Zfp382	ENSRNOG000000020777	0.025426145
Zfp532	ENSRNOG000000017116	0.043777314
Zfp598	ENSRNOG000000012434	0.046404557
Zfp641	ENSRNOG000000032447	0.016129417
Zfp646	ENSRNOG000000026115	0.048592645
Zfp692	ENSRNOG000000002682	0.009196421
Zfp710	ENSRNOG000000014278	0.039982663
Zfp827	ENSRNOG000000011697	7.60E-06
Znrf1	ENSRNOG000000019028	0.026292361
Zswim4	ENSRNOG000000007582	0.042381746
Zup1	ENSRNOG000000000398	0.037080904
Zzef1	ENSRNOG000000024535	0.046374997

Supplemental Table 6: Female cervical spinal cord compared to brainstem microglia downregulated genes

Gene name	Gene stable ID	FDR
AABR07000398.1	ENSRNOG000000047746	1.06E-10
AABR07008030.1	ENSRNOG000000051672	0.002757937

AABR07011996.1	ENSRNOG00000061272	0.013618805
AABR07015057.1	ENSRNOG00000060518	9.90E-09
AABR07015067.2	ENSRNOG00000054657	1.63E-05
AABR07015079.1	ENSRNOG00000046081	1.35E-09
AABR07015081.1	ENSRNOG00000047351	4.52E-05
AABR07015081.2	ENSRNOG00000054945	4.50E-08
AABR07015507.1	ENSRNOG00000051190	0.035856646
AABR07019403.1	ENSRNOG00000058057	0.046910195
AABR07021547.1	ENSRNOG00000051100	0.020221941
AABR07021759.1	ENSRNOG00000023269	0.000207301
AABR07021823.1	ENSRNOG00000052785	0.027435372
AABR07029581.1	ENSRNOG00000046330	0.012190425
AABR07030823.1	ENSRNOG00000046001	0.000437348
AABR07031193.1	ENSRNOG00000011300	1.45E-13
AABR07034767.1	ENSRNOG00000001825	8.38E-05
AABR07042821.1	ENSRNOG00000054489	7.01E-05
AABR07044388.2	ENSRNOG00000033581	0.011109005
AABR07049085.1	ENSRNOG00000006956	0.000713175
AABR07050646.1	ENSRNOG00000053592	1.56E-08
AABR07053687.1	ENSRNOG00000015756	0.002296106
AABR07058699.2	ENSRNOG00000060211	2.86E-06
AABR07070307.1	ENSRNOG00000053753	0.001219771
AABR07071876.1	ENSRNOG00000017306	0.034082968
AABR07073181.1	ENSRNOG00000021437	0.000101637
Aass	ENSRNOG00000039494	5.69E-05
Abat	ENSRNOG00000002636	0.000234077
Abca4	ENSRNOG00000012892	6.61E-07
Abca5	ENSRNOG00000004378	0.016728537
Abcc4	ENSRNOG00000010064	0.036739614
Abhd3	ENSRNOG00000029370	0.031739416
Abhd8	ENSRNOG00000000054	0.014121248
AC108574.1	ENSRNOG00000057903	0.000985174
AC120486.10	ENSRNOG00000059066	6.57E-06
AC141489.1	ENSRNOG00000033916	0.00013953
Acaa2	ENSRNOG00000013766	0.003791407
Acacb	ENSRNOG0000000658	0.039739438
Ace	ENSRNOG00000062101	2.06E-10
Ace2	ENSRNOG00000031665	0.021711851
Ackr3	ENSRNOG00000019622	2.08E-08
Acsl6	ENSRNOG00000026745	8.71E-06
Acss3	ENSRNOG00000004448	0.006501768
Acta2	ENSRNOG00000058039	6.64E-12
Actr10	ENSRNOG00000007504	0.031714896
Actr1a	ENSRNOG00000019725	0.040638515
Acvrl1	ENSRNOG00000028713	0.001731081
Adamts1	ENSRNOG00000001607	8.71E-06
Adamts15	ENSRNOG00000009892	0.002154064
Adgre1	ENSRNOG00000046254	0.044074046
Adgrg6	ENSRNOG00000011411	0.005685933
Adh5	ENSRNOG00000046357	0.035154553
Adi1	ENSRNOG00000008950	0.024250687
Adprh	ENSRNOG00000027260	0.046348029
Aif1	ENSRNOG00000000853	0.002476027

Aif1l	ENSRNOG00000009951	0.016611359
Aifm3	ENSRNOG00000037957	0.028267549
Ajuba	ENSRNOG00000012791	0.020307412
Akap12	ENSRNOG00000019549	0.021625299
Akr1a1	ENSRNOG00000016727	0.011029699
Akr1b1	ENSRNOG00000009513	3.30E-05
Aldh5a1	ENSRNOG00000023538	0.003247077
Aldh7a1	ENSRNOG00000014645	0.017450918
Alox5	ENSRNOG00000012972	0.025360842
Alox5ap	ENSRNOG00000000907	0.045183383
Anapc10	ENSRNOG00000018296	0.008881218
Ano6	ENSRNOG00000006995	0.011392149
Antxr1	ENSRNOG00000008678	0.000458478
Aoc3	ENSRNOG000000051307	0.000170895
Aprt	ENSRNOG00000014405	0.015253246
Aqp1	ENSRNOG00000011648	8.64E-07
Arhgap42	ENSRNOG00000026821	0.014414453
Arhgap44	ENSRNOG00000003603	0.017468685
Arhgef17	ENSRNOG000000053502	8.13E-05
Arhgef25	ENSRNOG00000005034	0.001160306
Arhgef28	ENSRNOG00000016544	0.044074046
Arl11	ENSRNOG00000014653	0.049529859
Arl3	ENSRNOG00000019973	0.043103708
Arl6	ENSRNOG00000001689	0.017442268
Arl6ip1	ENSRNOG00000017751	0.003824809
Arl6ip5	ENSRNOG00000006818	0.008617263
Armc2	ENSRNOG00000026217	0.034571867
Armc3	ENSRNOG00000016716	0.018822874
Armcx2	ENSRNOG00000025705	0.018744069
Armcx4	ENSRNOG000000043128	0.001491554
Arpc3	ENSRNOG00000008673	0.034405186
Arpc4	ENSRNOG00000008994	0.00191571
Asah1	ENSRNOG00000010034	0.000226286
Astn1	ENSRNOG00000005667	0.031714896
Atp11c	ENSRNOG00000003472	0.00351052
Atp1a2	ENSRNOG00000007290	0.001844377
Atp1b2	ENSRNOG00000011227	6.02E-10
Atp2b2	ENSRNOG000000030269	1.08E-05
Atp2b3	ENSRNOG000000061304	9.37E-11
Atp5f1a	ENSRNOG00000017032	0.004905911
Atp5f1b	ENSRNOG00000002840	0.001354923
Atp5f1d	ENSRNOG00000014625	0.003917552
Atp5f1e	ENSRNOG00000049912	0.0012882
Atp5if1	ENSRNOG00000013300	0.003266475
Atp5mc1	ENSRNOG00000007235	0.005462436
Atp5mc2	ENSRNOG00000015320	0.032838784
Atp5mc3	ENSRNOG00000001596	0.027338359
Atp5md	ENSRNOG000000042869	0.001928825
Atp5me	ENSRNOG00000000064	0.000231401
Atp5mf	ENSRNOG000000027049	0.001810955
Atp5mg	ENSRNOG00000028884	0.003815008
Atp5pd	ENSRNOG00000003626	0.007262495
Atp5pf	ENSRNOG00000001551	0.009254516

Atp5po	ENSRNOG00000001991	0.01114971
Atp6v0b	ENSRNOG00000019655	0.031297113
Atp6v0e1	ENSRNOG00000003269	0.005293961
Atp6v1a	ENSRNOG00000001992	0.02677675
Atp9a	ENSRNOG00000049484	0.007875887
Axl	ENSRNOG00000020716	0.019887485
AY172581.2	ENSRNOG00000029145	9.93E-05
AY172581.24	ENSRNOG00000043866	0.002697901
AY172581.9	ENSRNOG00000030478	2.72E-10
B2m	ENSRNOG00000017123	0.002660936
Baiap2l1	ENSRNOG00000001007	0.014925937
Banf1	ENSRNOG00000020460	0.013862357
Bcam	ENSRNOG00000029399	6.00E-07
Bcap31	ENSRNOG00000055756	0.039950005
Bcar1	ENSRNOG00000019253	0.003815008
Bckdhh	ENSRNOG00000009928	0.037190087
Bcl2a1	ENSRNOG00000047606	0.023550937
Bgn	ENSRNOG00000055962	7.01E-05
Bmp6	ENSRNOG00000013717	0.042255013
Bola2	ENSRNOG00000047988	0.030034456
Bpnt1	ENSRNOG00000002378	0.004678738
Bsg	ENSRNOG00000008414	0.002262379
Bst2	ENSRNOG00000059900	0.027556104
Btbd11	ENSRNOG00000005758	0.005611012
Btla	ENSRNOG00000030246	0.045942586
C1qc	ENSRNOG00000012804	0.000172225
C1qtnf3	ENSRNOG00000018570	2.76E-09
C1qtnf5	ENSRNOG00000007613	0.018822874
C5ar1	ENSRNOG00000047800	0.001462634
C7	ENSRNOG000000061379	0.015483567
Ca12	ENSRNOG00000017766	6.64E-12
Ca13	ENSRNOG00000021323	8.92E-06
Ca14	ENSRNOG00000023162	0.012316442
Cab39l	ENSRNOG00000011603	0.00721074
Cachd1	ENSRNOG00000010514	0.001488476
Cacna1c	ENSRNOG00000007090	0.002035956
Cacna1h	ENSRNOG00000033893	0.006668401
Cacnb4	ENSRNOG00000007666	0.019457269
Cadm3	ENSRNOG00000003365	0.014654914
Cald1	ENSRNOG00000010233	9.17E-08
Calm1	ENSRNOG00000004060	0.010149036
Calml4	ENSRNOG00000038202	0.028202835
Calr	ENSRNOG00000003029	0.006844688
Calu	ENSRNOG00000006197	0.046952521
Cant1	ENSRNOG00000003239	0.02822201
Car2	ENSRNOG00000009629	4.28E-06
Casc4	ENSRNOG00000016357	0.000213017
Casq2	ENSRNOG00000016243	0.004678738
Cat	ENSRNOG00000008364	0.013862357
Cav1	ENSRNOG00000056836	2.07E-05
Cavin1	ENSRNOG00000019778	0.0033017
Cavin2	ENSRNOG00000025895	0.008159285
Cavin3	ENSRNOG00000017914	0.001953268

Ccdc141	ENSRNOG00000012580	0.002543584
Ccdc152	ENSRNOG000000039473	0.004952726
Ccdc40	ENSRNOG000000059401	0.016560314
Ccdc65	ENSRNOG000000058916	0.026666198
Ccn1	ENSRNOG000000014350	0.022407673
Ccng1	ENSRNOG000000003256	0.023935407
Cct2	ENSRNOG000000021317	0.018054581
Cct5	ENSRNOG000000011632	0.002620472
Cd164	ENSRNOG00000000304	0.018662437
Cd200	ENSRNOG000000002141	0.006848914
Cd226	ENSRNOG000000038197	0.018763215
Cd302	ENSRNOG000000006623	0.011446669
Cd320	ENSRNOG000000006901	0.045578696
Cd48	ENSRNOG000000004737	7.23E-06
Cd53	ENSRNOG000000017874	0.001851131
Cd59	ENSRNOG000000042821	0.043307127
Cd68	ENSRNOG000000037563	0.010349767
Cd81	ENSRNOG000000020451	0.008181268
Cd99l2	ENSRNOG000000023841	0.007193314
Cdc42ep1	ENSRNOG000000008517	0.025888795
Cdh1	ENSRNOG000000020151	0.041668607
Cdh13	ENSRNOG000000014371	0.002520775
Cdh17	ENSRNOG000000015562	0.025046068
Cdh2	ENSRNOG000000015602	0.00823502
Cdh3	ENSRNOG000000020129	7.88E-09
Cdk2ap2	ENSRNOG000000018391	0.016560314
Cdkn1c	ENSRNOG000000059500	4.03E-05
Cdr2	ENSRNOG000000017260	0.004737669
Cep170b	ENSRNOG000000033688	0.000389911
Cers2	ENSRNOG000000021138	0.008008433
Cetn2	ENSRNOG000000059593	0.034663138
Cfap126	ENSRNOG000000034221	0.005863543
Cfap300	ENSRNOG000000043410	5.47E-07
Cfap43	ENSRNOG000000036585	0.001105203
Cfap44	ENSRNOG000000028077	0.008443566
Cfap52	ENSRNOG000000037718	0.049188442
Cfap69	ENSRNOG000000006114	0.009296875
Cfl2	ENSRNOG000000045892	0.035583249
Cfp	ENSRNOG000000025811	6.02E-08
Cgn	ENSRNOG000000020952	0.030401991
Cgnl1	ENSRNOG000000054080	2.13E-05
Chchd1	ENSRNOG000000009297	0.012514156
Chchd3	ENSRNOG000000013211	0.013874064
Chmp2a	ENSRNOG000000043328	0.044781448
Chrac1	ENSRNOG000000009103	0.043103708
Ciita	ENSRNOG000000002659	0.02108155
Cldn1	ENSRNOG000000001926	3.85E-06
Cldn2	ENSRNOG000000054495	6.07E-14
Cldnd1	ENSRNOG000000001657	0.028613223
Clec10a	ENSRNOG000000018715	0.047660621
Clec2g	ENSRNOG000000059538	0.043970737
Clec4a1	ENSRNOG000000042139	0.00226489
Clec7a	ENSRNOG000000054251	0.022007591

Clec9a	ENSRNOG00000051690	0.000427882
Clic2	ENSRNOG00000000728	0.009576633
Clic6	ENSRNOG00000026870	8.15E-17
Clmn	ENSRNOG00000011044	0.024802833
Clptm1	ENSRNOG00000018255	0.010090279
Cltb	ENSRNOG00000017506	0.034654112
Clu	ENSRNOG00000016460	2.17E-07
Cmtr1	ENSRNOG00000000532	1.61E-05
Cnn1	ENSRNOG00000027736	0.005567752
Cnn3	ENSRNOG00000011559	9.14E-07
Cnpy2	ENSRNOG00000003549	0.001105532
Cnpy3	ENSRNOG00000016315	0.049464828
Cnr1	ENSRNOG00000008223	0.046435205
Cnrip1	ENSRNOG00000005326	0.008502943
Cntn1	ENSRNOG00000004438	2.06E-09
Coa4	ENSRNOG00000025385	0.029406644
Cobll1	ENSRNOG00000027016	0.006624751
Col18a1	ENSRNOG00000001229	0.003283148
Col4a1	ENSRNOG00000016281	0.000856653
Col4a2	ENSRNOG00000023972	0.007415604
Col4a5	ENSRNOG00000018951	0.00151484
Col8a1	ENSRNOG00000039668	0.001851131
Col8a2	ENSRNOG00000010841	0.003856155
Col9a3	ENSRNOG00000009531	0.002129624
Commd1	ENSRNOG00000009281	0.042381746
Commd3	ENSRNOG00000016383	0.030630665
Comt	ENSRNOG00000001889	0.014450452
Cops9	ENSRNOG00000037402	0.008128533
Cox4i1	ENSRNOG00000017817	0.01725997
Cox4i2	ENSRNOG00000007827	0.019479441
Cox5b	ENSRNOG00000016660	0.020789671
Cox6a1	ENSRNOG00000001170	0.005201611
Cox6b1	ENSRNOG00000024309	0.023192953
Cox6c	ENSRNOG00000010807	0.001171143
Cox7a2l	ENSRNOG00000004526	0.017326887
Cox7a2l2	ENSRNOG00000042903	0.010983803
Cox7b	ENSRNOG00000054689	0.012868914
Cox7c	ENSRNOG00000030237	1.48E-05
Cox8a	ENSRNOG00000021177	0.004213819
Cpe	ENSRNOG00000043387	4.51E-06
Cplx2	ENSRNOG00000000105	0.00782744
Creg1	ENSRNOG00000003291	0.013252688
Crip2	ENSRNOG00000005041	0.011750052
Crispld2	ENSRNOG00000016752	0.007495128
Crtac1	ENSRNOG00000015220	0.008653664
Csad	ENSRNOG00000011573	0.034456253
Csrp1	ENSRNOG00000008937	0.000171485
Csrp2	ENSRNOG00000003772	0.016560314
Cstb	ENSRNOG00000001201	0.049529859
Ctla2a	ENSRNOG00000039971	0.033507843
Ctsa	ENSRNOG00000015857	0.022904323
Ctsc	ENSRNOG00000016496	0.002228087
Ctsl	ENSRNOG00000018566	0.020759832

Cx3cl1	ENSRNOG00000016326	0.037575774
Cxcl16	ENSRNOG00000026647	0.003943124
Cxcl9	ENSRNOG00000022242	0.004387077
Cyb561	ENSRNOG00000007433	1.54E-07
Cyb5r2	ENSRNOG00000019751	0.021863971
Cyba	ENSRNOG00000013014	0.039398993
Cycs	ENSRNOG00000010452	0.016643348
Cyp26b1	ENSRNOG00000015076	0.008909927
Cyt11	ENSRNOG00000028108	4.58E-07
Dab2	ENSRNOG00000028930	0.035192498
Dab2ip	ENSRNOG00000055226	0.006668401
Dad1	ENSRNOG00000009090	0.004041669
Dag1	ENSRNOG00000019400	0.011392149
Dbn1	ENSRNOG00000014170	0.047283175
Ddah1	ENSRNOG00000014613	0.045260714
Ddost	ENSRNOG00000015079	0.028623647
Decr1	ENSRNOG00000008236	0.009163589
Degs1	ENSRNOG00000003223	0.002477426
Des	ENSRNOG00000019810	1.06E-10
Dgkb	ENSRNOG00000030771	1.08E-05
Dhrs3	ENSRNOG00000015736	0.010658535
Diablo	ENSRNOG00000029197	0.023956778
Dipk1b	ENSRNOG00000004532	0.040884596
Dis3	ENSRNOG00000009125	0.001056265
Dkk2	ENSRNOG00000011360	0.008881218
Dkk3	ENSRNOG00000016343	0.002651993
Dlgap1	ENSRNOG00000016196	0.000334187
Dmd	ENSRNOG00000046366	0.003403338
Dmpk	ENSRNOG00000015085	7.38E-07
Dmtn	ENSRNOG00000012273	0.000461819
Dmwd	ENSRNOG00000014984	0.00920035
Dnah12	ENSRNOG00000059865	0.001716131
Dnah9	ENSRNOG00000004171	0.000500646
Dnase1l3	ENSRNOG00000009291	3.74E-05
Dock9	ENSRNOG00000011969	0.009731076
Dpm3	ENSRNOG00000029077	0.006715677
Dpp4	ENSRNOG00000030763	0.006902394
Dpp6	ENSRNOG00000030547	0.021329606
Drc1	ENSRNOG00000024905	0.0004025
Dse	ENSRNOG00000000824	0.034519725
Dsp	ENSRNOG00000013928	0.005497406
Dtna	ENSRNOG00000016671	0.001871707
Dynll1	ENSRNOG00000011222	0.002353052
Dzip1l	ENSRNOG00000014746	0.001579124
Ech1	ENSRNOG00000020308	0.035415582
Edf1	ENSRNOG00000016272	0.035154553
Ednra	ENSRNOG00000012721	0.034654112
Ednrb	ENSRNOG00000010997	0.000149904
Eef1b2	ENSRNOG00000024186	0.002133156
Eef1d	ENSRNOG00000021638	0.037352648
Eef1g	ENSRNOG00000020075	0.026560962
Efcab1	ENSRNOG00000050091	2.14E-06
Efhd1	ENSRNOG00000015596	0.019441893

Efs	ENSRNOG00000042029	0.010149036
Egfl7	ENSRNOG00000019388	6.67E-07
Egflam	ENSRNOG00000012058	0.014450452
Ehd2	ENSRNOG00000011346	0.003943124
Eif3m	ENSRNOG00000012738	0.02570021
Eif5a	ENSRNOG00000016478	0.018564648
Eln	ENSRNOG00000001469	0.004860716
Elof1	ENSRNOG00000014284	0.017485312
Elov1	ENSRNOG00000028448	0.040713696
Elov14	ENSRNOG00000009773	0.013982374
Elov17	ENSRNOG00000010450	0.000766781
Emc3	ENSRNOG00000009934	0.004571803
Emc7	ENSRNOG00000005884	0.015059938
Emg1	ENSRNOG00000012828	0.007502345
Emp2	ENSRNOG00000002664	0.007267141
Enah	ENSRNOG00000031934	6.75E-05
Enkur	ENSRNOG00000018631	0.018869301
Enpp2	ENSRNOG00000004089	1.29E-07
Epas1	ENSRNOG00000021318	0.0001887
Ephb4	ENSRNOG00000045952	0.003220277
Ephx1	ENSRNOG00000003515	4.11E-05
Epn3	ENSRNOG00000003284	7.47E-05
Eps8l2	ENSRNOG00000018336	5.59E-06
Ergic3	ENSRNOG00000031085	0.001953268
Erh	ENSRNOG00000004883	0.0230159
Esam	ENSRNOG00000033217	0.003917552
Esd	ENSRNOG00000009512	0.009179625
Etfb	ENSRNOG00000017851	0.017700427
Etl4	ENSRNOG00000008666	0.002241296
Evi2a	ENSRNOG00000022764	0.037677698
Exosc5	ENSRNOG00000020635	0.000110841
Extl1	ENSRNOG00000016776	0.008720195
F10	ENSRNOG00000033444	0.048578663
F2rl3	ENSRNOG00000048186	0.002720578
F5	ENSRNOG00000057855	0.005293961
Faah	ENSRNOG00000045949	0.01862039
Fads1	ENSRNOG00000020480	0.000458453
Fam107a	ENSRNOG00000033261	0.000313571
Fam110b	ENSRNOG00000009114	0.009299429
Fam160a1	ENSRNOG00000048256	2.79E-07
Fam171b	ENSRNOG00000004783	0.007193314
Fam189a2	ENSRNOG000000061147	0.000114394
Fam241b	ENSRNOG00000000551	0.01714879
Fbln5	ENSRNOG00000050539	0.002740086
Fbxo44	ENSRNOG00000009298	0.022020287
Fcgr1a	ENSRNOG00000021199	0.002638112
Fcgr3a	ENSRNOG00000024382	0.033913351
Fcgrt	ENSRNOG00000020583	1.40E-11
Fermt2	ENSRNOG00000009102	0.006385463
Fgd5	ENSRNOG00000010213	0.036370242
Fgf1	ENSRNOG00000013867	7.32E-05
Fgfr2	ENSRNOG00000016374	0.000212759
Fgfr3	ENSRNOG00000016818	0.028840675

Fis1	ENSRNOG00000001420	0.031297113
Fjx1	ENSRNOG00000005347	0.027849496
Fkbp11	ENSRNOG000000054775	0.029305175
Fkbp4	ENSRNOG00000006444	0.049243941
Fkbp9	ENSRNOG00000005478	0.001713107
Flrt2	ENSRNOG00000003732	0.01777305
Flt3	ENSRNOG000000054764	3.88E-09
Fmc1	ENSRNOG00000005618	0.028494302
Fmod	ENSRNOG00000003183	1.36E-12
Folr1	ENSRNOG00000019902	1.72E-07
Foxc1	ENSRNOG00000017800	0.042583534
Foxred2	ENSRNOG00000005749	0.001180293
Frem1	ENSRNOG00000022309	5.33E-08
Frmpr1	ENSRNOG00000012546	0.000400967
Frmpr4	ENSRNOG00000004118	9.53E-09
Fuca1	ENSRNOG00000009325	0.020064756
Fxyd1	ENSRNOG00000021079	1.06E-05
Fzd2	ENSRNOG00000021962	0.008502943
Fzd4	ENSRNOG00000016848	0.000543786
Gabarap	ENSRNOG00000017417	0.016221015
Gal3st4	ENSRNOG00000001375	0.022007591
Gas6	ENSRNOG00000018233	9.56E-05
Gcsam	ENSRNOG00000022110	4.24E-06
Gdf11	ENSRNOG00000007610	0.008158589
Gdf7	ENSRNOG00000006046	2.12E-05
Gdi2	ENSRNOG00000018091	0.024727068
Ghr	ENSRNOG00000015654	0.04889184
Gja4	ENSRNOG00000014357	0.00020367
Glis3	ENSRNOG00000014768	0.004982731
Glo1	ENSRNOG00000000541	0.009084823
Glrx5	ENSRNOG00000004206	0.009760642
Gm2a	ENSRNOG000000052219	0.00332758
Gmfg	ENSRNOG00000019838	0.043754263
Gnptg	ENSRNOG00000024455	0.040779448
Golt1b	ENSRNOG000000058386	0.017979977
Got2	ENSRNOG00000011782	0.013044825
Gpc4	ENSRNOG00000002413	0.000476771
Gpm6a	ENSRNOG00000010731	4.49E-05
Gpr155	ENSRNOG00000018485	0.046883038
Gpr160	ENSRNOG00000009487	0.020273982
Gpr171	ENSRNOG00000025297	0.000856112
Gpr65	ENSRNOG00000003806	0.036256993
Gpx1	ENSRNOG00000048812	0.026206513
Gpx8	ENSRNOG00000010461	0.009624392
Grcc10	ENSRNOG00000025810	0.025807946
Grem1	ENSRNOG00000026053	8.33E-05
Grip2	ENSRNOG00000009726	0.007538373
Gsta1	ENSRNOG00000013484	4.47E-05
Gsta4	ENSRNOG00000030449	0.026685461
Gstp1	ENSRNOG00000018237	0.00516292
Gucy1a1	ENSRNOG00000012302	0.009299429
Gucy1a2	ENSRNOG00000029876	0.001423063
Gucy1b1	ENSRNOG00000012060	0.000677657

Gulp1	ENSRNOG00000003242	0.005097057
H2az2	ENSRNOG000000052275	0.046552702
H3f3c	ENSRNOG000000032401	0.005001756
Havcr1	ENSRNOG00000007243	0.000307149
Heg1	ENSRNOG00000001793	0.001558862
Hey1	ENSRNOG000000011593	0.02427692
Hey2	ENSRNOG000000013364	0.000559686
Heyl	ENSRNOG000000015318	0.02221531
Hfe	ENSRNOG000000016967	0.003678429
Hint1	ENSRNOG00000000622	0.000136538
Hmgn3	ENSRNOG000000031032	0.00157044
Hsd17b11	ENSRNOG00000002210	0.047895996
Hsp90aa1	ENSRNOG000000059714	0.002125998
Hspa12a	ENSRNOG000000018019	0.012668273
Hspa4l	ENSRNOG000000010819	5.92E-05
Hspb8	ENSRNOG000000022392	3.39E-05
Htr2c	ENSRNOG000000030877	1.68E-11
Hyal1	ENSRNOG000000015858	0.000653456
Hyal2	ENSRNOG000000031420	0.005130064
Hydin	ENSRNOG000000017178	2.94E-07
Iah1	ENSRNOG000000060853	0.049464828
Ica1	ENSRNOG000000008628	0.014414453
Id4	ENSRNOG000000016099	0.002229972
Ifi27	ENSRNOG000000009263	0.038691311
Ifi27l2b	ENSRNOG000000026605	0.022641142
Ifi35	ENSRNOG000000020678	0.02300555
Ifi47	ENSRNOG000000002470	0.039591998
Ift57	ENSRNOG000000001958	0.038312541
Igf1	ENSRNOG000000004517	0.008653664
Igf2	ENSRNOG000000020369	1.47E-10
Igf2r	ENSRNOG000000014997	0.012861091
Igfbp2	ENSRNOG000000016957	3.61E-08
Igfbp3	ENSRNOG000000061910	0.000439308
Igfbp4	ENSRNOG000000010635	2.30E-05
Igfbp7	ENSRNOG000000002050	6.84E-10
Igsf1	ENSRNOG000000007600	4.40E-06
Il13ra1	ENSRNOG000000013170	0.032648494
Inka2	ENSRNOG000000015691	0.000318219
Itga1	ENSRNOG000000053550	0.002302598
Itga3	ENSRNOG000000004276	1.91E-06
Itga7	ENSRNOG000000007905	1.03E-06
Itgb6	ENSRNOG000000008346	1.05E-07
Itgb8	ENSRNOG000000006569	0.000334187
Itih3	ENSRNOG000000017689	0.027831398
Itm2b	ENSRNOG000000016271	0.019645159
Itm2c	ENSRNOG000000017359	0.000408453
Jag1	ENSRNOG000000007443	0.015253246
Jam3	ENSRNOG000000009149	0.010991162
Jph2	ENSRNOG000000008170	0.003469587
Kcne2	ENSRNOG000000029811	5.72E-10
Kcnj13	ENSRNOG000000016057	7.69E-07
Kcnk1	ENSRNOG000000019937	1.70E-06
Kcnk10	ENSRNOG000000003813	0.002802659

Kcnk13	ENSRNOG00000047363	0.02300555
Kcnmb1	ENSRNOG00000005465	1.91E-05
Kcnn4	ENSRNOG00000019440	0.036064701
Kcng1	ENSRNOG00000020532	5.01E-05
Kdelr2	ENSRNOG00000001083	0.012490279
Kdr	ENSRNOG000000046829	0.034666546
Kif1a	ENSRNOG00000023993	0.038506384
Kirrel1	ENSRNOG00000016408	4.91E-05
Kit	ENSRNOG00000002227	4.49E-05
Kitlg	ENSRNOG00000005386	0.019558494
Kl	ENSRNOG00000001092	7.04E-15
Klhdc7a	ENSRNOG00000018867	1.85E-06
Klhl23	ENSRNOG00000007981	0.043716933
Krt18	ENSRNOG000000047393	2.85E-07
Krtcap2	ENSRNOG00000020542	0.003402855
Lama2	ENSRNOG00000011134	2.46E-05
Lama5	ENSRNOG00000053691	8.56E-06
Lamb2	ENSRNOG000000047768	2.57E-07
Lamtor2	ENSRNOG00000019908	0.033249864
Laptm4a	ENSRNOG00000006865	0.001232424
Laptm4b	ENSRNOG00000006766	0.038872979
Lats2	ENSRNOG000000056343	0.022052841
Ldb3	ENSRNOG000000059166	0.011654916
Lfng	ENSRNOG00000001250	0.004311674
Lgalsl	ENSRNOG00000005464	2.20E-05
Limd2	ENSRNOG000000025448	0.014583003
Lims2	ENSRNOG00000016021	0.043042296
Lman2	ENSRNOG00000016161	0.043307127
Lmbrd1	ENSRNOG00000012178	0.033203952
Lmod1	ENSRNOG000000051548	2.11E-05
Lmx1a	ENSRNOG00000004642	1.73E-07
LOC100359922	ENSRNOG00000006283	0.000678861
LOC100359951	ENSRNOG00000029627	0.005293961
LOC100360057	ENSRNOG00000011104	0.002669858
LOC100360117	ENSRNOG00000032635	0.022492409
LOC100360218	ENSRNOG00000001713	0.011212584
LOC100360449	ENSRNOG00000026716	0.002327929
LOC100360828	ENSRNOG00000023086	0.049077703
LOC100360841	ENSRNOG00000033803	0.024229057
LOC100361854	ENSRNOG00000029512	0.004540728
LOC100362027	ENSRNOG00000032825	0.000589448
LOC100362333	ENSRNOG000000055277	0.004769897
LOC100362366	ENSRNOG00000028690	0.000342517
LOC100362432	ENSRNOG00000019811	0.00248584
LOC100363469	ENSRNOG000000031579	0.00361439
LOC100910944	ENSRNOG000000045555	0.039591998
LOC100911847	ENSRNOG00000018774	0.000334187
LOC102555453	ENSRNOG00000028993	0.001416866
LOC102555453	ENSRNOG00000029115	9.07E-06
LOC103689961	ENSRNOG000000051483	0.030090749
LOC108348144	ENSRNOG00000052226	0.003056138
LOC108348287	ENSRNOG00000031022	0.0002731
LOC108352650	ENSRNOG00000004196	0.000320914

LOC498555	ENSRNOG00000038074	0.001952968
LOC685963	ENSRNOG00000030747	3.30E-05
LOC686087	ENSRNOG00000058316	0.00041377
LOC687679	ENSRNOG00000016507	0.046206676
LOC687780	ENSRNOG00000020982	0.006848914
Lox	ENSRNOG00000014426	0.011810959
Loxl1	ENSRNOG00000008680	0.048601146
Loxl4	ENSRNOG00000015727	8.18E-05
Lpl	ENSRNOG00000012181	9.70E-06
Lrp8	ENSRNOG00000013064	0.003220277
Lrrc32	ENSRNOG00000015310	0.007127583
Lrrc58	ENSRNOG00000027151	0.024430425
Lrrn2	ENSRNOG00000009691	0.004311674
Lsm10	ENSRNOG00000025716	0.026256024
Lsm3	ENSRNOG00000008733	0.049726996
Ltbp1	ENSRNOG00000033090	0.002982972
Ltbp3	ENSRNOG00000020813	0.017979977
Ltbp4	ENSRNOG00000020871	5.26E-05
Ly86	ENSRNOG00000000137	0.016280817
Lyz2	ENSRNOG00000005825	9.21E-06
M6pr	ENSRNOG00000014992	0.046870564
Maf1	ENSRNOG00000013514	0.029839854
Maged1	ENSRNOG00000006756	0.010060084
Maoa	ENSRNOG00000002848	0.033682898
Map1b	ENSRNOG00000017428	0.01572867
Map2	ENSRNOG00000011841	0.025803429
Map3k7cl	ENSRNOG00000001584	1.46E-05
Mapk4	ENSRNOG00000015401	6.75E-09
Marveld2	ENSRNOG000000052167	0.019457269
Matn2	ENSRNOG00000006060	0.00191571
Mboat2	ENSRNOG000000061050	0.003370871
Mcam	ENSRNOG00000007726	8.71E-06
Mcee	ENSRNOG00000016327	0.032613408
Mdh1	ENSRNOG00000008103	0.000767176
Mdk	ENSRNOG00000017560	1.00E-06
Mea1	ENSRNOG00000017144	0.028865737
Mecom	ENSRNOG00000012645	0.003171483
Mesd	ENSRNOG00000012366	0.009547675
Mest	ENSRNOG00000048088	0.002258873
Mfrp	ENSRNOG00000039107	4.53E-10
Mgat1	ENSRNOG00000031208	0.03244467
Mgat2	ENSRNOG00000004234	0.033203952
Mgat3	ENSRNOG00000017434	7.03E-06
Mgp	ENSRNOG00000005695	0.020908531
Micos10	ENSRNOG000000042696	0.021172984
Micos13	ENSRNOG000000046002	0.002967649
Micu1	ENSRNOG000000043436	0.036370242
Mill1	ENSRNOG00000017699	0.00059474
Mkks	ENSRNOG00000006705	0.04817906
Mmp12	ENSRNOG000000030187	0.005611325
Mmp14	ENSRNOG00000010947	9.48E-05
Mmp15	ENSRNOG00000012622	0.007104701
Mmp24	ENSRNOG000000047028	0.021311427

Mns1	ENSRNOG00000057867	0.000200096
Mocs2	ENSRNOG00000056325	0.008392468
Morn4	ENSRNOG00000027156	0.0466217
Mpc2	ENSRNOG00000003150	0.04258097
Mpdz	ENSRNOG00000007894	0.000214083
Mrc1	ENSRNOG00000018251	0.003232931
Mreg	ENSRNOG00000015774	0.007647523
Mrfap1	ENSRNOG00000055319	0.001512847
Mrpl20	ENSRNOG00000018647	0.001495904
Mrpl33	ENSRNOG00000025388	0.026206513
Mrpl52	ENSRNOG00000039297	0.031154404
Mrps16	ENSRNOG00000006898	0.037587338
Mrvi1	ENSRNOG00000017767	0.000985174
Ms4a7	ENSRNOG00000020953	0.000482125
Msi1	ENSRNOG00000001156	0.000225201
Msx1	ENSRNOG00000006876	6.45E-08
Mt-atp6	ENSRNOG00000031979	1.08E-07
Mt-atp8	ENSRNOG00000033299	0.000429592
Mt-co1	ENSRNOG00000034234	0.000236161
Mt-co2	ENSRNOG00000030371	0.001281244
Mt-co3	ENSRNOG00000030700	0.000355768
Mt-cyb	ENSRNOG00000031766	3.66E-10
Mt-nd1	ENSRNOG00000030644	3.87E-08
Mt-nd2	ENSRNOG00000031033	4.89E-11
Mt-nd3	ENSRNOG00000033615	0.013005642
Mt-nd4	ENSRNOG00000029707	5.41E-08
Mt-nd4l	ENSRNOG00000031053	3.85E-06
Mt-nd5	ENSRNOG00000029971	7.71E-11
Mt-nd6	ENSRNOG00000029042	5.75E-08
Mtss2	ENSRNOG00000017500	0.002167186
Mustn1	ENSRNOG00000017369	0.009033337
Mxd4	ENSRNOG00000015033	0.046092833
Mxra8	ENSRNOG00000019244	0.043695295
Mycl	ENSRNOG00000014259	0.016560314
Myh11	ENSRNOG00000057880	2.08E-11
Myh14	ENSRNOG00000020014	0.012452444
Myl12a	ENSRNOG00000015278	0.011123782
Myl9	ENSRNOG00000020246	1.22E-10
Myo10	ENSRNOG00000010161	0.039415231
Myo1d	ENSRNOG00000003276	0.02713079
Myo5b	ENSRNOG00000014104	1.16E-07
Myo5c	ENSRNOG00000008356	2.69E-05
Naaa	ENSRNOG00000002273	0.005567752
Nans	ENSRNOG00000008945	0.036370242
Nav2	ENSRNOG00000014530	3.69E-05
Nckap1	ENSRNOG00000007518	8.93E-05
Ncoa4	ENSRNOG00000019768	0.016244919
Ncs1	ENSRNOG00000008761	0.002563576
Ncstn	ENSRNOG00000005355	0.016875347
Ndfip1	ENSRNOG00000013562	0.006231838
Ndrp2	ENSRNOG00000010389	0.000170598
Ndufa11	ENSRNOG00000048320	0.003172757
Ndufa13	ENSRNOG00000020602	0.000296686

Ndufa2	ENSRNOG00000017571	0.012452444
Ndufa3	ENSRNOG00000060293	0.036190143
Ndufa4	ENSRNOG00000005512	0.004899121
Ndufa5	ENSRNOG00000005698	0.030395934
Ndufa9	ENSRNOG00000061684	0.019350862
Ndufaf8	ENSRNOG00000042653	0.012316442
Ndufb10	ENSRNOG00000014568	0.012413422
Ndufb11	ENSRNOG00000008329	0.000609045
Ndufb2	ENSRNOG00000026616	0.000373325
Ndufb4	ENSRNOG00000002721	0.046878318
Ndufb8	ENSRNOG00000014078	0.000556087
Ndufb9	ENSRNOG00000009364	0.001005835
Ndufc2	ENSRNOG00000012383	0.003297892
Ndufs1	ENSRNOG00000011849	0.028727768
Ndufs2	ENSRNOG00000038372	0.001352291
Ndufs4	ENSRNOG00000011383	0.004139137
Ndufs5	ENSRNOG00000026646	0.029258792
Ndufs8	ENSRNOG00000017446	0.019645159
Ndufv2	ENSRNOG00000042503	0.023881003
Nebi	ENSRNOG00000049452	0.000132314
Nedd4	ENSRNOG00000058898	0.034082968
Nell2	ENSRNOG00000006235	5.66E-07
Neur11	ENSRNOG00000020339	0.001305301
NEWGENE_1308171	ENSRNOG00000029792	0.042368446
Nexn	ENSRNOG00000012512	3.25E-05
Nid1	ENSRNOG00000002461	0.001735821
Ninj1	ENSRNOG00000016587	0.004576394
Nme1	ENSRNOG00000002693	0.011143495
Nme2	ENSRNOG00000002671	0.001428251
Nop2	ENSRNOG00000018453	1.15E-07
Nos1	ENSRNOG00000001130	0.003760417
Notch3	ENSRNOG00000004346	6.02E-10
Npy1r	ENSRNOG00000014149	7.08E-05
Nr2f2	ENSRNOG00000010308	0.009208136
Nrarp	ENSRNOG00000009354	0.007127583
Nsg2	ENSRNOG00000020644	9.74E-07
Nt5dc2	ENSRNOG00000018358	0.001495904
Ntn4	ENSRNOG00000005573	0.001356428
Ntng1	ENSRNOG00000031136	8.97E-05
Ntrk2	ENSRNOG00000018839	2.74E-08
Ntrk3	ENSRNOG00000018674	0.022492409
Nxn	ENSRNOG00000008178	0.04778962
Obsl1	ENSRNOG00000015346	0.049554708
Olfml1	ENSRNOG00000056562	0.000383985
Olr59	ENSRNOG00000018606	0.031539206
Optn	ENSRNOG00000017941	0.042374055
Orai1	ENSRNOG00000001336	0.013779652
Osbp15	ENSRNOG00000020713	0.020037997
Osbp16	ENSRNOG00000010812	0.037193264
Ost4	ENSRNOG00000008605	0.00131644
Ostc	ENSRNOG00000023322	0.001922837
Ostf1	ENSRNOG00000012156	0.008398667
P2ry13	ENSRNOG00000029756	0.013982374

Pam	ENSRNOG00000033280	0.010637429
Paqr5	ENSRNOG00000014164	0.003943124
Pard3b	ENSRNOG00000024345	0.049299099
Park7	ENSRNOG00000018289	0.005380506
Parm1	ENSRNOG00000002579	1.46E-05
Parva	ENSRNOG00000015713	0.000199263
Pcdh1	ENSRNOG00000060410	0.006793212
Pcp4	ENSRNOG00000001628	0.032207172
Pcp4l1	ENSRNOG00000003209	0.018054581
Pde3a	ENSRNOG00000025042	1.14E-06
Pde4c	ENSRNOG00000019518	0.006103833
Pde5a	ENSRNOG00000014443	0.001932748
Pde6d	ENSRNOG00000018610	0.023550938
Pdgfd	ENSRNOG00000029148	0.001905865
Pdgfra	ENSRNOG00000002244	1.86E-05
Pdgfrb	ENSRNOG00000018461	0.002543584
Pdia6	ENSRNOG00000050197	0.005380506
Pdlim3	ENSRNOG00000012658	0.040000275
Pdzd2	ENSRNOG00000013140	0.000856975
Pdzrn3	ENSRNOG00000057556	0.001782876
Pear1	ENSRNOG00000014243	0.004818695
Pef1	ENSRNOG00000013972	0.011214828
Pfdn5	ENSRNOG00000012985	0.003416321
Pfdn6	ENSRNOG00000000473	0.009208136
Pfkm	ENSRNOG00000057988	0.004838227
Phb	ENSRNOG00000046799	0.028466262
Phb2	ENSRNOG00000012999	0.012058181
Phlda3	ENSRNOG00000009068	0.010879721
Phldb2	ENSRNOG00000002171	0.004809205
Pid1	ENSRNOG00000029735	0.022007591
Pigk	ENSRNOG00000042359	0.047422206
Pigm	ENSRNOG00000007735	0.042013738
Pigx	ENSRNOG00000033623	0.003481231
Pip5k1b	ENSRNOG00000015232	0.000154708
Pitpnm2	ENSRNOG00000029260	0.001939574
Pkig	ENSRNOG00000010235	0.043923479
Pla2g15	ENSRNOG00000019859	0.008158589
Pla2g5	ENSRNOG00000016838	1.24E-07
Plce1	ENSRNOG00000014276	0.010073726
Pld3	ENSRNOG00000018390	0.002229972
Pln	ENSRNOG00000000413	0.006904283
Plod2	ENSRNOG00000030183	0.018822874
Plpp3	ENSRNOG00000008116	0.002802659
Pls3	ENSRNOG00000027520	0.001251542
Pltp	ENSRNOG00000016488	0.009296875
Plvap	ENSRNOG00000017676	0.000407415
Plxnb1	ENSRNOG00000029510	8.97E-07
Plxnd1	ENSRNOG00000025209	0.007298022
Pnma8b	ENSRNOG00000016863	0.043103708
Podxl	ENSRNOG00000012495	0.012688228
Polr2g	ENSRNOG00000019439	0.026516416
Pon2	ENSRNOG00000009112	0.046035357
Ppa1	ENSRNOG00000000557	0.037573413

Ppia	ENSRNOG00000027864	0.022492409
Ppib	ENSRNOG00000016781	0.007652347
Ppp1r1a	ENSRNOG00000036827	0.003708497
Ppp1r1b	ENSRNOG00000028404	1.01E-05
Ppp1r9a	ENSRNOG00000008869	0.040543111
Ppp2cb	ENSRNOG00000015182	0.032719
Ppp2r1a	ENSRNOG00000011282	0.015059938
Prcp	ENSRNOG00000010630	0.027909731
Prdm16	ENSRNOG00000045913	2.06E-11
Prdx3	ENSRNOG00000010958	0.007510731
Prdx4	ENSRNOG00000003763	0.000766781
Prelp	ENSRNOG00000003120	9.06E-07
Prkaa2	ENSRNOG00000007706	0.000275379
Prlr	ENSRNOG000000057557	1.57E-11
Prnp	ENSRNOG00000021259	0.005293961
Prps1	ENSRNOG00000060262	0.037684119
Prps2	ENSRNOG00000004160	0.005690488
Prr32	ENSRNOG00000049388	8.81E-08
Prrx1	ENSRNOG00000003720	0.000153044
Psca	ENSRNOG00000061376	0.000101819
Psm2	ENSRNOG00000049920	0.016307844
Psm3l	ENSRNOG00000007851	0.018085482
Psm4	ENSRNOG00000013493	0.047056514
Psm7	ENSRNOG00000056853	0.029854538
Psmb1	ENSRNOG00000001488	0.000334187
Psmb10	ENSRNOG00000019494	0.017105811
Psmb2	ENSRNOG00000011463	0.014299546
Psmb4	ENSRNOG00000020979	0.020055673
Psmb5	ENSRNOG00000013386	0.003470481
Psmb6	ENSRNOG00000019551	0.004867662
Psmb8	ENSRNOG00000000456	0.030339201
Psmc2	ENSRNOG00000012026	0.032531198
Psmd14	ENSRNOG00000061129	0.02782658
Psmd6	ENSRNOG00000006751	0.025360842
Psme2	ENSRNOG00000019246	0.011123782
Pth1r	ENSRNOG00000020948	0.043042296
Ptpn13	ENSRNOG00000002061	0.005293961
Ptprb	ENSRNOG000000055293	0.009924575
Ptpnf	ENSRNOG00000019977	3.23E-05
Ptprk	ENSRNOG00000047605	0.000409299
Pttg1ip	ENSRNOG00000001223	0.02358514
Pxylp1	ENSRNOG00000012480	0.048578663
Rab1a	ENSRNOG00000004992	0.024890236
Rab1b	ENSRNOG00000050510	0.009547675
Rab5b	ENSRNOG00000006130	0.032207172
Rab5c	ENSRNOG00000018568	0.029639271
Rabac1	ENSRNOG00000020233	0.019368261
Rack1	ENSRNOG00000052620	0.012424688
Ranbp1	ENSRNOG00000001884	0.008142511
Ranbp17	ENSRNOG00000005042	0.02108155
Rapgef4	ENSRNOG00000001516	0.004043658
Rasd1	ENSRNOG00000003348	0.045183383
Rasd2	ENSRNOG00000014761	8.82E-07

Rasl10b	ENSRNOG00000055765	0.036590609
Rbfox2	ENSRNOG00000004688	0.044908031
Rbp1	ENSRNOG00000013794	0.000349144
Rbpms2	ENSRNOG00000015896	0.002720889
Rcn3	ENSRNOG00000043007	0.003416321
Rdh11	ENSRNOG000000054770	0.000399751
Reck	ENSRNOG00000014863	0.003758262
Reep5	ENSRNOG00000020167	0.029232704
Reln	ENSRNOG00000021441	2.38E-05
Retsat	ENSRNOG00000014090	0.011766323
RGD1308430	ENSRNOG00000029146	0.034006521
RGD1310352	ENSRNOG00000006148	0.013724834
RGD1310587	ENSRNOG00000002322	0.036385909
RGD1559575	ENSRNOG000000032396	0.021018172
RGD1560212	ENSRNOG000000057774	0.047538584
RGD1560394	ENSRNOG000000038150	0.029554475
RGD1561149	ENSRNOG00000008113	0.000924713
RGD1561161	ENSRNOG000000039582	0.005856362
RGD1564664	ENSRNOG000000055564	0.001428251
Rgs18	ENSRNOG00000003959	0.045260714
Rgs4	ENSRNOG00000002773	0.014169798
Rgs5	ENSRNOG00000002730	0.000837633
Rhpn1	ENSRNOG00000007597	0.02366169
Rimklb	ENSRNOG00000023814	0.018471213
Rnf152	ENSRNOG00000014859	0.004574262
Rnf26	ENSRNOG00000007720	0.03849515
Rnh1	ENSRNOG00000016416	0.023192953
Ror1	ENSRNOG00000029449	0.005567752
Rpa3	ENSRNOG00000008309	0.039982663
Rpe65	ENSRNOG00000009582	2.30E-06
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Rpl11	ENSRNOG00000026260	0.000114414
Rpl12	ENSRNOG00000016220	5.33E-08
Rpl13	ENSRNOG00000015335	0.013771466
Rpl14	ENSRNOG00000019007	0.000716881
Rpl15	ENSRNOG00000008140	0.001844377
Rpl17	ENSRNOG00000018680	0.001716554
Rpl18	ENSRNOG00000021035	0.001081529
Rpl18a	ENSRNOG00000018795	0.005380506
Rpl19	ENSRNOG00000004741	0.031325833
Rpl21	ENSRNOG00000000957	0.000993615
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Rpl23	ENSRNOG00000004107	9.18E-05
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Rpl26	ENSRNOG00000004214	0.000904451
Rpl27	ENSRNOG00000020674	0.001332698
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Rpl28	ENSRNOG00000017127	0.011123782
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Rpl31	ENSRNOG00000013508	0.004270525
Rpl32	ENSRNOG00000010746	0.003402855
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Rpl37a	ENSRNOG000000023385	0.000318909
Rpl4	ENSRNOG000000009378	0.008850186
Rpl5	ENSRNOG000000023529	0.005116225
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Rplp0	ENSRNOG00000001148	0.021015644
Rplp1	ENSRNOG000000013874	7.05E-05
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Rps19l2	ENSRNOG000000037897	0.003318163
Rps20	ENSRNOG000000008555	0.044869816
Rps21	ENSRNOG000000060449	0.000756958
Rps23	ENSRNOG000000016580	0.001239737
Rps24	ENSRNOG000000010189	0.000389811
Rps25	ENSRNOG000000027503	9.07E-06
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Rps4x	ENSRNOG000000003201	0.000627273
Rps5	ENSRNOG000000019453	0.010937608
Rps7	ENSRNOG000000008551	1.92E-05
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Rpsa	ENSRNOG000000018645	0.018054581
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Rrp1	ENSRNOG000000001203	5.71E-06
Rrp12	ENSRNOG000000048495	0.003005119
Rrp15	ENSRNOG000000002450	0.004173648
Rrp1b	ENSRNOG000000001194	1.09E-08
Rrp36	ENSRNOG000000017836	0.040521532
Rrp7a	ENSRNOG000000022896	1.99E-05
Rrp8	ENSRNOG000000018766	0.00074733
Rrp9	ENSRNOG000000012927	1.43E-05
Rsph10b	ENSRNOG000000001036	0.000121198
Rsph9	ENSRNOG000000019474	0.003416321
RT1-Bb	ENSRNOG000000032708	0.002543584
RT1-Da	ENSRNOG000000032844	0.000348186
RT1-Db1	ENSRNOG000000033215	0.026908532

RT1-DOa	ENSRNOG00000026762	6.93E-05
Rtcb	ENSRNOG00000004813	0.009406612
Rtn3	ENSRNOG00000021202	0.007507792
Rtn4r1	ENSRNOG00000003121	0.000887092
S1pr3	ENSRNOG00000014524	0.040689732
Sall2	ENSRNOG00000013287	0.041190556
Sar1b	ENSRNOG00000004820	0.045699617
Saraf	ENSRNOG00000012329	0.009908784
Scamp2	ENSRNOG00000019136	0.002167186
Scamp4	ENSRNOG00000018271	0.027777658
Scara5	ENSRNOG00000014398	0.012452444
Scgb1c1	ENSRNOG00000012847	0.000948776
Scp2	ENSRNOG00000011413	0.0332376
Scrn1	ENSRNOG00000009636	9.02E-05
Sdf2l1	ENSRNOG00000001859	0.002543584
Sdhc	ENSRNOG00000003163	3.12E-05
Sdhd	ENSRNOG00000022980	0.006992574
Sec11a	ENSRNOG00000011029	0.004173648
Sec61a1	ENSRNOG00000013743	0.017301001
Sec61b	ENSRNOG00000006345	0.034082968
Sec61g	ENSRNOG00000005203	0.000508474
Sectm1a	ENSRNOG000000036672	0.045979282
Selenof	ENSRNOG000000055257	0.000423247
Selenop	ENSRNOG000000053086	0.016284249
Sem1	ENSRNOG00000010420	0.041657504
Sema3f	ENSRNOG00000017704	0.000661036
Sema5a	ENSRNOG00000011977	0.002681603
Sephs2	ENSRNOG00000048397	0.024771458
Serpib9	ENSRNOG000000033772	0.008964572
Sf3b5	ENSRNOG00000014908	0.033203952
Sfrp1	ENSRNOG00000017783	1.09E-09
Sft2d1	ENSRNOG00000024140	0.000175349
Sh3bgrl3	ENSRNOG00000015967	0.038721668
Sh3bp4	ENSRNOG00000019316	0.029212304
Sh3d19	ENSRNOG00000011752	0.029371881
Sh3gl2	ENSRNOG00000006761	0.048159464
Shisal1	ENSRNOG000000052725	0.004466452
Sigmar1	ENSRNOG00000014604	0.008649957
Sil1	ENSRNOG00000019826	0.005307909
Skp1	ENSRNOG000000005828	0.035856646
Slamf7	ENSRNOG00000023209	4.11E-05
Slamf9	ENSRNOG00000008045	0.004031196
Slc12a2	ENSRNOG00000015971	0.047173835
Slc13a4	ENSRNOG00000011184	1.04E-13
Slc15a2	ENSRNOG00000002305	0.009731076
Slc16a12	ENSRNOG000000021916	0.000171485
Slc16a2	ENSRNOG00000002832	0.000135434
Slc19a1	ENSRNOG00000001232	0.016954374
Slc20a2	ENSRNOG00000019490	0.006516512
Slc22a17	ENSRNOG00000016414	0.003116063
Slc22a8	ENSRNOG00000018086	0.021865873
Slc24a4	ENSRNOG00000006729	3.51E-06
Slc25a3	ENSRNOG00000008289	0.021314644

Slc25a5	ENSRNOG00000039980	0.0305525
Slc26a10	ENSRNOG00000029465	0.003758262
Slc29a4	ENSRNOG00000001115	0.000132805
Slc2a12	ENSRNOG00000011161	0.001372599
Slc2a5	ENSRNOG00000017693	0.015498938
Slc30a4	ENSRNOG00000000170	0.040606107
Slc31a1	ENSRNOG00000014475	9.39E-05
Slc35f6	ENSRNOG00000009459	0.036739614
Slc38a11	ENSRNOG00000004966	0.002398526
Slc38a3	ENSRNOG00000016827	0.000583746
Slc39a3	ENSRNOG00000045524	0.00592924
Slc43a3	ENSRNOG00000061768	0.023769136
Slc46a1	ENSRNOG00000010291	0.034082968
Slc48a1	ENSRNOG00000053196	0.029406644
Slc4a10	ENSRNOG00000005307	8.97E-11
Slc4a2	ENSRNOG00000014347	0.017598585
Slc4a3	ENSRNOG00000020138	0.007106352
Slc4a5	ENSRNOG00000010378	1.85E-08
Slc5a5	ENSRNOG00000018822	0.002003925
Slc5a6	ENSRNOG00000057628	0.010599817
Slc6a17	ENSRNOG00000050090	2.84E-05
Slc7a10	ENSRNOG00000010938	0.046883038
Slc7a8	ENSRNOG00000014311	0.040151798
Slc9a3r1	ENSRNOG00000003232	0.048592645
Slc9a6	ENSRNOG00000000879	0.027831398
Slc9a9	ENSRNOG00000008554	0.031509963
Slco1a2	ENSRNOG00000031249	2.81E-10
Slco1c1	ENSRNOG00000009740	0.002298275
Slco3a1	ENSRNOG00000032798	0.001105532
Smco4	ENSRNOG00000011162	0.030350758
Smdt1	ENSRNOG00000008461	0.002946429
Smim15	ENSRNOG00000031995	0.029026236
Smim3	ENSRNOG00000019536	0.001372599
Smo	ENSRNOG00000008332	0.00690027
Snap91	ENSRNOG00000023861	0.006103833
Snrpc	ENSRNOG00000000493	0.032433898
Snx3	ENSRNOG00000046705	0.012174986
Sod3	ENSRNOG00000003869	1.70E-06
Sorbs1	ENSRNOG00000015658	0.044792644
Sorbs2	ENSRNOG00000013391	2.11E-07
Sostdc1	ENSRNOG00000005770	4.44E-13
Sox18	ENSRNOG00000016248	0.009255477
Spaca6	ENSRNOG00000039076	0.048530976
Sparcl1	ENSRNOG00000015093	2.65E-09
Spart	ENSRNOG00000014155	0.048146704
Spcs1	ENSRNOG00000018075	8.38E-05
Spcs3	ENSRNOG00000038933	0.034456253
Speg	ENSRNOG00000019850	0.039530121
Spon1	ENSRNOG00000058003	0.008111053
Ssr2	ENSRNOG00000019940	0.002105635
Ssr4	ENSRNOG00000053172	0.028613223
St6gal1	ENSRNOG0000001823	0.038312541
ST7	ENSRNOG00000056243	0.006423661

Stab1	ENSRNOG00000018434	0.012814258
Stc1	ENSRNOG00000015075	0.001495904
Steap2	ENSRNOG00000006076	0.001372599
Stk39	ENSRNOG00000024808	3.60E-06
Ston1	ENSRNOG00000016688	0.004192862
Stpg1	ENSRNOG000000031448	0.001673383
Stra6	ENSRNOG00000008312	0.000660119
Strip2	ENSRNOG00000057729	0.032207172
Stt3a	ENSRNOG00000031896	0.049243941
Suclg1	ENSRNOG00000005587	0.019733942
Sulf1	ENSRNOG00000009037	0.000132958
Sumo1	ENSRNOG00000016133	0.011146812
Sumo4	ENSRNOG00000032840	0.018905651
Susd3	ENSRNOG00000016525	0.022492409
Swi5	ENSRNOG00000022860	0.009700898
Syde1	ENSRNOG00000007307	0.015034138
Sync	ENSRNOG00000008118	0.023881003
Synm	ENSRNOG00000014030	0.000131299
Synpo2	ENSRNOG00000014867	0.000206966
Synpo2l	ENSRNOG00000008949	0.000136538
Tagln	ENSRNOG00000017628	1.18E-15
Tax1bp3	ENSRNOG00000019357	0.001187207
Tcaf1	ENSRNOG00000017911	0.006021673
Tceal9	ENSRNOG00000034198	0.034268062
Tcf7l1	ENSRNOG00000014753	0.045942586
Tcn2	ENSRNOG00000004280	0.046092833
Tdrp	ENSRNOG00000027245	0.031539206
Tead1	ENSRNOG00000015488	0.009254516
Tekt1	ENSRNOG00000014973	0.033494391
Tenm3	ENSRNOG00000012802	0.021362275
Tenm4	ENSRNOG00000011151	1.35E-07
Tex15	ENSRNOG00000007748	3.83E-10
Tex264	ENSRNOG00000013201	0.010870765
Tfam	ENSRNOG00000000613	0.035035971
Tgfa	ENSRNOG00000016182	0.044439809
Tgfbr3	ENSRNOG00000002093	2.69E-05
Thbs2	ENSRNOG00000010529	0.001316191
Thtpa	ENSRNOG00000018105	0.035844351
Timp3	ENSRNOG00000004303	9.04E-06
Tinagl1	ENSRNOG00000013179	1.08E-06
Tjp1	ENSRNOG00000011077	0.003171483
Tjp3	ENSRNOG00000020501	0.027496713
Tlr11	ENSRNOG00000032368	0.002528755
Tlr12	ENSRNOG00000042455	0.000210009
Tlr2	ENSRNOG00000009822	0.009208136
Tm4sf1	ENSRNOG00000015812	0.002353052
Tm9sf2	ENSRNOG00000012751	0.015860731
Tma7	ENSRNOG00000047225	0.036385909
Tmbim4	ENSRNOG00000004312	0.004761052
Tmed4	ENSRNOG00000005016	0.033926955
Tmed7	ENSRNOG00000003691	0.000161232
Tmem101	ENSRNOG00000054581	0.002003987
Tmem108	ENSRNOG00000010911	0.018246074

Tmem115	ENSRNOG00000021899	0.003394191
Tmem119	ENSRNOG00000000700	0.005023654
Tmem128	ENSRNOG00000005346	0.049529859
Tmem147	ENSRNOG00000021006	0.014583003
Tmem176a	ENSRNOG00000023708	0.013252688
Tmem176b	ENSRNOG00000008465	0.032613408
Tmem18	ENSRNOG00000005144	0.027971372
Tmem200b	ENSRNOG00000032018	0.001462634
Tmem223	ENSRNOG00000019266	4.71E-05
Tmem256	ENSRNOG00000037540	0.024149114
Tmem258b	ENSRNOG00000032740	0.002363616
Tmem37	ENSRNOG00000047714	0.029639271
Tmem47	ENSRNOG00000030418	8.38E-05
Tmem50a	ENSRNOG00000017279	0.007853322
Tmem51	ENSRNOG00000014197	7.08E-05
Tmem59	ENSRNOG00000009778	0.009762846
Tmem72	ENSRNOG00000023340	9.66E-16
Tmem86a	ENSRNOG00000013663	0.000887092
Tmem9	ENSRNOG00000010204	0.024187524
Tmem98	ENSRNOG00000021316	0.009269452
Tmsb4x	ENSRNOG00000047931	0.001942096
Tmtc1	ENSRNOG00000001854	0.028242283
Tmx1	ENSRNOG00000057934	0.023615099
Tmx2	ENSRNOG00000005308	0.004077394
Tnfaip8l2	ENSRNOG00000021100	0.007713753
Tns1	ENSRNOG00000014182	0.00468738
Tns2	ENSRNOG00000010588	0.043307127
Tomm6	ENSRNOG00000046316	0.023088474
Tomm7	ENSRNOG00000043114	0.002024899
Tor1a	ENSRNOG00000006894	0.013724834
Tp53i11	ENSRNOG00000008738	2.87E-06
Tp73	ENSRNOG00000024707	0.011355176
Tpm1	ENSRNOG00000018184	0.001804219
Tpm2	ENSRNOG00000016731	1.05E-11
Tpp1	ENSRNOG00000019212	0.041183758
Tpt1	ENSRNOG00000001049	0.008167367
Trarg1	ENSRNOG00000022239	0.007839908
Tril	ENSRNOG00000026941	0.013954897
Trim2	ENSRNOG00000010124	0.01114971
Trim63	ENSRNOG00000016543	0.011254071
Trpm3	ENSRNOG00000027770	6.45E-08
Trpv4	ENSRNOG00000001195	0.002630683
Tspan12	ENSRNOG00000059016	0.000924713
Tspan18	ENSRNOG00000008758	0.03089059
Tspan3	ENSRNOG00000016474	0.002363616
Tspan31	ENSRNOG00000025592	0.0005323
Tspan33	ENSRNOG00000007900	0.000875912
Tspan6	ENSRNOG00000003786	0.001836382
Tspan7	ENSRNOG00000003229	6.17E-08
Tspan8	ENSRNOG00000004411	0.020918704
Tsta3	ENSRNOG00000009020	0.028911941
Ttc30b	ENSRNOG00000059460	0.027305531
Ttc9	ENSRNOG00000007254	1.03E-06

Ttr	ENSRNOG00000016275	1.21E-14
Ttyh1	ENSRNOG00000032699	0.027400901
Tvp23b	ENSRNOG00000050649	0.002883417
Twsg1	ENSRNOG00000013340	3.26E-07
Txn1	ENSRNOG00000012081	0.016129417
Txn2	ENSRNOG00000005614	0.004173648
Txndc15	ENSRNOG00000000133	0.021976269
Tyrobp	ENSRNOG00000020845	0.035061674
Uba52	ENSRNOG00000019974	0.010245984
Ube2l3	ENSRNOG00000001862	0.006407464
Ugt1a6	ENSRNOG00000018740	0.004387077
Umps	ENSRNOG00000001797	0.040779448
Unc80	ENSRNOG00000028362	0.045359165
Uqcrfs1	ENSRNOG00000018281	0.015180559
Uqcrh	ENSRNOG00000012550	0.019733942
Uqcrq	ENSRNOG00000048174	0.002211902
Vamp8	ENSRNOG00000012748	0.017326887
Vangl1	ENSRNOG00000016477	0.026872419
Vapa	ENSRNOG00000014765	0.047422206
Vat1l	ENSRNOG00000011989	3.67E-11
Vav3	ENSRNOG00000020485	0.020758073
Vdac1	ENSRNOG00000006375	0.02174757
Vdac3	ENSRNOG00000019277	0.031341523
Vti1b	ENSRNOG00000060436	0.007964628
Vwa3a	ENSRNOG00000025110	0.031325833
Vwa3b	ENSRNOG00000023566	0.006385463
Wdr66	ENSRNOG00000001342	0.005380506
Wdr78	ENSRNOG00000006999	0.001247415
Wfikkn2	ENSRNOG00000002831	1.29E-09
Wipf3	ENSRNOG00000009571	9.74E-06
Wls	ENSRNOG00000036816	7.47E-06
Wnk2	ENSRNOG00000016684	0.001332698
Wnt5b	ENSRNOG00000008168	0.011493097
Wwc1	ENSRNOG00000008065	0.000351937
Xcr1	ENSRNOG00000006620	4.11E-05
Yap1	ENSRNOG00000005933	0.000114394
Ybx1	ENSRNOG00000023786	0.006711818
Yipf5	ENSRNOG00000014564	0.019639476
Ywhae	ENSRNOG00000005290	0.034108194
Ywhaq	ENSRNOG00000051650	0.007630254
Zcchc18	ENSRNOG00000055939	0.038583022
Zfand3	ENSRNOG00000059659	0.028130837
Zfp365	ENSRNOG00000000638	0.043757339
Zfp366	ENSRNOG00000017249	0.009826003
Zfp423	ENSRNOG00000014658	0.039391147
Zfp462	ENSRNOG00000032048	0.049676692
Zfp521	ENSRNOG00000016874	0.047872212
Zic1	ENSRNOG00000014644	0.000132805
Zic2	ENSRNOG00000054879	0.022276606
Zic3	ENSRNOG00000000861	0.011388407
Zic4	ENSRNOG00000014871	0.007507792
Znhit2	ENSRNOG00000021794	0.02820358

Supplemental Table 7: Upregulated genes in spinal vs brainstem microglia shared between males and females

Gene name	Gene stable ID
7SK	ENSRNOG00000058555
AABR07000629.3	ENSRNOG00000050801
AABR07012583.2	ENSRNOG00000059093
AABR07027902.1	ENSRNOG00000050847
AABR07028615.1	ENSRNOG00000018500
AABR07030085.3	ENSRNOG00000053589
AABR07035470.1	ENSRNOG00000024277
AABR07036007.1	ENSRNOG00000053790
AABR07044421.1	ENSRNOG00000061998
AABR07044980.1	ENSRNOG00000061835
AABR07053509.2	ENSRNOG00000059260
AABR07058158.1	ENSRNOG00000062170
AABR07060920.1	ENSRNOG00000054587
AABR07064304.1	ENSRNOG00000046049
AABR07065124.1	ENSRNOG00000055422
AABR07066522.1	ENSRNOG00000049511
AABR07068127.1	ENSRNOG00000025970
AABR07072449.1	ENSRNOG00000011809
Abcc3	ENSRNOG00000002948
Abr	ENSRNOG00000056837
AC098008.3	ENSRNOG00000051318
AC111804.2	ENSRNOG00000062261
AC114233.1	ENSRNOG00000051046
AC125873.1	ENSRNOG00000056094
AC134224.1	ENSRNOG00000062127
AC134224.2	ENSRNOG00000062155
AC134224.3	ENSRNOG00000062158
Acin1	ENSRNOG00000013533
Adap1	ENSRNOG00000054033
Adgrg5	ENSRNOG00000039891
Adm	ENSRNOG00000027030
Agap2	ENSRNOG00000025584
Ago1	ENSRNOG00000055915
Akap6	ENSRNOG00000004841
Akap8	ENSRNOG00000006559
Akap8l	ENSRNOG00000006355
Alpk3	ENSRNOG00000011659
Ap4m1	ENSRNOG00000001353
Arap1	ENSRNOG00000019555
Arrdc2	ENSRNOG00000019009
Arrdc3	ENSRNOG00000045649

Atf3	ENSRNOG00000003745
Atf4	ENSRNOG00000017801
Atxn7	ENSRNOG00000007246
Atxn7l3	ENSRNOG00000020930
Bag3	ENSRNOG00000020298
Baz1a	ENSRNOG00000006828
Bcl6	ENSRNOG00000001843
Best1	ENSRNOG00000020346
Bptf	ENSRNOG00000047296
Brwd1	ENSRNOG00000001632
Btbd19	ENSRNOG00000042163
Btg1	ENSRNOG00000004284
Btg2	ENSRNOG00000003300
C3	ENSRNOG00000046834
C6	ENSRNOG00000024115
Ccdc102a	ENSRNOG00000025843
Ccdc62	ENSRNOG00000038002
Ccdc88b	ENSRNOG00000024931
Ccl4	ENSRNOG00000011406
Ccl2	ENSRNOG00000033234
Cd83	ENSRNOG00000018092
Cdc42bpb	ENSRNOG00000009675
Cebpb	ENSRNOG00000057347
Cep164	ENSRNOG00000029826
Cep250	ENSRNOG00000019340
Ces1a	ENSRNOG00000039725
Cflar	ENSRNOG00000012473
Chad	ENSRNOG00000003304
Chd3	ENSRNOG00000009722
Chd7	ENSRNOG00000006689
Ciart	ENSRNOG00000042717
Cmip	ENSRNOG00000013178
Col11a2	ENSRNOG00000000463
Cramp1	ENSRNOG00000024635
Crebbp	ENSRNOG00000005330
Crem	ENSRNOG00000014900
Cspp1	ENSRNOG00000021718
Csrnp1	ENSRNOG00000033433
Cul9	ENSRNOG00000018372
Cxcl2	ENSRNOG00000002792
Ddit3	ENSRNOG00000006789
Dgka	ENSRNOG00000022943
Disc1	ENSRNOG00000019779

Dnaaf2	ENSRNOG00000028155
Dnaja1	ENSRNOG00000007029
Dnaja4	ENSRNOG00000012106
Dnajb1	ENSRNOG00000021824
Dnajb4	ENSRNOG00000013011
Dnmt3a	ENSRNOG00000026649
Donson	ENSRNOG00000002012
Dpysl3	ENSRNOG00000018992
Dusp5	ENSRNOG00000014061
Egr1	ENSRNOG00000019422
Egr2	ENSRNOG00000000640
Egr3	ENSRNOG00000017828
Egr4	ENSRNOG00000015719
Epha1	ENSRNOG00000017525
Ephb3	ENSRNOG00000031801
Erf	ENSRNOG00000020426
Fam20c	ENSRNOG00000001314
Fbf1	ENSRNOG00000008577
Fbxo40	ENSRNOG00000002459
Fbxw4	ENSRNOG00000046211
Fos	ENSRNOG00000008015
Fosb	ENSRNOG00000046667
Fosl2	ENSRNOG00000052357
Gab2	ENSRNOG00000011882
Gatad2b	ENSRNOG00000015553
Gfap	ENSRNOG00000002919
Gigyf1	ENSRNOG00000001410
Gm22748	ENSRNOG00000055217
Gm25994	ENSRNOG00000045884
Gmip	ENSRNOG00000027257
Gnas	ENSRNOG00000025889
Golga2	ENSRNOG00000011884
Gon4l	ENSRNOG00000020297
Grasp	ENSRNOG00000007346
Gripap1	ENSRNOG00000009071
Gxylt1	ENSRNOG00000005234
Gys1	ENSRNOG00000020812
Hcar2	ENSRNOG00000026653
Hectd4	ENSRNOG00000001352
Herpud1	ENSRNOG00000018796
Hexd	ENSRNOG00000036667
Hivep3	ENSRNOG00000009341
Hlx	ENSRNOG00000002309

Hmox1	ENSRNOG00000014117
Hnrnpdl	ENSRNOG00000002270
Hsp90ab1	ENSRNOG00000019834
Hspa8	ENSRNOG00000034066
Hspb1	ENSRNOG00000023546
Hspd1	ENSRNOG00000014525
Hsph1	ENSRNOG00000000902
Icam1	ENSRNOG00000020679
Icam4	ENSRNOG00000042078
Idi1	ENSRNOG00000016690
Ier2	ENSRNOG00000054344
Ier3	ENSRNOG00000000827
Ier5	ENSRNOG00000059406
Ifit2	ENSRNOG00000036604
Ifnlr1	ENSRNOG00000033984
Ifrd1	ENSRNOG00000050997
Il1a	ENSRNOG00000004575
Il1b	ENSRNOG00000004649
Insig1	ENSRNOG00000006859
Irf2bp2	ENSRNOG00000049900
Itgb3	ENSRNOG00000048449
Jun	ENSRNOG00000026293
Junb	ENSRNOG00000042838
Jund	ENSRNOG00000019568
Kansl3	ENSRNOG00000015417
Kdm6b	ENSRNOG00000037613
Khyn	ENSRNOG00000020506
Kif13b	ENSRNOG00000013089
Klc2	ENSRNOG00000020299
Klf2	ENSRNOG00000014205
Klf4	ENSRNOG00000016299
Klf6	ENSRNOG00000016885
Kmt2d	ENSRNOG00000061499
Ksr1	ENSRNOG00000012818
Lif	ENSRNOG00000007002
Lmbr1l	ENSRNOG00000061607
LOC100909712	ENSRNOG00000011586
LOC103690164	ENSRNOG00000048357
LOC103692471	ENSRNOG00000058834
LOC499407	ENSRNOG00000058912
Lrrc45	ENSRNOG00000045926
Ltbp2	ENSRNOG00000012094
Luc7l2	ENSRNOG00000006001

Madd	ENSRNOG00000012568
Maff	ENSRNOG00000012886
Mafg	ENSRNOG00000036697
Mafk	ENSRNOG0000001277
Map3k1	ENSRNOG00000013177
Mat2a	ENSRNOG00000013520
Maz	ENSRNOG00000055082
Mfsd12	ENSRNOG00000039858
Mical1	ENSRNOG0000000307
Mical2	ENSRNOG00000016244
Mical3	ENSRNOG00000053203
Midn	ENSRNOG00000015434
Mink1	ENSRNOG00000033508
Mir142	ENSRNOG00000035633
Mir207	ENSRNOG00000035596
Mir23a	ENSRNOG00000035644
Mir24-2	ENSRNOG00000035501
Mllt6	ENSRNOG00000053285
Mob3c	ENSRNOG00000037620
Mtmr12	ENSRNOG00000022929
Myo18a	ENSRNOG00000033101
Myo7a	ENSRNOG00000013641
Ncf1	ENSRNOG00000001480
Ncor2	ENSRNOG00000001004
Nes	ENSRNOG00000018681
Nfatc2	ENSRNOG00000012175
Nfkbia	ENSRNOG00000007390
Nfkbid	ENSRNOG00000025111
Nfkbie	ENSRNOG00000019907
Nfkbiz	ENSRNOG000000031163
Nr4a1	ENSRNOG00000007607
Nr4a2	ENSRNOG00000005600
Numa1	ENSRNOG00000000417
Olr1	ENSRNOG000000056219
Osgin1	ENSRNOG00000014948
Padi2	ENSRNOG00000007574
Pcna	ENSRNOG00000021264
Pde4a	ENSRNOG00000020828
Peli2	ENSRNOG00000012363
Per1	ENSRNOG00000007387
Phlda1	ENSRNOG00000004019
Phospho1	ENSRNOG00000005569
Pi16	ENSRNOG00000000525

Pik3c2b	ENSRNOG00000029938
Pik3r1	ENSRNOG00000018903
Pim1	ENSRNOG00000000529
Pkp4	ENSRNOG00000005504
Plekha5	ENSRNOG00000008747
Plekho2	ENSRNOG00000029242
Plk2	ENSRNOG00000011951
Plk3	ENSRNOG00000018484
Polg2	ENSRNOG00000013728
Pou2f2	ENSRNOG00000055650
Ppm1j	ENSRNOG00000012481
Ppp1r15a	ENSRNOG00000020938
Ppp1r3c	ENSRNOG00000018494
Prkag2	ENSRNOG00000009085
Prpf40b	ENSRNOG00000052539
Psd	ENSRNOG00000019435
Pspc1	ENSRNOG00000020782
Pstpip1	ENSRNOG00000016413
Ptp4a1	ENSRNOG00000011771
Rapgef1	ENSRNOG00000014316
Rapgef3	ENSRNOG00000059961
Rdh5	ENSRNOG00000053850
Rel	ENSRNOG00000054437
Relb	ENSRNOG00000033235
RGD1305464	ENSRNOG00000018689
RGD1306556	ENSRNOG00000052424
RGD1562310	ENSRNOG00000001123
Rgs1	ENSRNOG00000003895
Rgs2	ENSRNOG00000003687
Rhob	ENSRNOG00000021403
RNase_MRP	ENSRNOG00000057527
Rnf19b	ENSRNOG00000000123
Rnf40	ENSRNOG00000018840
Rpph1	ENSRNOG00000054493
RT1-CE3	ENSRNOG00000031607
Samd4a	ENSRNOG00000010489
Sat1	ENSRNOG00000003809
Sde2	ENSRNOG00000003247
Sema4c	ENSRNOG00000016254
Sema4d	ENSRNOG00000013679
Setx	ENSRNOG00000013491
Sh3gl3	ENSRNOG00000019776
Shisa8	ENSRNOG00000049407

Sik1	ENSRNOG00000001189
Ski	ENSRNOG00000055340
Slc10a1	ENSRNOG00000005794
Slc16a3	ENSRNOG00000036677
Slfn4	ENSRNOG00000057092
Smad7	ENSRNOG00000018359
Smarca2	ENSRNOG00000011931
Smarcc2	ENSRNOG00000031135
Smox	ENSRNOG00000021255
Snx29	ENSRNOG00000002294
Snx32	ENSRNOG00000026527
Socs3	ENSRNOG00000002946
Soga1	ENSRNOG00000053240
Sowahc	ENSRNOG00000048831
Sp140	ENSRNOG00000022800
Srcap	ENSRNOG00000050282
Tafa3	ENSRNOG00000030253
Taok3	ENSRNOG00000001138
Tcirg1	ENSRNOG00000017220
Tctex1d4	ENSRNOG00000018463
Tgfb1i1	ENSRNOG00000019965
Themis2	ENSRNOG00000012965
Tnfaip3	ENSRNOG00000049517
Tnfrsf13c	ENSRNOG00000007664
Tnrc6a	ENSRNOG00000024737
Tnrc6c	ENSRNOG00000022395
Tpm3	ENSRNOG00000017441
Traf3	ENSRNOG00000008145
Trak1	ENSRNOG00000019262
Trim3	ENSRNOG00000018356
Trpm2	ENSRNOG00000001216
Tspyl2	ENSRNOG00000061782
Tulp2	ENSRNOG00000020927
Ubc	ENSRNOG00000057823
Ubn2	ENSRNOG00000005564
Ubr4	ENSRNOG00000018183
Upf2	ENSRNOG00000023593
Usp36	ENSRNOG00000028255
Ylpm1	ENSRNOG00000027317
Zc3h12a	ENSRNOG00000009131
Zc3h13	ENSRNOG00000011237
Zeb1	ENSRNOG00000017863
Zfand2a	ENSRNOG00000032917

Zfand5	ENSRNOG00000018107
Zfhx3	ENSRNOG00000014452
Zfp827	ENSRNOG00000011697
Znrf1	ENSRNOG00000019028

Supplemental Table 8: Downregulated genes in spinal vs brainstem microglia shared between males and females

Gene stable ID	Gene name
AABR07019403.1	ENSRNOG00000058057
AABR07021759.1	ENSRNOG00000023269
AABR07030823.1	ENSRNOG00000046001
AABR07031193.1	ENSRNOG00000011300
AABR07042821.1	ENSRNOG00000054489
AABR07044388.2	ENSRNOG00000033581
AABR07049085.1	ENSRNOG00000006956
AABR07050646.1	ENSRNOG00000053592
AABR07058699.2	ENSRNOG00000060211
AABR07070307.1	ENSRNOG00000053753
AABR07073181.1	ENSRNOG00000021437
Abat	ENSRNOG00000002636
Abca4	ENSRNOG00000012892
Abcc4	ENSRNOG00000010064
Abhd3	ENSRNOG00000029370
AC108574.1	ENSRNOG00000057903
AC120486.10	ENSRNOG00000059066
AC141489.1	ENSRNOG00000033916
Ace	ENSRNOG00000062101
Ackr3	ENSRNOG00000019622
Acsl6	ENSRNOG00000026745
Acss3	ENSRNOG00000004448
Acta2	ENSRNOG00000058039
Adamts1	ENSRNOG00000001607
Adamts15	ENSRNOG00000009892
Aifm3	ENSRNOG00000037957
Ajuba	ENSRNOG00000012791
Aldh5a1	ENSRNOG00000023538
Alox5	ENSRNOG00000012972
Alox5ap	ENSRNOG00000000907
Ano6	ENSRNOG00000006995
Antxr1	ENSRNOG00000008678
Aqp1	ENSRNOG00000011648
Arhgap44	ENSRNOG00000003603
Arhgef17	ENSRNOG00000053502
Arl6	ENSRNOG00000001689
Arl6ip1	ENSRNOG00000017751

Armcx2	ENSRNOG00000025705
Armcx4	ENSRNOG00000043128
Asah1	ENSRNOG00000010034
Astn1	ENSRNOG00000005667
Atp11c	ENSRNOG00000003472
Atp1a2	ENSRNOG00000007290
Atp1b2	ENSRNOG00000011227
Atp2b2	ENSRNOG00000030269
Atp2b3	ENSRNOG00000061304
Atp5md	ENSRNOG00000042869
Atp6v0b	ENSRNOG00000019655
Atp6v1a	ENSRNOG00000001992
AY172581.2	ENSRNOG00000029145
Baiap2l1	ENSRNOG00000001007
Bcam	ENSRNOG00000029399
Bcar1	ENSRNOG00000019253
Bmp6	ENSRNOG00000013717
Bpnt1	ENSRNOG00000002378
C1qtnf3	ENSRNOG00000018570
C1qtnf5	ENSRNOG00000007613
C5ar1	ENSRNOG00000047800
C7	ENSRNOG00000061379
Ca12	ENSRNOG00000017766
Ca13	ENSRNOG00000021323
Ca14	ENSRNOG00000023162
Cachd1	ENSRNOG00000010514
Cacna1h	ENSRNOG00000033893
Cacnb4	ENSRNOG00000007666
Cald1	ENSRNOG00000010233
Calml4	ENSRNOG00000038202
Car2	ENSRNOG00000009629
Casc4	ENSRNOG00000016357
Cat	ENSRNOG00000008364
Cav1	ENSRNOG00000056836
Cavin1	ENSRNOG00000019778
Cavin2	ENSRNOG00000025895
Cavin3	ENSRNOG00000017914
Ccdc141	ENSRNOG00000012580
Ccdc40	ENSRNOG00000059401
Ccn1	ENSRNOG00000014350
Cd164	ENSRNOG00000000304
Cd48	ENSRNOG00000004737
Cd53	ENSRNOG00000017874

Cd59	ENSRNOG00000042821
Cd99l2	ENSRNOG00000023841
Cdh1	ENSRNOG00000020151
Cdh2	ENSRNOG00000015602
Cdh3	ENSRNOG00000020129
Cdkn1c	ENSRNOG00000059500
Cdr2	ENSRNOG00000017260
Cep170b	ENSRNOG00000033688
Cers2	ENSRNOG00000021138
Cfap126	ENSRNOG00000034221
Cfap300	ENSRNOG00000043410
Cfap43	ENSRNOG00000036585
Cfap52	ENSRNOG00000037718
Cfap69	ENSRNOG00000006114
Cfp	ENSRNOG00000025811
Cgn	ENSRNOG00000020952
Cgnl1	ENSRNOG00000054080
Cldn1	ENSRNOG00000001926
Cldn2	ENSRNOG00000054495
Clec2g	ENSRNOG00000059538
Clec9a	ENSRNOG00000051690
Clic6	ENSRNOG00000026870
Clmn	ENSRNOG00000011044
Clu	ENSRNOG00000016460
Cnn1	ENSRNOG00000027736
Cnn3	ENSRNOG00000011559
Cnpy2	ENSRNOG00000003549
Cntn1	ENSRNOG00000004438
Cobll1	ENSRNOG00000027016
Col4a5	ENSRNOG00000018951
Col8a1	ENSRNOG00000039668
Col8a2	ENSRNOG00000010841
Col9a3	ENSRNOG00000009531
Cox7c	ENSRNOG00000030237
Cox8a	ENSRNOG00000021177
Cpe	ENSRNOG00000043387
Creg1	ENSRNOG00000003291
Crip2	ENSRNOG00000005041
Crispld2	ENSRNOG00000016752
Crtac1	ENSRNOG00000015220
Cxcl9	ENSRNOG00000022242
Cyb561	ENSRNOG00000007433
Dab2ip	ENSRNOG00000055226

Dad1	ENSRNOG00000009090
Dag1	ENSRNOG00000019400
Ddah1	ENSRNOG00000014613
Degs1	ENSRNOG00000003223
Des	ENSRNOG00000019810
Dkk3	ENSRNOG00000016343
Dlgap1	ENSRNOG00000016196
Dmd	ENSRNOG00000046366
Dmpk	ENSRNOG00000015085
Dmtn	ENSRNOG00000012273
Dnah12	ENSRNOG00000059865
Dnah9	ENSRNOG00000004171
Dnase1l3	ENSRNOG00000009291
Dock9	ENSRNOG00000011969
Dpm3	ENSRNOG00000029077
Drc1	ENSRNOG00000024905
Dsp	ENSRNOG00000013928
Dtna	ENSRNOG00000016671
Dzip1l	ENSRNOG00000014746
Ednra	ENSRNOG00000012721
Efcab1	ENSRNOG00000050091
Efs	ENSRNOG00000042029
Elovl7	ENSRNOG00000010450
Emc3	ENSRNOG00000009934
Enah	ENSRNOG00000031934
Enkur	ENSRNOG00000018631
Enpp2	ENSRNOG00000004089
Epas1	ENSRNOG00000021318
Ephb4	ENSRNOG00000045952
Ephx1	ENSRNOG00000003515
Epn3	ENSRNOG00000003284
Eps8l2	ENSRNOG00000018336
Etl4	ENSRNOG00000008666
F5	ENSRNOG00000057855
Faah	ENSRNOG00000045949
Fads1	ENSRNOG00000020480
Fam107a	ENSRNOG00000033261
Fam160a1	ENSRNOG00000048256
Fam171b	ENSRNOG00000004783
Fcgrt	ENSRNOG00000020583
Fermt2	ENSRNOG00000009102
Fgf1	ENSRNOG00000013867
Fgfr2	ENSRNOG00000016374

Fgfr3	ENSRNOG00000016818
Fkbp9	ENSRNOG00000005478
Flrt2	ENSRNOG00000003732
Flt3	ENSRNOG000000054764
Fmod	ENSRNOG00000003183
Folr1	ENSRNOG00000019902
Frem1	ENSRNOG00000022309
Frmprd4	ENSRNOG00000004118
Fxyd1	ENSRNOG00000021079
Fzd4	ENSRNOG00000016848
Gal3st4	ENSRNOG00000001375
Gas6	ENSRNOG00000018233
Gcsam	ENSRNOG00000022110
Gdf11	ENSRNOG00000007610
Gja4	ENSRNOG00000014357
Glis3	ENSRNOG00000014768
Gpc4	ENSRNOG00000002413
Gpm6a	ENSRNOG00000010731
Gpr155	ENSRNOG00000018485
Gpr160	ENSRNOG00000009487
Grem1	ENSRNOG00000026053
Gsta1	ENSRNOG00000013484
Gsta4	ENSRNOG00000030449
Gucy1a1	ENSRNOG00000012302
Gucy1b1	ENSRNOG00000012060
Gulp1	ENSRNOG00000003242
Havcr1	ENSRNOG00000007243
Heg1	ENSRNOG00000001793
Hey2	ENSRNOG00000013364
Hspa12a	ENSRNOG00000018019
Hspa4l	ENSRNOG00000010819
Hspb8	ENSRNOG00000022392
Htr2c	ENSRNOG00000030877
Hyal1	ENSRNOG00000015858
Hyal2	ENSRNOG00000031420
Hydin	ENSRNOG00000017178
Ica1	ENSRNOG00000008628
Id4	ENSRNOG00000016099
Igf1	ENSRNOG00000004517
Igf2	ENSRNOG00000020369
Igf2r	ENSRNOG00000014997
Igfbp2	ENSRNOG00000016957
Igfbp4	ENSRNOG00000010635

Igfbp7	ENSRNOG00000002050
Igsf1	ENSRNOG00000007600
Itga3	ENSRNOG00000004276
Itga7	ENSRNOG00000007905
Itgb6	ENSRNOG00000008346
Itgb8	ENSRNOG00000006569
Itm2c	ENSRNOG00000017359
Jam3	ENSRNOG00000009149
Kcne2	ENSRNOG00000029811
Kcnj13	ENSRNOG00000016057
Kcnk1	ENSRNOG00000019937
Kcnk13	ENSRNOG00000047363
Kcnq1	ENSRNOG00000020532
Kdelr2	ENSRNOG00000001083
Kif1a	ENSRNOG00000023993
Kirrel1	ENSRNOG00000016408
Kit	ENSRNOG00000002227
Kl	ENSRNOG00000001092
Klhdc7a	ENSRNOG00000018867
Kihl23	ENSRNOG00000007981
Krt18	ENSRNOG00000047393
Lama2	ENSRNOG00000011134
Lama5	ENSRNOG00000053691
Lamb2	ENSRNOG00000047768
Lats2	ENSRNOG00000056343
Ldb3	ENSRNOG00000059166
Lfng	ENSRNOG00000001250
Lgalsl	ENSRNOG00000005464
Lmx1a	ENSRNOG00000004642
LOC100362432	ENSRNOG00000019811
LOC108348144	ENSRNOG00000052226
LOC686087	ENSRNOG00000058316
Lox	ENSRNOG00000014426
Loxl1	ENSRNOG00000008680
Lpl	ENSRNOG00000012181
Lrp8	ENSRNOG00000013064
Lrrc32	ENSRNOG00000015310
Lrrc58	ENSRNOG00000027151
Lrrn2	ENSRNOG00000009691
Ltbp1	ENSRNOG00000033090
Ltbp4	ENSRNOG00000020871
Lyz2	ENSRNOG00000005825
Maged1	ENSRNOG00000006756

Maoa	ENSRNOG00000002848
Map2	ENSRNOG00000011841
Map3k7cl	ENSRNOG00000001584
Mapk4	ENSRNOG00000015401
Matn2	ENSRNOG00000006060
Mboat2	ENSRNOG000000061050
Mcam	ENSRNOG00000007726
Mdk	ENSRNOG00000017560
Mest	ENSRNOG00000048088
Mfrp	ENSRNOG000000039107
Mgat3	ENSRNOG00000017434
Mgp	ENSRNOG00000005695
Micu1	ENSRNOG000000043436
Mill1	ENSRNOG00000017699
Mmp14	ENSRNOG00000010947
Mmp15	ENSRNOG00000012622
Mns1	ENSRNOG000000057867
Mpdz	ENSRNOG00000007894
Mrpl20	ENSRNOG00000018647
Mrpl33	ENSRNOG000000025388
Msi1	ENSRNOG00000001156
Msx1	ENSRNOG000000006876
Mt-atp6	ENSRNOG000000031979
Mt-co1	ENSRNOG000000034234
Mt-cyb	ENSRNOG000000031766
Mt-nd1	ENSRNOG000000030644
Mt-nd2	ENSRNOG000000031033
Mt-nd4	ENSRNOG000000029707
Mt-nd4l	ENSRNOG000000031053
Mt-nd5	ENSRNOG000000029971
Mt-nd6	ENSRNOG000000029042
Mtss2	ENSRNOG00000017500
Mustn1	ENSRNOG00000017369
Mxra8	ENSRNOG00000019244
Mycl	ENSRNOG00000014259
Myh11	ENSRNOG000000057880
Myl12a	ENSRNOG00000015278
Myl9	ENSRNOG000000020246
Myo1d	ENSRNOG000000003276
Myo5b	ENSRNOG00000014104
Myo5c	ENSRNOG000000008356
Naaa	ENSRNOG000000002273
Nav2	ENSRNOG00000014530

Nckap1	ENSRNOG00000007518
Ncoa4	ENSRNOG00000019768
Ncstn	ENSRNOG00000005355
Ndrp2	ENSRNOG00000010389
Ndufb11	ENSRNOG00000008329
Nedd4	ENSRNOG00000058898
Nell2	ENSRNOG00000006235
Neur1	ENSRNOG00000020339
NEWGENE_1308171	ENSRNOG00000029792
Ninj1	ENSRNOG00000016587
Nos1	ENSRNOG00000001130
Notch3	ENSRNOG00000004346
Npy1r	ENSRNOG00000014149
Nr2f2	ENSRNOG00000010308
Nrarp	ENSRNOG00000009354
Nsg2	ENSRNOG00000020644
Nt5dc2	ENSRNOG00000018358
Ntn4	ENSRNOG00000005573
Ntng1	ENSRNOG00000031136
Ntrk2	ENSRNOG00000018839
Obs1	ENSRNOG00000015346
Olfml1	ENSRNOG00000056562
Olr59	ENSRNOG00000018606
Osbpl5	ENSRNOG00000020713
P2ry13	ENSRNOG00000029756
Paqr5	ENSRNOG00000014164
Parm1	ENSRNOG00000002579
Parva	ENSRNOG00000015713
Pcp4l1	ENSRNOG00000003209
Pde3a	ENSRNOG00000025042
Pde4c	ENSRNOG00000019518
Pde5a	ENSRNOG00000014443
Pde6d	ENSRNOG00000018610
Pdgfd	ENSRNOG00000029148
Pdgfra	ENSRNOG00000002244
Pdgfrb	ENSRNOG00000018461
Pdzd2	ENSRNOG00000013140
Pear1	ENSRNOG00000014243
Phlda3	ENSRNOG00000009068
Phldb2	ENSRNOG00000002171
Pigm	ENSRNOG00000007735
Pip5k1b	ENSRNOG00000015232
Pitpnm2	ENSRNOG00000029260

Pla2g5	ENSRNOG00000016838
Plce1	ENSRNOG00000014276
Plid3	ENSRNOG00000018390
Plod2	ENSRNOG00000030183
Plpp3	ENSRNOG00000008116
Plxnb1	ENSRNOG00000029510
Pnma8b	ENSRNOG00000016863
Podxl	ENSRNOG00000012495
Ppp1r1a	ENSRNOG00000036827
Ppp1r1b	ENSRNOG00000028404
Ppp2r1a	ENSRNOG00000011282
Prdm16	ENSRNOG00000045913
Prdx3	ENSRNOG00000010958
Prelp	ENSRNOG00000003120
Prkaa2	ENSRNOG00000007706
Prlr	ENSRNOG00000057557
Prr32	ENSRNOG00000049388
Psma2	ENSRNOG00000049920
Psemb2	ENSRNOG00000011463
Ptpn13	ENSRNOG00000002061
Ptprb	ENSRNOG00000055293
Ptprf	ENSRNOG00000019977
Ptprk	ENSRNOG00000047605
Pxylp1	ENSRNOG00000012480
Rab1a	ENSRNOG00000004992
Rab5b	ENSRNOG00000006130
Rasd1	ENSRNOG00000003348
Rbp1	ENSRNOG00000013794
Rbpms2	ENSRNOG00000015896
Reck	ENSRNOG00000014863
Reln	ENSRNOG00000021441
RGD1308430	ENSRNOG00000029146
RGD1561149	ENSRNOG00000008113
RGD1561161	ENSRNOG00000039582
RGD1564664	ENSRNOG00000055564
Rgs5	ENSRNOG00000002730
Rhpn1	ENSRNOG00000007597
Rnf152	ENSRNOG00000014859
Rps27a	ENSRNOG00000034246
Rrad	ENSRNOG00000011901
Rsph10b	ENSRNOG00000001036
Rsph9	ENSRNOG00000019474
Rtn4rl1	ENSRNOG00000003121

S1pr3	ENSRNOG00000014524
Saraf	ENSRNOG00000012329
Scamp2	ENSRNOG00000019136
Scara5	ENSRNOG00000014398
Scgb1c1	ENSRNOG00000012847
Scrn1	ENSRNOG00000009636
Sdhc	ENSRNOG00000003163
Sec61b	ENSRNOG00000006345
Sema3f	ENSRNOG00000017704
Sema5a	ENSRNOG00000011977
Sfrp1	ENSRNOG00000017783
Sft2d1	ENSRNOG00000024140
Sh3bp4	ENSRNOG00000019316
Sh3d19	ENSRNOG00000011752
Shisal1	ENSRNOG000000052725
Slamf7	ENSRNOG00000023209
Slc13a4	ENSRNOG00000011184
Slc16a12	ENSRNOG00000021916
Slc16a2	ENSRNOG00000002832
Slc20a2	ENSRNOG00000019490
Slc22a17	ENSRNOG00000016414
Slc22a8	ENSRNOG00000018086
Slc24a4	ENSRNOG00000006729
Slc26a10	ENSRNOG00000029465
Slc29a4	ENSRNOG00000001115
Slc2a12	ENSRNOG00000011161
Slc31a1	ENSRNOG00000014475
Slc38a3	ENSRNOG00000016827
Slc43a3	ENSRNOG000000061768
Slc46a1	ENSRNOG00000010291
Slc4a10	ENSRNOG00000005307
Slc4a2	ENSRNOG00000014347
Slc4a3	ENSRNOG00000020138
Slc4a5	ENSRNOG00000010378
Slc5a5	ENSRNOG00000018822
Slc6a17	ENSRNOG000000050090
Slc7a8	ENSRNOG00000014311
Slc9a3r1	ENSRNOG00000003232
Slco1a2	ENSRNOG000000031249
Slco1c1	ENSRNOG00000009740
Slco3a1	ENSRNOG000000032798
Smo	ENSRNOG00000008332
Sod3	ENSRNOG00000003869

Sorbs2	ENSRNOG00000013391
Sostdc1	ENSRNOG00000005770
Sparcl1	ENSRNOG00000015093
Spart	ENSRNOG00000014155
Spcs1	ENSRNOG00000018075
Steap2	ENSRNOG00000006076
Stk39	ENSRNOG00000024808
Ston1	ENSRNOG00000016688
Stpg1	ENSRNOG00000031448
Stra6	ENSRNOG00000008312
Strip2	ENSRNOG00000057729
Stt3a	ENSRNOG00000031896
Sulf1	ENSRNOG00000009037
Susd3	ENSRNOG00000016525
Syde1	ENSRNOG00000007307
Synm	ENSRNOG00000014030
Synpo2	ENSRNOG00000014867
Synpo2l	ENSRNOG00000008949
Tagln	ENSRNOG00000017628
Tax1bp3	ENSRNOG00000019357
Tcaf1	ENSRNOG00000017911
Tead1	ENSRNOG00000015488
Tekt1	ENSRNOG00000014973
Tenm3	ENSRNOG00000012802
Tenm4	ENSRNOG00000011151
Tex15	ENSRNOG00000007748
Tgfbr3	ENSRNOG00000002093
Thbs2	ENSRNOG00000010529
Timp3	ENSRNOG00000004303
Tinagl1	ENSRNOG00000013179
Tjp1	ENSRNOG00000011077
Tjp3	ENSRNOG00000020501
Tlr12	ENSRNOG00000042455
Tm4sf1	ENSRNOG00000015812
Tm9sf2	ENSRNOG00000012751
Tmed4	ENSRNOG00000005016
Tmed7	ENSRNOG00000003691
Tmem108	ENSRNOG00000010911
Tmem115	ENSRNOG00000021899
Tmem18	ENSRNOG00000005144
Tmem258b	ENSRNOG00000032740
Tmem37	ENSRNOG00000047714
Tmem47	ENSRNOG00000030418

Tmem59	ENSRNOG00000009778
Tmem72	ENSRNOG00000023340
Tmem86a	ENSRNOG00000013663
Tmem9	ENSRNOG00000010204
Tmem98	ENSRNOG00000021316
Tmtc1	ENSRNOG00000001854
Tns1	ENSRNOG00000014182
Tor1a	ENSRNOG00000006894
Tp53i11	ENSRNOG00000008738
Tp73	ENSRNOG00000024707
Tpm1	ENSRNOG00000018184
Tpm2	ENSRNOG00000016731
Trarg1	ENSRNOG00000022239
Trim2	ENSRNOG00000010124
Trpm3	ENSRNOG00000027770
Trpv4	ENSRNOG00000001195
Tspan12	ENSRNOG00000059016
Tspan18	ENSRNOG00000008758
Tspan31	ENSRNOG00000025592
Tspan33	ENSRNOG00000007900
Tspan6	ENSRNOG00000003786
Tspan7	ENSRNOG00000003229
Ttc9	ENSRNOG00000007254
Ttr	ENSRNOG00000016275
Twsg1	ENSRNOG00000013340
Ugt1a6	ENSRNOG00000018740
Vat1l	ENSRNOG00000011989
Vav3	ENSRNOG00000020485
Vwa3a	ENSRNOG00000025110
Vwa3b	ENSRNOG00000023566
Wdr66	ENSRNOG00000001342
Wdr78	ENSRNOG00000006999
Wfikkn2	ENSRNOG00000002831
Wipf3	ENSRNOG00000009571
Wls	ENSRNOG00000036816
Wnk2	ENSRNOG00000016684
Wwc1	ENSRNOG00000008065
Xcr1	ENSRNOG00000006620
Yap1	ENSRNOG00000005933
Zcchc18	ENSRNOG00000055939
Zfp366	ENSRNOG00000017249
Zfp462	ENSRNOG00000032048
Zfp521	ENSRNOG00000016874

Zic1	ENSRNOG00000014644
Zic2	ENSRNOG00000054879
Zic3	ENSRNOG00000000861
Zic4	ENSRNOG00000014871

Supplemental Table 9: MAGICTRICKS enriched factors for female compared to male cervical spinal cord microglia differentially expressed genes.

Upregulated		Downregulated	
Factor	Score	Factor	Score
ARID3A	4.81385106	BCL3	0.969566372
ATF1	1.822492349	BCLAF1	2.56135347
ATF2	4.921842614	CEBPD	1.875880359
BACH1	0.66215781	CHD1	2.481741957
BATF	13.70087135	CHD2	2.76737095
BCL11A	6.20457689	CREB1	1.572148181
BCL3	0.58406837	E2F4	1.081074435
BHLHE40	3.630335255	ELF1	7.721253513
BRF2	0.206695118	ELK1	4.442388418
CBX3	0.795476655	ELK4	2.944762768
CCNT2	1.797776675	ETS1	7.571632045
CEBPA	8.303332292	GABPA	9.60561145
CEBPD	1.109799573	GTF2B	3.149525343
CHD1	3.727783777	GTF2F1	4.3634131
CHD2	1.617481456	HDAC1	2.068341565
COREST	1.454553945	IRF1	6.493353161
CREB1	1.615878998	KDM5A	2.979372424
E2F1	3.817771743	MAX	2.948975468
E2F4	1.103093562	MAZ	0.940289924
EBF1	1.514288543	MTA3	1.00086769
EGR1	1.283647606	MXI1	3.495067703
ESR1	1.751846503	MYBL2	1.036059602
FOS	5.029889539	MYC	2.326662345
FOSL2	8.14127898	NFATC1	0.788098479
FOXA1	11.33797476	NFKB	2.207328646
FOXA2	8.775241618	NRF1	3.184886026
FOXM1	3.546484161	PHF8	10.67908877
FOXP2	2.259622746	PLU1	8.715686797
GATA2	7.651280489	PML	3.781403764
GATA3	7.383623121	POLR2A	8.454734055
HMGN3	1.50029833	POU2F2	2.930976243
HNF4A	1.608090584	RBBP5	0.984370472
HNF4G	1.442957337	REST	1.817588528
IKZF1	3.700833262	RFX5	0.961524404
IRF4	5.586409888	SAP30	2.552622812
JUN	7.467229334	SIN3A	1.949610487
JUNB	1.57128127	SIN3AK20	3.9389687
JUND	4.263082389	SIX5	5.583113441
KAP1	2.764387406	SP1	1.727102055
MAFF	8.136511892	SP2	2.342686383
MAFK	14.40545745	SP4	3.137550092
MAZ	1.739661629	SRF	1.260533765
MEF2A	7.916587549	TAF1	11.36585631
MEF2C	3.744485511	TAF7	3.797928121
MTA3	2.520479952	TBLR1	0.673502549

MYBL2	0.926234624	TBP	8.980270968
NFATC1	2.139494458	TCF3	1.726247054
NFIC	8.278790298	THAP1	2.969074169
NFKB	1.747829326	WRNIP1	1.514050197
NR2F2	1.65840408	YY1	5.648218299
NR3C1	2.469010621	ZBTB33	1.886066544
P300	4.512311573	ZNF143	3.447310168
PAX5	3.020996496		
PHF8	1.192893792		
PLU1	1.450134498		
PML	1.669178873		
POLR2A	1.365429156		
POU2F2	2.342065997		
POU5F1	0.943437335		
RAD21	1.753905328		
RBBP5	2.010306175		
REST	1.126854754		
RUNX3	7.780836231		
SPI1	11.40866025		
SPT20	1.242621667		
STAT3	8.196320501		
STAT5A	2.127102137		
TAF1	2.311310588		
TAF7	0.544170456		
TAL1	8.895840155		
TBLR1	2.176903425		
TBP	1.692589103		
TCF12	1.420633779		
TCF7L2	4.690063492		
TEAD4	7.011410235		
TFAP2A	1.492397135		
TFAP2C	1.729519005		
TRIM28	1.790173755		
UBTF	3.075756198		
YY1	1.76657837		
ZNF217	1.992846555		
ZNF263	0.828035672		

Supplemental Table 10: MAGICTRICKS enriched factors for male cervical spinal cord compared to brainstem microglia differentially expressed genes.

Upregulated		Downregulated	
Factor	Score	Factor	Score
ATF2	2.138419459	CEBPB	0.999076002
ATF3	0.882182995	CTBP2	1.350335902
BACH1	0.839580819	ESR1	1.717178524
BCL11A	1.571649284	EZH2	15.50459924
BCL3	2.304812115	FOS	1.544726807
BCLAF1	0.742008176	FOSL2	2.637315721
BHLHE40	3.946517871	FOXA1	4.184048961
CCNT2	1.120400794	FOXA2	3.329289695
CEBPB	1.902222931	GATA2	3.980810801
CEBPD	2.484050816	GATA3	1.290417459
CHD1	1.066842232	HNF4A	0.965053811
COREST	1.478100193	JUN	1.75843419
CTBP2	1.310742501	MAFF	1.708240973
CTCF	1.363416154	MAFK	4.050671765
CTCFL	1.524852306	NR3C1	1.545868093
EBF1	5.072657364	P300	3.356893135
EGR1	2.609487697	RAD21	4.121712007
EZH2	1.707385624	SMC3	2.234648431
FOSL2	2.183654456	STAT3	1.822764826
FOXM1	1.403525878	TCF7L2	1.060642371
GTF2B	0.87620356	TEAD4	1.864051136
GTF2F1	0.941914991	ZNF217	0.933561834
HDAC2	1.359700339		
HMG3	0.666626455		
JUND	1.32616669		
MAZ	1.848557181		
MBD4	1.02736652		
MEF2A	1.809127606		
MEF2C	2.221719925		
MTA3	1.855191927		
MYC	2.015921413		
NFATC1	2.326264179		
NFIC	1.078754874		
NFKB	2.848896277		
NR3C1	2.743075328		
P300	1.021724251		
PAX5	2.076016188		
PLU1	1.466638731		
PML	1.375246464		
POLR2A	2.530453019		
POU2F2	2.18598852		
RAD21	1.609309905		
RUNX3	1.364683795		
SMC3	2.25975271		
SPI1	2.386385311		

SREBP1	0.429220459
STAT5A	1.817840367
SUZ12	0.717708413
TAF1	1.183328593
TAF7	0.897308096
TBLR1	1.29181834
TBP	3.14017351
TCF12	1.404374152
TCF3	4.103226935
TCF7L2	1.014977841
USF1	1.908619226
USF2	1.622763398
WRNIP1	1.226837206
ZBTB7A	2.504796644
ZKSCAN1	0.77064469
ZNF263	2.400100647

Supplemental Table 11: MAGICTRICKS enriched factors for female cervical spinal cord compared to brainstem microglia differentially expressed genes.

Upregulated		Downregulated	
Factor	Score	Factor	Score
ATF1	1.219149212	EZH2	7.947027601
ATF2	3.897453009		
ATF3	0.993971701		
BACH1	2.092298431		
BATF	1.380371216		
BCL11A	1.951687452		
BCL3	4.30073552		
BCLAF1	1.773948357		
BHLHE40	3.528563943		
CCNT2	2.561894376		
CEBPB	2.552816338		
CEBPD	4.510680367		
CHD1	5.072213357		
CHD2	3.471851368		
COREST	2.67072069		
CREB1	2.476780583		
CTCF	1.408413354		
CTCFL	1.861744651		
E2F1	2.998692574		
E2F4	1.063709216		
EBF1	6.08160565		
EGR1	4.965290065		
ELK1	0.950315989		
ESR1	0.964125474		
FOSL2	2.826304932		
FOXM1	3.245418276		
FOXP2	1.118594967		
GTF2B	2.805736812		
GTF2F1	3.165820362		
HDAC2	0.893605651		
HMG3	1.513895101		
HNF4A	0.919992145		
HNF4G	1.9821329		
IRF1	0.895025271		
IRF4	0.801130229		
JUN	1.809587211		
JUNB	1.65434563		
JUND	2.272545607		
MAX	1.478142985		
MAZ	4.648095007		
MBD4	0.897918805		
MEF2A	2.481487138		
MEF2C	2.544706089		
MTA3	2.67544897		
MYBL2	0.841814362		

MYC	2.721056726
NELFE	1.305628345
NFATC1	4.519456208
NFIC	1.123340876
NFKB	5.772244407
NFYA	1.489302464
NFYB	1.197427287
NR2F2	0.997750121
NR3C1	2.022938369
P300	1.735804177
PAX5	3.653119165
PBX3	3.565533501
PLU1	4.3566667
PML	2.113590165
POLR2A	5.619523229
POU2F2	5.33469877
REST	1.207932049
RFX5	2.008331673
RUNX3	3.195886631
RXRA	0.83073488
SIN3AK20	0.978951674
SMC3	1.475590684
SP1	2.077586853
SP4	0.8338993
SPI1	6.501712798
SRF	1.536772143
STAT1	0.679748302
STAT3	1.272402831
STAT5A	1.538070152
TAF1	2.576815062
TAF7	2.735491587
TBLR1	2.940384764
TBP	5.770745857
TCF12	2.749697798
TCF3	7.878002232
TCF7L2	1.80036021
TEAD4	1.16679475
TFAP2A	2.436556412
TFAP2C	2.900690539
UBTF	2.631907173
USF1	1.026490791
USF2	1.744160553
WRNIP1	2.229109789
YY1	1.108339503
ZBTB33	1.533876173
ZBTB7A	5.122020635
ZEB1	1.027483842

ZKSCAN1	0.820766194
ZNF263	2.625234733